Centrifuge 5804 / 5804 R / 5810 / 5810 R

Instruction Manual · Mode d'emploi succinct
Instrucciones breves

eppendorf

Centrifuge 5804 / 5804 R / 5810 / 5810 R

Shortcuts

Task / Function	Lid	Press	Display Centrifuge 5804 /R / 5810 /R	Chapter in instruction manual
Parameter set		1. Select time or speed etc. 2. Select ▲ or ▼	1. Selected parameter flashes. 2. New nominal value appears.	3.5 3.8
Soft start / stop		1. Press repeatedly time 2. Select ramp ▲ or ▼	Acceleration ramp 9 (fast)... 0 (slow) Deceleration ramp 9...0	3.11
Alarm ON / OFF		time + speed	**"alarm on"** **"alarm off"**	3.19
Programming (only during standstill)		1. Set parameter 2. Press 2 x prog 3. Storing: prog > 2 sec	1. Parameter shown 2. "**P...**" symbolizes first free program no. 3. "**ok**"	3.14
At set rpm	 open	start stop > 4 sec	 on off	3.12

Figure 1 + 2

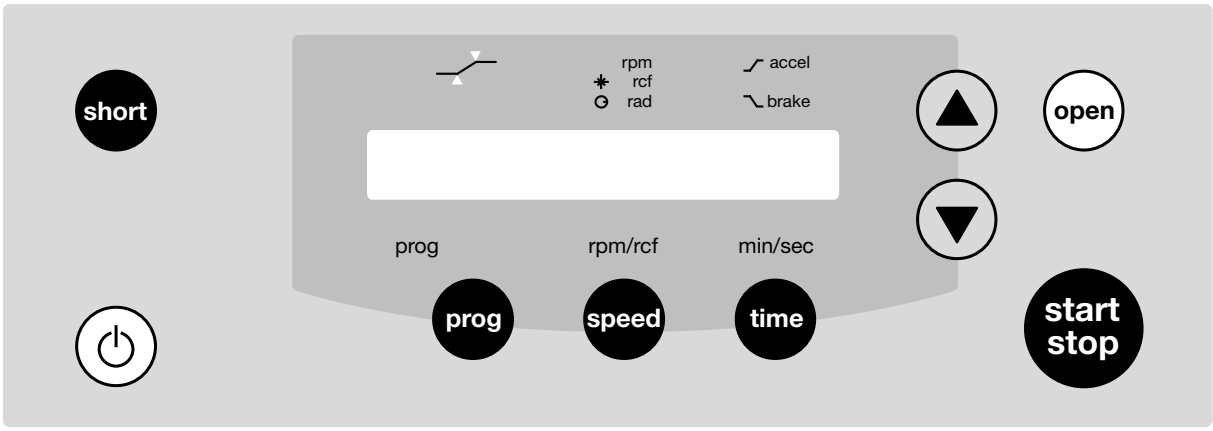

Fig. 1: Display field and control panel of the 5804 / 5810 (non-refrigerated)

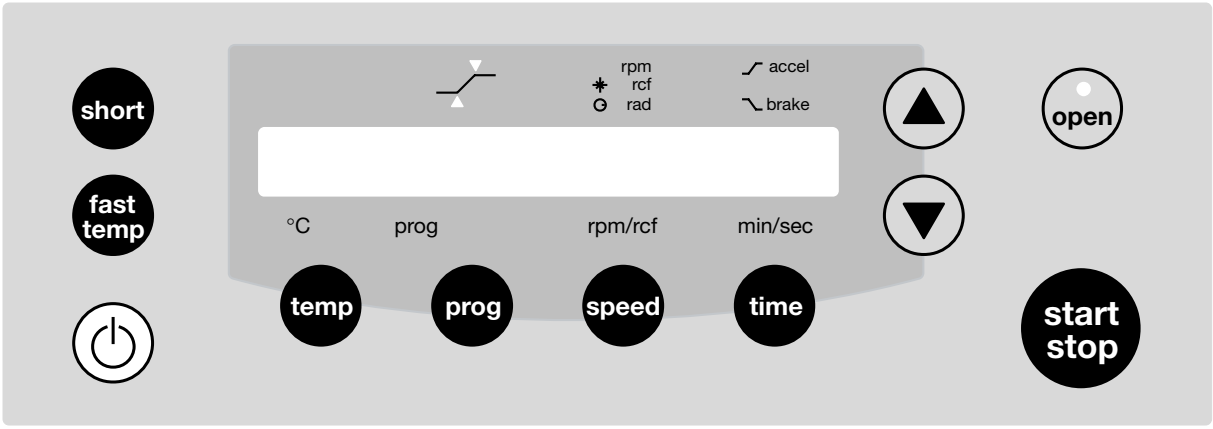

Fig. 2: Display field and control panel of the 5804 R / 5810 R (refrigerated)

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1 Introduction

The Centrifuges 5804 / 5810 are non-refrigerated bench-top centrifuges and the Centrifuges 5804 R / 5810 R are refrigerated bench-top centrifuges. The Centrifuges 5804 / 5804 R / 5810 / 5810 R are intended exclusively for use indoors and are for separating aqueous solutions and suspensions of differing density in approved test tubes.
The 5804 / 5804 R models have a maximum capacity of 400 ml and the 5810 / 5810 R models have a maximum capacity of 1600 ml.

This sign is found on your centrifuge and on several pages in the operating manual.
Texts labeled with this sign contain safety notes. Read these safety precautions before using the centrifuge for the first time.

Before starting up the Centrifuges 5804 / 5810 and 5804 R / 5810 R for the first time, please read the instruction manual.

1.1 Delivery package

1 Centrifuge 5804 / 5810 with fan cooling or 1 refrigerated Centrifuge 5804 R / 5810 R (rotor not included with centrifuges)
1 Main power cable (European standard plug)
1 Instruction manual
1 Rotor key

1.2 Unpack

When the machines are removed from the packaging, they must be supported by two persons near the rubber feet at the bottom on the left- and right-hand side and then carried the short distance to the lab bench. Please observe the weight-bearing capacity of the bench. If the machines are to be transported over long distances in the lab, a trolley must be used.

1.3 Installing the device

For 5804 R and 5810 R only: To avoid damage to the compressor caused by incorrect transportation, wait four hours after installation before switching on the device.

To disconnect the centrifuge from the power supply in the event of an error, an emergency switch must be installed away from the centrifuge, preferably outside the centrifugation room or next to the exit of this room.

- Place the centrifuge onto a horizontal, **stable and resonance-free** work surface.
- Ensure that the working environment is well-ventilated and not exposed to direct sunlight.
- There should be 15 cm clearance at the sides of the centrifuge and 10 cm to the rear.
- According to the regulations of the EN 61010-2-020 standard, a safety distance of 30 cm must be observed around the centrifuge during operation. No objects which cause damage when destroyed must be positioned in this space.
- Before plugging in the centrifuge, compare your power supply with the electrical requirements listed on the identification plate.
  The mains cable of the centrifuge may be connected only to a socket with a protective conductor.
- On refrigerated centrifuges 5804 R and 5810 R with a mains voltage of 120 V, a distinction is made between two versions depending on requirements: the 15 A variant is equipped with a conventional IEC power cable (see Fig. 3) so that these devices can be operated directly at the lab work-station using a conventional socket (120 V, 15 A). However, this causes a drop in the cooling performance of this kind of device. This technical specification leads to a rise in the lowest temperature which can be reached at maximum speed and to slower cooling down to the specified value.

1 Introduction

Fig. 3: 15 A IEC power cable

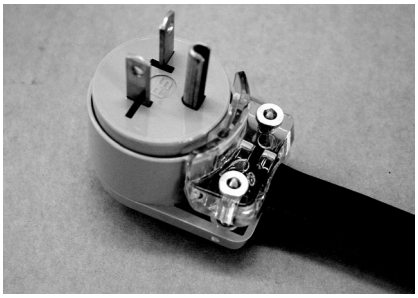


Fig. 4: 20 A standard variant

On the 20 A standard variant, by contrast, the power cable is permanently attached to the device (see Fig. 4). These devices have a special 20 A plug and require the appropriate socket to guarantee the supply of current and voltage required for the centrifuges (120 V, 20 A). The advantage is greater, more rapid cooling.

– To switch on the centrifuge, press the mains switch (on the right-hand side of the device). The nominal values of the test run appear in the display and the control lamp in the **Open** key lights up.

– The centrifuge lid can be opened by pressing the **Open** key.

Please insert the rotor before starting and tighten it with the supplied rotor key.
The rotors A-4-81 and A-4-81-MTP are tightened with the special rotor key included in the rotor delivery package.

2 Safety regulations and applicational limitations

In the interests of your own personal safety, always observe the following regulations:

The rotor and the rotor cover must always be securely fastened.

Do not begin centrifugation before the rotor has been securely fastened.

The rotor must be loaded symmetrically. Opposing tubes should be of the same type and should be filled equally.

For reasons of mechanical stabilization, **all** positions of rotor A-4-44 and A-4-62 / A-4-62-MTP must be loaded with buckets of the same type.

Prior to centrifugation, the tubes should in any case be visually inspected for material damage. Damaged tubes may not be centrifuged. This is because broken tubes can, in addition to sample loss, result in further damage to the centrifuge and accessories.

Do not use buckets and rotors which show clear signs of corrosion or mechanical defects. Please check accessories at regular intervals.

Do not operate centrifuges which have not been correctly installed or repaired.

Do not move or knock against the centrifuge during operation.

Repairs must only be performed by an Eppendorf authorized service technician.

Only use original rotors and spare parts recommended by Eppendorf.

The Centrifuges 5804 / 5810 and 5804 R / 5810 R may only be used for special applications. They must not be operated in a hazardous or flammable environment and must not be used to centrifuge explosive or highly reactive substances.

If such liquids are spilled in the rotor or rotor chamber, the centrifuge must be cleaned with a moist cloth and a mild soap solution.

A liquid density of 1.2 g/ccm must not be exceeded at the maximum rotational speed.

During longer spin times in the 5804 / 5810 models, the sample tubes may heat up. Observe the limiting data specified by the tube manufacturer.

The use of organic solvents (e.g. chloroform) may have an adverse effect on the stability of plastic test tubes.

Following operation in a cooling room, run the centrifuge for 30 minutes in the cooling room until it is warm. Alternatively, allow it to warm up in a lab for at least three hours, but **do not plug in the centrifuge** in order to prevent damage caused by condensation.

Rotors are high-grade components which are subject to extreme mechanical strain. Aluminium rotors are protected against corrosion caused by commonly-used laboratory chemicals by means of an electrolytic coating, although this protection cannot be fully guaranteed.

Please ensure that the rotor is protected from mechanical damage. Even slight scratches and cracks can cause severe inner damage to the rotor materials, which are difficult or impossible to detect with the eye.

Please avoid using aggressive chemicals with the rotors. Such chemicals include concentrated and mild alkalis, concentrated acids, solutions containing mercury ions, copper ions and other heavy-metal ions, chlorinated hydrocarbons and concentrated saline solutions.

When handling toxic or radioactive liquids or pathogenic bacteria out of Risk Group II (see World Health Organization: "Laboratory Biosafety Manual"), observe national regulations.

In the event of contamination caused by impurities or aggressive agents, the rotor must be cleaned **immediately** using a neutral cleaning liquid. This is particularly important for the bores of the fixed-angle rotor and for the buckets.

Please clean your rotor regularly using a **neutral** cleaning liquid (e.g. Extran® neutral or RBS neutral). This will protect the rotor and prolong its service life.

