Concentrator 5301

Bedienungsanleitung · Instruction Manual · Mode d’emploi

eppendorf

Concentrator 5301

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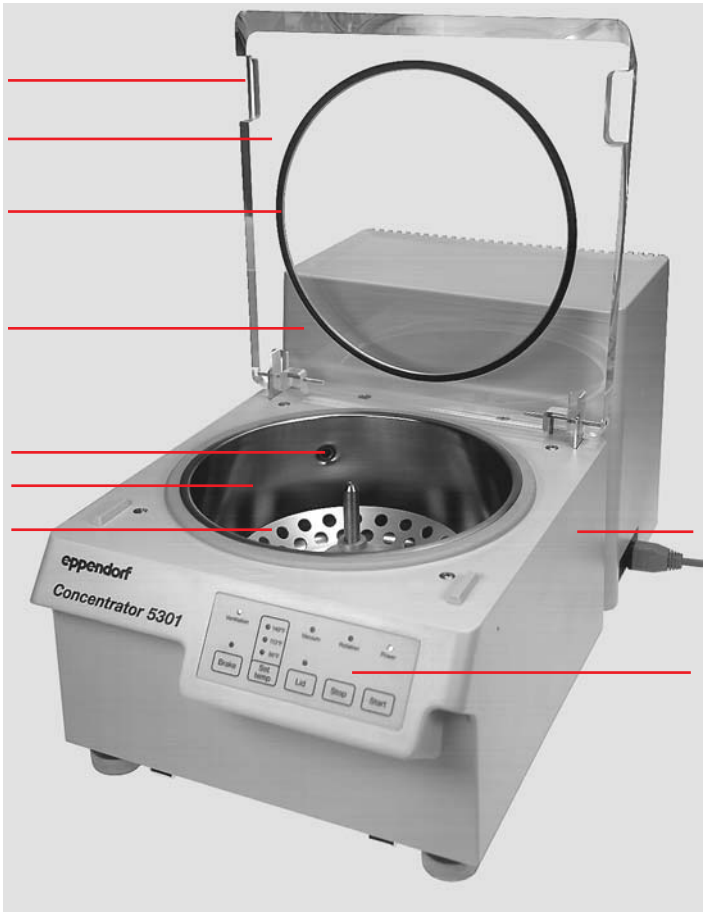


Fig. 1

Fig. 2

Fig. 3

Contents

1 Introduction

Dear Customer,

The Concentrator 5301 is designed for the evaporation of liquid samples in micro test tubes:

- for 1.5 and 2.0 ml micro test tubes in a 48-place rotor,
- for 0.5 ml micro test tubes in a 72-place rotor,
- for 1.5 and 2.0 ml micro test tubes in a 70-place rotor.

The device is available in two versions:

- Concentrator 5301 Complete System with built-in diaphragm vacuum pump

and

- A Basic Concentrator 5301 without pump.

The second version can be connected to an external vacuum system.

Each device without a pump can be upgraded to a Concentrator Complete System by an Eppendorf service technician.

The following important practical functions of the Concentrator 5301 have been optimized:

- Three temperature levels can be set (30, 45, 60 °C) or evacuation can take place without temperature regulation.
- Three functions are available for liquid evaporation: in addition to pure evacuation, aqueous or alcoholic solutions can be concentrated rapidly with two special functions.
- The Concentrator 5301 may also be operated as a desiccator only.
- The chemical-resistant pump in the Concentrator 5301 Complete System makes a variety of applications possible. A solvent trap can be connected to the device behind the pump.

The device is suitable for use in laboratories in the life sciences, clinical chemistry, medicine and industrial research. Its space-saving design eases installation directly on the bench top. The device is easy and convenient to operate.

1.1 Safety precautions

The device must not be operated in a hazardous or flammable environment and must not be used to evaporate/ centrifuge self-inflammable substances.

Before plugging in the device, compare your power supply with the electrical requirements listed on the identification plate (see Fig. 1 and 2 on the fold-back cover at the front of this manual: identification plates on the right-hand panel of the Concentrator 5301 Complete System and on the rear panel of the Concentrator 5301).

The rotor must be properly mounted. It should be loaded symmetrically.

