

 **endorf**



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Figure 1 / Abbildung 1

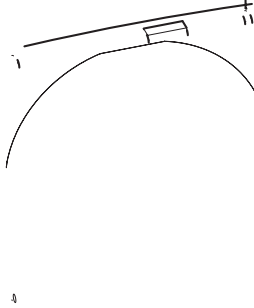


Figure 1 / Abbildung 1



**rpm/rcf**

rpm/rcf button

rpm/rcf-Taste



**time**

Time knob

Zeitwahl-Drehknopf



**speed**

Speed selector knob

Geschwindigkeits-Drehknopf



**open**

Lid release button

Deckelentriegelungs-Taste



**short**

Short run button

Kurzzeitlauf-Taste



**start/stop**

Start/stop button

Start/Stop-Taste

**1** Power switch and plug

Netzschalter und -stecker

**2** Rotor nut

Rotormutter

**3** Rotor

Rotor


**E** Emergency lid release

Notentriegelung




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The Centrifuge 5418 is a non-refrigerated bench-top centrifuge. It is intended for sample preparation within the sphere of clinical diagnostics and in the routine, training and research laboratory in hospitals, science and industry. The devices may only be operated by trained specialist staff.

Up to 18 micro test tubes with a filling volume of 0.2 to 2.0 ml can be centrifuged simultaneously in the fixed-angle rotor.

- 
- Now connect the centrifuge to the power supply and switch it on at the power switch (on the rear side, see inside cover page). The centrifuge is now ready for operation and the display is active.
  - **Before starting for the first time, check whether the rotor and the rotor lid are**

## 2 Safety precautions and applicational limitations



For your personal safety, please be sure to comply with the following regulations unconditionally.

- The centrifuge 5418 must only be used for the specified applications (see "Introduction"). It must not be operated in explosive atmospheres. Explosive, radioactive or highly reactive substances must not be centrifuged.
- When being moved from the cool room to a normal lab environment, the centrifuge must either run for half an hour in the cool room first to warm up, or it must warm up for at least 3 hours in the lab before being connected to the power supply system, in order to prevent damage from condensation.
- The centrifuge must not be moved or knocked while in operation.
- Centrifuges which have not been properly installed or repaired may not be operated. Repairs may only be carried out by Service personnel authorized by Eppendorf. Use only original Eppendorf spare parts and rotors.
- When handling toxic liquids or pathogenic microorganisms of risk group II (see World Health Organization: Laboratory Biosafety Manual) comply with the relevant national regulations. Bioseals are a component of biosafety systems which are not capable, in isolation, of ensuring that people and the environment are protected when pathogenic microorganisms are being handled. When working with pathogenic microorganisms of a higher risk group, more than one aerosol-tight bioseal must be provided for. If the named liquids are spilled in the rotor or rotor chamber, the centrifuge must be thoroughly and professionally cleaned. Before using any cleaning or decontamination method other than that set out in Section 4, "Maintenance and cleaning", please consult Eppendorf to ensure the intended method will not damage the device.
- **The rotor and rotor lid must always be secured in accordance with specification. The centrifuge may only be operated with the rotor and rotor lid firmly tightened. To do this, before centrifugation, place the rotor key supplied for tightening up the rotor on the rotor nut and turn it clockwise until the rotor nut is firmly tightened up.** The rotor lid must then be sealed. This is the only way to ensure safe centrifugation and reliable protection from aerosols (see Section 3.4 "Rotor" with regard to exceptions for Rotor FA-45-18-11 for centrifuging micro test tubes with closed tube lids). If unusual noises occur when the centrifuge starts, the rotor or the rotor lid are not properly secure. In this case, stop centrifugation immediately using **start/stop**.
- The rotor may only be loaded symmetrically. Opposing vessels should be of the same type and be filled equally. On the rotor you will find information about maximum load (adapter, tube and contents) per bore - this limit may not be exceeded. The maximum permitted loading imbalance is 3.75 g. This corresponds to maximum load (adapter, tube and contents) of one bore of rotor FA-45-18-11. The centrifuge and the rotor may be damaged by prohibited imbalanced loading.
- Rotors showing clear signs of corrosion or mechanical damage must not be used. Check the accessories regularly.












