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Thermo Scientific Sorvall BIOS A Centrifuge and Heavy Duty Centrifuge

Instruction Manual

50154616-d • 2022-02

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ThermoFisher SCIENTIFIC

Table of Contents

Table of Figures

Table of Tables

Preface

Before starting to use the centrifuge, read through this instruction manual carefully and follow the instructions.

Failure to follow the instructions and safety information in this instruction manual will result in the expiration of the sellers Warranty.

Items Supplied

The centrifuges are supplied without a rotor. The items supplied with a rotor are listed: [→ B–1]

Article No.	Item	Quantity
	Centrifuge	**1**
75007698	Thermo Scientific Sorvall BIOS A, 200, 208, 220, 230, 240 V ±10%, 60 Hz, Single phase Japan only: 200 V ±10%, 50 Hz	
75007699	Thermo Scientific Sorvall BIOS A, 380, 400, 415 V ±10%, 50/60 Hz, 3-phase	
75007700	Thermo Scientific Sorvall BIOS A Heavy Duty, 200, 208, 220, 230, 240 V ±10%, 60 Hz, Single phase Japan only: 200 V ±10%, 50 Hz	
	Power Supply Cable	**1**
	For Single phase units with 200, 208, 220, 230, 240 V	
	NEMA 6-50P 50A, 250 V (Permanently connected with the device at the factory) 	
	For 3-phase units with 380, 400, 415 V	
20190369	IEC60309 32A-6h 5 pin red (3P+N+PE), 220/380 V; 230/400 V; 240/415 V 	
20280119	**Bubble Level**	**1**
	Instruction Manual	**1**

Table Preface–1: Items Supplied

If any parts are missing, please contact the nearest Thermo Fisher Scientific representative.

Intended Use for Sorvall BIOS A and Sorvall BIOS A Heavy Duty

This centrifuge is designed to separate sample mixtures of different densities like chemicals, environmental samples and other non-human body samples.

Associated Rotors and Components

The Thermo Scientific™ Sorvall™ BIOS A and Thermo Scientific Sorvall BIOS A Heavy Duty centrifuge can be operated with the Thermo Scientific™ Fiberlite™ F6-10x1000 LEX rotor. For more details on components: [→ A–3] [→ B–1]

Signal Words and Colors

Signal Word and Color	Degree of Hazard
WARNING	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates information considered important, but not hazard-related.

Table Preface–2: Signal Words and Colors

Precautions

WARNING

Observe the safety instructions. Not following these instructions can cause damage like harm by mechanical impact, electrical shock, infection and loss of sample.

The centrifuge is to be used for its intended use only. Improper use can cause damages, contamination, and injuries with fatal consequences.

The centrifuge must be operated by trained personnel only.

It is the obligation of the operator to make sure, that the proper protective clothing is used. Mind the “Laboratory Biosafety Manual” of the World Health Organization (WHO) and the regulations in your country.

As safety zone maintain a clear radius of at least 30 cm around the centrifuge. Do not place any dangerous substances within this safety zone.

Set up in a well-ventilated environment, on a horizontally leveled and rigid surface with adequate load-bearing capacity.

Do not modify the centrifuge and its accessories in any unauthorized way.

The centrifuge housing is not to be opened by the operator.

Thermo Fisher Scientific is not responsible for the process of human blood transfusion.

To ensure safe operation of this centrifuge regarding blood and blood components you have to follow the regulations in your country.

WARNING

Risk of damage due to incorrect power supply.

Make sure that the centrifuge is plugged only into a power outlet that has been properly grounded.

WARNING

Risk from handling hazardous substances.

Especially when working with corrosive samples (salt solutions, acids, bases), the components and the centrifuge chamber have to be cleaned thoroughly.

Do not centrifuge explosive or flammable materials or substances.

The centrifuge is neither inert nor protected against explosion. Never use the centrifuge in an explosion-prone environment.

Do not centrifuge toxic or radioactive materials or any pathogenic micro-organisms without suitable safety precautions.

If centrifuging any hazardous materials mind the “Laboratory Biosafety Manual” of the World Health Organization (WHO) and any local regulations. When centrifuging microbiological samples from the Risk Group II (according to the “Laboratory Biosafety Manual” of the World Health Organization (WHO)), aerosol-tight biological seals have to be used. Look on the internet page of the World Health Organization (www.who.int) for the “Laboratory Biosafety Manual”. For materials in a higher risk group, extra safety measures have to be taken.

If toxins or pathogenic substances have contaminated the centrifuge or its parts, appropriate disinfection measures have to be taken. [→ 🗎 IV–5]

Extreme care should be taken with highly corrosive substances which can cause damage and impair the mechanical stability of the rotor. These should only be centrifuged in fully sealed tubes.

If a hazardous situation occurs, turn off the power supply to the centrifuge and leave the area immediately.

WARNING

Serious injuries can occur, if you touch a spinning rotor with your hands or tools.

Never open the centrifuge door until the rotor has come to a complete stop and this has been confirmed on the touchscreen.

The emergency door release may be used in emergencies only to recover the samples from the centrifuge, e.g. during a power failure. [→ 🗎 V-1]

Do not open the centrifuge, while it is running.

In any case of severe mechanical failure, such as rotor or bucket crash, the centrifuge is not aerosol-tight.

In case of rotor failure the centrifuge can be damaged. Leave the room. Inform customer service.

WARNING

Safety can be impaired by wrong loading and worn accessories.

Use only a properly installed rotor. [→ 🗎 III–2]

Do not use rotors, buckets or components which show any signs of removed protective coating, corrosion or cracks. Contact customer service for further advice or inspections.

