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Centrifuge 5427 R

Original instructions

5409 900.021-05/112018

Table of contents

1 Operating instructions

1.1 Using this manual

- Read this operating manual completely before using the device for the first time. Observe the instructions for use of the accessories where applicable.
- This operating manual is part of the product. Please keep it in a place that is easily accessible.
- Enclose this operating manual when transferring the device to third parties.
- The current version of the operating manual for all available languages can be found on our webpage www.eppendorf.com/manuals.

1.2 Danger symbols and danger levels

1.2.1 Danger symbols

The safety instructions in this manual have the following danger symbols and danger levels:

	**Hazard point**		**Biohazard**
	**Electric shock**		**Explosive substances**
	**Risk of crushing**		**Material damage**

1.2.2 Danger levels

DANGER	*Will* lead to severe injuries or death.
WARNING	*May* lead to severe injuries or death.
CAUTION	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

1.3 Symbols used

Depiction	Meaning
1. 2.	Actions in the specified order
▸	Actions without a specified order
•	List
Text	Display or software texts
ⓘ	Additional information

1.4 Abbreviations used

PCR
Polymerase Chain Reaction

rcf
Relative centrifugal force : *g*-force in m/s²

rpm
Revolutions per minute

UV
Ultraviolet radiation

2 Safety

2.1 Intended use

The Centrifuge 5427 R is used for the separation of aqueous solutions and suspensions of different densities in approved sample tubes.

The Centrifuge 5427 R is exclusively intended for use indoors. All country-specific safety requirements for operating electrical equipment in the laboratory must be observed.

2.2 User profile

The device and accessories may only be operated by trained and skilled personnel.

Before using the device, read the operating manual carefully and familiarize yourself with the device's mode of operation.

2.3 Application limits

2.3.1 Declaration concerning the ATEX directive (2014/34/EU)

DANGER! Risk of explosion.

- Do not operate the device in areas where explosive substances are handled.
- Do not use this device to process any explosive or highly reactive substances.
- Do not use this device to process any substances which may generate an explosive atmosphere.

Due to its design and the environmental conditions inside the device, the Centrifuge 5427 R is not suitable for use in a potentially explosive atmosphere.

The device must be used only in a safe environment, such as in the open environment of a ventilated laboratory or a fume hood. The use of substances which could create a potentially explosive atmosphere is not permitted. The final decision on the risks associated with the use of these types of substances is the responsibility of the user.

2.4 Information on product liability

In the following cases, the designated protection of the device may be affected. Liability for any resulting damage or personal injury is then transferred to the owner:

- The device is not used in accordance with the operating manual.
- The device is used outside of its intended use.
- The device is used with accessories or consumables that are not recommended by Eppendorf.
- The device is maintained or repaired by persons not authorized by Eppendorf AG.
- The user makes unauthorized changes to the device.

2.5 Warnings for intended use

2.5.1 Personal injury or damage to device

WARNING! Electric shock due to damage to the device or mains/power cord.

- Only switch on the device if the device and mains/power cord are undamaged.
- Only operate devices which have been installed or repaired properly.
- In case of danger, disconnect the device from the mains/power supply voltage. Disconnect the mains/power plug from the device or the earth/grounded socket. Use the isolating device intended for this purpose (e.g. the emergency switch in the laboratory).

WARNING! Lethal voltages inside the device.
If you touch any parts which are under high voltage you may experience an electric shock. Electric shocks cause injuries to the heart and respiratory paralysis.

- Ensure that the housing is closed and undamaged.
- Do do not remove the housing.
- Ensure that no liquids can penetrate the device.

Only authorized service staff may open the device.

WARNING! Danger due to incorrect voltage supply.

- Only connect the device to voltage sources which correspond with the electrical requirements on the name plate.
- Only use earth/grounded sockets with a protective earth (PE) conductor.
- Only use the mains/power cord supplied.

WARNING! Damage to health due to infectious liquids and pathogenic germs.

- When handling infectious liquids and pathogenic germs, observe the national regulations, the biosafety level of your laboratory, the material safety data sheets, and the manufacturer's application notes.
- Use aerosol-tight sealing systems for the centrifugation of these substances.
- When working with pathogenic germs which belong to a higher risk group, more than one aerosol-tight bioseal must be used.
- Wear your personal protective equipment.
- For comprehensive regulations about handling germs or biological material of risk group II or higher, please refer to the "Laboratory Biosafety Manual" (source: World Health Organization, Laboratory Biosafety Manual, the current edition).

WARNING! Risk of injury when opening or closing the centrifuge lid
There is a risk of crushing your fingers when opening or closing the centrifuge lid.

- Do not reach between the device and centrifuge lid when opening or closing the centrifuge lid.
- Do not reach into the locking mechanism of the centrifuge lid.
- Open the centrifuge lid fully to ensure that the centrifuge lid cannot slam shut.

WARNING! Risk of injury from rotating rotor.
If the emergency release of the lid is operated, the rotor may continue to rotate for several minutes.

- Wait for the rotor to stop before operating the emergency release.
- To check, look through the monitoring glass in the centrifuge lid.

WARNING! Risk of injury from chemically or mechanically damaged accessories.
Even minor scratches and cracks can lead to severe internal material damage.

- Protect all accessory parts from mechanical damage.
- Inspect the accessories for damage before each use. Replace any damaged accessories.
- Do not use rotors, rotor lids or buckets showing signs of corrosion or mechanical damage (e.g., deformations).
- Do not use accessories that have exceeded their maximum service life.

CAUTION! Poor safety due to incorrect accessories and spare parts.
The use of accessories and spare parts other than those recommended by Eppendorf may impair the safety, functioning and precision of the device. Eppendorf cannot be held liable or accept any liability for damage resulting from the use of accessories and spare parts other than those recommended, or from the improper use of such equipment.

- Only use accessories and original spare parts recommended by Eppendorf.

NOTICE! Damage to the device due to spilled liquids.

1. Switch off the device.
2. Disconnect the device from the mains/power supply.
3. Carefully clean the device and the accessories in accordance with the cleaning and disinfection instructions in the operating manual.
4. If a different cleaning and disinfecting method is to be used, contact Eppendorf AG to ensure that the intended method will not damage the device.

NOTICE! Damage to electronic components due to condensation.
Condensate may form in the device when it has been transported from a cool environment to a warmer environment.

- After installing the device, wait for at least 4 h. Only then connect the device to the mains/power line.

2.5.2 Incorrect handling of the centrifuge

NOTICE! Damage from knocking against or moving the device during operation.
If the rotor hits the rotor chamber wall, it will cause considerable damage to the device and rotor.

- Do not move or knock against the device during operation.

2.5.3 Incorrect handling of the rotors

WARNING! Risk of injury from improperly attached rotors and rotor lids.

- Only centrifuge with the rotor and rotor lid firmly tightened.
- If unusual noises occur when the centrifuge starts, the rotor or rotor lid may not be attached properly. Press the **start/stop** key immediately to stop centrifugation.

CAUTION! Risk of injury due to asymmetric loading of a rotor.

- Load rotors symmetrically with identical tubes.
- Only load adapters with suitable tubes.
- Always use the same type of tubes (weight, material/density and volume).
- Check symmetric loading by balancing the adapters and tubes used with a balance.

CAUTION! Risk of injury from overloaded rotor.
The centrifuge is designed for the centrifugation of material with a maximum density of 1.2 g/mL at maximum speed and filling volume and/or load.

- Do not exceed the maximum load of the rotor.

NOTICE! Damage to rotors from aggressive chemicals.
Rotors are high-quality assemblies which withstand extreme stresses. This stability can be impaired by aggressive chemicals.

- Avoid using aggressive chemicals such as strong and weak alkalis, strong acids, solutions with mercury ions, copper ions and other heavy metal ions, halogenated hydrocarbons, concentrated saline solutions and phenol.
- If it is contaminated by aggressive chemicals, clean the rotor and especially the rotor bores immediately using a neutral cleaning agent.
- Due to the manufacturing process, color variations may occur on PTFE coated rotors. These color variations do not affect the service life or resistance to chemicals.

NOTICE! If handled incorrectly, the rotor may fall.
The swing-bucket rotor may fall if the buckets are used as handles.

- Remove the buckets before inserting and/or removing a swing-bucket rotor.
- Always use both hands to carry the rotor cross.

2.5.4 Extreme strain on the centrifugation tubes

CAUTION! Risk of injury from overloaded tubes.

- Note the loading limits specified by the tube manufacturer.
- Only use tubes which are approved by the manufacturer for the required *g*-forces (rcf).

NOTICE! Risk from damaged tubes.
Damaged tubes must not be used, as this could cause further damage to the device and the accessories and sample loss.

- Visually check all tubes for damage before use.

NOTICE! Danger due to open tube lids.
Open tube lids may break off during centrifugation and damage both the rotor and the centrifuge.

- Carefully seal all tube lids before centrifuging.

NOTICE! Damage to plastic tubes due to organic solvents.
Organic solvents (e.g., phenol, chloroform) reduce the strength of plastic tubes, so that the tubes may get damaged.

- Note the manufacturer's information on the chemical resistance of the tubes.

NOTICE! Danger due to deformed or embrittled tubes. Autoclaving at excessive temperatures can lead to plastic tubes becoming brittle and deformed.
This could cause damage to the device and the accessories and sample loss.

- Observe the temperatures specified by the manufacturer when autoclaving tubes.
- Do not use deformed or brittle tubes.

2.5.5 Aerosol-tight centrifugation

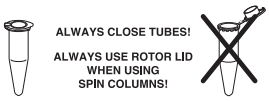
WARNING! Damage to health due to limited aerosol tightness with incorrect rotor/rotor lid combination.
Aerosol-tight centrifugation is guaranteed only if the rotors and rotor lids intended for this purpose are used. The designation of aerosol-tight fixed-angle rotors always starts with **FA**. In addition, the aerosol-tight rotors and rotor lids of this centrifuge are marked with a red ring on the rotor and a red rotor lid screw.
Aerosol-tight swing-bucket rotors are marked **AT** (aerosol-tight).

- Always use rotors and rotor lids marked aerosol-tight together for aerosol-tight centrifugation. The details specifying in which centrifuge you may use the aerosol-tight rotors and rotor lids can be found on the rotor and on the top of the rotor lid.
- Only use aerosol-tight rotor lids in combination with rotors that are specified on the rotor lid.

WARNING! Damage to health due to limited aerosol tightness if used incorrectly.
Mechanical stresses and contamination by chemicals or other aggressive solvents may impair the aerosol tightness of the rotors and rotor lids. Autoclaving at excessive temperatures can lead to vessels, adapters and rotor lids becoming brittle and deformed.

- Check the integrity of the seals of the aerosol-tight rotor lids or caps before each use.
- Only use aerosol-tight rotor lids or caps if the seals are undamaged and clean.
- Do not exceed temperatures of 121°C or a time of more than 20 min. while autoclaving.
- After each proper autoclaving process (121 °C, 20 min.), coat the threads of the rotor lid screw with a thin layer of pivot grease (order no. Int. 5810 350.050, North America 022634330).
- For QuickLock rotor lids, only the seal must be replaced after 50 autoclaving cycles.
- **Never** store aerosol-tight rotors or buckets closed.

