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# Instruction Manual

## Centrifuge SMC 6plus

with horizontal rotor 6 x

SARSTEDT No.: 90.184.660



CE

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**1. Device data**

(to be completed by customer during installation)

Type: \_\_\_\_\_

Serial no.: \_\_\_\_\_

Place of installation: \_\_\_\_\_

Date of installation: \_\_\_\_\_

Inventory no.: \_\_\_\_\_

**2. Important address**

**Distributed by:**

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**3. Important notes**

**Read the safety instructions in this manual before putting the device into operation!**

A sound knowledge of the contents of these operating instructions is a basic requirement to ensure correct use and trouble-free operation of the device.

**Please keep these instructions in a safe place for future reference.**

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**Technical modification reserved!**

Nümbrecht, March 2015

**SARSTEDT AG & Co.**

### 3.1. Explanation of symbols

These operating instructions contain important symbols to indicate dangers and possible operating errors.



The "Caution" symbol means that in this section:

- Important information is given.
- An immediate or possible risk of danger to life and limb of persons is described.
- A note on dangerous situations is given.

**Non-observance of these symbols can lead to minor, serious, or even life-threatening injuries as well as to material damage.**



**Warning of hazardous electrical voltage!**



**Warning against harmful or irritating substances!**

- Failure to observe this symbol can result in severe harm to health.
- Always comply with the applicable accident prevention regulations (APR) when handling these substances.



This "Info" symbol refers to notes regarding proper use of the device or to general, explanatory information. Non-observance of these notes or information can lead to the device being operated incorrectly or even becoming damaged.

Additional symbols contain notes on the topic displayed in the symbol, for example accident prevention regulations, supply voltage, maintenance, or disposal.

### 3.2. Device-specific safety notes

This device has been built according to the latest state of the art and the accepted principles of safety engineering.

All relevant safety information and guidelines, as well as regulations for safety at work and accident prevention regulations for laboratory use must be observed.

Nonetheless, danger can arise for the user or third parties during operation, as well as damage to the device or other material assets.



**The device may only be used:**

- for the intended purpose
- in technically safe and perfect condition.
- in adherence with the current accident prevention regulations.
- for the separation of materials of varying density or particle size suspended in a fluid.
- with a maximum sample density of 1.15 g/cm<sup>3</sup>.



**The device may not be used:**

- in explosion-hazarded areas.
- with flammable or explosive materials or substances that may precipitate strong reactions with one another.
- for centrifugation of toxic or radioactive materials and pathogenic micro-organisms without appropriate safety systems.



**The device is operated with a mains voltage of 115/230 V ~, ± 10%.**

**Therefore, the following notes must be observed:**

- No water or other liquids may be permitted to enter the device.
- The device may only be connected to the mains supply by means of a suitable power cord supplied.
- Before operating the device, check the power cord for signs of damage.
- Damaged power cord must not be used under any circumstances.
- The device must only be connected to the mains voltage specified on the type label.
- A damaged device must not be operated.
- Never open housing parts that are fixed with screws.
- Remove the plug from the wall outlet, if the device is not used for a prolonged period of time or if it is to be cleaned.



The device must only be used with the accessories described in these operating instructions.

### 3.3. Responsibilities of the owner

The device owner is responsible for ensuring that only such persons are allowed to operate the device, who have read these instructions and understand them. This should be confirmed by the person's signature. Moreover, the observance of safety regulations by personnel should be checked at regular intervals.

### 3.4. Responsibilities of operating personnel

Before working with the device for the first time, the operator must:

- read these operating instructions.
- observe the applicable rules and the regulations for accident prevention.

#### 4. Other information

##### 4.1. Guarantee and liability

The "Delivery and Payment Conditions" of SARSTEDT AG & Co. always apply. These are printed on the reverse side of the invoice.

During the warranty period, the device may only be repaired by SARSTEDT AG & Co. or by persons authorized by SARSTEDT AG & Co. In case of improper use or repair, the warranty will be void.

The device complies with the international standard .

