ROTANTA 460 / 460 R / 460 RC / 460 RF

Inhalt des Dokuments / content of the document

Operating instructions (EN)

Rotoren und Zubehör / Rotors and accessories

Operating instructions

ROTANTA 460 / 460 R / 460 RC / 460 RF

Translation of the original operating instructions

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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
[Buttons]	Controls (for example: buttons, switches)
'Indicator'	Indicator elements (for example: signal lights, screen elements)

2 Safety

2.1 Intended use

Intended use

This device is a laboratory centrifuge suitable for medical applications.

Their exclusive therapeutic purpose is to centrifuge blood in blood bag systems. The separated blood components are transferred by another device (separator) into corresponding satellite bags. The individual components obtained in this way are then used for transfusion or autotransfusion.

The centrifuge is only to be operated by qualified personnel working for blood donation services or hospitals.

The centrifuge is only intended for the uses referred to above.

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.

Intended use also includes the observation of all instructions in the user manual and compliance with the required inspection and maintenance intervals.

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 microbiologically 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	ROTANTA 460	
Type	5650	5650-01
Mains voltage (±10%)	200-240 V 1~	100-127 V 1~
Mains frequency	50-60 Hz	50-60 Hz
power consumption	1000 VA	1100 VA
Power consumption	5.0 A	11.0 A
max. capacity	4 x 1000 ml	
max. permissible density	1.2 kg/dm³	
max. speed (RPM)	15000	
max. acceleration (RCF)	24400	
max. kinetic energy	41000 Nm	
Obligation to perform checks (DGUV Rules 100-500) (valid only in Germany)	yes	

Ambient conditions (EN / IEC 61010-1):				
Installation site	indoors only			
Altitude	up to 2000 m above sea level			
Ambient temperature	2 °C to 35 °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)	≤68 dB(A)			
Dimensions:				
Width	554 mm			
Depth	706 mm		715 mm	
Altitude	456 mm			
Weight	approx. 101 kg		approx. 111 kg	
Manufacturer	Andreas Hettich GmbH & Co. KG, D-78532 Tuttlingen			
Model	ROTANTA 460 R			
Type	5660 5660-50	5660-20 5660-70	5660-07	5660-77
Mains voltage (±10%)	200-240 V 1~		200-240 V 1~	
Mains frequency	50 Hz		60 Hz	
power consumption	1800 VA		1900 VA	
Power consumption	8.5 A		9.2 A	
Refrigerant	R452A			
max. capacity	4 x 1000 ml			
max. permissible density	1.2 kg/dm³			

max. speed (RPM)	15000			
max. acceleration (RCF)	24400			
max. kinetic energy	51000 Nm			
Obligation to perform checks (DGUV Rules 100-500) (valid only in Germany)	yes			
Ambient conditions (EN / IEC 61010-1):				
Installation site	indoors only			
Altitude	up to 2000 m above sea level			
Ambient temperature	5 °C to 35 °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			
Noise level (rotor-dependent)	≤66 dB(A)			
Dimensions:				
Width	770 mm			
Depth	706 mm	723 mm	706 mm	723 mm
Altitude	456 mm	481 mm	456 mm	481 mm
Weight	approx. 141 kg			
Manufacturer	Andreas Hettich GmbH & Co. KG, D-78532 Tuttlingen			
Model	ROTANTA 460 R			ROTANTA 460 RC
Type	5660-01 5660-51			5670 5670-50
Mains voltage (±10%)	100-127 V 1~	100 V 1~		200-240 V 1~

Mains frequency	50 Hz	50 Hz	50 Hz
power consumption	max. 2000 VA		1800 VA
Power consumption	-		8.5 A
Refrigerant	R452A		
max. capacity	4 x 1000 ml		
max. permissible density	1.2 kg/dm³		
max. speed (RPM)	15000		
max. acceleration (RCF)	24400		
max. kinetic energy	51000 Nm		
Obligation to perform checks (DGUV Rules 100-500) (valid only in Germany)	yes		
Ambient conditions (EN / IEC 61010-1):			
Installation site	indoors only		
Altitude	up to 2000 m above sea level		
Ambient temperature	5 °C to 35 °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	FCC Class B		EN / IEC 61326-1 Class B
Noise level (rotor-dependent)	≤66 dB(A)		≤68 dB(A)
Dimensions:			
Width	7700 mm		554 mm
Depth	715 mm		697 mm

Altitude	456 mm		683 mm
Weight	approx. 151 kg		approx. 140 kg
Manufacturer	Andreas Hettich GmbH & Co. KG, D-78532 Tuttlingen		
Model	ROTANTA 460 RF		
Type	5675 5675-50	5675-01 5675-51	
Mains voltage (±10%)	200-240 V 1~	100-127 V 1~	100 V 1~
Mains frequency	50 Hz	60 Hz	50 Hz
power consumption	1800 VA	max. 2000 VA	
Power consumption	8.5 A		
Refrigerant	R452A		
max. capacity	4 x 1000 ml		
max. permissible density	1.2 kg/dm³		
max. speed (RPM)	15000		
max. acceleration (RCF)	24400		
max. kinetic energy	51000 Nm		
Obligation to perform checks (DGUV Rules 100-500) (valid only in Germany)	yes		
Ambient conditions (EN / IEC 61010-1):			
Installation site	indoors only		
Altitude	up to 2000 m above sea level		
Ambient temperature	5 °C to 35 °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)	≤68 dB(A)	
Dimensions:		
Width	554 mm	
Depth	697 mm	
Altitude	961mm	
Weight	approx. 164 kg	approx. 174 kg

Rating plate

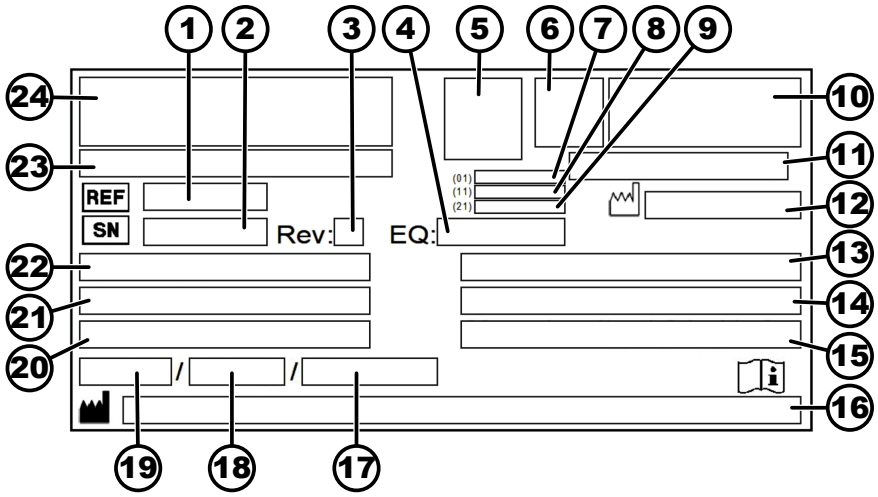


Fig. 1: Rating plate

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

CE 0483

Device conformity according to EU directives.

Notified body:

mdc medical device certification GmbH – Notified Body CE 0483

Tel: +49 (0)711 253597 0

Fax: +49 (0)711 258597 10

E-mail: mdc@mdc-ce.de

Website: www.mdc-ce.de

Address: Kriegerstrasse 6, D-70191 Stuttgart, Germany

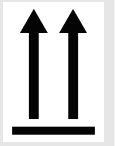
Single Registration Number

SRN: DE-MF-000010680

Basic-UDI-DI

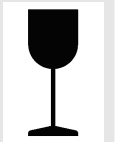
Basic-UDI-DI	Device assignment
040506740100039N	ROTANTA 460 / 460R / 460RC / 460RF (medical device)

3.3 Important labels on the packaging



TOP

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

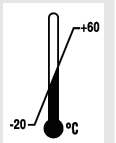


FRAGILE GOODS

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%).

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.

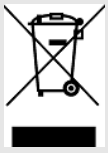
Biohazard warning.

Warning: hot surface.

Failure to observe this warning may result in damage to property and/or personal injury.

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).

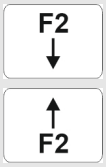
Use in European Union countries, Norway and Switzerland.

The centrifuge is equipped with an RS232 interface.

The RS232 interface is marked with a symbol.

The centrifuge can be controlled and data retrieved via the interface. The *[PROG]* button lights up during data communication.

	Equipotential: Connector (PE plug) for equipotential bonding (only for centrifuges with a PE plug).

	Automatic circuit breaker

3.5 Operating and indicator elements

3.5.1 Control

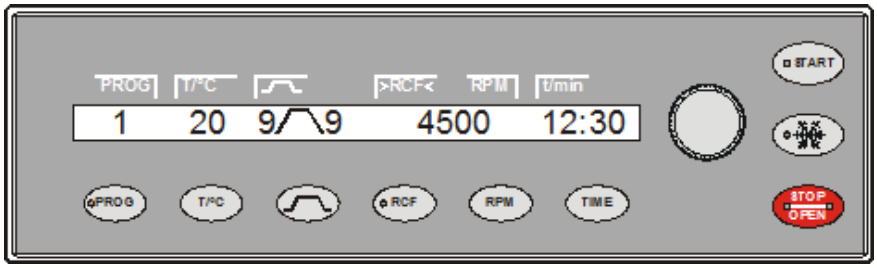


Fig. 2: Control (device with cooling)

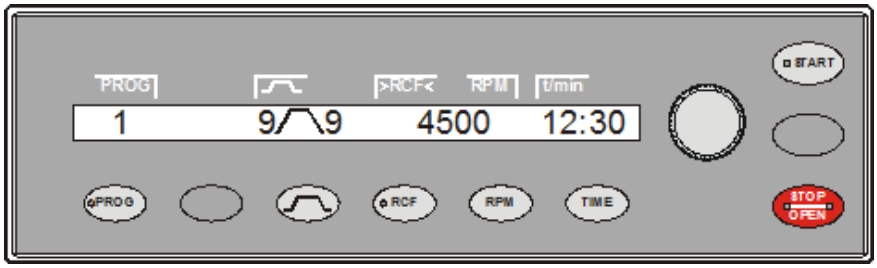


Fig. 3: Control (device without cooling)

3.5.2 Indicator elements

Fig. 4: [Cooling] button

- The button flashes until the rotor is read in.
- The button lights up during the centrifugation run to pre-cool the rotor for as long as the rotor is not yet at a standstill.

Fig. 5: [PROG] button

- The button lights up when data communication is taking place.

Fig. 6: [RCF] button

- The button lights up when the RCF is displayed.

Fig. 7: [START] button

- The button flashes until the rotor is read in.
- The button lights up during the centrifugation run for as long as the rotor is not yet at a standstill.

Fig. 8: [STOP/OPEN] button

- The right side of the button lights up when the centrifuge is in ramp-down. The rotor has not yet stopped.
- The left side of the button lights up when the rotor is stationary.
- The light on the left side of the button goes out when the lid is unlocked.

3.5.3 Controls

Fig. 9: [Rotary knob]

- Setting the individual parameters.
  Turning anticlockwise decreases the value.
  Turning clockwise increases the value.

Fig. 10: [Mains switch]

- Switch the device on and off.

Fig. 11: [Ramp-up and ramp-down parameters] button

- Ramp-up levels, parameters
  Level 9 = shortest ramp-up time, Level 1 = longest ramp-up time.
- Ramp-up time, parameters
  Adjustable in 1 second increments.
- Brake levels, parameters
  1-9 = Linear braking curve
  1b-9b = similar to an exponential braking curve
  Level 9, 9b = shortest ramp-down time, ...Level 1, 1b = long ramp-down time, Level 0 = unbraked ramp-down.
- Ramp-down time, parameters
  Adjustable in 1 second increments.
- Brake cut-off speed, parameter N Brake
  Adjustable from 50 RPM to the maximum rotor speed (N_{max}), in increments of 10. Unbraked ramp-down takes place after reaching this speed.

Fig. 12: [Cooling] button

- Start centrifugation run to pre-cool the rotor (only for devices with cooling).
- Centrifugation run, for pre-cooling of the rotor, takes place automatically with the PREC program (PRECOOLING).

Fig. 13: [PROG] button

- Retrieve programs and program links, parameter RCL (Recall).
  Programs: Program locations 1 to 99. Program links: Program locations A to Z.
- Save programs and program links, parameter STO (Store).
  99 programs can be stored (program locations 1 to 99).
  Program location 0 serves as a buffer for the centrifugation data of the last centrifugation run. No programs can be stored in this program location.
  25 program links can be stored (program locations A to Z, program location J does not exist). A program link can consist of 20 programs.

- Link programs, parameter EDIT.
- Open the *'Machine Menu'*.
- Scroll forward in the menus.

Fig. 14: [RCF] button

- Relative centrifugal force, parameter RCF.
  The RCF is displayed in brackets ⟩ ⟨.
  A numerical value can be set that gives a speed between 50 RPM and the maximum rotor speed (Nmax).
  Adjustable in 1 second increments.
- Centrifuging radius, parameter RAD.
  Adjustable from 10 mm to 330 mm, in 1 millimetre increments.
- Querying the integral RCF.
  The integral RCF can only be queried if the integral RCF indicator is enabled.
- Switch to RCF value.

Fig. 15: [RPM] button

- Speed, parameter RPM.
  Adjustable from 50 RPM to the maximum rotor speed (N_{max}), in increments of 10.
- Switch to RPM value.

Fig. 16: [START] button

- Start centrifugation runs.
- Save entries and changes.
- Go to *'Machine Menu'* and open the submenus.

Fig. 17: [T/°C] button

- Temperature (for centrifuges with cooling)
  Adjustable in degrees Celsius (°C) or degrees Fahrenheit (°F).
  Parameter T/°C=degrees Celsius (°C). Adjustable from -20°C to +40°C, in 1°C increments.
  Parameter T/°F=degrees Fahrenheit (°F). Adjustable from -4°F to +104°F, in 1°F increments.
  The lowest achievable temperature is rotor dependent.
- Temperature (for centrifuges with heating)
  Enable or disable heating, parameter Heater.
- Scroll backward in the menus (the button is blank for centrifuges without cooling).

Fig. 18: [TIME] button

- Runtime, parameter t/hms.
  h: Hours. from 1 h to 99 h, in 1 hour increments.
  m: Minutes. from 1 min to 59 min, in 1 minute increments.
  s: Seconds. from 1 s to 59 s, in 1 second increments.
- Continuous operation "∞"
- Set the start of the runtime count.

Fig. 19: [STOP/OPEN] button

- End the centrifugation run.
  The rotor coasts to a stop with the preselected ramp-down parameter.
- Pressing the button twice triggers the quick stop function.
- Unlock the lid.
- Exit parameter input and the menus.

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 grease for the trunnions
- 1 Hex key (5 mm x 170)
- 1 right-angled hex key (2.5 mm)
- 1 6-lobe (Torx) pin key wrench, short (T20 SG)

- 1 power cable
- 1 user manual
- 1 instruction sheet, transport lock

Additionally for device with nitrogen:

- 1 instruction sheet for nitrogen connection
- 1 cartridge application gun
- 1 silicone

Additionally for type 5675:

- 1 single-end open-ended spanner 10 mm AF
- 1 double-end open-ended spanner 17/19 mm AF

Additionally for delivery in Germany:

- 1 inspection book

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 22*. 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

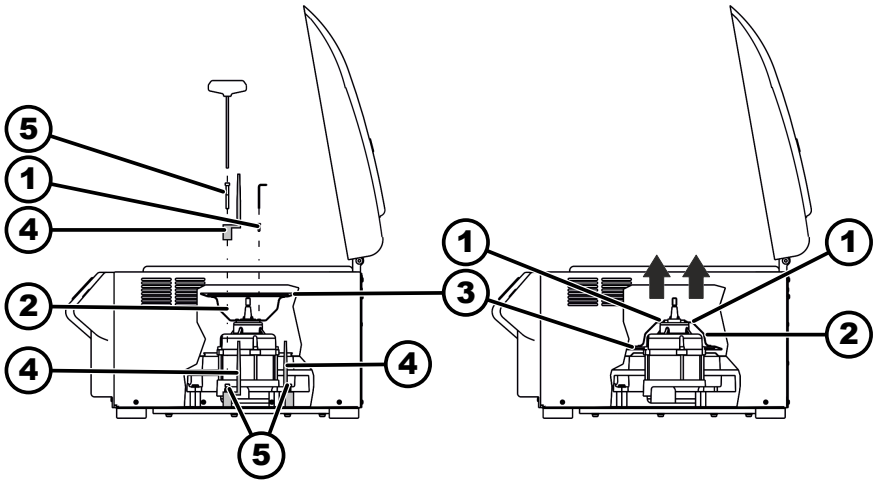


Fig. 20: Transport lock ROTANTA 460

1 Screws
2 Motor cover
3 *Bellows (only for centrifuges with cooling)
4 Transport lock
5 Transport lock screws

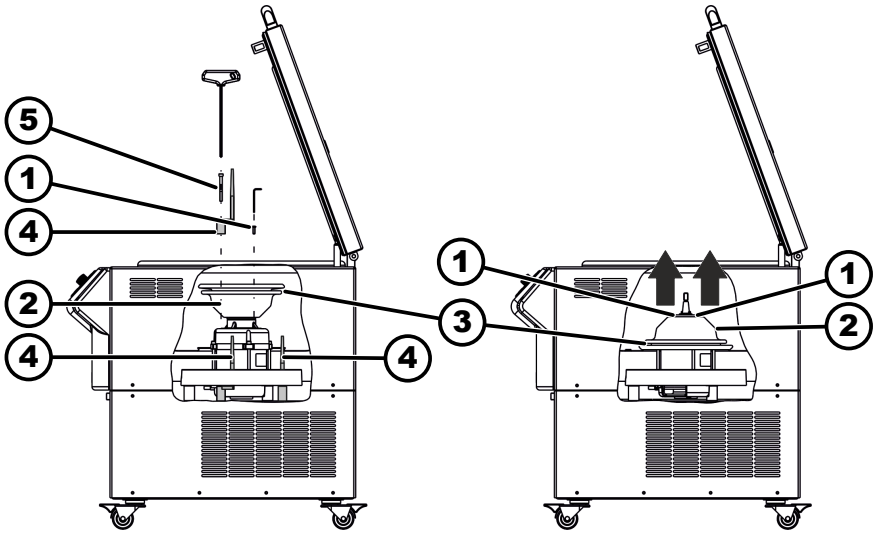


Fig. 21: Transport lock ROTANTA 460 RC

1 Screws
2 Motor cover
3 Bellows
4 Transport lock
5 Screws for transport lock

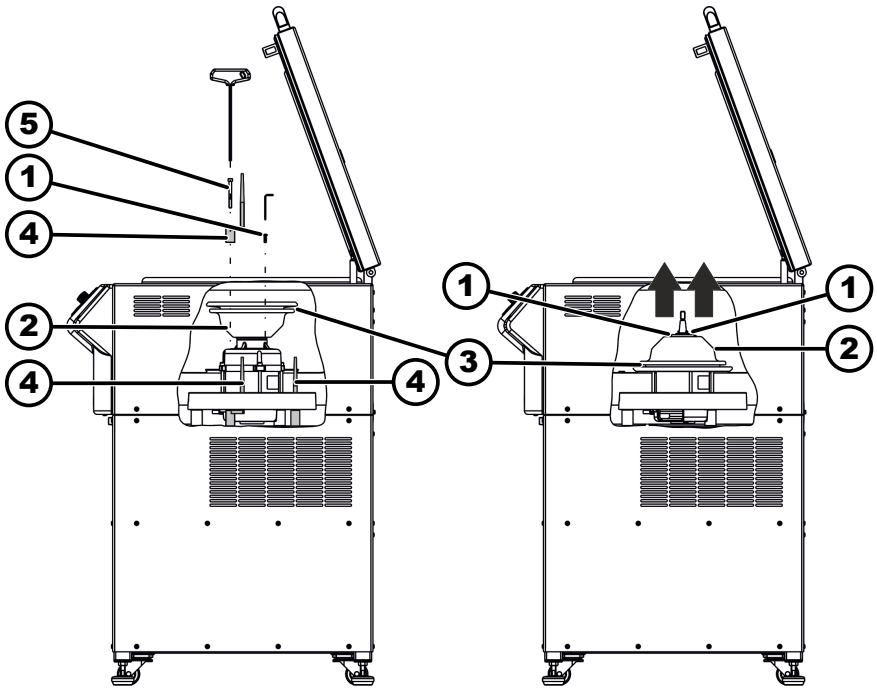


Fig. 22: Transport lock ROTANTA 460 RF

1 Screws
2 Motor cover
3 Bellows
4 Transport lock
5 Screws for transport lock

1. Open the lid.
2. Unscrew the motor cover (*2*).
3. For ROTANTA 460 R / RC / RF:
   Remove the bellows (*3*).
4. 3 Screw on the transport locks (*4*) using the 3 screws of the transport lock (*5*).
5. Turn over the motor cover (*2*) and insert it.
6. Screw in 4 screws (*1*).
7. For ROTANTA 460 R / RC / RF:
   Put the bellows (*3*) over the edge of the engine cover (*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 10*.

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.

Unpacking 5670

Personnel:

- Trained user

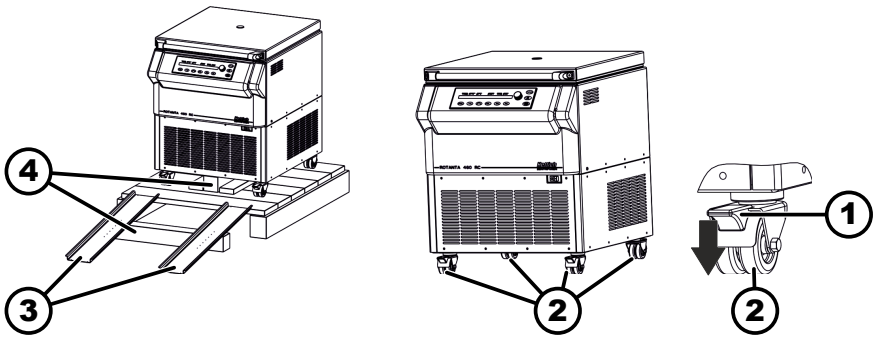


Fig. 23: Unpacking 5670

1 Brake
2 Castors
3 Metal rail
4 Wooden beams

1. Remove the packaging.
2. Remove the wooden beam (*4*).
3. Attach the metal rails (*3*) to the wooden pallet using two nails each.
4. Slide the wooden beam (*4*) under the metal rails (*3*) to support them.
5. Push up the brake (*1*) on the castors (*2*) to release it.
6. Carefully roll the centrifuge off the wooden pallet over the metal rails (*3*).
7. Push the centrifuge to its installation location.
8. Push the brake (*1*) on the castors (*1*) down to lock it.