2.6 Safety instructions on the device and accessories

Depiction	Meaning	Location
	**NOTICE** ▸ Observe the safety instructions in the operating manual.	Right side of the device
	▸ Observe the operating manual.	Right side of the device
	Warning: Possible hand injury	Upper side of the device, under the centrifuge lid
	▸ Seal the tubes. ▸ Use the rotor lid	Upper side of the device, under the centrifuge lid
	▸ Always tighten the rotor with the enclosed rotor key.	Upper side of the device, under the centrifuge lid
	Warning of biological risks when handling infectious liquids or pathogenic germs.	Aerosol-tight fixed-angle rotors: Rotor lid

3 Product description

3.1 Product overview

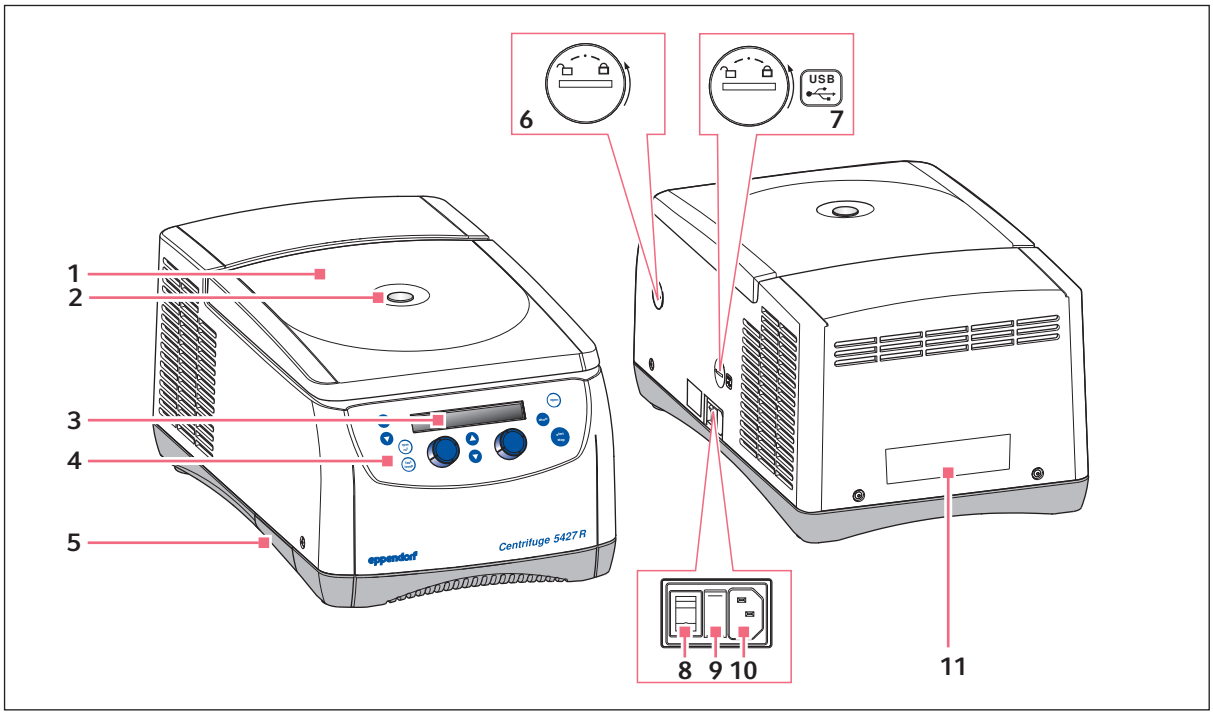


Fig. 3-1: Front and rear view of the Centrifuge 5427 R

1 Centrifuge lid

2 Monitoring glass
Visual control for rotor stop or speed control option using stroboscope

3 Display
Display of centrifugation parameters and device settings (see Fig. 5-2 on p. 24)

4 Control panel
Keys and dials for operating centrifuge (see Fig. 5-1 on p. 23)

5 Condensation water tray

6 Emergency release
(see p. 46)

7 Interface for software updates
For Technical Service only: interface for error analyses and software updates

8 Mains/power switch
Switch for switching the device on (I) and off (0)

9 Fuse holder

10 Mains/power cord socket
Connection for the supplied mains/power cord.

11 Name plate

3.2 Delivery package

1	Centrifuge 5427 R
1	Rotor key
1	Mains/power cord
1	Directions
1	Condensation water tray

- Check whether the delivery is complete.
- Check all parts for any transport damage.
- To safely transport and store the device, retain the transport box and packing material.

3.3 Features

The high-performance Centrifuge 5427 R has a capacity of 48 × 2 mL and reaches a maximum of 25 001 × *g* or a maximum of 16 220 rpm. You can select from 9 different rotors to centrifuge the following tubes for your various applications:

- Micro test tubes (0.2 mL to 5.0 mL)
- PCR strips
- Microtainers (0.6 ml)
- Spin columns (1.5 mL, 2.0 mL)

The Centrifuge 5427 R has a temperature control function for centrifuging at temperatures from -11 °C to 40 °C. The **FastTemp** function is used to start a temperature control run without samples in order to quickly bring the rotor chamber to the set temperature.

The Centrifuge 5427 R can be connected to the Eppendorf VisioNize system. The Eppendorf VisioNize system provides the option to connect the centrifuge to centralized monitoring and data management software. For further information, please refer to the www.eppendorf.com.

3.4 Name plate

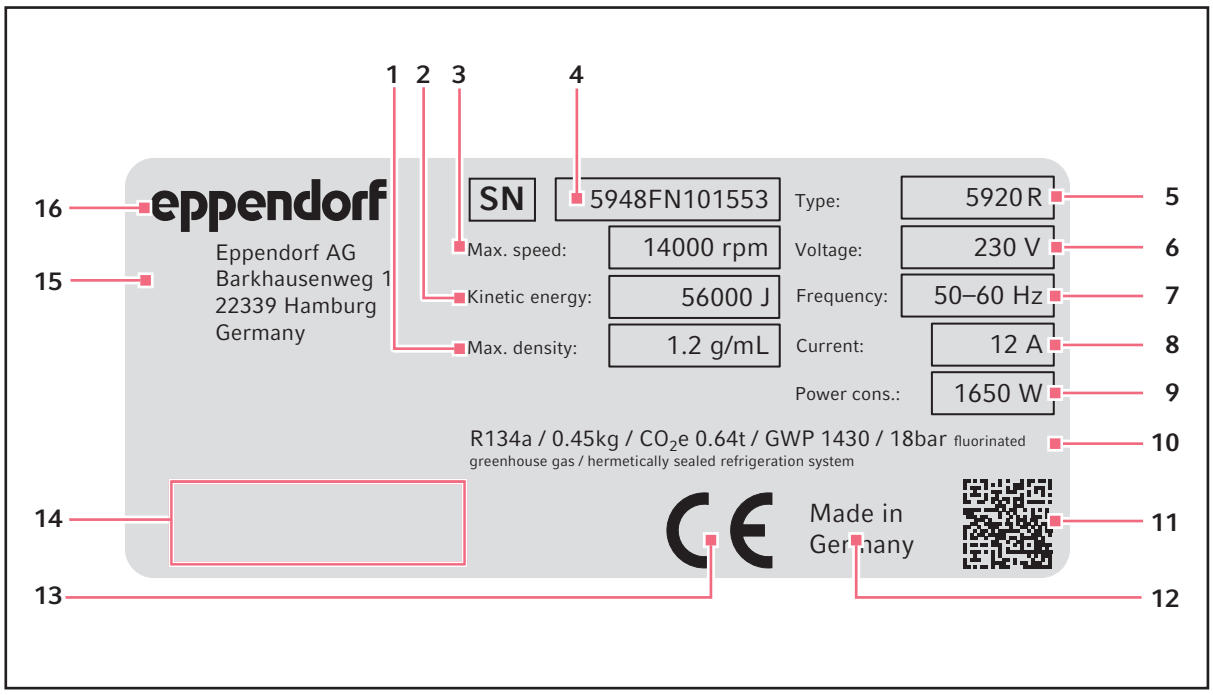


Fig. 3-2: Eppendorf AG device identification (example)

1 **Maximum density of the material for centrifuging**
2 **Maximum kinetic energy**
3 **Maximum speed**
4 **Serial number**
5 **Product name**
6 **Rated voltage**
7 **Rated frequency**
8 **Maximum rated current**
9 **Maximum rated power**
10 **Information on the refrigerant (refrigerated centrifuges only)**
11 **Data matrix code for serial number**
12 **Designation of origin**
13 **CE marking**
14 **Approval marks and symbols (device-specific)**
15 **Manufacturer's address**
16 **Manufacturer**

Tab. 3-1: Approval marks and symbols (device-specific)

Symbol/Approval mark	Meaning
SN	Serial number
	Symbol for waste electrical and electronic equipment (WEEE) according to EU Directive 2012/19/EU, European Community
c UL US LISTED	UL listing approval mark: declaration of conformity, USA
FC	Certification mark for electromagnetic compatibility according to the *Federal Communications Commission*, USA
	Certification mark for compliance with "China-RoHS" thresholds according to SJ/T 11364 *Marking for the restriction of the use of hazardous substances in electrical and electronic products* standard, People's Republic of China

4 Installation

4.1 Selecting the location

WARNING! Danger due to incorrect voltage supply.

- Only connect the device to voltage sources which correspond with the electrical requirements on the name plate.
- Only use earth/grounded sockets with a protective earth (PE) conductor.
- Only use the mains/power cord supplied.

NOTICE! If an error occurs, objects in the immediate proximity of the device may become damaged.

- In accordance with the recommendations of EN 61010-2-020, leave a safety clearance of **30 cm** around the device during operation.
- Please remove all materials and objects from this area.

NOTICE! Damage due to overheating.

- Do not install the device near heat sources (e.g. heating, drying cabinet).
- Do not expose the device to direct sunlight.
- Ensure unobstructed air circulation. Maintain a clearance of at least 30 cm (11.8 in) around all ventilation gaps.

Mains/power connection for centrifuges: Operation of the centrifuge is only permitted in a building installation which complies with the applicable national regulations and standards. In particular, it must be ensured that there are no impermissible loads on the supply lines and assemblies that are located upstream of the internal protection of the device. This can be ensured by additional circuit breakers or other suitable safety elements in the building installation.

The mains/power switch and the disconnecting device of the mains/power line must be easily accessible during operation (e.g. a residual current circuit breaker).

Select the location of the device according to the following criteria:

- Mains/power connection in accordance with the name plate
- Minimum distance to other devices and walls: 30 cm (11.8 in)
- Resonance free table with horizontal even work surface
- The surrounding area must be well ventilated.
- The location is protected against direct sunlight.

4.2 Preparing installation

Prerequisites

The weight of the centrifuge is 30.0 kg (66.14 lb). For unpacking and installation the assistance of another person is required.

Perform the following steps in the sequence described.

1. Open the box.
2. Remove the accessories.
3. The centrifuge must be lifted from the box by two people.
4. Remove the transport securing device from the sides.
5. Place the device on a suitable lab bench.

Do not use the opening for the condensation water tray as a handle.

6. Remove the plastic sleeve.

4.3 Installing the instrument

Prerequisites

The device is on a suitable lab bench.

NOTICE! Damage to electronic components due to condensation.
Condensate may form in the device when it has been transported from a cool environment to a warmer environment.

- ▸ After installing the device, wait for at least 4 h. Only then connect the device to the mains/power line.

NOTICE! Centrifuge 5427 R: Compressor damage after improper transport.

- ▸ After installation, wait 4 hours before switching on the centrifuge.

Perform the following steps in the sequence described.

1. Let the device warm up to ambient temperature.
2. Check that the mains voltage and frequency match the requirements on the device name plate.
3. Connect the centrifuge to the mains and switch it on using the mains/power switch.
   - Display is active.
   - Lid opens automatically
4. Remove the transport securing device of the lid latch.
5. Remove the transport securing device of the motor shaft.
6. Insert the condensation water tray into the holder provided.

5 Operation
5.1 Operating controls

Before using the Centrifuge 5427 R for the first time, familiarize yourself with the display and the operating controls.