Guarantee and liability claims are excluded, if they are based on one or more of the following causes:

- use of the device for other than the intended purpose.
- improper installation, commissioning, operation, or maintenance of the device.
- operation of the device with defective safety fittings or incorrectly attached or non-functional safety or protective equipment.
- non-observance of the notes in these operating instructions regarding transport, storage, installation, commissioning, operation, maintenance, setting up, or disposal.
- unauthorized modifications to the device.
- catastrophic failure due to external cause and/or force majeure.
- incorrect repairs.

##### 4.2. Shutdown / disposal



- If the device is to be scrapped, it must be handled and disposed of in accordance with the applicable laws and regulations.
- All substances used in connection with the device must be handled and disposed of in accordance with the applicable laws and regulations.



These operating instructions are made of paper.

#### 5. Description of the centrifuge

The centrifuge SMC 6plus is a table-top centrifuge with horizontal rotor designed for continuous operation. The horizontal rotor contained in the standard delivery schedule and the tube holders can accommodate up to 6 specimen tubes. The special horizontal rotor facilitates a fast and simple specimen charge and complete horizontal separation.

A lid safety switch prevents the centrifuge from operating when the lid is open. The yellow "LATCH" indicator at the front of the centrifuge lights up as soon as the lid has been correctly locked. In addition to the lid safety switch, the SMC 6plus is equipped with a "0 rpm" lid locking system. This safety system keeps the lid closed at all times (even in the event of a power failure) and ensures that the lid can be unlocked only when the rotor has come to a standstill.

#### 6. Transport, installation and connection

##### Delivery Schedule

##### Standard delivery schedule

1 x Centrifuge SMC 6plus with horizontal rotor 6 x	SARSTEDT-No. 90.184.660
6 x tube holder, 100 mm	
6 x tube holder, 75 mm	
1 x power cord	
1 x operating instruction	

##### Accessories

92.184.554	0.25 inch rubber adapter (recommended for glass and flat bottom tubes)
92.184.553	1.0 inch rubber adapter (recommended for glass and flat bottom tubes)
92.184.551	6 x tube holder, 100 mm
92.184.552	6 x tube holder, 75 mm
92.184.555	1 x Cap for tube holder

If you have any questions concerning other SARSTEDT products or the SARSTEDT product range, please contact:

SARSTEDT AG & Co.                      Telefon: +49 22 93 / 305-0  
 Postfach 1220                         Telefax: +49 22 93 / 305-3450  
 D-51582 Nümbrecht

or contact your local SARSTEDT sales office.

##### 6.1. Unpacking



- Check that the packaging shows no signs of damage.
- In case of transport damage, please contact the shipping agent immediately. Observe the notification periods of the different freight carriers (railway, mail, parcel service, trucking company, etc.). It can be as short as 24 hours.
- Check the scope of delivery for completeness.
- Defects and damage must be notified immediately to SARSTEDT AG & Co.

##### 6.2. Installation



- Position the centrifuge on a firm, vibration-free and flat surface.
- Maintain a safety zone around the centrifuge of at least 30 cm.
- During centrifuging, no person or dangerous substance must come within the safety zone.
- During operation, no contact must occur with other equipment or objects.
- Do not place vibration-sensitive objects or samples on the installation surface.
- There must be sufficient space above the installation surface to open the centrifuge lid.
- Ensure that there is adequate air circulation to prevent the samples and the centrifuge from overheating.
- The installation location must always be well ventilated.

### 6.3. Commencing operation



#### Caution before first use!

- Check that the actual supply voltage corresponds with the stated supply voltage.
- Comply with the permitted ambient conditions for the machine.
- In the cold season, after delivery and unpacking, wait approx. 1 hour until the centrifuge has reached ambient temperature (18 °C to 23 °C).
- The control elements are shown in Section 7.



For safety reasons, the locking system is always activated.

- The user can switch it off for approx. 15 seconds by pressing the “OPEN/(EMERGENCY STOP)” button briefly. This is possible only with the centrifuge switched on and the rotor at a standstill.
- At the end of a centrifugation, the lid is automatically unlocked for approx. 60 seconds.