Repairs must only be performed by an Eppendorf authorized service technician. Only use original rotors and spare parts recommended by Eppendorf.

Do not expose body parts to the vacuum under any circumstances.
Continuous pumping of liquids is not permitted.
Please note the maximum permissible pressures and pressure differences listed under "Technical Data". Excess pressure in the pipes caused by closed taps or blocked pipes can result in bursting. Therefore, be sure to always keep the exhaust fumes pipe free and to use sufficiently wide pipes.

When evaporating poisonous liquids or liquids which contain pathogenic bacteria, a suitable chemical or cooling trap must be used to ensure the required condensation and separation of the vapor. The corresponding safety precautions must be observed (hood, lab with appropriate safety class).

Please avoid releasing poisonous, health-damaging or corrosive substances. When handling poisonous, health-damaging or corrosive substances or pathogenic germs of risk group II (see World Health Organization: "Laboratory Biosafety Manual"), the appropriate national regulations are to be observed.

1 Introduction

1.2 Installing the device

Concentrator 5301 Complete System: After unpacking the device, unscrew the two thumbscrews at the rear of the base plate (transport safety device of the vacuum pump).

Place the device onto a level, horizontal surface. To ensure sufficient ventilation, there should be 10 cm clearance at both sides of the device and 30 cm at the back of the device.

Connect the emission condensator to the nozzle on the left side of the pump housing (see Fig. 3 on the fold-back cover at the front of this manual) using the solvent-resistant tube included in the accessories (8 mm inner diameter).

Connect the device with the power cable to the main power supply. The main power socket is on the bottom right of the housing of the vacuum pump next to the main power switch. When the device is switched on, the lid can be opened as long as the control lamp **Lid** lights up.

Before commissioning the Concentrator with integrated vacuum pump, please be sure that the ambient temperature during operation is between 15 °C and a maximum of 35 °C. Measures according to DIN VDE 0530 are to be taken when setting up the device at an elevation greater than 1,000 m above sea level.

Concentrator 5301: As for Concentrator Complete System, however, the removal of the transport safety device for the vacuum pump is not applicable.

The main power switch on the rear panel of the device is next to the socket for direct connection of a vacuum pump (see Fig. 2 on the fold-back cover at the front of this manual).

A vacuum pump can be connected to the main power supply via the Concentrator with a special connector (see Sec. 7, Ordering information).

The power consumption of a vacuum pump which is connected directly to the Concentrator is max. 400 W.

The normal program sequence can also be performed with a vacuum pump connected to the power supply independently of the Concentrator or with a central vacuum system when a solenoid valve is switched between the vacuum pump and the Concentrator. For additional information, please contact an Eppendorf service technician.

If a solenoid valve is not used, the vacuum system can be disconnected from the Concentrator as required before the evaporation run is ended by manually closing a correctly positioned valve (e.g., cock with ground-in stopper).

Every pump used should be able to hold a maximum ultimate pressure of 20 mbar.

Condensate separator: Depending on the type of pump used, an emission condensator can be switched between the devices or behind the pump. The solvent-resistant pump of the Concentrator Complete System enables installation of the emission condensator behind the pump.

Note: When attaching a filter to the outlet of the condensator, the excess pressure at the pump outlet of the Concentrator Complete System must not exceed 1 bar.

When evaporating chemically aggressive liquids or liquids with volatile, chemically aggressive or biologically hazardous components, an appropriately effective cooling trap or chemical trap must be used instead of a condensate separator.

Concentrator 5301 complete system with gel dryer connection (Order no. 5301 000.326): In order to be able to connect a gel dryer to the Concentrator 5301, please use the accompanying tube connection. Screw the tube connection into the free thread of the stop valve on the left side of the Concentrator. The size of the connection thread for the gel dryer connection is G1/4".

1.3 Delivery package

1 Concentrator 5301 / Concentrator 5301 Complete System / Concentrator 5301 complete system with gel dryer connection without rotor

1 Rotor F 45-48-11 with 6 feet for rotors F 45-48-11 and F 45-72-8

1 Main power cable

1 Instruction manual for Concentrator / Concentrator 5301 Complete System

1 Emission condensator (only for Concentrator Complete System)

1 Tube for connecting the emission condensator / Concentrator Complete System

1 Set of main power fuses

2 Operating controls

Please open up the fold-back cover at the front of this manual.