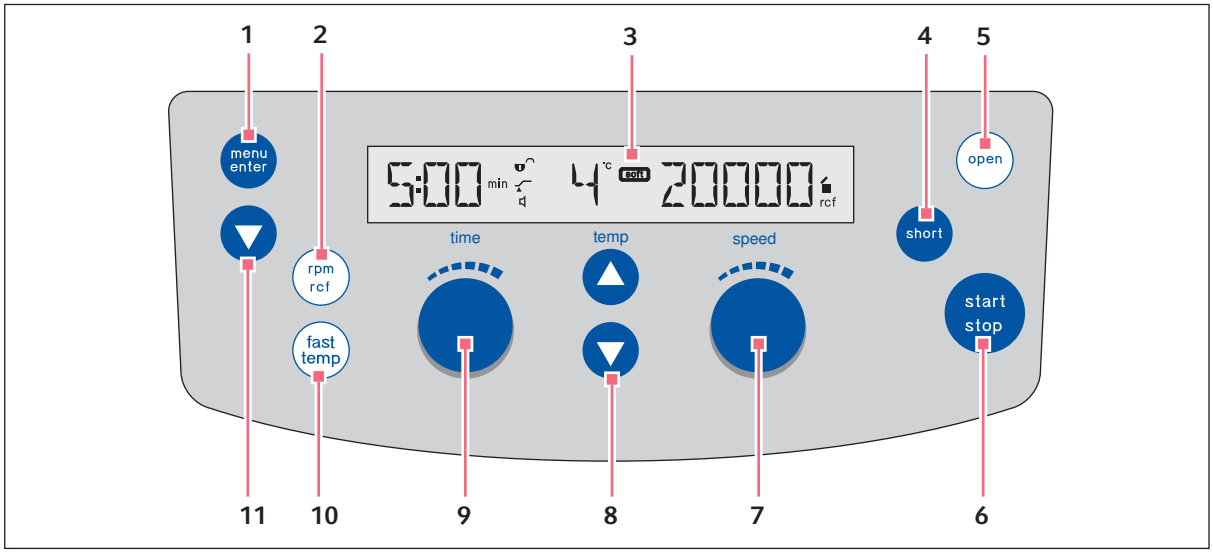


Fig. 5-1: Control panel of the Centrifuge 5427 R

1 **Call and select menu parameters**
(see *Menu navigation on p. 25)*

2 **Switch display of centrifugation speed (rpm or rcf)**

3 **Display**

4 **Short run centrifugation**
(see *Short run centrifugation on p. 33)*

5 **Release lid**

6 **Start and stop centrifugation**

7 **Set speed of centrifugation**

8 **Set temperature**

9 **Set centrifugation time**

10 **Start FastTemp temperature control run**
(see *Temperature control run FastTemp on p. 34)*

11 **Select menu item**
(see *Menu navigation on p. 25)*

Please also read the precise description of the individual menu functions (see p. 25).

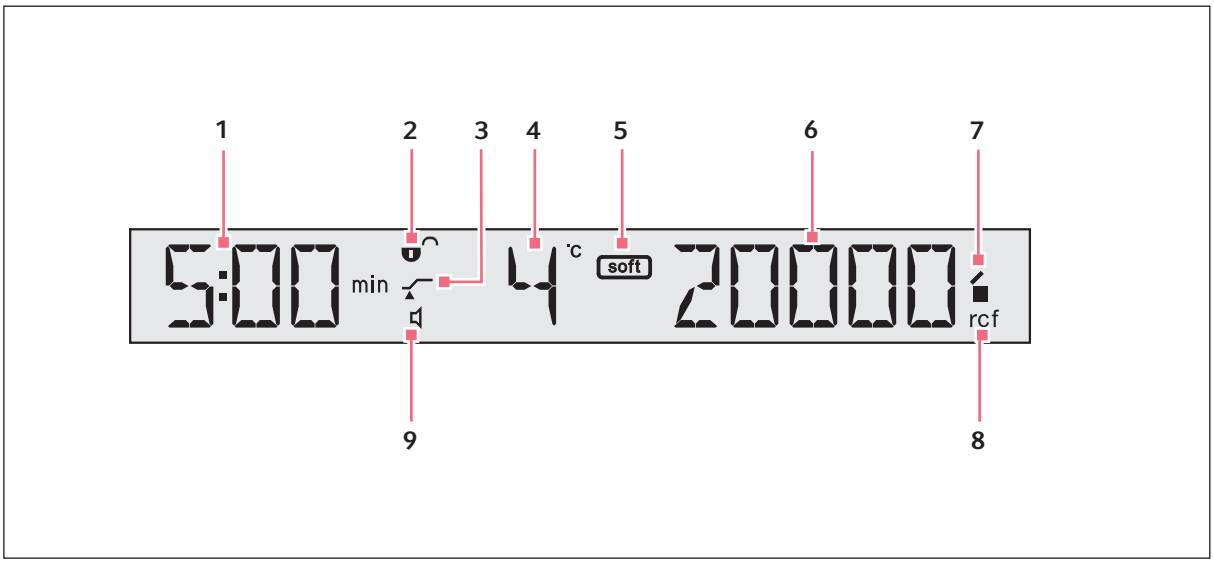


Fig. 5-2: Display of Centrifuge 5427 R

1 Centrifugation time

2 Key lock
Key lock. Centrifugation parameters cannot be accidentally changed.
No key lock. Centrifugation parameters can be changed.

3 Start of run time: ATSET function
Start of run time after reaching 95 % of the specified *g*-force (rcf) or speed (rpm).
Immediate start of run time.

4 Temperature

5 Soft ramp
soft Rotor accelerates and brakes slowly.
No symbol: Rotor accelerates and brakes rapidly.

6 *g*-force (rcf) or speed (rpm)

7 Status of centrifuge
: Centrifuge lid unlocked.
: Centrifuge lid locked.
(Flashes): centrifugation in progress.

8 Display of centrifugation speed
rcf *g*-force (relative centrifugal acceleration).
rpm speed (revolutions per minute).

9 Status of speaker
Speaker switched on.
Speaker switched off.

5.2 Menu navigation

Proceed as follows to change settings in the device menu:

1.	menu enter	Open the menu.
2.	▼	Select the desired menu item.
3.	menu enter	Confirm your selection.
4.	▼	Select the setting of the corresponding parameters.
5.	menu enter	Confirm the changed setting. The **BACK** menu item belonging to the first menu level appears.
6.	menu enter	Exit the menu.

To exit the second menu level without changing a parameter, select the **BACK** menu item and confirm with **menu/enter**.

5.3 Menu

Tab. 5-1: Menu structure of the Centrifuge 5427 R.

Menu level 1 (M 1)	**Menu level 2 (M 2)**		**Display**
SOFT Soft ramp decreases acceleration speed and braking speed. Disabled with short spin centrifugation	*ON*	Rotor accelerates and brakes slowly.	SOFT
	OFF	Rotor accelerates and brakes rapidly.	
RAD For the internal conversion of speed (rpm) to *g*-force (rcf), the radius is dependent on the adapter used.	*0_2ML* *0_4ML* *0_5ML* *0_6ML*	Select the radius according to the adapter used. Only rotor FA-45-12-17: *MAX* *1_5/2* *HPLC* *CRYO*	
	MAX	Largest radius of the used rotor.	
LOCK Key lock centrifugation parameters (temperature, *g*force (rcf) or speed (rpm)) cannot be accidentally changed.	*ON*	Set the centrifugation parameters permanently. *SAFE* appears in the display when the **time**, **temp** or **speed** keys are pressed.	🔒
	OFF		🔓

Menu level 1 (M 1)	Menu level 2 (M 2)		Display
ATSET Set start of centrifuging run time.	*ON*	The set run time will be counted down after 95 % of the specified *g*-force (rcf) or speed (rpm) has been reached.	
	OFF	The set time is counted down immediately.	
SHORT Set the speed of the short spin centrifugation. No SOFT function with short spin centrifugation.	*MAX*	Short spin centrifugation at the maximum speed of the inserted rotor	
	SET	Short spin centrifugation with set speed (*g*-force (rcf) or speed (rpm)).	
TEMP Set the time limit for continuous cooling ("ECO shut-off") (see p. 34).	*8 h*	Default setting: continuous cooling ends after 8 h.	
	1 h *2 h* *4 h*	To limit continuous cooling after a run to 1 h, 2 h, or 4 h, the centrifuge lid must be opened and closed again after the run.	
	oo	Endless operation of continuous cooling.	
ALARM Switch the loudspeaker on or off.	*ON*	Switch on loudspeaker.	
	OFF	Switch off loudspeaker.	
VOL Set the volume.	*VOL1* … *VOL5*	The volume of the loudspeaker can be set to 5 levels (*VOL1* to *VOL5*). The loudspeaker must be switched on for the adjustment to be audible.	
SLEEP Switch the standby mode on or off. If the centrifuge has not been used for 15 min, it will switch to standby. *EP* then appears in the display. Press a key or close the centrifuge lid to exit the standby mode.	*ON*	Standby mode activated.	
	OFF	Standby mode deactivated.	

The *BACK* menu item can also be found in both menu levels.

BACK in menu level 2: return to menu level 1.

BACK in menu level 1: exit the menu.

5.4 Preparing for centrifugation

5.4.1 Switching on the centrifuge

1. Switch on the centrifuge at the mains/power switch.
   The centrifuge lid opens automatically after switching on using the mains/power switch.
   The parameter settings of the last run are displayed.

5.4.2 Replacing the rotor

NOTICE! Material damage due to improper rotor insertion.
The motor shaft or bearing may get damaged if the rotor falls into the motor shaft guides in an uncontrolled manner when it is inserted.

- Hold the rotor with both hands.
- Guide the rotor onto the motor shaft.

5.4.2.1 Inserting the rotor

1. Place the rotor vertically on the motor shaft.
2. Insert the supplied rotor key into the rotor nut.
3. Turn the rotor key **clockwise** until the rotor nut is firmly tightened.

5.4.2.2 Removing the rotor

1. Turn the rotor nut **counterclockwise** using the supplied rotor key.
2. Remove the rotor by lifting it vertically.

5.4.2.3 Automatic rotor detection

The centrifuge has automatic rotor detection. It detects a newly inserted rotor and displays the name of the rotor for 2 s. *g*-force (rcf) and speed (rpm) are automatically limited to the maximum permitted value for the rotor.

1. Manually turn the rotor **counterclockwise** to trigger rotor detection.
   - The name of the rotor appears in the display.
   - The *g*-force (rcf) and speed (rpm) are automatically limited to the maximum permissible value for the rotor.

Rotor detection can also be triggered by short spin centrifugation:

- Press the **short** key until the name of the rotor appears in the display.

Error message after rotor change

- If you start centrifuging immediately after a rotor change, the centrifuge has not carried out an automatic rotor detection yet. The speed set for the previous rotor may exceed the maximum permitted speed for the new rotor. In this case, the centrifuge stops after the automatic rotor detection and displays **SPEED**. The new maximum permitted speed appears in the display. You can then restart centrifuging with this setting or adjust the speed as necessary.

▸ After each rotor change, check whether the new rotor is detected by the device. Check the set *g*-force (rcf) or speed (rpm) and adjust it if necessary.

5.4.3 Loading the rotor

5.4.3.1 Loading a fixed-angle rotor

CAUTION! Risk of injury due to asymmetric loading of a rotor.

- ▸ Load rotors symmetrically with identical tubes.
- ▸ Only load adapters with suitable tubes.
- ▸ Always use the same type of tubes (weight, material/density and volume).
- ▸ Check symmetric loading by balancing the adapters and tubes used with a balance.

CAUTION! Risk from damaged or overloaded tubes.

- ▸ When loading the rotor, observe the safety instructions for hazards resulting from overloaded or damaged tubes.

Use matching rotor lids

- Fixed-angle rotors may only be operated with the appropriate rotor lid in each case. The rotor name on the rotor must be the same as the name on the rotor lid.
- To carry out an aerosol-tight centrifugation, an aerosol-tight rotor (label: **red ring**) and the corresponding aerosol-tight rotor lid (label: **aerosol-tight** and **red lid screw**) must be used.

The device automatically detects imbalances during operation and stops the run immediately with an error message and a signal tone.

- ▸ Check the load, balance the tubes and restart the run.

To load the rotor, proceed as follows:

1. Check the maximum payload (adapter, tube and contents) for each rotor bore.

   The information about this can be found on every rotor and in this operating manual (see *Rotors for the Centrifuge 5427 R on p. 55)*.
2. Load rotors and adapters only with the tubes intended for them.
3. Insert sets of two tubes in the opposite bores of the rotor. To ensure symmetric loading, tubes that are arranged opposite each other must be of the same type and contain the same filling quantity.

