



Centrifuge 5804/5804 R/5810/5810 R

Operating manual
Bruksanvisning




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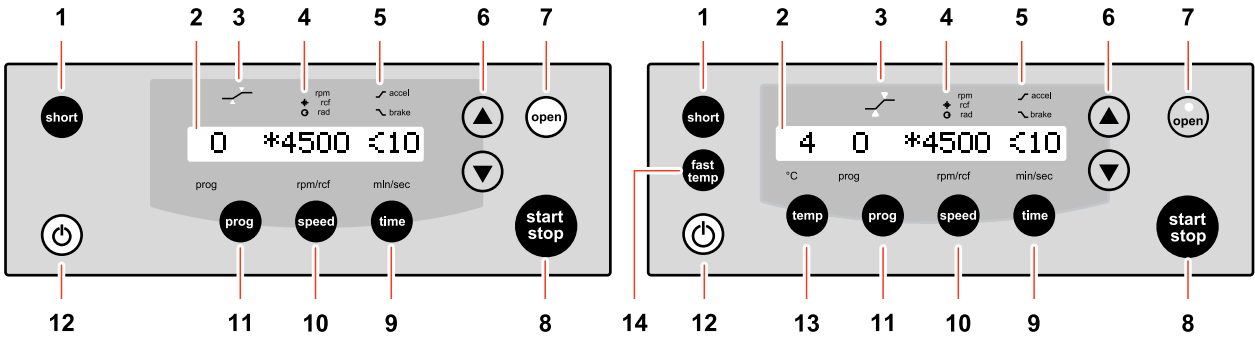
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You will find a detailed description of these figures in your language in Chapters 2.1 and 5.1.



1 Centrifuge lid	2 Monitoring glass
3 Operator panel with display	4 Emergency release
5 Condensation water tray (only Centrifuge 5804 R/ 5810 R)	

Task/function	Press	Display	Details
Set parameter	<ol style="list-style-type: none"> Press speed or time etc. Press ▲ or ▼. 	<ol style="list-style-type: none"> Selected parameter flashes. New value appears. 	Chapter 5.4.1
Soft start/stop	<ol style="list-style-type: none"> Press time repeatedly. Press ▲ or ▼ to select ramp. 	↗: Acceleration ramp 0 (long) ... 9 (short). ↘: Deceleration ramp 0 (long) ... 9 (short).	Chapter 6.2 (English, German)
Alarm ON/OFF	▶ Press speed + time simultaneously.	<i>Alarm on/Alarm off</i>	Chapter 6.7.2 (English, German)
Programming (during rotor stop only)	<ol style="list-style-type: none"> Set parameter. Press 2 x prog. Store: Press prog > 2 s. 	<ol style="list-style-type: none"> Parameter. <i>P...</i>: first idle program no. <i>OK</i> 	Chapters 6.4 - 6.6 (English, German)
At set rpm (with open centrifuge lid only)	Press start stop > 4 s.	 ▲ : on/ ▼ : off	Chapter 6.3 (English, German)



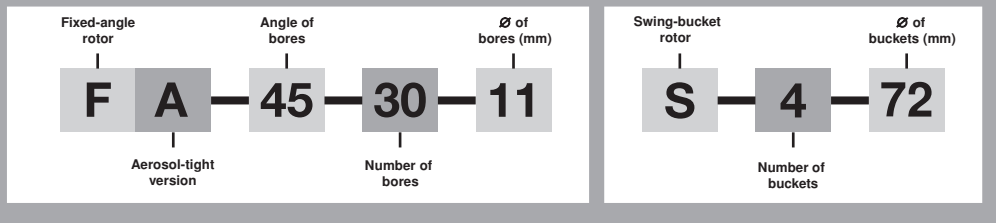
1 Short spin centrifugation	2 Display
3 Status At set rpm function	4 Indicate speed (rpm), g-force (rcf) *and radius setting \odot .
5 Symbol for acceleration \swarrow and braking \searrow	6 Set parameters and values
7 Release centrifuge lid	8 Start or stop centrifugation
9 Adjust centrifugation time	10 Set centrifugation speed
11 Select or save program	12 Standby
13 Set temperature (only 5804 R/5810 R)	14 Start temperature control run FastTemp (only 5804 R/5810 R)



1 Program number	2 Symbol for g-force (rcf)
3 g-force (rcf)/rotational speed (rpm)	4 Symbol flashes when rotor is in motion
5 Symbol for acceleration \swarrow and braking \searrow	6 Centrifugation time
7 Temperature (only 5804 R/5810 R)	

Rotor code:

All Eppendorf® rotors are identified using a simple, alphanumeric format that represents the technical specifications in a uniform series of letters and numbers.



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All Eppendorf® rotors are identified using a simple, alphanumeric format that represents the technical specifications in a uniform series of letters and numbers.

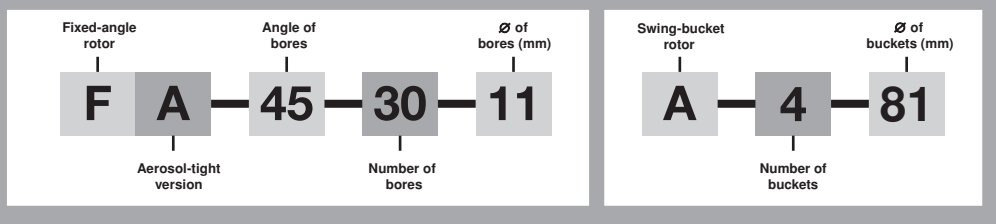


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1 Operating instructions

1.1 Using this manual

- ▶ Read this operating manual completely before using the device for the first time. If required, please also observe the instructions for use of the accessories.
- ▶ This operating manual is part of the product. Thus, it must always be easily accessible.
- ▶ Enclose this operating manual when transferring the device to third parties.
- ▶ If this manual is lost, please request another one. You will find the current version on our webpage www.eppendorf.com/worldwide.

1.2 Danger symbols and danger levels

1.2.1 Hazard icons



	Biohazard		Explosion
	Electric shock		Crushing
	Hazard point		Material damage

1.2.2 Degrees of danger

The safety instructions in this operating manual indicate the following degrees of danger:

DANGER	<i>Will</i> lead to severe injuries or death.
WARNING	<i>May</i> lead to severe injuries or death.
CAUTION	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

1.3 Symbols used

Example	Meaning
▶	You are requested to perform an action.
1. 2.	Perform these actions in the sequence described.
•	List.
	Press this key to perform the described action.
<i>Text</i>	Terms from the display of the device.
	References useful information.

1.4 Abbreviations used

MTP	Micro test plate
NN	Mean sea level (MSL)
PCR	Polymerase chain reaction
PTFE	Polytetrafluorethylene
RCF	Relative centrifugal force – <i>g</i> -force in m/s^2
rpm	Revolutions per minute –in rpm
UV	Ultraviolet radiation

2 Product description

2.1 Main illustration



Fig. 1: Depiction of Centrifuge 5810 and Centrifuge 5810 R. The Centrifuge 5804 and Centrifuge 5804 R are similar in design.

<p>1 Centrifuge lid</p>	<p>2 Monitoring glass Visual control for rotor stop or option for speed check via stroboscope</p>
<p>3 Operator panel with display (see <i>Overview of operating controls on p. 46</i>)</p>	<p>4 Emergency release (see <i>Emergency release on p. 65</i>)</p>
<p>5 Condensation water tray (only Centrifuge 5804 R/ 5810 R)</p>	

The depiction of the centrifuge can be found on the front fold-out page (see Fig. 1).

2.2 Delivery package

Each delivery package consists of one of the following centrifuges and the accessories listed in the following.

Quantity	Order No. (International)	Order No. (North America)	Description
1	-	-	5804/5804 R/5810/5810 R centrifuge See chapter <i>Ordering Information</i> for corresponding device version, equipment and order number
1	5810 350.018	022664166	Rotor key Standard
1	-	-	Power cable see chapter <i>Ordering information</i> for corresponding power cable variants and order numbers
1	5820 900.040	5820900040	Operating manual Centrifuge 5804/5804 R/5810/5810 R Languages: EN, DE, FR, ES, IT, PT
1	5820 900.059	5820900059	Operating manual Centrifuge 5804/5804 R/5810/5810 R Languages: DA, EL, FI, NL, SV (230 V devices only)
1	5820 901.004	-	Test log book (for Germany only)

Only 5804 R and 5810 R:

Quantity	Order No. (International)	Order No. (North America)	Description
1	5811 001.068	022662678	Tray for condensation water

2.3 Features

The versatile 5804/5804 R/5810/5810 R centrifuge has a capacity of maximally 4 x 250 mL (5804/5804 R centrifuge) resp. 4 x 750 mL (5810/5810 R centrifuge) and achieves max. 20,800 x g/14,000 rpm. The versatility is reflected in the available rotor options. You can select between 12 (5804/5804 R centrifuge) resp. 16 (5810/5810 R centrifuge) different rotors to centrifuge the following tubes for your various applications:

- Micro test tubes (0.2 to 5.0 mL)
- PCR strips
- Microtainers
- Spin columns
- Cryotubes
- Conical tubes (15/50 mL)
- Bottles (175 to 750 mL)
- Various tubes (3 to 120 mL)
- Microplates
- PCR plates
- Deepwell plates (max. height 29 mm)
- Slides (with CombiSlide adapter)
- Cell culture tubes

Handling the centrifuge is facilitated by:

- Low access height of 29 cm for loading and unloading the rotors
- Automatic rotor detection with rotational speed limit
- Automatic rotor imbalance detection
- Clear digital display

All centrifuges in these series have 35 program spaces for user-defined settings and 10 different acceleration and braking ramps.

Adapter-specific manual radius adjustment guarantees maximum RCF accuracy.

The Centrifuge 5804 R/5810 R has an additional temperature control function for centrifugation between -9°C and 40°C. Use the **FastTemp** function to start a temperature control run without samples to adjust the rotor chamber incl. rotor, buckets and adapters quickly to the set target temperature. Continuous cooling also maintains the temperature in the rotor chamber with the centrifuge lid closed when the centrifuge is not in use.

The built-in condensation drain eliminates water accumulation and prevents corrosion.

2.4 Rotors



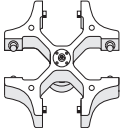


Eppendorf centrifuges may only be operated with rotors that are intended for use with the corresponding centrifuge.













- ▶ Only use rotors which bear the name of the centrifuge (e.g. 5804 R).















The 5804/5804 R/5810/5810 R centrifuge can be operated with the following rotors. Before use of sample tubes, please note the recommended manufacturer's specifications with regard to the resistance to centrifugation (max. g-force).

2.4.1 Rotor A-4-81 (only 5810/5810 R)

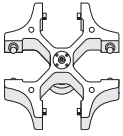

Rotor A-4-81 with 500 mL rectangular bucket




			Max. g-force:	3,220 x <i>g</i>
Rotor A-4-81	Rectangular bucket 500 mL	Aerosol-tight cap	Max. speed:	4,000 rpm
Swing-bucket rotor with 4 x 500 mL rectangular buckets			Max. load per bucket (adapter, tube and contents):	780 g

Tube	Tube	Adapter	Adapter bottom shape	Max. g-force
	Capacity	Order no. (international)	Tube diameter	Max. speed
	Tubes per adapter/rotor		Max. tube length with/without aerosol-tight bucket cap	Centrifugation radius
	Reaction tube 1.5/2 mL 20/80	 5810 745.004	flat Ø 11 mm 43 mm/43 mm	2,950 x <i>g</i> 4,000 rpm 16.5 cm
	Blood collection tube 1.2 to 5 mL 20/80	 5810 746.000	flat Ø 11 mm 108 mm/108 mm	3,000 x <i>g</i> 4,000 rpm 16.8 cm
	Tube 2.6 to 5 mL 25/100	 5810 720.001	flat Ø 13 mm 107 mm/108 mm	3,000 x <i>g</i> 4,000 rpm 16.8 cm
	Tube 2.6 to 7 mL 18/72	 5810 747.007	flat Ø 13 mm 108 mm/108 mm	3,000 x <i>g</i> 4,000 rpm 16.8 cm
	Blood collection tube 3 to 15 mL 16/64	 5810 748.003	flat Ø 16 mm 108 mm/108 mm	3,000 x <i>g</i> 4,000 rpm 16.8 cm
	Tube 7 to 17 mL 16/64	 5810 721.008	flat Ø 17.5 mm 118 mm/118 mm	3,000 x <i>g</i> 4,000 rpm 16.8 cm

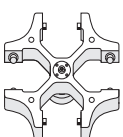
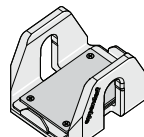
Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with/without aerosol-tight bucket cap	Max. g-force Max. speed Centrifugation radius
	Conical tube 15 mL 12/48	 5810 722.004	conical Ø 17.5 mm 119 mm/121 mm	3,100 x <i>g</i> 4,000 rpm 17.3 cm
	Conical tube 50 mL 5/20	 5810 723.000	conical Ø 31 mm 116 mm/122 mm	3,100 x <i>g</i> 4,000 rpm 17.3 cm
	Centriprep 50 mL 5/20	 5810 739.004	flat Ø 31 mm -/121 mm	3,100 x <i>g</i> 4,000 rpm 17.3 cm
	Conical tube, skirted 50 mL 5/20	 5810 739.004  5804 737.008	flat Ø 31 mm -/119 mm	3,100 x <i>g</i> 4,000 rpm 17.3 cm
	Bottles 180 to 250 mL 1/4	 5825 722.000	flat Ø 62 mm -/133 mm	3,100 x <i>g</i> 4,000 rpm 17.3 cm
	Wide-neck bottle 400 mL 1/4	 5810 728.002	flat Ø 81 mm -/133 mm	3,220 x <i>g</i> 4,000 rpm 18.0 cm
	Wide-neck bottle, rectangular 500 mL -/4	-	flat 83 mm 134 mm/134 mm	3,220 x <i>g</i> 4,000 rpm 18.0 cm


Rotor A-4-81 with conical tubes

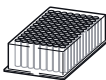
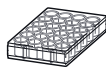


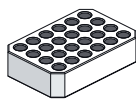

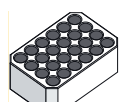

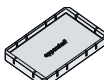
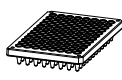
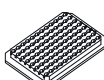
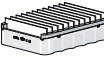

		Max. g-force:	3,220 x <i>g</i>
Rotor A-4-81 Swing-bucket rotor with 4 conical tubes	Bucket for 7 x 50 mL conical tubes	Max. speed:	4,000 rpm
		Max. load:	7 x 75 g

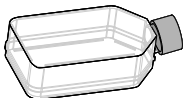
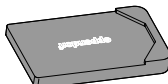
Tube	Tube Capacity Tubes per adapter/rotor	Adapter Order no. (international)	Bottom shape Tube diameter Max. tube length	Max. g-force Max. speed Centrifugation radius
	Conical tube 15 mL 7/28	 5820 718.005	conical Ø 17.5 mm 120 mm	3,184 x <i>g</i> 4,000 rpm 17.8 cm
	Conical tube 50 mL 7/28	-	conical Ø 30 mm 117 mm	3,220 x <i>g</i> 4,000 rpm 18.0 cm

Rotor A-4-81 with MTP/Flex bucket

		Max. g-force:	2,900 x <i>g</i>
Rotor A-4-81 Swing-bucket rotor with 4 MTP/Flex buckets	MTP/Flex buckets	Max. speed:	4,000 rpm
		Max. load per bucket:	380 g

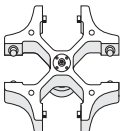
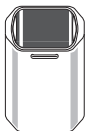

Tube	Plate Capacity Plates, rack or glass slides per adapter/rotor	Adapter Order no. (international)	Bottom shape Tube diameter Max. loading height	Max. g-force Max. speed Centrifugation radius
	Micro test plate 96/384 wells 4/16	-	flat - 60 mm	2,900 x <i>g</i> 4,000 rpm 16.3 cm



Tube	Plate Capacity Plates, rack or glass slides per adapter/rotor	Adapter Order no. (international)	Bottom shape Tube diameter Max. loading height	Max. g-force Max. speed Centrifugation radius
	Deepwell plate 96 wells 1/4	-	flat - 60 mm	2,900 x <i>g</i> 4,000 rpm 16.3 cm
	Cell culture plate 24 wells 2/8	-	flat - 60 mm	2,900 x <i>g</i> 4,000 rpm 16.3 cm
	Kit 1/4	-	flat - 60 mm	2,900 x <i>g</i> 4,000 rpm 16.3 cm
	Tube in IsoRack 24 x 0.5 mL 1/4	 5825 708.008	flat Ø 6 mm 60 mm	2,700 x <i>g</i> 4,000 rpm 15.0 cm
	Tube in IsoRack 24 x 1.5/2 mL 1/4	 5825 709.004	flat Ø 11 mm 60 mm	2,600 x <i>g</i> 4,000 rpm 14.6 cm
	384-well PCR plate 1/4	 5825 713.001	flat - 60 mm	2,700 x <i>g</i> 4,000 rpm 15.8 cm
	96-well PCR plate 1/4	 5825 711.009	flat - 60 mm	2,600 x <i>g</i> 4,000 rpm 16.1 cm
Slides	CombiSlide 12/48 or 8/32	  5825 706.005	flat - 60 mm	1,000 x <i>g</i> 2,372 rpm 15.9 cm





















Tube	Plate Capacity Plates, rack or glass slides per adapter/rotor	Adapter Order no. (international)	Bottom shape Tube diameter Max. loading height	Max. g-force Max. speed Centrifugation radius
	Cell culture bottle with/without filter 75 cm ² : Sarstedt 83.1811.002/ 83.1811 25 cm ² : Sarstedt 83.1810.002/ 83.1810 Greiner Bio-One 690175/690160 TPP 90026/90025 IWAKI 3102-025 1/4	 5825 719.000	flat - 60 mm	1,000 x g 2,501 rpm 14.3 cm










2.4.2 Rotor A-4-62 and A-4-62-MTP (only 5810/5810 R)

Rotor A-4-62 with 250 mL rectangular bucket

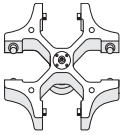
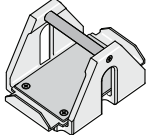
			Max. g-force:	3,220 x g
Rotor A-4-62	Rectangular bucket 250 mL	Aerosol-tight cap	Max. speed:	4,000 rpm
Swing-bucket rotor with 4 x 250 mL rectangular buckets			Max. load per bucket (adapter, tube and contents):	620 g


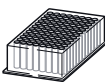
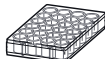

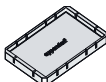

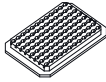


Tube	Tube Capacity Tubes per adapter/rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with/without aerosol-tight bucket cap	Max. g-force Max. speed Centrifugation radius
	Reaction tube 1.5/2 mL 16/64	 5810 751.004	flat Ø 11 mm 43 mm/43 mm	3,000 x g 4,000 rpm 17.1 cm

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with/without aerosol-tight bucket cap	Max. g-force Max. speed Centrifugation radius
	Tubes 1.2 to 5 mL 25/100	 5810 750.008	flat Ø 11 mm 115 mm/123 mm	3,050 x g 4,000 rpm 17.3 cm
	Tubes 2.6 to 7 mL 15/60	 5810 752.000	flat Ø 13 mm 118 mm/121 mm	3,050 x g 4,000 rpm 17.3 cm
	Tubes 3 to 15 mL 12/48	 5810 753.007	flat Ø 16 mm 116 mm/121 mm	3,050 x g 4,000 rpm 17.3 cm
	Tubes 7 to 17 mL 12/48	 5810 754.003	flat Ø 17.5 mm 114 mm/118 mm	3,050 x g 4,000 rpm 17.3 cm
	Conical tube 15 mL 9/36	 5810 755.000	conical Ø 17.5 mm 121 mm/127 mm	3,150 x g 4,000 rpm 17.8 cm
	Tube 7 to 18 mL 8/32	 5810 756.006	flat Ø 20 mm 119 mm/126 mm	3,050 x g 4,000 rpm 17.3 cm
	Tube 18 to 30 mL 4/16	 5810 757.002	flat Ø 26 mm 116 mm/119 mm	3,050 x g 4,000 rpm 17.3 cm
	Conical tube 50 mL 3/12	 5810 758.009	conical Ø 31 mm 116 mm/122 mm	3,150 x g 4,000 rpm 17.8 cm
	Conical tube 50 mL 4/16	 5810 763.002	conical Ø 31 mm -/122 mm	3,050 x g 4,000 rpm 17.3 cm
	Tube 30 to 50 mL 4/16	 5810 759.005	flat Ø 31 mm -/119 mm	3,050 x g 4,000 rpm 17.3 cm

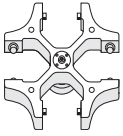
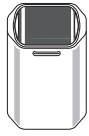

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with/without aerosol-tight bucket cap	Max. g-force Max. speed Centrifugation radius
	Conical tube, skirted 50 mL 4/16	 5810 759.005  5804 737.008	flat Ø 31 mm -/119 mm	3,050 x <i>g</i> 4,000 rpm 17.3 cm
	Tube 50 to 75 mL 2/8	 5810 760.003	flat Ø 35 mm 118/122 mm	3,050 x <i>g</i> 4,000 rpm 17.3 cm
	Tube 80 to 120 mL 1/4	 5810 761.000	flat Ø 45 mm 125/138 mm	3,050 x <i>g</i> 4,000 rpm 17.3 cm
	Bottles 180 to 250 mL 1/4	 5810 770.009	flat Ø 62 mm 127/136 mm	3,220 x <i>g</i> 4,000 rpm 18.0 cm















Rotor A-4-62 with MTP bucket


















		Max. g-force:	2,750 x <i>g</i>
Rotor A-4-62 Swing-bucket rotor with 4 MTP buckets	MTP buckets	Max. speed:	4,000 rpm
		Max. load per bucket:	380 g



Tube	Plate Capacity Plates or glass slides per adapter/ rotor	Adapter Order no. (international)	Bottom shape Max. loading height	Max. g-force Max. speed Centrifugation radius
	Micro test plate 96/384 wells 3/12		flat 53 mm	2,750 x <i>g</i> 4,000 rpm 15.4 cm
	Deepwell plate 96/384 wells 1/4		flat 53 mm	2,750 x <i>g</i> 4,000 rpm 15.4 cm
	Cell culture plate 24 wells 2/8		flat 53 mm	2,750 x <i>g</i> 4,000 rpm 15.4 cm
	384-well PCR plate 1/4	 5825 713.001	flat 53 mm	2,700 x <i>g</i> 4,000 rpm 14.9 cm
	96-well PCR plate 1/4	 5825 711.009	flat 53 mm	2,600 x <i>g</i> 4,000 rpm 15.2 cm
Slides	CombiSlide 12/48 or 8/32	  5825 706.005	flat 53 mm	1,000 x <i>g</i> 2,442 rpm 15.0 cm

2.4.3 Rotor A-4-44

			Max. g-force:	4,400 x <i>g</i>
Rotor A-4-44 Swing-bucket rotor with 4 x 100 mL rectangular buckets	Rectangular bucket 100 mL	Aerosol-tight cap	Max. speed:	5,000 rpm
			Max. load per bucket (adapter, tube and contents):	310 g

Tube	Tube Capacity Tubes per adapter/rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with/without aerosol-tight bucket cap	Max. g-force Max. speed Centrifugation radius
	Reaction tube 1.5/2 mL 12/48	 5804 751.000	flat Ø 11 mm 43 mm/43 mm	4,100 x <i>g</i> 5,000 rpm 14.8 cm
	Tubes 1.2 to 5 mL 14/56	 5804 750.004	flat Ø 11 mm 102 mm/105 mm	4,200 x <i>g</i> 5,000 rpm 15.0 cm
	Tubes 2.6 to 7 mL 9/36	 5804 752.007	flat Ø 13 mm 106 mm/108 mm	4,200 x <i>g</i> 5,000 rpm 15.0 cm
	Tubes 3 to 15 mL 7/28	 5804 753.003	flat Ø 16 mm 106 mm/108 mm	4,200 x <i>g</i> 5,000 rpm 15.0 cm
	Tubes 7 to 17 mL 6/24	 5804 754.000	flat Ø 17.5 mm 106 mm/110 mm	4,200 x <i>g</i> 5,000 rpm 15.0 cm
	Conical tube 15 mL 4/16	 5804 755.006	conical Ø 17.5 mm -/121 mm	4,300 x <i>g</i> 5,000 rpm 15.5 cm
	Conical tube 15 mL 2/8	 5804 717.007	conical Ø 17.5 mm 121 mm/121 mm	4,400 x <i>g</i> 5,000 rpm 15.7 cm