Unpacking 5675

Personnel:

- Trained user

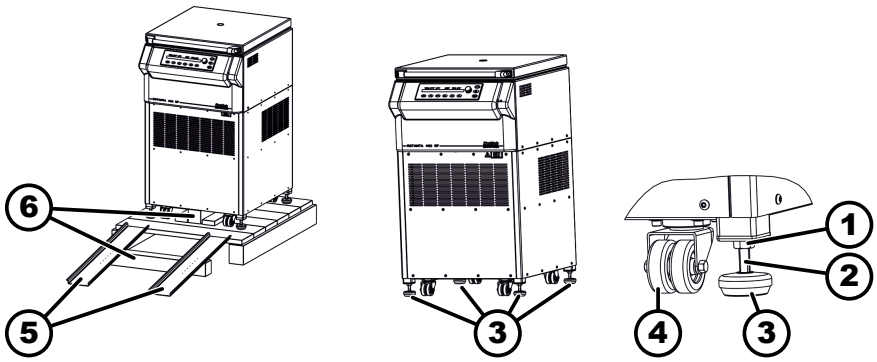


Fig. 24: Unpacking 5675

1 Hexagon nut
2 Flat
3 Device feet
4 Castor
5 Metal rail
6 Wooden beams

1. Remove the packaging.
2. Remove the wooden beam (*6*).
3. Attach the metal rails (*5*) to the wooden pallet using two nails each.
4. Slide the wooden beam (*6*) under the metal rails (*5*) to support them.
5. Place an open-end spanner (size 10 mm) on the surfaces (*2*) and turn the device feet (*3*) upwards as far as possible.
6. Carefully roll the centrifuge off the wooden pallet over the metal rails (*5*).
7. Push the centrifuge to its installation location.
8. Place the open-end spanner (size 10 mm) on the flats (*2*) and turn the device feet (*3*) down until the castors (*4*) are no longer in contact with the ground.
9. Align the centrifuge so it is horizontal by turning the device feet (*3*).
10. Turn the hexagon nuts (*1*) upwards using the open-end spanner provided (size 19 mm) and screw them in to lock the device feet in position (*3*).

5.2 Remove the transport lock

Personnel:

- Trained user

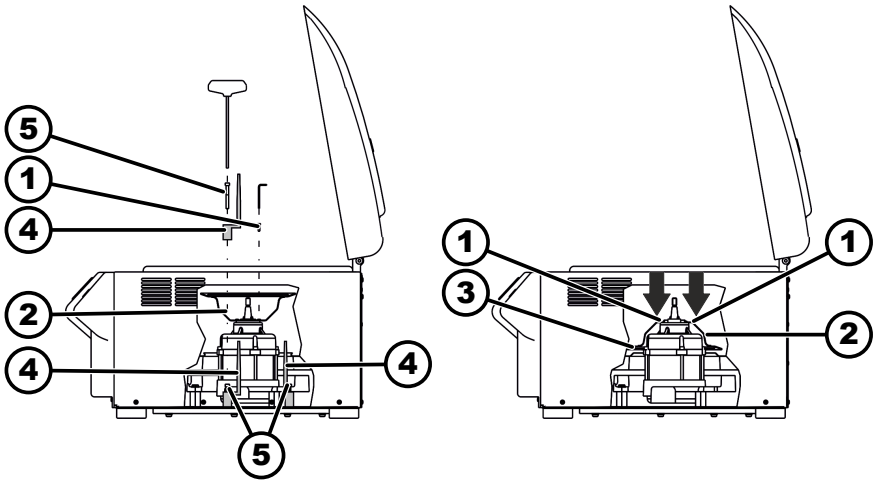


Fig. 25: Transport lock ROTANTA 460

1 Screws
2 Motor cover
3 *Bellows (only for centrifuges with cooling)
4 Transport lock
5 Transport lock screws

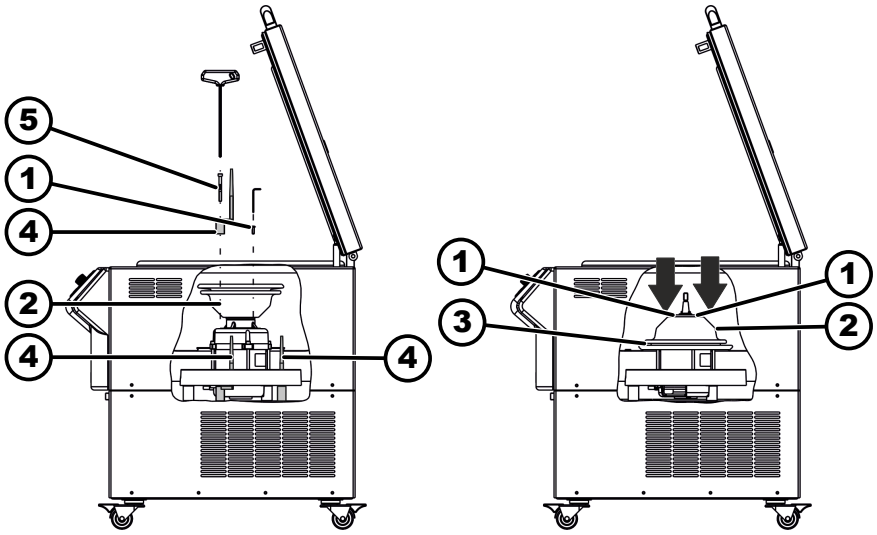


Fig. 26: Transport ROTANTA 460 RC

1 Screws
2 Motor cover
3 Bellows
4 Transport lock
5 Screws for transport lock

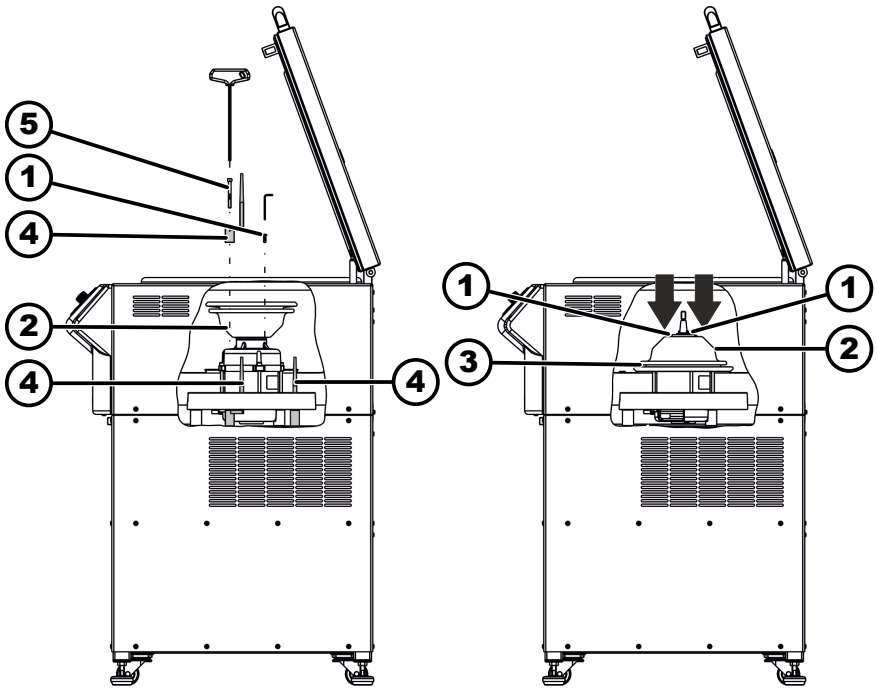


Fig. 27: Transport ROTANTA 460 RF

1 Screws
2 Motor cover
3 Bellows
4 Transport lock
5 Screws for transport lock

1. Open the lid.
2. Unscrew 4 screws (*1*).
3. Remove the motor cover (*2*).
4. 3 Unscrew the transport locks (*4*) using the 3 screws of the transport lock (*5*).
5. Keep the screws and transport locks in a safe place.
6. Turn over the motor cover (*2*) and insert it. Note the recess for the cable.
7. For ROTANTA 460 R / RC / RF:

   Push the bellows (*3*) over the edge of the centrifuging chamber.
8. Screw in 4 screws (*1*).

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 10*).

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.

Connecting the centrifuge to a nitrogen supply

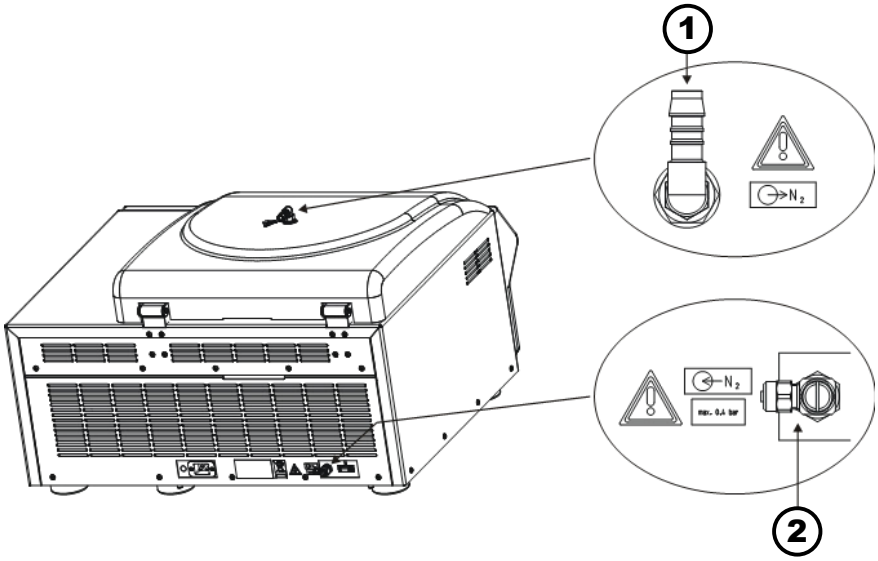
Valid only for model with nitrogen supply.

- A monitoring device for the oxygen concentration must be used, with an additional limit switch-off, to ensure that no ignitable mixture is created in the centrifuge.
- The operator must arrange for the "centrifuge and monitoring device" application to be approved by an accredited testing institute (e.g. TÜV in Europe), in accordance with Annex II of Directive 94/9/EC (ATEX-95). This also includes specifying the substances used, the type of ignition protection and the preparation of a risk assessment.
- The system is used at the operator's risk.
- Special instructions on the leak-tightness of the centrifuge parts with regard to nitrogen flushing. The operator must ensure the leak-tightness and functionality of the following interfaces:
  - Seal between the lid and the centrifuging chamber.
  - Seal between the centrifuging chamber and the motor cover.
  - Leak-tightness of the inlet and outlet connections for nitrogen inerting.

Personnel:

- Trained user

1. The centrifuge is prepared for connection to a nitrogen supply.



1 Nitrogen outlet
2 Nitrogen inlet, throttle valve

2. The nitrogen inlet (*2*) is located at the back of the machine and is connected via a pneumatic quick-release fitting with a 6 mm pneumatic hose.
3. The nitrogen outlet (*1*) is located on the lid and is connected via a 12 mm hose connection. Attach the hose onto the screw-in fitting.
4. Check whether the mains voltage matches the specification on the rating plate.
5. Connect the device to a standard mains socket using the mains cable.

Monitoring the nitrogen flow

The operator is responsible for monitoring the nitrogen flow.

Technical conditions

Nitrogen inlet: pressure upstream of the throttle valve, 0.4 bar.

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 following indicators appear one after the other, depending on the centrifuge type:

- the centrifuge model
- the program version and mains voltage
- the rotor code (Rotor), the maximum rotor speed (Nmax) and the centrifuging radius (R) of the last rotor recognised by the rotor detection.

  The centrifuging radius displayed is a default value that must be adjusted depending on the accessories used.
- When the lid is closed: *'OPEN OEFFNEN'* indicator
- When the lid is open: The centrifugation data of the last program used or program 1.

Immediate display of centrifugation data after switching on

1. Set the mains switch to *[I]*.
2. Press and hold any button at the first visual change in the display (inverse display).
   ➡ Centrifugation data is displayed.

Switching off the centrifuge

The rotor is stationary.

Set the mains switch to *[0]*.

6 Operation

6.1 Opening and closing the lid

Opening the lid

Personnel:

- Trained user

The centrifuge is switched on

The rotor is stationary.

Press the *[STOP/OPEN]* button.

➡ The lid unlocks by means of a motor.

The light on the left side of the *[STOP/OPEN]* button goes out.

Closing the lid

CAUTION

Danger of crushing when closing the lid.

Danger of crushing fingers when the closing motor pulls the lid against the seal.

- No parts of the body should be in the hazard zone of the lid when closing the lid.
- To close the lid, press on the lid from above.

NOTICE

Damage to the device caused by the lid slamming.

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

When the left side of the [STOP/OPEN] button flashes, press the [STOP/OPEN] button so that the motorised lid lock assumes the home position (open).

Personnel:

- Trained user

Close the lid and press the front edge of the lid down gently.

➡ The lid locks using a motor.

The left side of the *[STOP/OPEN]* button lights up.

6.2 Removing and installing the rotor

Removing the rotor with a clamping nut

Personnel:

- Trained user

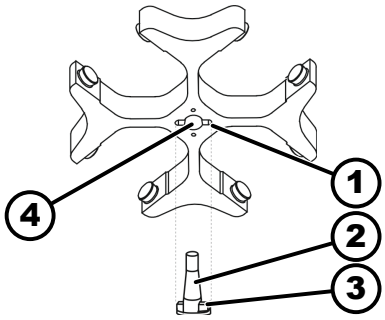


Fig. 28: Rotor installation and removal

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 63*.
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.

6.3 Inserting and removing buckets

Inserting buckets

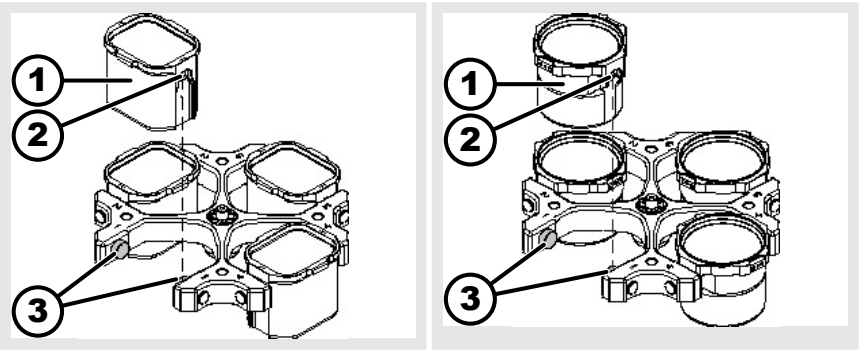
NOTICE

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.



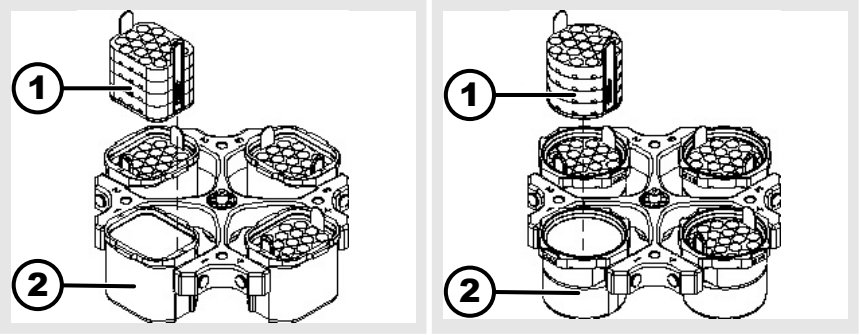
1. Check that the rotor is firmly seated.
2. Grease the trunnions (3).
3. Insert the bucket (1) into the rotor from above. The trunnions (3) must be in the grooves (2).
4. Push the bucket (1) down as far as it will go.

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).

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

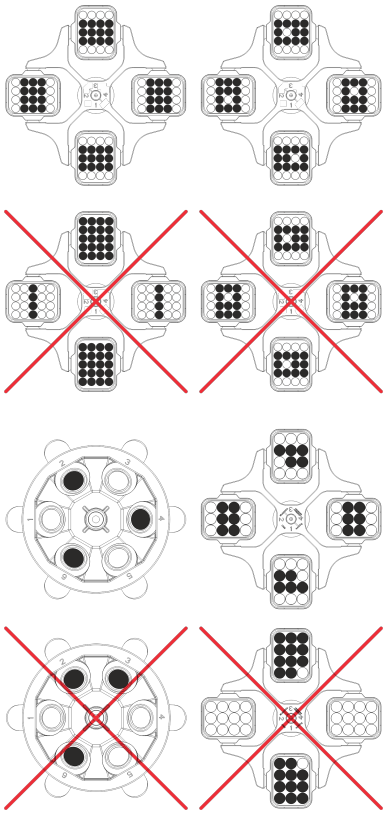
→ Fill centrifuge tubes outside the centrifuge.

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.

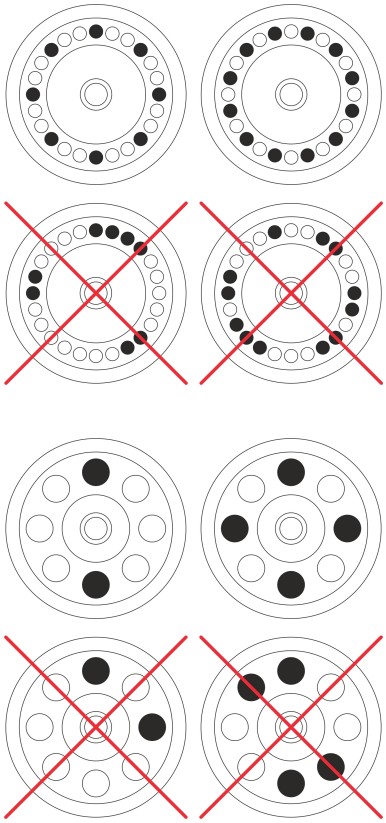
Buckets marked with a set number (for example S001/4) must only be used in the set.

The following must be observed when using blood bags:

1. → The differences can be compensated with balancing weights if the buckets are not filled with the same weight.

2. Empty buckets can be loaded with compensating inserts if there are insufficient blood bag systems available to load the rotor fully.
3. If necessary, fine-tune with the tare weights supplied.

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 and hole

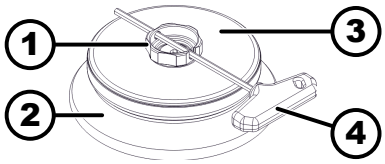


Fig. 29: Biosafety system

1 Rotary handle
2 Rotor
3 Lid
4 Key

Closing

1. Place the lid (*3*) centrally on the rotor (*2*).
2. Insert the supplied key (*4*) into the hole in the rotary handle (*1*).
3. Turn the lid (*3*) at the key (*4*) clockwise until it is tightly closed.

Opening

1. Insert the supplied key (*4*) into the hole in the rotary handle (*1*).
2. Turn the lid (*3*) at the key (*4*) anticlockwise until it is open.
3. Remove the lid (*3*) from the rotor (*2*).

6.6.3 Lid with bracket and spring-type lock

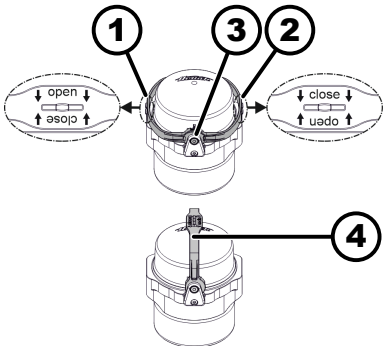


Fig. 30: Biosafety system

1 Bracket position "open"
2 Bracket opening operations
3 Bracket position "close"
4 Bracket carrying position

Closing

1. Swivel the bracket to the "open" position (*1*).

   The arrows of the labelling must point downwards so that the word "open" is legible.
2. Place the lid centrally on the bucket.

   The two pins of the lid must be in the two openings of the bracket (*2*).
3. Swivel the bracket to the "close" position (*3*).

   The arrows of the labelling must point downwards so that the word "close" is legible.

   The bracket must rest on the bucket so that the bucket can swing out during the centrifugation run.

4. For transport or when inserting and removing the bucket, swing the bucket into the carrying position (*4*) and hold the bucket by the bracket.
   ➡ The tightness of the biosafety system is also guaranteed in the carrying position.
   Do not rock the biosafety system back and forth during transport, otherwise leak-tightness is no longer ensured.

Opening

1. Swivel the bracket to the "open" position (*1*).
   The arrows of the labelling must point downwards so that the word "open" is legible.
2. Remove the lid from the bucket.

6.6.4 Lid with screw cap

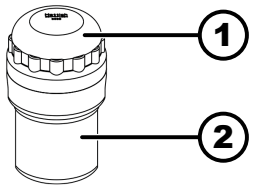


Fig. 31: Biosafety system

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*).