In order to exclude transport damage and to check correct installation, carry out a test run when starting up the centrifuge.

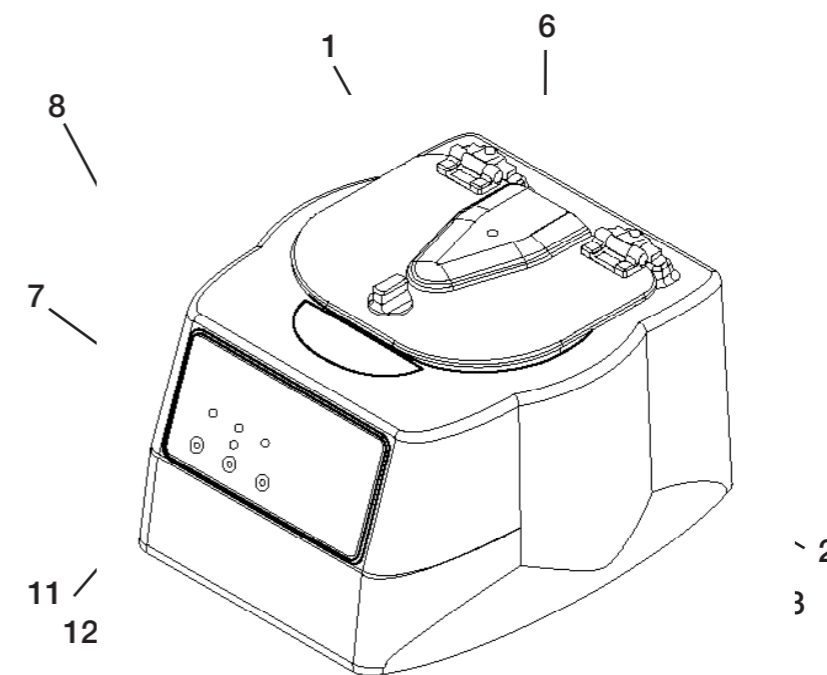
#### Procedure:

- Connect centrifuge with the power cord to the power supply.
- Press “OPEN/(EMERGENCY STOP)” button.
- “UNLOCKED” display lights up.
- Turn lid knob in counter clockwise direction and open lid.
- There should be no foreign bodies in the rotor chamber.
- Turn rotor by hand and check whether it runs freely and horizontally and that the screw in the middle of the rotor is tightened firmly. If this is not the case, the centrifuge must not be put into operation.
- Insert empty tube holder into the rotor and check that it is fitted correctly.
- The rotor must be loaded evenly.
- Close lid and turn lid knob in clockwise direction to end position.
- “LATCH” display lights up.
- The centrifuge will only start running if the lid has been closed correctly.
- Press “START” button and perform a test run.
- “RUN” display lights up.
- Apparatus accelerates, tube holders slip into a horizontal position.
- Pay attention to the running noise of the centrifuge. There should be a soft humming. In the case of loud or unusual noise stop centrifuge immediately by pushing the “OPEN/(EMERGENCY STOP)” button and then check the above points once again.
- Press “OPEN/(EMERGENCY STOP)” button.
- The test run is ended and the rotor braked to a standstill.
- The centrifuge is now ready for operation.

### 7. Operation

By choosing the SMC 6plus, you have decided in favour of a centrifuge that is very easy to use. Two programs with different centrifugation speeds can be started via an individual starter button and automatically run until the end of the preset centrifugation time. While Program 1 (“Start”) is designed for the centrifugation of serum and serum gel tubes, Program 2 (“Urine Start”) processes urine samples. Whenever required, each program can be prematurely stopped by pushing the “OPEN/STOP” button.