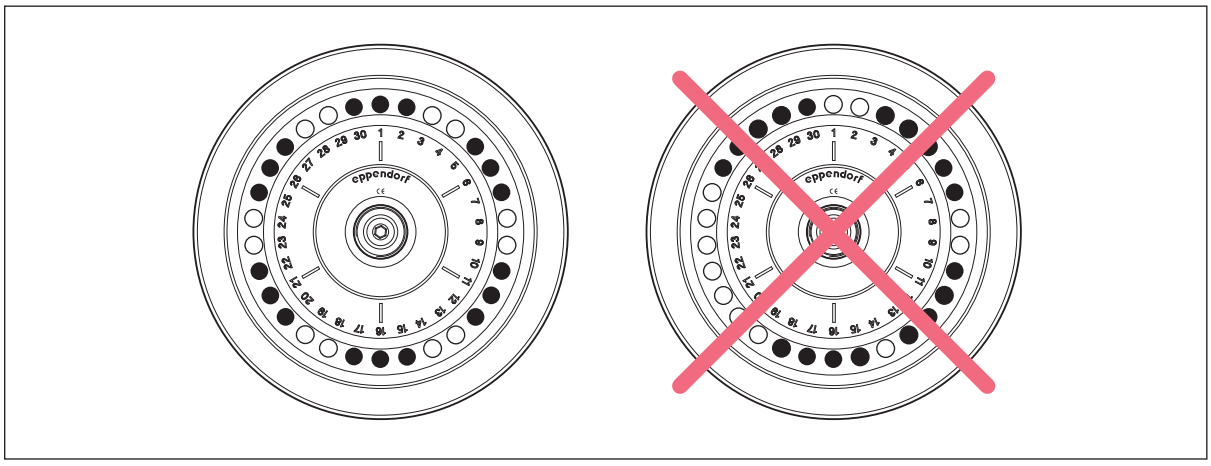
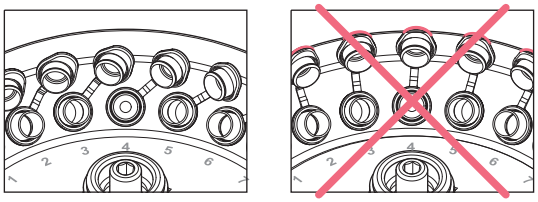


Fig. 5-3: Example of a correctly and incorrectly loaded rotor

To minimize weight differences between filled sample tubes, we recommend balancing with a balance. This will reduce wear on the drive and cut operating noise.

Spin columns
For centrifuging spin columns in the rotor FA-45-24-11-Kit, you can leave the tube lids open. However, this can only be done using the tubes provided by kit manufacturers for this purpose. For reliable centrifugation, you must lean the open tube lids against the edge of the rotor. Ensure that the lids do not protrude past the edge of the rotor in the process, then attach the matching rotor lid.



5.4.3.2 Loading a swing-bucket rotor

Prerequisites

- Use a rotor and adapter combination that is approved by Eppendorf.
- These are sorted by weight category. Buckets located opposite each other must belong to the same weight category. This is engraved in the groove on the side: e.g., *68* (the last 2 digits in grams). For repeat orders, please specify the weight class.
- Matched and checked tubes

To load the rotor, proceed as follows:

1. Check the bucket grooves for cleanliness and lightly lubricate them with pivot grease.
   Contaminated grooves and pegs prevent a uniform swinging of the buckets.
2. Hang the buckets into the rotor.
   All rotor positions must be loaded with buckets.

3. Check that all buckets are hanging properly and can swing out freely.
4. Check the maximum payload (adapter, tube and contents) for each bucket.

   The details on the maximum payload can be found on the rotor and in this operating manual (see *Rotors for the Centrifuge 5427 R on p. 55)*.
5. Load the buckets symmetrically.

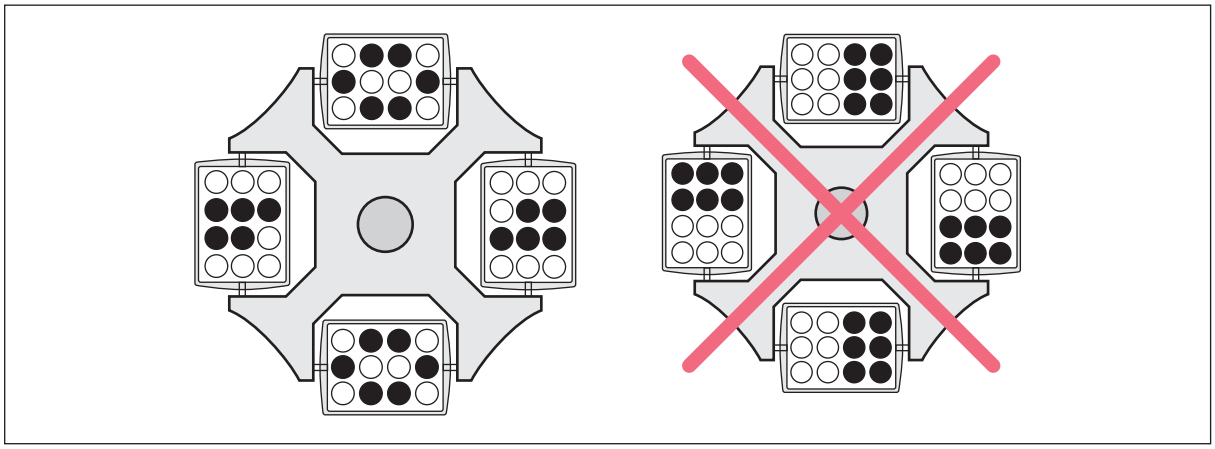
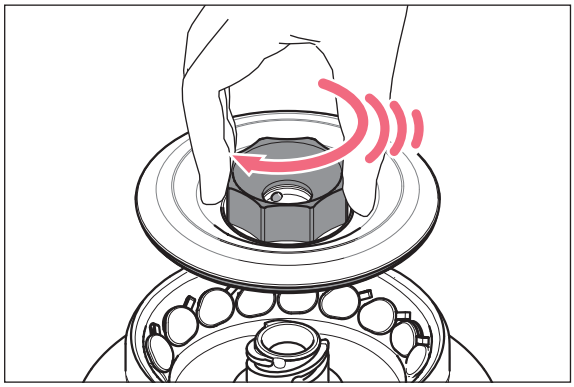


Fig. 5-4: Example of incomplete, but symmetric loading of buckets. The pegs of each bucket must be uniformly loaded.

The equipping shown on the right side is incorrect because it does not allow the buckets to swing out properly.

5.4.4 Closing the rotor lid

1. Only QuickLock rotor lid: check that the external sealing washer is correctly positioned in the groove.



2. Place the rotor lid vertically on the rotor.
3. Turn the rotor lid screw clockwise to seal the rotor.

   Only QuickLock rotor lid:
   Turn the rotor lid screw clockwise as far as it will go, until an audible "click" can be heard. The rotor is only properly locked after the audible "click" can be heard!

5.4.5 Closing the centrifuge lid

WARNING! Risk of injury when opening or closing the centrifuge lid
There is a risk of crushing your fingers when opening or closing the centrifuge lid.

- Do not reach between the device and centrifuge lid when opening or closing the centrifuge lid.
- Do not reach into the locking mechanism of the centrifuge lid.
- Open the centrifuge lid fully to ensure that the centrifuge lid cannot slam shut.

1. Check the correct attachment of the rotor and rotor lid.
   The lid will be automatically closed and the locking mechanism can be clearly heard.

The **open** key lights up blue. The display shows the ▪ symbol.

5.5 Centrifugation

CAUTION! Danger due to incorrectly loaded rotors and damaged/overloaded tubes!

- Before commencing centrifugation, follow the safety instructions relating to risks from asymmetrically loaded and/or overloaded rotors and from overloaded, damaged and/or open tubes.

WARNING! Risk of injury from improperly attached rotors and rotor lids.

- Only centrifuge with the rotor and rotor lid firmly tightened.
- If unusual noises occur when the centrifuge starts, the rotor or rotor lid may not be attached properly. Press the **start/stop** key immediately to stop centrifugation.

Before using the Centrifuge 5427 R for the first time, familiarize yourself with the operating controls and the display (see *Operating controls on p. 23)*.

Each of the centrifuging variants described here must be preceded by the preparation described above (see *Preparing for centrifugation on p. 27)*.

Please also note the instructions on cooling (see p. 34).

5.5.1 Centrifuging with preset time

Perform the following steps in the sequence described:

1. Use **time** to set the run time.
2. Use **temp** to set the temperature.
3. With **speed**, set the *g*-force (rcf) or speed (rpm).
4. Press **start/stop** to start the centrifugation.

During centrifugation

- ∎ blinks in the display when the rotor is running.
- The current actual temperature will be displayed.
- The current g-force (rcf) or speed (rpm) of the rotor is displayed.
- The **fast temp**, **open**, **short** keys and the device menu are blocked during centrifugation.
- The total run time, temperature and speed (rpm) can be changed during the run. The display can be switched between *g*-force (rcf) and speed (rpm).
- You can also terminate the centrifugation before the set run time has elapsed by pressing the **start/stop** key.

End of centrifugation

- After completion of the set time, the centrifuge stops automatically. During the braking process, the elapsed centrifugation time flashes in the display. When the rotor stops a signal tone is sounded.
- The centrifuge lid remains closed to maintain the sample temperature. You can open it by pressing the **open** key.

During the run you can modify the total run time, the temperature and the g-force (rcf)/ speed (rpm).
The values on the display blink while changes are being made. The new parameters are adopted immediately. If the time is changed during a run, the elapsed time will be subtracted from this value. Please note that the shortest new total run time that can be set must be 2 min longer than the elapsed time.

When using adapters, you can adjust the radius.

5.5.2 Centrifuging in continuous operation

Perform the following steps in the sequence described:

1. Use **time** to set the continuous run.

   The continuous run function can be set above 9:59 h or below 10 s. The timer shows *oo* to indicate continuous operation.

2. Use **temp** to set the temperature.
3. With **speed**, set the *g*-force (rcf) or speed (rpm).
4. Press the **start/stop** key to start the centrifugation.

   The ∎ symbol blinks in the display when the rotor is running.

5. Press the **start/stop** key to end the centrifugation.
   - During the braking process, the centrifugation time flashes in the display.
   - When the rotor stops a signal tone is sounded.
   - The centrifuge lid remains closed to maintain the sample temperature. You can open it by pressing the **open** key.

5.5.3 Short run centrifugation

Prerequisites

In the *SHORT* menu, the user sets whether the short spin centrifugation runs with the maximum *g*-force (rcf) or speed (rpm) of the inserted rotor (*MAX*) or with a freely selected speed (*SET*).

The short spin centrifugation runs as long as the **short** key is pressed.

1. Only with short run centrifugation with a set speed: set the required *g*-force (rcf) or speed (rpm) using the **speed** arrow keys.
2. Start short run centrifugation: Keep the **short** key pressed.
   - The ■ symbol blinks in the display when the rotor is running.
   - All other keys are disabled during short spin centrifugation.
3. Stop short run centrifugation: Release the **short** key.
   - During the braking process, the centrifugation time flashes in the display.
   - The centrifuge lid remains closed to maintain the sample temperature. Press the **open** key to open the lid.

During the braking process, the short spin centrifugation can be restarted up to two times by pressing the **short** key again.

The soft ramp is disabled during short spin centrifugation.

5.5.4 Setting the centrifugation radius

If an adapter for tubes is used in a rotor, this changes the centrifugation radius. To correctly determine the *g*-force, the parameter for the tube/adapter combination has to be set in the *RAD* menu item.

Prerequisites

- Rotor is inserted.
- The centrifuge has detected the rotor (see *Preparing for centrifugation on p. 27)*.

1. Press the **menu/enter** key.
2. Select the *RAD* menu item using the arrow key. Confirm with the **menu/enter** key.

   In the *RAD* menu item, the parameters for the rotor-specific tube/adapter combination are available.
3. Select the parameters for the tube/adapter combination using the arrow key. Confirm with the **menu/enter** key.