According to EN 55011, the centrifuges 5804/5804 R and 5810/5810 R are Class A products. Interference with signal reception can occur in residential areas. The operator should take appropriate protective measures.

2 Safety regulations and applicational limitations

The following rotors and accompanying buckets have a maximum operating life of seven years. The date of production is engraved on the rotor in four-digit form (e.g. 10/98 = October 1998):

A-4-44	5804 730.003	A-4-62-MTP	5810 711.002
A-2-DWP	5804 740.009	T-60-11	5804 730.003
F-34-6-38	5804 727.002	A-4-81	5810 718.007
A-4-62	5810 709.008	A-4-81-MTP	5810 725.003

Transparent rotor lids made of PC and PP as well as the PC caps of the rectangular buckets have an operating life of three years. The date of production is engraved in the form of a clock  .

Contact with organic solvents (e.g. phenol, chloroform) may have an adverse effect on the transparent (polycarbonate) caps of the aerosol-tight rotors. Please check lids of this type regularly for chemical damage or for cracks. Cracked caps or caps with a milky discoloration must be replaced immediately.

Do not use rotors, caps or buckets which have been subjected to chemical or mechanical damage or which have exceeded their maximum operating life!

* PC = Polycarbonate; PP = Polypropylene

3 Operating

3.1 Operating controls

See the fold-back cover at the front of this manual.

In the text, prog , time , speed , etc. signify keys

"Buckets" include buckets and titer plate buckets.

3.2 Mounting / dismounting the rotors

A summary of the various different rotors can be found in the brochure.

Clean the motor axle and the rotor bores with a cloth before attaching the rotor.

- When fastening / loosening the rotor onto / from the motor axle, ensure that the temperature of the rotor and the motor axle is between 10 °C and 30 °C.
- Mount the rotor onto the motor axle and tighten the rotor nut by turning clockwise using the appropriate rotor key supplied.
- To dismount the rotor, turn the rotor nut counterclockwise using the rotor key.
- When the rotors are not in the centrifuge, please place them in the rotor stand (Order no. 5804 720.008).
- Do not centrifuge using rotors and buckets with visible corrosion or mechanical defects (see Chapter 2: Safety regulations and applicational limitations).

The Centrifuges 5804 / 5810 and 5804 R / 5810 R have automatic rotational speed limitation.

3.3 Rotor lid F-45-30-11

The non-aerosol-tight rotor lid of the rotor F-45-30-11 is attached by pressing the lid onto the rotor. The rotor lid need not be screwed tight.

3.4 Loading the rotors

The rotors and buckets must always be loaded symmetrically. The adapters may only be loaded with the test tubes recommended.

Differences in the weight of the filled sample tubes should be kept as low as possible in order to prolong the life-time of the drive and to minimize running noises caused by imbalance.

⚠ On each rotor you will find information concerning the maximum weight of a completely loaded bucket (bucket including adapter, tubes and liquid or titer plate buckets including titer plate and liquid) (see also applicational limitations).

Performance data of the rotors

Type Designation	max. capacity (ml)	max. rotational speed rpm / max. rcf (x g)	max. Radius (cm)	5804 / 5804 R	5810 / 5810 R	Aerosol-tight centrifugation possible
Swing-bucket rotors						
A-4-81 [1]	4 x 400 ml	4,000 / 3,250	18.0	–	●	●
A-4-81 [1] [3]	96 x 2 ml	4,000 / 2,600	14.6	–	●	–
A-4-81-MTP [1]	16 x MTP-Platte	4,000 / 2,900	15.3	–	●	–
A-4-62 [2]	4 x 250 ml	4,000 / 3,200	18.0	–	●	●
A-4-62-MTP [2]	16 x MTP-Platte	4,000 / 2,750	15.4	–	●	–
A-4-44	4 x 100 ml	5,000 / 4,500	16.1	●	●	●
A-2-DWP	4 x Deepwell-Platte	3,700 / 2,250	14.7	●	●	–
Fixed-angle rotors						
F-34-6-38	6 x 85 ml	11,000 / 15,550	11.5	●	●	–
F-34-6-38	6 x 85 ml	12,000 / 18,500	11.5	–	only 5810 R	–
F-45-30-11	30 x 2 ml	14,000 / 20,800	9.5	●	●	–
FA-45-30-11	30 x 2 ml	14,000 / 20,800	9.5	●	●	●
F-45-48-PCR	6 x 8er PCR-Streifen	12,000 / 15,350	9.5	●	●	–
Drum rotor						
T-60-11	60 x 2 ml	14,000 / 16,400	7.5	●	●	–

3 Operating

1) The swing-bucket rotor can be delivered without buckets, equipped with rectangular buckets as an A-4-81 or with MTP buckets as an A-4-81-MTP, whereby the flex buckets (especially MTP-buckets) can be purchased extra in sets of 2 or 4, user-friendly change of rectangular buckets or MTP and flex buckets is guaranteed by the use of a common rotor cross.

2) The swing-bucket rotor can be delivered as A-4-62 (loaded with buckets) or as A-4-62-MTP (loaded with microtest plates). User-friendly exchange of rectangular buckets or microtest plate buckets is guaranteed by the use of all-in-one rotor cross.

3) A-4-81 is equipped with flex buckets and IsoRack adapters.

Swing-bucket rotor

Only the combinations of rotor/buckets/adapter which are recommended by the manufacturer may be used.
Please check whether all buckets have been **inserted correctly** and can swing freely.

For purposes of mechanical stabilization, **all** positions of the rotors A-4-44 and A4-62 / A-4-62-MTP must be loaded with the same buckets. In contrast, the rotor A-4-81 / A-4-81-MTP can be equipped with a mix of rectangular buckets and titer plate buckets. It is in principle not permitted to use swing-bucket rotors with only two rectangular buckets or titer plate buckets inserted.

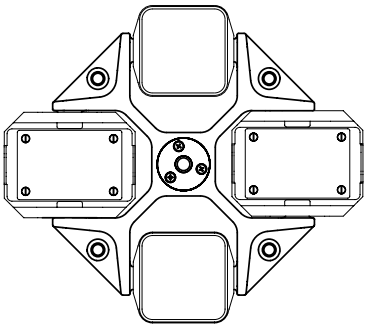


Fig. 5: Rotor A-4-81-MTP symmetrically loaded

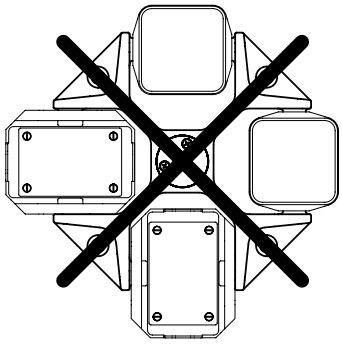


Fig. 6: Not allowed, because the pegs are not evenly loades, rotor is asymmetrically loades

The rectangular buckets are sorted according to weight. The weight category is printed on the side in the groove: e.g. 86 (the last two places in grammes). Opposing buckets should be of the same weight category. When placing follow-up orders, please state the weight category. This also applies to titer plate buckets.
Ensure that the grooves are clean before inserting the buckets. Unclean grooves and pivots prevent the buckets from swinging freely.

When working with a rotor which is not completely loaded, position the tubes within the buckets in such a way that the rotor pivots are stressed evenly.

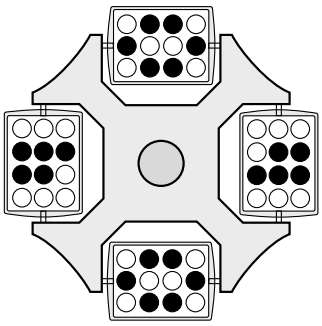


Fig. 7: Rotor is symmetrically loaded

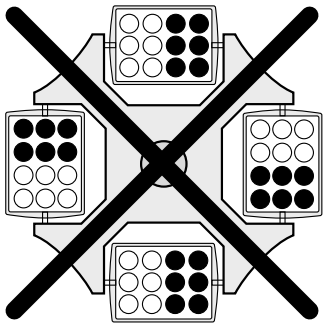


Fig. 8: Not permitted: pivots are not stressed evenly, rotor is not symmetrically loaded

A manual swing test with empty tubes must be carried out if oversized tubes (i.e. longer than 100 mm) are used.

3 Operating

Permitted loads for the swing-bucket rotor

Rotor	A-4-44 (4 x 100 ml)	A-2-DWP (Deepwell-plate rotor)	A-4-62 (4 x 250 ml) A-4-62-MTP	A-4-81 (4 x 400 ml) A-4-81-MTP
Maximum load per 100 ml rectangular bucket	310 g (adapter + tubes)	—	630 g (adapter + tubes)	780 g (adapter + tubes)
Maximum load per plate carrier	—	380 g (with full plates)	380 g (with full plates)	380 g (with full plates)
Maximum load per 50 ml Falcon® bucket	144 g (for two conical tubes incl. liquid and form insert)	—	—	—
Specifications on the rotor (weight for loaded buckets / rectangular buckets)	4 x 0.6 kg	2 x 1.010 kg	4 x 1.1 kg	4 x 1.4 kg (A-4-81) 4 x 1.22 kg (A-4-81-MTP)

The weight specifications printed on the rotor (e.g. 4 x 0.6 kg for the 4 x 100 ml swing-bucket rotor A-4-44) correspond to the overall weight of the rectangular bucket, inclusive of adapter, test tubes and the contents of each individual position.

In general, commercially-available deepwell plates with a 96-well plate format may only be used in the buckets of the A-4-62-MTP on condition that the **maximum load** does not exceed **380 g** and the **maximum height** of the plate does not exceed **53 mm**. This restriction also applies to stacked titer plates or culture plates.

Commercially available deepwell plates or filter plates / filter plate stacks in the 96-well plate format may be inserted in the buckets of the A-2-DWP only if their **load does not exceed 380 g** and their **height does not exceed 89 mm.** These restrictions also apply to stacked titer plates or culture plates.

Commercially available deepwell plates or filter plates / filter plate stacks may be inserted in the buckets of the A-4-81-MTP only if their **load does not exceed 380 g** and their **height does not exceed 60 mm**. These restrictions also apply to stacked titer plates or culture plates.

If deepwell plates used with dimensions which do not correspond to the values stated above (e.g. prototypes, combination plates with a heavy lid or specially designed plates), the user must consult Eppendorf to establish the suitability of using these plates in a titer plate or Deepwell plate rotor.

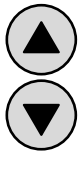
Under no circumstances use MTP-, MTP / Flex- and DWP-buckets with deformed side plates.

3.5 Routine centrifugation with preset time / rcf display

Turn on the main power switch. The nominal values of the last run are displayed.

Load the rotor symmetrically and close the centrifuge lid. The **Open** key lights blue.

activates the preset speed. The SPEED display flashes.



modify the values. The new nominal value appears in the display.

If the preset speed is in rcf, please check the radius that has been entered. (see Section 3.10).

3 Operating

speed to select rcf, press this key repeatedly until the rcf symbol (✱) appears to the left of the SPEED display. The rcf value flashes and can be modified using the **arrow** keys.

time activates the preset time. The TIME display flashes. The time can be modified using the **arrow** keys.

temp activates the preset temperature. The nominal temperature in °C can be modified using the **arrow** keys.

start stop starts the run. ■ flashes and displays the rotation of the rotor.

Rotor recognition (see also Chapter 3.16) occurs at 200 to 700 1/min and the device then accelerates to the nominal speed.