The maximum load (adapter, tube and contents) per bore is 3.75 g for this rotor.

When loading the rotor, make sure that the micro test tubes are inserted in the rotor bores opposite one another in pairs. To ensure that the rotor is symmetrically loaded, opposing tubes must contain the same filling volume.

The fixed-angle rotor can be operated both with and without a rotor lid.

Without a rotor lid, the rotor is not aerosol-tight and is noisier. Particular attention should be paid to the fact that tube lids are closed in accordance with specification before centrifugation.

Aerosol-tight centrifugation can only be carried out with the rotor lid in place. **Spin Columns must always be centrifuged with the rotor lid.** The rotor lid is not required



**start/stop** if the button is pressed again, centrifugation is stopped before expiry of the set run time.

After expiry of the set run time, the centrifuge will otherwise stop automatically. During braking, the timer flashes and shows the spin time which has elapsed. When the rotor has come to a standstill, a signal tone is heard and the centrifuge lid opens automatically. The display then shows the symbol .

Timer setting and speed can be changed during centrifugation using the two knobs. If these parameters are adjusted, the display begins flashing. The new centrifuging parameters are accepted after a short time.

The time which has elapsed up to this point is offset against the new specified value. In order that centrifugation cannot be stopped by changing the timer setting, the shortest time which can be set is the time which has already elapsed plus 2 minutes. Parameters cannot be adjusted during the braking process.

Switch on the centrifuge with the power switch if necessary and open the lid using the **open** button. The specified values of the last run are displayed. Load the rotor symmetrically, fit the rotor lid and close the centrifuge lid.

**short** starts a short spin run at maximum speed/g-force. The **short** button must be kept depressed throughout the entire short run. The symbol ■

## 3 Operation

### 3.9 rcf display and calculation

**rpm/rcf** Pressing the button toggles the display from rpm (1/min) to rcf and vice versa.

Please note that the g-force (rcf) shown when toggling the display is standardized to 1.5/2.0 ml micro test tubes. At 14,000 rpm you can achieve the following maximum g-force (rcf) in rotor FA-45-18-11 with the various adapters:

Adapter	Max. centrifugal radius $r_{\max}$ [cm]	Max. g-force (rcf)
None	7.7	16,873
0.2 ml	5.6	12,271
0.4 ml	7.7	16,873
0.5 ml	6.6	14,462
0.6 ml	7.7	16,873

To calculate the g-force (rcf) for a specific adapter you can apply the following formula according to DIN 58 970:

$$\text{rcf} = 1.118 \cdot 10^{-5} \cdot n^2 \cdot r_{\max}$$

n: speed in rpm

$r_{\max}$ : max. centrifugal radius in cm

Example: The 0.2 ml adapter has a maximum radius of 5.6 cm. At 5,000 rpm, a maximum g-force (rcf) of 1,565 x g is achieved.

### 3.10 Standby mode

If the centrifuge has not been used for 15 min., it switches to standby mode. The “EP” logo then appears in the display. When a button or knob is used or the centrifuge lid is closed, the centrifuge is reactivated and ready for operation.

### 3.11 Opening the centrifuge in case of power failure



If the lid release does not function following a power failure, the emergency lid release can be operated by hand.

Remove the power plug and wait for the rotor to come to a standstill. This may take as long as 5 minutes. Look through the window in the lid of the centrifuge to check whether the rotor has come to a standstill. Emergency lid release on underside of device by pull cord: behind the front left foot there is a small white plastic cap in the base plate (see letter “E” in Figure 1, first inside cover page). Remove the cap and draw the cord out straight downward.

Later, ensure that the cord is pushed completely back into the housing before the lid is closed. Then push the plastic cap back into the base plate.