   The display shows the *g*-force for the rotor/adapter combination used in the rotor.

Default setting: the centrifuge calculates the *g*-force for the largest radius of the rotor used.

5.6 Cooling

5.6.1 Temperature display

Temperature display if the rotor stops — Set temperature
Temperature display during centrifugation — Actual temperature

5.6.2 Temperature monitoring

After the set temperature has been reached, the centrifuge reacts to temperature deviations during centrifugation as follows:

Deviation from set temperature	Action
±3 °C	Temperature display flashes.
±5 °C	Display shows **Err 18**. Centrifugation is stopped automatically.

5.6.3 Temperature control run FastTemp

With the FastTemp function, you can immediately start a temperature run without samples, at rotor-specific or temperature-specific speeds. This will quickly bring the rotor chamber, including rotor and adapter, up to the set temperature.

Prerequisites

- The centrifuge is switched on.
- Rotor and rotor lid are correctly mounted.
- The centrifuge lid is closed.
- The temperature and *g*-force (rcf) or speed (rpm) have been set for the upcoming centrifugation (see *Centrifugation on p. 31)*.

1. Press the **fast temp** key.

The display shows

- *FT*
- Actual temperature in the rotor chamber
- *g*-force (rcf) or speed (rpm)

The temperature control run FastTemp automatically ends when the set temperature has been reached. A periodic signal tone sounds.

2. Press the **start/stop** key to end the temperature control run early.

5.6.4 Continuous cooling

Continuous cooling

If the rotor stops, the rotor chamber will be maintained at the set temperature if the following requirements have been met:

- The centrifuge is switched on.
- The centrifuge lid is closed.
- The set temperature is lower than the ambient temperature.
  The following factors apply during the continuous cooling:
- The set temperature will be displayed.
- Independent of the set temperature, 4 °C must be achieved in order to prevent the rotor chamber or sample from freezing and to prevent increased condensation in the device.
- The temperature adjustment takes longer because the rotor is not rotating. Open the centrifuge lid to end continuous cooling.

Additional settings for continuous cooling are: 1 h, 2 h, 4 h, 8 h and infinity.

Setting continuous cooling

1. Press the **menu/enter** key.
2. Select *TEMP* using the arrow key. Confirm with the **menu/enter** key.
3. Select *1 h* (*2 h, 4 h, 8 h or infinity*) using the arrow key. Confirm with the **menu/enter** key.
   The device switches to standby mode at the end of continuous cooling. The display shows *EP*.

- If the centrifuge is not opened after centrifugation (e.g., taking samples was forgotten), the centrifuge remains at the set temperature (sample protection) for a further 8 h.
- If the centrifuge lid is opened after the run (samples were taken), the value set for continuous cooling (1 h, 2 h, 4 h, 8 h or infinity) applies.
- Endless operation of continuous cooling can shorten the service life of the compressor. The rotor chamber may freeze.

5.7 Standby mode

The centrifuge switches to the standby mode when the following prerequisites are met:

- The centrifuge lid is open: the centrifuge has not been used for 15 min.
- The centrifuge lid is closed: continuous cooling was stopped (see *Continuous cooling on p. 35)*.

In the **Standby mode**, the following applies:

- The display shows *EP*.
- The rotor chamber is not cooled.

▸ Press any key to end the standby mode.

5.8 After centrifugation

If the centrifuge has not been used for 15 min, it will switch to standby mode. *EP* appears in the display.

If the centrifuge is temporarily not used, carry out the following steps. Please also observe the care instructions (see p. 40).

1. Turn the rotor nut **counterclockwise** using the supplied rotor key.
   Remove the rotor by lifting it vertically.
2. Empty the condensation water tray.
3. Leave the centrifuge lid open.

6 Maintenance

6.1 Service

WARNING! Risk of fire or electrical shock

- Have the centrifuge's electrical safety, especially the paths for the protective connections, checked every 12 months by trained and skilled personnel.

We recommend to have the centrifuge and the associated rotors checked by Technical Service during a service at least every 12 months. Please note the country-specific regulations.

6.2 Preparing cleaning/disinfection

- Clean all accessible surfaces of the device and the accessories at least weekly and when contaminated.
- Clean the rotor regularly. This way the rotor is protected and the durability is prolonged.
- Furthermore, observe the notes on decontamination (see *Decontamination before shipment on p. 41)* when the device is sent to the authorized Technical Service for repairs.

The procedure described in the following chapter applies to the cleaning as well as to the disinfection or decontamination. The table below describes the steps required on top of this:

Cleaning	Disinfecting/decontamination
1. Use a mild cleaning fluid to clean the accessible surfaces of the device and the accessories. 2. Carry out the cleaning as described in the following chapter.	1. Choose the disinfection method which corresponds to the legal regulations and guidelines in place for your range of application. For example, use alcohol (ethanol, isopropanol) or alcohol-based disinfectants. 2. Carry out the disinfection or decontamination as described in the following chapter. 3. Then clean the device and the accessories.

If you have any further questions regarding the cleaning and disinfection or decontamination or regarding the cleaning fluid to be used, contact the Eppendorf AG Application Support. The contact details are provided on the back of this manual.

6.3 Cleaning/disinfection

DANGER! Electric shock due to the ingress of liquid.

- Switch off the device and disconnect it from the mains/power line before starting cleaning or disinfection.
- Do not allow any liquids to penetrate the inside of the housing.
- Do not perform a spray clean/spray disinfection on the housing.
- Only reconnect the device to the mains/power line when it is completely dry, both inside and outside.

NOTICE! Damage from the use of aggressive chemicals.

- Do not use any aggressive chemicals on the device or its accessories, such as strong and weak bases, strong acids, acetone, formaldehyde, halogenated hydrocarbons or phenol.
- If the device has been contaminated by aggressive chemicals, clean it immediately using a mild cleaning agent.

NOTICE! Corrosion due to aggressive cleaning agents and disinfectants.

- Do not use any corrosive cleaning agents, aggressive solvents or abrasive polishes.
- Do not incubate the accessories in aggressive cleaning agents or disinfectants for longer periods.

NOTICE! Damage from UV and other high-energy radiation.

- Do not use UV, beta, gamma, or any other high-energy radiation for disinfection.
- Avoid storage in areas with strong UV radiation.

Autoclaving
All rotors, rotor lids and adapters can be autoclaved (121 °C, 20 min).

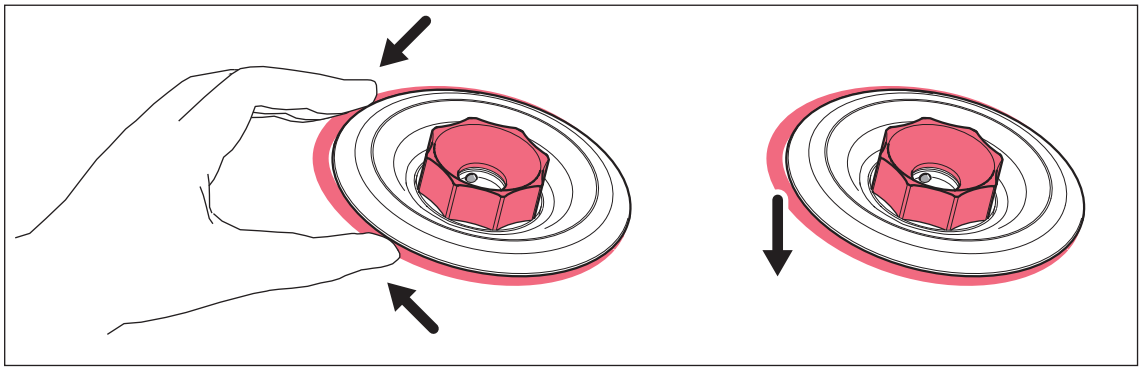
Aerosol tightness
Check that the seals are intact before use.
Only QuickLock rotor lid: Replace the sealing ring in the lid groove when it becomes worn.
Regular care of the sealing rings is necessary in order to protect the rotors.
Never store aerosol-tight rotors with the lid tightened!
To prevent damage, grease the lid thread on aerosol-tight rotors regularly using a little pivot grease (order no. int.: 5810 350.050/North America: 022634330).

6.3.1 Cleaning and disinfecting the device

1. Open the lid. Switch the device off at the mains/power switch. Disconnect the mains/power plug from the voltage supply.
2. Loosen the rotor nut by turning the rotor key **counterclockwise**.
3. Remove the rotor.
4. Clean and disinfect all accessible surfaces on the device including the mains/power cord using a damp cloth and recommended cleaning agents.
5. Thoroughly clean the rubber seals of the rotor chamber with water.
6. Rub the dry rubber seals with glycerine or talcum powder to prevent them from becoming brittle. Other components of the device, such as the lid latch, motor shaft and rotor cone, must not be lubricated.
7. Clean the motor shaft with a soft, dry, lint-free cloth. Do not grease the motor shaft.
8. Check the motor shaft for damage.
9. Check the device for corrosion and damage.
10. Leave the centrifuge lid open when the device is not being used.
11. Only connect the device to the power supply if it is fully dry inside and out.

6.3.2 Disinfecting and cleaning the rotor

1. Inspect the rotor and accessories for damage and corrosion. Do not use any damaged rotors or accessories.
2. Clean and disinfect the rotors and accessories using the recommended cleaning agents.
3. Clean and disinfect the rotor lids. **Only QuickLock rotor lid:** Remove the sealing ring to thoroughly clean the groove below it.



4. Rinse the rotors and accessories thoroughly with distilled water. Rinse the rotor bores of fixed-angle rotors particularly thoroughly.

   Do not immerse the rotor in liquid as liquid can enter through the openings when doing so.

5. Place the rotors and accessories on a towel to dry. Place fixed-angle rotors with the rotor bores facing downwards to allow the bores to also dry.
6. Correctly reinsert the rotor lid sealing ring in the clean and dry groove.
7. Clean the rotor cone with a soft, dry, lint-free cloth. Do not lubricate the rotor cone.
8. Inspect the rotor cone for damage.

9. Place the dry rotor onto the motor shaft.
10. Tighten the rotor nut firmly by turning it **clockwise** with the rotor key.
11. Leave the rotor lid open when the rotor is not being used.

6.4 Additional care instructions for refrigerated centrifuges

- Empty and clean the condensation water tray regularly and especially after liquid spillage in the rotor chamber. Pull out the condensation water tray at the front right under the device.
- Regularly free the rotor chamber from ice formations by thawing, by either leaving the centrifuge lid open or by performing a short temperature control run at approx. 30 °C.
- Leave the centrifuge lid open when not in use for a longer period.

  Residual moisture can escape. The lid spring is relieved.
- Wipe up the condensation water in the rotor chamber. Use a soft, absorbent cloth for this.
- No later than every 6 months, remove any dust deposits from the ventilation slits of the centrifuge using a brush or swab. First switch off the device and remove the power plug.

6.5 Cleaning glass breakage

When using glass tubes there is a risk of glass breakage in the rotor chamber. The resulting glass splinters are swirled around in the rotor chamber during centrifugation and have a sandblasting effect on the rotor and accessories. Smallest glass particles become lodged in the rubber parts (e.g., the motor sleeve, the rotor chamber seal, and the rubber mats of adapters).

NOTICE! Glass breakage in the rotor chamber
Glass tubes in the rotor chamber may break if the *g*-force is too high. Broken glass can damage the rotor, accessories and samples.

- Please note the manufacturer's information on the recommended centrifugation parameters (load and speed).

Effects of glass breakage in the rotor chamber:
- Fine black metal abrasion dust in the rotor chamber (in metal rotor bowls).
- The surfaces of the rotor chamber and accessories are scratched.
- The chemical resistance of the rotor chamber is reduced.
- Contamination of samples.
- Wear on rubber parts.