Use only with rotors which have been loaded properly.

Never overload the rotor.

Always balance the samples.

Use only rotors and components for this centrifuge which have been approved by Thermo Fisher Scientific. Exceptions to this rule are commercially available glass or plastic centrifuge lab ware, provided they have been designed to fit the rotor or the adapter cavities and are approved for the speed or the RCF value of the rotor.

Make sure the rotor is locked properly into place before operating the centrifuge.

WARNING

Physical harm caused by ignoring operative basics.

Never use the centrifuge if parts of its casing is damaged or missing.

Never start the centrifuge when the centrifuge door is open.

Do not move the centrifuge while it is running.

Do not lean on the centrifuge.

Do not place anything on top of the centrifuge during a run.

Implement measures which ensure that no one can approach the centrifuge for longer than absolutely necessary while it is running.

WARNING

The magnets built into the rotors can have a negative effect on active implants, such as cardiac pacemakers.

The magnets are mounted on the bottom of the rotor.

Always keep a distance of 20 cm between the rotor and the active implant, as the product generates permanent magnetic fields. The magnetic field strength at a distance of 20 cm is less than 0.1 mT, so there should be no interference.

CAUTION

Due to air friction the temperature of rotor may rise significantly while the centrifuge is spinning.

Refrigerated units have limitations in cooling capabilities.

Displayed and set temperature can deviate from sample temperature. Sample temperature might exceed critical temperature of your application.

NOTICE

To shut down the centrifuge:

Press the STOP key to shut down the centrifuge.

Turn off the centrifuge at the power supply switch. The power supply plug must be freely accessible at all times.

Pull out the power supply plug or disconnect the power supply in an emergency.

NOTICE

In case of serious incident:

Report any case of serious incident that has occured in relation to the device to the manufacturer and your local authorities

Symbols used on the Centrifuge and its Components

This symbol refers to general hazards. Observe the information contained in the instruction manual to keep yourself and your environment safe.

CAUTION means that material damage could occur.

WARNING means that injuries or material damage or contamination could occur.

This symbol refers to biological hazards.

Observe the information contained in the instruction manual to keep yourself and your environment safe.

	This symbol refers to hazards from sharp items. Observe the information contained in the instruction manual to keep yourself and your environment safe.
	This symbol refers to hazards from closing mechanical parts. Observe the information contained in the instruction manual to keep yourself and your environment safe.
	This symbol refers to information on hazards, described within the manual. Observe the information contained in the instruction manual to keep yourself and your environment safe.
	This symbol on rotors and components refers to information on hazards, described within the manual. Observe the information contained in the instruction manual to keep yourself and your environment safe.
	This symbol demands to disconnect mains before transporting or servicing the centrifuge.
	This symbol shows the direction of rotation.
	Indicates the device manufacturer.
	Indicates the date when the device was manufactured.
	Indicates the date after which the device is not to be used.
	Indicates the manufacturer's batch code so that the batch or lot can be identified.
	Indicates the manufacturer's catalogue number so that the device can be identified.
	Indicates the manufacturer's serial number so that a specific device can be identified.

	Indicates a device that is intended for one single use only.
	Indicates the need for the user to consult the instructions for use.
	The symbol indicating separate collection for EEE consists of the crossed-out wheeled bin.
	Indicates CE conformity.
	Indicates conformity to Chinese environmental law.
	Indicates conformity with Underwriter Laboratories (UL) requirements.

Table Preface–3: Symbols used on the Centrifuge and its Components

Symbols used in the Manual

	This symbol refers to general hazards. Observe the information contained in the instruction manual to keep yourself and your environment safe. ***CAUTION*** means that material damage could occur. ***WARNING*** means that injuries or material damage or contamination could occur.
	This symbol refers to biological hazards. Observe the information contained in the instruction manual to keep yourself and your environment safe.
[→ 🗎 B–1]	This is a cross reference. The arrow stands for “refer to” or “see”. The symbol in the middle stands for “page”. The page number is stated at the end. In this example it is B–1. The first sign stands for the chapter, the second sign for the page within this chapter. Page numbers are placed at each bottom of a page.

Table Preface–4: Symbols used in the manual

THE ACTIVITIES DESCRIBED IN THIS CHAPTER ARE FOR SERVICE TECHNICIANS.

Transport and Set Up

CAUTION Make sure that the centrifuge and the packaging is not damaged. Speak to the shipping company and Thermo Fisher Scientific immediately if damage is found.

1. Location

WARNING Risk of impact by moving centrifuge.
The centrifuge can crush into objects and persons in a radius of 30 cm when spinning.
Keep a safety zone of 30 cm around the centrifuge for safe operation.
Make sure that no one is in the safety zone while the centrifuge spins.

CAUTION UV rays decrease the stability of plastics.
Do not expose the centrifuge, rotors and plastic accessories to direct sunlight.

Operate the centrifuge only inside a room.

The set-up location must fulfill these requirements:

- Keep a safety zone of minimum 30 cm (Figure I–1 on page I–2, green area) around the centrifuge.

  Persons and hazardous substances must be kept out of this safety zone while centrifuging.
- The supporting structure must:
  - » be stable and free of resonance,
  - » be applicable for horizontal setup of the centrifuge,
  - » hold the weight of the centrifuge.
- Do not expose the centrifuge to heat and strong sunlight.
- The set-up location must be well-ventilated at all times.

THE ACTIVITIES DESCRIBED IN THIS CHAPTER ARE FOR SERVICE TECHNICIANS.