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with/without aerosol-tight bucket cap	Max. g-force Max. speed Centrifugation radius
	Tube 7 to 18 mL 4/16	 5804 756.002	flat Ø 20 mm 104 mm/107 mm	4,200 x <i>g</i> 5,000 rpm 15.0 cm
	Tube 18 to 30 mL 2/8	 5804 757.009	flat Ø 26 mm 100 mm/110 mm	4,200 x <i>g</i> 5,000 rpm 15.0 cm
	Conical tube 50 mL 1/4	 5804 758.005	conical Ø 31 mm -/122 mm	4,300 x <i>g</i> 5,000 rpm 15.5 cm
	Conical tube 50 mL 1/4	 5804 718.003	conical Ø 31 mm 119 mm/122 mm	4,400 x <i>g</i> 5,000 rpm 15.7 cm
	Conical tube 50 mL -/8	 5804 706.005 Max. load 144 g (insert, tubes and contents)	flat with conical insert - -/120 mm	4,500 x <i>g</i> 5,000 rpm 16.1 cm
	Tube 30 to 50 mL 1/4	 5804 759.001	flat Ø 31 mm 108 mm/122 mm	4,200 x <i>g</i> 5,000 rpm 15.0 cm
	Conical tube, skirted 50 mL 1/4	 5804 759.001  5804 737.008	flat Ø 31 mm 108 mm/122 mm	4,200 x <i>g</i> 5,000 rpm 15.0 cm
	Tube 50 to 75 mL 1/4	 5804 760.000	flat Ø 35 mm 108 mm/119 mm	4,200 x <i>g</i> 5,000 rpm 15.0 cm

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with/without aerosol-tight bucket cap	Max. g-force Max. speed Centrifugation radius
	Tube 80 to 100 mL 1/4	 5804 761.006	flat Ø 45 mm 100 mm/114 mm	4,200 x <i>g</i> 5,000 rpm 15.0 cm

2.4.4 Rotor A-2-DWP-AT (only 5810/5810 R)

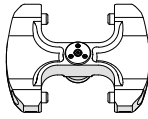
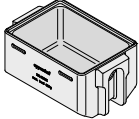
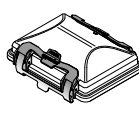
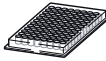

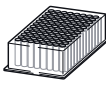



			Max. g-force:	3,486 x <i>g</i>
A-2-DWP rotor	Bucket	Aerosol-tight cap	Max. speed:	4,500 rpm
Swing-bucket rotor with 2 aerosol-tight buckets			Max. load per bucket (adapter, tube and contents):	500 g

Plate	Plate Capacity Plates per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Max. loading height	Max. g-force Max. speed Centrifugation radius
	Micro test plate 96/384 wells 1/2	 5820 712.007	flat 67 mm	3,486 x <i>g</i> 4,500 rpm 154 mm
	Deepwell plate 96 mL 1/2	 5820 712.007	flat 67 mm	3,486 x <i>g</i> 4,500 rpm 154 mm
	384-well PCR plate 1/4	—	flat 67 mm	3,373 x <i>g</i> 4,500 rpm 14.9 cm
	96-well PCR plate 1/4	—	flat 67 mm	3,441 x <i>g</i> 4,500 rpm 15.2 cm

2.4.5 A-2-DWP rotor

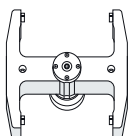
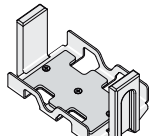

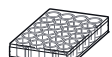
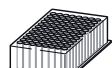
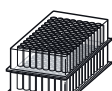

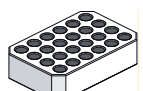

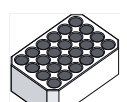

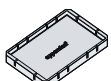
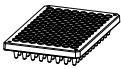
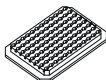

		Max. g-force:	2,250 x g
A-2-DWP rotor Swing-bucket rotor with 2 Deepwell plate carriers	Deepwell plate carrier	Max. speed:	3,700 rpm
		Max. load per carrier (adapter, tube and contents):	380 g











Plate	Plate Capacity Plates per adapter/ rotor	Adapters Order no. (International)	Adapter bottom shape Max. loading height	Max. g-force Max. speed Centrifugation radius
	Micro test plate 96/384 wells 5/10	SBS adapter* 5825 718.003	flat 89 mm	2,250 x g 4,000 rpm 14.7 cm
	Cell culture plate 24 wells 4/8	SBS adapter* 5825 718.003	flat 89 mm	2,250 x g 4,000 rpm 14.7 cm
	Deepwell plate 96 wells 1/4	SBS adapter* 5825 718.003	flat 89 mm	2,250 x g 4,000 rpm 14.7 cm
	Kit 1/2	SBS adapter* 5825 718.003	flat 89 mm	2,250 x g 4,000 rpm 14.7 cm
	Tube in IsoRack 24 x 0.5 mL 1/2	 5825 708.008	flat Ø 6 mm 89 mm	2,050 x g 3,700 rpm 13.8 cm
	Tube in IsoRack 24 x 1.5/2 mL 1/2	 5825 709.004	flat Ø 11 mm 89 mm	1,990 x g 3,700 rpm 13.3 cm
	384-well PCR plate 1/2	 5825 713.001	flat 89 mm	2,170 x g 3,700 rpm 14.2 cm















	Plate Capacity Plates per adapter/ rotor	Adapters Order no. (International)	Adapter bottom shape Max. loading height	Max. g-force Max. speed Centrifugation radius
	96-well PCR plate 1/2	 5825 711.009	flat 89 mm	2,220 x <i>g</i> 3,700 rpm 14.5 cm

*) Optional. Secures the plate against slipping.

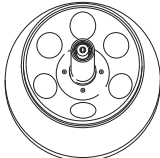
2.4.6 Rotor FA-45-6-30

















	Rotor FA-45-6-30 Fixed-angle rotor for 6 conical tubes	Max. g-force:	16,639 x <i>g</i> (5810 R: 20,133 x <i>g</i>)
		Max. speed:	11,000 rpm (5810 R: 12,100 rpm)
		Max. load (adapter, tube and contents):	6 x 75 g






	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with rotor lid	Max. g-force at 11,000 rpm (5804/ 5804 R/5810) Max. g-force at 12,100 rpm (5810 R) Centrifugation radius
	Conical tube 15 mL 1/6	 5820 717.009	conical Ø 17 mm 125 mm	16,233 x <i>g</i> 19,642 x <i>g</i> 12.0 cm
	Conical tube 50 mL 1/6	-	conical Ø 30 mm 127 mm	16,639 x <i>g</i> 20,133 x <i>g</i> 12.3 cm
	Oak Ridge 10 mL 1/6	 5820 719.001	round Ø 16.1 mm 84 mm	16,233 x <i>g</i> 19,642 x <i>g</i> 12.0 cm
	Oak Ridge 16 mL 1/6	 5820 720.000	round Ø 18.1 mm 107 mm	16,233 x <i>g</i> 19,642 x <i>g</i> 12.0 cm
	Oak Ridge 30 mL 1/6	 5820 721.006	round Ø 25.7 mm 104 mm	14,204 x <i>g</i> 17,187 x <i>g</i> 10.5 cm

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with rotor lid	Max. g-force at 11,000 rpm (5804/ 5804 R/5810) Max. g-force at 12,100 rpm (5810 R) Centrifugation radius
	Oak Ridge 35 mL 1/6	 5820 722.002	conical Ø 28.7 mm 113 mm	15,151 x g 18,333 x g 11.2 cm
	Reaction Tube 5 mL 1/6	 5820 730.005	conical Ø 17 mm -	16,369 x g (5810 R: 19,806 x g) 11,000 rpm (5810 R: 12,100 rpm) 12.1 cm
	Tube 2.6 to 5 mL 1/6	 5820 726.008	round Ø 13.5 mm -	16,233 x g (5810 R: 19,246 x g) 11,000 rpm (5810 R: 12,100 rpm) 12.0 cm
	Tube 4 to 8 mL 1/6	 5820 725.001	round Ø 13.5 mm 119 mm	16,233 x g (5810 R: 19,246 x g) 11,000 rpm (5810 R: 12,100 rpm) 12.0 cm
	Tube 5.5 mL 1/6	 5820 728.000	round Ø 16.4 mm -	16,233 x g (5810 R: 19,246 x g) 11,000 rpm (5810 R: 12,100 rpm) 12.0 cm
	Tube 7.5 to 12 mL 1/6	 5820 727.004	round Ø 16.4 mm 119 mm	16,233 x g (5810 R: 19,246 x g) 11,000 rpm (5810 R: 12,100 rpm) 12.0 cm
	Tube 9 mL 1/6	 5820 729.007	round Ø 17.4 mm 122 mm	16,233 x g (5810 R: 19,246 x g) 11,000 rpm (5810 R: 12,100 rpm) 12.0 cm


2.4.7 Rotor F-34-6-38






	<p>Rotor F-34-6-38 Fixed-angle rotor for 6 x 85 mL tubes</p>	Max. g-force:	15,557 x g (5810 R: 18,514 x g)
		Max. speed:	11,000 rpm (5810 R: 12,000 rpm)
		Max. load (adapter, tube and contents):	6 x 125 g





	Tube	Tube	Adapter	Adapter bottom shape	Max. g-force at 11,000 rpm (5804/5804 R/5810)
		Capacity	Order no. (international)	Tube diameter	Max. g-force at 12,100 rpm (5810 R)
		Tubes per adapter/rotor		Max. tube length with rotor lid	Centrifugation radius
	Reaction tube	1.5/2 mL 4/24	 5804 770.005	round Ø 11 mm 43 mm	15,300 x g 18,200 x g 11.3 cm
	Blood collection tube	2 ml to 5 ml 3/18	 5804 738.004	round Ø13 mm 80 mm	14,339 x g 17,065 x g 10.6 cm
	Blood collection tube	4 ml to 7 ml 3/18	 5804 739.000	round Ø13 mm 107 mm	15,442 x g 18,353 x g 11.4 cm
	Tube	7 to 15 mL 2/12	 5804 771.001	round Ø 16 mm 112 mm	15,150 x g 18,000 x g 11.2 cm
	Conical tube	15 mL 1/6	 5804 776.003	conical Ø 17.5 mm 123 mm	14,450 x g 17,200 x g 10.7 cm
	Tube	15 to 18 mL 1/6	 5804 772.008	round Ø 18 mm 123 mm	14,750 x g 17,550 x g 10.9 cm
	Tube	20 ml to 30 ml 1/6	 5804 773.004	round Ø26 mm 123 mm	14,900 x g 17,700 x g 11.0 cm
	Tube	50 mL 1/6	 5804 774.000	round Ø 29 mm 123 mm	15,157 x g 18,014 x g 11.2 cm

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with rotor lid	Max. g-force at 11,000 rpm (5804/ 5804 R/5810) Max. g-force at 12,100 rpm (5810 R) Centrifugation radius
	Conical tube 50 mL 1/6	 5804 775.007	conical Ø 29,5 mm 121 mm	14,600 x <i>g</i> 17,400 x <i>g</i> 10.8 cm
	Tube 85 mL -/6	-	- Ø 38 mm 121 mm	15,550 x <i>g</i> 18,500 x <i>g</i> 11.5 cm
	Reaction tube 5 mL 1/6	 5804 777.000	conical Ø 17 mm -	14,150 x <i>g</i> (5810 R: 16,842 x <i>g</i>) 11,000 rpm (5810 R: 12,000 rpm) 10.45 cm


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

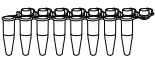

	Rotor FA-45-30-11 Aerosol-tight fixed-angle rotor for 30 reaction tubes Rotor F-45-30-11 Fixed-angle rotor for 30 reaction tubes	Max. g-force:	20,817 x <i>g</i>
		Max. speed:	14,000 rpm
		Max. load (adapter, tube and contents):	30 x 3.5 g

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter	Max. g-force Max. speed Centrifugation radius
	Reaction tube 1.5/2 mL -/30	-	- Ø 11 mm	20.817 x <i>g</i> 14,000 rpm 9.5 cm
	PCR tube 0.2 mL 1/30	 5425 715.005	conical Ø 6 mm	16.200 x <i>g</i> 14,000 rpm 7.4 cm
	Reaction vessel 0.4 mL 1/30	 5425 717.008	conical Ø 6 mm	20.817 x <i>g</i> 14,000 rpm 9.5 cm


Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter	Max. g-force Max. speed Centrifugation radius
	Reaction vessel 0.5 mL 1/30	 5425 716.001	- Ø 8 mm	18.400 x <i>g</i> 14,000 rpm 8.4 cm
	Microtainers 0.6 mL 1/30	 5425 716.001	- Ø 8 mm	20,817 x <i>g</i> 14,000 rpm 9.5 cm



2.4.9 Rotor F-45-48-PCR

	Rotor F-45-48-PCR Fixed-angle rotor for tube strips or 0.2 mL PCR tubes	Max. g-force: Max. speed: Max. load (tube and contents):	15,294 x <i>g</i> 12,000 rpm 6 x 3.5 g
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Tube	Tube Capacity Tubes per adapter/ rotor	Adapter	Tube diameter	Max. g-force Max. speed Centrifugation radius
	8-tube/5-tube tube strips 8/5 x 0.2 mL -/6 x 8 or -/6 x 5	-	Ø 6 mm	15,294 x <i>g</i> 12,000 rpm 9.5 cm
	Reaction tube 0.2 mL -/48	-	Ø 6 mm	15,294 x <i>g</i> 12,000 rpm 9.5 cm





2.4.10 Rotor T-60-11





















	Rotor T-60-11	Max. g-force:	14,000 x <i>g</i>
	Drum rotor for reaction tubes	Max. speed:	16,435 rpm
		Max. load (tube and contents):	6 x 70 g



Tube	Tube Capacity Tubes per adapter/ rotor	Adapter	Tube diameter	Max. g-force Max. speed Centrifugation radius
	Reaction tube 1.5/2 mL 10/60	-	Ø 11 mm	16,435 x <i>g</i> 14,000 rpm 7.5 cm
	Reaction tube 0.4 mL 20/120	-	Ø 6 mm	16,435 x <i>g</i> 14,000 rpm 7.5 cm

2.4.11 Rotor S-4-104 (only 5810/5810 R)



			Max. g-force:	3,214 x <i>g</i>
Rotor S-4-104 Swing-bucket rotor with 4 x 750 mL round buckets	Round bucket 750 mL	Aerosol-tight cap	Max. speed:	3,900 rpm
			Max. load per bucket (adapter, tube and contents):	1,000 g











Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with/without aerosol-tight bucket cap	Max. g-force Max. speed Centrifugation radius
	Reaction tube 1.5/2 mL 62/248	 5825 740.009	continuous Ø 11 mm x 39 mm	3,197 x <i>g</i> 3,900 rpm 18.8 cm
	Reaction tube 5 mL 14/56	 5825 739.000	continuous Ø 17 mm x 60 mm	3,214 x <i>g</i> 3,900 rpm 18.9 cm











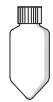

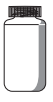

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with/without aerosol-tight bucket cap	Max. g-force Max. speed Centrifugation radius
	Tube 2.6 to 5 mL 23/92	 5825 737.008	round Ø 13 mm x 77 mm 108 mm/115 mm	3,044 x <i>g</i> 3,900 rpm 17.9 cm
	Tube 4 to 8 mL 23/92	 5825 738.004	round Ø 13 mm x 100 mm 108 mm/115 mm	3,044 x <i>g</i> 3,900 rpm 17.9 cm
	Tube 5.5 mL 20/80	 5825 735.005	round Ø 16 mm x 82 mm 114 mm/119 mm	3,061 x <i>g</i> 3,900 rpm 18 cm
	Tube 7.5 to 12 mL 20/80	 5825 736.001	round Ø 16 mm x 98 mm 114 mm/119 mm	3,061 x <i>g</i> 3,900 rpm 18 cm
	Tube 9 mL 20/80	 5825 743.008	round Ø 17.5 mm x 100 mm 106 mm/111 mm	3,044 x <i>g</i> 3,900 rpm 17.9 cm
	Conical tube 15 mL 14/56	 5825 734.009	conical Ø 17 mm x 104 mm 120 mm/125 mm	3,197 x <i>g</i> 3,900 rpm 18.8 cm
	Conical tube 50 mL 7/28	 5825 733.002	conical Ø 29 mm x 109 mm 116 mm/122 mm	3,180 x <i>g</i> 3,900 rpm 18.7 cm
	Conical tube, skirted 50 mL 5/20	 5825 732.006	conical Ø 29 mm x 104 mm 116 mm/120 mm	3,027 x <i>g</i> 3,900 rpm 17.8 cm
	Centrifuge bottle 175 to 225 mL 1/4	 5825 742.001	conical Ø 61 mm x 118 mm 125/143 mm	3,095 x <i>g</i> 3,900 rpm 18.2 cm
	Centrifuge bottle 250 mL 1/4	 5825 741.005	flat Ø 62 mm x 129 mm 125 mm/145 mm	3,112 x <i>g</i> 3,900 rpm 18.3 cm

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length with/without aerosol-tight bucket cap	Max. g-force Max. speed Centrifugation radius
	Wide-neck bottle 750 mL 1/4	 5825 744.004	flat Ø 102 mm x 132 mm 132 mm/150 mm	3,146 x <i>g</i> 3,900 rpm 18.5 cm


2.4.12 Rotor S-4-72


			Max. g-force:	3,234 x <i>g</i>
Rotor S-4-72	Round bucket 250 mL		Max. speed:	4,200 rpm
Swing-bucket rotor with 4 x 250 mL round buckets			Max. load per bucket (adapter, tube and contents):	450 g

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length	Max. g-force Max. speed Centrifugation radius
	Reaction tube 1.5/2 mL 26/104	 5804 794.001	continuous Ø 11 mm 43 mm	3,136 x <i>g</i> 4,200 rpm 15.9 cm
	Reaction tube 5 mL	 5804 793.005	conical Ø 17 mm x 60 mm	3,215 x <i>g</i> 4,200 rpm 16.3 cm
	Tube 2.6 to 5 mL 14/56	 5804 788.001	round Ø 13 mm x 77 mm 115 mm	3,136 x <i>g</i> 4,200 rpm 15.9 cm
	Tube 4 to 8 mL 14/56	 5804 789.008	round Ø 13 mm x 104 mm 115 mm	3,136 x <i>g</i> 4,200 rpm 15.9 cm
	Tube 5.5 mL 13/52	 5804 790.006	round Ø 16 mm x 82 mm 112 mm	3,096 x <i>g</i> 4,200 rpm 15.7 cm


Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length	Max. g-force Max. speed Centrifugation radius
	Tube 7.5 to 12 mL 13/52	 5804 791.002	round Ø 16 mm x 98 mm 112 mm	3,096 x <i>g</i> 4,200 rpm 15.7 cm
	Tube 9 mL 12/48	 5804 792.009	round Ø 17.5 mm x 100 mm 113 mm	3,116 x <i>g</i> 4,200 rpm 15.8 cm
	Conical tube 15 mL 8/32	 5804 783.000	conical Ø 17 mm x 104 mm 120 mm	3,234 x <i>g</i> 4,200 rpm 16.4 cm
	Conical tube 50 mL 4/16	 5804 784.006	conical Ø 29 mm x 109 mm 120 mm	3,234 x <i>g</i> 4,200 rpm 16.4 cm
	Conical tube, skirted 50 mL 2/8	 5804 785.002	conical Ø 29 mm x 104 mm 120 mm	3,027 x <i>g</i> 3,900 rpm 17.8 cm
	Centrifuge bottle 175 mL: BD352076 1/4	 5804 786.009	conical Ø 61 mm x 118 mm 130 mm	3,017 x <i>g</i> 4,200 rpm 15.3 cm
	Centrifuge bottle 250 mL: Nalgene 3127-0250 1/4	 5804 787.005	flat Ø 62 mm x 129 mm 130 mm	3,155 x <i>g</i> 4,200 rpm 16 cm






2.4.13 Rotor F-35-48-17





	Max. g-force:	5,005 x g
Rotor F-35-48-17 Fixed-angle rotor with 48 steel cores	Max. speed:	5,500 rpm
	Max. load per bore (adapter, tube and contents):	48 x 56 g

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter Max. tube length	Max. g-force Max. speed Centrifugation radius
	Conical tube 15 mL 1/36		flat Ø 17 mm x 104 mm 127 mm	5,005 x g 5,500 rpm 14.8 cm

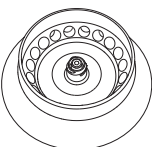
2.4.14 FA-45-48-11 rotor


	Max. g-force:	19,083 x g
Rotor FA-45-48-11 Aerosol-tight fixed-angle rotor for 48 tubes	Max. speed:	13,000 rpm
	Max. load per bore (adapter, tube and contents):	3,75 g

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter	Max. g-force Max. speed Centrifugation radius
	Reaction tube 1.5 to 2 mL -/48		round Ø 11 mm	19,083 x g 13,000 rpm 10.1 cm
	PCR tube 0.2 mL 1/48	 5425 715.005	conical Ø 6 mm	15,115 x g 13,000 rpm 8 cm
	Reaction tube 0.4 mL 1/48	 5425 717.008	conical Ø 6 mm	19,083 x g 13,000 rpm 10.1 cm

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter	Max. g-force Max. speed Centrifugation radius
	Reaction tube 0.5 mL 1/48	 5425 716.001	– Ø 8 mm	17,005 x <i>g</i> 13,000 rpm 9 cm
	Reaction tube 0.6 mL 1/48	 5425 716.001	– Ø 8 mm	19,083 x <i>g</i> 13,000 rpm 10.1 cm

2.4.15 Rotor FA-45-20-17

	Max. g-force:	20,913 x <i>g</i>
Rotor FA-45-20-17 Aerosol-tight fixed-angle rotor for 20 tubes	Max. speed:	13,000 rpm
	Max. load per bore (adapter, tube and contents):	9.5 g

Tube	Tube Capacity Tubes per adapter/ rotor	Adapter Order no. (international)	Adapter bottom shape Tube diameter	Max. g-force Max. speed Centrifugation radius
	Reaction tube 5 mL -/20	–	conical Ø 17 mm	20,913 x <i>g</i> 13,100 rpm 10.9 cm

3 Safety

3.1 Intended use

The 5804/5804 R/5810/5810 R centrifuge is intended exclusively for indoor use and for separating aqueous solutions and suspensions of various densities in approved test tubes.

3.2 User profile

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

3.3 Application limits

3.3.1 Declaration concerning the ATEX directive (94/9/EC)



Risk of explosion.

- ▶ Do not operate the device in areas where work is completed with explosive substances.
- ▶ Do not use this device to process any explosive or highly reactive substances.
- ▶ Do not use this device to process any substances which could create an explosive atmosphere.

The 5804/5804 R/5810/5810 R centrifuge is not suitable for use in a potentially explosive atmosphere due to its design and the ambient conditions inside the device.

The device only must be used in a safe environment, such as in the open environment of a ventilated laboratory or fume hood. The use of substances that may contribute to a potentially explosive atmosphere is not permitted. The user is responsible for making the final decision regarding the risks associated with the use of such substances.

3.3.2 Maximum service life for accessories



Risk of injury from chemically or mechanically damaged accessories.

Even minor scratches and cracks can result in serious damage to the accessories.

- ▶ Protect all accessory parts from damage.
- ▶ Inspect the accessories for damage before each use. Replace any damaged accessories.
- ▶ Do not use rotors, rotor lids, carriers, buckets or caps with signs of corrosion or mechanical damage (e.g. deformations).
- ▶ Do not use accessories whose maximum service life has been exceeded.
- ▶ When inserting the buckets and rotors, ensure that they do not become scratched.



Risk of injury due to chemically damaged rotor lids resp. caps.

Transparent rotor lids resp. caps out of PC, PP or PEI may lose their strength under the impact of organic solvents (e.g. phenol, chloroform).

- ▶ Regularly check the rotor lids resp. caps for damages and cracks.
- ▶ Immediately replace any rotor lids resp. caps showing cracks or milky stains.

Rotor	Maximum service from commissioning onward	
A-2-DWP-AT	100,000 mechanical cycles	7 years
A-2-DWP	34,000 mechanical cycles	7 years
A-4-44	34,000 mechanical cycles	7 years
A-4-62	40,000 mechanical cycles	7 years
A-4-81	100,000 mechanical cycles	7 years
F-34-6-38	75,000 mechanical cycles	7 years
FA-45-6-30		7 years
FA-45-48-11	75,000 mechanical cycles	7 years
FA-45-20-17	75,000 mechanical cycles	7 years
F-35-48-17	75,000 mechanical cycles	7 years
S-4-72	60,000 mechanical cycles	7 years
S-4-104	100,000 mechanical cycles	7 years
T-60-11		7 years

Accessories	Maximum service from commissioning onward	
Rotor lid of polycarbonate (PC), polypropylene (PP) or polyetherimide (PEI)	--	3 years
Aerosol-tight rotor lid, without replaceable gaskets	50 autoclaving cycles	--
Rotor lid QuickLock		3 years
Gaskets of the QuickLock rotor lid	50 autoclaving cycles	--
Caps of polycarbonate (PC), polypropylene (PP) or polyetherimide (PEI)	50 autoclaving cycles	3 years
Adapter	--	1 year

The service life of all other rotors and rotor lids of this centrifuge (see *Rotors on p. 13*) is not limited.

The following requirements have to be met for using rotors, lids and accessories:

- proper use
- recommended maintenance
- undamaged condition.