During the run, the rotational speed of the rotor or the appropriate rcf value, the sample temperature and the remaining spin time in minutes are displayed. The last minute is counted down in seconds. During the run, all parameters can be modified.

After the end of a run, or after a run has been interrupted by pressing the **Stop** key, the rotor is braked and brought to a standstill. During the braking process, the time display flashes and the elapsed spin time is displayed.

When the lamp in the **Open** key lights up, the lid can be unlocked by pressing the key.

3.6 Continuous operation

time The continuous operation function is set above 99 min or below 1 min using the **arrow** keys. In the time display, "oo" indicates continuous operation.
During the run, the actual rotational speed/ RCF and temperature values and the elapsed time in minutes are displayed. If the centrifuge runs for more than 99 min, "99." appears in the display. The run is ended with the **STOP** key.

3.7 Short spin centrifugation (Short spin)

short Press for as long as the run should last. The text "SH" will appear in the display. The elapsed time is displayed in seconds. An already interrupted run can be continued up to two times by repeatedly pressing the key, as long as the centrifuge has not yet come to a stillstand.

If the Short key is pressed while the lid is open, one of the following two status signs will appear, depending upon the rotor recognized (see Chapter 3.16 Automatic rotor recognition): "rpm max" or "200 – rpm"

The status displays mean:

"rpm max": The inserted rotor accelerates to its nominal rotational speed.

"200 – rpm": The maximum rotational speed for the short-spin run can be set over the arrow keys.

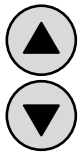
If the Short key is pressed for longer than three seconds while the centrifuge lid is open, the device will switch over to the other status and display it for two seconds. The status set last will be maintained.

3 Operating

3.8 Time change during the run

time

Press this key during the run (not during the braking phase).

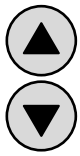


change the duration of the run. The time elapsed is taken into account in the new actual value.

3.9 Refrigeration (for 5804 R / 5810 R only)

temp

The nominal temperature value can be set from – 9 °C to + 40 °C.
It can be modified during centrifugation.



Once the nominal temperature value has been reached, a deviation greater than ± 3 °C is indicated by a flashing temperature display.

If the temperature deviates by more than 5 °C, a periodic warning signal can be heard and the centrifuge switches itself off.

fast temp

starts a temperature run at a rotor-specific speed for the best possible refrigeration. The new preselected temperature is quickly attained **in the rotor** by cooling. **FT** appears in the PROG field. The run is then ended automatically at the arrived at nominal temperature or by pressing the **Stop** key. A signal can be heard at regular intervals.
The centrifuge does not terminate the run until the rotor, carrier or rectangular bucket have reached the pre-selected temperature. The target temperature is initially measured on the chamber and then shown in the display. However, the temperature run is automatically terminated when the rotor, carrier or rectangular bucket have reached the target temperature.

Standby-refrigeration

When the lid is closed, the rotor chamber is refrigerated to the preselected nominal temperature before or after a run, as long as this value is below ambient temperature. The rotor does not turn during this procedure and the temperature changes more slowly.

If the centrifuge is not used for longer than 8 hours, or if the lid is not opened for this time, the refrigeration function switches off for safety reasons. **Standby off** appears in the display, together with the nominal temperature in the rotor chamber. The desired temperature can be reached rapidly via the **Fast Temp** function.

The standby cooling of the centrifuge can also be switched on permanently. To do this the **Temp** and **Prog** keys must be pressed simultaneously. **Standby 8h** appears in the display. Following this, the **Fast temp** must be pressed immediately in order to switch the standby cooling over into permanent operation. **Standby endless** appears in the display.

The standby cooling is automatically switched off after 8 hours in order to protect the device. The switching of standby cooling to permanent operation is carried out at own risk and can lead to overheating of the compressor.

Please empty and clean the tray for condensation water (on the right at the bottom of the device) on a regular basis.

Remove any condensation water and ice regularly from the rotor chamber using a soft, moist cloth. Defrosting is recommended for ice removal.

3 Operating

3.10 Preset radius

The internal conversion of rotational speed to RCF occurs as a standard with the largest radius
A smaller radius can be entered for another adapter.

speed

Press this key repeatedly until the radius symbol (↻) appears to the left of the SPEED display.
The radius value flashes.

▲
▼

change the values entered. The new rcf value appears three seconds (or 10 s during the stillstand) after the rotor radius has been entered.

3.11 Centrifugation with Soft start / stop

If the maximum acceleration / deceleration speed (level 9) is not desired, it is possible to set the speeds in nine different levels.

time

Press this key repeatedly until ⟋ (the symbol for the acceleration levels) appears next to the TIME display

▲
▼

Presetting the acceleration level 9 – 0.

Deceleration is set in the same way ⟍.
Braking level 0 corresponds to free deceleration.

For levels 0 – 8, the symbols ⟋ ⟍ appear in the display.

Approximate braking times for different rotors for the levels 0 to 9 (in seconds) for 230 V centrifuges

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	304	174	130	118	100	75	51	44	32	14
●	●	T-60-11	800	280	140	95	70	55	45	40	36	36
●	●	F-34-6-38	880	370	280	190	170	150	125	95	75	54
●	●	F-45-30-11	240	140	70	45	35	30	25	22	19	18
●	●	FA-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

The given times are to be considered guidelines. While level 9 means "strongest braking", level 0 means "free deceleration", whereby considerable fluctuations can occur with this uncontrolled deceleration depending upon the condition of the device and the load. The deceleration times for the 230 V and 120 V devices are almost identical.

3.12 At set rpm

The "at set rpm" function triggers a counting down of the centrifugation time upon achieving the preselected rotational speed ("at set rpm").

Pressing the START / STOP key for longer than 4 seconds while the centrifuge lid is open triggers a switching over to the "at set rpm" function. While the key is pressed, both triangles of the pictogram are illuminated in blue in an alternating sequence.
The activated "at set rpm" function is symbolized by the continuously illuminated, upper blue triangle in the pictogram .

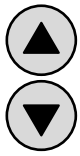
In order to leave the "at set rpm" function again, and thus to activate the countdown of the centrifugation time directly after switching on the centrifuge, press the **START** / **STOP** key while the centrifuge lid is open. The standard setting is selected again after 4 seconds, symbolized by the illumination of the lower triangle in the pictogram .

3 Operating

3.13 Preset program

Programs can only be preselected when the device is at a standstill.

Press this key **once** ➔ the program no. that has been set flashes.
0 Data from last run.
1...9, A...Z Fixed programs.



select further program numbers.

Returns to program 0 or leaves the programming mode when the lid is open.

In order to start the selected program immediately, the centrifuge lid must be closed prior to pressing the **START** / **STOP** key.

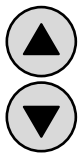
3.14 Programming

Storing a fixed program (only possible when the device is at a standstill):

It is possible to save a maximum of 35 fixed programs (1...9, A...Z).

Enter the program data to be used first by pressing the parameter keys and the arrow keys or use the data from the last run. The "at set rpm" functions and the set deceleration ramp can also be saved in a program if necessary.

Press this key **twice** ➔ the first free program no., indicated by "P...", appears in the display and flashes.



The desired free program number (1...9, A...Z) can be selected.

Hold down this key for **two seconds** until **ok** appears in the display. The previously set parameters of Temp., Speed, Time, etc. are now saved as a data set.

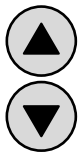
If parameters are modified during the run with a fixed program, "0" appears in the PROG field and the user exits the program without it being modified.

To exit the fixed program, call up program "0" or modify the parameters.

3.15 Write protection

In order to avoid accidental deletion of an existing fixed program, the old data set must be deleted while the lid is open prior to renewed assignment of a program number:

Press this key once ➔ the program no. display flashes.



select the program no. which is to be deleted.

Press this key within ten seconds until **cleared** appears.

3 Operating

3.16 Nominal value display

All nominal values are displayed when the centrifuge is at a standstill. During a run, all nominal values can be displayed for 2.5 seconds by pressing one of the parameter keys **(Temp, Speed, Time)**.

3.17 Automatic rotor recognition

Automatic rotor recognition occurs at the beginning of each run.
When a new rotor is recognized, the maximum rotational speed appears in the display for two seconds.
If the nominal speed set is greater than the maximum speed for the rotor used, it is aligned to the maximum speed and the run is interrupted. SPEED appears in the display and the run must be restarted.

The rotational speed and the radius for the rcf value will be reset to the maximum permitted value.

If a run with a program has been started, the program number is set to "0".

3.18 Display of elapsed spin time

time prog

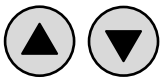
If the **Time** key and the **Prog** key are pressed simultaneously, the total running time (in hours) of the centrifuge appears in the display. This function can only be selected when the rotor is at a standstill.

3.19 Switching on/off the warning signal

speed time

Press the **Speed** and **Time** keys simultaneously. "Alarm on" and "Alarm off" appear after 2 seconds alternately in the display.

3.20 Exiting the Service program



If the Service program has been selected accidentally, press both arrow keys simultaneously.

3.21 Control via serial interface (optional)

All centrifuge functions can be operated via the serial interface (RS 232). The appropriate conversion must be carried out by the service department.

Only devices which have been tested in accordance with IEC 950 may be connected via the serial interface.

3.22 Opening the centrifuge in the case of a power failure

If the magnetic lid latch cannot be activated because of a power failure, the emergency lid release can be activated manually:

Turn off the main power switch. Wait until the rotor has come to a standstill (The rotor may continue spinning for up to eight minutes). Insert the standard rotor key into the opening in the middle of the front part in the nut underneath and turn counter-clockwise. This disengages the lid, allowing it to be opened.

Be **absolutely** sure to remove the rotor key afterwards.

3.23 Overload cutout switch / Fuses

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

To turn on the overcurrent protector switch again, please turn off the centrifuge for 10 seconds with the mains power switch. When the centrifuge is subsequently turned on again, the overcurrent protector switch will be automatically reactivated.

4 Maintenance and cleaning

4.1 Device

The outside of the centrifuge and the rotor chamber should be cleaned regularly with neutral detergent. This is for hygiene purposes as well as to prevent contamination caused by residual contamination.

The user is responsible for cleaning or decontaminating the centrifuge in the event of contamination caused by high-risk substances.

Open the lid of the centrifuge and disconnect the main power plug. Unscrew the rotor with the rotor key provided and clean separately. Only **neutral** agents may be used for cleaning and disinfection (e.g. diluted Extran® **neutral**, RBS **neutral** or 70 % isopropanol/water mixture or an alcohol-based disinfectant). The rotor chamber should only be cleaned with a moist cloth.

After cleaning with detergent, the rubber seals in the rotor chamber should be rinsed **well with water** and lubricated with glycerine in order to prevent the seals from becoming brittle.

If condensation water forms in the rotor chamber after freezing occurs, dry with a soft absorbent cloth.

The user must consult the manufacturer before cleaning or decontaminating the centrifuge using methods not recommended by the manufacturer in order to ensure that the centrifuge and accessories are not damaged. To ensure that the centrifuge functions correctly and safely in the long-term, please note that aggressive chemicals can damage the rotor, buckets and boiler. Please check the centrifuge regularly for damage caused by corrosion.

4.2 The rotors

The rotor and buckets must be cleaned regularly to prevent contamination caused by residue. Check at least the rotor and housing **monthly** for residue and corrosion. This applies in particular to the rotor bores. Please clean your rotor using a neutral cleaning liquid. This will protect the rotor and prolong its service life. As a reminder, the message "clean rotor" appears in the display of the centrifuge three times after every 200 runs.