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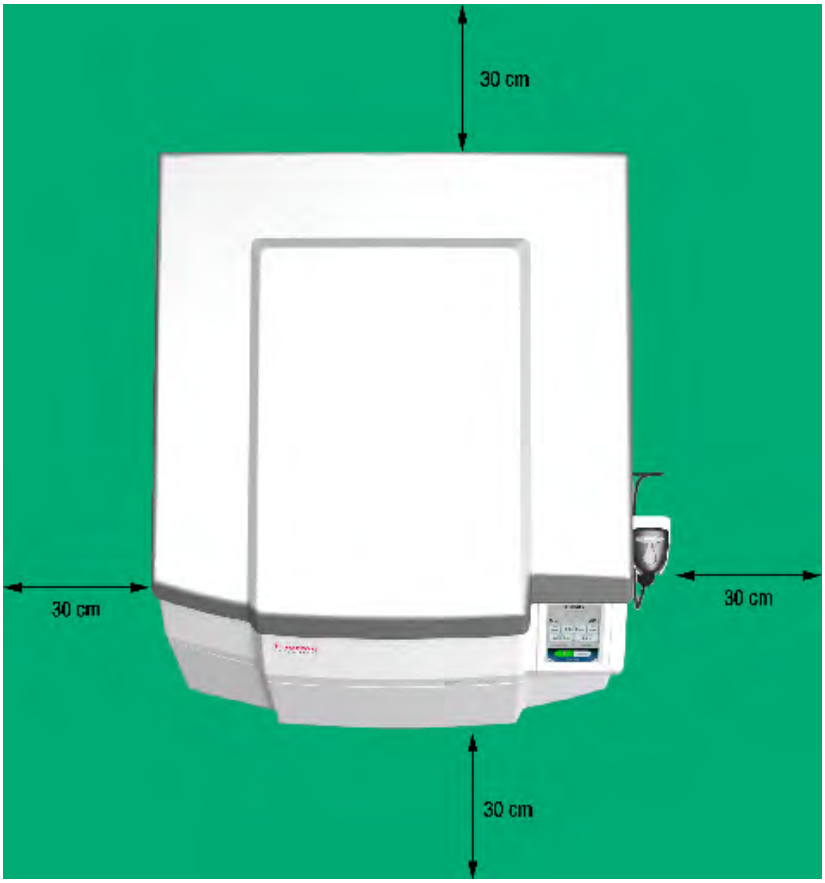

Figure I–1: Centrifuge clearance, example with barcode scanner

2. Transporting

WARNING	Never stand before a moving centrifuge to stop it. If the centrifuge is moved on an uneven surface, it can get faster due to its own weight. An impact of the centrifuge can lead to serious injuries.
CAUTION	Always remove the rotor before you transport the centrifuge. If you do not remove the rotor you can damage the centrifuge drive or drive shaft.
NOTICE	Dispose the centrifuge packaging.
NOTICE	Assign a shipping company for the transport. Inform the customer service about the transport.

- Use a forklift to lift a centrifuge that is fixed on a palette.
- Impact can damage the centrifuge.
- Send the centrifuge upright and if possible in packaging.

THE ACTIVITIES DESCRIBED IN THIS CHAPTER ARE FOR SERVICE TECHNICIANS.

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3. Setting Up

CAUTION

Do not push at the touchscreen.

Due to the weight of the centrifuge it must be controlled by two or more people when rolling of the pallet. Do not stand in front of the centrifuge when rolling it down the ramp.

The centrifuge has four steering casters that must be parallel, so that the centrifuge can be moved from the pallet.

Make sure that the items supplied are complete. [→ vi]

If the items supplied are not complete, please speak to Thermo Fisher Scientific.

Necessary Tools

Graphic	Item	Quantity
	Wrench (30 mm)	2
	Socket wrench with nut (19 mm)	1
	Screwdriver (torque T30)	1
	Screwdriver (torque T20)	1

Table I–1: Overview of necessary tools for setting up

Setting Up

1. Remove the wooden plank on the backside of the pallet. The backside of the pallet is the side with the bevels.

2. Screw both rails on the bevels. Make sure that you position them not at the edge of the pallet.
3. Remove the metal pipes

   a. Remove the 4 screws from the downside of the pallet.

   b. Lift the centrifuge by turning down the 4 centrifuge feet until the metal pipes can be removed.

   c. Remove the metal pipes.

4. Lower the centrifuge by lifting the 4 centrifuge feet.

   Make sure that the 4 centrifuge feet are entirely turned up to the bottom of the centrifuge.

5. Move the centrifuge from the pallet.
6. Move the centrifuge to the location, where you want to operate it.

7. Turn down the 4 centrifuge feet until all 4 casters are not in contact with the ground. All 4 centrifuge feet need to have firm contact to the ground. [→ I–4] The maximum height for setting up is 9.5 cm (3.7 inch) measured from the ground to the bottom of the centrifuge.

8. To fasten the 4 centrifuge feet you have to fasten their two lock nuts. The lower lock nut has to be fastened gently down against the foot. The upper lock nut has to be fastened up against the centrifuge bottom.

THE ACTIVITIES DESCRIBED IN THIS CHAPTER ARE FOR SERVICE TECHNICIANS.

Level the Centrifuge

CAUTION

If you do not level the centrifuge, the centrifuge can crash because of imbalance.

If you move the centrifuge, you must level it again.

Do not move the centrifuge with a rotor attached to the drive shaft because damage can occur to the drive.

Do not put anything below the centrifuge feet to level the centrifuge.

Level the centrifuge as follows:

1. Put the bubble level on the top of the drive shaft in the centrifugation chamber.
2. Adjust the centrifuge feet until the bubble in the level is fully in the circle mark.
3. Turn the drive shaft with the bubble level around a full turn.