For guaranteeing aerosol tightness

- Exchange aerosol-tight rotor lids and caps after 50 autoclaving cycles.
- Exchange the gasket of QuickLock rotor lids after 50 autoclaving cycles.

The date of manufacture is stamped on the rotors in the format *03/10* (= March 2010) or on the inside of the plastic rotor lids and caps in the form of a clock ⌚. This is for information only and does not have any reference to the service life.

3.4 Information on product liability

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

- 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 which are not recommended by Eppendorf.
- The device is maintained or repaired by people not authorized by Eppendorf.
- The user makes unauthorized changes to the device.

3.5 Warnings for intended use

Before using 5804/5804 R/5810/5810 R centrifuge first read the operating manual and observe the following general safety instructions.

3.5.1 Personal injury or damage to the equipment



Electric shock due to damage to device or mains cable.

- ▶ Only switch on the device if the device and mains cable are undamaged.
- ▶ Only use devices that have been properly installed or repaired.
- ▶ In case of danger, disconnect the device from the mains supply.



Lethal voltages inside the device.

- ▶ Ensure that the housing is always closed and undamaged so that no parts inside the device can be contacted by accident.
- ▶ Do not remove the housing of the device.
- ▶ Do not allow any liquids to penetrate the inside of the housing.
- ▶ Do not allow the device to be opened by anyone except service personnel who have been specifically authorized by Eppendorf.



Risk from incorrect supply voltage

- ▶ Only connect the device to power supplies which correspond with the electrical requirements on the nameplate.
- ▶ Only use sockets with a protective earth (PE) conductor and suitable power cable.



Damage to health due to handling infectious liquids and pathogenic germs.

- ▶ When handling infectious liquids and pathogenic germs, observe the national regulations, the biological security level of your laboratory, the material safety data sheets, and the manufacturer's application notes.
- ▶ For the centrifugation of these substances, use suitable aerosol-tight closure systems.
- ▶ When working with pathogenic germs belonging to a higher risk group, more than one aerosol-tight bioseal must be used.
- ▶ Wear personal protective equipment.
- ▶ Follow the instructions regarding hygiene, cleaning and decontamination.
- ▶ For complete instructions regarding the handling of germs or biological material in risk group II or higher, please refer to the "Laboratory Biosafety Manual" (Source: World Health Organization, current edition of the Laboratory Biosafety Manual).



Centrifuge lid can crush fingers. Keep hands clear.

- ▶ When opening or closing the device lid, do not reach between the lid and device or into the latching mechanism of the lid.
- ▶ Always open the centrifuge lid completely to prevent it from falling.



Danger of crushing if the centrifuge lid falls down due to a defective gas spring.

A defective gas spring is an insufficient support for the centrifuge lid.

- ▶ Make sure that the centrifuge lid can be opened completely and that it will remain in this position.
- ▶ Regularly check the gas spring for its proper function.
- ▶ Have defective gas springs replaced immediately.

We recommend that the gas springs be replaced every 2 years by a service technician.



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 incorrect or non-recommended accessories and spare parts, or from the improper use of such equipment.

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



Damage to device due to spilled liquids.

1. Switch the device off.
2. Disconnect the device from the 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.



Damage to electronic components due to condensation.

Condensation can form inside the device after the device has been moved from a cool to a warmer environment.

- ▶ 5804/5810 Wait for at least 3 hours before connecting the device to the power supply.
- ▶ **5804/5810 only:** Alternatively: let the device run for half an hour before transporting it.
- ▶ 5804 R/5810 R Wait for at least 4 hours before connecting the device to the power supply.



Centrifuge 5804 R/5810 R: compressor damage after improper transport.

- ▶ The centrifuge can only be switched on 4 h after it has been set-up.

3.5.2 Incorrect handling of the centrifuge



Damage from knocking against or moving the device during operation.

If the rotor bangs against the rotor chamber wall, it will cause considerable damage to the device and rotor.

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

3.5.3 Incorrect handling of the rotors



Risk of injury from improperly attached rotors and rotor lids.

- ▶ Only centrifuge when the rotor and rotor lid are firmly tightened.
- ▶ If unusual noises occur when the centrifuge starts, the rotor or the rotor lid may not be properly secured. Stop centrifugation immediately by pressing the **start/stop** key.



Risk of injury from asymmetric loading of rotors.

- ▶ Load rotors symmetrically with identical tubes and/or buckets and plates.
- ▶ Only load adapters with the suitable tubes and plates.
- ▶ Always use the same type of tubes and plates (weight, material/density and volume).
- ▶ Check for symmetric loading by using scales to balance the adapters and tubes or plates.



Risk of injury from overloaded rotor.

The centrifuges are designed for the centrifugation of material with a max. density of 1.2 g/mL at maximum speed and with maximum filling volume resp. load.

- ▶ Observe the information on each rotor relating to maximum load (adapter, tube and contents) per rotor bore/per bucket and make sure it is not exceeded.



Damage to rotors from aggressive chemicals.

Rotors are high-quality components which withstand extreme stresses. This stability can be impaired by aggressive chemicals.

- ▶ Avoid the use of aggressive chemicals, including strong and weak alkalis, strong acids, solutions with mercury, copper and other heavy metal ions, halogenated hydrocarbons, concentrated saline solutions and phenol.
- ▶ If the rotor is contaminated with aggressive chemicals, immediately clean it using a neutral cleaning agent and then rinse it thoroughly with water. This applies to the rotor bores in particular.
- ▶ Due to the manufacturing process, color variations may occur on rotors marked "coated". These color variations do not effect service life or resistance to chemicals.



If handled incorrectly, the swing-bucket rotor can fall over.

Buckets from swing-bucket rotors may not be used as handles.

- ▶ Before moving the rotor, remove the buckets.
- ▶ Always pick up the rotor at the rotor cross using both hands.



If handled incorrectly, the rotor can fall over.

- ▶ Always pick up the rotor F-35-48-17 with both hands.
- ▶ In order to hold the rotor safely, possibly you have to remove 3 to 4 sleeves from the opposite outer row.

3.5.4 Extreme strain on the centrifuging tubes



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 specified *g*-forces (rcf).



Risk from damaged tubes.

Damaged tubes must not be used, as this could lead to sample loss and further damage to the device and accessories.

- ▶ Visually check all tubes for damage before use.



Risk from open tube lids.

Open tube lids can break off during centrifugation and cause damage to the rotor and the centrifuge.

- ▶ Carefully close all tube lids before centrifuging.



Hazard to plastic tubes from organic solvents.

The use of organic solvents (e.g., phenol, chloroform) will reduce the strength of plastic tubes, which could lead to tube damage.

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



Sample tubes heat up.

In non-cooled centrifuges, the temperature in the rotor chamber, rotor and sample may exceed 40 °C based on the run time, *g*-force (rcf)/speed (rpm) and ambient temperature.

- ▶ Note that this can reduce the centrifugation resistance of the sample tubes.
- ▶ Please note the temperature resistance of the samples.

3.5.5 Aerosol-tight centrifugation



Risk to health due to limited aerosol tightness in the event of incorrect use.

Autoclaving, mechanical stresses and contamination by chemicals or other aggressive solvents can impair the aerosol-tightness of the rotors and rotor lid.

- ▶ Regularly check that the seals of aerosol-tight rotor lids are undamaged.
- ▶ Only use aerosol-tight rotor lids with undamaged and clean gaskets./Paragraph
- ▶ Thinly brush the threads of the rotor lid screw after every proper autoclaving (121 °C, 20 min.) with pivot grease (order no. Int.: 5810 350.050 / North America: 022634330). Do not apply the pivot grease to the gaskets. Replace aerosol-tight rotor lids after 10 autoclave cycles.
- ▶ Aerosol-tight rotors should never be stored with rotor lids screwed on tightly.



WARNING!

Risk 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. For fixed-angle rotors the labeling always begins with **FA**, swing-bucket rotors are labeled with **AT** (aerosol tight).

The aerosol-tight rotors and rotor lids are additionally marked with a red ring on the rotor and a red rotor lid screw.

- ▶ For aerosol-tight centrifugation, always simultaneously use rotors and rotor lids which are marked as aerosol-tight in the centrifuge intended for the corresponding purpose. The details specifying in which centrifuge you may use the aerosol-tight rotors and rotor lids can be found on the rotor and, beginning from production date of October 2003, on the upper side of the rotor lid.
- ▶ Only use aerosol-tight rotor lids in combination with rotors which are marked on the rotor lid.
- ▶ Only use aerosol-tight rotors/buckets with the corresponding rotor lids/caps.

3.6 Safety instructions on the device

Depiction	Meaning	Location
	<p>WARNING</p> <p>General hazard point. Follow the operating manual.</p>	Right side of the device

4 Installation

4.1 Selecting the location



Damage to objects near the device.

If the rotor becomes damaged or an imbalance occurs, the device may change position slightly.

- ▶ During operation, maintain a safe distance of **30 cm** on all sides of the device in accordance with EN 61010-2-020.



Damage from overheating.

- ▶ Do not place the device near sources of heat (e.g., heater, drier compartment).
- ▶ Do not expose the device to direct sunlight.
- ▶ Ensure unobstructed air circulation. Ensure a minimum distance of 30 cm between all sides of the devices and any adjacent devices or the wall. Make sure that the base of the device is not obstructed.
- ▶ Make sure that the air slots in the device are always free from obstructions.



Radio interference.

This device is a category A product in accordance with EN 55011. There may be disturbance to radio reception in residential areas.

- ▶ Ensure that appropriate preventive measures are taken.

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

- Suitable power connection as per the name plate (230 V/120 V/100 V).
- Stable, horizontal and resonance-free lab bench. Weight of the device: 55 kg (5804) or 80 kg (5804 R), 68 kg (5810), 99 kg (5810 R).
- A well ventilated environment which is protected from direct sunlight to prevent the device from heating up more.

4.2 Preparing installation



Bodily injury due to lifting and carrying heavy loads

The device is heavy. Lifting and carrying the device can lead to back injuries.

- ▶ Transport the device without the rotor inserted.
- ▶ The device may only be transported in its original packaging.
- ▶ The device must be transported by least two people.
- ▶ Use a transport aid (e.g., dolly) to transport the device longer distances.

Perform the following steps in the sequence described.

1. Open the box.
2. Remove the covering cardboard.
3. Remove the accessories.

4.3 Installing the instrument



Risk from incorrect supply voltage

- ▶ Only connect the device to power supplies which correspond with the electrical requirements on the nameplate.
- ▶ Only use sockets with a protective earth (PE) conductor and suitable power cable.



Centrifuge 5804 R/5810 R: compressor damage after improper transport.

- ▶ The centrifuge can only be switched on 4 h after it has been set-up.

Perform the following steps in the sequence described.

1. Lift the centrifuge by the underside in the vicinity of the device feet and place it directly on a suitable lab bench.
2. Let the device warm up to ambient temperature for at least 3 hours (5804/5810) resp. 4 hours (5804 R/5810 R) in order to prevent damages to electronic assemblies by condensation and damages to the compressor (only 5804 R/5810 R).
3. Check that the mains voltage and frequency match the requirements on the device type plate. Centrifuge 5804 R/5810 R with power supply voltage 120 V: See also the notes on the power supply at the end of this chapter.
4. Connect the centrifuge to the mains and switch it on using the power switch on the right side of the device.
 - The key **open** lights up.
 - Display is illuminated.
5. Open the centrifuge lid using the **open** key.
6. Use the details included in the scope of delivery to check that the delivery is complete (see *Delivery package on p. 12*).
7. Check all parts for any transport damage. Contact your dealer if any damage is found.
8. **Only 5804 R/5810 R:** Insert the condensation water tray at the front of the device into the provided holder (see figure 1 on page 3).

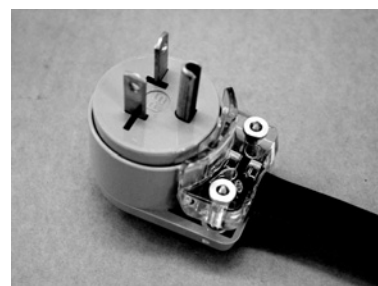
Tab. 1: Centrifuge 5804 R / 5810 R with mains voltage 120 V in two versions

15 A IEC power cable



- Conventional IEC power cable.
- Connection to standard socket (120 V/ 15 A).
- Standard cooling performance:
 - Increased minimum achievable temperatures at maximum speed of centrifugation.
 - Slower cooling down to set temperature.

20 A variant



- Power cable fitted permanently to the device.
- Special mains connection required (120 V/ 20 A).
- Increased cooling performance.
 - Lower temperatures at maximum speed of centrifugation possible.
 - Quicker cooling down to set temperature.

5 Operation

5.1 Overview of operating controls

Before using the centrifuge for the first time, familiarize yourself with the operating controls and the display.

The depiction of the operator panel and the device display can be found on the front fold-out page (s. Fig. 2 and Fig. 3).

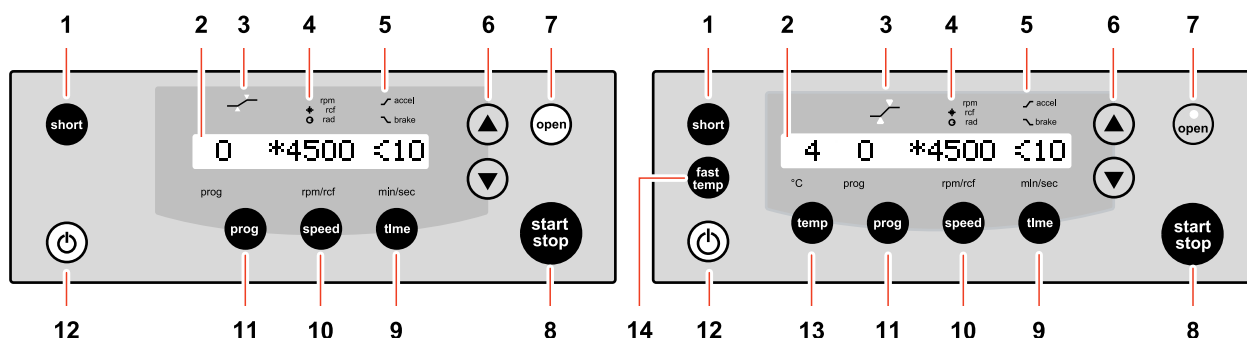


Fig. 2: Control panel of the Centrifuge 5804/5810 and the Centrifuge 5804 R/5810 R.

1 Short spin centrifugation	2 Display
3 Status At set rpm function <small>↗</small> : Start of run time when reaching 95% of the preset g-force (rcf) or speed (rpm). <small>↘</small> : Start of run time immediately.	4 Indicate speed (rpm), g-force (rcf) * and radius setting \odot .
5 Symbol for acceleration <small>↗</small> and braking <small>↘</small>	6 Set parameters and values.
7 Release centrifuge lid.	8 Start or stop centrifugation.
9 Adjust centrifugation time.	10 Set centrifugation speed.
11 Select or save program.	12 Standby
13 Only 5804 R/5810 R: Set the temperature.	14 Only 5804 R/5810 R: Start temperature control run FastTemp.



Fig. 3: Display of Centrifuge 5804/5810 and the Centrifuge 5804 R/5810 R

1 Program number	2 Symbol for g-force (rcf)
3 g-force (rcf)/rotational speed (rpm)	4 Symbol flashes during centrifugation
5 Symbol for acceleration <small>↗</small> and braking <small>↘</small>	6 Centrifugation time
7 Only 5804 R/5810 R: Temperature	

The display of the centrifugation parameters changes depending upon the condition of the device:


- Rotor stop: display of set values.
- Centrifugation: display of actual values.

When you press the **temp**, **time** or **speed** keys during centrifugation, the respective set value is displayed for 2.5 seconds.

Please also read the precise description of the individual functions (see p. 56).

5.2 Preparing for centrifugation

5.2.1 Switching on the centrifuge

1. Switch on the centrifuge using the mains power switch or the  standby key.
2. Open the closed centrifuge lid by pressing the **open** key.
The parameter settings of the last run are displayed.

5.2.2 Inserting the rotor

Requirement

When attaching the rotor to or releasing it from the motor shaft, the temperature of the rotor and motor shaft must be within the range of 10 –30°C.



- ▶ Swing-bucket rotors: Before inserting or removing the rotor, remove the carriers and grip the rotor by the rotor cross with both hands.
- ▶ F-35-48-17: Before inserting or removing the rotor, remove the sleeves and grip the rotor with both hands.

1. Fit the rotor vertically on the motor shaft.
2. Insert the supplied rotor key into the rotor nut.
Rotor cross A-4-81: Use the special rotor key.
3. Turn rotor key **clockwise** until the rotor nut is firmly tightened.

5.2.3 Automatic rotor detection

The centrifuge has automatic rotor detection. It detects a newly inserted rotor during centrifugation and displays its maximum g-force (rcf)/speed (rpm) for approx. 2 seconds. The set g-force (rcf)/speed (rpm) is automatically limited to the maximum permissible value of the rotor, if necessary.



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. *SPEED* is flashing in the display. If you have started a program run, the program number is set to zero.

You can now restart centrifugation with the automatically limited g-force (rcf)/speed (rpm) or adjust it.



After a rotor change and before centrifugation, carry out a short short-spin run for rotor detection (see p. 54).

- ▶ Always check the set g-force (rcf)/speed (rpm) after a rotor change and adjust it if necessary.

5.2.4 Loading the rotor



Risk of injury from asymmetric loading of rotors.

- ▶ Load rotors symmetrically with identical tubes and/or buckets and plates.
- ▶ Only load adapters with the suitable tubes and plates.
- ▶ Always use the same type of tubes and plates (weight, material/density and volume).
- ▶ Check for symmetric loading by using scales to balance the adapters and tubes or plates.



Risk from damaged or overloaded tubes!

- ▶ When loading the rotor, note the safety instructions with regard to risks from overloaded or damaged tubes (see *Warnings for intended use on p. 39*).



The device automatically detects imbalances during operation. The device immediately terminates the run with an error message and a signal tone. Check the load, balance the tubes and restart the run.

Fixed-angle rotors

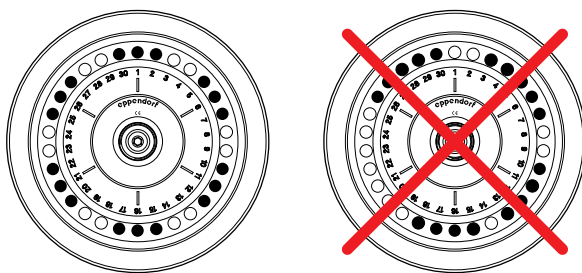


Rotor lid!

- Fixed-angle rotors may only be operated with the appropriate rotor lid in each case. This is clearly shown by the identical rotor name labeling on the rotor and on the rotor lid.
- To carry out an aerosol-tight centrifugation, an aerosol-tight rotor must be used in combination with the corresponding rotor lid or cap.

To load the rotor, proceed as follows:

1. Check the maximum load (adapter, tube and contents) per rotor bore.
The information about this can be found on the rotor and in this operating manual (see *Rotors on p. 13*).
2. Load rotors and adapters only with the tubes intended for them.
3. Insert tubes opposite each other in pairs into the rotor bores. For symmetrical loading, tubes located opposite each other must be of the same type and contain the same filling quantity.



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

4. Attach and tighten rotor lid.

Swing-bucket rotor

Requirement

- A combination of rotor, bucket and adapter, approved by Eppendorf.
- The buckets are sorted by weight category. Buckets located opposite each other must belong to the same weight category. It is stamped onto the side of the groove, e.g. 68 (the last 2 digits in grams). When reordering - also plate buckets - make sure to specify the existing weight category.
- Matching and tested tubes and plates.
- Do not remove the middle guiding elements of the modular adapters of the rectangular buckets in order, e.g., to increase capacity through multi-level centrifugation.



Damage to adapters due to incorrect stacking.

- ▶ Stack the adapters in rectangular buckets in a closed row only from the bottom of the bucket. Do not leave any gaps between the modules.



Filling the plates too high can cause overflowing.

During the run the meniscuses in the tubes along the edges of the plates are at an angle. This is due to the centrifugal forces and cannot be avoided.

- ▶ Fill the plate wells to a maximum of 2/3 of the maximum filling volume.

To load the rotor, proceed as follows:

1. Check the bucket grooves for cleanliness and grease lightly with pivot grease (order no. Int.: 5810 350.050 / North America: 022634330).
Dirty grooves and pegs prevent the buckets from swinging out evenly.
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 freely.
4. If a plate type is used for the first time or for overlength tubes (> 100 mm) carry out a manual loading and swing test.
5. Check the maximum load per bucket (adapter, tube or plate and contents) and the loading height.
The information about this can be found on the rotor and in this operating manual (see *Rotors on p. 13*).
6. Load the buckets symmetrically.

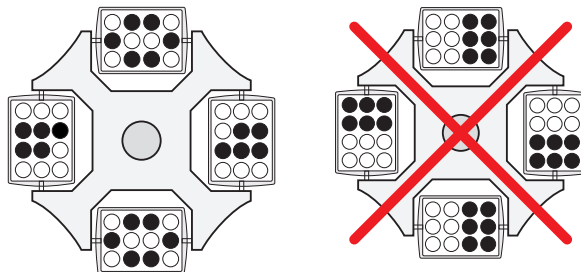


Fig. 4: Incomplete, but symmetric loading of the buckets. The pegs of each bucket must be uniformly loaded.

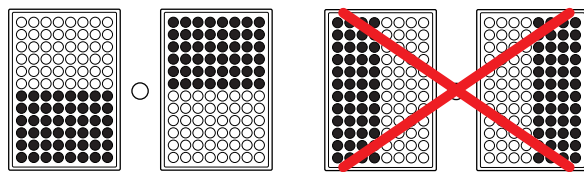


Fig. 5: Symmetrical loading of the plates.

The plate arrangement shown on the right-hand side is incorrect, as the buckets will not swing properly.

The same principle also applies to the loading of rotor A-4-81-MTP/Flex with 4 plates.

The plates have some play in the buckets.

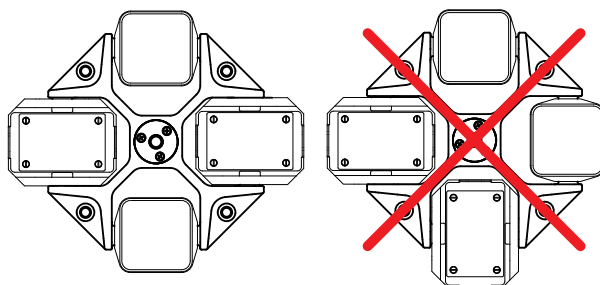


Fig. 6: Mixed loading of rotors

Rotor	Mixed loading
S-4-104 A-4-81/A-4-81-MTP/Flex	<ul style="list-style-type: none"> • 2 plate buckets (MTP or DWP bucket) • 2 round buckets or 2 rectangular buckets
A-4-81/A-4-81-MTP/Flex	<ul style="list-style-type: none"> • 2 plate buckets (MTP or DWP bucket) • 2 buckets for conical tubes • 2 rectangular buckets
A-4-44	<ul style="list-style-type: none"> • 2 rectangular buckets • 2 buckets for conical tubes



Rotor damage due to mixed loading.

If you load the rotors A-4-62 and A-4-62-MTP with a mixed equipment, the rotors are damaged during centrifugation.

- ▶ Load all positions of the rotors A-4-62 and A-4-62-MTP with the same buckets.
- ▶ Always load all 4 positions of the swing-bucket rotors.

7. Check the loading of the bucket.

5.2.5 Closing the centrifuge lid



Centrifuge lid can crush fingers. Keep hands clear.

- ▶ When opening or closing the device lid, do not reach between the lid and device or into the latching mechanism of the lid.
- ▶ Always open the centrifuge lid completely to prevent it from falling.

1. Check the correct attachment of the rotor and rotor lid.
2. Push down the centrifuge lid until the lid latch engages and the lid is automatically closed. The centrifuge will close automatically.

The **open** key lights up blue. The ■ symbol appears in the display.

5.3 Cooling (only 5804 R/5810 R)

5.3.1 Temperature adjustment

- ▶ Select the temperature setting using the **temp** key.
- ▶ Set the temperature using the arrow keys between -9°C and +40°C.

5.3.2 Temperature display

If the rotor is stopped:	Set temperature
During centrifugation:	Actual temperature

5.3.3 Temperature monitoring

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

Deviation from set value	Action
± 3 °C	Temperatures on the display are flashing.
± 5 °C	Periodic warning tone. Centrifugation is stopped automatically.

5.3.4 FastTemp

This function can be used to start a temperature control run directly without samples with a rotor and temperature-specific speed in order to quickly adjust the rotor chamber, including the rotor, buckets and adapters, to the previously set nominal temperature.

Requirement

- The centrifuge is switched on.
- The rotor and rotor lid are properly attached.
- The centrifuge lid is closed.
- The temperature and g-force (rcf)/speed (rpm) are set for the subsequent centrifugation (see *Centrifuging on p. 53*).