When using the swing-bucket rotor, ensure that the grooves in which the buckets are fitted are free of contamination. The buckets can be lubricated with the lubricant (grease for pivots) supplied, although care must be taken to ensure that the buckets can still swing freely.

4.3 The aerosol-tight rotor

The sealing rings of the aerosol-tight rotor FA-45-30-11 are subject to natural wear and tear and should be replaced regularly if damaged. To protect the rotor, please ensure that the sealing rings are maintained regularly.

When handling the rotor lid, please observe the specifications regarding the chemical resistance of the materials of construction.

The cover of the aerosol-tight rotor must not be fastened tightly during storage!

4.4 Rotor sterilization

All rotors are autoclavable (121 °C, 20 min).
After the rotor has been autoclaved ten times, the lids of the aerosol-tight buckets or rotors must be exchanged.

The aerosol-tight Rotor FA-45-30-11 and the lid can be autoclaved at 142 °C for 2 hours to destroy prions, but the aerosol-tight lid must be exchanged after each autoclaving.

4 Maintenance and cleaning

4.5 Glass breakage

When centrifuging glass tubes, please observe that high speeds/rcf's increase the risk of glass breakage. Please follow the manufacturer's instructions concerning the maximum speed/rcf of centrifuge tubes. In the event of glass breakage, carefully remove all splinters and all ground glass from the rotor, the buckets, the adapters and the rotor chamber. You may need to replace the rubber mats and adapters to prevent further damage.

Fine splinters of glass may otherwise scratch the surface of the rotors and buckets, reducing their resistance to chemicals. The air turbulences within the rotor chamber produce a very fine black powder of abraded metal. In addition to causing damage to the rotor chamber, rotor, buckets and adapters, the powder also contaminates the samples.

Check the rotor bores regularly for residues and damage.

4.6 Refrigerated centrifuges

Clean the refrigeration mesh of the heat exchanger (on the rear side of the device) with a brush at least twice a year. Be sure to first switch off the centrifuge and pull the plug.

Switch off the centrifuge after use, leave the lid open and empty the tray for condensation water, situated below the device on the front right-hand side.

4.7 Return of devices

When returning centrifuges, please ensure that the devices have been decontaminated and thereby do not present a health risk to our Service staff.

You will find additional information and a blank of the decontamination confirmation at www.eppendorf.com.
Do also consult your laboratory safety officer about a suitable decontamination method.

Please fill out the decontamination confirmation and place it together with the device when it is to be sent back to Eppendorf.

5 Troubleshooting

Centrifuges 5804 / 5810 and 5804 R / 5810 R

Error	Display	Cause	Solution
No display.	**None**	No main power connection. Power failure.	Check power supply cable. Check main power fuse on the device and in the laboratory.
	clean rotor **Standby off**	200 runs. Centrifuge not used for 8 hours.	Clean rotor and drum. Open lid and then close it again.
Centrifuge does not start up.	**no rotor**	No rotor. Error in the drive or rotor recognition.	Mount rotor. Switch off the device and switch it on again.
Lid cannot be opened.	**None**	Power failure.	Bring rotor to a standstill, activate emergency lid release.
Lid not closed completely.	**Press Open** **Close Lid**	Lid latch not engaged. Lid not closed correctly.	Press **Open** and close lid again. Press down lid.
Lid does not open.	**Lift Lid**	Lid does not open automatically.	Open lid manually.
Centrifuge shakes during acceleration and switches off.	**IMBAL**	Rotor not loaded symmetrically.	Check rotor equipment and rotor load.
	ROTOR	Rotor not fastened.	Fasten rotor correctly.
		Device has been moved or work surface unstable.	Place device on stable work surface.
Centrifuge switches off.	**SPEED**	Nominal speed for rotor too high.	Enter new nominal speed.
	Error 1	Rotor is not recognized. Problem with the rotational speed measuring system.	Repeat run. If error recurs, test with another rotor.
	Error 2	Imbalance sensor damaged.	Repeat run.
	Error 3	Problem with the rotational speed measuring system.	Leave device **switched on** for 8 min, press **Open**, then open the device. Repeat run.
	Error 4	Lid latch sensor damaged.	Switch device off and then switch it on again. Repeat run.
	Error 5	Unauthorized opening of lid or lid switch damaged.	Repeat run.
	overload **or** **Error 6**	Converter overloaded. Brake defective. Voltage supply too low. Rotor becomes loose.	Allow to cool. Restart device after 5 min. Check voltage supply. Tighten rotor.
	Error 7	Overspeed.	Repeat run.
	Error 8	Rotor loose. Drive error. Motor defective.	Tighten rotor.
Centrifuge switches off. Warning signal.	**overtemp**	Temperature deviation from nominal value > 5°C.	Repeat run.
	Error 9–25	Electronics error.	
	Clear Memory	Program memory full.	Delete several programs or press **Start** or **Prog** to begin new run.
	Interrupt	Power failure during the run.	Restart.
Flashing temperature display.		Temperature deviation from nominal value > 3 °C.	

If the above solutions are unsuccessful, please contact SERVICE.

6 Technical data

Centrifuges	**5804 / 5804 R**	**5810 / 5810 R**
Power supply:	230 V / 50 or 60 Hz	230 V / 50 or 60 Hz
Maximum power requirement:		
5804 / 5810	900W	900 W
5804 R / 5810 R	1650 W	1650 W
Fuse protection:		
5804 / 5810	Excess current switch 12 A	Excess current switch 12 A
5804 R / 5810 R	Excess current switch 12 A	Excess current switch 12 A
Max. rotational speed:	14 000 rpm	14 000 rpm
Max. centrifugal force:	20 800 rcf	20 800 rcf
Max. kinetic energy:		
5804 / 5810	19 000 Nm (11 000 rpm)	19 000 Nm (11 000 rpm)
5804 R / 5810 R	19 000 Nm (11 000 rpm)	23 000 Nm (12 000 rpm)
Max. load:	4 x 100 ml	4 x 400 ml
Max. density of material to be centrifuged:	1.2 g/ml	1.2 g/ml
Permitted ambient temperature during operation:		
5804 / 5810	2 °C to 40 °C	2 °C to 40 °C
5804 R / 5810 R	15 °C to 35 °C	15 °C to 35 °C
Permitted maximum relative air humidity:	75 %	75 %
Degree of contamination	2	2
Overvoltage category	II	II
Standardized interface (optional)	RS 232 C	RS 232 C
Noise level	< 65 dB (A)	< 65 dB (A)
Dimensions (W x D x H):		
5804 / 5810	466 x 496 x 337 mm (D = 550 with operating section)	535 x 536 x 345 mm (D = 608 with operating section)
5804 R / 5810 R	634 x 496 x 342 mm (D = 550 with operating section)	700 x 536 x 345 mm (D = 608 with operating section)
Weight:		
5804 / 5810	55 kg	68 kg
5804 R / 5810 R	80 kg	99 kg

Electrical data for 120 V model		
Power supply:	120 V / 60 Hz	120 V / 60 Hz
Maximum power requirement:		
5804 / 5810	950 W	950 W
5804 R / 5810 R, 20 A version	1650 W	1650 W
5804 R / 5810 R, 15 A version	1300 W	1300 W
Fuse projection in the device:		
5804 / 5810	Excess current switch 12 A	Excess current switch 12 A
5804 R / 5810 R, 20 A version	Excess current switch 18 A	Excess current switch 18 A
5804 R / 5810 R, 15 A version	Excess current switch 15 A	Excess current switch 15 A

Technical specifications subject to change!

7 Ordering information

Centrifuge 5804	
Bench-top centrifuge, max. capacity 4 x 100 mL	
with rotational speed regulation up to 14,000 rpm	
120 V / 60 Hz, not including rotor	22622501
230 V / 50 – 60 Hz, not including rotor	22622552
Centrifuge 5804 R	
Refrigerated bench-top centrifuge, max. capacity 4 x 100 mL	
with rotational speed regulation up to 14,000 rpm	
Temperature range: – 9 to 40 °C	
120 V / 60 Hz, not including rotor	22623508
230 V / 50 – 60 Hz, not including rotor	22623559
Other voltages or 50 Hz frequency upon request.	
Captain Eppi, Rotor key holder, 1 piece	22639609
Captain Eppi, Rotor key holder, 10 pieces	22639625
Rotor stand, for all rotors for Centrifuges 5804 5804 R / and 5810 / 5810 R	22639021
Swing-bucket rotor and accessories (see brochure for further details) **for Centrifuge 5804 / 5804 R**	
Swing-bucket rotor A-4-44 (4 x 100 mL),	
with 4 rectangular buckets of 100 mL	22637401
1 rectangular bucket of 100 mL with weight category (for individual deliveries,	
please state the existing weight category)	22637410
2 aerosol-tight caps for 100 mL rectangular bucket	22637428
4 replacement seals for aerosol-tight caps of the rectangular bucket 100 mL	22637444
Adapters for standard test tubes, blood withdrawal systems and micro test tubes	
for 100 mL rectangular bucket	
(Number and diameter of bores)	
2 adapters for 3 – 5 mL test tubes (14 x 11)	22637509
2 adapters for 1.5 – 2 mL micro test tubes (12 x 11)	22637525
2 adapters for 4 – 7 mL test tubes (12 x 13)	22637541
2 adapters for 3 – 15 mL test tubes (7 x 16)	22637568
2 adapters for 7 – 17 mL test tubes (6 x 17.5)	22637584
2 adapters for 7 – 18 mL test tubes (4 x 20)	22637622
2 adapters for 12 – 30 mL test tubes (2 x 26)	22637649
2 adapters for 30 – 50 mL test tubes (1 x 31)	22637681
2 adapters for 50 – 75 mL test tubes (1 x 35)	22637703
2 adapters for 80 – 120 mL test tubes (1 x 46)	22637720
4 spare rubber mats	22662503
2 spare clamps	22662511
Adapters for Falcon® test tubes for 100 mL rectangular bucket	
(Number and diameter of bores)	
2 adapters for 15 mL Falcon® test tubes (4 x 17.5)	22637606
2 adapters for 50 mL Falcon® test tubes (1 x 31)	22637665
4 buckets for 50 mL Falcon® test tubes (2 x 31)	22637452
8 spare adapters for 50 ml Falcon® tubes as re-order	22637479
Deepwell plate rotor A-2 DWP	
with 2 DWP buckets for deepwell plates	22638564
Deepwell plate bucket with weight category for swing-bucket rotor A-2-DWP	
(individual delivery only as a replacement delivery with prior agreement)	22638572

7 Ordering information

Fixed-angle rotors and accessories (see brochure) **for the centrifuges 5804 / 5804 R 5810 / 5810 R**

Fixed-angle rotor 6 x 85 mL, type F-34-6-38 with rotor lid	22637207
Spare lid for rotor F-34-6-38	22662961
2 adapters for micro test tubes (4 x 11.5)	22637215
2 adapters for 7 – 15 mL test tubes (2 x 16.5)	22637223
2 adapters for 15 – 18 mL test tubes (1 x 18.5)	22637231
2 adapters for 20 – 30 mL test tubes (1 x 26.5)	22637240
2 adapters for 50 mL test tubes (1 x 29)	22637258
2 adapters for 50 mL Falcon® test tubes (1 x 29.5)	22637266
2 adapters for 15 mL Falcon® test tubes (1 x 17)	22637274
Fixed-angle rotor 30 x 1.5 mL, type F-45-30-11 with rotor lid	22637002
Spare lid for rotor F-45-30-11	22662970
Fixed-angle rotor 30 x 1.5 mL, type FA-45-30-11 aerosol-tight, with rotor lid of aluminium	22637100
Spare lid for rotor FA-45-30-11	22637126
6 adapters for 0.4 mL centrifuge tubes	22636243
6 adapters for 0.5 mL micro test tubes and Microtainers®	22636227
6 adapters for 0.2 mL PCR-tubes	22636260
PCR-strip rotor F-45-48-PCR for 6 x 8-strips, 6 x 5-strips, 48 x 0.2 mL PCR-tubes	22638581