6.6.5 Lid with spring-type lock

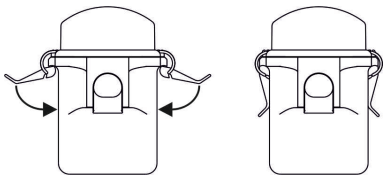


Fig. 32: Biosafety system

Closing

1. Put on the lid.
2. Fold down both clamping brackets until they are under the lugs of the bucket.

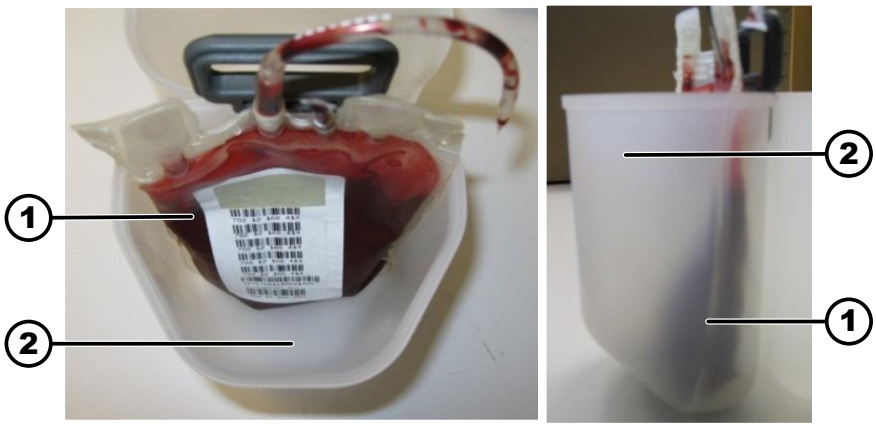
Opening

1. Fold up both clamping brackets until they are above the lugs of the bucket.
2. Remove the lid from the rotor.

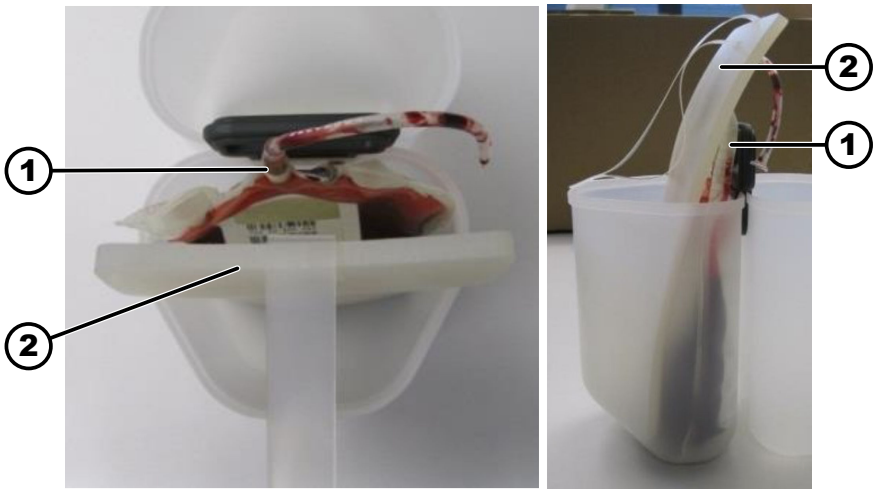
6.7 Packing instructions, HettLiner

Packing before centrifugation

Ensure that the plastic insert cannot tip over when loading and unloading the inserts (if necessary, use loading aid 4509).



1. Insert the blood bag (1) into the insert (2).



2. Hold the blood bag by the connectors (1) and push the support plate (2) on the outer side of the blood bag into the insert from top to bottom.

   Ensure that the lower edge of the support plate stands on the floor as completely as possible.

3. Fold the support plate outwards and press it down until the folded edge of the support plate is level with the liquid level of the blood bag.

   The upper edge of the support plate must not project too far out of the insert during centrifugation due to the risk of its becoming caught in the rotor arms.

   Note the position of the loop (1) so that it can be reached after centrifugation.

4. If available, fold empty satellite bag(s) and pack differently depending on the appropriate accessories and filling volume of the blood bag. It is advantageous to fold the satellite bags and pack them on the outside between the folded-down support plate and the outer wall of the insert.

   Ensure that the silicone plate does not slip when doing this.

   If necessary, the silicone plate can be retained and held against the loop when packing the satellite bag.

   The position of the loop must be checked afterwards.

5. Place the connections over the support plate so that the valves cannot break.

   Ensure that the hoses do not project out of the insert.

   Stow hose sections projecting over the edge of the insert between the folded-down support plate and the insert wall.

6. If necessary, balance weights should be placed between the folded-down support plate and the receptacle wall.

Unpacking after centrifugation

1. Pull the satellite bag out of the insert while holding the silicone plate in place with one hand.
2. Slowly pull out the folded-down part of the support plate at the loop provided for this purpose.

   Return the support plate to its original shape in a controlled manner. The folded-down part of the support plate may spring back and mix blood components.
3. Remove the remaining blood bag either together with the support plate or after removing the support plate from the insert.

6.8 Centrifugation

6.8.1 Centrifugation in continuous operation

Personnel:

- Trained user

1. Set minutes, seconds and hours on *'0'* or retrieve a continuously running program.
2. Press the *[START]* button.

   ➡ The centrifugation run is started.

   The *[START]* button flashes until the rotor is read in.

   The *[START]* button lights up during the centrifugation run.

   The timing starts at *'00:00'*.

   The rotor speed or the resulting RCF value, the temperature in the centrifuging chamber (only for centrifuges with cooling) and the elapsed time are displayed during the centrifugation run.

3. Press the *[STOP/OPEN]* button to end the centrifugation run.
   ➡ Ramp-down takes place with the selected ramp-down parameter.
   The ramp-down parameter is displayed.
   The right side of the *[STOP/OPEN]* button lights up when the centrifuge is in ramp-down.
   The left side of the *[STOP/OPEN]* button lights up when the rotor is at a standstill.
   The light on the *[START]* button and the right side of the *[STOP/OPEN]* button go out.

6.8.2 Centrifugation with time preselection

Personnel:

- Trained user

1. Set centrifugation parameters or retrieve a program or a program link.
2. Press the *[START]* button.
   ➡ The centrifugation run is started.
   The *[START]* button flashes until the rotor is read in.
   The *[START]* button lights up during the centrifugation run.
   The rotor speed or the resulting RCF value, the temperature in the centrifuging chamber (only for centrifuges with cooling) and the remaining time are displayed during the centrifugation run.
3. Ramp-down takes place with the selected ramp-down parameter after the time has elapsed or if the centrifugation run is cancelled.
   ➡ The ramp-down parameter is displayed.
   The right side of the *[STOP/OPEN]* button lights up when the centrifuge is in ramp-down.
   The left side of the *[STOP/OPEN]* button lights up when the rotor is at a standstill.
   The light on the *[START]* button and the right side of the *[STOP/OPEN]* button go out.

6.8.3 Short-term centrifugation

Personnel:

- Trained user

1. Press and hold the *[START]* button.
   ➡ The *[START]* button flashes until the rotor is read in.
   The *[START]* button lights up during the centrifugation run.
   Timing starts at 00:00.
   The rotor speed or the resulting RCF value, the temperature in the centrifuging chamber (only for centrifuges with cooling) and the elapsed time are displayed during the centrifugation run.

2. Release the *[START]* button to end the centrifugation run.
   ➡ The ramp-down parameter is displayed.

   The right side of the *[STOP/OPEN]* button lights up when the centrifuge is in ramp-down.

   The left side of the *[STOP/OPEN]* button lights up when the rotor is at a standstill.

   The light on the *[START]* button and the right side of the *[STOP/OPEN]* button go out.

6.8.4 Changing settings during centrifugation

It is not possible to change settings during centrifugation when working with program links or when a program lock has been set.

The runtime, speed, relative centrifugal force (RCF), ramp-up and ramp-down parameters and the temperature (only for device with cooling) can be changed during centrifugation.

Change the value of the desired parameter.
➡ The values of the current program are copied to program location *'0'* and updated with the changed value.

The original program is not overwritten.

The program location number is displayed in brackets *'( )'*. The centrifugation data in the indicator does not match the stored centrifugation data of the program location.

6.9 Quick stop function

Personnel:

- Trained user

Press the *[STOP/OPEN]* button twice.
➡ Ramp-down with brake level "9" (shortest ramp-down time) is displayed and executed.

If brake level "0" is preselected, ramp-down takes place with brake level "9d". With brake level "9d", the ramp-down time is longer than with brake level "9".

7 Software operation

7.1 Centrifugation parameters

7.1.1 Ramp-up and ramp-down parameters

The set ramp-up and ramp-down parameters are displayed.

x: 1-9 = ramp-up level, t = ramp-up time

y: 1-9, 1b-9b = brake level, 0 = unbraked ramp-down, t = ramp-down time

Ramp-up level and ramp-up time

The *'Ramp-up time'* function is enabled.

1. Press the *[Ramp-up and ramp-down parameters]* button.
   ➡ The ramp-up level parameter or ramp-up time parameter is displayed.
2. Press the *[TIME]* button to toggle between the ramp-up level and the ramp-up time.
3. Use the *[Rotary knob]* to set the desired level or time.

4. If required: Press the *[Ramp-up and ramp-down parameters]* button to set the next parameter.
5. Press the *[START]* button.

   or

   Press the *[Ramp-up and ramp-down parameters]* button repeatedly until the centrifugation data is displayed.

Brake level and ramp-down time

B-brake levels can only be set for rotors that are suitable for use with blood bags.

- *Setting the B-brake levels is only possible if they are enabled.*
- *Setting ramp-down times is only possible if they are enabled.*

The *'Ramp-down time'* function is enabled.

1. Press the *[Ramp-up and ramp-down parameters]* button repeatedly until the *'Brake level'* parameter, *'B-brake level'* or the *'Ramp-down time'* parameter is displayed.
2. Press the *[TIME]* button to toggle between the brake level and the ramp-down time.
3. Use the *[Rotary knob]* to set the desired level or time.
4. If required: Press the *[Ramp-up and ramp-down parameters]* button to set the next parameter.
5. Press the *[START]* button.

   or

   Press the *[Ramp-up and ramp-down parameters]* button repeatedly until the centrifugation data is displayed.

Brake cut-off speed

1. Press the *[Ramp-up and ramp-down parameters]* button repeatedly until the *'N Brake'* parameter is displayed.
2. Use the *[Rotary knob]* to set the desired value.
3. The *[Ramp-up and ramp-down parameters]* button

   or

   Press the *[START]* button.

   ➡ Settings are shown in the indicator.

7.1.2 Runtime TIME

Changing the runtime

For continuous operation, the minutes, seconds and hours must be set to zero.

Continuous operation is indicated in the indicator by means of the '∞' symbol.

1. Press the *[TIME]* button.

   ➡ *'t/hms'* is displayed.

   The minutes are displayed in brackets ⟨ ⟩.
2. Use the *[Rotary knob]* to set the desired value.

3. Press the *[TIME]* button.
   ➡ The seconds are displayed in brackets ⟨ ⟩.
4. Use the *[Rotary knob]* to set the desired value.
5. Press the *[TIME]* button.
   ➡ The hours are displayed in brackets ⟨ ⟩.
6. Use the *[Rotary knob]* to set the desired value.
7. Press the *[START]* button.

   or

   Press the *[TIME]* button repeatedly until the centrifugation data is displayed.
   ➡ Settings are shown in the indicator.

Start of runtime count

- The *'Dual time mode'* function is enabled. The function is enabled ex works.

1. Press the *[TIME]* button repeatedly until *'Timing begins at Start'* or *'Timing begins at Speed'* is displayed.
2. Use the *[Rotary knob]* to select the desired setting.
   - *'Timing begins at Start'* = Runtime counting begins after the start of the centrifugation run.
   - *'Timing begins at Speed'* = Timing of the runtime starts after the set speed is reached.
     This is indicated by the *'⌜'* symbol in the indicator to the left of the time.
3. Press the *[TIME]* button.

   or

   Press the *[START]* button.
   ➡ Settings are shown in the indicator.

7.1.3 Speed, RPM

1. Press the *[RPM]* button.
   ➡ The *'RPM'* parameter is displayed.
2. Use the *[Rotary knob]* to set the desired value.
3. Press the *[RPM]* button or the *[START]* button.
   ➡ The setting is transferred to the indicator.

7.1.4 Integral RCF

Integral RCF is a measure of sedimentation effect (∫ n2 dt). The value is used to compare centrifugation runs.

Querying integral RCF

The integral RCF is not saved. The integral RCF is deleted after starting the next centrifugation run or switching off the device.

If the 'Timing begins at Speed' function is selected, calculation of the integral RCF only starts after the set speed has been reached.

- Integral RCF is enabled.

1. Press the *[RCF]* button repeatedly until the integral RCF is displayed.
2. Press the *[RCF]* button.
   ➡ The centrifugation data is displayed.
3. If necessary, press the *[RPM]* button.
   ➡ The RPM is displayed.

Enabling or disabling integral RCF

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.
4. Press the *[PROG]* button repeatedly until *'RCF Integral = on'* or *'RCF Integral = off'* is displayed.
5. Use *[Rotary knob]* to set *'off'* or *'on'*.
   off = integral RCF disabled
   on = integral RCF enabled.
6. Press the *[START]* button.
   ➡ The setting is stored.
   'Store Settings ...' is displayed briefly
   '-> Settings' is then displayed.
7. Press the *[OPEN/STOP]* button once to exit the *'Settings menu'*
   or
   Press the *[OPEN/STOP]* button twice to exit the *'Machine Menu'*.

7.1.5 Temperature (for centrifuges with cooling)

1. Press the *[T/°C]* button.
   ➡ The parameter T/°C or T/°F is displayed.
2. Use the rotary knob to set the desired value.
3. Press the *[T/°C]* button or the *[START]* button.
   ➡ The setting is transferred to the indicator.

7.1.6 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.

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

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

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.

7.1.7 Relative centrifugal force RCF and centrifuging radius RAD

The relative centrifugal force RCF is dependent on the centrifuging radius RAD. The centrifuging radius must be set before setting the relative centrifugal force.

1. Press the *[RCF]* button repeatedly until the *'RAD'*, *'RCF'* parameters are displayed and the value of the *'RAD'* parameter is displayed in brackets ⟨ ⟩.
   ➡ The *[RCF]* button lights up.
2. Use the *[Rotary knob]* to set the desired centrifuging radius.
   The value of the RCF adjusts automatically when the centrifuging radius is changed.
3. Press the *[RCF]* button.
   ➡ The value of the *'RCF'* parameter is displayed in brackets ⟨ ⟩
4. Use the *[Rotary knob]* to set the desired *'RCF'*.
5. Press the *[PROG]* button.
   ➡ The set RCF value is saved.

7.1.8 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.

7.2 Programming

7.2.1 Write protection for programs

Write protection can be enabled or disabled when the rotor is at a standstill.

1. Open the desired program.
2. Press the *[PROG]* button.
   ➡ The RCL parameter is displayed.
3. Press and hold the *[PROG]* button.
   ➡ The STO parameter is displayed.
   'Set Protection = 1-' is displayed after 8 seconds.
4. Use *[Rotary knob]* to set *'+'* or *'-'*.
   + = The program is write-protected
   - = The program is not write-protected
5. Press the *[START]* button.
   ➡ The setting is stored.

7.2.2 Opening or loading programs

1. Press the *[PROG]* button.
   ➡ The RCL parameter is displayed.
2. Use the *[Rotary knob]* to set the desired program location.
3. Press the *[START]* button.
   ➡ *'Program recall...'* is displayed briefly.
   The centrifugation data of the desired program location is displayed

7.2.3 Entering or changing programs

The previous data in the program location is overwritten upon saving.

If "Protected !!" is displayed, the data in the program location is write-protected and saving is not possible.

1. Set the desired parameters.
2. Press the *[PROG]* button repeatedly until the *'STO'* parameter is displayed.
3. Use the *[Rotary knob]* to set the desired program location.

   If a "+" is displayed after the program location, the data is write-protected.

   The write protection must be removed before data can be saved.

4. Press the *[START]* button.
   ➡ Settings are stored in the desired program location.
   'Program store...' is displayed briefly.

7.2.4 Automatic buffer

The centrifugation data is temporarily stored at program location *'0'* and can be retrieved after each start of a centrifugation run.

No programs can be stored in program location *'0'*.

7.3 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 (Rotor), the maximum rotor speed (Nmax) and the centrifuging radius (R) of the newly detected rotor are displayed.
- If the maximum speed of the rotor used is less than the set speed, the speed is limited to the maximum rotor speed.

  In this case, the program location number is displayed in brackets *'( )'*.
- If the cycle counter is enabled, the number of completed run cycles (centrifugation runs) of the rotor code used is displayed briefly after opening the lid.

7.4 Cooling (for centrifuges with cooling)

7.4.1 Instructions, cooling

To achieve an exact temperature, a pre-tempering run of up to 60 minutes must be carried out before each centrifugation run.

The temperature setpoint can be adjusted from -20 °C to +40 °C or from -4 °F to +104 °F.

For centrifuges with the heating/cooling option, the temperature setpoint can be adjusted from -20 °C to +90 °C or from -4 °F to +194 °F .

The lowest achievable temperature is rotor dependent.

7.4.2 Standby cooling

When the rotor is at a standstill and the lid is closed, the centrifuging chamber is cooled to the preselected temperature if this is less than 20 °C or 68 °F.

The preselected temperature is displayed during standby cooling.

7.4.3 Precooling the rotor

For rapid pre-cooling of the unloaded rotor and accessories, we recommend a centrifugation run with the continuous run settings and a speed of

- Swing-out rotor: approx. 20% of the maximum rotor speed used.
- Angle rotor: approx. 40% of the maximum rotor speed used.

The centrifugation run, for precooling of the rotor, takes place automatically with the PREC program (PRECOOLING).

A centrifugation run, for precooling the rotor, cannot be executed when working with program links.

The rotor is stationary.

1. Press the *[Cooling]* button.
   ➡ The button flashes until the rotor is read in for precooling.
   The button lights up once the rotor has been read in.
   The rotor speed or the resulting RCF value, the temperature in the centrifuging chamber (only for centrifuges with cooling) and the remaining or elapsed time are displayed during the centrifugation run.
2. Press the *[STOP/OPEN]* button.
   ➡ Precooling of the rotor is terminated.
   Ramp-down takes place with the selected brake level.
   The brake level is displayed.

7.4.4 Delayed cooling

If required, the settings can be adjusted so that cooling takes place with a time delay after the centrifugation run has started. The delay time is adjustable from 15 to 900 seconds, in 1 second increments. No delay time is set ex works.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.
4. Press the *[PROG]* button repeatedly until *'Cool acc time = 0'* is displayed.
5. Use the *[Rotary knob]* to set the desired value.
   0 = no delay time
6. Press the *[START]* button.
   ➡ The setting is stored.
   'Store Settings...' is displayed briefly.
   '-> Settings' is then displayed.
7. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'Machine Menu'*.

7.4.5 Preventing cooling from switching on during ramp-down

The settings can be adjusted so that the cooling no longer switches on during the ramp-down at the end of the centrifugation run after reaching a set speed.

This can prevent any potential stirring up of sediments in the sample.

This speed can be set from 0 RPM up to the maximum rotor speed (Nmax) in increments of 10 RPM.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.

4. Press the *[PROG]* button repeatedly until *'Cool dec speed = ... rpm'* is displayed.
5. Use the *[Rotary knob]* to set the desired value.
6. Press the *[START]* button.
   ➡ The setting is stored.
   'Store Settings...' is displayed briefly.
   '-> Settings' is then displayed.
7. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'***Machine Menu***'*.

7.4.6 Temperature monitoring

Temperature monitoring is used to protect temperature-sensitive samples.

The temperature is monitored after reaching the set temperature range. The target temperature range is set to target temperature ±3°C.

The centrifugation run is aborted and the error message *'°C/ * -ERROR 58.6'* is displayed if the temperature in the centrifuging chamber exceeds the set temperature by the value *'Error 58 Temp'* for more than 2 minutes.

The centrifugation run is aborted and the error message *'°C/ * -ERROR 58.7'* is displayed if the temperature in the centrifuging chamber falls below the set temperature by the value *'Error 58 Temp'* for more than 2 minutes.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.
4. Press the *[PROG]* button repeatedly until *'Error 58 Temp 15 °C'* is displayed.
5. Use the *[Rotary knob]* to set the desired value.
   Adjustable from 4 °C to 25 °C, in 1 °C increments, as well as the "disabled" setting. Temperature monitoring is deactivated when "disabled" is set.
6. Press the *[START]* button.
   ➡ The setting is stored.
   'Store Settings...' is displayed briefly.
   '-> Settings' is then displayed.
7. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'***Machine Menu***'*.

7.5 Heating (for centrifuges with heating)

During the centrifugation run, the centrifuging chamber is heated to the preselected temperature if required. The heating is switched off when the rotor is at a standstill.

Swing-out rotors and angle rotors must run at maximum speed.

CAUTION

Danger of burns from hot surfaces.

The surface temperature of the heating element in the centrifuging chamber can be up to 500 °C or 932 °F.

– Do not touch the heating element.

NOTICE

Damage to plastic buckets due to excessive temperature

– Plastic buckets may only be used at temperatures up to a maximum of 40 °C or 104 °F.

To achieve an exact temperature, a pre-tempering run of up to 60 minutes must be carried out before each centrifugation run.

enable / disable

The rotor is stationary.

1. Press the *[T/°C]* button repeatedly until *'Heater = off'* or *'Heater = on'* is displayed.
2. Use *[Rotary knob]* to set *'off'* or *'on'*.
   off = heating disabled
   on = heating enabled
3. Press the *[T/°C]* button or the *[START]* button.
   ➡ The settings are stored.
   Centrifugation data is displayed.

7.6 Machine Menu

7.6.1 Querying system information

The following system information can be queried:

- Centrifuge model
- Mains voltage
- Rotor information
- Centrifuge program version
- Program version for the frequency inverter

The rotor is stationary.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Info'* is displayed.
3. Press the *[START]* button.
   ➡ The centrifuge model is displayed.
4. Press the *[PROG]* button.
   ➡ The mains voltage is displayed

5. Press the *[PROG]* button.
   ➡ The rotor code (Rotor), the maximum rotor speed (Nmax) and the centrifuging radius (R) of the last rotor recognised by the rotor detection are displayed.
   The last rotor recognised is marked with an asterisk (*).
   The *[Rotary knob]* can be used to display the information of the rotors approved for the centrifuge.
6. Press the *[PROG]* button.
   ➡ The program version of the centrifuge is displayed.
7. Press the *[PROG]* button.
   ➡ The program version of the frequency converter is displayed.
8. Press the *[STOP/OPEN]* button twice to exit the *'-> Info'* menu
   or
   Press the *[STOP/OPEN]* button three times to exit the *'***Machine Menu***'*.