   If 50% of the bubble stays in the circle mark, the centrifuge is leveled. If more than 50% of the bubble is out of the circle mark, the centrifuge must be leveled again.

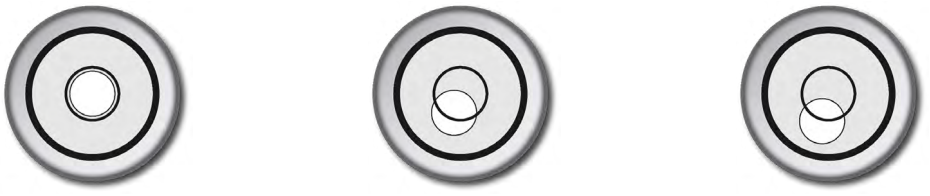

Figure I–2: Position of the bubble in the water level

4. To fasten the 4 centrifuge feet you have to fasten their two lock nuts. The lower lock nut has to be fastened gently down against the foot. The upper lock nut has to be fastened up against the centrifuge bottom.

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4. Mains Connection

NOTICE Connect the centrifuge into grounded electrical sockets only.

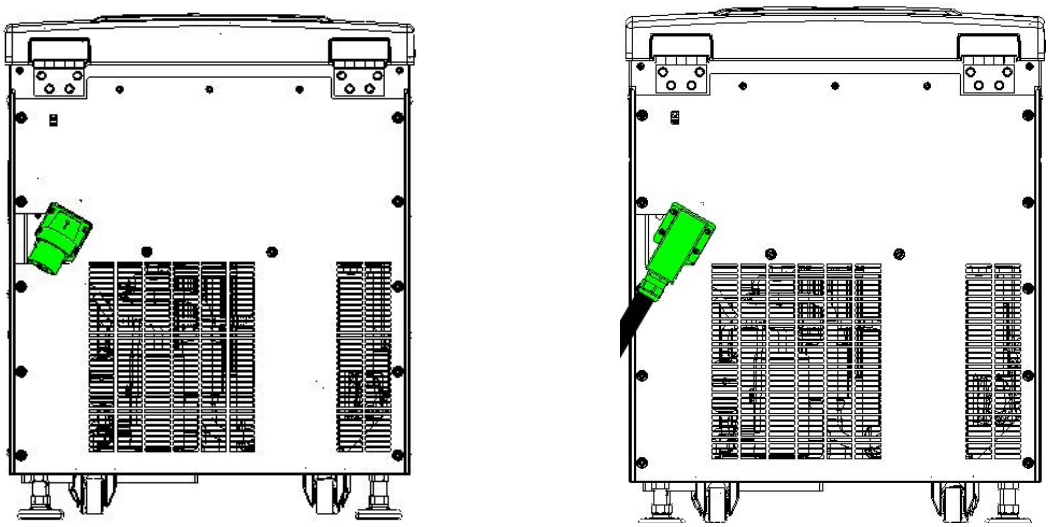


Figure I–3: Mains connection on the backside of the centrifuge

1. Turn off the power supply switch located on the right side (pull the switch handle towards the front of the centrifuge).
2. Make sure that the cable specification agrees with the safety standards of your country.
3. Make sure that the voltage and frequency are the same as the figures on the rating plate.

5. Storage

WARNING When you remove the centrifuge and accessories from use, clean and if necessary disinfect or decontaminate the full system. If you are not sure speak to the Thermo Fisher Scientific customer service.

- Before storing the centrifuge and the accessories it must be clean and if necessary disinfected and decontaminated. Centrifuge, rotors and accessories have to be fully dry before storage.
- Keep the centrifuge in a clean, dust-free location.
- Keep the centrifuge on its rubber feet and not on its casters.
- Do not store the centrifuge in direct sunlight.

THE ACTIVITIES DESCRIBED IN THIS CHAPTER ARE FOR SERVICE TECHNICIANS.