Fig. 1: Front view of the device, lid opened

1.1: Plexiglass lid
1.2: Recessed grip of lid
1.3: Opening for emergency lid release
1.4: Control panel
1.5: Rotor chamber
1.6: Rotor
1.7: Suction opening
1.8: Pump housing
1.9: Sealing ring for lid

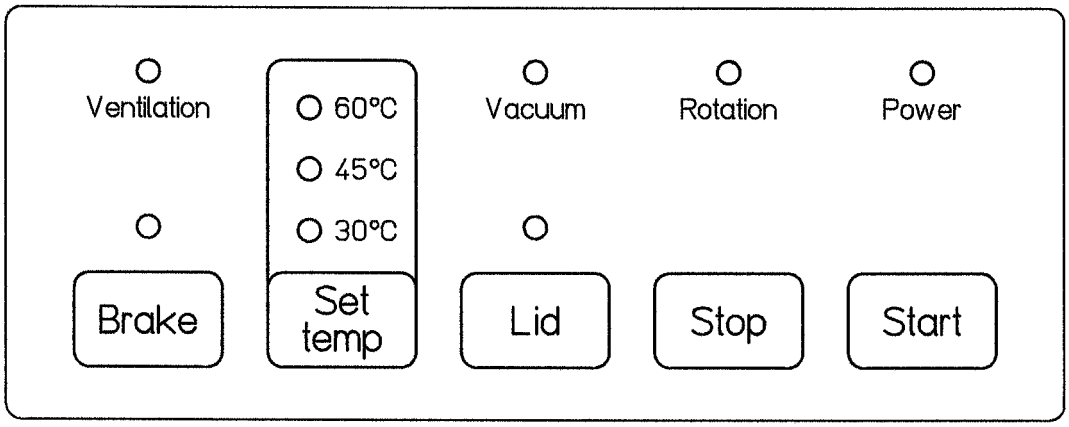
Fig. 2: Rear panel of the Concentrator 5301

2.1: Nozzle for tube connection to vacuum pump
2.2: Socket for electrical connection of vacuum pump
2.3: Main power switch

Fig. 3: Side view of the left of the Concentrator 5301 Complete System

3.1: Nozzle for tube connection to emission condensator

Fig. 4: Control panel



Turn on the main power switch (on the right of the pump housing of the Concentrator Complete System, on the rear panel of the Concentrator).

The **Power** and **Lid** control lamps light up (green). The Ventilation control lamp flashes. The device is ready for operation.

With the **Set temp** key, you can heat the rotor chamber to a desired temperature (see Sec. 3.4).

The lid can be opened (recessed grips on right and left of lid).

The Concentrator with built in diaphragm vacuum pump only reaches the outputs and ultimate pressures given in the "Technical Data" after a warm up phase of approx. 15 min. The warm up phase reduces the condensation of liquids in the pump and subsequently on the lid of the rotor chamber, thus extending the service life of your pump. For precautionary removal of condensation, you should allow the Concentrator to continue to run for several minutes after completing your work.

3 Operation

3.1 Mounting / Dismounting the rotor

Mount the rotor onto the drive axle making sure it is seated onto the spindle. To dismount, pull rotor off the drive axle. The rotor does not have to be tightened.

A spacer is available (order no. 5301 316.005) for sandwich use of 2 rotors (with rotors F 45-48-11 and F 45-72-8 in any order, not with rotor F 45-70-11).

The delivery package of the device contains feet which can be screwed into the appropriate bores of the rotors F 45-48-11 and F 45-72-11. The feet make sure that the tubes are not pushed out of the bores when the rotor is placed onto the bench.

3.2 Loading the rotor

The rotor should be loaded symmetrically with open tubes. Maximum unsymmetrical load for one run ≤ 1 hour: difference of 6 x 2.0 ml tubes between 2 rotor sides.

3.3 Evaporation without heating

Close the lid.