### 3.12 Fuses

The fuse box is located under the power plug. To replace the fuses, unplug the power plug and pull the fuse box out towards the rear. The two fuses can then be replaced (see Ordering information).



The outer surfaces of the centrifuge and the rotor chamber should be cleaned regularly with a neutral agent (e.g. Extran<sup>®</sup> neutral, RBS<sup>®</sup> neutral or Teepol<sup>®</sup> 610 S). This is for hygiene purposes and to prevent adhering impurities causing corrosion.

If material hazardous to health or aggressive material contaminate the device, the owner is responsible for appropriate cleaning and decontamination.

Before cleaning, unplug the power plug with the lid open, unscrew the rotor using the rotor key supplied and clean it separately. Use only neutral agents for cleaning (e.g. Extran<sup>®</sup>)

## 4 Maintenance and cleaning

For thorough cleaning, the rotor is unscrewed using the rotor key supplied and cleaned using a neutral agent (e.g. Extran<sup>®</sup> neutral, RBS<sup>®</sup> neutral, Teepol<sup>®</sup> 610 S).

Bacillo<sup>®</sup> AF, Meliseptol<sup>®</sup> and Perform<sup>®</sup> are recommended for cleaning and disinfecting the rotor and the rotor bores. The rotor bores are also brushed out with a bottle brush. The rotor and bores are then rinsed out thoroughly and placed on a cloth with the bores facing downwards to dry. The rotor is then put back in and the rotor nut tightened up.

The rotor has been tested for resistance to the cleaning agents and disinfectants mentioned. However, this does not guarantee that the device is disinfected following application of one of the methods mentioned. You should also consult your laboratory safety officer with regard to a suitable method of cleaning and disinfecting. However, before any cleaning or disinfecting method other than that recommended by the manufacturer is used, please check with Eppendorf that the intended method will not damage the rotor or its accessories. In order to ensure long-term, reliable work with your centrifuge, please note that aggressive chemicals may damage the rotor.

The rotor, the rotor lid and all the adapters can be autoclaved (121 °C, 20 min.). The sealing ring of the aerosol-tight rotor lid should be replaced after no more than 10 autoclaving operations.

The sealing ring of the rotor lid should be replaced when worn. Regular care of the sealing ring is required to protect the rotor. Check that the seals are undamaged before use. The aerosol-tight rotor may not be stored with the lid done up tightly!

### 4.3 Glass breakage

When centrifuging glass tubes, be aware that as speed/rcf increases, so does the risk of glass breaking. Please observe manufacturers' information about maximum loading of centrifuge tubes.

In case of glass breakage, carefully remove all splinters and all ground glass from the rotor, the adapters and the rotor chamber. You may need to replace adapters in order to prevent further damage.

Otherwise fine glass splinters will scratch the surface of the rotor, reducing its resistance to chemicals. Air vortices will result in very fine black abraded metal in the rotor chamber; in addition to damaging the rotor chamber, rotor and adapters, this material will also cause samples to become contaminated.

Check the rotor bores regularly for residues or damage.

### 4.4 Returning devices

When returning centrifuges, ensure that these devices are fully decontaminated and do not present any kind of health risk to our service staff.

For further information and a blank of the decontamination confirmation, please visit [www.eppendorf.com](http://www.eppendorf.com). Do also consult your laboratory safety officer about a suitable decontamination method.

Please fill in the decontamination confirmation and enclose it with the device if it is to be returned to Eppendorf.



## 5 Troubleshooting guide

If the suggested rectification measures repeatedly fail, contact Eppendorf.