Drum rotor and accessories (see brochure) **for the centrifuges 5804 / 5804 R 5810 / 5810 R**

Drum rotor T-60-11 with rotor lid, for 60 x 1.5 mL / 2 mL tubes / 120 x 0.4 mL tubes with 6 adapters for 1.5 mL /2 mL tubes	22638505
Adapter for 1.5 mL / 2 mL tubes (set of 6)	22638521
Adapter for 0.4 mL tubes (set of 6)	22638548

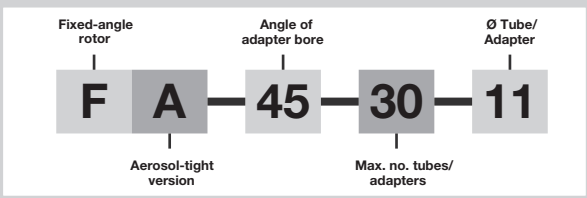
Accessories for the Centrifuges 5804 / 5804 R

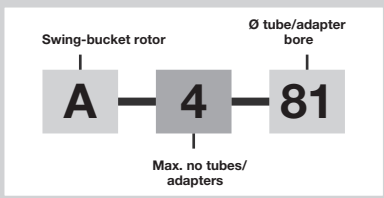
Grease for pivots	22634330
Standard rotor key	22664166
Conversion kit for interface for 5804	Upon request
Conversion kit for interface for 5804 R	Upon request
Tray for condensation water	22662678

Important note:
Please use the original accessories recommended by Eppendorf. Using spare parts or disposables which we have not recommended can reduce the precision, accuracy and life of the centrifuges.
We do not honor any warranty or accept any responsibility for damage resulting from such action.

Rotor code

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





7 Ordering information

Centrifuge 5810	
Bench-top centrifuge, max. capacity 4 x 400 mL	
with rotational speed regulation up to 14,000 rpm	
120 V / 60 Hz, not including rotor	22625004
230 V / 50 – 60 Hz, not including rotor	22625055
Centrifuge 5810 R	
Refrigerated bench-top centrifuge, max. capacity 4 x 400 mL	
with rotational speed regulation up to 14,000 rpm	
Temperature range: –9 to 40 °C	
120 V / 60 Hz, not including rotor	22625501
230 V / 50 – 60 Hz, not including rotor	22625551
Other voltages or 60 Hz frequency upon request.	
Rotor stand, for all rotors for Centrifuges 5804 5804 R / and 5810 / 5810 R	22639021
Swing-bucket rotor and accessories (see brochure for further details) **for Centrifuges 5810 / 5810 R**	
Swing-bucket rotor A-4-81 (4 x 400 mL) with 4 rectangular buckets of 400 mL	22638602
1 rectangular bucket of 400 mL with weight category (for individual deliveries, please state the existing weight category)	22638637
2 aerosol-tight caps for 400 mL rectangular bucket	22638661
Replacement cap sealings	22638670
Adapters for standard test tubes, Vacutainers and Falcons® for 400 rectangular bucket:	
2 adapters for 2.6 – 7 mL (25 x 13, number and diameter of bores)	22638700
2 adapters for 5 mL (Monovette®; 18 x 13)	22638718
2 adapters for 7 – 17 mL (16 x 17.5)	22638726
2 adapters for 5 mL Falcon® (12 x 7.5)	22638742
2 adapters for 50 mL Falcon® (5 x 31)	22638769
2 adapters for 180 - 250 mL tubes (1 x 62)	22638921
2 adapters for 400 mL (1 x 81)	22638785
2 adapters for Centriprep®, Centrifugal Filter Units (5 x 31)	22638904
Replacement adapter rubber mats	22665201
Replacement adapter clamps	22638696
2 bottles 400 mL	22638653
Swing-bucket rotor A-4-81-MTP, with 4 MTP / Flex-buckets	22638807
4 MTP / Flex-buckets for swing-bucket rotor type A-4-81-MTP or A-4-81 for use of IsoRack adapters, cell culture flasks adapters and MTP, DWP	22638840
2 MTP / Flex-buckets	22638866
1 MTP / Flex-bucket	22638882
2 adapters for each cell culture flask for use in the MTP / Flex-buckets	22639005
2 adapters for each IsoRack for 0.5 ml micro test tubes	22638980
2 adapters for each IsoRack for 1.5 and 2.0 ml micro test tubes	22638998
1 IsoRack Starter Set: 2 IsoRack adapters, 2 IsoRacks with lid, 2 x 0 °C cool packs IsoRack; for 0.5 ml and 1.5 ml/2 ml micro test tubes	22510070
Swing-bucket rotor A-4-62 (4 x 250 mL), with 4 rectangular buckets of 250 mL	22638009
1 rectangular bucket of 250 mL with weight category (for individual deliveries, please state the existing weight category)	22638025
2 aerosol-tight caps for 250 mL rectangular bucket	22638033
4 replacement seals for aerosol-tight caps	22638017

7 Ordering information

Adapters for standard test tubes, blood withdrawal symptoms and micro test tubes for 250 mL rectangular bucket (Number and diameter of bores)

2 adapters for 1.5 – 5 mL test tubes (25 x 11)	22638203
2 adapters for 1.5 – 2 mL micro test tubes (16 x 11)	22638220
2 adapters for 4 – 7 mL test tubes (15 x 13)	22638246
2 adapters for 3 – 15 mL test tubes (12 x 16)	22638262
2 adapters for 7 – 17 mL test tubes (12 x 17.5)	22638301
2 adapters for 7 – 18 mL test tubes (8 x 20)	22638327
2 adapters for 18 – 30 mL test tubes (4 x 26)	22638360
2 adapters for 30 – 50 mL test tubes (4 x 31)	22638386
2 adapters for 50 – 75 mL test tubes (2 x 35)	22638408
2 adapters for 80 – 120 mL test tubes (1 x 46)	22638424
2 adapters for 160 – 250 mL test tubes (1 x 62)	22638441
4 spare rubber mats	22638483
4 spare rubber mats for adapter 22638441	22638459
2 spare clamps	22628467

Adapters for Falcon® test tubes for 250 mL rectangular bucket (Number and diameter of bores)

2 adapters for 15 mL Falcon® test tubes (9 x 17.5)	22638289
2 adapters for 50 mL Falcon® test tubes (3 x 31)	22638343
2 adapters for 50 mL Falcon®-test tubes (4 x 31)	22638351
Swing bucket rotor 4 x 100 mL, type A-4-44, see 5804 / 5804 R and brochure	
Swing-bucket rotor A-4-62-MTP, with 4 plate carriers	22638041
4 plate carriers for swing-bucket rotor, A-4-62-MTP, for 4 plates or 1 deepwell plate	22638068
1 plate carriers for swing-bucket rotor, A-4-62-MTP with weight category (individual delivery only as a replacement delivery with prior agreement)	22638076
Deepwell plate rotor A-2 DWP with 2 DWP buckets for deepwell plates	22638564
Deepwell plate bucket with weight category for swing-bucket rotor A-2-DWP (individual delivery only as a replacement delivery with prior agreement)	22638572
Fixed-angle rotors and accessories: see 5804 / 5804 R and brochure	
Drum rotor and accessories: see 5804 / 5804 R and brochure	

Accessories for the Centrifuges 5810 / 5810 R

Grease for pivots	22634330
Standard rotor key	22664166
Conversion kit for interface for 5810	Upon request
Conversion kit for interface for 5810 R	Upon request
Tray for condensation water	22662678

Important note:
Please use the original accessories recommended by Eppendorf. Using spare parts or disposables which we have not recommended can reduce the precision, accuracy and life of the centrifuges.
We do not honor any warranty or accept any responsibility for damage resulting from such action.

Mode d’emploi succint

Les centrifugeuses 5804 / 5810 sont des modèles de paillasse non réfrigérés et les centrifugeuses 5804 R / 5810 R sont des modèles de paillasse réfrigérés. La Centrifugeuse 5804 / 5804 R / 5810 / 5810 R doit exclusivement être utilisée à l'intérieur. Elle sert à séparer les solutions et les suspensions aqueuses de différentes densités dans des tubes autorisés. Les modèles 5804 / 5804 R ont une capacité de charge maximale de 400 ml, les modèles 5810 / 5810 R de 1600 ml.

Avant de procéder à la première mise en service des centrifugeuses 5804 / 5810 et 5804 R / 5810 R, il convient de lire le mode d’emploi. Pour un aperçu complet des instructions d'emploi, nous vous recommendons de lire en outre la version en anglais (pages 5 à 25) plus complètes.

Vous trouverez ce symbole sur votre centrifugeuse, ainsi qu'à différents endroits de la notice d'utilisation. Celui-ci indique la présence de consignes de sécurité importantes. N'utiliser la centrifugeuse qu'après avoir lu ces consignes desécurité.

Instructions de sécurité

Pour la propre sécurité des utilisateurs, il convient de respecter strictement les instructions ci-après:

Les rotors et les couvercles de rotor doivent toujours être fixés conformément aux instructions.
Ne jamais centrifuger sans avoir vérifié le serrage de la fixation du rotor.

Le rotor doit uniquement être garni de manière symétrique et les tubes se trouvant les uns à côté des autres doivent être du même type et identiquement remplis.

Pour assurer la stabilisation mécanique, **tous** les emplacements des rotors A-4-44 et A-4-62 / A-62-MTP doivent être dotés des mêmes suspensions.

Avant d’effectuer la centrifugation, il convient de vérifier visuellement dans chaque cas un éventuel endommagement des récipients. Les récipients endommagés ne doivent pas être centrifugés puisque si ceux-ci se cassent, il peut y avoir outre la perte de l’échantillon d’autres dommages sur la centrifugeuse et les accessoires.

Les gobelets et les rotors qui présentent des traces nettes de corrosion ou des détériorations mécaniques, ne doivent pas être utilisés. Veuillez contrôler régulièrement les accessoires.

Les centrifugeuses qui n‘ont pas été installées ou remises en état par des spécialistes ne peuvent pas être utilisées.

La centrifugeuse ne peut pas être déplacée ni secouée au cours du fonctionnement.

Les réparations ne peuvent être effectuées que par le service après-vente autorisé par la société Eppendorf.

Seuls des pièces de rechange et des rotors d‘origine de la société Eppendorf peuvent être insérés.

Les centrifugeuses 5804 / 5804 R ou 5810 / 5810 R ne peuvent être utilisés que pour les cas indiqués d’utilisation. Elles ne doivent pas être utilisées dans des endroits soumis à un risque d’explosion, des matières explosives ou hautement réactives ne doivent pas être centrifugées.

La densité de 1,2 g/ml ne peut pas être dépassée lors de la centrifugation à régime maximal.

En cas de durée plus longue de fonctionnement dans les centrifugeuses non réfrigérées 5804 / 5810, les récipients d’échantillonnage se réchauffent. Les données limites spécifiées par le fabricant des récipients à propos de la charge admissible doivent être respectées.

En cas d’utilisation de solvants organiques (par ex. chloroforme), la solidité des récipients en plastique peut être diminuée.