Press **Start**:	The rotor starts up. The **Rotation** control lamp lights up (green). As soon as the lid has locked automatically, the **Lid** control lamp (green) goes out.
	At 1,000 rpm, the vacuum pump is switched on. The **Vacuum** control lamp lights up and the ventilation valve closes. The **Ventilation** control lamp flashes.
	The rotor accelerates to its final speed of 1,400 rpm.
	If **Start** is pressed during the run, the ventilation valve is opened, air streams in and rinses the pump and the tubing system. We recommend that you press **Start** for a few seconds at the end of the last run of the day (see Sec. 3.3) to remove remaining condensate from the pump.
Press **Stop**:	The rotor chamber is ventilated. After 2 s, the vacuum pump is switched off. The **Vacuum** control lamp goes out.
	The rotor decelerates without braking (see Sec. 3.5). When the rotor is at a standstill: The **Rotation** control lamp goes out. The **Lid** control lamp lights up when the lid can be opened.

3.4 Evaporation with heating

Press **Set temp**:	**30 °C** display flashes until the temperature in the rotor chamber is reached (**30 °C** display constant).
	If **Set temp** is pressed repeatedly, the display switches to **45 °C**, then to **60 °C** and then the heating is switched off.

The temperature selected can be changed during the run and is regulated accordingly. After switch-on, the device is set to operation without heating.

Following evaporation, ensure that heating is switched off again. To do so, press **Set temp** repeatedly until the three temperature displays go out.

Note: When heating selected, the behavior of the samples at the desired temperature must be compatible.

Caution:
Avoid touching the wall of the rotor chamber after evaporation at 60 °C. This could have a temperature in excess of 65 °C.

When switching from a higher to a lower temperature, a rapid blinking of the control lamp after a brief waiting period shows that the rotor chamber temperature deviates from the selected temperature.

3 Operation

3.5 Centrifugation with braked deceleration

To switch on gentle braking, press **Brake**. The **Brake** control lamp lights up (red).
It is possible to switch over between deceleration with soft braking/without braking at any time.

3.6 Special functions

For optimal evaporation of samples, 3 different functions are available:

Function 1: This function is especially suitable for the evaporation of alcoholic solutions and is set as a default when the device is switched on.

Function 2: For evaporation of solvents with a particularly high vapor pressure.

Function 3: This function is especially suitable for the evaporation of aqueous solutions.

These functions are switched on by pressing **Brake** and **Set temp** simultaneously. To indicate that the device has recognized that these two keys have been pressed, the control lamp Ventilation flashes briefly three times. When both keys are pressed, the different functions are selected in succession.

When the device is at a standstill or in operation, the function selected is indicated as follows by the control lamps **Ventilation** and **Vacuum**:

	Ventilation control lamp	**Vacuum control lamp**
Function 1		
during run	flashes	lights up constantly
in standstill	flashes	off
Function 2		
during run	off	lights up constantly
in standstill	lights up constantly	off
Function 3		
during run	off	flashes
in standstill	lights up constantly	flashes

Desiccator function:
The Concentrator 5301 can also be operated as a desiccator only. The rotor chamber is evacuated normally, although the rotor does not move.

This function can be called up and ended as follows:

- Hold down the **STOP** key. After one second, press **START** as well. The run is carried out with the set parameters (F1, F2, F3, selected temperature) without the rotor moving. Function 2 is recommended for this.
- Press the **STOP** key to end the desiccator function.

3.7 Opening the device in the case of a power failure

In the event of a power failure, the ventilation valve opens. Before the rotor comes to a standstill, standard pressure is restored in the rotor chamber. The lid can be unlocked when the rotor is at a standstill by inserting a sharp object (paper clip) into the opening in the right panel of the housing under the lid. The lid can then be opened.

3.8 Exchanging the main power fuse

The fuses are located under the flap in the housing of the main power switch.

3.9 Gel dryer connection

The Concentrator 5301 complete system is available under the order no. 5301 000.326 with gel dryer connection.

The gel dryer can be operated parallel to the evaporation or on its own. When using parallel to the evaporation, the stop valve is opened, meaning that the knob is parallel to the flow direction.
The drying of the gel and the evaporation begin with the switching on of the internal vacuum pump.

If simultaneous evaporation is not desired, please use the Exsiccator function (see Ch. 3.6).