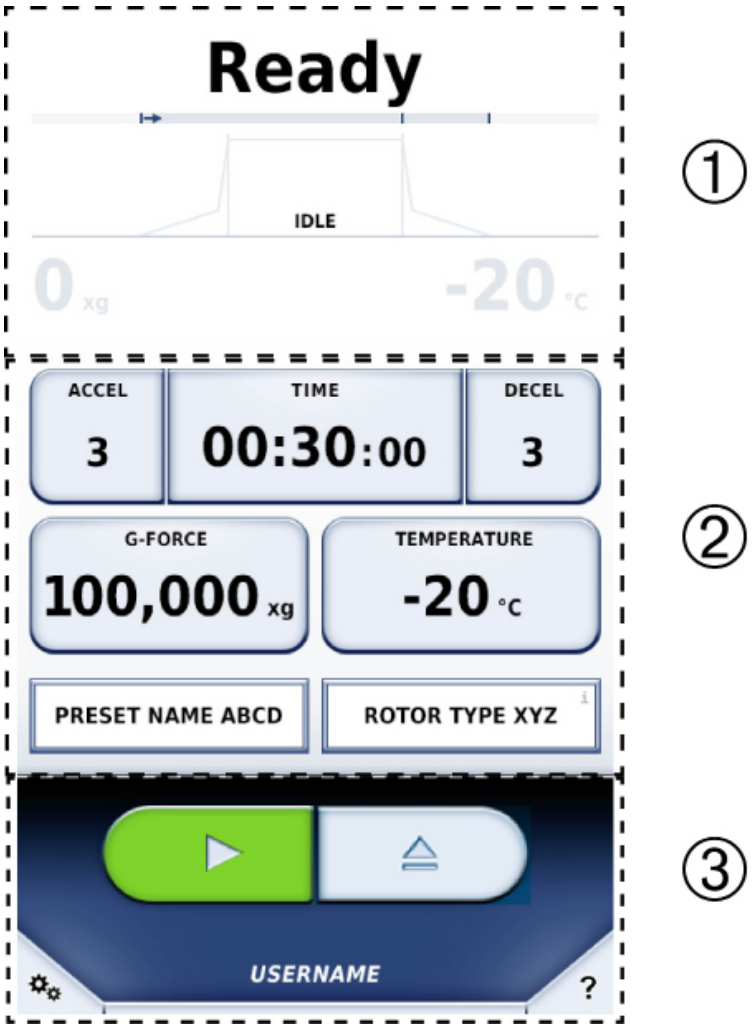
6. Shipping

WARNING Before shipping the centrifuge and accessories you must clean and if necessary, disinfect or decontaminate the full system. If you are not sure speak to the Thermo Fisher Scientific customer service.

Before shipping the centrifuge:

- The centrifuge must be clean and decontaminated.
- You must confirm the decontamination with a decontamination certificate.

Thermo Scientific Centri-Touch User Interface



①	Actual status information
②	Set values
③	Settings and navigation

Status

The upper part of the touchscreen displays the centrifuge status.

The remaining time is indicated while centrifugation is in progress. The progress bar shows the actual phase of the centrifugation.

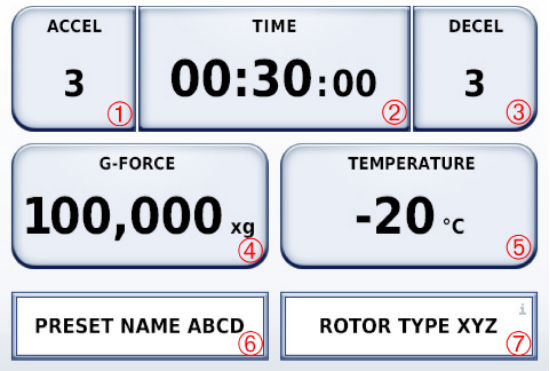
①	**Status**: In the Time mode, the remaining time for the centrifugation process is shown here. In the Hold mode, the elapsed time is displayed.
②	**Progress**: The curve diagram is divided into the sections acceleration, centrifugation and deceleration.
③	**Speed**: The current speed of the rotor is shown here.
④	**Temperature**: The temperature in the centrifugation chamber is shown here.

Status that can be displayed

Ready	Centrifugation can be started.
Door open	Centrifuge door is open.
Door moving	Door is automatically closing or opening.
Error	An error has occurred.
Canceled	Centrifugation has been stopped manually.
Complete	Centrifugation has been successfully completed.
Pretempering completed	Pretempering has been successfully completed.
No rotor	No rotor is identified in the centrifuge.

Run Parameters

The set points for centrifugation can be set in the parameterization window. Clicking one of these buttons will open a new window in which you can input the appropriate set point value.



① **Acceleration:** Select an acceleration profile (Level 1-10).

② **Time**: Select the duration for centrifugation and the time mode.

③ **Deceleration**: Select the deceleration profile (Level 1-10).

④ **Speed**: Set the speed as rpm or RCF.

⑤ **Temperature**: Set the temperature (in °C) for the centrifugation chamber.

⑥ **Program**: Select a program for centrifugation. The previously selected program will always be displayed initially. You can change the parameters once you have selected a program. Changing a parameter will cancel the program.

⑦ **Rotor**: The rotor currently in use is displayed.

Control and Configuration

In this section you can start and halt centrifugation. You can also define settings, such as for the centrifugation programs. If you are not sure of the use of a button you can use the tooltip mode, which provides information about all of the operator control elements.

① **Start centrifugation:** Centrifugation can be started using the current set values.

② **Open Door / Stop**: When centrifugation starts, this button switches to **Stop** ❑.

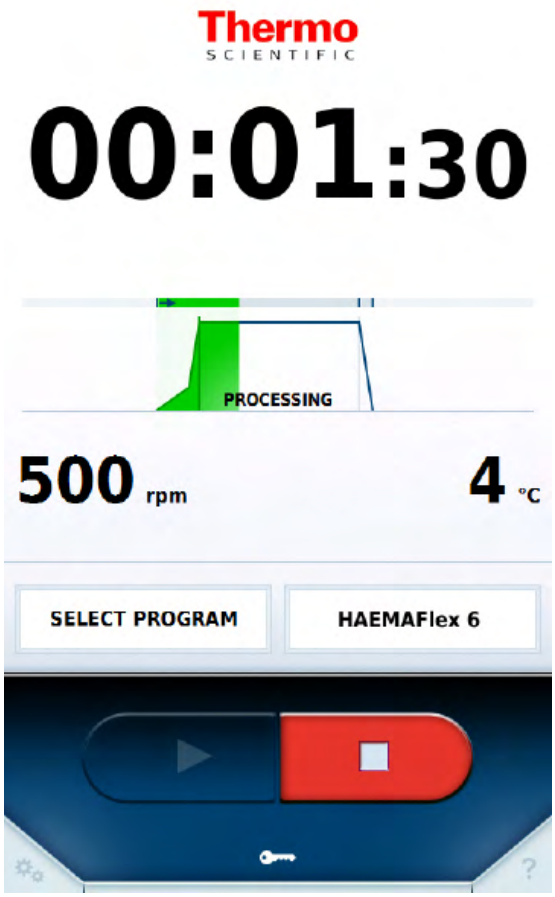
③ **Configuration**: The configuration menu is displayed when this button is clicked. This button is not active while centrifugation is in progress.