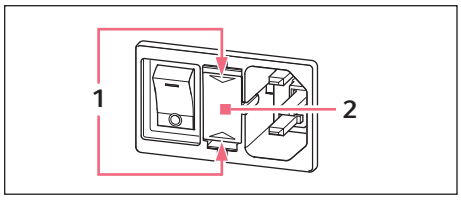
How to proceed in case of glass breakage
1. Remove all splinters and glass powder from the rotor chamber and accessories.
2. Thoroughly clean the rotor and rotor chamber. Thoroughly clean the bores of the fixed-angle rotors, in particular.
3. If required, replace the adapters to prevent any further damage.
4. Regularly check the rotor bores for deposits and damage.

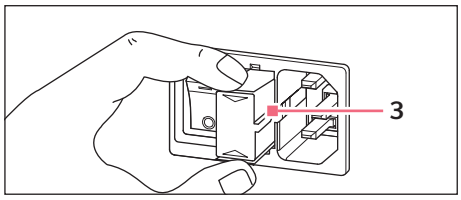
6.6 Replacing fuses

DANGER! Electric shock.

- Switch off the device and disconnect the mains/power plug before commencing any service or cleaning operations.

The fuse holder is located between the mains connection socket and the mains power switch.





1. Disconnect the power plug.
2. Press the upper and lower end of the plastic springs **1** together and pull the fuse holder **2** fully out.
3. Replace faulty fuses and reinsert the fuse holder. Make sure that the guiding rail **3** is positioned correctly.

6.7 Decontamination before shipment

If you are shipping the device to the authorized Technical Service for repairs or to your authorized dealer for disposal please note the following:

WARNING! Risk to health from contaminated device.

1. Observe the information in the decontamination certificate. It is available as a PDF document on our webpage (www.eppendorf.com/decontamination).
2. Decontaminate all the parts you are going to dispatch.
3. Include the fully completed decontamination certificate in the shipment.

7 Troubleshooting

If you cannot remedy an error with the recommended measures, please contact your local Eppendorf partner. The contact addresses can be found on the Internet at www.eppendorf.com.

7.1 General errors

Problem	Cause	Solution
No display.	No mains/power connection.	▸ Check the mains/power connection.
	Mains/power outage.	▸ Check the fuse of the centrifuge. ▸ Check the mains/power fuse of the lab.
Centrifuge lid cannot be opened.	The rotor is still running.	▸ Wait for the rotor to stop.
	Mains/power outage.	1. Check the fuse of the centrifuge. 2. Check the mains/power fuse of the lab. 3. Activate the emergency lid release.
Centrifuge cannot be started.	The centrifuge lid is not closed.	▸ Close the centrifuge lid.
Centrifuge shakes when it starts up.	The rotor is asymmetrically loaded.	1. Stop the centrifuge and load symmetrically. 2. Restart the centrifuge.
Centrifuge brakes during a short run centrifugation, although the **short** key is pressed.	The **short** key was released briefly more than twice (protective function for the drive).	▸ Press the **short** key continuously during a short run centrifugation.
Temperature display flashes.	Temperature deviation from set value: ±3 °C.	▸ Check the settings. ▸ Wait until the set temperature has been reached. ▸ Check unhindered air circulation through the air slots. ▸ Thaw ice or switch off the centrifuge and allow it to cool down.

7.2 Error messages

Proceed as follows if the following error messages appear:

1. Remove fault (see remedy).
2. If necessary, repeat centrifugation.

Problem	Cause	Solution
ERR 1	Rotor not detected.	▸ Check rotor. ▸ If this error message appears again, test with a different rotor.
ERR 2	Electronics fault.	▸ Switch the centrifuge off and back on again after >20 s.
NO RPM (ERR 3)	Error in the rotational speed measurement system.	▸ Leave the device switched on until the error message disappears (10 s or 6 min).
ERR 5	Prohibited opening of lid or lid switch is defective during a run.	1. Wait for the rotor to stop.
Err 6	• Error in the drive electronics. • The drive is overheated.	▸ Repeat the run. ▸ If this error message appears again, switch centrifuge off and back on again after >20 s. ▸ Allow the drive to cool down for at least 15 min.
Err 7	Major deviation in the speed check.	1. Wait for the rotor to stop. 2. Tighten the rotor.
Err 8	Drive fault.	1. Wait for the rotor to stop. 2. Repeat the run.
ERR 9 to *ERR 14*	Electronics error.	▸ Switch the centrifuge off and back on again after >20 s.
IMBAL (ERR 15)	The rotor is asymmetrically loaded.	▸ Load the rotor symmetrically and balance it.
ERR 16 to *ERR 17*	Electronics error.	▸ Switch the centrifuge off and back on again after >20 s.
Err 18	Temperature deviation from set value in the rotor chamber: ±5 °C.	▸ Check the settings. ▸ Check unhindered air circulation through the air slots. ▸ Thaw ice or switch off the centrifuge and allow it to cool down.
ERR 19	Condenser overheated.	▸ Check unhindered air circulation through the air slots. ▸ Allow the centrifuge to cool down.
Err 20	Temperature sensor in rotor chamber is faulty.	▸ Switch the centrifuge off and back on again after >20 s.

Problem	Cause	Solution
ERR 21	The temperature sensor on the condenser is faulty.	▸ Switch the centrifuge off and back on again after 20 s.
Err 22	Electronics fault.	▸ Switch the centrifuge off and back on again after >20 s.
NO E-FAN (ERR 23)	Electronic fan is faulty.	▸ Switch the centrifuge off and back on again after >20 s.
Err 24	Failure at the compressor.	▸ Allow the centrifuge to cool down and repeat the run.
INT (ERR 25)	Mains/power failure during a run.	▸ Check the mains/power connection.
Err 28	Error during speed check.	▸ Switch the centrifuge off and back on again after >20 s.
ERR 29	Set g-force/speed too high, e.g., after a rotor change (see *Preparing for centrifugation on p. 27)*.	▸ Check the g-force/speed. ▸ Repeat the run.
LID (ERR 30)	• Centrifuge lid cannot be locked. • Centrifuge lid cannot be released.	▸ Try again to close the centrifuge lid. ▸ Switch the centrifuge off and back on. ▸ Press the **open** key. If the error occurs repeatedly: ▸ Switch off the centrifuge. ▸ Actuate emergency release(see *Emergency release on p. 46)*.
OFF	• Displayed after power off.	

7.3 Emergency release

If the centrifuge lid cannot be opened, you can activate the emergency release manually.

WARNING! Risk of injury from rotating rotor.
If the emergency release of the lid is operated, the rotor may continue to rotate for several minutes.

- Wait for the rotor to stop before operating the emergency release.
- To check, look through the monitoring glass in the centrifuge lid.

Use the rotor key delivered with the Centrifuge 5427 R for the emergency release.

1. Disconnect the mains/power plug.
2. Remove the plastic cover for the emergency release on the right side of the device (see Fig. 1 and Fig. 2).

   Turn the plastic cover 90° **counterclockwise** using an appropriate tool (e.g., screwdriver) and remove it.
3. Insert the centrifuge rotor key in the rear hexagonal opening until a noticeable resistance is felt.
4. Turn the rotor key **counterclockwise**.

   This will release the centrifuge lid.
5. Open the centrifuge lid.
6. Remove the rotor key or turn the plastic covers back on.

   Turn the plastic cover using an appropriate tool (e.g., screwdriver) by 90° in a **clockwise** direction.

8 Transport, storage and disposal

8.1 Transport

CAUTION! Risk of injury due to lifting and carrying of heavy loads
The device is heavy. Lifting and carrying the device can lead to back injuries.

- Transport and lift the device with an adequate number of helpers only.
- Use a transport aid for transporting the device.

- Remove the rotor from the centrifuge before transport.
- Use the original packing for transport.

	Air temperature	Relative humidity	Atmospheric pressure
General transport	-25 °C – 60 °C	10 % – 75 %	30 kPa – 106 kPa
Air freight	-20 °C – 55 °C	10 % – 75 %	30 kPa – 106 kPa

8.2 Storage

	Air temperature	Relative humidity	Atmospheric pressure
In transport packing	-25 °C – 55 °C	10 % – 75 %	70 kPa – 106 kPa
Without transport packing	-5 °C – 45 °C	10 % – 75 %	70 kPa – 106 kPa

8.3 Disposal

If the product needs to be disposed of, the relevant legal regulations must be observed.

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

Within the European Community, the disposal of electrical devices is regulated by national regulations based on EU Directive 2012/19/EU pertaining to waste electrical and electronic equipment (WEEE).

According to these regulations, any devices supplied after August 13, 2005, in the business-to-business sphere, to which this product is assigned, may no longer be disposed of in municipal or domestic waste. To document this, they have been marked with the following marking:

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

9 Technical data

9.1 Power supply

Mains/power connection	230 V, 50 Hz – 60 Hz 120 V, 50 Hz – 60 Hz 100 V, 50 Hz – 60 Hz	
Current consumption	2.4 A (230 V) 4.6 A (120 V) 5.5 A (100 V)	
Power consumption	maximum 550 W (230 V) maximum 550 W (120 V) maximum 550 W (100 V)	
EMC: noise emission (radio interference)	230 V: EN 61326-1/EN 55011 – Class B 120 V: CFR 47 FCC Part 15 – Class A 100 V: EN 61326-1/EN 55011 – Class A	
EMC: noise immunity	EN 61326-1	
Degree of pollution	2	
Fuses	Voltage variant	Fuse
	230 V 120 V 100 V	250 V 4AT HBC 250 V 8AT HBC 250 V 10AT

9.2 Ambient conditions

Environment	For indoor use only
Ambient temperature	10 °C – 40 °C
Relative humidity	10 % – 75 %, non-condensing
Atmospheric pressure	79.5 kPa – 106 kPa Use up to a height of 2 000 m above sea level.

9.3 Weight/dimensions

Dimensions	Width: 31.9 cm (12.6 in) Depth: 54.0 cm (21.3 in) Height: 25.4 cm (10.2 in)
Weight without rotor	30.0 kg (66.14 lb)

Rotor weights	**Accessories**	**Weight**
F-45-48-11		1770 g
FA-45-48-11		2110 g
FA-45-30-11		1500 g
F-45-30-11		1020 g
FA-45-24-11		1290 g
FA-45-24-11-Kit		1600 g
S-24-11-AT		1340 g
	Buckets without caps	27
FA-45-12-17		2090 g
F-45-48-5-PCR		850 g

9.4 Noise level

Noise level	< 56 dB(A)

The noise level was measured according to DIN EN ISO 3745 frontally in a sound measuring room with accuracy class 1 at a distance of 1 m from the device and at lab bench height.