Before the device is started, the enclosed tube connector must be screwed into the stop valve.

Please close the stop valve when the gel dryer is no longer required.

4 Cleaning and maintenance

When cleaning and disinfecting the device on the outside and inside (rotor chamber), only use neutral detergents (e.g. Extran® neutral) and disinfectants containing alcohol. Disconnect the main power plug before starting cleaning.

For the frequent evaporation of corrosive liquids (e.g. buffers containing HCl), apply a thin coating of Vaseline to the rotor and rotor chamber (see "Ordering information").

The rotors can be autoclaved at 121 °C for 20 minutes. They can be cleaned with the same solutions as the device. Do not allow saline aqueous solutions to dry. Do not allow acids or alkaline solutions to soak into the material (aluminum).

The chemical-resistant pump of the Concentrator 5301 Complete System does not require maintenance. The pump and tubing system can be blown through by pressing **Start** during the run (see Sec. 3.3).

Valves and diaphragms are subject to natural wear and should be renewed by an authorized Service technician, at the latest when the pressure values begin to decrease. A permanent conveyance of liquids can damage diaphragms and valves. Please regularly remove the condensation from the pump as described above. This measure prolongs the service life of the parts subject to wear and tear.

Returning devices

When returning the Concentrator 5301, please ensure that the device is completely decontaminated so it does not present any kind of health hazard 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 table

Error	Cause	Solution
No display.	No main power connection.	Check power supply cable.
	Power failure.	Check main power fuse at the device (see Sec. 3.8) and in the laboratory.
Concentrator does not start up (Display "Lid" flashes).	Lid not closed.	Close lid.
	Lid switch defective.	⇒ SERVICE.
Concentrator does not start up or switches off during run (**Rotation** control lamp flashes.)	Mechanical stiffness.	Move rotor by hand. Remove any obstruction and restart.
	Electronics error in drive.	⇒ SERVICE.
No noticeable evaporation.	Sealing ring in lid of device damaged.	Mount new sealing ring (see "Ordering information").
All 3 temperature displays flash.	Heating or temperature sensor defective.	⇒ SERVICE.
All displays flash.	Electronics error.	⇒ SERVICE.
Pump does not start up.	Thermal switch at connecting box of pump initiated.	Pump overload, leave to cool, restart.
		⇒ SERVICE.
One of the heating displays flashes (1x per second).	Heating at least 5 °C above nominal value.	Allow heat from previous run to cool.
One of the heating displays flashes rapidly (2x per second).	Heating at least 10 °C above nominal value.	Switch off external heat source (e.g. halogen lamp).
No conveyance capacity.	Long, narrow pipe?	Use short pipes that are wide enough.
	Condensation in the pump?	Allow pump to run for a few minutes with the intake connector open.

If the suggested measure repeatedly fails to eliminate the fault, please contact Service.

6 Technical data

Power supply:	see identification plate
Power consumption:	max. 500 W (with largest external pump permitted)
Max. rotational speed:	1,400 rpm
Max. centrifugal force:	240 x g
Max. load:	96 x 2.0 ml micro test tubes
Max. density of material to be centrifuged:	1.2 g/ml
Permitted ambient temperature for operating the device:	15–35 °C
Permitted max. average annual relative air humidity:	75 %
Dimensions (H x W x D)	
Concentrator 5301:	230 x 320 x 369 mm
Concentrator 5301 Complete System:	298 x 320 x 530 mm
Weight	
Concentrator 5301:	17 kg
Concentrator 5301 Complete System:	31 kg
Main power fuse 230 V:	4.0 A time-lag
Main power fuse 115 V:	6.25 A time-lag
Max. excess pressure at pump outlet of Concentrator 5301 Complete System:	1 bar

Technical data of the diaphragm vacuum pump

Max. power / motor capacity of the diaphragm vacuum pump	
120 V	2.9 A / 220 W
230 V	1.6 A / 220 W
Max. power input of the diaphragm vacuum pump	
120 V	350 VA
230 V	345 VA
Motor protection	Thermal cutout
Protection degree according to IEC 529	IP 54
Maximum output 50 / 60 Hz	1.7 / 2.0 m^3/h
Attainable ultimate pressure (absolute)	9 mbar
Maximum permissible pressure at outlet (absolute)	2 bar
Maximum pressure difference between inlet and outlet	2 bar
Nominal rotational speed of the pump at 50 / 60 Hz	1500 min^{-1} / 1800 min^{-1}

Materials of the diaphragm vacuum pump surfaces coming into contact with media	
Housing cover insert	PTFE carbon reinforced
Head cover, diaphragm clamping disc, inlet / outlet / fittings	ETFE
Valve	FFKM
Diaphragm	PTFE-NBR
Hose	PTFE

Technical specifications subject to change!