7.6.1.1 Centrifuge address

The address of the centrifuge is set to]=29 ex works. Address set.

7.6.2 Cycle counter

The centrifuge is equipped with a cycle counter. The cycle counter counts the run cycles (centrifugation cycles) of the various rotor codes.

For swing-out rotors, the cycle counter is used to record the run cycles (centrifugation runs) of the buckets.

If the rotor is detected for the first time by the rotor detection, the centrifugation run is cancelled. *'Enter max cycles = ⟨30000 ⟩'* is displayed after pressing any button. The maximum permissible number of run cycles indicated on the bucket must be entered before the centrifugation run can be restarted.

The cycle counter can be disabled for rotors and buckets that are not marked with the maximum permissible number of run cycles. The number of run cycles (centrifugation runs) of the rotor code used is displayed briefly every time the lid is opened.

If the maximum permissible number of bucket run cycles entered is exceeded, *'*MAX CYCLES PASSED*'* is displayed after each start of a centrifugation run.

The centrifugation run must be restarted. The buckets must be replaced with new ones.

If the buckets have been replaced, the cycle counter must be reset to *'0'*.

Entering the maximum permissible number of run cycles

The maximum permissible number of run cycles must be entered after starting the first centrifugation run.

'Enter max cycles = ⟨30000⟩' is displayed.

1. Use the *[Rotary knob]* to set the maximum permissible number of run cycles indicated on the bucket.
2. Press the *[START]* button.
   ➡ The setting is stored.
   'Store max cycles ...' is displayed briefly.

Resetting the cycle counter and entering the maximum permissible number of run cycles

The cycle counter must be reset to *'0'* after inserting new buckets. The maximum permissible number of run cycles must be entered.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Operating Time'* is displayed.
3. Press the *[START]* button.
   ➡ The external operating hours are displayed.
4. Press the *[PROG]* button repeatedly until the run cycles are displayed.
5. Press the *[RCF]* button.
   ➡ The number of run cycles is displayed in brackets ⟨ ⟩.
6. Turn the *[Rotary knob]* to the left to reset the number of run cycles to *'0'*.
7. Press the *[RCF]* button.
   ➡ The maximum permissible number of run cycles is displayed in brackets ⟨ ⟩.
8. Use the *[Rotary knob]* to set the maximum permissible number of run cycles indicated on the bucket.
9. Press the *[START]* button.
   ➡ The settings are stored.
   'Store cycles ...' is displayed briefly.
   The run cycles are displayed.
10. Press the *[OPEN/STOP]* button twice to exit the *'Operating Time'* menu
    or
    Press the *[OPEN/STOP]* button three times to exit the *'Machine Menu'*.

Enabling the cycle counter

The rotor is stationary.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Operating Time'* is displayed.
3. Press the *[START]* button.
   ➡ The external operating hours are displayed.
4. Press the *[PROG]* button repeatedly until *'Cycles = disabled'* is displayed when the cycle counter is disabled.
   If run cycles are displayed, the cycle counter is already enabled.
5. Press the *[RCF]* button repeatedly until the maximum permissible number of run cycles is displayed in brackets ⟨ ⟩.
6. Use the *[Rotary knob]* to set the maximum permissible number of run cycles indicated on the bucket.
7. Press the *[START]* button.
   ➡ The settings are stored.
   'Store cycles ...' is displayed briefly.
   The run cycles are displayed.

8. Press the *[OPEN/STOP]* button twice to exit the *'Operating Time'* menu

   or

   Press the *[OPEN/STOP]* button three times to exit the *'Machine Menu'*.

Disabling the cycle counter

The rotor is stationary.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Operating Time'* is displayed.
3. Press the *[START]* button.
   ➡ The external operating hours are displayed.
4. Press the *[PROG]* button repeatedly until, with the cycle counter enabled, the run cycles are displayed.

   If *'Cycles = disabled'* is displayed, the cycle counter is already disabled.
5. Press the *[RCF]* button repeatedly until the maximum permissible number of run cycles is displayed in brackets ⟨ ⟩.
6. Use *[Rotary knob]* to set the maximum permissible number of run cycles to *'0'*.
7. Press the *[START]* button.
   ➡ The settings are stored.

   'Store cycles ...' is displayed briefly.

   'Cycles = disabled' is displayed.
8. Press the *[OPEN/STOP]* button twice to exit the *'Operating Time'* menu

   or

   Press the *[OPEN/STOP]* button three times to exit the *'Machine Menu'*.

7.6.3 Querying operating hours, centrifugation runs and cycle counter

The operating hours are divided into internal and external operating hours.

- Internal operating hours *'OP Time int ='*: Total time for which the device has been switched on.
- External operating hours *'OP Time ext ='*: Total time of centrifugation runs to date.

The rotor is stationary.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Operating Time'* is displayed.
3. Press the *[START]* button.
   ➡ *'OP Time ext ='* is displayed.
4. Press the *[PROG]* button.
   ➡ *'OP Time int ='* is displayed.

5. Press the *[PROG]* button.
   ➡ *'Number of Starts ='* is displayed.
   This is the number of all centrifugation runs.
6. Press the *[PROG]* button.
   ➡ *'Cycles ='* is displayed.
   This is the number of run cycles (centrifugation runs) of the rotor code used since the last cycle counter reset to *'0'* and the maximum permissible number of run cycles.
7. Press the *[PROG]* button.
   ➡ *'Rotor cycles total ='* is displayed.
   This is the number of all run cycles (centrifugation runs) of the rotor code used.
8. Press the *[STOP/OPEN]* button twice to exit the *'-> Operating Time'* menu
   or
   Press the *[STOP/OPEN]* button three times to exit the *'***Machine Menu***'*.

7.6.4 Enabling or disabling dual time mode

It is possible to set when runtime counting starts during a centrifugation run if the *'Dual time mode'* function is enabled. The function is enabled ex works.

The rotor is stationary.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.
4. Press the *[PROG]* button repeatedly until *'Dual time mode enabled'* or *'Dual time mode disabled'* is displayed.
5. Use *[Rotary knob]* to set *'enabled'* or *'disabled'*.
   disabled = The function is disabled
   enabled = The function is enabled.
6. Press the *[START]* button.
   ➡ The settings are stored.
   'Store Settings...' is displayed briefly.
   '-> Settings' is then displayed.
7. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'Machine Menu'*.

7.6.5 Enabling or disabling B-brake levels

B-brake levels can only be set for rotors that are suitable for use with blood bags.

- *Setting the B-brake levels is only possible if they are enabled.*
- *Setting ramp-down times is only possible if they are enabled.*

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.
4. Press the *[PROG]* button repeatedly until *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.
5. Use *[Rotary knob]* to set *'off'* or *'on'*.
   off = B-brake levels disabled,
   on = B brake levels enabled.
6. Press the *[START]* button.
   ➡ The settings are stored.
   'Store Settings...' is displayed briefly.
   '-> Settings' is then displayed.
7. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'Machine Menu'*.

7.6.6 Enabling or disabling ramp-up and ramp-down times

The rotor is stationary.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.
4. Press the *[PROG]* button repeatedly until *'Ramp Unit = Steps'* or *'Ramp Unit = Steps / Time'* is displayed.
5. Use *[Rotary knob]* to set *'Steps'* or *'Steps / Time'*.
   Steps = ramp-up and ramp-down times disabled,
   Steps / Time = ramp-up and ramp-down times enabled.
6. Press the *[START]* button.
   ➡ The setting is stored.
   'Store Settings...' is displayed briefly.
   '-> Settings' is then displayed.
7. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'Machine Menu'*.

7.6.7 Program lock

The following program locks can be set when the rotor is at a standstill:

LOCK 1	LOCK 1 is displayed. Programs can only be retrieved, not changed.
LOCK 2	LOCK 2 is displayed. No programs can be retrieved or changed. The centrifuge can be controlled via the interface (only for centrifuges with an interface).
LOCK 3	no status indicator No program lock. Programs can be retrieved and changed.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Change Lock'* is displayed.
3. Press the *[START]* button.
   ➡ Lock status is displayed.
   If no PIN is entered, e.g. *'LOCK = ⟨3⟩ confirm by START'* is displayed.
   If a PIN is entered, e.g. *'LOCK = 3'* is displayed.
4. Use the *[Rotary knob]* to set the desired status.
   'PIN = ---- confirm by START' is displayed if a PIN is entered. In this case, the valid PIN must first be set with the *[Rotary knob]* and then the *[START]* button must be pressed before the lock status can be set.
5. Press the *[START]* button.
   ➡ The setting is stored.
   e.g. *'Store LOCK 2'* is briefly displayed.
   '-> Change Lock' is then displayed.
6. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'Machine Menu'*.

7.6.8 PIN (Personal Identification Number)

A PIN can be set to prevent unauthorised persons from changing the program lock. No PIN is set ex works.

Setting or changing the PIN

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Change PIN'* is displayed.
3. Press the *[START]* button.
   ➡ *'old PIN = ---- <START>'* is displayed.

4. Use the *[Rotary knob]* to set the valid PIN.
   If you are setting the PIN for the first time, skip this step or set *'0000'*.
   Input help: Press and hold down the relevant button.

[Ramp-up and ramp-down parameters] button	only the thousands digit of the PIN is changed.
[RCF] button	only the hundreds digit of the PIN is changed.
[RPM] button	only the tens digit of the PIN is changed.

5. Press the *[START]* button.
   ➡ *'new PIN = ---- <START>'* is displayed.
   If an incorrect PIN was set, *'old PIN = ---- <START>'* is displayed again. In this case, set the valid PIN with the *[Rotary knob]* and press the *[START]* button.
6. Use the *[Rotary knob]* to set the new PIN.
   '0000' must be set in order to disable the PIN.
7. Press the *[START]* button.
   ➡ The setting is stored.
   'Store PIN ...' is displayed briefly.
   '-> Change PIN' is then displayed.
8. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'Machine Menu'*.

Procedure if the PIN is lost

What is known as a Help number can be retrieved if the PIN is lost. The manufacturer can use this number to calculate a PIN that replaces the previously valid PIN.

1. Hold down the *[PROG]* button for 8 seconds.
   *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button until *'-> Change PIN'* is displayed.
3. Press the *[START]* button.
   ➡ *'old PIN = ---- <START>'* is displayed.
4. Press the *[PROG]* button.
   ➡ *'Get HELP # no'* is displayed.
   The previous PIN becomes invalid after retrieving the Help number.
5. Use *[Rotary knob]* to set *'yes'*.
6. Press the *[START]* button.
   ➡ *'Are you sure ? no'* is displayed.
7. Use *[Rotary knob]* to set *'yes'*.
8. Press the *[START]* button.
   ➡ *'HELP # = 5487'* is displayed.
   Note down this Help number and use it to request the required PIN. Setting a new PIN using the PIN received

7.6.9 Audible signal

7.6.9.1 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.

7.6.9.2 Enabling or disabling an audible signal

The rotor is stationary.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.
   'SOUND / BELL': Signal after completion of the centrifugation run
4. Use *[Rotary knob]* to set *'off'* or *'on'*.
   off = audible signal disabled
   on = audible signal enabled
5. Press the *[PROG]* button.
   ➡ *'SOUND / BELL error = on'* or *'SOUND / BELL error = off'* is displayed.
   'SOUND / BELL error': Signal after the occurrence of a fault
6. Use *[Rotary knob]* to set *'off'* or *'on'*.
   off = audible signal disabled
   on = audible signal enabled
7. Press the *[START]* button.
   ➡ The setting is stored.
   'Store Settings...' is displayed briefly.
   '-> Settings' is then displayed.
8. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'***Machine Menu***'*.

7.6.10 Centrifugation data displayed after switching on

The centrifugation data of program 1 or the last program used is displayed after switching on.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.
4. Press the *[PROG]* button repeatedly until *'Start program = Last'* or *'Start program = First'* is displayed.

5. Use *[Rotary knob]* to set *'Last'* or *'First'*.
   Last = last program used
   First = program 1
6. Press the *[START]* button.
   ➡ The settings are stored.
   'Store Settings...' is displayed briefly.
   '-> Settings' is then displayed.
7. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'Machine Menu'*.

7.6.11 Setting a temperature unit (for centrifuges with cooling)

The temperature can be entered in degrees Celsius (°C) or degrees Fahrenheit (°F).

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.
4. Press the *[PROG]* button repeatedly until *'Temp Unit = Fahrenheit'* or *'Temp Unit = Celsius'* is displayed.
5. Use *[Rotary knob]* to set *'Celsius (°C)'* or *'Fahrenheit (°F)'*.
   Celsius = values in Celsius (°C)
   Fahrenheit = values in Fahrenheit (°F)
6. Press the *[START]* button.
   ➡ The setting is stored.
   'Store Settings ...' is displayed briefly.
   '-> Settings' is then displayed.
7. Press the *[OPEN/STOP]* button once to exit the *'Settings'* menu
   or
   Press the *[OPEN/STOP]* button twice to exit the *'Machine Menu'*.

7.6.12 Indicator backlight

For centrifuges with a program version from V01.18:

The indicator backlight can be switched off after 2 minutes to save energy.

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = on'* or *'SOUND / BELL = off'* is displayed.
4. Press the *[PROG]* button repeatedly until *' Power save = on'* or *' Power save = off'* is displayed.
   Power save : Automatic switching off of the backlight

5. Use *[Rotary knob]* to set *'off'* or *'on'*.
   off = disable automatic switch-off
   on = automatic switch-off enabled
6. Press the *[START]* button.
   ➡ The setting is stored.
   'Store Settings...' is displayed briefly.
   '-> Settings' is then displayed.
7. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'Machine Menu'*.

7.7 Program links

7.7.1 Linking programs or changing a program link

25 program links can be stored (program locations A to Z, program location J does not exist).

A program link can consist of a maximum of 20 programs.

In a program link, the speed from one program to the next is always adjusted with the ramp-up parameter of the next program.

No centrifugation parameters can be changed in a program link. Changing the parameters is only possible in the individual programs.

No continuous operation programs or programs with ramp-up and ramp-down times may be linked.

The [TIME] button can be used to retrieve the total runtime of the program link and the runtime of the currently running program during the centrifugation run.

Program links are enabled.

1. Press the *[PROG]* button repeatedly until *'EDIT A…Z'* is displayed.
2. Use the *[Rotary knob]* to set the desired program location where the program link is to be saved.
3. Press the *[START]* button.
   ➡ The program location of the program link and the first program of the program link are displayed.
4. Use the *[Rotary knob]* to set the first program of the program link.
5. Press the *[PROG]* button.
   ➡ The next program in the program link is displayed.
6. Use the *[Rotary knob]* to set the next program of the program link.
7. Press the *[PROG]* button.
   ➡ The next program in the program link is displayed.
8. Repeat steps 6 and 7 until all programs are set.
9. Use *[Rotary knob]* to set *'END'*. For this, turn the rotary knob anti-clockwise.
   No *'END'* can be set after the 20th program in the case of program links consisting of 20 programs.

10. Press the *[START]* button.
    ➡ *'STO B'* is displayed.
11. Press the *[START]* button to save the program link.
    ➡ *'Multi program store...'* is displayed briefly.

7.7.2 Opening a program link

1. Press the *[PROG]* button repeatedly until *'RCL A…Z'* is displayed.
2. Use the *[Rotary knob]* to set the desired program location.
3. Press the *[START]* button.
   ➡ *'Multi program recall...'* is displayed briefly.
   The centrifugation data of the first program of the program link is displayed, along with the total runtime of the program link.

7.7.3 Enabling or disabling program links

1. Press and hold the *[PROG]* button.
   ➡ *'***Machine Menu***'* is displayed after 8 seconds.
2. Press the *[PROG]* button repeatedly until *'-> Settings'* is displayed.
3. Press the *[START]* button.
   ➡ *'SOUND / BELL = off'* or *'SOUND / BELL = on'* is displayed.
4. Press the *[PROG]* button repeatedly until *' Multi programs = off'* or *' Multi programs = on'* is displayed.
5. Use *[Rotary knob]* to set *'off'* or *'on'*.
   off = program link disabled
   on = program link enabled
6. Press the *[START]* button.
   ➡ The setting is stored.
   'Store Settings...' is displayed briefly.
   '-> Settings' is then displayed.
7. Press the *[STOP/OPEN]* button once to exit the *'Settings menu'*
   or
   Press the *[STOP/OPEN]* button twice to exit the *'Machine Menu'*.

8 Cleaning and care

8.1 Overview table

Chap.	Task to execute	if required	daily	weekly	Annually	Page
8	**Cleaning and care**					62
8.3	**Cleaning**					64
8.3	Cleaning the device		X			64
8.3	Cleaning the biosafety systems			X		64

Chap.	Task to execute	if required	daily	weekly	Annually	Page
8.3	Cleaning the accessories			X		64
8.4	**Disinfection**					64
8.4	Disinfecting the device	X				64
8.4	Disinfecting the accessories	X				65
8.5	**Maintenance**					65
8.5	Greasing the rubber seal of the centrifuging chamber			X		65
8.5	Greasing the rubber seal of the biosafety system			X		65
8.5	Trunnion greasing			X		65
8.5	Checking the accessories			X		65
8.5	Checking the biosafety system			X		66
8.5	Inspecting the centrifuging chamber for damage				X	66
8.5	Greasing the motor shaft				X	66
8.5	Accessories with a limited service life	X				66
8.5	Replacing centrifuge tubes	X				66

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 62

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.
- The centrifuge is equipped with a cycle counter.

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.

* Error number does not appear on the display.

Fault description	Cause	Remedy
No display	No power. Triggering of the over-current protection fuse.	■ Check the supply voltage. ■ Set the mains switch to *[I]*.
TACHO-ERROR 1, 2, 96	Tacho defective. Motor, electronics defective.	■ Open the lid. ■ Set the mains switch to *[0]*. ■ Wait at least 10 seconds. ■ Turn the rotor vigorously by hand. ■ Set the mains switch to *[I]*. The rotor must rotate while switching on.
IMBALANCE 3*	The rotor is unevenly loaded.	■ Open the lid. ■ Check the loading of the rotor. ■ Repeat the centrifugation run.
CONTROL-ERROR 4.1-4.5, 6	Lid lock error.	■ Perform a MAINS RESET.
N > MAX 5.0, 5.1	Overspeed error.	■ Perform a MAINS RESET.
N < MIN 13	Underspeed error.	■ Perform a MAINS RESET.
ROTORCODE 10.1-10.3	Rotor coding error.	■ Perform a MAINS RESET.
MAINS INTERRUPT 11*	Loss of mains power during the centrifugation run. The centrifugation run was not completed.	■ Open the lid. ■ Press the *[START]* button. ■ If required: Repeat the centrifugation run.
VERSION-ERROR 12	No conformity of the electronic components, error/defect in electronics.	■ Perform a MAINS RESET.
CONTROL-ERROR 25.1-25.4	Error/defect in electronics.	■ Perform a MAINS RESET.
CRC ERROR 27, 27.1	Error/defect in electronics.	■ Perform a MAINS RESET.
SER I/O-ERROR 31, 34, 36	Error/defect in electronics.	■ Perform a MAINS RESET.
° C * -ERROR 51, 53-55	Error/defect in electronics.	■ Perform a MAINS RESET.
° C * -ERROR 52.0, 52.1	Overtemperature in the centrifuging chamber. Error/defect in electronics	■ Perform a MAINS RESET.
° C * -ERROR 58.0, 58.1	Temperature deviation too great.	■ Perform a MAINS RESET.
° C * -ERROR 58.6, 58.7	Temperature deviation too great.	■ Perform a MAINS RESET. ■ Increase the "Error 58 Temp" value.
FU/CCI-ERROR 60, 61.2-61.20, 61.128-61.132, 62	Error/defect in electronics/motor.	■ Perform a MAINS RESET.
FU/CCI-ERROR 61.1	Mains voltage too low. Error/defect in electronics/motor.	■ Check the mains voltage. ■ Perform a MAINS RESET.

Fault description	Cause	Remedy
SENSOR-ERROR 90	Error/defect in electronics.	■ Perform a MAINS RESET.
SENSOR-ERROR 91-93	Error/defect in imbalance sensor.	■ Perform a MAINS RESET.
° C * -ERROR 97, 98	Error/defect in electronics.	■ Perform a MAINS RESET.
NO ROTOR OR ROTORCODE ERROR	No rotor installed. Tacho defective.	■ Open the lid. ■ Install the rotor.
N > ROTOR MAX	Speed in the selected program greater than the maximum rotor speed.	■ Check and correct the speed.
	The rotor has been changed. The built-in rotor has a higher maximum speed than the previously used rotor. The rotor has not yet been recognised by the rotor detection.	■ Set a speed up to the maximum speed of the previously used rotor. Press the *[START]* button to perform rotor detection.
N > ROTOR MAX in Prog: e.g. 3	There is a program in the displayed program location where the speed is greater than the maximum rotor speed.	■ Check and correct the speed.
	The rotor has been changed. The built-in rotor has a higher maximum speed than the previously used rotor. The rotor has not yet been recognised by the rotor detection.	■ Set a speed up to the maximum speed of the previously used rotor. Press the *[START]* button to perform rotor detection.
Runtime 00:00 in Prog: e.g. B.3	There is a continuous program in the displayed program location.	■ Replace the continuous program in the program link with a program with time preselection.
Empty Program	There is no program link stored in the displayed program location .	■ Open a program link.
Ramp Unit Time in Prog: e.g. B. 3	There is a program in the displayed program location that has a start-up and/or run-down time.	■ Replace the program in the program link with a program with a start-up and braking stage.
Acc time > Run time	The set start-up time is longer than the run time.	■ Set a start-up time that is shorter than the run time.
Protected !!	The program is write-protected.	■ Disable write protection for the program.
FC INIT ERROR	Error/defect in electronics.	■ Perform a MAINS RESET.
FC VERSION ERROR	Error/defect in electronics.	■ Perform a MAINS RESET.
FATAL EEPROM ERROR 1-5	Error/defect in electronics.	■ Perform a MAINS RESET.
WATCHDOG RESET	Error/defect in electronics.	■ Perform a MAINS RESET.