#### 7.1. Control elements



- |                            |  |                                    |
|----------------------------|--|------------------------------------|
| 1. Lid                     | 6. Mains connection – power switch (rear side of device) | 10. LED “URINE RUN”                |
| 2. Lid knob                | 7. LED “UNLOCKED”  | 11. “START” button                 |
| 3. Safety lock             | 8. LED “RUN”   | 12. “OPEN/(EMERGENCY STOP)” button |
| 4. Counter (at the bottom) | 9. LED “LATCH”   | 13. “URINE START” button           |
| 5. Fuse (at the bottom)    |  |                                    |

#### 7.2. Counter

The cycle counter keeps a count of the total number of machine runs for servicing and maintenance records. The counter is located at the bottom.

### 7.3. Loading the rotor

The centrifuge must be evenly loaded for it to function properly.



**To ensure even loading, comply with the following rules when loading the horizontal rotor for six tube holders:**

- Opposite-located tube holders must be identical.
- Opposite-located tube holders must either be empty or loaded with the same number of samples of the same weight.
- When centrifuging an uneven number of samples, insert a tube filled with water as a counterbalance.

### 7.4. Centrifugation

If a problem occurs during operation which makes it necessary to switch off the centrifuge, push the "OPEN/(EMERGENCY STOP)" button immediately.

**Procedure:**

- Press "OPEN/(EMERGENCY STOP)" button to unlock the lid (the "UNLOCKED" display lights red up) and open lid.
- Insert specimen tubes in the tube holders. Make sure they are evenly loaded. Close lid and turn lid knob to end position in clockwise direction. The "LATCH" display lights yellow up in order to show correct interlocking.
- If the lid knob is not snapped in completely, the "LATCH" display will not light up and it will not be possible to put the centrifuge into operation.
- Press the "START" button.
- The rotor will start to turn. The "RUN" display lights red up.
- At the end of the running time the "RUN" display goes out and the rotor brake is applied until it comes to a complete standstill.
- The "UNLOCKED" display lights up; the interlocking mechanism is deactivated thereby facilitating access to the rotor chamber. After expiry of the automatic unlocking time the lid can be unlocked with idling rotor using the "OPEN/(EMERGENCY STOP)" button.
- Turn lid knob in an anticlockwise direction and open lid.
- Remove specimens.
- The centrifuge can be put into operation immediately again.



**Recommended conditions for centrifugation of S-Monovettes with gel preparation:**

- Tube holder 100 mm
- Serum-gel                      g-force                      2,000 x g (= fix set) / 15 min / 20 °C (within 4 hours after blood collection)
- Li-Hep-gel                      g-force                      2,000 x g (= fix set) / 20 min / 20 °C (within 4 hours after blood collection)

Concerning centrifugation conditions for other type of blood collection tubes refer to data provided by manufacturers.

### 8. Technical data

**Machine data**

Apparatus:	Centrifuge SMC 6plus
Rotor:	horizontal rotor 6 x
Tube holder:	6 pieces
Order number:	SARSTEDT No. 90.184.660
Centrifuge motor:	Brushless induction motor
Kinetic energy:	< 200 Nm
Timer:	electronic, continuous operation or 1-30 minutes +/- 1 %

**Program 1 (START)**

Speed:	max. 3,800	+/- 100 min <sup>-1</sup>
RCF: with tube holder 100 mm	max. 2,016 x g	+/- 90 x g
RCF: with tube holder 75 mm	max. 1,664 x g	+/- 90 x g
Time preset:	15 min	

**Program 2 (URINE START)**

Speed:	max. 1,800	+/- 90 min <sup>-1</sup>
RCF: with tube holder 100 mm	max. 460 x g	+/- 90 x g
Time preset:	5 min	

**Power supply**

Electrical connection:	115/230 V ~, ± 10 %,
Power consumption:	200 watts
Frequency:	50/60 Hz
Fusing:	4.0 A, re-startable

**Ambient conditions**

Admissible ambient temperature:	16 °C to 32 °C
Maximum relative humidity:	90 %, non-condensing

**Dimensions:**

Width x depth x height:	22 x 30 x 35 cm
Weight:	approx. 5.4 kg

**Loading the rotor**

Max. tube size:	17 mm x 100 mm
	17 mm x 75 mm
Number of tubes:	6

## 9. Maintenance and servicing

### 9.1. Service address

Should you have questions or problems concerning the device, please contact the customer service department of DESAGA GmbH / SARSTEDT-GRUPPE in Wiesloch or your local SARSTEDT sales office. Remember to specify the Serial no. of the device.