④ **Operator:** In certain modes, touching the operator name opens a window for selecting other operators.

⑤ **Tooltip Mode**: This button is used to activate the tooltip mode. All functional elements are deactivated with this mode. When an element is selected in the tooltip mode a field is displayed with information about that particular element. If you press the tooltip button again, this mode is canceled.

Lighthouse Mode

If no entry is made via the main screen in 30 seconds, the unit changes to lighthouse mode. In this mode, the status, current values and progress display are displayed larger.



The set value entry fields disappear and the progress display occupies their space. The time display is enlarged, so that the centrifugation status can be seen clearly from a greater distance. It is still possible to stop the centrifuge. Pressing on any area of the screen causes it to exit from lighthouse mode.

Operation

For detailed instructions and information refer to the separate manual for the Thermo Scientific™ Centri-Touch™ User Interface.

1. Switch on the Centrifuge

Push the switch at the right side.

The centrifuge checks its software. The touchscreen shows the Thermo Scientific logo while booting.

When ready the touchscreen shows the current status of the centrifuge.

2. Open the Centrifuge Door

Press the **Open** button on the touchscreen. [→ II–3] The centrifuge door will be opened automatically with the Thermo Scientific™ Auto-Door™ function.

The centrifuge door can only be opened when the centrifuge is switched on.

CAUTION *Do not use the mechanical emergency door release as regular procedure to open the centrifuge. Use the mechanical emergency door release only if a malfunction or power failure occurs and only when you have made sure that the rotor stopped spinning.* *[→ V-1]*

3. Install a Rotor

WARNING If you have not installed the rotor correctly, do not operate it.
Make sure that the rotor is not damaged. Do not use damaged rotors.
Make sure that the centrifugation chamber is free from objects.

NOTICE Two persons are necessary for this procedure because of the weight of a rotor.

3. 1. Before Installation

Make sure that all rotor parts are clean, dry and have no nicks and scratches.

①	Rotor lid	④	Rotor hub
②	Rotor lid knob	⑤	Centrifugation chamber surface
③	Rotor body	⑥	Drive shaft

Figure III–1: Overview centrifuge and rotor

3. 2. Rotor Installation

1. Open the centrifuge door.

   If necessary remove dust and foreign objects from the chamber.

   Wipe the drive shaft with a clean cloth. Clean the threads of the drive shaft to prevent possible damage to rotor or centrifuge.

   Apply one drop of gresae (75003786) to the drive shaft. Wipe the rotor hub from the bottom side of the rotor with a clean cloth.

   Grab the rotor without the rotor lid on the inner groove with your hands. Hold the rotor body over the drive shaft. Put the rotor body carefully on the drive shaft.

   NOTICE *Two persons are necessary for this procedure because of the weight of a rotor.*

CAUTION *The centrifuge drive can be damaged if the rotor body falls on it.*

Figure III–2: Rotor installation

Use the rotor locking tool (097-1406) clockwise to tighten the rotor on the drive shaft. Tighten the rotor locking screw until you reach a firm stop.

CAUTION *Use only the supplied rotor locking tool (097-1406) to avoid an overload on the fixation parts. Using any other tool, like a screwdriver, or over-tightening of the rotor locking screw can lead to an improper installation of the rotor possibly causing severe damage to the rotor and the centrifuge.*

Figure III–3: Tighten rotor on the drive shaft, e.g. HAEMAFlex 12

2. Load the rotor evenly. Balance opposite loads.

CAUTION *Incorrect loading can lead to damages. Always load the rotor symmetrically to avoid imbalance, bumpy spinning and possible damages.*