7 Ordering information

Concentrator 5301, incl. 48 x 1.5 / 2.0 ml fixed-angle rotor 230 V, 50/60 Hz, Other versions available on request!	5301 000.016
Concentrator 5301 complete system, incl. 48 x 1.5 / 2.0 ml fixed-angle rotor 230 V, 50/60 Hz, Other versions available on request!	5301 000.210
Concentrator 5301 complete system, w/o rotor	5301 000.610
Concentrator 5301 complete system with gel dryer connection, w/o rotor 230 V / 50 – 60 Hz	5301 000.326
Kit for upgrading Concentrator 5301 to Complete System, 230 V, 50/60 Hz, Other versions available on request!	5399 000.167
Rotor F-45-48-11 für 48 Safe-Lock Microcentrifuge Tubes 1,5 und 2,0 ml	5490 030.001
Rotor F-45-70-11 für 70 Safe-Lock Microcentrifuge Tubes 1,5 und 2,0 ml	5490 032.004
Rotor F-45-72-8 für 72 Safe-Lock Microcentrifuge Tubes 0,5 ml	5490 034.007
Rotor A-2-VC for MTP or PCR plates with a maximum height of 15 mm	5490 045.009
Rotor F-45-24-12 for 24 round bottom tubes of up to 6 ml (tube measurement 12 mm ø, 67 – 100 mm in length)	5490 036.000
Rotor F-50-8-16 for 8 round bottom tubes of up to 15 ml (tube measurement 16 mm ø, 97 – 120 mm in length)	5490 041.003
Rotor F-50-8-18 for 8 round bottom tubes of up to 16 ml (tube measurement 18 mm ø, 105 – 128 mm in length)	5490 042.000
Rotor F-45-8-17 for 8 Falcons® of up to 15 ml (tube measurements 17 mm ø, 120 mm in length)	5490 038.002
Rotor F-40-36-12 for 36 x 1.5 ml flasks (tube measurements 12 mm ø, 32 mm in length)	5490 040.007
Rotor F-45-36-15 for 36 x 6 ml flasks (tube measurements 15 mm ø, 48 mm in length)	5490 035.003
Rotor F-45-16-20 for 16 x 6.5 – 10 ml flasks (tube measurements 20 mm ø, 42 – 55 mm in length)	5490 043.006
Rotor F-40-18-19 for 18 x 10 ml flasks (tube measurements 19 mm ø, 66 mm in length)	5490 037.006
Rotor F-45-12-31 for 12 x 20 ml flasks (tube measurements 31 mm ø, 55 mm in length)	5490 044.002
Rotor F-35-8-24 für 8 x 25 ml flasks (tube measurements 24 mm ø, 86 mm in length)	5490 039.009
Spacer for sandwich use of 2 rotors	5301 316.005
Emission condensator (w/o tube)	5301 335.107
Tube for emission condensator	5301 337.002
Special connector for external pump (only for Germany, for other countries on request)	5301 010.003
Solenoid valve for external vacuum connection, 230 V 50/60 Hz Other versions available on request!	5301 030.004
Sealing ring for lid	0114 500.887
Vaseline	5810 350.050

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 this instrument. We do not honor any warranty or accept any responsibility for damage resulting from such action.