**DESAGA GmbH / SARSTEDT-GRUPPE**  
**Serviceabteilung**  
 In den Ziegelwiesen 1-7  
 D-69168 Wiesloch  
 Phone: +49 62 22 / 92 88 65  
 Fax.: +49 62 22 / 92 88 60



- Fill in the Contamination Questionnaire (Page 18) and ship it together with the device, a copy of the delivery note, and a short description of the problem.
- Always ship the device in the original packaging.
- The Contamination Questionnaire serves to protect our service personnel. Therefore, please fill it in carefully and completely.

### 9.2. Cleaning



#### Potential danger of contamination



- The regulations for cleaning the device must be observed.
- Inattentive cleaning or non-observance of the regulations can cause malfunctions!
- Disconnect the device from the mains supply before cleaning.
- Disinfect the apparatus before cleaning
- No liquid may be permitted to enter the device during cleaning.
- Clean the housing surfaces with a damp cloth. A soap solution may be used. Carefully dry the device after cleaning.
- Do not use scouring agents or aggressive cleaning liquids or solutions (except alcohol) under any circumstances.
- Isopropanol may be used in case of severe soiling.
- Fully/partially halogenated hydrocarbons, ketones, esters, and other chemical not specified by the manufacturer may damage the rotor and tube holders and may not be used.



#### Example for a disinfectant:

The following aqueous solution can be used as a disinfectant:  
 25 g ethanol 96 %, 35 g 1-propanol, 0,1 g glyoxal ad 100 g aqua dest.  
 Apply the solution, and allow it to react for a few minutes, depending on the contamination.  
 If necessary, repeat the application of disinfectant.

### 9.3. Rotor removal and installation

- Open the lid lock using the “OPEN/(EMERGENCY STOP)” button.
- Pull out the mains plug.
- Remove the tube holder.
- Loosen and remove the rotor nut in the centre of the rotor using a 13 mm wrench (open counterclockwise direction).
- Pull off the rotor in an upwards direction.



The rotor is refitted in the reverse order.



Ensure that the rotor is seated firmly on the axle after fitting and is correctly screwed on.



#### Tubeholder:

Small glass particles from a tube breakage remaining in the tube holder can stick to the next sample tube inserted in this holder. When handling this tube, the broken glass can penetrate protective gloves and cause injury from cuts to the user's fingers or hand. Broken glass remaining can result in stress points with subsequent tubes causing further breakage. If a tube breaks, remove it carefully from the tube holder. Dispose of the sample and tube fragments correctly, and clean both the inside and outside of the tube holder. If necessary use a new rubber adapter and reinsert the tube holder in the rotor.

### 9.4. Regular maintenance

It is recommended, depending on the amount of use and the external conditions, that the rated speed and the electrical safety be checked every 1-2 years to ensure continuing safe operation.

It is recommended that the rotor chamber be cleaned every 6 months or if a tube breaks.

It is to replace the tube holders after 5,000 machine runs or the latest after 24 months of use

The repeated inspections in accordance with accident prevention regulations (UW) published as „Technical Rule BGR 500” do not apply to the models of Series SMC 6 and LC24 as these conform to the following criteria:

Enclosed laboratory centrifuges	
Kinetic energy	<10,000Nm
Power consumption	<500 W