9.5 Application parameters

Run time	10 s – 9:59 h, infinite (∞), • 10 s – 2 min: can be set in increments of 10 s • 2 min – 10 min: can be set in increments of 30 s • 10 min – 9:59 h: can be set in increments of 1 min
Temperature	-11 °C – 40 °C
Relative centrifugal force	1 × *g* – 25 001 × *g* can be set in increments of 50 × *g*
Speed	100 rpm – 16 220 rpm can be set in increments of 50 rpm
Maximum load	48 tube with 2.0 mL volume
Maximum kinetic energy	9920 J
Compulsory test log book (in Germany)	No
Permissible density of the material for centrifuging (at maximum *g*-force (rcf) or speed (rpm) and maximum load)	1.2 g/mL

9.6 Acceleration times and deceleration times for the Centrifuge 5427 R (according to DIN 58 970)

Rotor	**Acceleration time/Deceleration time**		**Mains voltage**		
			230 V	**120 V**	**100 V**
FA-45-12-17	Without soft ramp	Acceleration time	27 s	29 s	29 s
		Deceleration time	24 s	25 s	25 s
	With soft ramp	Acceleration time	39 s	39 s	39 s
		Deceleration time	39 s	39 s	39 s
FA-45-24-11	Without soft ramp	Acceleration time	18 s	19 s	19 s
		Deceleration time	18 s	19 s	19 s
	With soft ramp	Acceleration time	29 s	29 s	29 s
		Deceleration time	31 s	31 s	31 s

Rotor	Acceleration time/Deceleration time		Mains voltage		
			230 V	**120 V**	**100 V**
FA-45-24-11-Kit	Without soft ramp	Acceleration time	21 s	22 s	22 s
		Deceleration time	21 s	21 s	21 s
	With soft ramp	Acceleration time	32 s	32 s	32 s
		Deceleration time	31 s	31 s	31 s
FA-45-30-11	Without soft ramp	Acceleration time	21 s	22 s	22 s
		Deceleration time	18 s	19 s	19 s
	With soft ramp	Acceleration time	32 s	32 s	32 s
		Deceleration time	33 s	33 s	33 s
F-45-30-11	Without soft ramp	Acceleration time	21 s	22 s	22 s
		Deceleration time	18 s	19 s	19 s
	With soft ramp	Acceleration time	29 s	29 s	31 s
		Deceleration time	32 s	32 s	32 s
FA-45-48-11	Without soft ramp	Acceleration time	28 s	29 s	29 s
		Deceleration time	22 s	23 s	23 s
	With soft ramp	Acceleration time	36 s	36 s	39 s
		Deceleration time	35 s	35 s	35 s
F-45-48-11	Without soft ramp	Acceleration time	28 s	29 s	29 s
		Deceleration time	22 s	23 s	23 s
	With soft ramp	Acceleration time	36 s	36 s	36 s
		Deceleration time	35 s	35 s	35 s

Rotor	Acceleration time/Deceleration time		Mains voltage		
			230 V	**120 V**	**100 V**
F-45-48-PCR	Without soft ramp	Acceleration time	11 s	12 s	12 s
		Deceleration time	12 s	13 s	13 s
	With soft ramp	Acceleration time	22 s	22 s	22 s
		Deceleration time	22 s	22 s	22 s
S-24-11-AT	Without soft ramp	Acceleration time	18 s	18 s	18 s
		Deceleration time	17 s	17 s	17 s
	With soft ramp	Acceleration time	29 s	29 s	29 s
		Deceleration time	30 s	30 s	30 s

9.7 Service life of accessories

WARNING! Risk of injury from chemically or mechanically damaged accessories.
Even minor scratches and cracks can lead to severe internal material damage.

- Protect all accessory parts from mechanical damage.
- Inspect the accessories for damage before each use. Replace any damaged accessories.
- Do not use rotors, rotor lids or buckets showing signs of corrosion or mechanical damage (e.g., deformations).
- Do not use accessories that have exceeded their maximum service life.

CAUTION! Risk of injury due to chemically damaged rotor lids or caps.
Transparent rotor lids or caps made of PC, PP or PEI may lose their strength if exposed to organic solvents (e.g., phenol, chloroform).

- If rotor lids or caps have come into contact with organic solvents, clean them immediately.
- Regularly check the rotor lids and caps for damage and cracks.
- Replace any rotor lids or caps that show cracks or milky stains immediately.

Beginning with initial setup, the following rotors including the corresponding buckets and rotor lids have a maximum service life of 7 years or a maximum number of cycles specified in the table (depending on what occurs first).

Rotor	**Maximum service life after initial setup**	
S-24-11-AT (5427 R)	100000 cycles	7 years
FA-45-48-11 (5427 R)	100000 cycles	7 years
FA-45-12-17	100000 cycles	7 years

All other rotors and rotor lids can be used during the entire service life of the centrifuge if the following conditions are met:

- proper use
- recommended maintenance
- undamaged condition

Accessories	**Maximum service life after initial setup**	
QuickLock rotor lid		3 years
Seals in the QuickLock rotor lids	50 autoclaving cycles	-
Rotor lid or caps made of polycarbonate (PC), polypropylene (PP) or polyetherimide (PEI)	50 autoclaving cycles	3 years
Adapter	-	1 years

The date of manufacture is stamped on the rotors and buckets in the format *03/15* or *03/2015* (= March 2015). On the inside of the plastic-rotor lids and aerosol-tight caps, the date of manufacture is stamped in the form of a clock .

To ensure aerosol tightness, the following applies:

- Replace aerosol-tight rotor lids and caps after 50 autoclaving cycles.
- Replace the seal of QuickLock rotor lids after 50 autoclaving cycles.

10 Rotors for the Centrifuge 5427 R

Eppendorf centrifuges may only be operated with rotors that are intended for use with the corresponding centrifuge.

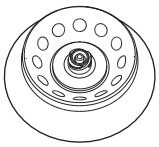
- Only use rotors that are intended for use with the corresponding centrifuge.

Please note the manufacturer's information on the centrifugation resistance of the sample tubes used (maximum *g*-force).

For ordering information, refer to the English and German version of the operating manual.

Technical data of the rotors and adapters and the order numbers of the adapters can be found in chapter *Rotors for the Centrifuge 5427 R* of the English version of the operating manual.

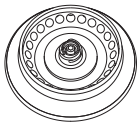
10.1 Rotor FA-45-12-17



Rotor FA-45-12-17 Aerosol-tight fixed-angle rotor for 12 reaction tubes	Max. *g*-force: 20 598 × *g* Max. speed: 14 000 rpm Max. load (adapter, tube and contents): 12 × 9.5 g

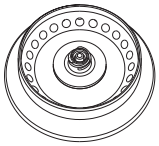
Tubes	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter base Diameter	Max. *g*-force: Max. speed Centrifugation radius
	Micro test tube 5 mL –/12	–	– Ø 17 mm	20 598 × *g* 14 000 rpm 9.4 cm
	Micro test tube 1.5 mL/2.0 mL 1/12	 5820 768.002	Open Ø 11 mm	17 530 × *g* 14 000 rpm 8.0 cm
	HPLC vial 1/12	 5820 770.007	Flat Ø 11 mm	16 215 × *g* 14 000 rpm 7.4 cm
	Cryo tube 1.0 mL – 2.0 mL 1/12	 5820 769.009	Flat Ø 13 mm	18 188 × *g* 14 000 rpm 8.3 cm

10.2 Rotor FA-45-24-11

	**Rotor FA-45-24-11** Aerosol-tight fixed-angle rotor for 24 tubes	Max. *g*-force:	25 001 × *g*
		Max. speed:	16 220 rpm
		Max. load (adapter, tube and contents):	24 × 3.75 g

Tubes	**Tube** **Capacity** **Tubes per adapter/ rotor**	**Adapter** **Order no. (international)**	**Adapter base** **Diameter**	**Max. *g*-force:** **Max. speed** **Centrifugation radius**
	Micro test tube 1.5 mL/2.0 mL –/24	–	– Ø 11 mm	25 001 × *g* 16 220 rpm 8.5 cm
	PCR tube 0.2 mL 1/24	 5425 715.005	Conical Ø 6 mm	18 825 × *g* 16 220 rpm 6.4 cm
	Micro test tube 0.4 mL 1/24	 5425 717.008	Conical Ø 6 mm	25 001 × *g* 16 220 rpm 8.5 cm
	Micro test tube 0.5 mL 1/24	 5425 716.001	Open Ø 8 mm	21 766 × *g* 16 220 rpm 7.4 cm
	Microtainers 0.6 mL 1/24	 5425 716.001	Open Ø 8 mm	25 001 × *g* 16 220 rpm 8.5 cm

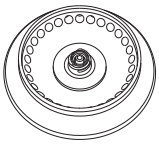
10.3 Rotor FA-45-24-11-Kit



Rotor FA-45-24-11-Kit Aerosol-tight fixed-angle rotor for 24 tubes	Max. *g*-force:	19 090 × *g*
	Max. speed:	13 200 rpm
	Max. load (adapter, tube and contents):	24 × 3.75 g

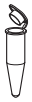
Tubes	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter base Diameter	Max. *g*-force: Max. speed Centrifugation radius
	Micro test tube 1.5 mL/2.0 mL –/24	–	– Ø 11 mm	19 090 × *g* 13 200 rpm 9.8 cm
	PCR tube 0.2 mL 1/24	 5425 715.005	Conical Ø 6 mm	15 000 × *g* 13 200 rpm 7.7 cm
	Micro test tube 0.4 mL 1/24	 5425 717.008	Conical Ø 6 mm	19 090 × *g* 13 200 rpm 9.8 cm
	Micro test tube 0.5 mL 1/24	 5425 716.001	Open Ø 8 mm	16 948 × *g* 13 200 rpm 8.7 cm
	Microtainers 0.6 mL 1/24	 5425 716.001	Open Ø 8 mm	19 090 × *g* 13 200 rpm 9.8 cm

10.4 Rotor FA-45-30-11 and F-45-30-11

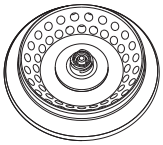


Rotor FA-45-30-11
Aerosol-tight fixed-angle rotor for 30 micro test tubes
Rotor F-45-30-11
Fixed-angle rotor for 30 micro test tubes

Max. *g*-force:	20 817 × *g*
Max. speed:	14 000 rpm
Max. load (adapter, tube and contents):	30 × 3.75 g

Tubes	**Tube** **Capacity** **Tubes per adapter/ rotor**	**Adapter** **Order no. (international)**	**Adapter base** **Diameter**	**Max. *g*-force:** **Max. speed** **Centrifugation radius**
	Micro test tube 1.5 mL/2.0 mL –/30	–	– Ø 11 mm	20 817 × *g* 14 000 rpm 9.5 cm
	PCR tube 0.2 mL 1/30	 5425 715.005	Conical Ø 6 mm	16 215 × *g* 14 000 rpm 7.4 cm
	Micro test tube 0.4 mL 1/30	 5425 717.008	Conical Ø 6 mm	20 817 × *g* 14 000 rpm 9.5 cm
	Micro test tube 0.5 mL 1/30	 5425 716.001	Open Ø 8 mm	18 407 × *g* 14 000 rpm 8.4 cm
	Microtainers 0.6 mL 1/30	 5425 716.001	Open Ø 8 mm	20 817 × *g* 14 000 rpm 9.5 cm

10.5 Rotors FA-45-48-11 and F-45-48-11



Rotor FA-45-48-11 Aerosol-tight fixed-angle rotor for 48 micro test tubes **Rotor F-45-48-11** Fixed-angle rotor for 48 micro test tubes	Max. *g*-force:	18 213 × *g* (outer ring) 16 049 × *g* (inner ring)
	Max. speed:	12 700 rpm
	Max. load (adapter, tube and contents):	48 × 3.75 g

Tubes	**Tube** **Capacity** **Tubes per adapter/ rotor**	**Adapter** **Order no. (international)**	**Adapter base** **Diameter**	**Max. *g*-force:** **Outer ring** **Inner ring** **Max. speed** **Centrifugation radius** **Outer ring** **Inner ring**
	Micro test tube 1.5 mL/2.0 mL –/48	–	– Ø 11 mm	18 213 × *g* 16 049 × *g* 12 700 rpm 10.1 cm 8.9 cm
	PCR tube 0.2 mL 1/48	 5425 715.005	Conical Ø 6 mm	14 426 × *g* 12 262 × *g* 12 700 rpm 8 cm 6.8 cm
	Micro test tube 0.4 mL 1/48	 5425 717.008	Conical Ø 6 mm	18 213 × *g* 16 049 × *g* 12 700 rpm 10.1 cm 8.9 cm
	Micro test tube 0.5 mL 1/48	 5425 716.001	Open Ø 8 mm	16 229 × *g* 14 065 × *g* 12 700 rpm 9 cm 7.8 cm
	Microtainers 0.6 mL 1/48	 5425 716.001	Open Ø 8 mm	18 213 × *g* 16 049 × *g* 12 700 rpm 10.1 cm 8.9 cm

10.6 Rotor F-45-48-5-PCR

	**Rotor F-45-48-5-PCR** Fixed-angle rotor for 48 PCR tubes	Max. *g*-force:	11 710 × *g*
		Max. speed:	10 500 rpm
		Max. load (tube and contents):	48 × 0.43 g

Tubes	Tube Capacity Tubes per adapter/ rotor	Adapter	Adapter base Diameter	Max. *g*-force: Max. speed Centrifugation radius
	 0.2 mL –/48	–	Conical Ø 6 mm	11 710 × *g* 10 500 rpm 9.5 cm
	PCR strips 0.2 mL –/6 × 8	–	Conical Ø 6 mm	11 710 × *g* 10 500 rpm 9.5 cm

10.7 Rotor S-24-11-AT

This rotor is only intended for use with 1.5 mL/2.0 mL tubes.