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:

Concentrator 5301

Produkttyp, Product type:

Vakuumkonzentrator / Vacuumconcentrator

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

73/23/EWG, EN 61010-1, EN 61010-2-20

89/336/EWG, EN 55011, EN 61000-6-1, EN 61000-3-2, EN 61000-3-3

Vorstand, Board of Management:

16.09.2002

Hamburg, Date:

Projektmanagement, Project Management:

ISO CERTIFIED 9001

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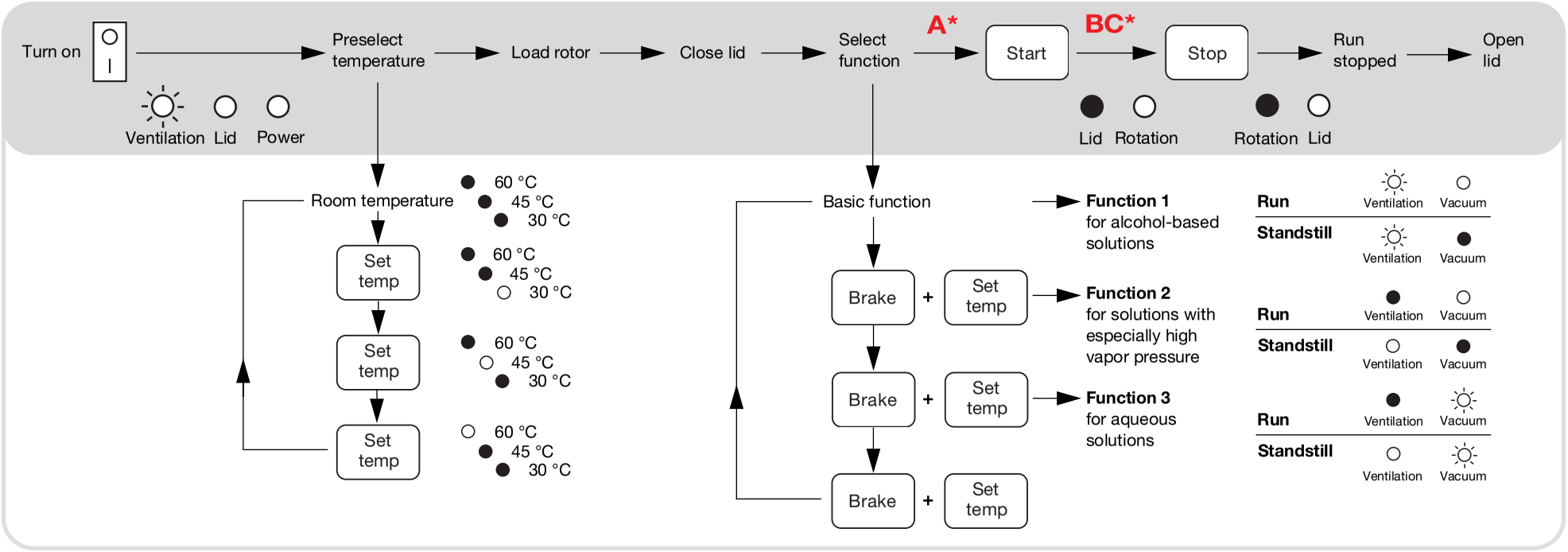
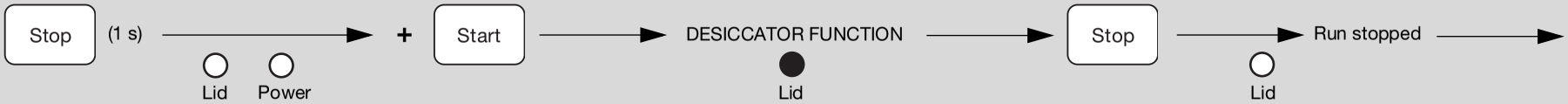
Operating guide for Concentrator 5301

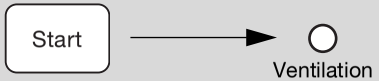
Operation



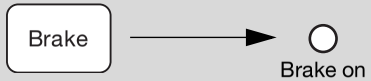
A **Desiccator function (without rotation), recommended using Function 2**



B **Ventilation during the run**



C **Centrifugation with braked deceleration**



LEGEND: * For further options see A, B, C.

Lamp off Lamp on Lamp blinks

This operating guide is a supplement to the operating instructions and not a substitute. You should therefore read the operating instructions prior to operating the Concentrator 5301 for the first time.

eppendorf

In touch with life

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