### 9.5. Programming

#### How to check program parameter settings

1. Use the cable to connect the centrifuge to the mains supply.
2. Press the "OPEN/STOP" button and open the lid.
3. Hold the "START" button (3 sec.) until the "LATCH" display starts flashing. Release the button.
4. After pressing the "START" button, the number of beeps (each beep equals one minute, maximum number of beeps: 30 = 30 minutes) indicates the preset centrifugation time.
5. Now press the "START" button once again to count the number of beeps (each beep equals 100 the rpm, maximum number of beeps: 38 = 3,800 the rpm) indicating the preset the rpm.
6. Press the "START" button once again to count the number of beeps (each beep equals one braking factor, maximum number of braking factors: 10 = maximum braking force) indicating the preset braking force.
7. Press the "START" button once again to count the number of beeps (each equals one factor of sensitivity to imbalance, maximum number of factors: 10 = maximum sensitivity) indicating the preset sensitivity to imbalance.
8. After pressing "OPEN/STOP", the device reverts to the operating mode.
9. To check the **URINE Program parameters**, use the second start button "URINE START" instead of the "START" button (see Item 4).

#### How to set program parameters

1. Use the cable to connect the centrifuge to the mains supply.
2. Press the "OPEN/STOP" button and open the lid.
3. Hold the "START" and "OPEN/STOP" buttons (3 sec.) until the "LATCH" display starts flashing.
4. Release the buttons.
5. Press the "START" button once per minute of the desired centrifugation time. The time can be set within a range of 1 to 30 minutes.
6. Press the "OPEN/STOP" button to save the setting. You can now program the rpm setting.
7. Press the "START" button to program the rpm. Press once to increase by 100 rpm (e.g. press "START" ten times for 1,000 rpm), min. rpm = 1,000; max. rpm = 3,800.
8. Press the "OPEN/STOP" button to save the setting. You can now program the braking force.
9. Press the "START" button to program the braking force (once = off, 10 times = maximum force). The preset braking force is 6.
10. Press the "OPEN/STOP" button to save the setting. You can now program the sensitivity to imbalance.
11. Press the "START" button to program the sensitivity (once = off, twice = minimum sensitivity, 10 times = maximum sensitivity). The preset sensitivity to imbalance is 6.
12. Press the "OPEN/STOP" button to save the setting and exit the centrifuge settings.
13. To set up the **URINE Program parameters**, use the second start button "URINE START" instead of the "START" button (see Item 4).

#### Note:

Setting up the sensitivity to imbalance is identical for both programs and is done by using the "START" button (see Item 11).

Please refer to the corresponding technical literature regarding the centrifugation conditions for urine tubes.

### 9.6. Access to the rotor chamber during a power failure

In the event of a power failure, it may be impossible to unlock the lid in the usual manner. If this happens, you can gain access to the rotor chamber by removing the label in front of the lid lock and manually deactivating the locking mechanism with a pen (see illustration). Pull the mechanism in the direction of the control panel, unlock it and open the lid. Then re-stick the label in position.



If the centrifuge is damaged, have it checked by a technician before further use!

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## Contamination questionnaire for repair orders

**Dear Customer,**

Please complete the contamination questionnaire before you return the instrument to the service department of DESAGA GmbH / SARSTEDT-GRUPPE or to your local SARSTEDT sales representative for maintenance or repair.

Firm: \_\_\_\_\_ Department: \_\_\_\_\_  
 Town: \_\_\_\_\_ Street: \_\_\_\_\_  
 Name: \_\_\_\_\_ Telephone No.: \_\_\_\_\_  
 Name of Instrument/Artikel:: \_\_\_\_\_ SN: \_\_\_\_\_

- The instrument is free from dangerous substances
- The instrument came into contact with the following dangerous substances

	Groups of substances	Substance name
<input type="checkbox"/>	toxic	
<input type="checkbox"/>	acidly	
<input type="checkbox"/>	explosive	
<input type="checkbox"/>	radio-active	
<input type="checkbox"/>	contagiously danger substances	
<input type="checkbox"/>	igniting subst.	
<input type="checkbox"/>	Other hazardous subst.	
<input type="checkbox"/>	The instrument has been decontaminated according to the legal regulations.	
(Please cross off if applicable!)		

**Description of the decontamination:**


Date: \_\_\_\_\_ Signatur: \_\_\_\_\_

Technical modifications reserved  
BA 006



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