Correct Loading ✓

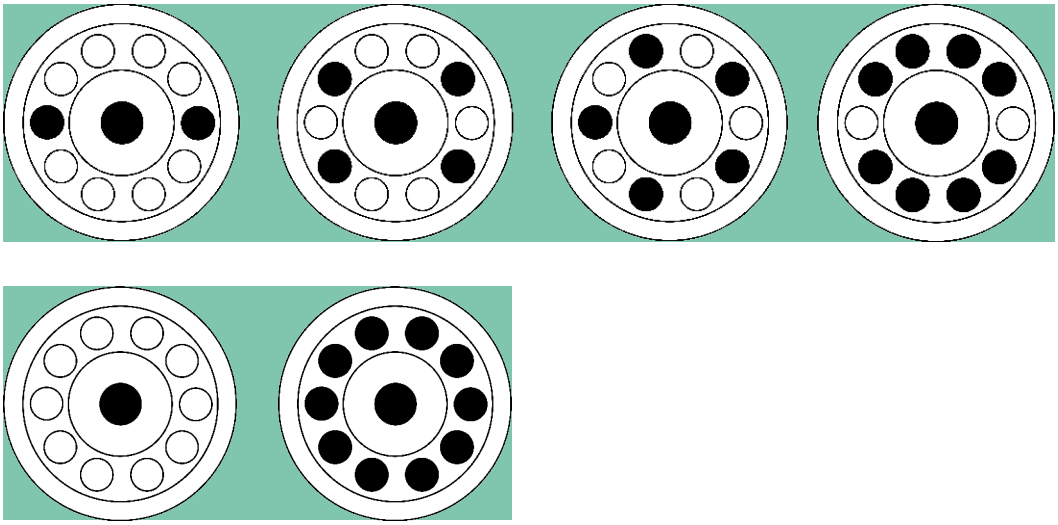


Figure III–4: Correct Loading

Incorrect Loading ×

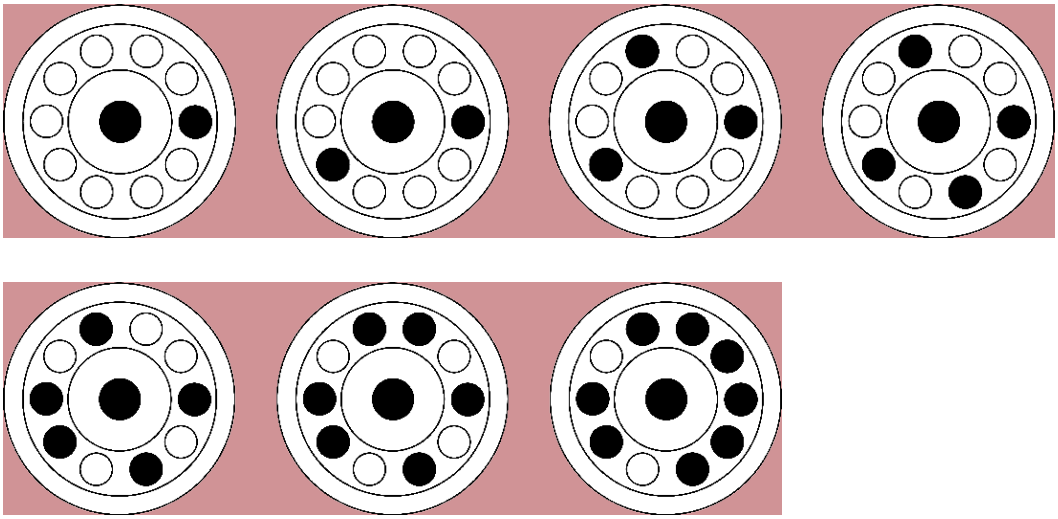


Figure III–5: Incorrect Loading

3. Put the rotor lid on the rotor body.

   NOTICE *If a centrifugation run is done without the rotor lid in place, the centrifuge will not be able to process the desired application as intended.*

Figure III–6: Put the rotor lid on the rotor body

4. Maximum Loading

Each rotor is designed to run with his maximum load at maximum speed. The safety system of the centrifuge requires that the rotor is not overloaded.

The rotors are designed to work with substance mixtures with a density of up to 1.2 g/ml. If the admissible maximum load is exceeded the following steps need to be taken:

- Reduce the fill level.
- Reduce the speed.

Use the table or the formula:

$$n_{adm} = n_{max} \sqrt{\frac{w_{max}}{w_{app}}}$$

n_{adm} = admissible maximum application speed

n_{max} = maximum rated speed

w_{max} = maximum rated load

w_{app} = applied load

Use of Tubes and Consumables

Care should be taken to ensure that the tubes and bottles used in the centrifuge are:

- rated to or above the selected RCF to be spun at,
- used at there minimum fill volume,
- not used above their design life (age or number of runs),
- undamaged.

Please refer to manufacturers data sheets for further information.

5. Close the Centrifuge Door

WARNING Do not grab into the clearance between the centrifuge door and the housing. The centrifuge door shuts automatically. Put your hands always on top of the centrifuge door. Use the emergency release only for malfunctions and electrical failures. [→ V-1]

NOTICE If the centrifuge door is open when the centrifuge is switched on, the centrifuge door needs to be closed manually. Only then, the centrifuge can be operated using the touchscreen.

Close the centrifuge door with the Auto-Door function by pressing on the **Close** button on the touchscreen. The centrifuge door will be automatically closed. Two locks close the centrifuge door fully. When closed, the touchscreen shows the **Start** button.

6. Entering Parameters

NOTICE *If the centrifuge door is open when the centrifuge is switched on, the centrifuge door needs to be closed manually. Only then, the centrifuge can be operated using the touchscreen.*

6. 1. Acceleration / Deceleration Profiles

There are 10 curves (1-10) for acceleration and 10 for deceleration (1-10). The acceleration / deceleration profile can be selected in the main screen.

Touch the number of the desired profile or move the slider by sliding your fingers over the numbers.

Select **Apply** to confirm this selection for the next run.

The profile with the lowest number has the shallowest incline marked with **min**; profile number 10 is the steepest incline which is marked with **max**.

6. 2. Preselect Speed / RCF-Value

1. Press on the speed field on the main screen.
2. Press rpm or RCF. The selected function is highlighted in yellow.
3. Enter the desired value. The digits show in sequential order.
4. Confirm your entry by pressing **Confirm**.

NOTICE *If a speed or RCF-value out of the nominal range has been selected, a message will appear with the permissible values.*

Explanation of RCF-Value

The relative centrifugal force (RCF) is given as a multiple of the force of gravity (g). It is a unitless numerical value which is used to compare the separation or sedimentation capacity of various centrifuges, since it is independent of the type of device. Only the centrifuging radius and the speed are used for calculation:

$RCF = 11.18 \times \left(\frac{n}{1000}\right)^2 \times r$

r = centrifuging radius in cm

n = rotational speed in rpm

The maximum RCF value is related to the maximum radius of the tube opening.

Remember that this value is reduced depending on the tubes and bottles used.

This can be accounted for in the calculation above if required.

6. 3. Runtime Preselection

1. Press the time field on the main screen to open the runtime selection menu.
2. Press **Time**, **Hold** or $\int \omega^2 dt$, depending on the value you would like to change.
3. Enter the desired value using the numeric pad. The digits show in sequential order.
4. Confirm your entry by pressing **Confirm**.