Fault description	Cause	Remedy
MAX CYCLES PASSED	The maximum permissible number of run cycles entered has been exceeded.	■ Replace the buckets with new buckets for safety reasons. ■ Reset the cycle counter to "0" after replacing the buckets.
Enter max cycles = <30000>	Request to enter the maximum permissible number of run cycles indicated on the buckets.	■ Enter the maximum permissible number of run cycles.
The left half of the display lights up.	-	■ 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

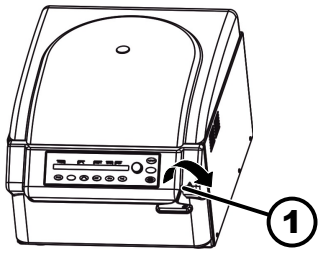


Fig. 33: Emergency release

1 Hole

1. Look through the window in the lid to ensure that the rotor is stationary.
2. Insert the hex key horizontally into the hole (*1*) and turn clockwise until the lid opens.
3. Remove the hex key from the hole (*1*).
4. Check whether the left side of the *[STOP/OPEN]* button flashes when power is restored.

   When the left side of the *[STOP/OPEN]* button flashes, press the *[STOP/OPEN]* button so that the motorised lid lock assumes the home position (open) again.

9.4 Switching on the automatic circuit breaker

Personnel:

■ Trained user

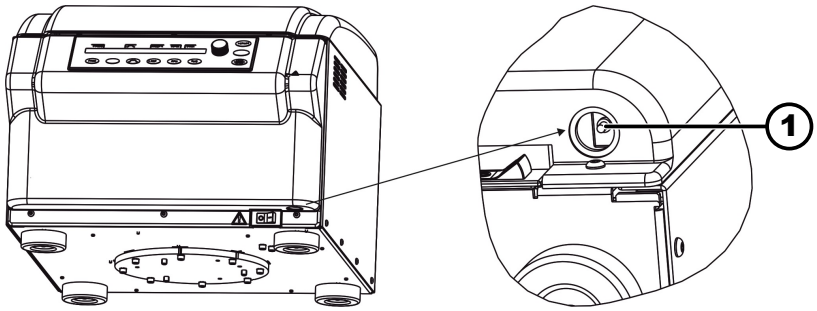


Fig. 34: Automatic circuit breaker

1 Plastic pin

The mains switch is in switch position *[O]*

The centrifuge is disconnected from the mains.

1. Press the plastic pin (*1*) of the automatic circuit breaker.
2. Reconnect the device to the mains.

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 1 (heat exchangers)
- Group 4 (large devices)

Fig. 35: Household waste ban

The crossed-out wheelie 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.

11 Index

S

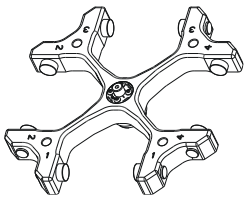
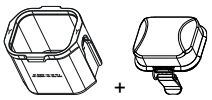
T

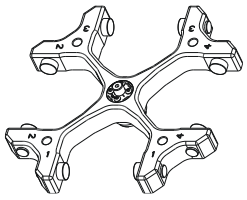
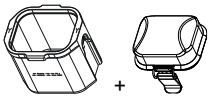
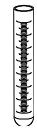
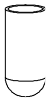
V

W

Z

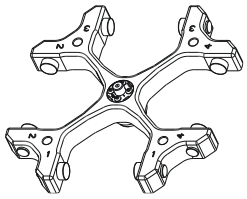
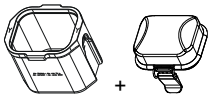
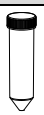
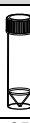
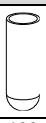
Rotoren und Zubehör /
Rotors and accessories

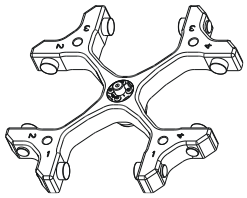
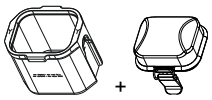
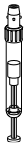
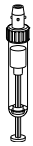
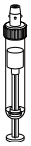
5699-R		5625-A + 5627							
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000									
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 80 000							
		max. Beladung / max. load: 750 g							
		4730				4732			
									
									
Kapazität / capacity	ml	1,5	2,0	3	4	4	5	6	7
Maße / dimensions ∅ x L	mm	11 x 38	11 x 38	10 x 60	10 x 88	12 x 60	12 x 75	12 x 82	12 x 100
Anzahl p. Rotor / number p. rotor		224	224	120	120	80	80	80	80
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	3572/4637	3572/4637	4637	4637	4637	4637	4637	4637
Radius / radius	mm	151/196	151/196	196	196	196	196	196	196
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	10							
Probenerwärmung/Sample temp. rise	K 2)	16							

5699-R		5625-A + 5627							
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000									
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 80 000							
		max. Beladung / max. load: 750 g							
		4733			4734	4735		4737	4738
									
									
Kapazität / capacity	ml	10	15	15	25	75	75	100	250
Maße / dimensions ∅ x L	mm	17 x 70	17 x 100	17 x 100	24 x 100	35 x 105	34 x 100	44 x 100	65 x 115
Anzahl p. Rotor / number p. rotor		68	68	68	24	12	12	8	4
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	4637	4637	4637	4637	4495	4495	4637	4495
Radius / radius	mm	196	196	196	196	190	190	196	190
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	10							
Probenerwärmung/Sample temp. rise	K 2)	16							

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

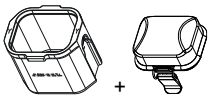
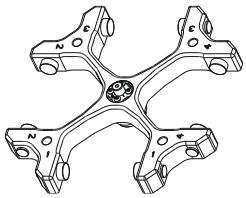
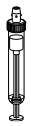
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maxim um speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
12) in conformity with DIN EN 61010, part 2 – 020. Observe the notes for bio safety systems in chapters "Notes on safety" and "Maintenance and servicing".

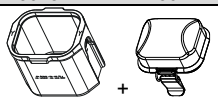
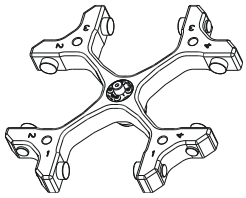
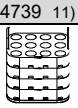
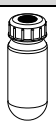
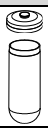
5699-R		5625-A + 5627							
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000		 mit Bioabdichtung / with bio-containment 12) max. Laufzyklen / max. cycles: 80 000 max. Beladung / max. load: 750 g							
		4739	4740	4739 11)	4734		4740 11)	4736	
									
									
Kapazität / capacity	ml	15	50	12	25	30	50	85	100
Maße / dimensions ∅ x L	mm	17 x 120	30 x 115	17 x 100	25 x 90	25 x 110	30 x 115	38 x 102	40 x 115
Anzahl p. Rotor / number p. rotor		48	20	48	24	24	20	12	12
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	4637	4637	4637	4637	4637	4637	4495	4495
Radius / radius	mm	196	196	196	196	196	196	190	190
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	10							
Probenerwärmung/Sample temp. rise	K 2)	16							

5699-R		5625-A + 5627							
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000		 mit Bioabdichtung / with bio-containment 12) max. Laufzyklen / max. cycles: 80 000 max. Beladung / max. load: 750 g							
		4730	4732				4733		
									
									
Kapazität / capacity	ml	1,1; 1,2; 1,4	2,7 - 3	2,6; 2,9	4,5 - 5	4,9	4 - 5,5	7,5 - 8,2	9 - 10
Maße / dimensions ∅ x L	mm	8 x 66	11 x 66	13 x 65	11 x 92	13 x 90	15 x 75	15 x 92	16 x 92
Anzahl p. Rotor / number p. rotor		120	80	80	80	80	68	68	68
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	4637	4637	4637	4637	4637	4637	4637	4637
Radius / radius	mm	196	196	196	196	196	196	196	196
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	10							
Probenerwärmung/Sample temp. rise	K 2)	16							

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.
11) Die Einlage aus den Gestellen entfernen
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.

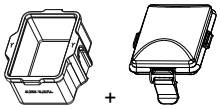
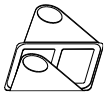
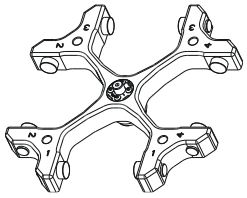
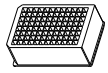
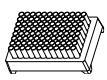
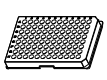
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
11) Take the inserts out of the frame / adapter
12) 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".

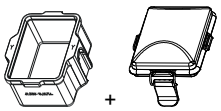
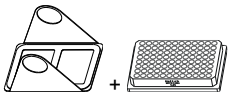
5699-R		5625-A + 5627							
Ausschwingrotor 4-fach / Swing out rotor 4-times									
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 80 000							
		max. Beladung / max. load: 750 g							
		4733	4732		4733				
									
									
∠ 90°									
max. Laufzyklen / max. cycles 400 000									
Kapazität / capacity	ml	10	1,6 - 5	4 - 7	4 - 7	8,5 – 10			
Maße / dimensions ∅ x L	mm	15 x 102	13 x 75	13 x 100	16 x 75	16 x 100			
Anzahl p. Rotor / number p. rotor		68	80	80	68	68			
Drehzahl / speed	RPM	4600	4600	4600	4600	4600			
RZB / RCF	3)	4637	4637	4637	4637	4637			
Radius / radius	mm	196	196	196	196	196			
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	10							
Probenerwärmung/Sample temp. rise	K 2)	16							

5699-R		5625-A + 5627							
Ausschwingrotor 4-fach / Swing out rotor 4-times									
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 80 000							
		max. Beladung / max. load: 750 g							
		4733	4734	4740 11)	4736	4736	4739 11)		
									
									
∠ 90°									
max. Laufzyklen / max. cycles 400 000									
Kapazität / capacity	ml	10	30	50	85	94	14		
Maße / dimensions ∅ x L	mm	16 x 80	26 x 95	29 x 107	38 x 106	38 x 110 20)	16,5 x 106		
Anzahl p. Rotor / number p. rotor		68	24	20	12	12	48		
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600		
RZB / RCF	3)	4637	4637	4637	4495	4495	4637		
Radius / radius	mm	196	196	196	190	190	196		
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	10							
Probenerwärmung/Sample temp. rise	K 2)	16							

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.
11) Die Einlage aus den Gestellen entfernen
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.
20) Maße mit Deckel

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.
11) Take the inserts out of the frame / adapter
12) 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".
20) Dimensions with lid

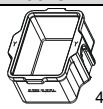
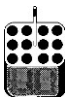
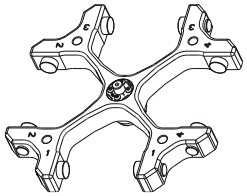
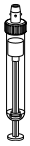
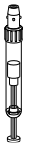
5699-R		5628 + 5629							
Ausschwingrotor 4-fach / Swing out rotor 4-times									
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 50 000							
		max. Beladung / max. load: 800 g							
		4626							
									
		QP	DWP	MS	CP	MTP		Microtest-platten / plate Terasaki	
90°									
max. Laufzyklen / max. cycles 400 000									
Maße / dimensions TxBxH / DxWxH	mm	**86x128x 83**	**86x128x44,5**	**86x128x46**	**86x128x22**	**86x128x17,5**	**86x128x15**	**59x84x11**	
Anzahl p. Rotor / number p. rotor		4	4	4	16	20	24	8	
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	
RZB / RCF	3)	4211	4211	4211	4211	4211	4211	4211	
Radius / radius	mm	178	178	178	178	178	178	178	
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	10							
Probenerwärmung/Sample temp. rise	K 2)	16							

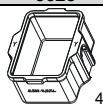
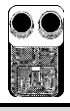
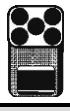
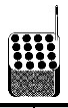
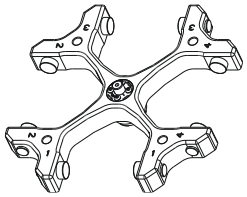
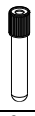
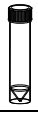
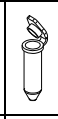
5699-R		5628 + 5629							
Ausschwingrotor 4-fach / Swing out rotor 4-times									
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 50 000							
		max. Beladung / max. load: 800 g							
		4626 + 1485							
90°									
max. Laufzyklen / max. cycles 400 000		96-PCR-Platte / plate	PCR-Strips						
									
Maße / dimensions TxBxH / DxWxH	mm	**82x124x20**							
Anzahl p. Rotor / number p. rotor		4	48 x 8						
Drehzahl / speed	RPM	4600	4600						
RZB / RCF	3)	4211	4211						
Radius / radius	mm	178	178						
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	10							
Probenerwärmung/Sample temp. rise	K 2)	16							

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.
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" 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.
12) 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".

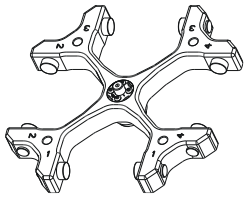
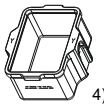
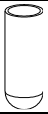
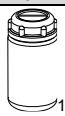
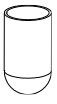
MTP Mikrotiterplatte / Microtitre plate
CP Kulturplatte / Culture plate
DWP Deep Well Platte / Deep well plate
MS Micronic System / Micronic system
QP Filterplatte / Filter plate

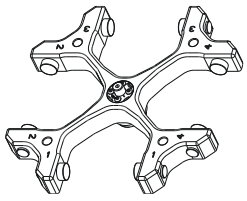
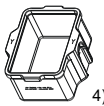
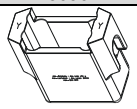
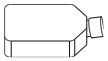
5699-R		5628 + 5220-A							
Ausschwingrotor 4-fach / Swing out rotor 4-times		 4) + 							
		max. Laufzyklen / max. cycles: 50 000							
		max. Beladung / max. load: 800 g							
		5267	5268		5264		5258	5227	
									
 ∠ 90° max. Laufzyklen / max. cycles 400 000									
Kapazität / capacity	ml	1,1; 1,2; 1,4	2,6; 2,9	4,9	4 - 5,5	7,5-8,2	9 - 10	2,7 - 3	4,5 - 5
Maße / dimensions ∅ x L	mm	8 x 66	13 x 65	13 x 90	15 x 75	15 x 92	16 x 92	11 x 66	11 x 92
Anzahl p. Rotor / number p. rotor		160	96	96	96	96	88	160	160
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	4069	4164	4164	4116	4116	4093	4116	4116
Radius / radius	mm	172	176	176	174	174	173	174	174
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	10							
Probenerwärmung/Sample temp. rise	K 2)	16							

5699-R		5628 + 5220-A									
Ausschwingrotor 4-fach / Swing out rotor 4-times		 4) + 									
		max. Laufzyklen / max. cycles: 50 000									
		max. Beladung / max. load: 800 g									
		5268		5259	5266		5267		5281		5264
											
 ∠ 90° max. Laufzyklen / max. cycles 400 000					 							
Kapazität / capacity	ml	1,6 - 5	4 - 7	50	30		3	4	1,5	2,0	4 - 7	9
Maße / dimensions ∅ x L	mm	13 x 75	13 x 100	30 x 115	25 x 110		10 x 60	10 x 88	11 x 38		16 x 75	14 x 100
Anzahl p. Rotor / number p. rotor		96	96	16	40		160		128		96	96
Drehzahl / speed	RPM	4600	4600	4600	4600		4600		4600		4600	4600
RZB / RCF	3)	4164	4164	4187	4187		4069		4164		4116	4116
Radius / radius	mm	176	176	177	177		172		176		174	174
9 (97%)	sec	79										
9	sec	88										
Temperatur / temperature	°C 1)	10										
Probenerwärmung/Sample temp. rise	K 2)	16										

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.
4) nicht mit Deckel 5629 verschließbar

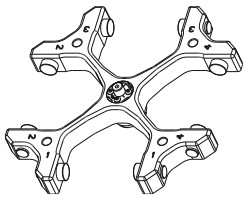
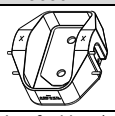
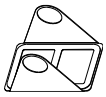
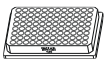
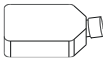
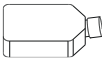
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
4) not closeable with lid 5629

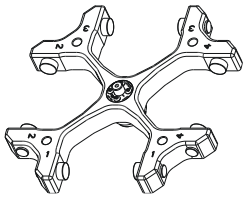
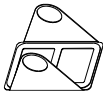
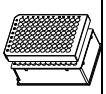
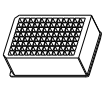
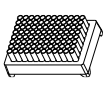
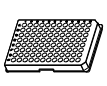
5699-R		5628 + 5220-A								
Ausschwingrotor 4-fach / Swing out rotor 4-times  90° max. Laufzyklen / max. cycles 400 000		 4) + 								
		max. Laufzyklen / max. cycles: 50 000								
		max. Beladung / max. load: 800 g								
		5242	5243	5249	5262	5263-A + 6319 11)	5263-A	5268		
										
						5127				
						 15)				
Kapazität / capacity	ml	25	50	100	100	250	250	7	5	6
Maße / dimensions ∅ x L	mm	24 x 100	34 x 100	40 x 115	44 x 100	62 x 122	65 x 115	12 x 100	12 x 75	12 x 82
Anzahl p. Rotor / number p. rotor		40	16	8	8	4	4	96	96	
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	4600	
RZB / RCF	3)	4093	4093	4069	4069	4187	4045	4164	4164	
Radius / radius	mm	173	173	172	172	177	171	176	176	
9 (97%)	sec	79								
9	sec	88								
Temperatur / temperature	°C 1)	10								
Probenerwärmung/Sample temp. rise	K 2)	16								

5699-R		5628			5636	5630-B
Ausschwingrotor 4-fach / Swing out rotor 4-times  90° max. Laufzyklen / max. cycles 400 000		 4)			 **max. 1200**	
		max. Laufzyklen / max. cycles: 50 000			max. Laufzyklen / max. cycles: 80 000	
		max. Beladung / max. load: 800 g			max. Beladung / max. load: 450 g	max. Beladung / max. load: 500 g
		6338-B	6339-A	6337-B	5648	5671
						
					 16)	
Kapazität / capacity	ml	50	50	15	---	250 / 260
Maße / dimensions ∅ x L	mm	29 x 115	29 x 115	17 x 120	152,5 x 85,5 x 12	- - -
Anzahl p. Rotor / number p. rotor		24	24	56	12	4
Drehzahl / speed	RPM	4600	4600	4600	max. 1200	4600
RZB / RCF	3)	4258	4187	4258	4921	3785
Radius / radius	mm	180	177	180	208	160
9 (97%)	sec	79				
9	sec	88				
Temperatur / temperature	°C 1)	10				
Probenerwärmung/Sample temp. rise	K 2)	16				

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.
4) nicht mit Deckel 5629 verschließbar
11) Die Einlage aus den Gestellen entfernen
15) Bei Temperaturen über 40 °C und/oder geringer Befüllung der Gefäße können sich diese verformen.
16) maximal 1200 RPM

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.
4) not closeable with lid 5629
11) Take the inserts out of the frame / adapter
15) At temperatures above 40 °C and/or poor filling of the tubes, these can go out of shape.
16) maximum 1200 RPM

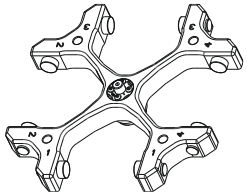
5699-R		5630-B				
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000						
		max. Laufzyklen / max. cycles: 80 000				
		max. Beladung / max. load: 500 g				
		5672	5673	**4626 + 1485**		
				 + 		
				96-PCR-Platte / plate	PCR-Strips	
						
Kapazität / capacity	ml	40	160			
Maße / dimensions TxBxH / DxWxH	mm			**82x124x20**		
Anzahl p. Rotor / number p. rotor		4	4	4	48 x 8	
Drehzahl / speed	RPM	4600	4600	4600		
RZB / RCF	3)	3785	3785	3832		
Radius / radius	mm	180	160	162		
9 (97%)	sec	79				
9	sec	88				
Temperatur / temperature	°C 1)	10				
Probenerwärmung/Sample temp. rise	K 2)	16				

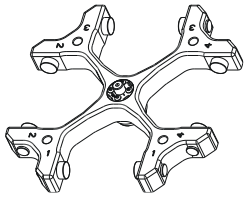
5699-R		5630-B						
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000								
		max. Laufzyklen / max. cycles: 80 000						
		max. Beladung / max. load: 500 g						
		4626						
								
		QP	DWP	MS	CP	MTP		Microtest-platten / plate Terasaki
								
Maße / dimensions TxBxH / DxWxH	mm	**86x128x 83**	**86x128x44,5**	**86x128x46**	**86x128x22**	**86x128x17,5**	**86x128x15**	**59x84x11**
Anzahl p. Rotor / number p. rotor		4	4	4	16	20	24	8
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	3832	3832	3832	3832	3832	3832	3832
Radius / radius	mm	162	162	162	162	162	162	162
9 (97%)	sec	79						
9	sec	88						
Temperatur / temperature	°C 1)	10						
Probenerwärmung/Sample temp. rise	K 2)	16						

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.