Error / Display	Cause	Remedy
No display	No power	Check power connection
	Power failure	Check power fuses of device and laboratory
Lid cannot be opened	Power failure	See above, activate emergency lid release
	Rotor still running	Wait for rotor to stop
Centrifuge will not start	Lid not closed	Press lid shut
Centrifuge shakes when starting up	Rotor unevenly loaded	Stop centrifuge and load evenly
Centrifuge brakes during a short run although the <b>short</b> button is still depressed	Button was released briefly more than 2x (drive protection function)	Do not release button during a short run
LID ERROR	Lid cannot be locked	Close lid again and start
	Lid cannot be unlocked	Switch device off and back on, press the <b>open</b> button, if error recurs: switch off device, activate emergency lid release, if error recurs => Service
	Lid cannot be unlocked during a run	Wait for centrifuge to come to a standstill, repeat run, if error recurs => Service
INT	Power interruption during a run	Check power plug
NO RPM	Error in speed measuring system	Leave device switched on until the error message disappears (10 s or 6 min.), repeat run, if error recurs => Service
Err 6	Drive error	Repeat run, if error recurs => Service
Err 7	Overspeed or major control deviation	Check rotor properly tightened, repeat run

## 5 Troubleshooting guide

Error / Display	Cause	Remedy
Err 8	Rotor loose, drive error	Tighten up rotor, repeat run, if error recurs => Service
Err 11	Power interruption during a run	Check power plug, repeat run
Err 9, 10, 12 – 17	Electronics error	Repeat run, if error recurs => Service



Mains power connection:	230 V / 50 – 60 Hz 120 V / 50 – 60 Hz 100 V / 50 – 60 Hz
Power output	170 W
Speed	100 to 14,000 rpm



## 7 Ordering information

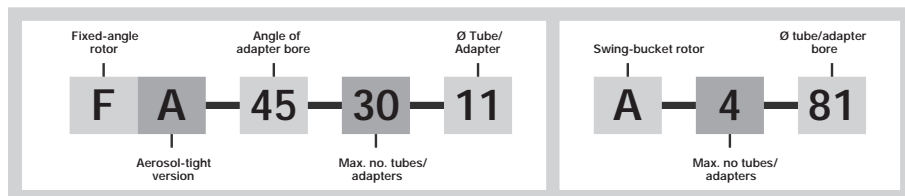
7

Ordering information

	Order no. international	Order no. North America
<b>Centrifuge 5418</b> with rotor FA-45-18-11 incl. rotor lid 230 V / 50 – 60 Hz	5418 000.017	022620321
<b>Centrifuge 5418</b> with rotor FA-45-18-11 incl. rotor lid 120 V / 50 – 60 Hz	5418 000.025	022620304
<b>Fixed-angle rotor and rotor lid</b>  Fixed-angle rotor FA-45-18-11 with rotor lid, aluminum, aerosol-tight, angle 45°, 18 places, max. diameter 11 mm, designed for 1.5/2.0 ml micro test tubes	5418 707.005	022652061
Spare lid (aluminum) for rotor FA-45-18-11, aerosol-tight	5418 708.001	022652087
Spare seal for rotor lid FA-45-18-11, 5 pcs.	5418 709.008	022652109
<b>Accessories</b>		
Adapter for 0.2 ml PCR tubes, for FA-45-18-11, per 6 pcs.	5425 715.005	022636260
Adapter for 0.4 ml micro test tubes, for FA-45-18-11, per 6 pcs.	5425 717.008	022636243
Adapter for 0.5 ml micro test tubes and 0.6 ml Microtainers <sup>®</sup> , for FA-45-18-11, per 6 pcs.	5425 716.001	022636227
Rotor key	5416 301.001	022634305
Captain Eppi, rotor key holder, 1 pc	5703 350.102	022639609
Set of fuses      2 x 2.5 AT (230 V)	5425 351.003	022668188
2 x 5.0 AT (120 V / 100 V)	5425 353.006	022668226

### Rotor code

All Eppendorf rotors are designated according to a simple, logical system which describes the technical specifications as a uniform series of numbers and letters e.g.:



















# Eppendorf Offices

Eppendorf AG

# **eppendorf**

**Your local distributor: [www.eppendorf.com/worldwide](http://www.eppendorf.com/worldwide)**

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