En cas de passage du chambre réfrigérée à un laboratoire normal, soit la centrifugeuse doit être préchauffée 1/2 heure dans la chambre réfrigérée soit elle doit se réchauffer au moins pendant 3 heures dans le laboratoire et ne doit pas être raccordée au secteur avant d’éviter des dommages en raison du condensat.

Les rotors sont des composants de qualité supérieure devant résister à des charges extrêmes. Les rotors en aluminium sont protégées très largement contre la corrosion de produits chimiques courants des laboratoires grâce à une couche anodisée, cette protection n’est cependant pas illimitée. Veuillez protéger les rotors des détériorations mécaniques. Même de légères fissures ou rayures peuvent entraîner des détériorations internes graves du matériel qui sont visuellement difficilement reconnaissables, voire même complètement non reconnaissables.

Veuillez éviter de réduire leur protection par des produits chimiques agressifs, par exemple: des alcalis forts et faibles, des acides forts, des solutions contenant des ions de mercure, de cuivre et d’autres métaux lourds, de l’hydrocarbure chlorée, des solutions salées concentrées.

Mode d'emploi succint

Lors de manipulation de liquides toxiques ou marqués sur un plan radioactif ou de germes pathogènes du groupe de risques II (voir World Health Organization: "Laboratory Biosafety Manual") les réglementations nationales correspondantes doivent être respectées.

En cas d'impuretés dues à des solutions agressives, veuillez nettoyer immédiatement le rotor **immédiatement** à l'aide d'un produit de rinçage neutre. Ceci est en particulier valable pour les alésages des rotors à angle fixe et les gobelets.

Les rotors et les godets/nacelles correspondants ont une durée de vie maximale de 7 ans; la date de fabrication est gravée sous le format 10/98, qui signifie octobre 1998:

A-4-44	5804 730.003	A-4-62-MTP	5810 711.002
A-2-DWP	5804 740.009	T-60-11	5804 730.003
F-34-6-38	5804 727.002	A-4-81	5810 718.007
A-4-62	5810 709.008	A-4-81-MTP	5810 725.003

Les couvercles des rotors et les capuchons des gobelets rectangulaires en PC* ou en PP* ont une durée de vie de 3 ans. La date de fabrication est gravée sous la forme d'une horloge .

Les couvercles transparents peuvent perdre de leur solidité sous l'effet de solvants organiques (phénol, chloroforme). Veuillez contrôler régulièrement si de tels couvercles ne présentent pas de corrosion chimique ou de petites fissures. Les couvercles présentant des fissures ou des décolorations laiteuses doivent être immédiatement remplacés.

Les rotors, couvercles ou nacelles qui sont endommagés sous l'effet de réactions chimiques ou mécaniques ou qui ont dépassé leur durée de vie maximale ne peuvent plus être utilisés!

* PC = Polycarbonate; PP = Polypropylène

Installation

Ne concerne que le modèle 5804 R / 5810 R: attendre au moins 4 heures avant la première mise sous tension de la centrifugeuse pour éviter d'endommager le groupe compresseur et qui serait la conséquence d'un transport non conforme.

- La tension et la fréquence du réseau doivent correspondre aux données fournies sur la plaque du fabricant de l'appareil.
- Placer la centrifugeuse sur une surface horizontale, stable et exempte de résonance. (en cas de forte vibration du support, le dispositif de sécurité anti-balourd peut être rendu inactif)
- S'assurer d'une bonne ventilation de l'environnement de la centrifugeuse et éviter toute incidence solaire directe.
- Respecter un espace libre d'au moins 15 cm sur les côtés de la centrifugeuse, et de 10 cm à l'arrière.
- Selon les recommandations de la norme EN 61010-2-020, il convient de marquer et de respecter un espace libre de sécurité de 30 cm tout autour de la centrifugeuse. Cet espace devra être interdit à tout objet susceptible de comporter un risque par sa destruction.
- Raccorder la centrifugeuse au secteur et la mettre sous tension par le commutateur principal.
- Actionner la touche **open** pour ouvrir le capot.

Avant de démarrer la machine, mettre en place le rotor et le serrer fermement à l'aide de la clé du rotor.
Les rotors A-4-81 et A-4-81-MTP sont serrés fermement avec la clé spéciale du rotor faisant partie des éléments livrés avec les rotors.

Chargement du rotor

(Il convient de respecter les indications fournies dans le guide des accessoires)

Concernant le rotor libre:

: vérifier **le bon positionnement** des nacelles ainsi que la liberté de leur mouvement d'oscillation

Pour garantir la stabilité de l'ensemble pour les rotors A-4-44 et A-4-62 / A-4-62-MTP, **toutes** les places doivent être occupées par des nacelles identiques. Par contre, pour le rotor A-4-81 / A-4-81-MTP, un équipement mixte de gobelets rectangulaires et de plaques en titre suspendues est possible.
Lorsque des tubes de hauteur supérieure à 100 mm sont utilisés, il est impératif de vérifier manuellement et à vide leur possibilité d'oscillation.

Mode d'emploi succint

Eléments de fonction et de commande

(déplier la première et dernière page de couverture)

Fig. 1: Cadran et clavier de commande 5804 / 5810 (non-réfrigérée).
Fig. 2: Cadran et clavier de commande 5804 R / 5810 R (réfrigérée).

prog , time , speed , Pictogramme des touches utilisées pour activer une fonction.

speed
Active la consigne vitesse: le message **SPEED** clignote.
Active la commutation vers le message RZB de l'accélération relative g (✱) ou du correcteur du rayon (↻).

▲ ▼
Modifie les valeurs numériques: le cadran indique la nouvelle valeur de consigne.

time
Active la présélection du temps, 1 – 99 min. ou marche continue; au cadran: **00.**
Active la programmation des phases d'accélération et de freinage, voir tableau ⌐ ¬ .

temp
Active la présélection de la température pour la centrifugation et pour la réfrigération en attente. Gamme de températures: – 9 °C à + 40 °C.

start stop
Permet le démarrage de la centrifugation. ■ Clignote et indique que le rotor tourne.
Démarre la reconnaissance manuelle du rotor.
Arrête la marche.
Interrompt la programmation en cours (escape).
Efface le programme sélectionné.

fast temp
Démarre une réfrigération initiale rapide avec une vitesse de rotation spécifique.
S'arrête dès l'obtention de la température de consigne: ➔ émission d'un signal sonore périodique.

prog
Active le programme en mémoire.
Démarre une nouvelle programmation (P1...P9, PA...PZ).

Démarre des centrifugations courtes. Maintenir la touche short appuyée pour maintenir la centrifugation en marche. L'inscription "**SH**" s'affiche à l'écran.

at set rpm
"At set rpm" entraîne un décomptage de la durée de la centrifugation lorsque le régime présélectionné est atteint (« at set rpm »). En appuyant sur la touche START / STOP pendant plus de 4 s lorsque le couvercle de la centrifugeuse est ouvert, cela entraîne une commutation sur la fonction "at set rpm".

Réfrigération d'attente
Le couvercle du capot étant fermé, l'intérieur du bol du rotor sera réfrigéré soit avant, soit après une centrifugation jusqu'à la température de consigne, si celle-ci se situe en dessous de la température ambiante.

Sélection du programme

(possible uniquement à l'arrêt de la machine)

prog
Actionner **une fois** ➔ le numéro du programme clignote.
0 Données de la dernière marche.
1...9, A...Z Programme fixe.

▲ ▼
Sélectionner le numéro du programme souhaité.

start stop
Avec le couvercle de la centrifugeuse ouvert, l'appareil revient au programme 0 et quitte le mode de programmation. Pour commencer le programme sélectionné, le couvercle de la centrifugeuse doit être fermé avant d'appuyer sur la touche **START** / **STOP**.

Mode d’emploi succint

Programmation

(possible uniquement à l’arrêt de la machine)

Permet d’abord de composer le programme en utilisant les touches paramètre et les touches fléchées.

Actionner **deux fois** ➔ le premier n° de programme libre et disponible se manifeste par le message "P..." qui clignote.

Le numéro du programme libre souhaité (1...9, A...Z) peut être sélectionné.

Maintenir la touche activée pendant **2 s** jusqu’à l’apparition de "OK".
Les paramètres réglés précédemment (Temp (temp), Speed (vitesse), Time (durée), etc.) sont à présent mémorisés.

Interrompt la programmation en cours (escape).

Si certains paramètres sont modifiés en cours de marche, "O" apparaît dans la zone programme, et l’utilisateur quitte le programme sans que celui-ci soit modifié (protection de l’écriture du programme).

Pour éviter d'effacer un programme par inadvertance, les données précédentes devront être annulées avant d'assigner de nouvelles données à une mémoire programme, avec le couvercle de la centrifugeuse ouvert.

Actionner une fois ➔ la zone N de programme clignote.

Appeler le N° de programme à effacer.

Maintenir en action dans les prochaines dix secondes jusqu’à apparition du message **cleared** (effacé).

Ouverture de la centrifugeuse en cas de coupure de courant

Mettre la touche secteur en position arrêt. Attendre éventuellement l’arrêt complet du rotor.
Introduire la clé du rotor dans l’orifice situé au milieu de la façade. La positionner dans la vis qui s’y trouve, tourner en sens anti-horaire, à gauche. Le capot sera ainsi déverrouillé et pourra être ouvert.
Retirer **impérativement** la clé du rotor.

Nettoyage

L’appareil

L’extérieur de la centrifugeuse ainsi que l’intérieur du bol du rotor peuvent être nettoyés à l’aide d’une solution détergente neutre:

Nettoyer de temps à autre le rotor, les nacelles et les béchers de manière à éliminer les souillures et d’éventuels dépôts qui risqueraient d’endommager les matériaux. Les seuls produits de nettoyage admis sont les produits nettoyants et désinfectants neutres (exemples: Extran® ou solution eau/éthanol à 70 %). L’intérieur du bol du rotor ne devra être nettoyé qu’à l’aide d’un tissu doux et légèrement humidifié.

Après chaque nettoyage au détergent, les joints caoutchouc de l’intérieur du bol du rotor seront **bien rincés à l’eau**, ensuite traité à la glycérine.

En cas de dépôt de condensats à l’intérieur du bol du rotor, sécher avec un chiffon doux et absorbant.

Mode d’emploi succint

Rotor

Il est interdit d’utiliser des rotors ou des béchers endommagés ou ayant subi une corrosion.

Le rotor comporte un anneau magnétique permettant son identification et le contrôle du régime. Il est fixé à la base de ce rotor. En cas d’endommagement, il devra être remplacé en atelier par un personnel qualifié.

Les rotors libres devront subir une attention particulière en veillant à la stricte propreté des articulations recevant les nacelles et les béchers. Elles devront être nettoyées et lubrifiées à l’aide de la graisse pour articulation fournie avec l’appareil. Les nacelles doivent pouvoir osciller librement.

Le rotor anti-aérosols ne devra jamais être entreposé avec son couvercle serré à fond.

Bris de verre

Lors de la centrifugation de tubes en verre, il faut savoir que le risque de bris de verre s'accroît au fur et à mesure que la vitesse de rotation ou de centrifugation augmente. Veuillez respecter les indications du fabricant relatives à la charge maximale des tubes de centrifugation.

En cas de bris de verre, veuillez retirer immédiatement tous les éclats et le verre pulvérisé du rotor, des tubes, des adaptateurs et de l'espace de la centrifugeuse. Eventuellement, les plaques en caoutchouc et les adaptateurs doivent être changés, pour éviter davantage de dégâts.