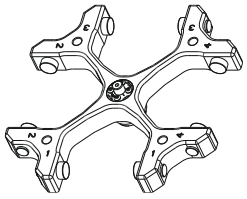
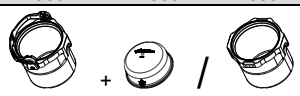
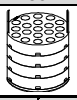
MTP Mikrotiterplatte / Microtitre plate
CP Kulturplatte / Culture plate
DWP Deep Well Platte / Deep well plate
MS Micronic System / Micronic system
QP Filterplatte / Filter plate

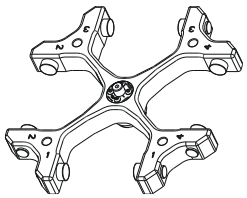
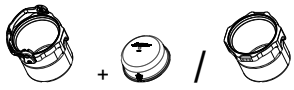
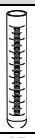
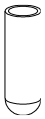
5699-R		5628 + 5220-A + 5280							
Ausschwingrotor 4-fach / Swing out rotor 4-times		 4) +  + 							
		max. Laufzyklen / max. cycles: 50 000							
		max. Beladung / max. load: 800 g							
		1662						1670	
		 2 x in 5280						 6) 2 x in 5280	
 90° max. Laufzyklen / max. cycles 400 000		1663	1664	1665	1666	1667	1668	1663	1664
									
Kapazität / capacity	ml	1	2	4	8	3 x 2	4 x 1	1	2
Maße / dimensions ∅ / A	mm²	6,2 / 30	8,7 / 60	12,4 / 120	17,5 / 240	8,7 / 60	6,2 / 30	6,2 / 30	8,7 x 60
Anzahl p. Rotor / number p. rotor		8	8	8	8	8	8	16	16
Filterkarten / filter cards		1675	1675	1675	1676	1677	1678	1692	1692
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	2744/4069	2744/4069	2744/4069	2744/4069	2744/4069	2744/4069	2744/4069	2744/4069
Radius / radius	mm	116 / 172	116 / 172	116 / 172	116 / 172	116 / 172	116 / 172	116 / 172	116 / 172
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	10							
Probenerwärmung/Sample temp. rise	K 2)	16							

5699-R		5628 + 5220-A + 5280							
Ausschwingrotor 4-fach / Swing out rotor 4-times		 4) +  + 							
		max. Laufzyklen / max. cycles: 50 000							
		max. Beladung / max. load: 800 g							
		1670							
		 6) 2 x in 5280							
 90° max. Laufzyklen / max. cycles 400 000		1665	1666	1667	1668				
									
Kapazität / capacity	ml	4	8	3 x 2	4 x 1				
Maße / dimensions ∅ / A	mm²	12,4 x 120	17,5 x 240	8,7 / 60	6,2 / 30				
Anzahl p. Rotor / number p. rotor		16	16	16	16				
Filterkarten / filter cards		1692	1691	1694	1693				
Drehzahl / speed	RPM	4600	4600	4600	4600				
RZB / RCF	3)	2744/4069	2744/4069	2744/4069	2744/4069				
Radius / radius	mm	116 / 172	116 / 172	116 / 172	116 / 172				
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	10							
Probenerwärmung/Sample temp. rise	K 2)	16							

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.
4) nicht mit Deckel 5629 verschließbar
6) Objektträger nur belastbar bis RZB 1100

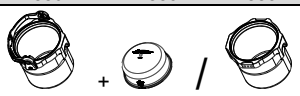
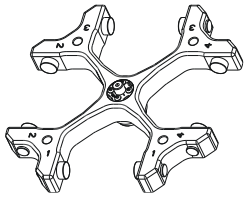
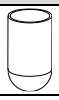
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
4) not closeable with lid 5629
6) Object slide will not stand RCF values exceeding 1100

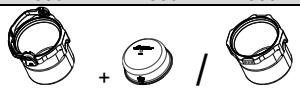
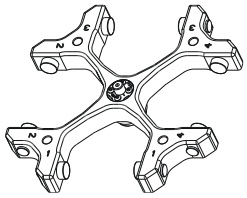
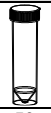
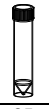
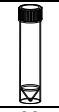
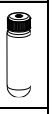
5699-R		4880 + 4883 / 4885							
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000									
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 75 000							
		max. Beladung / max. load: 1000 g							
		4830				4832			
									
									
Kapazität / capacity	ml	1,5	2,0	3	4	4	5	6	7
Maße / dimensions ∅ x L	mm	11 x 38	11 x 38	10 x 60	10 x 88	12 x 60	12 x 75	12 x 82	12 x 100
Anzahl p. Rotor / number p. rotor		192	192	96	96	76	76	76	76
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	3572/4637	3572/4637	4637	4637	4637	4637	4637	4637
Radius / radius	mm	151/196	151/196	196	196	196	196	196	196
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	7							
Probenerwärmung/Sample temp. rise	K 2)	18							

5699-R		4880 + 4883 / 4885							
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000									
		mit Bioabdichtung / with bio-containment 12)				-----			
		max. Laufzyklen / max. cycles: 75 000							
		max. Beladung / max. load: 1000 g							
		4833				4834	4835		
									
			Nalgene®						
									
Kapazität / capacity	ml	10	10	15	15	25	45	50	
Maße / dimensions ∅ x L	mm	17 x 70	16 x 80	17 x 100	17 x 100	24 x 100	31 x 100	34 x 100	
Anzahl p. Rotor / number p. rotor		76	76	76	76	28	16	16	
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	
RZB / RCF	3)	4637	4637	4637	4637	4637	4495	4495	
Radius / radius	mm	196	196	196	196	196	190	190	
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	7							
Probenerwärmung/Sample temp. rise	K 2)	18							

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

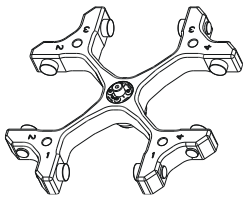
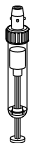
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
12) in conformity with DIN EN 61010, part 2 – 020. Observe the notes for bio safety systems in chapters "Notes on safety" and "Maintenance and servicing".

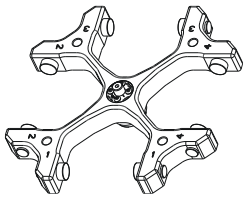
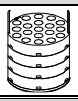
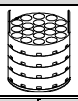
5699-R		4880 + 4883 / 4885						
Ausschwingrotor 4-fach / Swing out rotor 4-times								
		mit Bioabdichtung / with bio-containment 12)				-----		
		max. Laufzyklen / max. cycles: 75 000						
		max. Beladung / max. load: 1000 g						
		4835	4837	4836		4838	4839 11)	
								
∠ 90°								
max. Laufzyklen / max. cycles 400 000								
Kapazität / capacity	ml	75	100	85	100	250	10	14
Maße / dimensions ∅ x L	mm	35 x 105	44 x 100	38 x 102	40 x 115	65 x 115	15 x 102	16,5 x 106
Anzahl p. Rotor / number p. rotor		16	8	12	12	4	56	56
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	4495	4637	4495	4495	4495	4637	4637
Radius / radius	mm	190	196	190	190	190	196	196
9 (97%)	sec	79						
9	sec	88						
Temperatur / temperature	°C 1)	7						
Probenerwärmung/Sample temp. rise	K 2)	18						

5699-R		4880 + 4883 / 4885							4880 / 4885	
Ausschwingrotor 4-fach / Swing out rotor 4-times										
		mit Bioabdichtung / with bio-containment 12)			----				----	
		max. Laufzyklen / max. cycles: 75 000								
		max. Beladung / max. load: 1000 g								
		4839	4840 11)	4839 11)	4834		4840	5647	5647 11)	
										
∠ 90°										
max. Laufzyklen / max. cycles 400 000										
Kapazität / capacity	ml	15	50	12	25	30	50	50	50	
Maße / dimensions ∅ x L	mm	17 x 120	30 x 115	17 x 100	25 x 90	25 x 110	29 x 115	30 x 115	30 x 115	29 x 107
Anzahl p. Rotor / number p. rotor		56	20	56	28	28	20	28	28	
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	4600	
RZB / RCF	3)	4637	4637	4637	4637	4637	4637	4708	4708	
Radius / radius	mm	196	196	196	196	196	196	199	199	
9 (97%)	sec	79								
9	sec	88								
Temperatur / temperature	°C 1)	7								
Probenerwärmung/Sample temp. rise	K 2)	18								

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.
11) Die Einlagen aus den Gestellen / Reduzierungen entfernen
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.

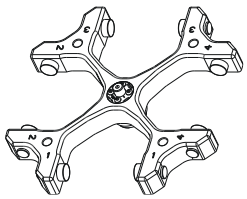
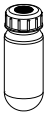
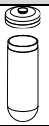
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
11) Take the inserts out of the frames / adapters
12) 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".

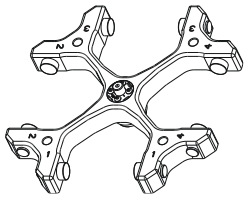
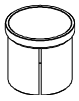
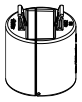
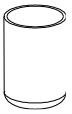
5699-R		4880 + 4883 / 4885							
Ausschwingrotor 4-fach / Swing out rotor 4-times  90° max. Laufzyklen / max. cycles 400 000									
		mit Bioabdichtung / with bio-containment 12)					----		
		max. Laufzyklen / max. cycles: 75 000							
		max. Beladung / max. load: 1000 g							
		4830	4832				4833		
									
									
Kapazität / capacity	ml	1,1; 1,2; 1,4	2,7 - 3	2,6; 2,9	4,5 - 5	4,9	4 - 5,5	7,5 - 8,2	9 - 10
Maße / dimensions ∅ x L	mm	8 x 66	11 x 66	13 x 65	11 x 92	13 x 90	15 x 75	15 x 92	16 x 92
Anzahl p. Rotor / number p. rotor		96	76	76	76	76	76	76	76
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	4637	4637	4637	4637	4637	4637	4637	4637
Radius / radius	mm	196	196	196	196	196	196	196	196
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	7							
Probenerwärmung/Sample temp. rise	K 2)	18							

5699-R		4880 + 4883 / 4885						
Ausschwingrotor 4-fach / Swing out rotor 4-times  90° max. Laufzyklen / max. cycles 400 000								
		mit Bioabdichtung / with bio-containment 12)					----	
		max. Laufzyklen / max. cycles: 75 000						
		max. Beladung / max. load: 1000 g						
		4832	4833					
								
								Nalgene® 
Kapazität / capacity	ml	1,6 - 5	10	4 - 7	4 - 7	8	8,5 - 10	10
Maße / dimensions ∅ x L	mm	13 x 75	15 x 102	13 x 100	16 x 75	16 x 125	16 x 100	16 x 80
Anzahl p. Rotor / number p. rotor		76	76	76	76	76	76	76
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	4637	4637	4637	4637	4637	4637	4637
Radius / radius	mm	196	196	196	196	196	196	196
9 (97%)	sec	79						
9	sec	88						
Temperatur / temperature	°C 1)	7						
Probenerwärmung/Sample temp. rise	K 2)	18						

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

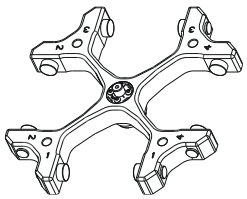
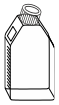
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
12) In conformity with DIN EN 61010, part 2 – 020. Observe the notes for bio safety systems in chapters "Notes on safety" and "Maintenance and servicing".

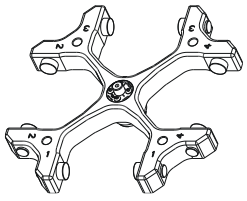
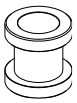
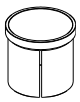
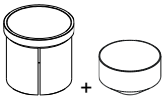
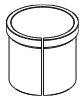
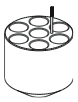
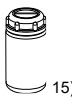
5699-R		4880 + 4883 / 4885											
Ausschwingrotor 4-fach / Swing out rotor 4-times  90° max. Laufzyklen / max. cycles 400 000													
		mit Bioabdichtung / with bio-containment 12)								-----			
		max. Laufzyklen / max. cycles: 75 000											
		max. Beladung / max. load: 1000 g											
		4834	4840 11)	4836		4847				4848			
													
							11)		11)				
													
Kapazität / capacity	ml	30	50	85	94	2,6 – 2,9	4,9	1,6 – 5	4 - 7	10	9 - 10	4 - 7	8,5 - 10
Maße / dimensions ∅ x L	mm	26 x 95	29 x 107	38 x 106	38 x 110 20)	13 x 65	13 x 90	13 x 75	13 x 100	16 x 80	16 x 92	16 x 75	16 x 100
Anzahl p. Rotor / number p. rotor		28	20	12	12	108		108		88		88	
Drehzahl / speed	RPM	4600	4600	4600	4600	4600		4600		4600		4600	
RZB / RCF	3)	4637	4637	4495	4495	4116	4684	4116	4684	4684		4684	
Radius / radius	mm	196	196	190	190	174	198	174	198	198		198	
9 (97%)	sec	79											
9	sec	88											
Temperatur / temperature	°C 1)	7											
Probenerwärmung/Sample temp. rise	K 2)	18											

5699-R		4880 + 4883 / 4885						
Ausschwingrotor 4-fach / Swing out rotor 4-times  90° max. Laufzyklen / max. cycles 400 000								
		mit Bioabdichtung / with bio-containment 12)						-----
		max. Laufzyklen / max. cycles: 75 000						
		max. Beladung / max. load: 1000 g						
		4845		4849				4852
								
		4447	4234-A	Falcon / Corning	BD	Nunc	Greiner	Nunc / Sarstedt
								
Kapazität / capacity	ml	450	750	30 / 40 / 50				160
Maße / dimensions ∅ x L	mm	97 x 110	96 x 135	---				---
Anzahl p. Rotor / number p. rotor		4		8				4
Drehzahl / speed	RPM	4600						
RZB / RCF	19)	4779		4613				
Radius / radius	mm	202		195				
9 (97%)	sec	79						
9	sec	88						
Temperatur / temperature	°C 1)	7						
Probenerwärmung/Sample temp. rise	K 2)	18						

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.
11) Die Einlage aus den Gestellen entfernen
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.
15) Bei Temperaturen über 40 °C und/oder geringer Befüllung der Gefäße können sich diese verformen.
19) Für die einsetzbaren Kulturflaschen beträgt die max. RCF 2300
20) Maße mit Deckel

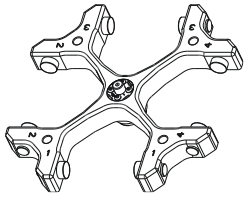
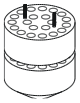
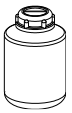
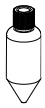
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
11) Take the inserts out of the frame / adapter
12) 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".
15) At temperatures above 40 °C and/or poor filling of the tubes, these can go out of shape.
19 The max. RCF for the accommodated cell culture flasks is 2300.
20) Dimensions with lid

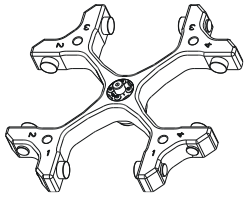
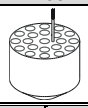
5699-R		4880 + 4885							
Ausschwingrotor 4-fach / Swing out rotor 4-times									
		max. Laufzyklen / max. cycles: 75 000							
		max. Beladung / max. load: 1000 g							
		4831				4851			
									
∠ 90°		BD	Falcon	Greiner	Nunc	Nunc	Sarstedt		
max. Laufzyklen / max. cycles 400 000									
Kapazität / capacity	ml	200				40			
Maße / dimensions ∅ x L	mm	----				---			
Anzahl p. Rotor / number p. rotor		4				8			
Drehzahl / speed	RPM	4600							
RZB / RCF	19)	4613							
Radius / radius	mm	195							
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	7							
Probenerwärmung/Sample temp. rise	K 2)	18							

5699-R		4880 + 4883 / 4885				4890 + 4883 / 4895		
Ausschwingrotor 4-fach / Swing out rotor 4-times								
		mit Bioabdichtung / with bio-containment 12)		----		mit Bioabdichtung / with bio-containment 12)		----
		max. Laufzyklen / max. cycles: 75 000				max. Laufzyklen / max. cycles: 38 000		
		max. Beladung / max. load: 1000 g						
		4841	4845	4845	4449	4846	4438	
								
∠ 90°		5127	0512 4)	Corning		0551			
max. Laufzyklen / max. cycles 400 000		 15)	 15)			 15)		 
Kapazität / capacity	ml	250	750	500		600	25	30	30
Maße / dimensions ∅ x L	mm	62 x 122	97 x 152	96 x 147		93 x 134	25 x 90	25 x 110	25 x 110
Anzahl p. Rotor / number p. rotor		4	4	4		4	28	28	28
Drehzahl / speed	RPM	4600	4600	4600		4600	4600	4600	4600
RZB / RCF	3)	4779	4779	4779		4779	4566	4566	4566
Radius / radius	mm	202	202	202		202	193	193	193
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	7							
Probenerwärmung/Sample temp. rise	K 2)	18							

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.
4) nicht mit Deckel 4883 verschließbar
11) Die Einlage aus den Gestellen entfernen
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.
15) Bei Temperaturen über 40 °C und/oder geringer Befüllung der Gefäße können sich diese verformen.
19) Für die einsetzbaren Kulturflaschen beträgt die max. RZB 2300

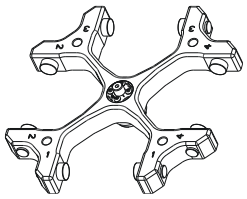
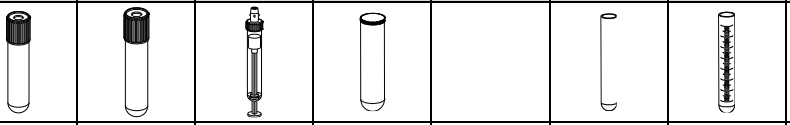
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
4) not closeable with lid 4883
11) Take the inserts out of the frame / adapter
12) 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".
15) At temperatures above 40 °C and/or poor filling of the tubes, these can go out of shape.
19 The max. RCF for the accommodated cell culture flasks is 2300.

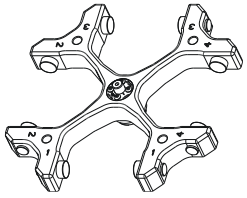
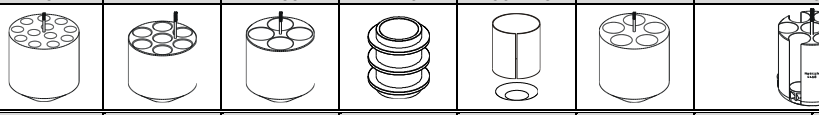
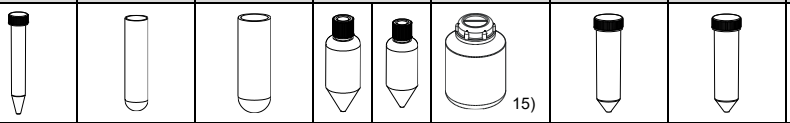
5699-R		4890 + 4883 / 4895								
Ausschwingrotor 4-fach / Swing out rotor 4-times										
		mit Bioabdichtung / with bio-containment 12)								
		max. Laufzyklen / max. cycles: 38 000								
		max. Beladung / max. load: 1000 g								
		4451 4)	4430	4430		4432		4433		
			 4)							
∠ 90°		0512	Corning	Nunc®	Nalgene®	2078	0536	0553	0578	
max. Laufzyklen / max. cycles 400 000		 15)								
Kapazität / capacity	ml	750	250	200	175	1,5	2,0	5	7	2,7 - 3
Maße / dimensions ∅ x L	mm	97 x 152	60 x 172	60 x 130	62 x 144	11 x 38		12 x 75	12 x 100	11 x 66
Anzahl p. Rotor / number p. rotor		4	4	4	4	168		120	120	120
Drehzahl / speed	RPM	4600	4600	4600	4600	4600		4600	4600	4600
RZB / RCF	3)	4873	5063	5063	5063	3407/4542		4471	4471	4471
Radius / radius	mm	206	214	214	214	144/192		189	189	189
9 (97%)	sec	79								
9	sec	88								
Temperatur / temperature	°C 1)	7								
Probenerwärmung/Sample temp. rise	K 2)	18								

5699-R		4890 + 4883 / 4895							
Ausschwingrotor 4-fach / Swing out rotor 4-times									
		mit Bioabdichtung / with bio-containment 12)				----			
		max. Laufzyklen / max. cycles: 38 000							
		max. Beladung / max. load: 1000 g							
		4433	4434			4435			
									
∠ 90°					Nalgene®				
max. Laufzyklen / max. cycles 400 000									
Kapazität / capacity	ml	4,5 - 5	4 – 5,5	9 - 10	10	2,6 – 2,9	4,9	1,6 - 5	4 - 7
Maße / dimensions ∅ x L	mm	11 x 92	15 x 75	16 x 92	16 x 80	13 x 65	13 x 90	13 x 75	13 x 100
Anzahl p. Rotor / number p. rotor		120	76	76	76	84	84	84	84
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	4471	4637	4637	4637	4471	4471	4471	4471
Radius / radius	mm	189	196	196	196	189	189	189	189
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	7							
Probenerwärmung/Sample temp. rise	K 2)	18							

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.
4) nicht mit Deckel 4883 verschließbar
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.
15) Bei Temperaturen über 40 °C und/oder geringer Befüllung der Gefäße können sich diese verformen.

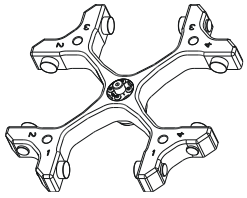
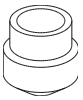
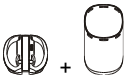
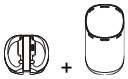
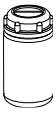
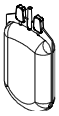
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
4) not closeable with lid 4883
12) 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".
15) At temperatures above 40 °C and/or poor filling of the tubes, these can go out of shape.