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

The display shows from left to right: actual temperature value, *FT*, g-force (rcf)/speed (rpm) and -- (time).

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

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

After the set temperature has been reached and the temperature control run is complete, the centrifuge keeps the rotor chamber with the centrifuge lid closed at the set target temperature if the temperature is below the ambient temperature. However, independent of the target temperature, 4 °C must be met via this continuous cooling in order to prevent the rotor chamber from freezing.



The centrifuge stops the cycle automatically if the rotor or the buckets have reached the set temperature. Therefore, there may be a delay between the display of the set temperature and the automatic end of the temperature control run.



When using aerosol-tight buckets, always carry out a FastTemp run at low temperatures without a cap. There is a danger otherwise of the caps becoming fixed by suction due to a vacuum. Do not pull on the sealing clamps or hooks to loosen the cap. Adjust the temperature of the buckets to room temperature so that the caps can be removed easily.

5.3.5 Continuous cooling

If the rotor stops, the rotor chamber will be maintained at the target 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 centrifuge is not in standby mode.

During continuous cooling the following applies:

- The set and actual temperature are displayed alternately.
- Irrespective of the set temperature, the temperature does not go below 4 °C to prevent the rotor chamber from freezing and from increased condensation in the device.
- The temperature adjustment is slower because the rotor does not rotate during this process.

To end continuous cooling, open the centrifuge lid or press the standby key.

If the centrifuge is not used for more than 8 hours, the continuous cooling is switched off automatically (ECO shut-off). The device then switches to standby mode. This protects against ice formation in the rotor chamber and increased condensation in the device. The display shows *Standby off* and the measured temperature in the rotor chamber. With **FastTemp** you can quickly reach the desired temperature again (see p. 51).

You can also change from automatically switching off continuous cooling after 8 hours (ECO shut-off) to unlimited continuous cooling.



NOTICE!

Ice formation and compressor overheating during continuous cooling.

- ▶ Switch the centrifuge off regularly to eliminate any ice formation by thawing.
- ▶ Regularly remove condensation from the rotor chamber using a soft, absorbent cloth.
- ▶ Empty and clean the condensation water tray regularly.

1. When the centrifuge lid is opened, press the **temp** and **prog** keys simultaneously. *Standby 8h* appears in the display.
2. Press the **fast temp** key immediately. Endless operation for continuous cooling is activated. *Standby endless* appears in the display.
3. To change back to *Standby 8h*, repeat the process.

5.4 Centrifuging



Danger due to incorrectly loaded rotors or damaged or 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 (see *Warnings for intended use on p. 39*).



Risk of injury from improperly attached rotors, rotor lids and caps.

- ▶ Only centrifuge with firmly tightened rotor and rotor lid as well as with inserted carriers, buckets and correctly closed caps.
- ▶ If unusual noises occur when the centrifuge starts, the rotor, the rotor lid or a cap may not be properly secured. Stop centrifugation immediately by pressing the **start/stop** key.

Each of the centrifuging variants described here must be preceded by the preparation described above (see *Preparing for centrifugation on p. 47*).

5.4.1 Centrifuging with preset time

Perform the following steps in the sequence described.



1. Speed (rpm) setting: press once. g-force (rcf) setting: press repeatedly until the symbol * additionally appears in the display.

The displayed g-force (rcf)/speed (rpm) flashes and can be set with the arrow keys.

For the g-force (rcf) setting also check the set radius (see *Rotors on p. 13*), (see *Setting the radius on p. 56*).



2. Use the arrow keys to set the g-force (rcf)/speed (rpm).

The new set value appears in the display.



3. Select the runtime setting and set it with the arrow keys.



4. **Only 5804 R/5810 R:** Select the temperature setting and set it with the arrow keys.



5. Start centrifugation.

- ■ blinks in the display when the rotor is running.
- **Only 5804 R/5810 R:** The current temperature is displayed.
- The current g-force (rcf)/speed (rpm) of the rotor is displayed.
- You can display all set values for 2.5 s by pressing a parameter key (**Temp, Speed, Time**).
- You can terminate centrifugation early by pressing the **start/stop** key.
- After completion of the set time, the centrifuge stops automatically.
- During braking the elapsed centrifugation time is displayed in a flashing manner.



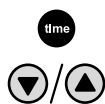
6. Open the centrifuge lid as soon as the key lights up.



During the run, you can change the total run time, the temperature (only Centrifuge 5804 R/5810 R) and the g-force (rcf)/ speed (rpm) as well as the acceleration time and the braking time. The new parameters are adopted immediately. The time which has already elapsed is considered in the newly set total run time. Note that the shortest new total runtime which can be set is the time which has already elapsed plus 2 minutes.

5.4.2 Centrifuging in continuous operation

Perform the following steps in the sequence described.



1. Set the g-force (rcf)/speed (rpm) and possibly the temperature as previously described (see p. 53).
2. Select the runtime setting.
3. Set continuous operation below 1 min or above 99 min.
In the display ∞ indicates continuous run.
4. Start centrifugation.
 - ■ blinks in the display when the rotor is running.
 - If the centrifuge runs for more than 99 min, 99. appears in the display.
 - **Only 5804 R/5810 R:** The current temperature is displayed.
 - The current g-force (rcf)/speed (rpm) of the rotor is displayed.
5. End centrifugation after the desired time.
 - During braking the elapsed centrifugation time is displayed flashing.
6. Open the centrifuge lid as soon as the key lights up.

5.4.3 Short spin centrifugation

You can carry out a short spin centrifugation with the currently set or with the maximum g-force (rcf)/ speed (rpm) of the used rotor.

Setting the speed option



- ▶ Press and hold down the key with the centrifuge lid open.

One of the following options appears in the display:

rpm max: the rotor accelerates up to its maximum g-force (rcf)/speed (rpm) (see *Rotors on p. 13*).

200 - rpm: the rotor only accelerates up to its set g-force (rcf)/speed (rpm).



- ▶ Press and hold down the key for more than 3 s with the centrifuge lid open to switch between the *rpm max* and *200 - rpm* options.

The selected option appears in the display for 2 s and is retained.

Starting the short spin centrifugation

1. If *200 - rpm* is set, set the g-force (rcf)/ speed (rpm) for the short spin centrifugation (see p. 53).
2. **Only 5804 R/5810 R:** Set the temperature (see p. 53).
3. Keep the key pressed to start the short spin centrifugation.
 - *SH* appears in the display while the rotor is running.
 - The time is counted upwards in seconds.
4. Release to end the short spin centrifugation.



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



5. Open the centrifuge lid as soon as the key is illuminated.
6. Remove the centrifuging material.

5.4.4 Removing the rotor

Requirement

When attaching the rotor to or releasing it from the motor shaft, the temperature of the rotor and motor shaft must be within the range of 10 –30 °C.



- ▶ Swing-bucket rotors: Before inserting or removing the rotor, remove the carriers and grip the rotor by the rotor cross with both hands.
- ▶ F-35-48-17: Before inserting or removing the rotor, remove the sleeves and grip the rotor with both hands.

1. Turn the rotor nut **counterclockwise** using the rotor key.
2. Remove the rotor by lifting it vertically.
3. **Only 5804 R/5810 R:** Switch off the centrifuge after use and empty the condensation water tray. Leave centrifuge lid fully opened and protect it against closing.

5.4.5 Standby mode

- ▶ You can switch between standby mode and ready state at any time when centrifugation is not performed by pressing the standby key.

Standby mode

- The display expires.
- The standby key lights up in red.
- **Only 5804 R/5810 R:** The rotor chamber is not cooled (see *Continuous cooling on p. 52*).





Ready state

- The centrifugation parameters are displayed.
- The standby key lights up in green.
- **Only 5804 R/5810 R:** The rotor chamber is cooled when the centrifuge lid is closed (see *Continuous cooling on p. 52*).

6 Operating controls and function









6.1 Setting the radius

When you control the rotational speed via the g-force (rcf, RCF), and not via the speed (rpm), the internal conversion of speed to g-force takes place by default with the largest radius of the used rotor (see *Rotors on p. 13*). You can adapt this radius to an applied adapter:

-  1. Press several times until the symbol  also appears in the display.
The current radius flashes.
-  2. Set the new radius.
-  3. Wait for 3 seconds (if the rotor is stopped: 10 seconds).
The changed g-force appears.

6.2 Setting the acceleration and braking times

You can set the acceleration and braking time in the levels 0 to 9 (see Tab. on p. 70). Level 9 is preset (shortest acceleration and braking time).

-  1. Press twice until the  symbol for acceleration level (accel) appears in the display.
-  2. Select acceleration level 0 to 9.
-  3. Press once until the  symbol for braking level (brake) appears in the display.
-  4. Select braking level 0 to 9.
Braking level (brake) 0 corresponds to free deceleration.
The device only shows the  and  symbols continually when levels 0 to 8 have been set.

6.3 Setting the start of run time (At set rpm)

The centrifuge can count down the set time either immediately from the start of centrifugation or only once 95% of the specified g-force (rcf)/speed (rpm) has been reached (At set rpm). The respective setting is indicated by the flashing triangle in the symbol above the display:



Preset time: the set time is counted down immediately after the start of centrifugation.



At set rpm: the set time is counted down once 95% of the specified g-force (rcf)/ speed (rpm) has been reached.

Requirement

The centrifuge lid is open.



- ▶ Hold down this key for at least 4 s to switch between the two settings,

When pressing the key, both triangles of the symbol will flash in turn.

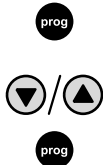
6.4 Saving the program

You can save the current centrifugation parameters and functions (*At set rpm*, acceleration and braking times and radius) under up to 35 program numbers.

Requirement

Rotor stop.

1. Check the parameters and functions to be saved.
2. Press key twice.



The first free program number appears with *P...* in the display.

3. Select the program number (*1...9, A...Z*).

4. Press and hold key for 2 seconds.

ok appears in the display. The current centrifugation parameters and functions are saved under the selected program number.



When you want to overwrite a saved program, you have to delete it before saving the new parameters (see *Deleting the program on p. 57*).

6.5 Loading the program

Requirement

- Rotor stop.



1. Press once.

Program number flashes:

- *0*: centrifugation parameters and functions of the last run.
- *1...9, A...Z*: stored programs.

2. Select the program number.

3. Closed centrifuge lid: centrifugation starts with the loaded centrifugation parameters and functions.

When the centrifuge lid is open, you can press the **start/stop** key to return to program 0 or exit the programming mode.



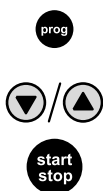
If you change the centrifugation parameters during a run with a stored program, the centrifuge changes to program *0*. The stored program remains unchanged.

You can also exit the stored program by loading program *0*.

6.6 Deleting the program

Requirement

- Rotor stop.
- The centrifuge lid is open.



1. Press once.

The program number flashes.

2. Select the program number.

3. Within 10 seconds, keep key pressed for 2 seconds

The following text appears in the display: *cleared*.

The selected program is deleted. You can save new centrifugation parameters and functions under this program number.

6.7 Special functions

6.7.1 Display operating hours

Requirement

Rotor stop.



▶ Press both keys simultaneously.

The previous total run time of the centrifuge (in hours) appears in the display

6.7.2 Switching on/off the warning signal



▶ Press both keys simultaneously to change the setting.

Alarm on or *Alarm off* appears in the display after 2 s.

6.7.3 Exiting the service functions



▶ Press both keys simultaneously to exit a service program called by mistake.

6.7.4 Controlling the centrifuge via the serial interface (optional)

Optionally, you can also control all centrifuge functions via a serial interface (RS 232 c). For this a retrofit must be carried out by Eppendorf Service. Only devices verified according to IEC 950 must be connected to the serial interface.

7 Maintenance

7.1 Maintenance



Danger of crushing if the centrifuge lid falls down due to a defective gas spring.

A defective gas spring is an insufficient support for the centrifuge lid.

- ▶ Make sure that the centrifuge lid can be opened completely and that it will remain in this position.
- ▶ Regularly check the gas spring for its proper function.
- ▶ Have defective gas springs replaced immediately.

We recommend that the gas springs be replaced every 2 years by a service technician.

We recommend that the centrifuge with the associated rotors be checked at the latest every 12 months by Technical Service during maintenance. Observe the relevant national regulations.

7.2 Prepare 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. 62*) 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
<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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.

7.3 Cleaning/disinfection



Electric shock as a result of penetration of liquid.

- ▶ Switch off the device and disconnect the power plug before starting cleaning or disinfection work.
- ▶ Do not allow any liquids to penetrate the inside of the housing.
- ▶ Do not spray clean/spray disinfect the housing.
- ▶ Only plug the device back in if it is completely dry, both inside and outside.



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 becomes contaminated with aggressive chemicals, clean it immediately with a mild cleaning agent.



Corrosion due to aggressive cleaning agents and disinfectants.

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



Damage from UV and other high-energy radiation.

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



Autoclaving

Except for the rotor crosses A-4-81, S-4-72 and S-4-104, all rotors, rotor lids, buckets, carriers, caps and adapters can be autoclaved (121 °C, 20 min).

For guaranteeing the aerosol tightness, after a maximum of 50 autoclaving cycles the gaskets of the caps and the QuickLock rotor lid have to be exchanged.

Do not use any stained, porous or otherwise defective gaskets. Also note the operating manual of the centrifuge and the supplement sheet on aerosol-tight centrifugation delivered together with the aerosol-tight rotors.

The aerosol-tight rotor FA-45-30-11 can be autoclaved at 142°C for 2 hours to destroy prions. In this case note that the rotor lid must be replaced after each autoclaving.



Aerosol tightness

Check that the seals are intact before use.

Replace the rotor lid of the aerosol-tight rotors when the sealing rings on the lid screw and in the lid groove become worn. The sealing rings require regular care to protect the rotors.

Aerosol-tight rotors should never be stored with lids screwed on!

In order to prevent damage, lightly lubricate the lid thread of the aerosol-tight rotors with pivot grease (order no. Int.: 5810 350.050/North America: 022634330).



Swing-bucket rotor

- Before cleaning the rotor, remove old pivot grease from grooves and pivots.
- Make sure that the grooves and pivots are clean. Dirty grooves and pivots prevent the buckets from swinging out evenly.
- After cleaning, lubricate the pivots of the rotor and the grooves of the buckets with pivot grease (order no. Int.: 5810 350.050/North America: 022634330) so that the carriers can move freely in a swinging manner.

7.3.1 Cleaning and disinfecting the device

1. Open the lid. Switch off the device with the mains switch. Disconnect the power plug from the power supply.
2. Loosen the rotor nut by turning the rotor key **counterclockwise**.
3. Remove the rotor.
4. Clean and disinfect all accessible surfaces of the device, including the power cable, using a damp cloth and the recommended cleaning agents.
5. Thoroughly clean the rubber seal of the rotor chamber with water.
6. Rub the dry rubber seal with glycerine or talcum powder to prevent it from becoming brittle. Other components of the device, such as the lid latch, lid springs, motor shaft and rotor cone, must not be lubricated.
7. Clean the motor shaft with a soft, dry and lint-free cloth. Do not lubricate the motor shaft.
8. Check the motor shaft for damage.
9. Inspect 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.

7.3.2 Cleaning and disinfecting the rotor



Detailed instructions for cleaning and maintenance can be found in "Fixed-Angle Rotor - Basic Inspection" and "Swing-Bucket Rotor - Basic Inspection".



After every 200 runs, the centrifuge displays *clean rotor* three times to remind you about the regular rotor cleaning.

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 with the recommended cleaning agents.
3. Use a bottle brush to clean and disinfect the rotor bores.
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 get trapped inside the cavities.

5. Place rotors and accessories on a cloth to dry. Place fixed-angle rotors with the rotor bores facing downwards to allow the bores to dry as well.
6. Clean the rotor cone with a soft, dry and lint-free cloth. Do not lubricate the rotor cone.
7. Inspect the rotor cone for damage.
8. Place the dry rotor onto the motor shaft.
9. Tighten the rotor nut firmly by turning it **clockwise** with the rotor key.
10. Load the fixed-angle rotor with the cleaned adapters or the swing-bucket rotor with the cleaned buckets and adapters, if necessary.
11. Leave the rotor lid open when the rotor is not being used.

7.4 Additional service instructions for Centrifuge 5804 R/5810 R

- ▶ 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.
- ▶ The condensation water outlet also needs to be cleaned on a regular basis, e.g., using a bottle brush.
- ▶ Regularly clear the rotor chamber of ice formations via thawing, either by leaving the centrifuge lid open or carrying out a brief temperature control run at approx. 30°C.
- ▶ Leave the centrifuge lid open when not in use for a long period.
This allows residual moisture to escape. The gas pressure spring is relieved.
- ▶ Wipe up condensate in the rotor chamber. To do so, use a soft absorbent cloth.
- ▶ Remove dust deposits from the ventilation slits of the centrifuge using a brush or swab at the latest every six months. First switch off the device and remove the power plug.

7.5 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. Fine glass particles can become lodged in the rubber parts (e.g., the motor sleeve, the sealing of the rotor chamber 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 in the rotor chamber (in metal rotor chambers)
- 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 rubber mats and adapters to prevent any further damage.
4. Regularly check the rotor bores for deposits and damage.

7.6 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. Follow the instructions in the decontamination certificate, which is available as a PDF on our website (www.eppendorf.com/decontamination).
2. Decontaminate all the parts you would like to dispatch.
3. Enclose the fully-completed decontamination certificate for returned goods (including the serial number of the device) with the dispatch.

8 Troubleshooting

If the suggested measures repeatedly are not successful, please contact your local Eppendorf partner. The contact addresses can be found online at www.eppendorf.com/worldwide.

8.1 Resetting the excess current switch

The 230 V and 120 V devices have built-in thermal excess-current switches which function as (all-pole) fuses. When the overload protection is actuated, these switch the power switch to OFF, but do not switch it on again automatically.

To switch on the excess current switch again, proceed as follows:

1. Switch off the centrifuge using the power switch.
2. Wait for at least 20 seconds and switch on the centrifuge again.

The excess current switch will be automatically reactivated and the centrifuge is ready for operation.

8.2 General errors

Symptom/message	Cause	Remedy
No display.	No mains connection.	▶ Check the mains connection.
No display.	Power failure.	▶ Check the mains fuse of the device (see <i>Resetting the excess current switch on p. 63</i>). ▶ Check the mains fuse of the laboratory.
Lid of the device cannot be opened.	Rotor is still running.	▶ Wait for rotor to stop.
Lid of the device cannot be opened.	Power failure.	1. Check the mains fuse of the device (see <i>Resetting the excess current switch on p. 63</i>). 2. Check the mains fuse of the laboratory. 3. Activate the emergency lid release (see p. 65).
<i>Clean rotor</i>	200 runs.	▶ Clean the rotor and chamber (see p. 59).
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.

8.3 Error messages

If one of the following error messages appears, proceed as follows:

1. Remove fault (see Remedy).
2. Press **open** key to clear the error message.
3. If necessary, repeat centrifugation.

Some errors can have various causes. The actual cause is described in the message in the device display.

Symptom/message	Cause	Remedy
<i>No rotor</i> Centrifuge does not start up.	No rotor.	▶ Insert the rotor.
<i>No rotor</i> Centrifuge does not start up.	Error in the drive or in the rotor detection.	▶ Switch the centrifuge off and back on again after > 20 s.
<i>Press Open</i>	Centrifuge lid could not be locked.	1. Press the open key. 2. Try again to close centrifuge lid.
<i>Close lid</i>	Centrifuge lid not closed properly.	▶ Close the centrifuge lid firmly.
<i>Lift lid</i> The centrifuge lid does not open.	The centrifuge lid cannot open automatically.	▶ Lift the centrifuge lid manually.
<i>IMBAL</i> The centrifuge shakes when it starts up and switches off.	Rotor is loaded asymmetrically.	▶ Load the rotor symmetrically (see p. 47).
<i>ROTOR</i> The centrifuge shakes when it starts up and switches off.	Rotor not screwed sufficiently.	1. Tighten the rotor nut (see p. 47). 2. Check the rotor cone and motor shaft for grooves and damage.
<i>ROTOR</i> The centrifuge shakes when it starts up and switches off.	<ul style="list-style-type: none"> • Centrifuge was pushed. • Table is not stable. 	▶ Position the centrifuge on a stable table (see p. 44).
<i>SPEED</i> Centrifuge switches off.	Nominal speed for rotor too high.	▶ Enter the appropriate nominal speed (see p. 13).
<i>change rotor</i>	The maximum service life of the rotor has been reached. The warning is displayed after 98,000, 99,000 and 99,600 runs (3 times after each run). After 100,000 runs, it is displayed after every run.	▶ Contact Technical Service.
Temperature display flashes. (only 5804 R/5810 R)	Temperature deviation from the set value: ± 3 °C.	<ul style="list-style-type: none"> ▶ Check the settings. ▶ Wait until the set temperature has been reached. ▶ Check unhindered air circulation through the air slots. ▶ Thaw ice or switch off device and allow it to cool down.

Symptom/message	Cause	Remedy
<i>Overtemp</i> (only 5804 R/5810 R) Centrifuge switches off and issues a warning tone.	Temperature deviation from the set value in the rotor chamber: ± 5 °C.	<ul style="list-style-type: none"> ▶ Check the settings. ▶ Check unhindered air circulation through the air slots. ▶ Thaw ice or switch off device and allow it to cool down.
<i>Clear memory</i>	Program memory full.	▶ Delete some programs (see p. 57).
<i>Interrupt</i>	Power failure during a run.	▶ Check the mains connection.
<i>Error 1</i>	Error in speed measuring system.	▶ If this error message appears again, test with a different rotor.
<i>Error 2</i>	Imbalance sensor faulty.	▶ Repeat the run.
<i>Error 3</i>	Error in speed measuring system.	▶ Insert rotor and screw tight.
<i>Error 3</i>	Error in speed measuring system.	▶ Allow the centrifuge to stand for 12 min when switched on until the open key lights up.
<i>Error 4</i>	Lid latch sensor faulty.	▶ Switch the centrifuge off and back on again after > 20 s.
<i>Error 5</i>	Prohibited opening of lid or lid switch is defective during a run.	<ol style="list-style-type: none"> 1. Wait for rotor to stop. 2. Open and close again the lid of the device. 3. Repeat the run.
<i>Error 6 or overload</i>	Mains voltage too low.	▶ Check the mains voltage.
<i>Error 6 or overload</i>	<ul style="list-style-type: none"> • Converter overloaded. • Brake faulty. 	▶ Switch off centrifuge, allow to cool down for at least 5 min, and then switch on again.
<i>Error 8</i>	<ul style="list-style-type: none"> • Drive fault. • Rotor loose. • Motor defective. 	<ol style="list-style-type: none"> 1. Wait for rotor to stop. 2. Tighten the rotor. 3. Repeat the run.
<i>Error 9 to Error 25</i>	Electronics fault.	▶ Switch the centrifuge off and back on again after > 20 s.

8.4 Emergency release

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



Risk of injury from rotating rotor.

- ▶ Wait for the rotor to stop before activating the emergency release. The rotor can continue rotating for up to 8 min.
- ▶ To check, look through the monitoring glass in the centrifuge lid.

You need the standard rotor key supplied with the centrifuge.

1. Disconnect the power plug.
2. Remove the plastic cover for the emergency release. This is located in the center on the front side of the device.
3. Insert the rotor key into the hexagonal opening behind until some resistance can be felt.
4. While keeping the rotor key pressed, turn it in a counterclockwise direction.
This will release the centrifuge lid.
5. Open the centrifuge lid.
6. Remove the rotor key and put the plastic covers back on.

9 Transport, storage and disposal

9.1 Transport

► The device may only be transported in its original packaging.

	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

9.2 Storage

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

9.3 Disposal

In case the product is to be disposed of, the relevant legal regulations are to 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 2002/96/EC 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 identification:



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

In Germany, this is mandatory from March 23, 2006. From this date, the manufacturer has to offer a suitable method of return for all devices supplied after August 13, 2005. For all devices supplied before August 13, 2005, the last user is responsible for the correct disposal.