Sinon, les petits bris de verre rayent la surface des rotors et des béchers, et leur compatibilité chimique s'en trouve ainsi réduite. Dans l'espace de centrifugation, des déchets d'abrasion de métal très fins, noirs apparaissent, qui provoquent, outre des dommages sur la centrifugeuse, les rotors, les béchers et les adaptateurs, également une contamination des échantillons.

Veuillez contrôler régulièrement qu'il ne se trouve pas de résidus ou de dommages sur les alvéoles des rotors.

Renvoi d’appareils

Lors du renvoi de centrifugeuses, veuillez prendre garde à ce que les appareils soient entièrement décontaminés et qu’ainsi, ils ne présentent aucun risque pour la santé de notre personnel d’entretien.

Vous trouverez d’autres informations et un modèle de l’attestation de décontamination sous www.eppendorf.com. Pour obtenir des renseignements à propos de la méthode de décontamination appropriée, veuillez-vous adresser également au responsable de la sécurité de votre laboratoire.

Veuillez remplir l’attestation de décontamination et joignez-la complétée à l’appareil lorsque celui-ci doit être renvoyé à la société Eppendorf.

Mode d'emploi succint

Tableau d'identification des anomalies

Centrifugeuses 5804 / 5804 R / 5810 / 5810 R

Anomalie	Message	Cause	Remède
Absence message.	**absent**	Problème de raccordement.	Vérifier raccordement secteur.
		Alimentation défectueuse.	Vérifier fusibles sur appareil et sur tableau d'alimentation du laboratoire.
Centrifugeuse ne démarre pas.	**Error 3** **Error 23**	Absence rotor. Problème sur entraînement ou sur le dispositif de reconnaissance du rotor.	Installer un rotor. Faire une manoeuvre arrêt/marche.
Capot impossible à ouvrir.	**absent**	Coupure secteur.	Attendre l'arrêt du rotor et ouvrir manuellement le capot.
Fermeture incomplète du capot.	**Press Open**	Capot non verrouillé.	Actionner touche **Open**, puis refermer le capot.
Capot bloqué.	**Lift Lid**	Le capot ne s'ouvre pas de lui-même.	Soulever le capot.
Forte vibration de la centrifugeuse au démarrage, puis arrêt.	**IMBAL**	Chargement dissymétrique du rotor.	Vérifier les dispositions des tubes et leur chargement.
	ROTOR	Rotor desserré.	Serrer fermement le rotor conformément aux instructions.
		Machine bousculée, support de base non stable.	Poser la centrifugeuse sur un support stable.
Centrifugeuse s'arrête.	**SPEED**	Régime de consigne trop élevé.	Programmer une vitesse compatible.
	Error 1	Défaut de reconnaissance du rotor.	Relancer la machine; si même message, changer de rotor.
	Error 2	Détecteur de balourd défectueux.	Refaire essai.
	Error 3	Défaut dans le système compte-tours.	Laisser reposer la machine sous tension pendant 8 min. et attendre que le témoin **Open** s'allume, **puis ouvrir**. Refaire essai.
	Error 4	Détecteur de verrouillage du capot défectueux.	Faire une manoeuvre arrêt/marche; Refaire essai.
	Error 5	Ouverture du capot non compatible ou commutateur de capot défectueux.	Refaire essai.
	overload ou **Error 6**	Convertisseur en surcharge frein défectueux. Rotor défait.	Refaire essai après 5 min. Resserrer rotor.
	Error 7	Surrégime.	Refaire essai.
	Error 8	Rotor défait. Défaut dans l'entraînement. Moteur défectueux.	Resserrer rotor.
	Error 9–25	Pannes d'électronique.	
La centrifugeuse s'arrête avec émission d'alarme sonore.	**overtemp**	Écart de température supérieur à 5 °C.	Refaire essai.
	Clear Memory	Mémoire programme saturée.	Effacer certains programmes.
Température clignotante.		Écart de température > 3 °C sur la consigne.	

Si aucune des mesures préconisées ci-dessus ne devait porter de remède aux anomalies, il convient de faire appel au service après-vente Eppendorf.

Instrucciones breves

Las centrífugas 5804 / 5810 son centrífugas de mesa sin refrigerar y las 5804 R / 5810 R son centrífugas de mesa refrigeradas. La Centrífuga 5804 / 5804 R / 5810 / 5810 R está determinada exclusivamente para la utilización en espacios interiores y sirve para la separación de soluciones acuosas y suspensiones de diferente densidad en tubos de muestras autorizados. Los modelos 5804 / 5804 R tienen una capacidad volumétrica máxima de 400 ml, y los modelos 5810 / 5810 R una capacidad máxima de 1.600 ml.

¡Antes de poner el aparato en marcha por primera vez, leer el manual de instrucciones! Para obtener una visión general más completa del manejo, es recomendable leer además la versión en inglés, más detallada, (páginas 5 a 25).

La guía de accesorios del anexo forma parte de las presentes instrucciones de servicio.

Este signo lo encontrará en la centrífuga, así como en varios puntos de estas instrucciones de servicio. Los textos marcados de esta manera se refieren a indicaciones relevantes para la seguridad. Únicamente debe utilizar la centrífuga si ha leído estas indicaciones de seguridad.

Indicaciones de seguridad

En interés de su propia seguridad, por favor, tenga en cuenta las siguientes disposiciones:

El rotor y su tapa tienen que estar siempre sujetos de acuerdo con las normas.
Únicamente debe centrifugarse con el rotor firmemente apretado.

El rotor sólo debe equiparse simétricamente; los recipientes que se encuentren unos frente a otros deben ser del mismo tipo y estar igual de llenos.

Por razones de estabilización mecánica, **todas** las posiciones de los rotores A-4-44 y A-4-62 / A-4-62-MTP tienen que estar equipadas con dispositivos suspensores del mismo tipo.

Antes de proceder a la centrifugación, deben inspeccionarse siempre visualmente los recipientes para identificar posibles daños materiales. Los recipientes deteriorados no deben centrifugarse, ya que su rotura, además de la pérdida de la muestra, podría tener como consecuencia mayores daños en la centrífuga y los accesorios.

No deben emplearse vasos ni rotores que presenten claros signos de corrosión o deterioros mecánicos. Por favor, controle los accesorios con regularidad.

No se deben poner en funcionamiento centrífugas no instaladas o no reparadas adecuadamente.

Durante el funcionamiento, no debe moverse ni golpearse la centrífuga.

Los trabajos de reparación sólo debe realizarlos el personal de servicio autorizado por la empresa Eppendorf.

Sólo deben emplearse piezas de recambio y rotores originales de la empresa Eppendorf.

Las centrífugas 5804 / 5804 R y 5810 / 5810 R deben emplearse únicamente para los casos de aplicación indicados. No deben ponerse en funcionamiento en locales con riesgo de explosión, y no deben centrifugarse sustancias explosivas ni de reacción fuerte.

No debe sobrepasarse la densidad de 1,2 g/ml en el material a centrifugar al número de revoluciones máximo.

En caso de tiempos de marcha prolongados en las centrífugas 5804 / 5810 no refrigeradas se calentarán los recipientes de muestras. Deben respetarse los datos límite especificados por el fabricante del recipiente en lo que se refiere a la capacidad de carga.

Si se emplean disolventes orgánicos (p. ej. Cloroformo), la resistencia de los recipientes de plástico puede disminuir.

Cuando se cambie de una sala refrigerada a una sala normal de laboratorio, la centrífuga debe o bien funcionar para calentarse durante 1/2 h en la sala refrigerada, o bien calentarse como mínimo durante 3 horas en la sala de laboratorio sin conectarse a la red, con el fin de evitar daños debidos a la condensación.

Los rotores son componentes de alta calidad que deben resistir cargas extremas. Los rotores de aluminio están protegidos ampliamente contra la corrosión producida por las sustancias químicas habituales en los laboratorios mediante una capa de anodización; sin embargo, esta protección no es ilimitada. Por favor, proteja los rotores frente al deterioro mecánico. Incluso los pequeños arañazos y grietas pueden producir graves daños internos al material que a simple vista son muy difíciles o incluso imposibles de detectar.

Por favor, evite la debilitación debida a sustancias químicas agresivas, entre las que se encuentran: álcalis fuertes y débiles, ácidos fuertes, soluciones con iones de mercurio, de cobre y de otros metales pesados, hidrocarburos clorurados, soluciones salinas concentradas.

Al manipular líquidos marcados como tóxicos o radiactivos o gérmenes patógenos del grupo de riesgo II (ver Organización Mundial de la Salud: "Laboratory Biosafety Manual" - Manual de bioseguridad en laboratorios), deben observarse las respectivas disposiciones nacionales.

Instrucciones breves

En caso de contaminación por medios agresivos, por favor, limpie el rotor inmediatamente con un detergente neutro. Esto es especialmente válido para los orificios de los rotores de ángulo fijo y los vasos.

Los siguientes rotores y los correspondientes vasos / dispositivos suspensores tienen una vida útil máxima de 7 años; la fecha de fabricación está estampada en forma 10/98 = oct 1998:

A-4-44	5804 730.003	A-4-62-MTP	5810 711.002
A-2-DWP	5804 740.009	T-60-11	5804 730.003
F-34-6-38	5804 727.002	A-4-81	5810 718.007
A-4-62	5810 709.008	A-4-81-MTP	5810 725.003

Las tapaderas de rotores, así como las caperuzas de los vasos rectangulares de PC o PP*, tienen una vida útil de 3 años. La fecha de fabricación está estampada en forma de reloj  .

Las caperuzas transparentes pueden perder su resistencia debido al efecto de los disolventes orgánicos (fenol, cloroformo). Por favor, controle periódicamente dichas caperuzas con respecto a ataques químicos o pequeñas grietas. Las caperuzas con grietas o con coloraciones lechosas deben sustituirse inmediatamente.

¡No deben volver a utilizarse los rotores, las tapas, las caperuzas ni los dispositivos suspensores que estén deteriorados debido a efectos químicos o mecánicos, o que hayan superado su vida útil!

* PC = Policarbonato; PP = Polipropileno

Instalación del aparato

Sólo para el modelo 5804 R / 5810 R: Para evitar averías en el compresor debido a un transporte inadecuado, el aparato sólo debe conectarse cuando hayan transcurrido 4 horas desde la instalación. La tension et la fréquence du réseau doivent correspondre aux données fournies sur la plaque du fabricant de l'appareil.

- La tensión y frecuencia de red tienen que coincidir con los datos indicados en la placa de características del aparato.
- Coloque la centrífuga en una mesa de laboratorio horizontal, estable y sin vibraciones (las vibraciones fuertes de la mesa de laboratorio pueden dejar fuera de servicio el interruptor de desequilibrio).
- El ambiente debe estar bien ventilado y protegido de los rayos solares.
- Debe mantenerse una distancia de 15 cm a ambos lados y de 10 cm por detrás de la centrífuga.
- Según recomienda la norma EN 61010-2-020, durante la centrifugación debe haber marcada una distancia de seguridad de 30 cm alrededor de la centrífuga; en este espacio no deben encontrarse objetos cuya destrucción pudiera causar daños.
- Enchufe la centrífuga a la red y conecte el interruptor principal.
- La tapa de la centrífuga se abre pulsando la tecla **Open.**

Antes del inicio, por favor, coloque el rotor y apriételo con la llave del rotor. Los rotores A-4-81 y A-4-81-MTP se aprietan con la llave especial del rotor que se incluye en el suministro de los rotores.