5699-R		4890 + 4883 / 4895							
Ausschwingrotor 4-fach / Swing out rotor 4-times									
		mit Bioabdichtung / with bio-containment 12)				----			
		max. Laufzyklen / max. cycles: 38 000							
		max. Beladung / max. load: 1000 g							
		4434							
									
∠ 90°									
max. Laufzyklen / max. cycles 400 000									
Kapazität / capacity	ml	4 -7	8,5 - 10	10	15		9	15	8
Maße / dimensions ∅ x L	mm	16 x 75	16 x 100	15 x 102	17 x 100		14 x 100	17 x 100	16 x 81
Anzahl p. Rotor / number p. rotor		76	76	76	76		76	76	76
Drehzahl / speed	RPM	4600	4600	4600	4600		4600	4600	4600
RZB / RCF	3)	4637	4637	4637	4637		4637	4637	4637
Radius / radius	mm	196	196	196	196		196	196	196
9 (97%)	sec	79							
9	sec	88							
Temperatur / temperature	°C 1)	7							
Probenerwärmung/Sample temp. rise	K 2)	18							

5699-R		4890 + 4883 / 4895								
Ausschwingrotor 4-fach / Swing out rotor 4-times										
		mit Bioabdichtung / with bio-containment 12)				----				
		max. Laufzyklen / max. cycles: 38 000								
		max. Beladung / max. load: 1000 g								
		4437	**4438 + 0726**	4439	4440	4466+4451	4441	4468		
										
∠ 90°					Falcon®	0551			11)	11)
max. Laufzyklen / max. cycles 400 000		 15)								
Kapazität / capacity	ml	15	25	50	225	175	600	50	50	50	50
Maße / dimensions ∅ x L	mm	17 x 120	24 x 100	34 x 100	61 x 137	61 x 118	93 x 134	29 x 115	29 x 115	29 x 107	29 x 115
Anzahl p. Rotor / number p. rotor		48	28	16	4		4	20	28	28	28
Drehzahl / speed	RPM	4600	4600	4600	4600		4600	4600	4600	4600	
RZB / RCF	3)	4755	4353	4424	5063		4873	4755	4613	4613	
Radius / radius	mm	201	184	187	214		206	201	195	195	
9 (97%)	sec	79									
9	sec	88									
Temperatur / temperature	°C 1)	7									
Probenerwärmung/Sample temp. rise	K 2)	18									

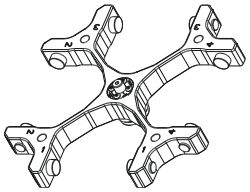
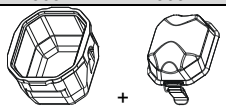
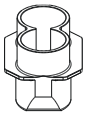
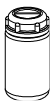
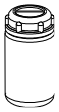
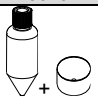
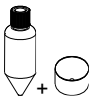
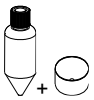
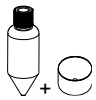
1) Tiefste erreichbare Temperatur bei maximaler Drehzahl, 1 h Laufzeit und 20°C Raumtemperatur (nur bei Kühlzentrifuge)
2) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit (nur bei Zentrifuge ohne Kühlung)
3) Angaben des Röhrchenherstellers beachten.
11) Die Einlage aus den Gestellen entfernen
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.
15) Bei Temperaturen über 40 °C und/oder geringer Befüllung der Gefäße können sich diese verformen.

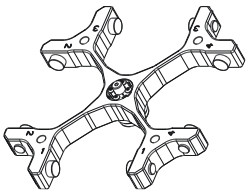
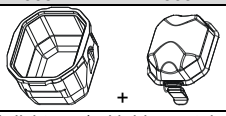
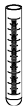
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
11) Take the inserts out of the frame / adapter
12) 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".
15) At temperatures above 40 °C and/or poor filling of the tubes, these can go out of shape.

5699-R		4890 + 4883 / 4895					5691-A	
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000								
		mit Bioabdichtung / with bio-containment 12)			----			
		max. Laufzyklen / max. cycles: 38 000					max. Laufzyklen / max. cycles: 80 000	
		max. Beladung / max. load: 1000 g					max. Beladung / max. load: 1000 g	
		4442	4443	4449		4469	5693 + 5692	5695 + 5692
					---			
			5127	Corning	3- / 4- fach/ 3- / 4- times		3-fach / 3-times	4-fach / 4-times
			 15)		 5)		 5)	 5)
Kapazität / capacity	ml	100	250	500	450	15	450	450
Maße / dimensions ∅ x L	mm	44 x 100	62 x 122	96 x 147	---	17 x 120	---	---
Anzahl p. Rotor / number p. rotor		8	4	4	4	56	4	4
Drehzahl / speed	RPM	4600	4600	4600	4600	4600	4600	4600
RZB / RCF	3)	4400	4873	5063	5063	4755	4637	4637
Radius / radius	mm	186	206	214	214	201	196	196
9 (97%)	sec	79					79	79
9	sec	88					88	88
Temperatur / temperature	°C 1)	7					10	
Probenerwärmung/Sample temp. rise	K 2)	18					16	16

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.
5) nur lauffähig in Zentrifugen ab Werk-Nr. XXXXXXX-02-01
6) Objektträger nur belastbar bis RZB 1100
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.
15) Bei Temperaturen über 40 °C und/oder geringer Befüllung der Gefäße können sich diese verformen.

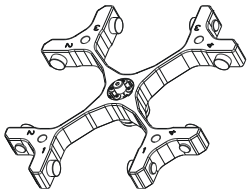
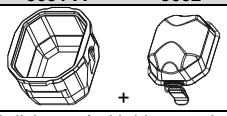
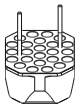
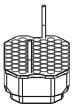
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
5) only executable in centrifuges from serial no. XXXXXXX-02-01
6) Object slide will not stand RCF values exceeding 1100
12) 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".
15) At temperatures above 40 °C and/or poor filling of the tubes, these can go out of shape.

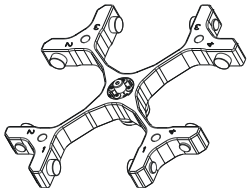
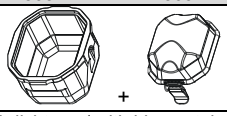
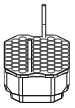
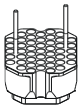
5654		5651-A + 5652							
Ausschwingrotor 4-fach / Swing out rotor 4-times  90° max. Laufzyklen / max. cycles 400 000		 mit Bioabdichtung / with bio-containment 12) max. Laufzyklen / max. cycles: 60 000 max. Beladung / max. load: 1520 g							
		5681 						5687 + 4449 	5669 
		5127  15)	4) 	Nalgene® + 5676 	Falcon® + 5677 		Nunc® + 5676 	Corning 	- - - 4) 
Kapazität / capacity	ml	250	290	175	175	225	200	500	1000
Maße / dimensions ∅ x L	mm	62 x 122	62 x 137	62 x 144	61 x 118	61 x 137	60 x 130	96 x 147	99/126 x 140
Anzahl p. Rotor / number p. rotor		8	8	8	8	8	8	4	4
Drehzahl / speed	RPM	3800	3800	3800	3800	3800	3800	3800	3800
RZB / RCF	3)	3196	3196	3196	3196	3196	3196	3196	3196
Radius / radius	mm	198	198	198	198	198	198	198	198
9 (97%)	sec	62							
9	sec	58							
Temperatur / temperature	°C 1)	3							
Probenerwärmung/Sample temp. rise	K 2)	9							

5654		5651-A + 5652							
Ausschwingrotor 4-fach / Swing out rotor 4-times  90° max. Laufzyklen / max. cycles 400 000		 mit Bioabdichtung / with bio-containment 12) max. Laufzyklen / max. cycles: 60 000 max. Beladung / max. load: 1520 g							
		5687 			5682 				
		0551  15)	4447 	0512 4)  15)					
Kapazität / capacity	ml	600	450	750	4- 7	8,5 - 10		15	4 – 5,5
Maße / dimensions ∅ x L	mm	93 x 134	97 x 110	97 x 152	16 x 75	16 x 100		17 x 100	15 x 75
Anzahl p. Rotor / number p. rotor		4	4	4	148	148		148	148
Drehzahl / speed	RPM	3800	3800	3800	3800	3800		3800	3800
RZB / RCF	3)	3196	3196	3196	2970	2970		2970	2970
Radius / radius	mm	198	198	198	184	184		184	184
9 (97%)	sec	62							
9	sec	58							
Temperatur / temperature	°C 1)	3							
Probenerwärmung/Sample temp. rise	K 2)	9							

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.
4) nicht mit Deckel 5652 verschließbar
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.
15) Bei Temperaturen über 40 °C und/oder geringer Befüllung der Gefäße können sich diese verformen.

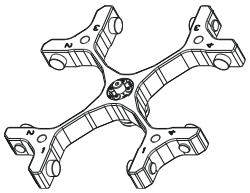
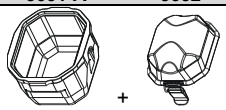
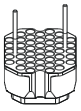
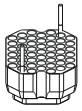
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
4) not closeable with lid 5652
12) 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".
15) At temperatures above 40 °C and/or poor filling of the tubes, these can go out of shape.

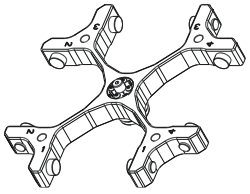
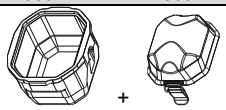
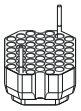
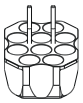
5654		5651-A + 5652							
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000		 + mit Bioabdichtung / with bio-containment 12) max. Laufzyklen / max. cycles: 60 000 max. Beladung / max. load: 1520 g							
		5682				5683	5684		
									
									
Kapazität / capacity	ml	7,5 - 8,2	9 - 10	10	10	15	4	5	6
Maße / dimensions ∅ x L	mm	15 x 92	16 x 92	15 x 102	16 x 80	17 x 120	12 x 60	12 x 75	12 x 82
Anzahl p. Rotor / number p. rotor		148	148	148	148	96	292	292	292
Drehzahl / speed	RPM	3800	3800	3800	3800	3800	3800	3800	3800
RZB / RCF	3)	2970	2970	2970	2970	3196	2874	2874	2874
Radius / radius	mm	184	184	184	184	198	178	178	178
9 (97%)	sec	62							
9	sec	58							
Temperatur / temperature	°C 1)	3							
Probenerwärmung/Sample temp. rise	K 2)	9							

5654		5651-A + 5652							
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000		 + mit Bioabdichtung / with bio-containment 12) max. Laufzyklen / max. cycles: 60 000 max. Beladung / max. load: 1520 g							
		5684						5685	
									
									
Kapazität / capacity	ml	7	1,1 - 1,4	3	4	4,5 - 5	2,7 - 3	4,9	2,6 – 3,4
Maße / dimensions ∅ x L	mm	12 x 100	8 x 66	10 x 60	10 x 88	11 x 92	11 x 66	13 x 90	13 x 65
Anzahl p. Rotor / number p. rotor		292	292	292	292	292	292	188	188
Drehzahl / speed	RPM	3800	3800	3800	3800	3800	3800	3800	3800
RZB / RCF	3)	2874	2874	2874	2874	2874	2874	2906	2906
Radius / radius	mm	178	178	178	178	178	178	180	180
9 (97%)	sec	62							
9	sec	58							
Temperatur / temperature	°C 1)	3							
Probenerwärmung/Sample temp. rise	K 2)	9							

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

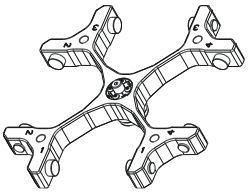
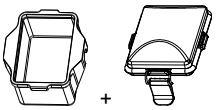
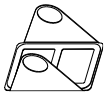
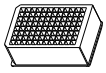
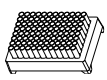
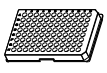
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
12) in conformity with DIN EN 61010, part 2 – 020. Observe the notes for bio safety systems in chapters "Notes on safety" and "Maintenance and servicing".

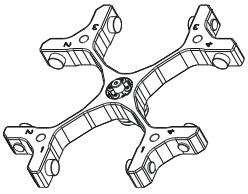
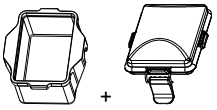
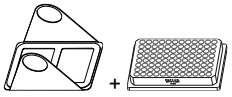
5654		5651-A + 5652							
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000		 + mit Bioabdichtung / with bio-containment 12) max. Laufzyklen / max. cycles: 60 000 max. Beladung / max. load: 1520 g							
		5685				5674			
									
									
Kapazität / capacity	ml	4 - 7	1,6 - 5	5	10	4,9	2,6 – 3,4	4- 7	1,6 - 5
Maße / dimensions ∅ x L	mm	13 x 100	13 x 75	13 x 75	13 x 100	13 x 90	13 x 65	13 x 100	13 x 75
Anzahl p. Rotor / number p. rotor		188	188	188	188	196	196	196	196
Drehzahl / speed	RPM	3800	3800	3800	3800	3800	3800	3800	3800
RZB / RCF	3)	2906	2906	2906	2906	2906	2906	2906	2906
Radius / radius	mm	180	180	180	180	180	180	180	180
9 (97%)	sec	62							
9	sec	58							
Temperatur / temperature	°C 1)	3							
Probenerwärmung/Sample temp. rise	K 2)	9							

5654		5651-A + 5652							
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 400 000		 + mit Bioabdichtung / with bio-containment 12) max. Laufzyklen / max. cycles: 60 000 max. Beladung / max. load: 1520 g							
		5674	5686						
									
			4)	4)					
									
Kapazität / capacity	ml	5	10	50					
Maße / dimensions ∅ x L	mm	13 x 75	13 x 100	29 x 115					
Anzahl p. Rotor / number p. rotor		196	196	40					
Drehzahl / speed	RPM	3800	3800	3800					
RZB / RCF		2906	2906	3196					
Radius / radius	mm	180	180	198					
9 (97%)	sec	62							
9	sec	58							
Temperatur / temperature	°C 1)	3							
Probenerwärmung/Sample temp. rise	K 2)	9							

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.
4) nicht mit Deckel 5652 verschließbar
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" 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.
4) not closeable with lid 5652
12) 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".

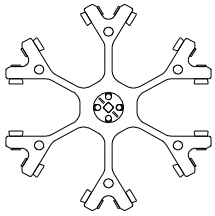
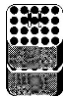
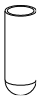
5654		5653 + 5629							
Ausschwingrotor 4-fach / Swing out rotor 4-times 									
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 80 000							
		max. Beladung / max. load: 500 g							
		4626							
									
90°		QP	DWP	MS	CP	MTP		Microtest-platten / plate Terasaki	
max. Laufzyklen / max. cycles 400 000									
Maße / dimensions TxBxH / DxWxH	mm	**86x128x 83**	**86x128x44,5**	**86x128x46**	**86x128x22**	**86x128x17,5**	**86x128x15**	**59x84x11**	
Anzahl p. Rotor / number p. rotor		4	4	4	16	20	24	8	
Drehzahl / speed	RPM	3800	3800	3800	3800	3800	3800	3800	
RZB / RCF	3)	2890	2890	2890	2890	2890	2890	2890	
Radius / radius	mm	179	179	179	179	179	179	179	
9 (97%)	sec	62							
9	sec	58							
Temperatur / temperature	°C 1)	- 4							
Probenerwärmung/Sample temp. rise	K 2)	12							

5654		5653 + 5629							
Ausschwingrotor 4-fach / Swing out rotor 4-times 									
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 80 000							
		max. Beladung / max. load: 500 g							
		4626 + 1485							
									
90°		96-PCR-Platte / plate	PCR-Strips						
max. Laufzyklen / max. cycles 400 000									
Maße / dimensions TxBxH / DxWxH	mm	**82x124x20**							
Anzahl p. Rotor / number p. rotor		4	48 x 8						
Drehzahl / speed	RPM	3800	3800						
RZB / RCF	3)	2890	2890						
Radius / radius	mm	179	179						
9 (97%)	sec	62							
9	sec	58							
Temperatur / temperature	°C 1)	- 4							
Probenerwärmung/Sample temp. rise	K 2)	12							

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

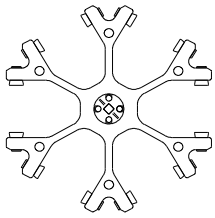
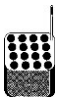
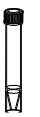
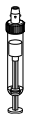
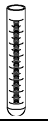
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
12) in conformity with DIN EN 61010, part 2 – 020. Observe the notes for bio safety systems in chapters "Notes on safety" and "Maintenance and servicing".

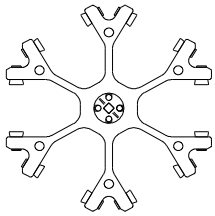
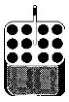
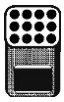
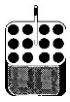
MTP Mikrotiterplatte / Microtitre plate
CP Kulturplatte / Culture plate
DWP Deep Well Platte / Deep well plate
MS Micronic System / Micronic system
QP Filterplatte / Filter plate

4446		5051 + 5053									
Ausschwingrotor 6-fach / Swing out rotor 6-times  ∠ 90° max. Laufzyklen / max. cycles 120 000		  max. Laufzyklen / max. cycles: 50 000 max. Beladung / max. load: 500 g									
		5262	5249	5243	5242	5248 5248-91 9)	5247 5247-91 9)	5227		5257	
											
											
Kapazität / capacity	ml	100	100	50	25	15	7	5	6	1,5	2,0
Maße / dimensions ∅ x L	mm	44 x 100	40 x 115	34 x 100	24 x 100	17 x 100	12 x 100	12 x 75	12 x 82	11 x38	
Anzahl p. Rotor / number p. rotor		6	6	12	30	72	120	120		240	
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000		4000	
RZB / RCF	3)	3291	3291	3291	3291	3291	3291	3309		2486/3363	
Radius / radius	mm	184	184	184	184	184	184	185		139/188	
9 (97%)	sec	38									
9	sec	46									
Temperatur / temperature	°C 1)	0									
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.
9) mit Dekantierhilfe
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.

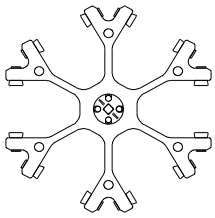
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
9) with decanting aid
12) 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".

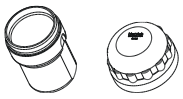
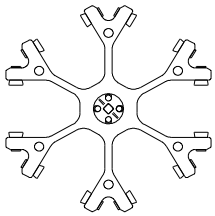
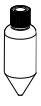
4446		5051 + 5053										
Ausschwingrotor 6-fach / Swing out rotor 6-times  ∠ 90° max. Laufzyklen / max. cycles 120 000		  max. Laufzyklen / max. cycles: 50 000 max. Beladung / max. load: 500 g										
		5281		6306	6306 4)	5258 4)		5243 4)	5264	5227		5248 5248-91 9)
												
												
Kapazität / capacity	ml	1,5	2,0	12	15	9-10	10	50	9	2,7 - 3	4,5 - 5	15
Maße / dimensions ∅ x L	mm	11 x 38		17 x 100	17 x 120	16x 92	15x 102	29 x 115	14 x 100	11 x66	11 x 92	17 x 100
Anzahl p. Rotor / number p. rotor		96		42		66		12	72	120	120	72
Drehzahl / speed	RPM	4000		4000		4000		4000	4000	4000	4000	4000
RZB / RCF	3)	3363		3434		3291		3291	3309	3309	3309	3291
Radius / radius	mm	188		192		184		184	185	185	185	184
9 (97%)	sec	38										
9	sec	46										
Temperatur / temperature	°C 1)	0										
Probenerwärmung/Sample temp. rise	K 2)	10										

4446		5051 + 5053												
Ausschwingrotor 6-fach / Swing out rotor 6-times  ∠ 90° max. Laufzyklen / max. cycles 120 000		  max. Laufzyklen / max. cycles: 50 000 max. Beladung / max. load: 500 g												
		5268		5259 4)		5264		5248	5264	5267		5268		
														
													
Kapazität / capacity	ml	2,6 ; 2,9	4,9	50		4 - 5, 5	7,5 x 8,2	8,5 - 10	4 - 7	3	1,1 – 1,4	1,6 – 5	4-7	5
Maße / dimensions ∅ x L	mm	13 x 65	13 x 90	30 x 115		15 x 75	15 x 92	16 x 100	16 x 75	10 x 60	8 x 66	13 x 75	13 x 100	13 x 75
Anzahl p. Rotor / number p. rotor		72		12		72		72	72	120		72		72
Drehzahl / speed	RPM	4000		4000		4000		4000	4000	4000		4000		4000
RZB / RCF	3)	3345		3363		3309		3291	3309	3274		3345		3345
Radius / radius	mm	187		188		185		184	185	183		187		187
9 (97%)	sec	38												
9	sec	46												
Temperatur / temperature	°C 1)	0												
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.
4) nicht mit Deckel 5053 verschließbar
9) mit Dekantierhilfe

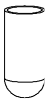
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
4) not closeable with lid 5053
9) with decanting aid

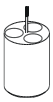
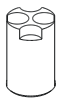
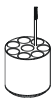
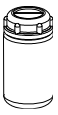
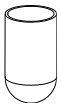
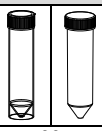
4446		5051 + 5280 5053							
Ausschwingrotor 6-fach / Swing out rotor 6-times									
		max. Laufzyklen / max. cycles: 50 000							
		max. Beladung / max. load: 500 g							
		1662						**1670**	
		 2 x in 5280						 6) 2 x in 5280	
 90° max. Laufzyklen / max. cycles 120 000		1663	1664	1665	1666	1667	1668	1663	1664
									
Kapazität / capacity	ml	1	2	4	8	3 x 2	4 x 1	1	2
Maße / dimensions ∅ / A	mm²	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		12	12	12	12	12	12	24	24
Filterkarten / filter cards		1675	1675	1675	1676	1677	1678	1692	1692
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	4000
RZB / RCF	3)	2290/3291	2290/3291	2290/3291	2290/3291	2290/3291	2290/3291	2290/3291	2290/3291
Radius / radius	mm	128 / 184	128 / 184	128 / 184	128 / 184	128 / 184	128 / 184	128 / 184	128 / 184
9 (97%)	sec	38							
9	sec	46							
Temperatur / temperature	°C 1)	0							
Probenerwärmung/Sample temp. rise	K 2)	10							

4446		5051 + 5280 5053				5092 + 5093			
Ausschwingrotor 6-fach / Swing out rotor 6-times									
						aerosoldicht / aerosol-proof **12)**			
		max. Laufzyklen / max. cycles: 50 000				max. Laufzyklen / max. cycles: 30000			
		max. Beladung / max. load: 500 g				max. Beladung / max. load: 500 g			
		1670				**SK 94.89**		5121	5120
		 6) 2 x in 5280							
 90° max. Laufzyklen / max. cycles 120 000		1665	1666	1667	1668	Falcon®	Falcon®	----	-----
							 4)		
Kapazität / capacity	ml	4	8	3 x 2	4 x 1	175	225	8	4,5 - 5
Maße / dimensions ∅ / A	mm²	12,4 / 120	17,5 / 240	8,7 / 60	6,2 / 30	61 x 118	61 x 137	16 x 125	11 x 92
Anzahl p. Rotor / number p. rotor		24	24	24	24	6	6	42	72
Filterkarten / filter cards		1692	1691	1694	1693	---	---	---	---
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	4000
RZB / RCF	3)	2290/3291	2290/3291	2290/3291	2290/3291	3631	3631	3542	3542
Radius / radius	mm	128 / 184	128 / 184	128 / 184	128 / 184	203	203	198	198
9 (97%)	sec	38							
9	sec	46							
Temperatur / temperature	°C 1)	0							
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.
4) nicht mit Deckel 5053/5093 verschließbar
6) Objektträger nur belastbar bis RZB 1100
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.