The following tubes must not be used in this rotor:
- Adapters for 0.2 mL, 0.4 mL, 0.5 mL and 0.6 mL tubes and the corresponding tubes.
- Spin columns

Rotor S-24-11-AT 	**Bucket for micro test tubes: 4 × 1.5 mL/ 2.0 mL** 	Max. *g*-force:	16 049 × *g*
		Max. speed:	12 700 rpm
		Max. load per bucket (tube and contents):	4 × 3.75 g

Tubes	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter base Diameter	Max. *g*-force: Max. speed Centrifugation radius
	Micro test tube 1.5 mL/2.0 mL –/24	–	– Ø 11 mm	16 049 × *g* 12 700 rpm 8.9 cm

11 Ordering information

11.1 Accessories

11.1.1 Rotors and rotor lids

Order no. (International)	Order no. (North America)	Description
5409 702.009	5409702009	**Rotor FA-45-24-11** aerosol-tight, aluminum, angle 45°, 24 places, max. tube diameter 11 mm, incl. rotor lid (aluminum)
5409 703.005	5409703005	**Rotor lid for F-45-24-11** aerosol-tight, aluminum
5409 717.006	5409717006	**Seal for rotor lid** FA-45-24-11 (5427 R), FA-45-16-17 (5430/5430 R) 5 pieces
5409 706.004	5409706004	**Rotor FA-45-30-11** aerosol-tight, aluminum, angle 45°, 30 places, max. tube diameter 11 mm, incl. rotor lid (aluminum)
5409 707.000	5409707000	**Rotor lid for FA-45-30-11** aerosol-tight, aluminum
5820 762.004	5820762004	**Seal for rotor lid** FA-45-30-11 (5427 R/5430/5430 R) 5 pieces
5409 708.007	5409708007	**Rotor F-45-30-11** aluminum, angle 45°, 30 places, max. tube diameter 11 mm, incl. rotor lid (polypropylene)
5409 709.003	5409709003	**Rotor lid for F-45-30-11** Polypropylene
5409 710.001	5409710001	**Rotor FA-45-48-11** aerosol-tight, aluminum, angle 45°, 48 places, max. tube diameter 11 mm, incl. rotor lid (aluminum)
5409 711.008	5409711008	**Rotor lid for FA-45-48-11** aerosol-tight, aluminum
5409 712.004	5409712004	**Rotor F-45-48-11** aluminum, angle 45°, 48 places, max. tube diameter 11 mm, incl. rotor lid (polypropylene)
5409 713.000	5409713000	**Rotor lid for F-45-48-11** Polypropylene
5409 704.001	5409704001	**Rotor FA-45-24-11-Kit** aerosol-tight, aluminum, angle 45°, 24 places, max. tube diameter 11 mm, incl. rotor lid
5409 705.008	5409705008	**Rotor lid for FA-45-24-11-Kit** aerosol-tight, aluminum
5820 767.006	5820767006	**Seal for rotor lid** FA-45-24-11-Kit (5427 R/530/5430 R), FA-45-48-11 (5427 R/5430/5430 R, 5804/5804 R/5810/5810 R), FA-30x2 (5910 R, 5920 R), FA-48x2 (5910 R, 5920 R) 5 pieces

Order no. (International)	Order no. (North America)	Description
5409 700.006	5409700006	**Rotor FA-45-12-17** aerosol-tight, aluminum, 45° angle, 12 places, max. tube diameter 17 mm, incl. rotor lid (aluminum)
5409 701.002	5409701002	**Rotor lid for FA-45-12-17** aerosol-tight, aluminum
5409 716.000	5409716000	**Seal for rotor lid** FA-45-12-17 (5427 R) 5 pieces
5409 714.007	5409714007	**Rotor F-45-48-5-PCR** aluminum, angle 45°, 48 places, max. tube diameter 6 mm
5409 715.003	5409715003	**Rotor S-24-11-AT** aerosol-tight, steel, angle 90°, 24 places, max. tube diameter 11 mm, incl. rotor lid (aluminum)
5409 720.007	5409720007	**Rotor lid for S-24-11-AT** aerosol-tight, aluminum
5409 721.003	5409721003	**Tube holder for S-24-11-AT** for 4 × 1,5 mL/2,0 mL Eppendorf tubes set of 2 pieces
5409 719.009	5409719009	**Seal for rotor lid** S-24-11-AT (5427 R/5430/5430 R) 5 pieces

11.1.2 Adapter

Order no. (International)	Order no. (North America)	Description
		Adapter used in FA-45-48-11, F-45-48-11, FA-45-30-11, F-45-30-11, FA-45-24-11, FA-45-24-11-Kit
5425 715.005	022636260	for 1 PCR tube (0.2 mL, max. Ø 6 mm), set of 6
5425 717.008	022636243	for 1 micro test tube (0.4 mL, max. Ø 6 mm), set of 6
5425 716.001	022636227	for 1 sample tube (0.5 mL, max. Ø 6 mm) or 1 Microtainer (0.6 mL, max. Ø 8 mm), set of 6

11.1.3 Other accessories

Order no. (International)	Order no. (North America)	Description
		Rotor key
5416 301.001	022634305	Standard
		Tray for condensation water
5409 850.083		

11.2 Safety

Order no. (International)	Order no. (North America)	Description
		Fuse
5301 850.249	022654403	4.0 A T (230 V), 2 pieces
5427 850.341	022654381	8.0 A T (120 V, 100 V), 2 pieces
5811 352.006	022664107	10.0 AT UL (100 V), 2 pieces

eppendorf

Declaration of Conformity

The product named below fulfills the requirements of directives and standards listed. In the case of unauthorized modifications to the product or an unintended use this declaration becomes invalid. This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product name:

Centrifuge 5427 R

including components

Product type:

Centrifuge

Relevant directives / standards:

2006/42/EC:	EN ISO 12100
2014/35/EU:	EN 61010-1, EN 61010-2-020, IEC 61010-1, IEC 61010-2-020
	UL 61010-1, CAN/CSA C22.2 No. 61010-1
2014/30/EU:	EN 61326-1, EN 55011
	47 CFR FCC part 15
2014/68/EU:	EN 378-1, EN 378-2
2011/65/EU:	EN 50581

Person authorized to compile
the technical file acc. to 2006/42/EC: Dr. Reza Hashemi
Executive Director Portfolio Management Centrifugation
Eppendorf AG

Hamburg, November 20, 2017

Dr. Wilhelm Plüster
Management Board

Dr. Reza Hashemi
Portfolio Management

Your local distributor: www.eppendorf.com/contact
Eppendorf AG · Barkhausenweg 1 · 22339 Hamburg · Germany
eppendorf@eppendorf.com

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5409 900.927-00

CERTIFICATE OF COMPLIANCE

Certificate Number	2018-2-7-E215059
Report Reference	E215059-D1009-1/A0/C0-ULCB
Issue Date	2018-2-7
Issued to:	EPPENDORF A G
Applicant Company:	BARKHAUSENWEG 1 22339 HAMBURG GERMANY
Listed Company:	Same as Applicant
This is to certify that representative samples of	Centrifuge 5427R (5409) Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	UL 61010-1, 3rd Edition, May 11, 2012, Revised April 29, 2016, CAN/CSA-C22.2 No. 61010-1-12, 3rd Edition, Revised April 29, 2016 (R2017), IEC 61010-1:2010 (Third Edition)
Additional Standards:	IEC 61010-2-020: 2016 (Third Edition) for use in combination with IEC 61010 1:2010 (Third Edition) UL 61010-2-020 - Edition 3 - Issue Date 2016/12/15 CSA C22.2 NO. 61010-2-020 - Issue Date 2017/05/01 IEC 61010-2-101 - Edition 2 - Issue Date 2015/01/01 (-2-101 only stated for CB report for 230V version and not relevant for cULus)
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information.

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Bruce Mahrenholz, Assistant Chief Engineer, Global Inspection and Field Services, UL LLC
Joseph Hosey, General Manager, Director of Sales – Canada, UNDERWRITERS LABORATORIES OF CANADA INC.

Helena Y. Wolf, Director, Global Market Access Operations, UL LLC

Health Protection Agency
Microbiology Services
Porton Down
Salisbury
Wiltshire
SP4 0JG

Certificate of Containment Testing

Containment Testing of Rotor FA-45-30-11 (5409 706.101-00) in the Eppendorf 5427/R Bench Top Centrifuge

Report No. 200-12 B

Report Prepared For: Eppendorf AG, Hamburg, Germany
Issue Date: 12th September 2012

Test Summary

Rotor FA-45-30-11 (5409 706.101-00) was containment tested in the Eppendorf 5427/R bench top centrifuge, using Annex AA of IEC 1010-2-20. The sealed rotor was shown to contain a spill within the centrifuge

Report Written By	Report Authorised By
Anna Moy	
Name: Miss Anna Moy **Title: Biosafety Scientist**	**Name: Mrs Sara Speight** **Title: Senior Biosafety Scientist**

Health Protection Agency
Microbiology Services
Porton Down
Salisbury
Wiltshire
SP4 0JG

Certificate of Containment Testing

Containment Testing of Rotor FA-45-24-11 (5409 702.106-00) in the Eppendorf 5427/R Bench Top Centrifuge

Report No. 200-12 D

Report Prepared For: Eppendorf AG, Hamburg, Germany
Issue Date: 12th September 2012

Test Summary

Rotor FA-45-24-11 (5409 702.10-00) was containment tested in the Eppendorf 5427/R bench top centrifuge, using Annex AA of IEC 1010-2-20. The sealed rotor was shown to contain a spill within the centrifuge

Report Written By	Report Authorised By
Anna Moy	
Name: Miss Anna Moy **Title: Biosafety Scientist**	**Name: Mrs Sara Speight** **Title: Senior Biosafety Scientist**

Public Health England

Public Health England
Microbiology Services
Porton Down
Salisbury
Wiltshire
SP4 OJG

Certificate of Containment Testing

Containment Testing of Rotor FA-45-12-17 (5409 700.103-00) in the Eppendorf 5427/R Bench Top Centrifuge

Report No. 38/13

Report Prepared For: Eppendorf AG, Hamburg, Germany
Issue Date: 24th April 2013

Test Summary

Rotor FA-45-12-17 (5409 700.103-00) was containment tested in the Eppendorf 5427/R bench top centrifuge, using Annex AA of IEC 61010-2-020:2006 (2nd Ed.). The sealed rotor was shown to contain a spill within the centrifuge.

Report Written By

Anna May

Name: Miss Anna Moy
Title: Biosafety Scientist

Report Authorised By

Name: Mrs Sara Speight
Title: Senior Biosafety Scientist

Health Protection Agency
Microbiology Services
Porton Down
Salisbury
Wiltshire
SP4 0JG

Certificate of Containment Testing

Containment Testing of Rotor S-24-11-AT (5409 715.100-00) in the Eppendorf 5427/R Bench Top Centrifuge

Report No. 200-12 F

Report Prepared For: Eppendorf AG, Hamburg, Germany
Issue Date: 12th September 2012

Test Summary

Rotor S-24-11-AT (5409 715.100-00) was containment tested in the Eppendorf 5427/R bench top centrifuge, using Annex AA of IEC 1010-2-20. The sealed rotor was shown to contain a spill within the centrifuge

Report Written By	Report Authorised By
Anna Moy	
Name: Miss Anna Moy **Title: Biosafety Scientist**	**Name: Mrs Sara Speight** **Title: Senior Biosafety Scientist**

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Eppendorf AG · Barkhausenweg 1 · 22339 Hamburg · Germany
eppendorf@eppendorf.com · www.eppendorf.com