10 Technical data

10.1 Power supply

Power connection:	230 V, 50 to 60 Hz 120 V, 60 Hz	
Current consumption:	5804/5810 (230 V):	6 A
	5804/5810 (120 V):	11 A
	5804 R/5810 R (230 V):	9 A/10 A
	5804 R/5810 R (120 V), 20 A:	16 A
	5804 R/5810 R (120 V), 15 A:	12 A
Power consumption:	5804/5810 (230 V):	max. 900 W
	5804/5810 (120 V):	max. 950 W
	5804 R/5810 R (230 V):	max. 1650 W
	5804 R/5810 R (120 V), 20 A:	max. 1650 W
	5804 R/5810 R (120 V), 15 A:	max. 1300 W
EMC: Interference emission (radio interference)	EN 61326-1 Class A	
EMC: Noise immunity	EN 61326	
Overvoltage category:	II	
Fuses:	5804/5810 (230 V):	Excess current switch 12 A
	5804/5810 (120 V):	Excess current switch 12 A
	5804 R/5810 R (230 V):	Excess current switch 12 A
	5804 R/5810 R (120 V), 20 A:	Excess current switch 18 A
	5804 R/5810 R (120 V), 15 A:	Excess current switch 15 A

10.2 Ambient conditions

Environment:	For indoor use only.	
Ambient temperature:	5804/5810:	2 to 40 °C
	5804 R/5810 R:	15 to 35 °C
Max. relative humidity:	75%, non-condensing humidity	
Atmospheric pressure:	Use up to an altitude of 2000 m above MSL.	
Degree of pollution:	2	

10.3 Weight/dimensions

Dimensions (W × D × H)	5804	466 × 550 × 337 mm (18.4 × 21.7 × 13.3 in.) Depth of footprint: 496 mm (19.5 in.)		
	5804 R	634 × 550 × 342 mm (25.0 × 21.7 × 13.5 in.) Depth of footprint: 496 mm (19.5 in.)		
	5810	535 × 608 × 345 mm (21.1 × 21.1 × 13.6 in.) Depth of footprint: 536 mm (21.1 in.)		
	5810 R	700 × 608 × 345 mm (27.6 × 23.9 × 13.6 in.) Depth of footprint: 536 mm (21.1 in.)		
Weight excl. rotor	5804	55 kg (121 lb.)		
	5804 R	80 kg (176 lb.)		
	5810	68 kg (150 lb.)		
	5810 R	99 kg (218 lb.)		
Rotor				
		A-4-81 (4 × 500 mL)	A-4-44 (4 × 100 mL)	F-34-6-38 (6 × 85 mL)
Noise level	5804	-	< 67 dB(A)	< 51 dB(A)
	5804 R	-	< 56 dB(A)	< 58 dB(A)
	5810	< 65 dB(A)	< 65 dB(A)	< 53 dB(A)
	5810 R	< 56 dB(A)	< 56 dB(A)	< 59 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.

10.4 Application parameters

Run time:	1 to 99 min, adjustable in 1 min increments. infinite (∞)	
Temperature (only 5804 R/5810 R):	-9 °C to 40 °C	
Relative centrifugal force (RCF or rcf):	10 to 20,913 x g adjustable up to 3,000 x g in 10 x g increments, thereafter in 100 x g increments.	
Rotational speed:	200 to 14,000 rpm, adjustable up to 5,000 rpm in 10 rpm, afterwards in 100 rpm increments.	
Max. load:	5804/5804 R:	4 x 250 mL
	5810/5810 R:	4 x 750 mL
Max. kinetic energy:	5804/5810:	19,000 Nm (11,000 rpm)
	5804 R:	19,000 Nm (11,000 rpm)
	5810 R:	23,000 Nm (12,000 rpm)
Test log mandatory in Germany:	Yes	
Permitted density of the centrifugate (at max. g-force/rpm and max. load):	1.2 g/mL	
Standardized interface (optional)	RS 232 C	

Deceleration times according to DIN 58 970

Tab. 2: Approximate deceleration times of the different rotors for the levels 0 to 9 (in seconds) for 230 V devices

5804/ 5804 R	5810/5810 R	Rotor	0	1	2	3	4	5	6	7	8	9
-		A-4-81	532	189	174	143	131	109	95	85	59	31
-		A-4-81- MTP/ Flex	643	191	174	142	131	110	94	83	58	30
-		A-4-62	740	190	170	140	130	110	95	85	55	26
-		A-4-62-MTP	620	190	170	140	130	110	95	85	55	26
		A-4-44	470	300	270	220	200	140	100	75	45	23
-		A-2-DWP-AT	857	231	202	176	157	135	112	102	69	39
		A-2-DWP	304	174	130	118	100	75	51	44	32	14
		FA-45-6-30	759	423	322	231	205	178	148	113	93	58
		F-34-6-38	880	370	280	190	170	150	125	95	75	54
		FA-45-30-11	240	140	70	45	35	30	25	22	19	18
		F-45-30-11	240	140	70	45	35	30	25	22	19	18
		F-45-48-PCR	169	119	60	41	31	26	22	19	17	16
		T-60-11	800	280	140	95	70	55	45	40	36	36
		S-4-104	680	192	169	147	130	112	68	46	37	32
-		S-4-72	360	238,	191	168	148	117	56	32	21	15
		FA-45-48-11	454	269	141	98	76	62	46	40	35	31
		FA-45-20-17	550	342	178	123	97	80	58	51	45	40
		F-35-48-17	16	26	40	72	140	185	211	243	304	228

These values are to be considered as guidelines. Level 9 means "strongest braking", level 0 means "free deceleration". Considerable fluctuations can occur depending upon the condition of the device and the load. The deceleration times for the 230 and 120 V devices are almost identical.

11 Ordering Information

11.1 Centrifuge 5804/5804 R

Please refer to our catalogue.

Order No. (International)	Order No. (North America)	Description
5804 000.013 5804 000.137	022622552 022622501	Centrifuge 5804 without rotor 230 V/50 – 60 Hz 120 V, 50 Hz – 60 Hz
5805 000.017 5805 000.130 5805 000.530	022623559 022623508 022625080	Centrifuge 5804 R refrigerated, without rotor 230 V/50 – 60 Hz 120 V/50 – 60 Hz, 15 A 120 V/50 – 60 Hz, 20 A

11.2 Centrifuge 5810/5810 R

Order No. (International)	Order No. (North America)	Description
5810 000.017 5810 000.130	022625055 022625004	Centrifuge 5810 without rotor 230 V/50 – 60 Hz 120 V/50 – 60 Hz, with US-plug
5811 000.010 5811 000.134 5811 000.533	022625551 022625501 022625101	Centrifuge 5810 R refrigerated, without rotor 230 V/50 – 60 Hz 120 V/50 – 60 Hz, 15 A, with US-plug 120 V/50 – 60 Hz, 20 A, with US-plug

11.3 Rotors and accessories

11.3.1 Rotor A-4-81 (only 5810/5810 R)

Rotor A-4-81, 500 mL bucket

Order No. (International)	Order No. (North America)	Description
5810 718.007 5810 743.001	022638602 022638611	Rotor A-4-81 for 500 mL rectangular buckets or MTP/Flex-buckets incl. 4 x 500 mL rectangular buckets without buckets
5810 730.007	022638629	Rectangular bucket 500 mL Set of 4
5810 724.007	022638661	Aerosol-tight cap for 500 mL rectangular buckets, 2 pieces
5810 733.006	022638670	Replacement cap sealing for aerosol-tight caps for 500 mL rectangular buckets, 4 pieces

Order No. (International)	Order No. (North America)	Description
5810 745.004 5810 746.000 5810 720.001 5825 717.007 5810 748.003 5810 721.008 5810 722.004 5810 723.000 5810 739.004 5825 722.000 5810 728.002	022638704 022638707 022638700 022638718 022638721 022638726 022638742 022638769 022638904 022638921 022638785	Adapter for 500 mL rectangular buckets for 20 sample tubes (1.5/2.0 mL, max. Ø 11 mm), set of 2 for 20 blood collection tubes (1.2 – 5 mL, max. Ø 11 mm), set of 2 for 24 tubes (2.6 – 7 mL, max. Ø 13 mm), set of 2 for 18 tubes (5 mL, Monovette, max. Ø 13 mm), set of 2 for 16 blood collection tubes (3 – 15 mL, max. Ø 16 mm), set of 2 for 16 tubes (7 – 17 mL, max. Ø 17.5 mm), set of 2 for 12 conical tubes (15 mL, max. Ø 17.5 mm), set of 2 for 5 conical tubes (50 mL, max. Ø 31 mm), set of 2 for 5 Centriprep Centrifugal Filter Units (max. Ø 31 mm), set of 2 for 1 bottle (180 – 250 mL, max. Ø 62 mm), set of 2 for 1 bottle (400 mL, max. Ø 81 mm), set of 2
5810 734.002	022638688	Replacement rubber mat for adapters for 500 mL rectangular buckets set of 4
5810 735.009	022638696	Replacement clamp for adapters for 500 mL rectangular buckets set of 2
5804 737.008	022654373	Adapter for 50 mL skirted conical tubes, set of 8
5810 729.009 5820 707.003	022638653 022638657	Wide-neck bottle for Rotor A-4-81 400 mL, set of 2 500 mL, rectangular, set of 2
5810 718.309	022664174	Rotor key for Rotor A-4-81

Rotor A-4-81, MTP/Flex carrier

Order No. (International)	Order No. (North America)	Description
5810 725.003	022638807	Rotor A-4-81-MTP/Flex Swing-bucket rotor, incl. 4 MTP/Flex buckets
5810 743.001	022638611	Rotor A-4-81 for 500 mL rectangular buckets or MTP/Flex-buckets without buckets
5810 741.009 5810 742.005	022638840 022638866	Retrofit kit MTP/Flex buckets for Rotor A-4-81 or A-4-81-MTP/Flex for use with IsoRack and cell culture flask adapters as well as MTP and DWP set of 4 set of 2
5825 708.008 5825 709.004	022638980 022638998	IsoRack adapter for 24 x 0.5 mL tubes in the IsoRack, set of 2 for 24 x 1.5/2.0 mL tubes in the IsoRack, set of 2
5825 721.004	022510070	IsoRack starter set for Flex buckets 2 x IsoRack Adapter, 2 x IsoRacks with lid, 2 x cool packs (0 °C IsoPack) for 0.5 mL and 1.5/2.0 mL sample tubes
5825 711.009 5825 713.001	022638947 022638955	Adapter used in A-4-81-MTP/Flex, A-4-62-MTP, A-2-DWP-AT and A-2-DWP for 96-well PCR plates, set of 2 for 384-well PCR plates, set of 2

Order No. (International)	Order No. (North America)	Description
5825 706.005	022638963	Adapter used in A-4-81-MTP/Flex, A-4-62-MTP and A-2-DWP Combislide Adapter, set of 2
5825 719.000	5825719000	Adapter used in A-4-81-MTP/Flex for 1 cell culture bottle, set of 2

Rotor A-4-81, bucket for conical tubes

Order No. (International)	Order No. (North America)	Description
5825 730.003	022638614	Bucket for A-4-81 for 7 50 mL conical tubes, set of 4
5820 718.005	5820718005	Adapter used in FA-45-6-30 for 15 mL conical tubes, set of 7

11.3.2 Rotor A-4-62 and A-4-62-MTP (only 5810/5810 R)

Rotor A-4-62

Order No. (International)	Order No. (North America)	Description
5810 709.008	022638009	Rotor A-4-62 incl. 4 x 250 mL rectangular buckets
5810 716.004	022638084	Rectangular bucket 250 mL Set of 4
5810 710.006	022638033	Aerosol-tight caps for 250 mL rectangular buckets, set of 2
5810 713.005	022638017	Spare sealing for aerosol-tight caps for 250 mL rectangular buckets Set of 4
5810 751.004 5810 750.008 5810 752.000 5810 753.007 5810 754.003 5810 756.006 5810 757.002 5810 759.005 5810 760.003 5810 761.000 5810 770.009 5810 755.000 5810 758.009 5810 763.002	022638220 022638203 022638246 022638262 022638301 022638327 022638360 022638386 022638408 022638424 022638441 022638289 022638343 022638351	Adapter for 250 mL rectangular buckets for 16 sample tubes (1.5/2.0 mL, max. Ø 11 mm), set of 2 for 25 tubes (1.2 – 5 mL, max. Ø 11 mm), set of 2 for 15 tubes (2.6 – 7 mL, max. Ø 13 mm), set of 2 for 12 tubes (3 – 15 mL, max. Ø 16 mm), set of 2 for 12 tubes (7 – 17 mL, max. Ø 17.5 mm), set of 2 for 8 tubes (7 – 18 mL, max. Ø 20 mm), set of 2 for 4 tubes (18 – 30 mL, max. Ø 26 mm), set of 2 for 4 tubes (30 – 50 mL, max. Ø 31 mm), set of 2 for 2 tubes (50 – 75 mL, max. Ø 35 mm), set of 2 for 1 tube (80 – 120 mL, max. Ø 45 mm), set of 2 for 1 bottle (180 – 250 mL, max. Ø 62 mm), set of 2 for 9 conical tubes (15 mL, max. Ø 17.5 mm), set of 2 for 3 conical tubes (50 mL, max. Ø 31 mm), set of 2 for 4 conical tubes (50 mL), operation w/o aerosol-tight cap, set of 2
5810 782.007	022638483	Replacement rubber mat for adapters for 250 mL rectangular buckets Set of 4

Order No. (International)	Order No. (North America)	Description
5810 781.000	022662431	Replacement clamp for adapters for 250 mL rectangular buckets Set of 2
5810 783.003	022638459	Replacement rubber mat for adapter 5810 770.009/022638441 Set of 4
5804 737.008	022654373	Adapter for 50 mL skirted conical tubes, set of 8

Rotor A-4-62-MTP

Order No. (International)	Order No. (North America)	Description
5810 711.002	022638041	Rotor A-4-62-MTP incl. 4 MTP buckets
5810 702.003	022638068	Replacement MTP bucket for A-4-62 for 4 MTP or 1 DWP Set of 4
5825 711.009 5825 713.001	022638947 022638955	Adapter used in A-4-81-MTP/Flex, A-4-62-MTP, A-2-DWP-AT and A-2-DWP for 96-well PCR plates, set of 2 for 384-well PCR plates, set of 2
5825 706.005	022638963	Adapter used in A-4-81-MTP/Flex, A-4-62-MTP and A-2-DWP Combislide Adapter, set of 2

11.3.3 Rotor A-4-44

Order No. (International)	Order No. (North America)	Description
5804 709.004	022637401	Rotor A-4-44 incl. 4 x 100 mL rectangular buckets
5804 741.005	022637436	Rectangular bucket 100 mL set of 4
5804 712.005	022637428	Aerosol-tight cap for 100 mL rectangular buckets, set of 2
5804 713.001	022637444	4 Replacement gasket for aerosoltight caps for 100 mL rectangular buckets, set of 4

Order No. (International)	Order No. (North America)	Description
5804 751.000 5804 750.004 5804 752.007 5804 753.003 5804 754.000 5804 756.002 5804 757.009 5804 759.001 5804 760.000 5804 761.006 5804 755.006 5804 717.007 5804 758.005 5804 718.003	022637525 022637509 022637541 022637568 022637584 022637622 022637649 022637681 022637703 022637720 022637606 022637614 022637665 022637673	Adapter for 100 mL rectangular bucket for 12 sample tubes (1.5/2.0 mL, max. Ø 11 mm), set of 2 for 14 tubes (1.2 – 5 mL, max. Ø 11 mm), set of 2 for 9 tubes (2.6 – 7 mL, max. Ø 13 mm), set of 2 for 7 tubes (3 – 15 mL, max. Ø 16 mm), set of 2 for 6 tubes (7 – 17 mL, max. Ø 17.5 mm), set of 2 for 4 tubes (7 – 18 mL, max. Ø 20 mm), set of 2 for 2 tubes (18 – 30 mL, max. Ø 26 mm), set of 2 for 1 tube (30 – 50 mL, max. Ø 31 mm), set of 2 for 1 tube (50 – 75 mL, max. Ø 35 mm), set of 2 for 1 tube (80 – 100 mL, max. Ø 45 mm), set of 2 for 4 conical tubes (15 mL, max. Ø 17.5 mm), set of 2 for 2 conical tubes (15 mL, max. Ø 17.5 mm), set of 2 for 1 conical tube (50 mL, max. Ø 31 mm), set of 2 for 1 conical tube (50 mL, max. Ø 31 mm), set of 2
5804 737.008	022654373	Adapter for 50 mL skirted conical tubes, set of 8
5804 782.003	022662503	Rubber mat for adapters of Rotor A-4-44 Set of 4
5804 781.007	022662511	Replacement clamp for adapters of rotor A-4-44 Set of 2
5804 706.005	022637452	Bucket for A-4-44 for 2 Falcon tubes (50 mL, max. Ø 31 mm), set of 4
5804 728.009	022637479	Adapter Form inserts for buckets with conical tubes for 1 conical tube (50 mL, max. Ø 31 mm), set of 8

11.3.4 Rotor A-2-DWP-AT (only 5810/5810 R)

Order No. (International)	Order No. (North America)	Description
5820 710.004	5820710004	Rotor A-2-DWP-AT incl. 2 buckets, 2 aerosol-tight caps and 2 plate holders
5820 711.000	5820711000	Bucket for rotor A-2-DWP-AT 2 pieces
5820 713.003	5820713003	Aerosol-tight bucket cap, Rotor A-2-DWP-AT 2 pieces
5820 705.000	5820705000	Spare seal for aerosoltight cap 2 pieces
5820 712.007	5820712007	Plate holder for bucket, Rotor A-2-DWP-AT 2 pieces
5825 711.009 5825 713.001	022638947 022638955	Adapter used in A-4-81-MTP/Flex, A-4-62-MTP, A-2-DWP-AT and A-2-DWP for 96-well PCR plates, set of 2 for 384-well PCR plates, set of 2

Aerosol impermeability tested and certified by the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down (UK).

11.3.5 Rotor A-2-DWP

Order No. (International)	Order No. (North America)	Description
5804 740.009	022638564	Rotor A-2-DWP Deepwell plates rotor, incl. 2 buckets
5804 743.008	022638556	Deepwell plate bucket used in A-2-DWP set of 2
5825 718.003	5825718003	SBS adapter for plates with rims in the SBS format Set of 2
5825 708.008 5825 709.004	022638980 022638998	IsoRack adapter for 24 x 0.5 mL tubes in the IsoRack, set of 2 for 24 x 1.5/2.0 mL tubes in the IsoRack, set of 2
5825 711.009 5825 713.001	022638947 022638955	Adapter used in A-4-81-MTP/Flex, A-4-62-MTP, A-2-DWP-AT and A-2-DWP for 96-well PCR plates, set of 2 for 384-well PCR plates, set of 2
5825 706.005	022638963	Adapter used in A-4-81-MTP/Flex, A-4-62-MTP and A-2-DWP Combislide Adapter, set of 2

11.3.6 Rotor FA-45-6-30

Order No. (International)	Order No. (North America)	Description
5820 715.006	5820715006	Rotor FA-45-6-30 aerosol-tight*, aluminum, 45° angle, 6 places, for 15/ 50 mL conical tubes, incl. rotor lid (aluminum)
5820 716.002	5820716002	Rotor lid for FA-45-6-30 aerosol-tight*, aluminum
5418 709.008	022652109	Seal for rotor lid FA-45-18-11 and FA-45-6-30 5 pieces
5820 717.009 5820 719.001 5820 720.000 5820 721.006 5820 722.002	5820717009 5820719001 5820720000 5820721006 5820722002	Adapter used in FA-45-6-30 for 15 mL conical tubes, set of 2 for 10 mL Oak Ridge, set of 2 for 16 mL Oak Ridge, set of 2 for 30 mL Oak Ridge, set of 2 for 35 mL Oak Ridge, set of 2
5820 730.005	5820730005	Adapter for 1 x 5 mL tube for rotor FA-46-6-30 Set of 2
5820 726.008 5820 725.001 5820 728.000 5820 727.004 5820 731.001 5820 729.007	5820726008 5820725001 5820728000 5820727004 5820731001 5820729007	Adapter for 1 x round-bottom tube for rotor FA-45-6-30 Diameter 13 mm x 75 mm, set of 2 Diameter 13 mm x 100 mm, set of 2 Diameter 16 mm x 75 mm, set of 2 Diameter 16 mm x 100 mm, set of 2 Diameter 16 mm x 125 mm, set of 2 Diameter 17,5 mm x 100 mm, set of 2

Aerosol impermeability tested and certified by the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down (UK).

11.3.7 Rotor F-34-6-38

Order No. (International)	Order No. (North America)	Description
5804 727.002	022637207	Rotor F-34-6-38 34° angle, 6 places for 85 mL tubes, incl. rotor lid
5804 727.509	022662961	Rotor lid for F-34-6-38
5804 770.005 5804 738.004 5804 739.000 5804 771.001 5804 776.003 5804 772.008 5804 773.004 5804 774.000 5804 775.007	022637215 022637279 022637282 022637223 022637274 022637231 022637240 022637258 022637266	Adapter used in F-34-6-38 for 4 sample tubes 1.5/2.0 mL (max. Ø 11 mm), set of 2 for 3 round-bottom and blood collection tubes (13 x 75 mm), set of 2 for 3 round-bottom and blood collection tubes (13 x 100 mm), set of 2 for 2 tubes (7 bis 15 mL, max. Ø 16 mm), set of 2 for 1 conical tube (15 mL, max. Ø 17 mm), set of 2 for 1 tube (15 bis 18 mL, max. Ø 18 mm), set of 2 for 1 tube (20 bis 30 mL, max. Ø 26 mm), set of 2 for 1 tube (50 mL, max. Ø 29 mm), set of 2 for 1 conical tube (50 mL, max. Ø 29.5 mm), set of 2

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

Order No. (International)	Order No. (North America)	Description
5804 726.006	022637100	Rotor FA-45-30-11 aerosol-tight*, 45° angle, 30 places for 1.5/2.0 mL tubes, incl. rotor lid (aluminum)
5804 736.001	022637126	Rotor lid for FA-45-30-11 aerosol-tight*, aluminum
5804 715.004	022637002	Rotor F 45-30-11 45° angle, 30 places for 1.5/2.0 mL tubes, incl. rotor lid (aluminum)
5804 715.403	022662970	Rotor lid for F-45-30-11 not aerosol-tight, aluminum
5425 715.005 5425 717.008 5425 716.001	022636260 022636243 022636227	Adapter used in FA-45-30-11 and F-45-30-11 for 1 PCR tube (0.2 mL, max. Ø 6 mm), set of 6 for 1 sample tube (0.4 mL, max. Ø 6 mm), set of 6 for 1 sample tube (0.5 mL, max. Ø 6 mm) or 1 Microtainer (0.6 mL, max. Ø 8 mm), set of 6

11.3.9 Rotor F-45-48-PCR

Order No. (International)	Order No. (North America)	Description
5804 735.005	022638581	Rotor F-45-48-PCR 45° angle, for 6 x 8-tube strips, 6 x 5-tube strips or 48 x 0.2 mL PCR tubes

11.3.10 Rotor T-60-11

Order No. (International)	Order No. (North America)	Description
5804 730.003	022638505	Rotor T 60-11 for 60 x 1.5/2.0 mL tubes incl. rotor lid, and 6 adapters for 1.5/2 mL sample tubes

Order No. (International)	Order No. (North America)	Description
5804 731.000 5804 732.006	022638521 022638548	Adapter used in T-60-11 for 10 sample tubes (1,5/2,0 mL, max. Ø 11 mm), set of 6 for 20 sample tubes (0.4 mL, max. Ø 6 mm), set of 6

11.3.11 Rotor S-4-104

Order No. (International)	Order No. (North America)	Description
5820 740.000	5820740000	Rotor S-4-104 4 x 750 mL incl. 4 rectangular buckets 750 mL for Centrifuges 5810/5810 R
5825 740.009	5825740009	Adapter for 31 x 1.5 - 2 mL tubes for rotor S-4-104 Set of 2
5825 739.000	5825739000	Adapter for 14 x 5 mL tubes for rotor S-4-104 Set of 2
5825 737.008 5825 738.004	5825737008 5825738004	Adapter for 23 x round-bottom tubes for rotor S-4-104 Diameter 13 mm x 75 mm, set of 2 Diameter 13 mm x 100 mm, set of 2
5825 735.005 5825 736.001	5825735005 5825736001	Adapter for 20 x round-bottom tubes for rotor S-4-104 Diameter 16 mm x 75 mm, set of 2 Diameter 16 mm x 100 mm, set of 2
5825 743.008	5825743008	Adapter for 20 x round-bottom tubes for rotor S-4-104 Diameter 17,5 mm x 100 mm, set of 2
5825 734.009	5825734009	Adapter for 14 x 15 mL conical tubes for rotor S-4-104 Set of 2
5825 733.002	5825733002	Adapter for 7 x 50 mL conical tubes for rotor S-4-104 Set of 2
5825 732.006	5825732006	Adapter for 5 x 50 mL skirted conical tubes for rotor S-4-104 Set of 2
5825 742.001	5825742001	Adapter for 150 - 225 mL conical bottles for rotor S-4-104 Set of 2
5825 741.005	5825741005	Adapter for 250 mL bottles for rotor S-4-104 Set of 2
5825 744.004	5825744004	Adapter for 750 mL bottles for rotor S-4-104 Set of 2
5820 708.000	5820708000	750 mL bottle for rotor S-4-104 Set of 2

Order No. (International)	Order No. (North America)	Description
5820 742.003	5820742003	Bucket 750 mL for rotor S-4-104 Set of 2
5820 744.006 5820 743.000 5820 748.001	5820744006 5820743000 5820748001	DWP bucket for rotor S-4-104 Set of 2 Set of 4 Set of 2
5820 746.009 5820 745.002	5820746009 5820745002	MTP bucket for rotor S-4-104 Set of 2 Set of 4
5820 747.005	5820747005	Aerosol-tight caps for 750 mL rectangular buckets for rotor S-4-104 Set of 2
5820 749.008	5820749008	Spare sealings for 750 mL rectangular buckets for rotor S-4-104 Set of 4
5820 750.006	5820750006	Spare sealings for DWP buckets for rotor S-4-104 Set of 4
5820 751.002	5820751002	MFC bucket for rotor S-4-104 Set of 2