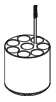
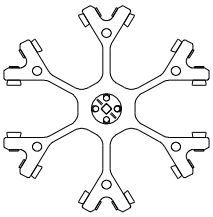
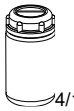
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
4) not closeable with lid 5053/5093
6) Object slide will not stand RCF values exceeding 1100
12) 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".

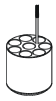
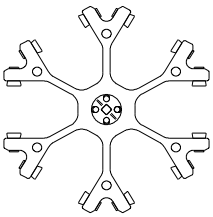
4446		5092 + 5093							
Ausschwingrotor 6-fach / Swing out rotor 6-times									
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 30 000							
		max. Beladung / max. load: 500 g							
		5126	5125	5123	5129	5124	5122	5120	
									
90°									
max. Laufzyklen / max. cycles 120 000									
Kapazität / capacity	ml	100	100	50	15	50	25	4 - 7	7
Maße / dimensions ∅ x L	mm	40 x 115	44 x 100	30 x 115	17 x 120	34 x 100	24 x 100	13 x 100	12 x 100
Anzahl p. Rotor / number p. rotor		6	6	12	42	6	24	72	72
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	4000
RZB / RCF	3)	3488	3488	3631	3631	3631	3434	3542	3542
Radius / radius	mm	195	195	203	203	195	192	198	198
9 (97%)	sec	38							
9	sec	46							
Temperatur / temperature	°C 1)	0							
Probenerwärmung/Sample temp. rise	K 2)	10							

4446		5092 + 5093							
Ausschwingrotor 6-fach / Swing out rotor 6-times									
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 30 000							
		max. Beladung / max. load: 500 g							
		5128	6319 4)	1791	5121	5134	5122	5135	5136
									
			5127						
90°									
max. Laufzyklen / max. cycles 120 000			15)						
Kapazität / capacity	ml	5	250	250	12	25	30	50	8,5 - 10
Maße / dimensions ∅ x L	mm	13 x 75	62 x 122	65 x 115	17 x 100	25 x 90	25 x 110	29 x 115	16 x 100
Anzahl p. Rotor / number p. rotor		72	6	6	42	18	24	12	48
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	4000
RZB / RCF	3)	3542	3631	3631	3542	3363	3327	3560	3488
Radius / radius	mm	198	203	203	198	188	192	199	195
9 (97%)	sec	38							
9	sec	46							
Temperatur / temperature	°C 1)	0							
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.
4) nicht mit Deckel 5093 verschließbar
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.
15) Bei Temperaturen über 40 °C und/oder geringer Befüllung der Gefäße können sich diese verformen.

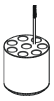
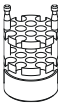
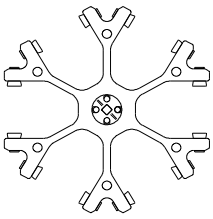
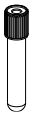
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
4) not closeable with lid 5093
12) 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".
15) At temperatures above 40 °C and/or poor filling of the tubes, these can go out of shape.

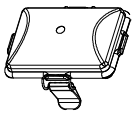
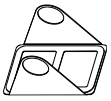
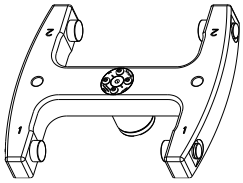
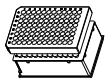
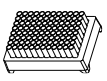
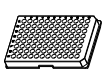
4446		5092 + 5093							
Ausschwingrotor 6-fach / Swing out rotor 6-times		 							
		mit Bioabdichtung / with bio-containment 12)							
		max. Laufzyklen / max. cycles: 30 000							
		max. Beladung / max. load: 500 g							
		5121						6319	5136
									
 90° max. Laufzyklen / max. cycles 120 000					4)			- - -	
								 4/15)	
Kapazität / capacity	ml	15	2,6 – 2,9	9 - 10	10	15	15	290	15
Maße / dimensions ∅ x L	mm	17 x 100	13 x 65	16 x 92	15 x 102	17 x 120	17 x 100	62 x 137	17 x 100
Anzahl p. Rotor / number p. rotor		42	42	42	42	42	42	6	48
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	4000
RZB / RCF	3)	3542	3542	3542	3542	3542	3542	3631	3488
Radius / radius	mm	198	198	198	198	198	198	203	195
9 (97%)	sec	38							
9	sec	46							
Temperatur / temperature	°C 1)	0							
Probenerwärmung/Sample temp. rise	K 2)	10							

4446		5092 + 5093						
Ausschwingrotor 6-fach / Swing out rotor 6-times		 						
		mit Bioabdichtung / with bio-containment 12)						
		max. Laufzyklen / max. cycles: 30 000						
		max. Beladung / max. load: 500 g						
		5136						
								
 90° max. Laufzyklen / max. cycles 120 000								
								
Kapazität / capacity	ml	10	15		4 – 4,5	7,5 - 8,2	9 - 10	10	4 - 7
Maße / dimensions ∅ x L	mm	16 x 80	17 x 100		15 x 75	15 x 92	16 x 92	15 x 102	16 x 75
Anzahl p. Rotor / number p. rotor		48	48		48	48	48	48	48
Drehzahl / speed	RPM	4000	4000		4000	4000	4000	4000	4000
RZB / RCF	3)	3488	3488		3488	3488	3488	3488	3488
Radius / radius	mm	195	195		195	195	195	195	195
9 (97%)	sec	38							
9	sec	46							
Temperatur / temperature	°C 1)	0							
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.
4) nicht mit Deckel 5093 verschließbar
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" 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.
4) not closeable with lid 5093
12) 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".

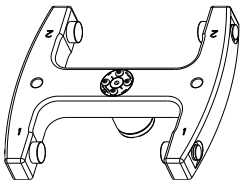
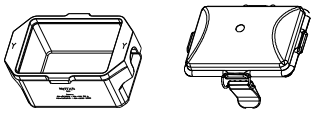
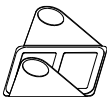
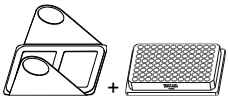
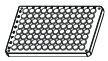
4446		5092 + 5093												
Ausschwingrotor 6-fach / Swing out rotor 6-times		 												
		mit Bioabdichtung / with bio-containment 12)												
		max. Laufzyklen / max. cycles: 30 000												
		max. Beladung / max. load: 500 g												
		5137										5138		
														
 90° max. Laufzyklen / max. cycles 120 000															
Kapazität / capacity	ml	1,6 - 5	4 – 7	5		6	1,1 - 1,4	2,6 - 2,9	2,7 - 3	4,5 - 5	4,9	1,1 - 1,4	2,7 - 3	2,6 - 2,9	1,6 - 5
Maße / dimensions ∅ x L	mm	13 x 75	13 x 100	12 x 75	13 x 75	12 x 82	8 x 66	13 x 65	11 x 66	11 x 92	13 x 90	**8 x 66**	**11 x 66**	13 x 65	13 x 75
Anzahl p. Rotor / number p. rotor		48		48		48	48		48		48	72		72	
Drehzahl / speed	RPM	4000		4000		4000	4000		4000		4000	4000		4000	
RZB / RCF	3)	3488		3488		3488	3488		3488		3488	3077		3077	
Radius / radius	mm	195		195		195	195		195		195	172		172	
9 (97%)	sec	38													
9	sec	46													
Temperatur / temperature	°C 1)	0													
Probenerwärmung/Sample temp. rise	K 2)	10													

5622		5631 + 4627						
Ausschwingrotor 2-fach / Swing out rotor 2-times		 						
		mit Bioabdichtung / with bio-containment 12)						
		max. Laufzyklen / max. cycles: 50 000						
		max. Beladung / max. load: 500 g						
		4626						
								
 90° max. Laufzyklen / max. cycles 400 000		QP	DWP	MS	CP	MTP		
								
Kapazität / capacity	ml	---	---	---	---	---	---	
Maße / dimensions TxBxH / DxWxH	mm	86x128x83	86x128x44,5	86x128x46	86x128x22	86x128x17,5	86x128x15	
Anzahl p. Rotor / number p. rotor		2	2	2	8	10	12	
Drehzahl / speed	RPM	5900 / (6200) *	5900 / (6200) *	5900 / (6200) *	5900 / (6200) *	5900 / (6200) *	5900 / (6200) *	
RZB / RCF	3)	5838/ (6446) *	5838/ (6446) *	5838/ (6446) *	5838/ (6446) *	5838/ (6446) *	5838/ (6446) *	
Radius / radius	mm	max. 150	max. 150	max. 150	max. 150	max. 150	max. 150	
9 (97%)	sec	50 / (52) *	50 / (52) *	50 / (52) *	50 / (52) *	50 / (52) *	50 / (52) *	
9	sec	32 / (39) *	32 / (39) *	32 / (39) *	32 / (39) *	32 / (39) *	32 / (39) *	
Temperatur / temperature	°C 1)	10						
Probenerwärmung/Sample temp. rise	K 2)	12						

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.
* (nur bei Kühlzentrifuge)
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.

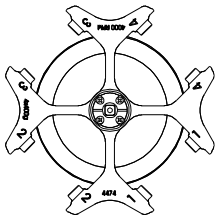
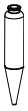
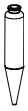
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
* (only with cooling centrifuges)
12) 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".

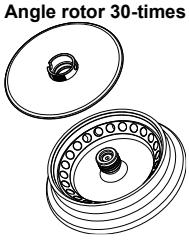
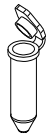
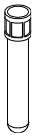
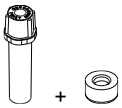
MTP Mikrotiterplatte / Microtitre plate
CP Kulturplatte / Culture plate
DWP Deep Well Platte / Deep well plate
MS Micronic System / Micronic system
QP Filterplatte / Filter plate

5622		5631 + 4627					
Ausschwingrotor 2-fach / Swing out rotor 2-times  ∠ 90° max. Laufzyklen / max. cycles 400 000		 mit Bioabdichtung / with bio-containment 12) max. Laufzyklen / max. cycles: 50 000 max. Beladung / max. load: 500 g					
		4626	**4626 + 1485**				
							
		Microtest-platten / plate Terasaki	96-PCR-Platte / plate	PCR-Strips			
							
Kapazität / capacity	ml	---	---	0,2 ---			
Maße / dimensions TxBxH / DxWxH	mm	59x84x11	82x124x20	---			
Anzahl p. Rotor / number p. rotor		4	2	24			
Drehzahl / speed	RPM	5900 / (6200) *	5900 / (6200) *	5900 / (6200) *			
RZB / RCF	3)	5838/ (6446) *	5838/ (6446) *	5838/ (6446) *			
Radius / radius	mm	max. 150	max. 150	max. 150			
9 (97%)	sec	50 / (52) *	50 / (52) *	50 / (52) *			
9	sec	32 / (39) *	32 / (39) *	32 / (39) *			
Temperatur / temperature	°C 1)	10					
Probenerwärmung/Sample temp. rise	K 2)	12					

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.
* (nur bei Kühlzentrifuge)
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.

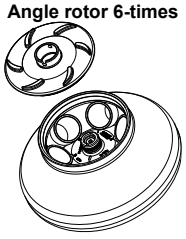
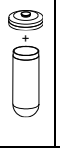
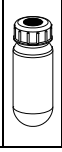
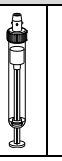
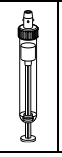
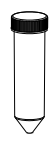
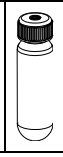
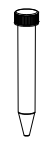
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
* (only with cooling centrifuges)
12) 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".

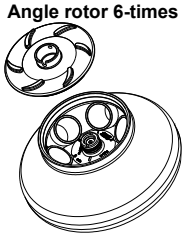
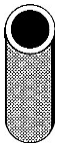
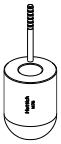
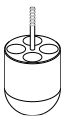
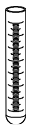
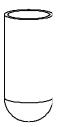
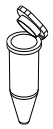
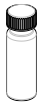
4474		4275						
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90° max. Laufzyklen / max. cycles 40 000								
		max. Laufzyklen / max. cycles: 50 000						
		max. Beladung / max. load: 370 g						
		4276-B	4277	0771	0703			
								
		0531		0528				
		 8)	 8)	 8)				
Kapazität / capacity	ml	100	100	100	50			
Maße / dimensions ∅ x L	mm	37 x 200	44 x 168	58 x 161	36,5 x 185			
Anzahl p. Rotor / number p. rotor		4	4	4	4			
Drehzahl / speed	RPM	2000	2000	2000	2000			
RZB / RCF	3)	961	961	984	912			
Radius / radius	mm	215	215	220	204			
9 (97%)	sec	14						
9	sec	17						
Temperatur / temperature	°C 1)	- 8						
Probenerwärmung/Sample temp. rise	K 2)	4						

4489-A								
Winkelrotor 30-fach / Angle rotor 30-times  ∠ 45° mit Bioabdichtung / with bio-containment 12)		---	2031	2023		2024		
			 13)					
								
Kapazität / capacity	ml	2,0	1,5	0,8	0,5	0,4	0,2	0,5
Maße / dimensions ∅ x L	mm	11 x 38	11 x 38	8 x 45	8 x 30	6 x 45	6 x 18	10,7 x 46
Anzahl p. Rotor / number p. rotor		30	30	30	30	30	30	15
Drehzahl / speed	RPM	15000						
RZB / RCF	3)	max. 24400						23394
Radius / radius	mm	max. 97						93
9 (97%)	sec	65						
9	sec	63						
Temperatur / temperature	°C 1)	4						
Probenerwärmung/Sample temp. rise	K 2)	19						

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.
8) Gefäß nur belastbar bis RZB 700
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.
13) bei hochtouriger Zentrifugation empfohlen

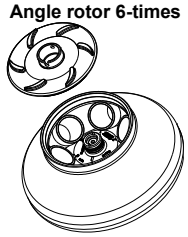
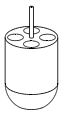
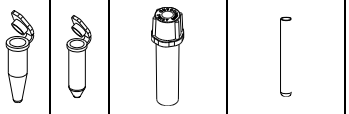
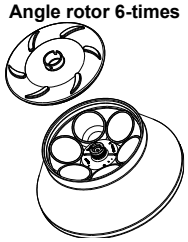
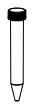
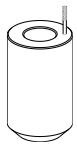
1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.
8) tube will not stand RCF values exceeding 700
12) 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".
13) recommended for high-speed centrifugation

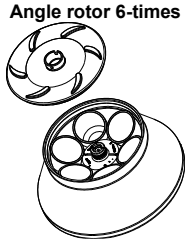
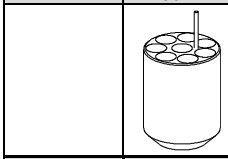
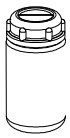
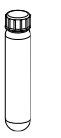
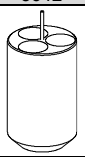
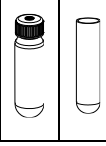
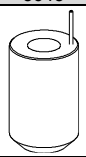
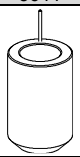
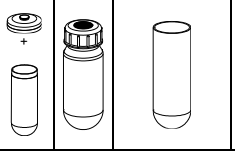
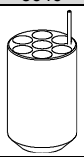
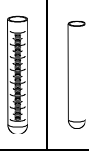
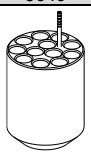
5615												
Winkelrotor 6-fach / Angle rotor 6-times  ∠ 45° mit Bioabdichtung / with bio-containment 12)		---		1454	1446	1447		1466	1451			1448
												
												
Verwendungsdauer / service life	Jahre / years	5										
Max. Laufzyklen / max. cycles		15 000										
Kapazität / capacity	ml	94	85	50	50	25	30	15	15	7,5 - 8,2	9 - 10	10
Maße / dimensions ∅ x L	mm	38 x 110	38 x 106	29 x 115	29 x 107	24 x 100	26 x 95	17 x 120	17x100	15 x 92	16 x 92	16 x 80
Anzahl p. Rotor / number p. rotor		6		6	6	6		6	6	6		12
Drehzahl / speed	RPM	11500		11500	11500	11500		11500	11500	11500		11500
RZB / RCF	3)	18038		17595	17299	16560		17299	17003	17003		17003
Radius / radius	mm	122		119	117	112		117	115	115		115
9 (97%)	sec	58										
9	sec	64										
Temperatur / temperature	°C 1)	6										
Probenerwärmung/Sample temp. rise	K 2)	22										

5615								
Winkelrotor 6-fach / Angle rotor 6-times  ∠ 45° mit Bioabdichtung / with bio-containment 12)		1451			1463		---	1476	1403
									
									
Verwendungsdauer / service life	Jahre / years	5							
Max. Laufzyklen / max. cycles		15 000							
Kapazität / capacity	ml	8,5 - 10	10	15	50	75	85	5	4
Maße / dimensions ∅ x L	mm	16 x 100	15 x 102	17 x 100	34 x 100	35 x 105	38 x 102	17 x 51	12 x 40
Anzahl p. Rotor / number p. rotor		6							24
Drehzahl / speed	RPM	11 500							
RZB / RCF	3)	17003	17003	17003	17743	17743	18038	16856	17003
Radius / radius	mm	115	115	115	120	120	122	114	115
9 (97%)	sec	58							
9	sec	64							
Temperatur / temperature	°C 1)	6							
Probenerwärmung/Sample temp. rise	K 2)	22							

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.
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" 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.
12) 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".

5615						5645			
Winkelrotor 6-fach / Angle rotor 6-times  ∠ 45° mit Bioabdichtung / with bio-containment 12)	1449  					**Winkelrotor 6-fach / Angle rotor 6-times**  ∠ 25° mit Bioabdichtung / with bio-containment 12)	**5637**  	**5638**  	
Verwendungsdauer / service life	Jahre / years	5				Verwendungsdauer / service life	Jahre / years	5	
Max. Laufzyklen / max. cycles		15000				Max. Laufzyklen / max. cycles		15000	
Kapazität / capacity	ml	1,5	2,0	0,5	3	Kapazität / capacity	ml	15	50
Maße / dimensions ∅ x L	mm	11 x 38		10,7 x 46	10 x 60	Maße / dimensions ∅ x L	mm	17 x 120	29 x 115
Anzahl p. Rotor / number p. rotor		24				Anzahl p. Rotor / number p. rotor		30	6
Drehzahl / speed	RPM	11500				Drehzahl / speed	RPM	8500 (9500)*	
RZB / RCF	3)	17299				RZB / RCF	3)	10824 (13521)*	9532 (11906)*
Radius / radius	mm	117				Radius / radius	mm	134	118
9 (97%)	sec	58				9 (97%)	sec	98 / (115)*	
9	sec	64				9	sec	105 (120)*	
Temperatur / temperature	°C 1)	6				Temperatur / temperature	°C 1)	7	
Probenerwärmung/Sample temp. rise	K 2)	22				Probenerwärmung/Sample temp. rise	K 2)	21	

5645											
Winkelrotor 6-fach / Angle rotor 6-times  ∠ 25° mit Bioabdichtung / with bio-containment 12)	---  5127  15)	5641 	5642  		5643  	5644  			5646  	5649  
Verwendungsdauer / service life	Jahre / years	5									
Max. Laufzyklen / max. cycles		15 000									
Kapazität / capacity	ml	250	10	30	25	50	94	85	85	15	5 ml
Maße / dimensions ∅ x L	mm	61,5 x 122	16 x 80	26 x 95	24 x 100	29 x 107	38 x 110	38 x 106	38 x 102	17 x 100	12 x 75
Anzahl p. Rotor / number p. rotor		6	48	18		6	6		6	42	72
Drehzahl / speed	RPM	8500 (9500)*	8500 (9500)*	8500 (9500)*		8500 (9500)*	8500 (9500)*		8500 (9500)*	8500 (9500)*	8500 (9500)*
RZB / RCF	3)	11228 (14025)*	10743 (13420)*	10339 (12915)*		9693 (12108)*	9855 (12310)*		9855 (12310)*	10662 (13319)*	10420 (13016)*
Radius / radius	mm	139	133	128		120	122		122	132	129
9 (97%)	sec	98 / (115)*	98 / (115)*	98 / (115)*		98 / (115)*	98 / (115)*		98 / (115)*	98 / (115)*	98 / (115)*
9	sec	105 (120)*	105 (120)*	105 (120)*		105 (120)*	105 (120)*		105 (120)*	105 (120)*	105 (120)*
Temperatur / temperature	°C 1)	7									
Probenerwärmung/Sample temp. rise	K 2)	21									

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.
* (nur bei Kühlzentrifuge)
12) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten.
15) Bei Temperaturen über 40 °C und/oder geringer Befüllung der Gefäße können sich diese verformen.

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.
* (only with cooling centrifuges)
12) 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".
15) At temperatures above 40 °C and/or poor filling of the tubes, these can go out of shape.