Funcionamiento

(Tenha em atenção os dados constantes do guia da centrífuga)

Carga de los rotores

Para los rotores basculantes, se aplica:

: Compruebe si todos los dispositivos suspensores están colgados completamente y pueden bascular con total libertad.

Por razones de estabilización mecánica, en el caso de los rotores A-4-44 y A-4-62 / A-4-62-MTP, todas las posiciones tienen que estar ocupadas por dispositivos suspensores del mismo tipo. Por el contrario, en el caso del rotor A-4-81 / A-4-81-MTP es posible una ocupación mixta con vasos rectangulares y dispositivos suspensores de placas Titer.
¡Si se utilizan tubos muy largos (más de 100 mm de longitud), es imprescindible realizar un test de basculación manual con contenedores vacíos!

Instrucciones breves

Elementos de funcionamiento y control

(Consultar la página desplegable de este manual)

Fig. 1: Pantalla y panel de control del modelo 5804 / 5810 (no refrigerada).
Fig. 2: Pantalla y panel de control del modelo 5804 R / 5810 R (refrigerada).

prog , time , speed , etc. indican teclas que se utilizan para activar funciones.

speed	Activa la preselección de la velocidad: En la pantalla parpadea **SPEED** (velocidad). Activa cambio a visualización FCR (✱) o a la corrección del radio (↻).
▲ ▼	Modifica los valores: En el campo de indicación aparece el nuevo valor nominal.
time	Activa la preselección del tiempo, 1 – 99 min o funcionamiento continuo: Pantalla **00**. Activa la programación de los niveles de aceleración y frenado ⟋ ⟍ .
temp	Activa la preselección de la temperatura de centrifugación y la refrigeración en standby. Rango de temperaturas: de – 9 °C a + 40 °C.
start stop	Inicia la centrifugación. ■ parpadea y muestra la rotación del rotor. Inicia la identificación manual del rotor. Detiene la centrifugación; Interrumpe el programa en curso (escape). Borra el programa seleccionado.
fast temp	Inicia una regulación rápida de la temperatura a la velocidad específica del rotor. Finaliza al llegar a la temperatura nominal: ➔ Señal acústica intermitente.
prog	Activa el programa memorizado. Inicia la nueva programación (P1...P9, PA...PZ). Inicia la marcha breve. Mantener pulsada la tecla Short durante el tiempo que debe durar la marcha. En la pantalla aparece el letrero "**SH**".
"at set rpm"	"At set rpm" produce una cuenta atrás del tiempo de centrifugado al alcanzarse el número de revoluciones preseleccionado ("at set rpm"). Si se pulsa la tecla START / STOP durante más de 4 s con la tapadera de la centrífuga abierta se produce una conmutación a la función "at set rpm".
Refrigeración en standby	Con la tapa cerrada, la cámara del rotor se refrigera antes o después de una centrifugación a la temperatura nominal preseleccionada, en tanto en cuanto esta temperatura esté por debajo de la temperatura ambiente.

Selección de un programa

(sólo es posible cuando la centrífuga está parada)

prog	confirmar una vez; parpadea el número de programa ajustado. 0 datos del último funcionamiento. 1...9, A...Z programas fijos.
▲ ▼	Seleccionar el número de programa deseado.
start stop	con la centrífuga abierta regresa al programa 0, o sale del modo de programación. Para iniciar el programa seleccionado debe cerrarse la tapa de la centrífuga antes de pulsar la tecla **START** / **STOP**.

Instrucciones breves

Programación

(sólo es posible cuando la centrífuga está parada)

En primer lugar, introducir los datos de programa deseados utilizando las teclas de parámetros y las teclas cursoras.

Pulsar dos veces ➔ en la pantalla aparece con "P..." el primer número de programa libre y parpadea.

se puede seleccionar el número de programa libre deseado (1...9, A...Z).

Mantener pulsada esta tecla durante **2 segundos** hasta que aparezca "ok" en la pantalla. Los parámetros ajustados previamente Temp., Speed, Time, etc. están ahora guardados como grupo de datos.

Interrumpe la programación en curso (escape).

Si durante la centrifugación con programas fijos se modifican los parámetros, en el campo PROG aparece la indicación "0" y el usuario sale del programa sin que quede modificado (protección contra sobreescritura).

Para evitar borrar por error un programa existente, en caso de que la tapa de la centrífuga esté abierta, antes de asignar nuevos datos a un número de programa debe borrarse el grupo de datos antiguo:

Pulsar una vez ➔. La pantalla número de programa parpadea.

Selección del número de programa a borrar.

Mantener pulsada esta tecla durante 2 segundos, hasta que aparezca la palabra cleared (borrado).

Apertura de la centrífuga en caso de fallo del suministro eléctrico

(apertura de emergencia)

Desconectar el interruptor de red. Debido a que el rotor podría seguir funcionando, esperar a que el rotor se pare.
Introducir la llave del rotor en la tuerca debajo del orificio situado en el centro de la parte frontal de la centrífuga y girar en el sentido contrario a las agujas del reloj. La tapa se desbloquea y se puede abrir.
A continuación, sacar obligatoriamente la llave del rotor.

Limpieza

Aparato

La superficie exterior de la centrífuga y la cámara del rotor pueden limpiarse con un detergente neutro:

De vez en cuando, deben limpiarse el rotor y los vasos, con el fin de evitar que los restos del material centrifugado provoquen modificaciones en el material. Para la limpieza y la desinfección deben emplearse únicamente agentes neutros (por ejemplo Extran® o etanol al 70 %). La cámara del rotor debe limpiarse únicamente con un paño húmedo.

Después de la limpieza con detergente, las juntas de goma de la cámara del rotor deben enjuagarse bien con agua y frotarse con glicerina.

En caso de que se produzca condensación de agua en la cámara del rotor, séquela con materiales absorbentes suaves.

Instrucciones breves

Rotor

No deben emplearse rotores deteriorados ni corroídos.

El anillo magnético fijado en la parte inferior de cada rotor, para la identificación del rotor y el control del número de revoluciones, debe sustituirlo el servicio técnico en caso de que se produzca algún deterioro.

Cuando se utilicen rotores basculantes, asegurarse de que las ranuras y los pivotes de los contenedores están limpios y engrasados con la grasa para pivotes suministrada, de tal forma que los contenedores puedan bascular con total libertad.

¡El rotor antiaerosol no debe guardarse con la tapa apretada!

Rotura de vidrios

Para el centrifugado de tubos de vidrio se debe tener en cuenta que si aumenta el número de revoluciones o la aceleración centrífuga relativa, crece el peligro de rotura del vidrio. Por favor, tenga en cuenta las instrucciones del fabricante sobre la carga máxima de tubos de centrífuga.

Si se produce una rotura de vidrio, por favor extraiga todos los fragmentos y polvo de vidrio del rotor, los contenedores, los adaptadores y la cámara de centrifugación. En caso necesario, deben cambiarse por otros nuevos las placas de goma y el adaptador para evitar daños posteriores.

De lo contrario los fragmentos finos de vidrio arañan la superficie del rotor y los contenedores, con lo que disminuye su resistencia a las sustancias químicas. En la cámara de centrifugación, y debido a los remolinos de aire, se forma una abrasión metálica negra muy fina, que además de daños en la cámara de centrifugación, el rotor, los contenedores y el adaptador, origina también impurezas en las muestras.

Por favor, revise regularmente los orificios del rotor en cuanto a residuos y daños.

Devolución de aparatos

Por favor, para devolver las centrífugas preste atención a que los aparatos estén completamente descontaminados, con el fin de que no representen ningún riesgo para la salud de nuestro personal de servicio.

En www.eppendorf.com. hallará más información y un impreso de confirmación de descontaminación. Para un método de descontaminación adecuado consulte también con los responsables de seguridad de su laboratorio.

Por favor, rellene la confirmación de descontaminación y acompáñela con el aparato en caso de que éste deba ser devuelto a Eppendorf.

Esquema para la localización de fallos

Centrifugeuses 5804 / 5804 R y 5810 / 5810 R

Error	Pantalla	Causa	Eliminación
En la pantalla no aparece nada.	**Nada**	No se ha enchufado a la red.	Controlar el cable de red.
		Fallo en el suministro eléctrico.	Comprobar el fusible del aparato y del laboratorio.
	CLEAn ro	200 marchas.	Limpiar el rotor y el recipiente.
	Standby off	8 h no utilizado.	Abrir la tapa y volverla a cerrar.
La centrífuga no centrifuga.	**no rotor**	No hay rotor.	Colocar un rotor.
		Fallo en el accionamiento o en la identificación del rotor.	Desconectar la máquina y volver a iniciarla.
No se puede abrir la tapa.	**Nada**	Fallo en el suministro eléctrico.	Dejar que el rotor se detenga y activar la apertura de emergencia de la tapa.
La tapa no se cierra totalmente.	**Press Open**	La tapa no está bloqueada.	Pulsar la tecla **Open** y a continuación cerrar de nuevo la tapa.
La tapa no se abre.	**Lift Lid**	La tapa no se abre automáticamente.	Abrir la tapa manualmente.

Instrucciones breves

Error	Pantalla	Causa	Eliminación
La centrífuga vibra durante la puesta en marcha y se desconecta.	**IMBAL**	El rotor no se ha cargado simétricamente.	Controlar el equipamiento y la carga del rotor.
	ROTOR	El rotor no se ha apretado bien.	Apretar bien el rotor.
		La máquina ha recibido un golpe, la mesa es inestable.	Colocar la máquina sobre una mesa fija.
La centrífuga se desconecta.	**SPEED**	Velocidad nominal demasiado alta para el rotor.	Controlar el equipamiento y la carga del rotor.
	Error 1	No se reconoce el rotor.	Repetir la centrifugación y, en caso de que se vuelva a producir el error, comprobar con otro rotor.
	Error 2	Sensor de desequilibrio averiado.	Repetir la centrifugación.
	Error 3	Avería en el sistema de medición de la velocidad de rotación.	Dejar el aparato conectado durante 8 min hasta que se encienda la tecla **Open** y abrir la centrífuga a continuación. Repetir la centrifugación.
	Error 4	Sensor de bloqueo de la tapa averiado.	Desconectar la máquina y volverla a conectar. Repetir la centrifugación
	Error 5	Apertura improcedente de la tapa o interruptor de la tapa averiado.	Repetir la centrifugación.
	overload o **Error 6**	Convertidor sobrecargado. Freno defectuoso.	Dejar enfriar y volver a iniciar al cabo de 5 min.
		Tensión de red demasiado baja.	Comprobar la tensión de red.
		Se ha aflojado el rotor.	Apretar el rotor.
	Error 7	Exceso de revoluciones.	Repetir la centrifugación.
	Error 8	Rotor suelto. Fallo en el accionamiento. Motor defectuoso.	Apretar el rotor.
La centrífuga se desconecta y se escucha una señal de alarma.	**overtemp**	Diferencia de temperatura > 5 °C respecto al valor nominal.	Repetir la centrifugación.
	Error 9–25	Fallo del sistema electrónico.	
	Clear Memory	Memoria para programas llena.	Borrar algunos programas o iniciar una nueva centrifugación mediante Start o Prog.
	Interrupt	Fallo del suministro eléctrico durante la centrifugación.	Reiniciar.
El indicador de temperatura parpadea.		Diferencia de temperatura > 3 °C respecto al valor nominal.	

Si las soluciones indicadas para la eliminación de la avería no diesen resultado después de aplicarlas repetidamente, por favor, póngase en contacto con el SERVICIO TÉCNICO.

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