11.3.12 Rotor S-4-72

Order No. (International)	Order No. (North America)	Description
5804 746.007	5804746007	Rotor S-4-72 4 x 250 mL incl. 4 round buckets 250 mL for Centrifuges 5804/5804 R
5804 794.001	5804794001	Adapter for 13 x 1.5 - 2 mL tubes for rotor S-4-72 Set of 2
5804 793.005	5804793005	Adapter for 8 x 5 mL tubes for rotor S-4-72 Set of 2
5804 788.001 5804 789.008	5804788001 5804789008	Adapter for 14 x round-bottom tubes for rotor S-4-72 Diameter 13 mm x 75 mm, set of 2 Diameter 13 mm x 100 mm, set of 2
5804 790.006 5804 791.002	5804790006 5804791002	Adapter for 13 x round-bottom tubes for rotor S-4-72 Diameter 16 mm x 75 mm, set of 2 Diameter 16 mm x 100 mm/125 mm, set of 2
5804 792.009	5804792009	Adapter for 12 x round-bottom tubes for rotor S-4-72 Diameter 17,5 mm x 100 mm, set of 2

Order No. (International)	Order No. (North America)	Description
5804 783.000	5804783000	Adapter for 8 x 15 mL conical tubes for rotor S-4-72 Set of 2
5804 784.006	5804784006	Adapter for 4 x 50 mL conical tubes for rotor S-4-72 Set of 2
5804 785.002	5804785002	Adapter for 3 x 50 mL conical tubes, skirted for rotor S-4-72 Set of 2
5804 786.009	5804786009	Adapter for 150 mL conical tubes for rotor S-4-72 Set of 2
5804 787.005	5804787005	Adapter for 250 mL bottles for rotor S-4-72 Set of 2
5804 747.003	5804747003	Buckets 250 mL for rotor S-4-72 Set of 4

11.3.13 Rotor F-35-48-17

Order No. (International)	Order No. (North America)	Description
5820 771.003	5820771003	Rotor F-35-48-17 incl. 24 steel sleeves and adapter for 24 x 15 mL tubes for Centrifuges 5804/5804 R/5810/5810 R
5820 772.000	5820772000	Rotor F-35-48-17 incl. 48 steel sleeves and adapter for 48 x 15 mL tubes for Centrifuges 5804/5804 R/5810/5810 R
5820 774.002	5820774002	Steel sleeves and adapter for Rotor F-35-48-17 for 15 mL tubes

11.3.14 Rotor FA-45-48-11

Order No. (International)	Order No. (North America)	Description
5820 760.001	5820760001	Rotor FA-45-48-11 aerosol-tight, for 48 x 1.5/2 mL tubes, incl. aerosol-tight rotor lid for Centrifuges 5804/5804 R/5810/5810 R
5820 761.008	5820761008	Spare lid, aerosol-tight for rotor FA-45-48-11 1 piece
5820 762.004	5820762004	Seal for rotor lid FA-45-24-11-Kit

11.3.15 Rotor FA-45-20-17

Order No. (International)	Order No. (North America)	Description
5820 765.003	5820765003	Rotor FA-45-20-17 aerosol-tight, for 20 x 5 mL tubes, incl. aerosol-tight rotor lid for Centrifuges 5804/5804 R/5810/5810 R
5820 766.000	5820766000	Spare lid, aerosol-tight for rotor FA-45-20-17 1 piece
5820 767.006	5820767006	Seal for rotor lid FA-45-30-11
5820 768.002	5820768002	Adapter for 1 x 1,5 - 2 mL tube for rotor FA-45-20-17 Set of 10
5820 769.009	5820769009	Adapter for cryo tubes for rotor FA-45-20-17 Set of 10
5820 770.007	5820770007	Adapter for autosampler tubes for Rotor FA-45-20-17 Set of 10

11.3.16 Rotor F-34-6-38

Order No. (International)	Order No. (North America)	Description
5804 777.000	5804777000	Adapter 1 x 5 mL tube for rotor F-34-6-38 Set of 2

11.3.17 Miscellaneous

Order No. (International)	Order No. (North America)	Description
5703 350.102 5703 350.110	022639609 022639625	Captain Eppi rotor key holder 1 piece 10 pieces
5804 720.008	022639021	Rotor stand suitable for all rotors of Centrifuge 5804/5804 R/5810/5810 R
5810 350.050	022634330	Pivot grease Tube 20 mL
5810 350.018	022664166	Rotor key Standard
5811 001.068	022662678	Tray for condensation water
on request on request	on request on request	Conversion kit for RS 232 interface For Centrifuge 5804 For Centrifuge 5804 R

Power cable for Centrifuge 5804 and Centrifuge 5810

Order No. (International)	Order No. (North America)	Description
0113 200.111	–	Mains/power cable 230 V/50 Hz, Europe
0013 594.490	–	230 V/50 Hz, GB/HK
0013 613.952	–	230 V/50 Hz, CN
0013 592.454	–	230 V/50 Hz, AUS
0113 200.863	022664999	120 V/60 Hz, USA
5804 652.002	–	202 V, Japan
0013 613.973	–	230 V/50 Hz, ARG

Power cable for Centrifuge 5804 R and Centrifuge 5810 R

Order No. (International)	Order No. (North America)	Description
0113 204.486	–	Mains/power cable 230 V/50 Hz, Europe
0113 204.680	–	230 V/50 Hz, GB/HK
0013 613.953	–	230 V/50 Hz, CN
0113 204.699	–	230 V/50 Hz, AUS
0113 200.863	022664999	120 V/60 Hz, USA
0113 205.105	–	230 V/50 Hz, ARG
5821 609.005	–	Mains/power cable 202 V, Japan

Connecting cable for Centrifuge 5804 / 5804 R and 5810 / 5810 R with rolling cabinet with transformer

Order No. (International)	Order No. (North America)	Description
5821 851.094		Cable for rolling cabinet - centrifuge 15 A

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Centrifuge 5804/5804 R/5810/5810 R — Bruksanvisning

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1 Användningsanvisningar

1.1 Använda denna manual

- ▶ Läs denna bruksanvisning i sin helhet innan du tar apparaten i drift för första gången. Observera bruksanvisningarna till tillbehören.
- ▶ En detaljerad beskrivning av apparaten finns dessutom i den engelska och tyska versionen av denna bruksanvisning.
En översikt över rotorerna, tekniska data och beställningsinformation finns dessutom i den engelska och tyska versionen.
- ▶ Denna bruksanvisning är en del av produkten. Förvara den så att den är lätt tillgänglig.
- ▶ När apparaten överlämnas till tredje part ska bruksanvisningen följa med.
- ▶ Om bruksanvisningen har kommit bort ska en ny rekvideras. Den aktuella versionen finns på vår hemsida www.eppendorf.com.

2 Produktbeskrivning

2.1 Huvudbild

Bild av centrifugen finner man på den främre utfällningssidan (s. bild 1).



Fig. 1: Bild av Centrifuge 5810 och Centrifuge 5810 R. Centrifuge 5804 och Centrifuge 5804 R är konstruerade på samma sätt.

1 Centrifuglock	2 Provglas Okulärbesiktning för rotorstillestånd eller varvtalskontroll med stroboskop
3 Kontrollpanel med display (se Översikt över manöverelementen på sida 135)	4 Nödutlösning (se Nödutlösning på sida 149)
5 Kondensvattenskål (endast Centrifug 5804 R/ 5810 R)	

3 Allmänna säkerhetsanvisningar

3.1 Avsedd användning

Denna Centrifug 5804/5804 R/5810/5810 R får endast användas inomhus och är avsedd för koncentrerings av vattniga lösningar och suspensioner med olika tätheter i olika godkända provkärl.

3.2 Krav på användaren

Denna apparat får endast användas av utbildad fackpersonal. Användaren måste ha läst bruksanvisningen noggrant och ha satt sig in i apparatens funktion.

3.3 Användningsgränser

3.3.1 Förklaring enligt ATEX-direktivet (94/9/EG)



Explosionsrisk.

- ▶ Apparaten får inte användas i rum där explosionsfarliga ämnen hanteras.
- ▶ Bearbeta inte några explosiva eller kraftigt reagerande ämnen med apparaten.
- ▶ Med denna apparat får inga ämnen bearbetas som kan orsaka en explosiv atmosfär.

Apparaten Centrifug 5804/5804 R/5810/5810 R är inte lämplig för användning i potentiellt explosiv atmosfär på grund av dess konstruktion och omgivningsvillkoren i apparatens inre. Därför får apparaten endast användas i en säker miljö, t.ex. den öppna miljön i ett ventilerat laboratorium eller tillsammans med en fläktkåpa. Ämnen som kan förorsaka en potentiellt explosiv atmosfär får inte användas. Det slutgiltiga beslutet om riskerna i samband med användning av sådana ämnen är användarens ansvar.

3.3.2 Maximal livslängd för tillbehören



Personskador på grund av kemiskt eller mekaniskt skadade ertillbehör.

Redan små repor och sprickor kan leda till svåra skador på tillbehören.

- ▶ Skydda alla tillbehörsdelar mot skador.
- ▶ Kontrollera tillbehören med avseende på skador före varje användning. Byt ut skadade tillbehör.
- ▶ Använd inte rotorlock, rotorlock, hänganordningar, bågare eller kåpor med korrosionsspår eller mekaniska skador (t.ex. böjningar).
- ▶ Använd inga tillbehör vars maximala livslängd har överskridits.
- ▶ Se till så att du inte repar hänganordningarna och rotorerna när du sätter in dem.



Risk för personskador på grund av kemiskt skadade rotorlock resp. kåpor.

Transparenta rotorlock resp. kåpor av PC, PP eller PEI kan förlora sin stabilitet vid inverkan av kemiska lösningsmedel (t.ex. fenol, kloroform).

- ▶ Kontrollera rotorlocken resp. kåpor regelbundet med avseende på skador och repor.
- ▶ Byt rotorlock resp. kåpor med sprickor eller mjölkfärgade missfärgningar omgående.

Rotor	Maximal livslängd efter den första driftsättningen	
A-2-DWP-AT	100 000 mekaniska cykler	7 år
A-2-DWP	34 000 mekaniska cykler	7 år
A-4-44	34 000 mekaniska cykler	7 år
A-4-62	40 000 mekaniska cykler	7 år
A-4-81	100 000 mekaniska cykler	7 år
F-34-6-38	75 000 mekaniska cykler	7 år
FA-45-6-30		7 år
FA-45-48-11	75 000 mekaniska cykler	7 år
FA-45-20-17	75 000 mekaniska cykler	7 år
F-35-48-17	75.000 mechanische Zyklen	7 år
S-4-72	60.000 mechanische Zyklen	7 år
S-4-104	100.000 mechanische Zyklen	7 år
T-60-11		7 år


Tillbehör	Maximal livslängd efter driftsättningen	
Rotorlock av polykarbonat (PC), propenplast (PP) eller polyeterimid (PEI)	--	3 år
Rotorlock aerosoltät utan utbytbara tätningar	50 autoklaveringscykler	--
Rotorlocket QuickLock		3 år
Tätningar till QuickLock-rotorlocket	50 autoklaveringscykler	--
Kåpor av polykarbonat (PC), propenplast (PP) eller polyeterimid (PEI)	50 autoklaveringscykler	3 år
Adapter	--	1 år

Alla övriga rotorerna och rotorlock till denna centrifug har ingen begränsning av livslängden. För användningen av rotorerna, locken och tillbehören måste följande förutsättningar vara uppfyllda:

- korrekt användning
- rekommenderad skötsel
- felfritt tillstånd

För att garantera aerosoltäthet

- Byt aerosoltäta rotorlock och kåpor efter 50 autoklaveringscykler.
- Byt tätning till QuickLock-rotorlock efter 50 autoklaveringscykler.

Tillverkningsdatumet är inpräglad på rotorerna i formen 03/10 (= mars 2010) resp. på QuickLock-rotorlockens insida som klocka . Detta är endast för information och utgör inte någon referens till den faktiska livslängden.

3.4 Anvisningar om produktansvar

I följande fall kan det avsedda skyddet för apparaten vara försämrat. Ansvar för sak- och personskador går då över till den driftansvariga:

- Apparaten används inte enligt bruksanvisningen.
- Apparaten används utanför avsedd användning.
- Apparaten används med tillbehör eller förbrukningsartiklar som inte rekommenderas av Eppendorf.
- Underhåll eller reparationer har utförts på apparaten av personer som inte är auktoriserade av Eppendorf.
- Användaren utför ändringar på apparaten som inte är auktoriserade.

3.5 Faror vid avsedd användning

Innan du använder Centrifug 5804/5804 R/5810/5810 R ska du läsa bruksanvisningen och beakta följande allmänna säkerhetsanvisningar.

3.5.1 Person- eller apparatskador



Elchock på grund av skador på apparaten eller elkabeln.

- ▶ Apparaten får endast kopplas på om apparaten och elkabeln är oskadade.
- ▶ Använd endast apparater som har installerats eller reparerats fackmässigt.
- ▶ Koppla i en risksituation från apparaten från nätspänningen.



Livsfarlig spänning i apparaten.

- ▶ Kontrollera att apparaten alltid är stängd och oskadad så att inga delar i apparatens inre kan vidröras av misstag.
- ▶ Avlägsna inte apparatens hölje.
- ▶ Se till att inga vätskor tränger in i höljet.
- ▶ Apparaten får endast öppnas av servicepersonal som är auktoriserad av Eppendorf.



Faror genom felaktig spänningsförsörjning.

- ▶ Apparaten får endast anslutas till spänningskällor som uppfyller de elektriska förutsättningarna som anges på typskylten.
- ▶ Använd uteslutande jordade eluttag och en lämplig nätkabel.



Hälsorisk vid kontakt med infektiösa vätskor och patogena mikrober.

- ▶ Beakta de nationella bestämmelserna vid kontakt med infektiösa vätskor och patogena mikrober, de biologiska säkerhetsreglerna för ert laboratorium samt säkerhetsdatablad och bruksanvisningar från tillverkaren.
- ▶ Använd endast lämpliga, aerosoltäta förslutningssystem vid centrifugering av dessa ämnen.
- ▶ Planera för mer än en aerosoltät biologisk tätning vid hantering av patogena bakterier av en högre riskgruppering.
- ▶ Använd din personliga skyddsutrustning.
- ▶ Beakta anvisningarna om hygien, rengöring och dekontaminering.
- ▶ Omfattande föreskrifter om hantering av mikrober eller biologiskt material av riskgrupp II eller högre finns i "Laboratory Biosafety Manual" (källa: World Health Organisation, Laboratory Biosafety Manual, i den senaste utgivna giltiga versionen).



Risk för att klämma fingrarna i centrifuglocket.

- ▶ Stick aldrig in händerna mellan locket och apparaten eller i lockets låsmekanism vid stängning.
- ▶ Öppna alltid centrifuglocket helt så att det inte kan falla igen.



Risk för klämning av extremiteter på grund av nedfallande centrifuglock på grund av defekt gasfjäder.

En defekt gasfjäder stöttar inte centrifuglocket tillräckligt.

- ▶ Kontrollera därför att centrifuglocket kan öppnas helt och att detta blir kvar i denna ställning.
- ▶ Kontrollera regelbundet att gasfjädrarna fungerar korrekt.
- ▶ Låt genast byta defekta gasfjädrar.

Vi rekommenderar att du låter en servicetekniker byta gasfjädrarna vartannat år.



Säkerhetsbrister på grund av fel tillbehör eller reservdelar.

Tillbehör och reservdelar, som inte rekommenderas av Eppendorf, påverkar utrustningens säkerhet, funktion och precision. Eppendorf ansvarar inte för skador som förorsakats av användning av ej rekommenderade reservdelar eller felhantering.

- ▶ Använd endast tillbehör och originalreservdelar som har rekommenderats av Eppendorf.



OBSI!

Apparatskador på grund av utspillda vätskor.

1. Stäng av apparaten.
2. Separera apparaten från elförsörjningen.
3. Rengör apparaten och tillbehören noggrant enligt instruktionerna om rengöring och desinfektion i bruksanvisningen.
4. Om en annan rengörings- eller desinfektionsmetod ska användas ska du först höra med Eppendorf AG att denna metod inte kan skada apparaten.



OBSI!

Skador på elektriska komponenter på grund av kondensbildning.

När apparaten har forslats från en kallare till en varmare omgivning kan kondens bildas i apparaten.

- ▶ 5804/5810 Vänta minst 3 h innan du ansluter apparaten till spänningsförsörjningen.
- ▶ **Endast 5804/5810:** Alternativ: Låt apparaten köra varm en halv timme direkt före en kort transport.
- ▶ 5804 R/5810 R Vänta minst 3 h innan du ansluter apparaten till spänningsförsörjningen.



OBSI!

Centrifug 5804 R/5810 R: Kompressorskador efter felaktig transport.

- ▶ Slå inte på centrifugen förrän 4 h efter uppställningen.

3.5.2 Felhantering av centrifugen



OBSI!

Skador på grund av stötar eller rörelser från apparaten när den är igång.

En rotor som slår mot rotorkammaren orsakar betydande skador på apparaten och rotorn.

- ▶ Flytta inte apparaten och undvik att utsätta den för stötar under drift.

3.5.3 Felhantering av rotorn



Skaderisk genom felmonterade rotorer och rotorlock.

- ▶ Centrifugera endast med fast åtdragen rotor och rotorlock.
- ▶ Om ovanliga ljud uppstår när centrifugen startar sitter rotorn inte fast ordentligt. Avsluta centrifugeringen omedelbart genom att trycka på knapp **start/stopp**.



Skaderisk om en rotor är osymmetriskt laddad.

- ▶ Rotorn ska bestyckas symmetriskt med likartade kärl resp. hänganordningar och plåtar.
- ▶ Adapterar får endast laddas med passande kärl resp. plåtar.
- ▶ Använd alltid kärl och plåtar av samma typ (vikt, material/densitet och volym).
- ▶ Kontrollera att rotorn är laddad symmetriskt genom att balansera ut den använda adaptern och kärnen resp. plattorna med hjälp av en våg.



Skaderisk om rotorn är överladdad.

Centrifugen är avsedd för användning med maximalt varvtal och maximal påfyllningsvolym resp. laddning endast med centrifugeringsmaterial med en täthet på max 1,2 g/ml.

- ▶ Beakta uppgifterna på varje rotor om maximilast (adapter, kärl, innehåll) per rotorborrhål resp. hänganordning och överskrid inte dessa.



Rotorn skadas av aggressiva kemikalier.

Rotorer är högvärdiga komponenter som tål extrema belastningar. Denna stabilitet kan försämrans genom aggressiva kemikalier.

- ▶ Undvik användning av aggressiva kemikalier, detta är bl.a. även starka eller svaga alkalier, starka syror, lösningar med kvicksilver-, koppar- och andra tungmetalljoner halogeniserade kolväten, koncentrerade saltlösningar och fenol.
- ▶ Rengör rotorn omedelbart med ett neutralt rengöringsmedel och spola sedan av den med rikligt med vatten om den har förorenats med aggressiva kemikalier. Detta gäller speciellt för rotorborrhålen
- ▶ För de rotorer som är märkta med "coated" kan färgväxlingar uppträda på grund av tillverkningsprocessen. Dessa har inga konsekvenser för hållbarheten eller kemikaliebeständigheten.



Svängrotorn kan falla vid felaktigt handhavande.

Svängrotorens hänganordningar får inte användas som handtag.

- ▶ Avlägsna hänganordningarna innan du flyttar rotorn.
- ▶ Ta alltid tag i rotorn med bägge händerna på rotorkrosset.



Rotorn kan falla vid felaktigt handhavande.

- ▶ Ta alltid tag i rotorn F-35-48-17 med båda händerna.
- ▶ Ta eventuellt bort tre till fyra hylsor som ligger mitt emot varandra från den yttre raden för att hålla rotorn säkert.

3.5.4 Extrema påfrestningar på centrifugeringskärLEN



Skaderisk p.g.a. överbelastade kärL.

- ▶ Observera kärLtillverkarnas specificerade gränsvärden för kärLens belastning.
- ▶ Använd endast kärL som tillverkaren har godkänt för den önskade *accelerationskraften* (rcf).



Fara genom skadade kärL.

Skadade kärL får inte användas. Följden kan bli skador på apparaten och tillbehören samt förlust av prover.

- ▶ Kontrollera alla kärL visuellt med avseende på skador före användningen.



Fara genom öppna kärLlock.

Öppna kärLlock kan bryta av under centrifugeringen och skada såväl rotorn som centrifugen.

- ▶ Stäng alla kärLlock omsorgsfullt före centrifugeringen.



Skador på plastkärLEN på grund av organiska lösningsmedel.

Vid användning av organiska lösningsmedel (t.ex. fenol, kloroform) försämras plastkärLens stabilitet, vilket kan skada kärLEN.

- ▶ Observera tillverkarens uppgifter om kärLens kemiska beständighet.



ProvkärL värms upp.

I okylda centrifuger kan temperaturen i rotorkammaren, rotorn och provet stiga till över 40 °C beroende på gångtid, *accelerationskraft* (rcf)/varvtal (vpm) och omgivningstemperatur.

- ▶ Observera centrifugeringsstabiliteten för provkärLEN som avtar på grund av detta.
- ▶ Kontrollera provernas temperaturbeständighet.

3.5.5 Aerosoltät centrifugering



Hälsoskador på grund av begränsad aerosoltäthet vid felaktig rotor-/rotorlockkombination.

Aerosoltät centrifugering kan endast garanteras när de avsedda rotorerna och rotorlocken används. Vid fastvinkelrotorer börjar beteckningen alltid med **FA**, svängrotorer är märkta med **AT** (aerosol tight).

De aerosoltäta rotorerna och rotorlocken är dessutom märkta med en röd ring på rotorn och en röd rotorlockskruv.

- ▶ För aerosoltät centrifugering ska alltid rotorer och rotorlock som är märkta som aerosoltäta användas samtidigt i den avsedda centrifugen. Uppgiften om vilken centrifug de aerosoltäta rotorerna och rotorlocken får användas i finns på rotorn och efter produktionsdatumet oktober 2003 på rotorlockets ovansida.
- ▶ Använd aerosoltäta rotorlock endast i kombination med rotorer som anges på rotorlocket.
- ▶ Använd aerosoltäta rotorer/bägare enbart i kombination med tillhörande rotorlock/kåpor.

3.6 Säkerhetsinstruktioner på apparaten

Framställning

Betydelse

Ort



Varning

Allmän farozon. Observera instruktionerna i bruksanvisningen.

Höger apparatsida

4 Installation

4.1 Välja uppställningsplats



Skador på föremål i närheten av apparaten.

Om det uppstår en rotorskada eller en obalans kan apparaten lätt ändra sin placering.

- ▶ Håll ett säkerhetsavstånd på **30 cm** runt apparaten i enlighet med EN 61010-2-020.



Skador på grund av överhettning.

- ▶ Apparaten får inte ställas upp i närheten av värmekällor (t.ex. värmeelement, torkskåp).
- ▶ Apparaten får inte exponeras för direkt solljus.
- ▶ Garantera en obehindrad luftcirkulation. Se till att det på alla sidor om apparaten finns ett avstånd på minst 30 cm till angränsande apparater eller mot väggen. Håll apparatens undersida fri.
- ▶ Håll alltid apparatens ventilationsöppningar fria.



Radiostörningar.

Denna apparat är en klass A-produkt enligt EN 55011. I bostäder kan radiomottagningen störas.

- ▶ Vidta lämpliga skyddsåtgärder.

Apparatens uppställningsplats bör väljas enligt följande kriterier:

- Lämplig nätanslutning enligt typsylv (230 V/120 V/100 V).
- Stabilt, vågrät och resonansfritt laboratoriebord. Apparats vikt: 55 kg (5804) resp. 80 kg (5804 R), 68 kg (5810), 99 kg (5810 R).
- Omgivningen bör vara välventilerad och skyddad mot direkt solljus för att förebygga ytterligare uppvärmning.

4.2 Förbereda installationen



Personskador på grund av lyft och bärande av tunga laster

Apparaten är tung. Lyft och bärande av apparaten kan leda till ryggskador.

- ▶ Transportera apparaten utan att rotorn är insatt.
- ▶ Transportera alltid apparaten i originalförpackningen.
- ▶ Transportera apparaten med hjälp av en andra person.
- ▶ Använd ett transporthjälpmiddel (t.ex. en säckkärra eller en vagn) vid längre transport.

De följande stegen ska genomföras i den ordningsföljd som anges:

1. Öppna förpackningskartongen.
2. Ta bort skyddspapperet.
3. Ta bort tillbehören.

4.3 Installera apparaten



Faror genom felaktig spänningsförsörjning.

- ▶ Apparaten får endast anslutas till spänningskällor som uppfyller de elektriska förutsättningarna som anges på typskylten.
- ▶ Använd uteslutande jordade eluttag och en lämplig nätkabel.



OBS!

Centrifug 5804 R/5810 R: Kompressorskador efter felaktig transport.

- ▶ Slå inte på centrifugen förrän 4 h efter uppställningen.

De följande stegen ska genomföras i ordningsföljden som anges:

1. Lyft centrifugen i undersidan i närheten av gummifötterna och ställ den direkt på laboratoriebordet.
2. Låt apparaten värmas till omgivningstemperaturen under 3 timmar (5804/5810) resp. 4 timmar (5804 R/5810 R) för att undvika skador på elektroniska komponenter och kompressorn genom kondensbildning (endast 5804 R/5810 R).
3. Kontrollera överensstämmelsen för nätspänning och nätfrekvens med uppgifterna på apparatens typskylt.
Centrifug 5804 R/5810 R med nätspänningen 120 V: Ta del av anvisningarna för strömförsörjning i slutet av detta kapitel.
4. Anslut centrifugen till nätet och sätt på centrifugen med nätbrytaren på apparatens högra sida.
 - Knappen **open** lyser.
 - Displayen lyser.
5. Du kan öppna centrifuglocket med knappen **open**.
6. Kontrollera alla delar på eventuella transportskador. Kontakta din återförsäljare om delar är skadade.
7. **Endast 5804 R/5810 R:** Skjut in kondensvattenskålen i därför avsedd hållare på apparatens framsida.

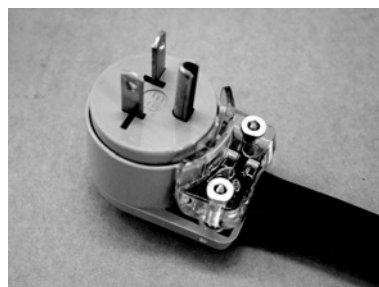
Tab. 1: Centrifugen 5804 R/5810 R med nätspänning 120 V i två varianter

15 A IEC-elkabel



- Konventionell IEC-elkabel.
- Anslutning till ett standard-eluttag (120 V/ 15 A).
- Standardkyleffekt:
 - Ökade minimalt uppnåbara temperaturer vid maximal centrifugeringshastighet.
 - Långsam kylning till börtemperaturen.

20 A-variant



- Elkabel fast monterad vid apparaten.
- Speciell nätanslutning nödvändig (120 V/ 20 A).
- Ökad kyleffekt:
 - Lägre temperaturer är möjliga vid maximal centrifugeringshastighet.
 - Snabb kylning till börtemperaturen.

5 Hantering

5.1 Översikt över manöverelementen

Lär dig manöverdon och display innan du använder centrifugen för första gången.

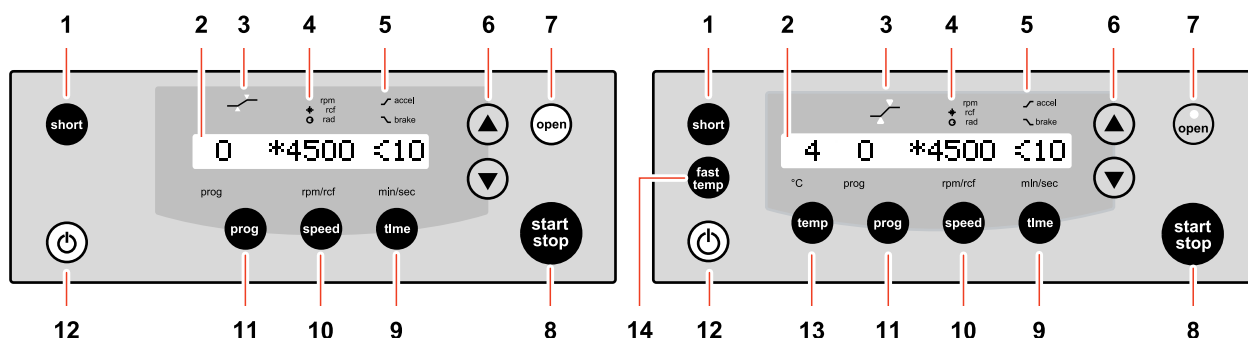


Fig. 2: Manöverfält för Centrifug 5804/5810 och Centrifug 5804 R/5810 R.

1 Kort centrifugering	2 Display
3 Status av funktionen at set rpm ↘: Start drifttid när 95 % av förinställd accelerationskraft (rcf)/varvtal (rpm) har uppnåtts. ↗: Start drifttid omedelbart.	4 Märkning varvtal (rpm), accelerationskraft (rcf) * och radieinställning \ominus .
5 Symbol för start ↘ och inbromsning ↗	6 Ställ in parametrar och värden.
7 Lås upp centrifuglocket.	8 Starta resp. stoppa centrifugeringen
9 Ställ in centrifugeringstiden.	10 Ställ in centrifugeringshastigheten.
11 Välj resp. spara program.	12 Standby
13 Endast 5804 R/5810 R: Ställ in temperaturen.	14 Endast 5804 R/5810 R: Starta tempereringskörning FastTemp.



Fig. 3: Display till Centrifug 5804/5810 och Centrifug 5804 R/5810 R

1 Programnummer	2 Symbol för accelerationskraften (rcf)
3 Accelerationskraft (rcf)/varvtal (rpm)	4 Symbolen blinkar under centrifugeringen
5 Symbol för start ↘ och inbromsning ↗	6 Centrifugeringstid
7 Endast 5804 R/5810 R: Temperatur	


Displayen för centrifugeringsparametrarna växlar beroende på apparatens tillstånd:

- Rotorstillestånd: Visning av börvärdena.
- Centrifugering: Visning av ärvärdena.

Om du trycker på knapparna **temp**, **time** eller **speed** under en centrifugering visas respektive börvärde under 2,5 s.

5.2 Förbereda centrifugeringen

5.2.1 Tillslag av centrifugen

1. Slå på centrifugen med nätbrytaren eller standby-knappen .
2. Du kan öppna det stängda centrifuglocket med knappen **open**.
Den senaste körningens parameterinställningar visas.

5.2.2 Sätt in rotorn

Förutsättningar

Vid fastsättning och losstagning av rotorn på/från motoraxeln måste rotorns och motoraxelns temperatur ligga inom intervallet 10 – 30 °C.



- ▶ Svängrotorer: Ta bort hänganordningarna innan du sätter in resp. tar ut rotorn och fatta tag i rotorkrosset med båda händerna.
- ▶ F-35-48-17: Ta bort hylsorna innan du sätter in resp. tar ut rotorn och fatta tag i rotorn med båda händerna.

1. Sätt motorn lodrätt på motoraxeln.
2. Sätt in den medlevererade rotornyckeln i rotormuttern.
Rotorkrossen A-4-81: Använd en speciell rotornyckel.
3. Vrid rotornyckeln **medurs** tills rotormuttern är fast åtdragen.

5.2.3 Automatisk rotordetektering

- ▶ Kontrollera alltid den inställda accelerationskraften (rcf)/varvtalet (rpm) och anpassa dessa vid behov efter ett rotorbyte.

5.2.4 Lasta rotorn



Skaderisk om en rotor är osymmetriskt laddad.

- ▶ Rotorn ska bestyckas symmetriskt med likartade kärl resp. hänganordningar och plåtar.
- ▶ Adaptrar får endast laddas med passande kärl resp. plåtar.
- ▶ Använd alltid kärl och plåtar av samma typ (vikt, material/densitet och volym).
- ▶ Kontrollera att rotorn är laddad symmetriskt genom att balansera ut den använda adaptorn och kärlden resp. plattorna med hjälp av en våg.



Apparaten upptäcker obalans automatiskt under driften. Apparaten avslutar körningen direkt med ett felmeddelande och en signalton. Kontrollera lastningen, balansera ut kärlden och starta om körningen.

Fastvinkelrotor



Rotorlock!

- Fastvinkelrotorer får endast användas med respektive passande rotorlock. Detta förtydligas genom påskriften av rotornamnet på både rotor och rotorlock.
- För genomförande av en aerosoltät centrifugering måste ett aerosoltät rotor användas i kombination med det tillhörande rotorlocket resp. kåpan.

Gör så här för att lasta rotorn:

1. Kontrollera lastning (adapter, kärl och innehåll) per rotorborrhål.
Uppgifter om detta finner du på varje rotor och i denna bruksanvisning.
2. Rotorer och adaptrar får endast lastas med de avsedda kärlen.
3. Kärlen får endast sättas in parvis i rotorborrhålen som sitter mittemot varandra. För en symmetrisk lastning måste kärlen som sitter mittemot varandra vara av samma typ och innehålla samma påfyllningsmängd.
För att minimera viktskillnaderna mellan de fyllda provkärlen rekommenderar vi en utbalansering med en våg. På så vis skonas drivenheterna och driftljuden minskas.
4. Sätta på och fästa rotorlocket.

Svängrotorer

Förutsättningar

- En kombination av rotor, hänganordning och adapter som är godkänd av Eppendorf.
- Hänganordningarna är sorterade efter viktklass. Hänganordningar som ligger mitt emot varandra måste tillhöra samma viktklass. Denna är inpräglad på sidan i spåret, t.ex. 68 (de sista två siffrorna i gram). Ange den befintliga viktklassen vid efterbeställning - även av plåthänganordningar.
- Passande och provade kärl och plåtar.
- Ta bort de mittre styrelementen till fyrkantbägarnas moduläradapter för att öka exempelvis kapaciteten genom etagecentrifugering.



OBS!

Skador på adaptrarna på grund av felaktig stapeluppbyggnad

- ▶ Bygg endast upp adaptrarna i fyrkantbägare i en sluten serie från bägarens golv. Lämna inga luckor mellan modulerna.



OBS!

Om plattorna fylls på för högt finns risk för spill.

Under körningen står meniskerna i plattornas randkärl snett. Detta kan inte undvikas på grund av centrifugalkraften.

- ▶ Därför bör plåtarnas brunnar fyllas med maximalt 2/3 av den maximala påfyllningsvolymen.

Gör så här för att lasta rotorn:

1. Kontrollera att hänganordningens spår är rena och fetta in dem med tappfett (beställningsnr: Int.: 5810 350.050/Nordamerika: 022634330).
Smutsiga spår och tappar förhindrar att hänganordningarna svänger lika mycket.
2. Fäst hänganordningarna i rotorn.
Alla rotorns positioner måste vara försedda med hänganordningar.
3. Kontrollera om alla hissanordningar är helt fästa och kan svänga ut fritt.
4. Vid den första användningen av en plåttyp eller vid väldigt långa kärl (> 100 mm) ska en manuell lastnings- och utsvängningstest göras.
5. Kontrollera maximal lastning (adapter, kärl resp. plåt och innehåll) per rotorborrhål.
Uppgifter om detta finner du på varje rotor och i denna bruksanvisning.
6. Lasta hänganordningarna symmetriskt.

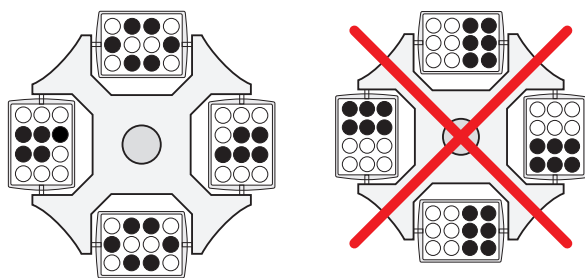


Fig. 4: Ofullständig men symmetrisk lastning av bägarna. Varje bägarens tappar måste vara lika lastad.

Den plåtbestyckning som visas på höger sida är felaktig eftersom hänganordningarna inte svänger ut riktigt.

Samma princip gäller även för bestyckningen av rotorn A-4-81-MTP/Flex med fyra plåtar.

Plåtarna har ett lätt spel i hänganordningarna.

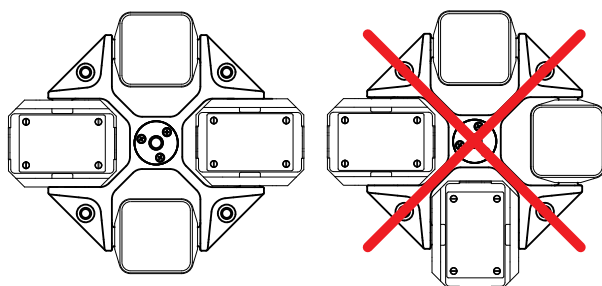


Fig. 5: Blandbestyckning av rotor

Rotor	Blandbestyckning
S-4-104 A-4-81/A-4-81-MTP/Flex	<ul style="list-style-type: none"> • Två plåthänganordningar (MTP- eller DWP-hänganordningar) • Två rundbägare eller två fyrkantsbägare
A-4-81/A-4-81-MTP/Flex	<ul style="list-style-type: none"> • Två plåthänganordningar (MTP- eller DWP-hänganordningar) • Två bägare för koniska kärl • Två fyrkantsbägare
A-4-44	<ul style="list-style-type: none"> • Två fyrkantsbägare • Två bägare för koniska kärl



OBS!

Rotorskador på grund av blandbestyckning.

Om du lastar rotorerna A-4-62 och A-4-62-MTP med en blandbestyckning skadas rotorerna vid centrifugeringen.

- ▶ Bestyck rotorerna A-4-62 och A-4-62-MTP med likadana hänganordningar på alla platser.
- ▶ Bestyck alltid alla fyra platserna vid svängrotorer.

7. Kontrollera hänganordningarnas lastning.

5.2.5 Stäng centrifuglocket.

1. Kontrollera att rotorn och rotorlocket är korrekt fästa.
 2. Tryck ned centrifuglocket tills locklåset går i lås och locket dras igen automatiskt. Centrifugen stängs automatiskt.
- Knappen **open** lyser blått. På displayen visas symbolen ■.

5.3 Kylning (endast 5804 R/5810 R)

5.3.1 Temperaturinställning

- ▶ Välj temperaturinställningen med knappen **temp**.
- ▶ Ställ in temperaturen med pilknapparna från -9 °C till +40 °C.

5.3.2 Temperaturvisning

När rotorn står still: Börtemperatur
Under centrifugeringen: ärtemperatur

5.3.3 Temperaturövervakning

När börtemperaturen har uppnåtts reagerar centrifugen på följande sätt på temperaturavvikelser under centrifugeringen:

Avvikelse från börvärdet	Åtgärd
± 3 °C	Temperaturerna på displayen blinkar.
± 5 °C	Periodisk varningston. Centrifugeringen avslutas automatiskt.

5.3.4 FastTemp

Med denna funktion startar du en tempereringskörning direkt utan prover med rotor- och temperaturspecifikt varvtal för att snabbt uppnå den inställda börtemperaturen i rotorkammaren inkl. rotorn, hänganordningen och adaptern.

Förutsättningar

- Centrifugen är inkopplad.
- Rotorn och rotorlocket är korrekt fästa.
- Centrifuglocket är stängt.
- Temperaturen och accelerationskraften (rcf)/varvtalet (rpm) för den anslutande centrifugeringen är inställda (se *Centrifugering på sida 141*).

1. Tryck på knappen **fast temp**.

På displayen visas följande från vänster till höger: ärvärdet för temperaturen, *FT*, accelerationen (rcf)/varvtalet (rpm) och -- (Time).

Tempereringskörningen avslutas automatiskt när börtemperaturen har uppnåtts. En periodisk signalton hörs.

2. Tryck på knappen **start/stop** för att avsluta tempereringskörningen i förtid.

När börtemperaturen har uppnåtts och när tempereringskörningen har avslutats håller centrifugen rotorkammaren på den inställda börtemperaturen när centrifuglocket är stängt om denna ligger under omgivningstemperaturen. Oberoende av börtemperaturen underskrids inte 4 °C vid denna kontinuerliga kylning för att förhindra att rotorkammaren fryser in.



Centrifugen avslutar körningen automatiskt när rotorn resp. hänganordningen är helt tempererad. Därför kan det förekomma en fördröjning av visningen av börtemperaturen och den automatiska avslutningen av tempereringskörningen.



Utför alltid en FastTemp-körning till låga temperaturer utan kåpa vid användning av aerosoltäta bågare. Kåporna kan annars sugas fast genom ett undertryck. Dra inte i låsbyglarna eller hakarna för att lossa kåpan. Temperera bågarna till rumstemperatur så att det går lätt att ta av kåporna.

5.3.5 Kontinuerlig körning

Vid rotorstillestånd hålls rotorkammaren på börtemperaturen så länge följande förutsättningar ges:

- Centrifugen är inkopplad.
- Centrifuglocket är stängt.
- Börtemperaturen är lägre än omgivningstemperaturen.
- Centrifugen är inte i standby-läget.

Under denna kontinuerliga kylning gäller följande:

- Bör- och ärtemperaturen visas omväxlande.
- Oberoende av börtemperaturen underskrids inte 4 °C för att förhindra att rotorkammaren fryser in och för att förhindra ökad kondensbildning i apparaten.
- I och med att rotorn inte roterar sker temperaturanpassningen långsammare.

Öppna centrifuglocket eller tryck på standby-knappen för att avsluta en kontinuerlig kylning.

Om centrifugen inte används under en längre tid än 8 timmar stängs den kontinuerliga kylningen av automatiskt (ECO shot-off). Apparaten växlar då till standby-läget. Detta skyddar mot isbildning i rotorkammaren och ökad kondensbildning i apparaten. På displayen visas *Standby off* och den uppmätta temperaturen i rotorkammaren. Med **FastTemp** kan du uppnå den önskade temperaturen snabbt igen (se på sida 139).

Du kan dessutom ställa om till obegränsad kontinuerlig kylning från den automatiska avstängningen av den kontinuerliga kylningen efter 8 timmar (ECO shut-off).



OBS!

Nedisning och överhettning av kompressorn vid kontinuerlig kylning.

- ▶ Stäng av centrifugen regelbundet för att åtgärda eventuell isbildning genom upptining.
- ▶ Ta regelbundet bort kondensvatten från rotorkammaren med en mjuk trasa med god sugförmåga.
- ▶ Töm och rengör kondensvattensålen regelbundet.

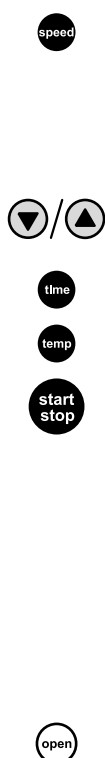
1. Tryck samtidigt på knapparna **temp** och **prog** när centrifuglocket är öppet. På displayen visas *Standby 8h*.
2. Tryck på knappen **fast temp** direkt. Ändlös drift för kontinuerlig kylning aktiveras. På displayen visas *Standby endless*.
3. För att ställa om till *Standby 8h* upprepar du förloppet.

5.4 Centrifugering

Förutsättningen för de centrifugeringsvarianter som beskrivs här är förberedelserna som tidigare har beskrivits (se *Förbereda centrifugeringen på sida 136*).

5.4.1 Centrifugering med tidsinställning

De följande stegen ska genomföras i ordningsföljden som anges:



1. Varvtalsinställning (rpm): tryck en gång: accelerationskraft (rcf)-inställning: tryck flera gånger tills symbolen * också visas på displayen.
Den visade accelerationskraften (rcf)/varvtalet (rpm) blinkar och kan ställas in med pilknapparna.
Kontrollera dessutom den inställda radien, vid accelerationskraftsinställningen (rcf).
2. Ställ in accelerationskraften (rcf)/varvtalet (rpm) med pilknapparna.
Det nya börvärdet visas på displayen.
3. Välj Gångtidsinställning och ställ in med pilknapparna
4. **Endast 5804 R/5810 R:** Välj Temperaturinställning och ställ in med pilknapparna.
5. Starta centrifugeringen.
 - På displayen blinkar ■ så länge rotorn är igång.
 - **Endast 5804 R/5810 R:** Den aktuella temperaturen visas.
 - Rotorns aktuella accelerationskraft (rcf)/varvtal (rpm) visas.
 - Du kan visa alla börvärden genom att trycka på en parameterknapp (**Temp, Speed, Time**) i 2,5 s.
 - Du kan avsluta centrifugeringen i förtid med knappen **start/stop**.
 - När den förinställda tiden har gått ut stoppar centrifugen automatiskt.
 - Under inbromsningen visas centrifugeringstiden som har gått ut blinkande.
6. Öppna centrifuglocket så snart knappen lyser.



Under körningen kan du ändra den totala gångtiden, temperaturen (endast Centrifug 5804 R/5810 R) och accelerationskraften (rcf)/varvtalet (rpm) samt starttiden och inbromsningstiden. De nya parametrarna övertas omedelbart. Den tid som redan har förflutit beräknas mot den nyinställda totallöptiden. Observera att den kortaste totallöptiden som kan ställas in är tiden som redan gått ut plus 2 minuter.

5.4.2 Ytterligare centrifugeringsalternativ: permanentdrift och Short Spin

- ▶ För en **kontinuerlig gång** ställer du in drifttiden på under 1 minut eller över 99 minuter. På displayen visas *SH* som symbol.
- ▶ En **kort centrifugering** med maximal eller aktuellt inställd accelerationskraft (rcf)/varvtal (rpm) startas genom att du trycker på knappen **short** när centrifuglocket är stängt. Du stoppar körningen genom att trycka på knappen.

5.4.3 Ta ut rotorn

Förutsättningar

Vid festsättning och losstagning av rotorn på/från motoraxeln måste rotorns och motoraxelns temperatur ligga inom intervallet 10 – 30 °C.



- ▶ Svängrotorer: Ta bort hänganordningarna innan du sätter in resp. tar ut rotorn och fatta tag i rotorkrosset med båda händerna.
- ▶ F-35-48-17: Ta bort hylsorna innan du sätter in resp. tar ut rotorn och fatta tag i rotorn med båda händerna.

1. Använd rotornyckeln för att skruva rotormuttern **moturs**.
2. Ta ut rotorn vertikalt och uppåt.
3. **Endast 5804 R/5810 R:** Stäng av centrifugen efter användningen och töm kondensvattenskålen. Låt centrifuglocket vara helt öppet och se till att det inte kan falla igen.

5.4.4 Standar-läge

- ▶ Du kan hela tiden växla mellan standby-läget och driftklart läge genom att trycka på standby-knappen när ingen centrifugering pågår.

Standby-läge

- Displayen slocknar.
- Standby-knappen lyser rött.
- **Endast 5804 R/5810 R:** Rotorkammaren kyls inte (se *Kontinuerlig körning på sida 140*).

Driftberett tillstånd

- Centrifugeringsparametrarna visas.
- Standby-knappen lyser grönt.
- **Endast 5804 R/5810 R:** Rotorkammaren kyls vid stängt centrifuglock (se *Kontinuerlig körning på sida 140*).

6 Underhåll

6.1 Service



Risk för klämning av extremiteter på grund av nedfallande centrifuglock på grund av defekt gasfjäder.

En defekt gasfjäder stöttar inte centrifuglocket tillräckligt.

- ▶ Kontrollera därför att centrifuglocket kan öppnas helt och att detta blir kvar i denna ställning.
- ▶ Kontrollera regelbundet att gasfjädrarna fungerar korrekt.
- ▶ Låt genast byta defekta gasfjädrar.

Vi rekommenderar att du låter en servicetekniker byta gasfjädrarna vartannat år.

Vi rekommenderar att man låter utföra service på centrifugen med tillhörande rotor minst en gång om året. Beakta landsspecifika föreskrifter.

6.2 Rengöring / Förberedelse av desinfektionen

- ▶ Rengör minst en gång i veckan och vid akut nedsmutsning av de åtkomliga ytorna på apparaten och tillbehören.
- ▶ Rengör rotorn regelbundet. Detta skyddar rotorn och förlänger dess livslängd.
- ▶ Observera dessutom anvisningarna om dekontaminering (se *Dekontaminering före sändning på sida 146*), om apparaten ska skickas till den auktoriserade tekniska servicen för reparation.

Rutinen som beskrivs i följande kapitel gäller för rengöring och desinfektion resp. dekontaminering. I följande tabell beskrivs de därutöver nödvändiga stegen:

Rengöring	Desinfektion/dekontaminering
<ol style="list-style-type: none">1. Använd ett mildt rengöringsmedel för rengöring av apparatens åtkomliga ytor och tillbehör.2. Genomför rengöringen enligt beskrivningarna i följande kapitel.	<ol style="list-style-type: none">1. Välj desinfektionsmetoder som uppfyller lagkrav och direktiv som gäller för ditt användningsområde. Använd t.ex. alkohol (etanol, isopropanol) eller alkoholhaltiga desinfektionsmedel.2. Genomför desinfektionen resp. dekontamineringen enligt beskrivningarna i följande kapitel.3. Rengör sedan apparaten och tillbehöret.



Kontakta Application Support hos Eppendorf AG om du har ytterligare frågor om desinfektionen resp. dekontamineringen eller rengöringsmedel som ska användas. Du finner kontaktinformationen på baksidan av denna instruktion.

6.3 Utföra rengöring/desinfektion



Elchock på grund av inträngande vätskor.

- ▶ Stäng av apparaten och separera den från elnätet innan du påbörjar rengöringen eller desinfektionen.
- ▶ Se till att inga vätskor tränger in i höljet.
- ▶ Sprutrengrör/sprutdesinficera inte på huset.
- ▶ Apparaten får inte anslutas till elnätet igen förrän den är fullständigt torkad.



OBS!

Skador som orsakas av frätande kemikalier.

- ▶ Använd inga aggressiva kemikalier på apparaten som t.ex. starka eller svaga baser, starka syror, aceton, formaldehyd, halogenerade kolväten eller fenol.
- ▶ Rengör apparaten med ett mildt rengöringsmedel omedelbart om den har förorenats av aggressiva kemikalier.



OBS!

Korrosion på grund av aggressiva rengörings- och desinfektionsmedel.

- ▶ Använd varken frätande rengöringsmedel resp. lösningsmedel eller polermedel.
- ▶ Inkubera inte tillbehöret en längre tid i aggressiva lösnings- eller desinfektionsmedel.



OBS!

Skador p.g.a. UV- eller annan energirik strålning.

- ▶ Utför inte desinfektion med UV-, beta- eller gammastrålning eller annan energirik strålning.
- ▶ Undvik lagring i områden med kraftig UV-strålning.



Autoklavera

Med undantag av rotorkrossarna A-4-81, S-4-72 och S-4-104 kan alla roterar, rotorlock, bägare, hänganordningar, kåpor och adaptrar autoklaveras (121 °C, 20 min).

För att garantera aerosoltätheten måste kåpornas och QuickLock-rotorlockens tätningar bytas efter maximalt 50 autoklaveringscykler.

Använd inga färgade, porösa eller på annat sätt defekta tätningar. Ta även del av centrifugens bruksanvisning när det gäller detta och det medföljande inläggsbladet för aerosoltät centrifugering.

Den aerosoltäta rotorn FA-45-30-11 kan autoklaveras vid 142 °C under 2 h för att prioner ska förstöras. Observera att i så fall måste rotorlocket bytas efter varje autoklavering.



Aerosoltäthet

Säkerställ att tätningarna är oskadade före användningen.

Byt de aerosoltäta rotorernas rotorlock om packningarna är slitna vid lockskraven och i lockspåret. Regelbunden skötsel av packningarna är nödvändig för att skydda rotorerna.

Lagra aldrig aerosoltäta roter med locket stängt!

Fetta regelbundet in lockgången till aerosoltäta roter lätt med tappfett (beställningsnr: (beställningsnr Int.: 5810 350.050/Nordamerika: 022634330) för att undvika skador.



Svängrotorer

- Ta bort gammalt tappfett från spåren och tapparna före rengöringen av rotorn.
- Kontrollera att spåren och tapparna är rena. Smutsiga spår och tappar förhindrar att hänganordningarna svänger lika mycket.
- Fetta in rotorernas tappar och hissanordningarnas spår lätt med tappfett (beställningsnr: Int.: 5810 350.050/Nordamerika: 022634330) efter rengöringen så att hänganordningarna kan röra sig gungande.

6.3.1 Desinfektion och rengöring av apparaten

1. Öppna locket. Stäng av apparaten med nätbrytaren. Dra ut nätkontakten från spänningsförsörjningen.
2. Lossa rotormuttern genom att skruva **moturs** med rotornyckeln.
3. Ta ut rotorn
4. Rengör och desinficera apparatens alla tillgängliga ytor, inklusive nätkabeln, med en fuktig trasa och med rekommenderade rengöringsmedel.
5. Tvätta av rotorkammarens gummitätning grundligt med vatten.
6. Smörj in den torra gummitätningen med glycerin eller talk för att förhindra att den blir spröd. Andra komponenter i apparaten, t.ex. locklås, lockfjädrar och rotorkona, får inte fettas in.
7. Rengör motoraxeln med en mjuk, torr och luddfri trasa. Fetta inte in motoraxeln.
8. Kontrollera motoraxeln med avseende på skador.
9. Kontrollera apparaten med avseende på korrosion och skador.
10. Låt centrifuglocket vara öppet när apparaten inte används.
11. Apparaten får inte anslutas till elnätet igen förrän den är fullständigt torkad.

6.3.2 Desinfektion och rengöring av rotorn



En detaljerad beskrivning av rengöring och underhåll finns i "Fastvinkelrotor - Basic Inspection" och "Svängrotor - Basic Inspection".



Efter 200 körningar visar centrifugen *clean rotor* tre gånger för att påminna dig om den regelbundna rengöringen av rotorn.

1. Kontrollera rotorn och tillbehören med avseende på korrosion och skador. Använd inga skadade rotor och inga skadade tillbehör.
2. Rengör och desinficera rotor och tillbehör med de rekommenderade rengöringsmedlen.
3. Rengör och desinficera rotorhålen med en flaskborste.
4. Spola av rotor och tillbehör grundligt med destillerat vatten. Spola av rotorborrhålen på fastvinkelrotorer extra grundligt.



Doppa inte rotorn i vatten. Vätska kan då tränga in i hålrummen.

5. Lägg rotor och tillbehör på en trasa för att torka. Lägg fastvinkelrotorer med rotorborrhålen neråt så att hålen torkar.
6. Rengör rotorkonan med en mjuk, torr och luddfri trasa. Fetta inte in rotorkonan.
7. Kontrollera rotorkonan med avseende på skador.
8. Placera den torra rotorn på motoraxeln.
9. Dra åt rotormuttern ordentligt genom att skruva **medurs** med rotornyckeln.
10. Utrusta vid behov fastvinkelrotorn med de rengjorda adaptrarna resp. svängrotorn med de rengjorda hänganordningarna.
11. Låt rotorlocket vara öppet när rotorn inte används.

6.4 Extra skötselanvisningar för Centrifug 5804 R/5810 R

- ▶ Töm och rengör kondensvattenskålen regelbundet och i synnerhet efter spill av vätska i rotorkammaren. Dra ut kondensvattenskålen fram till till höger under apparaten.
- ▶ Rengör dessutom kondensvattenutloppet regelbundet, t.ex. med en flaskborste.
- ▶ Befria rotorkammaren från isbildning regelbundet genom avfrostning genom att du låter centrifuglocket vara öppet eller genom en kort tempereringskörning vid cirka 30 °C.
- ▶ Låt centrifuglocket vara öppet om centrifugen inte används under en längre tid. Då kan kvarvarande fuktighet avdunsta. Gastryckfjädrarna avlastas.
- ▶ Torka upp kondensvattnet från rotorkammaren. Använd en mjuk trasa med god sugförmåga.
- ▶ Ta bort damm som har fastnat i centrifugens ventilationsöppningar med en pensel eller en borste minst en gång varje halvår. Stäng av centrifugen och dra ut nätkontakten innan detta görs.

6.5 Krossat glas

Vid användning av glaskärl kan det uppstå glasbrott i rotorkammaren. Det glassplitter som då uppstår virvlar runt i rotorkammaren vid centrifugeringen och har en sandblåstringseffekt på rotorn och tillbehören. Mycket små glaspartiklar lagras in i gummidelarna (t.ex. i motormanschetten, i rotorkammarens tätning och i adapternas gummimattor).



OBS!

Glasbrott i rotorkammaren

Vid för höga *accelerations*krafter kan glaskärl gå sönder i rotorkammaren. Glasbrott orsakar skador på rotorn och tillbehören samt på proverna.

- ▶ Beakta tillverkarens uppgifter om rekommenderade centrifugeringsparametrar (beskickning och varvtal).

Följder av glasbrott i rotorkammaren:

- Fint svarta metallpulver i rotorkammaren (vid rotorkammare av metall).
- Rotorkammarens och tillbehörens ytor skrapas.
- Rotorns kemikaliebeständighet försämras.
- Förorening av proverna.
- Avslipat material i gummidelar.

Upptädnad vid glasbrott

1. Ta bort splitter och glasmjöl från rotorkammaren och tillbehören.
2. Rengör rotorn och rotorkammaren grundligt. Rengör fastvinkelrotorernas hål extra grundligt.
3. Vid behov ska gummimattorna och adaptern bytas ut för att undvika ytterligare skador.
4. Kontrollera regelbundet rotorborrhålen med avseende på produktrester och skador.

6.6 Dekontaminering före sändning

Tänk på följande om du skickar apparaten till en auktoriserad teknisk serviceanläggning vid en reparation eller till återförsäljaren vid avfallshantering av enheten:



WARNING!

Hälsorisk på grund av kontaminerad apparat.

1. Observera hänvisningarna i dekontamineringsintyget. Du finner det som PDF-fil på vår hemsida (www.eppendorf.com/decontamination).
2. Dekontaminera alla delar som ska fraktas.
3. Bifoga frakten ett fullständigt ifyllt dekontamineringsintyg för varuretur (inkl. apparatens serienummer).

7 Problemlösning

Om de föreslagna åtgärderna inte leder till ett lyckat resultat upprepade gånger ska du kontakta din lokala Eppendorf-återförsäljare. Kontaktadressen finns på Internet under www.eppendorf.com/worldwide.

7.1 Återställ överströmbrytaren

På 230 V- och 120 V-apparater sitter det termiska överströmbrytare som säkringar (allpoliga). Dessa sätter brytaren i läge FRÅN vid utlösning av överströmskyddet, men återaktiveras inte automatiskt.

För återaktivering av överströmskydds-brytaren, gå tillväga på följande vis:

1. Stäng av centrifugen via nätbrytaren.
2. Vänta i minst 20 s och starta åter centrifugen.

Överströmbrytaren har återaktiverats och centrifugen är driftklar.

7.2 Allmänna fel

Symptom/meddelande	Möjlig orsak	Åtgärd
Ingen display.	Ingen nätanslutning.	▶ Kontrollera nätanslutningen.
Ingen display.	Strömavbrott.	▶ Kontrollera apparatens nätsäkring (se <i>Återställ överströmbrytaren på sida 147</i>). ▶ Kontrollera laboratoriets nätsäkring.
Det går inte att öppna apparatens lock.	Rotorn roterar fortfarande.	▶ Avvakta tills rotorn står stilla.
Det går inte att öppna apparatens lock.	Strömavbrott.	1. Kontrollera apparatens nätsäkring (se <i>Återställ överströmbrytaren på sida 147</i>). 2. Kontrollera laboratoriets nätsäkring. 3. Tryck på lock-nödutlösningen (se på sida 149).
<i>clean rotor</i>	200 körningar.	▶ Rengör rotor och behållare (se på sida 143).
Centrifugen bromsar under en kort centrifugering trots att knappen short trycks in.	Knappen short har släppts kort tid mer än två gånger (skyddsfunktion för drivenheten).	▶ Tryck konstant på knappen short under en kort centrifugering.

7.3 Felmeddelanden

Gör på följande sätt när följande felmeddelande visas:

1. Åtgärda fel (se Åtgärd).
2. Tryck på knappen **öppna** för att åtgärda felet.
3. Om nödvändigt, återuppta centrifugeringen.

Ett fel kan ha olika orsaker. De faktiska orsakerna beskrivs av meddelandet i apparatens fönster.

Centrifuge 5804/5804 R/5810/5810 R — Bruksanvisning

Symptom/meddelande	Möjlig orsak	Åtgärd
<i>no rotor</i> Centrifugen startar inte.	Ingen rotor.	▶ Sätt i rotor.
<i>no rotor</i> Centrifugen startar inte.	Fel i drivenhet eller i rotordetektering.	▶ Stäng av centrifugen och starta åter efter > 20 s.
<i>Press Open</i>	Centrifuglocket gick inte att låsa.	1. Tryck på tangenten open . 2. Stäng centrifuglocket igen.
<i>Close lid</i>	Centrifuglocket inte riktigt stängt.	▶ Centrifuglocket för kraftigt tilltryckt.
<i>Lift Lid</i> Centrifuglocket öppnas inte.	Centrifuglocket kan inte öppnas av sig själv.	▶ Lyft centrifuglocket för hand.
<i>IMBAL</i> Centrifugen skakar vid acceleration och stängs av.	Rotorn är osymmetriskt lastad.	▶ Lasta rotorn symmetriskt (se på sida 136).
<i>Rotor</i> Centrifugen skakar vid acceleration och stängs av.	Rotorn är inte tillräckligt fastskruvad.	1. Dra åt rotormuttern (se på sida 136). 2. Kontrollera rotorkonan och motoraxeln med avseende på repor och skador.
<i>Rotor</i> Centrifugen skakar vid acceleration och stängs av.	<ul style="list-style-type: none"> • Centrifugen stött. • Bord instabilt. 	▶ Ställ centrifugen på ett stabilt bord (se på sida 133).
<i>speed</i> Centrifugen stängs av.	Börvarvtalet är för högt för rotorn.	▶ Mata in passande börvarvtal.
<i>change rotor</i>	Rotorns maximala livslängd har uppnåtts. Varningen visas tre gånger efter 98 000, 99 000 och 99 600 körningar. Efter 100 000 körningar visas den efter varje körning.	▶ Kontakta den tekniska serviceavdelningen.
Temperaturvisaren blinkar. (endast 5804 R/5810 R)	Temperaturavvikelse från börvärdet: ± 3 °C.	<ul style="list-style-type: none"> ▶ Kontrollera inställningarna. ▶ Invänta att börvärdet uppnås. ▶ Kontrollera att luftcirkulationen är fri genom ventilationsöppningarna. ▶ Töa is eller stäng av apparaten och låt den svalna.
<i>overtemp</i> (endast 5804 R/5810 R) Centrifugen stängs av och avger varningssignal.	Temperaturavvikelse från börvärdet i rotorkammaren: ± 3 °C.	<ul style="list-style-type: none"> ▶ Kontrollera inställningarna. ▶ Kontrollera att luftcirkulationen är fri genom ventilationsöppningarna. ▶ Töa is eller stäng av apparaten och låt den svalna.
<i>Clear Memory</i>	Programminnet är fullt.	▶ Radera några program.
<i>Interrupt</i>	Strömavbrott under drift.	▶ Kontrollera nätanslutningen.
<i>Error 1</i>	Fel i varvtalsmätaren.	▶ Testa med en annan rotor om meddelandet visas igen.
<i>Error 2</i>	Obalanssensorn störd.	▶ Återuppta drift.

Symptom/meddelande	Möjlig orsak	Åtgärd
Error 3	Fel i varvtalsmätaren.	▶ Starta rotorn och skruva fast.
Error 3	Fel i varvtalsmätaren.	▶ Låt centrifugen stå i 12 minuter i tillkopplat tillstånd tills tangenten open tänds, öppna sedan.
Error 4	Sensorn för locklåsning störd.	▶ Stäng av centrifugen och starta åter efter > 20 s.
Error 5	Otillåten locköppning eller lockbrytare defekt under drift.	1. Avvakta tills rotorn står stilla. 2. Öppna och stäng åter centrifuglocket. 3. Återuppta drift.
Error 6 eller overload	För låg nätspänning.	▶ Kontrollera nätspänningen.
Error 6 eller overload	<ul style="list-style-type: none"> • Frekvensomformaren överbelastad. • Broms defekt. 	▶ Stäng av centrifugen, låt den svalna minst 5 minuter och slå på den igen.
Error 8	<ul style="list-style-type: none"> • Drivningsfel. • Rotor lös. • Motor defekt. 	1. Avvakta tills rotorn står stilla. 2. Skruva fast rotorn. 3. Återuppta drift.
Error 9 till Error 25	Elektronikstörning.	▶ Stäng av centrifugen och starta åter efter > 20 s.

7.4 Nödutlösning

Om inte centrifuglocket kan öppnas kan du trycka på nödutlösningen manuellt.



Risk för personskador på grund av den roterande rotorn.

- ▶ Avvakta tills rotorn står stilla innan du använder nödupplåsningen. Rotorn kan fortsätta att rotera upp till 8 minuter.
- ▶ Titta genom tittfönstret i centrifuglocket för kontroll.

Du behöver en standard-rotornyckel som medföljer centrifugen.

1. Dra ut nätkontakten.
2. Avlägsna plastskyddet på nödupplåsningen. Denna befinner sig i mitten av apparatens front.
3. För in rotornyckeln genom sexkantöppningen bakom tills du möter motstånd.
4. Vrid rotornyckeln moturs.
Centrifuglocket låses upp.
5. Öppna centrifuglocket.
6. Avlägsna rotornyckeln och sätt tillbaka plastskyddet.

8 Transport, lagring och skrotning

8.1 Transport

► Transportera alltid apparaten i originalförpackningen.

	Lufttemperatur	Relativ luftfuktighet	Lufttryck
Allmän transport	-25 °C – 60 °C	10 % – 75 %	30 kPa – 106 kPa
Luftfrakt	-20 °C – 55 °C	10 % – 75 %	30 kPa – 106 kPa

8.2 Lagring

	Lufttemperatur	Relativ luftfuktighet	Lufttryck
i transportförpackning	-25 °C – 55 °C	10 % – 75 %	70 kPa – 106 kPa
utan transportförpackning	-5 °C – 45 °C	10 % – 75 %	70 kPa – 106 kPa

8.3 Skrotning

Vid skrotning av produkten skall de gällande laga föreskrifterna följas.

Information om skrotning av elektroniska apparater inom Europeiska gemenskapen:

Inom inom Europeiska gemenskapen gäller nationella regler för skrotning av elektriska och elektroniska apparater, som baserar på EU-direktiv 2002/96/EC om elektriska och elektroniska produkter (WEEE).

Efter den får alla produkter som har levererats efter den 13-08-2005 inom Business-to-Business-området inte längre slängas med hushållssoporna. För att dokumentera detta är apparaterna försedda med följande märkning:



Eftersom lagarna om avfallshantering kan vara olika i EU, ombeds du att kontakta din leverantör om du har frågor.

I Tyskland gäller märkningsplikten fr.o.m 2006-03-23. Från detta datum har tillverkaren för alla apparater som har levererats efter 13-08-2005 möjlighet att erbjuda retur av apparater. Om produkterna har levererats före den 2005-08-13 ansvarar den sista användaren för att produkten skrotas lagenligt.

EG-Konformitätserklärung EC Conformity Declaration

Das bezeichnete Produkt entspricht den einschlägigen grundlegenden Anforderungen der aufgeführten EG-Richtlinien und Normen. Bei einer nicht mit uns abgestimmten Änderung des Produktes oder einer nicht bestimmungsgemäßen Anwendung verliert diese Erklärung ihre Gültigkeit.

The product named below fulfills the relevant fundamental requirements of the EC directives and standards listed. In the case of unauthorized modifications to the product or an unintended use this declaration becomes invalid.

Produktbezeichnung, Product name:

Centrifugen 5804 / 5804 R , 5810 / 5810 R

einschließlich Zubehör / including accessories

Produkttyp, Product type:

Laborzentrifugen / Laboratory Centrifuges

Einschlägige EG-Richtlinien/Normen, Relevant EC directives/standards:

2006/95/EG, EN 61010-1, EN 61010-2-20

2004/108/EG, EN 61000-6-1, EN 61000-3-2, EN 61000-3-3, EN 61326-1

98/79/EG, EN 14971, EN 61010-2-101, EN 61326-2-6



Vorstand, Board of Management:

18.09.2009

Hamburg, Date:



Projektmanagement, Project Management:

eppendorf



Eppendorf AG · Barkhausenweg 1 · 22339 Hamburg · Germany



Underwriters Laboratories Inc.®

CERTIFICATE OF COMPLIANCE

CERTIFICATE NUMBER: 060203 - E215059

ISSUE DATE: February 06, 2003

Page 1 of 1

Issued to: Eppendorf A G - Dept Mp
Barkhausenweg 1
D-22339 Hamburg Germany

Report Reference: E215059, February 19, 1999

This is to Certify that representative samples of: Laboratory Centrifuges, Models 5804, 5804R, 5810, 5810R.


Have been investigated by Underwriters Laboratories Inc.® in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 3101-1 - Electrical Equipment for Laboratory Use; Part 1: General Requirements
UL 3101-2-20 - Electrical Equipment for Laboratory Use, Part 2: Laboratory Centrifuges
CSA C22.2 No. 1010-1 - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part I: General Requirements

Additional Information: Electrical Ratings:

Ratings	Voltage	Frequency(Hz)	Power(W)
5804	120	60	850
5804R	120	60	1400
5810	120	60	950
5810R	120	60	1650

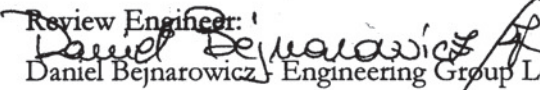
Only those products bearing the UL Listing Mark for the US and Canada should be considered as being covered by UL's Listing and Follow-Up Service meeting the appropriate requirements for US and Canada.

The UL Listing Mark for the US and Canada generally includes: the UL in a circle symbol with "C" and "US" identifiers:  the word "LISTED"; a control number (may be alphanumeric) assigned by UL; and the product category name (product identifier) as indicated in the appropriate UL Directory.

LOOK FOR THE UL LISTING MARK ON THE PRODUCT

Engineer:

Bogdan Maliszewski - Senior Project Engineer
UL International Germany GmbH

Review Engineer:

Daniel Bejnarowicz - Engineering Group Leader
UL International Germany GmbH

Pursuant to the Corporate Services Agreement between UL International Germany GmbH and Underwriters Laboratories Inc. ("UL"), UL hereby accepts and issues this Certificate of Compliance. For questions in Germany, you may call 49 6102 3690.



Certificate of Containment Testing

Containment Testing of Swing Out Rotor with Buckets [A-2-DWP-AT (5820 710.004-00)] and Autoclaved (x50) lids in the Eppendorf Centrifuge 5810

Report No. 104-09 B

Report prepared for: Eppendorf AG, Hamburg, Germany
Issue Date: 31st March 2010 (amended 17th Aug 10)

Test Summary

Swing out rotor with buckets [A-2-DWP-AT (5820 710.004-00)] and autoclaved (x50) lids was containment tested in the Eppendorf 5810 centrifuge, in accordance with Annex AA of IEC 1010-2-20. The sealed bucket was shown to contain the spill of micro-organisms and therefore prevent any release.

Report Written By

A handwritten signature in blue ink, appearing to be "Mlac", written over a horizontal dashed line.

Report Authorised By

A handwritten signature in blue ink, written over a horizontal dashed line.



Certificate of Containment Testing

Containment Testing of Rotor A-4-44 and Sealed Buckets and Lids (Cap 100, Order no. 5804 712.005) in the Eppendorf Centrifuge 5810

Report No. 352-97 (Part 1)

Report prepared for: Eppendorf AG, Hamburg, Germany
Issue Date: Original report issued 8th September 1997
Certificate issued 18th October 2010

Test Summary

Rotor A-4-44 and sealed buckets and lids (Cap 100, Order no. 5804 712.005) were containment tested in the Eppendorf Centrifuge 5810, using Annex AA of IEC 1010-2-020. The sealed buckets were shown to contain the spill within the centrifuge.

Report Written By

Anna May

Report Authorised By

[Signature]

Health Protection Agency
Microbiological Services
Porton Down
Salisbury
Wiltshire SP4 0JG
United Kingdom



Certificate of Containment Testing

Containment Testing of Rotor A-4-62 and Sealed Buckets and Lids (Cap 250/1, Order no. 5810 710.006) in the Eppendorf Centrifuge 5810

Report No. 352-97 (Part 2)

Report prepared for: Eppendorf AG, Hamburg, Germany
Issue Date: Original report issued 8th September 1997
Certificate issued 18th October 2010

Test Summary

Rotor A-4-62 and sealed buckets and lids (Cap 250/1, Order no. 5810 710.006) were containment tested in the Eppendorf Centrifuge 5810, using Annex AA of IEC 1010-2-020. The sealed buckets were shown to contain the spill within the centrifuge.

Report Written By

Anna May

Report Authorised By

[Signature]



Certificate of Containment Testing

400ml Rectangular Buckets fitted with
Sealed Caps in Eppendorf Centrifuge 5810
containing Rotor A-4-81

Report No. 1000-06

Report prepared for: Eppendorf AG, Hamburg, Germany
Issue Date: 21st March 2006

Test Summary

400 ml rectangular buckets fitted with sealed caps were
containment tested in the Eppendorf centrifuge 5810
containing rotor A-4-81, using Annex AA of IEC 1010-2-20.
The buckets were shown to contain a large spill.

Report Written By

A blue ink signature written over a horizontal dashed line.

Report Authorised By

A blue ink signature written over a horizontal dashed line.



Certificate of Containment Testing

Containment Testing of Rotor FA-45-6-30 [(5820 715.103-00) and autoclaved lid (x50)] in the Eppendorf Centrifuge 5810R

Report No. 40-10B

Report prepared for: Eppendorf AG, Hamburg, Germany
Issue Date: 19th July 2010 (amended 17th Aug 10)

Test Summary

Rotor FA-45-6-30 (5820 715.103-00) and autoclaved lid (x50) was containment tested in the Eppendorf centrifuge 5810R, in accordance with Annex AA of IEC 1010-2-20. The sealed rotor was shown to contain the spill of micro-organisms and therefore prevent any release.

Report Written By

A blue ink signature written over a dashed horizontal line.

Report Authorised By

A blue ink signature written over a dashed horizontal line.



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