Time	Hold	ACE
Duration of centrifugation; input as hh:mm. The set time is counted down when centrifugation is in progress. Initial value: Defined duration hh:mm:00	Unlimited duration of centrifugation. The time elapsed so far is displayed while centrifugation is in progress. Initial value: 00:00:00	Accumulated Centrifugal Effect enter in $x.y * 10^z$ X: Whole digits (1st input field) Y: Decimal numbers (2nd input field) Z: Power (3rd input field)

6. 4. Preselect Temperature

You can preselect temperatures between -20 °C and 30 °C.

To set the temperature, proceed as follows:

1. Press the temperature field in order to open the temperature menu.
2. Enter the desired temperature. The digits show in sequential order.
3. Confirm your entry by pressing **Confirm**.

6. 5. Pre-warm or Pre-cool the Centrifuge

To pre-temp the centrifuge, proceed as follows:

1. Use **Configuration** and **Runs** to select a stored program. The pre-temp function is connected to a program.
2. Press **Load** to select programmed parameters. In the main screen you can then set the required target temperature.

7. Programs

For detailed instructions and information refer to the according manual for the Thermo Scientific Centri-Touch User Interface.

The instructions stated here are just an extract of how to work with programs.

1. Press on the touchscreen.

   If a program is already loaded, the program name will be shown on the button.

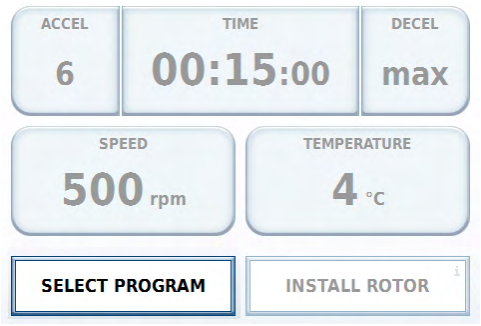


Figure III–7: Select program

2. Press **New**.

   a. Check the parameter. Change the parameter if necessary.

      To change a parameter, press the button of the parameter you want to change.

      Press **Apply**.

   b. Press **Enter Name**.

      Enter a name for the program.

      Press **Apply**.

   c. Press **Select Rotor**.

      Select a rotor.

      Press **Apply**.

3. Press **Apply** to save the program.
4. Press the new created program.

   Press **Load**.

   The program is now loaded and can be used.

8. Centrifugation

WARNING Do not operate the centrifuge on its casters.

8. 1. Start

Press the **Start** key on the touchscreen. The centrifuge accelerates to the preset speed with the time display active. After 30 seconds the touchscreen switches to the lighthouse mode. Pressing anywhere on the touchscreen ends the lighthouse mode. [→ 🗎 II–4]

You cannot open the centrifuge door as long as the centrifuge is running.

8. 2. Stop

With preset Run Time

Usually the run time is preset and you only have to wait until the centrifuge stops automatically when the preset time limit expires.

As soon as the speed drops to zero, the message **Complete** will appear on the touchscreen. Press **Open Door** to open the centrifuge door and remove the samples.

You can also stop the centrifuging program manually at any time by pressing **Stop** ❑. If the lighthouse mode is active, end it by pressing anywhere on the touchscreen. [→ 🗎 II–4]

Continuous Operation

If you selected continuous operation, you will have to stop the centrifuge manually. Press **Stop** ❑ on the touchscreen. The centrifuge will be decelerated at the designated rate. If the lighthouse mode is active, end it by pressing anywhere on the touchscreen. [→ 🗎 II–4] The message **Complete** will appear on the touchscreen. Press **Open Door** to open the centrifuge door and remove the samples.

8. 3. Using the Drain Box

You can use the drain box (75007730) to collect water from of the centrifugation chamber.

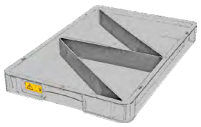


Figure III–8: Drain box (75007730)

1. Install the drain box.

Figure III–9: Installing the drain box (75007730)

2. Remove the plug from the bottom of the centrifugation chamber.

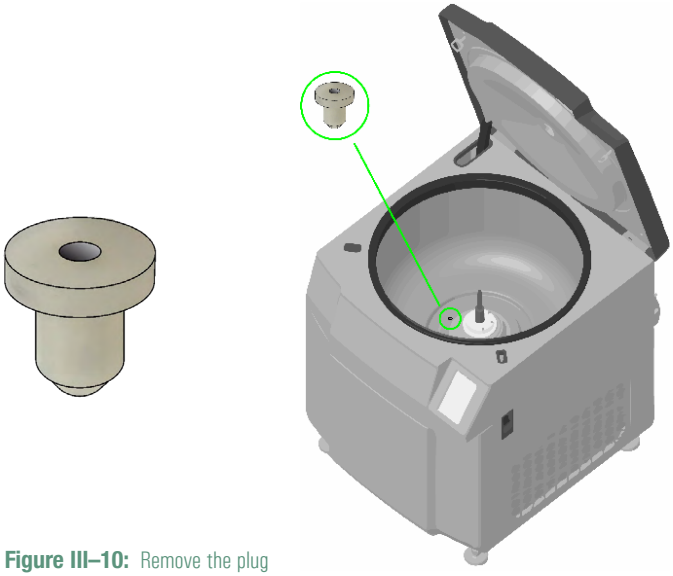


Figure III–10: Remove the plug

NOTICE *Removing the plug and not installing the drain box will lead to spillage on the floor.*

To remove the plug the centrifuge door must be open and the rotor has to be removed.

NOTICE *Don't use any sharp tool to extract the plug. This might damage the centrifugation chamber.*

3. You have to regularly check if the drain box is filled and empty the drain box to avoid spilling on the floor.
4. Clean, disinfect and decontaminate the drain box as stated in the Maintenance and Care chapter. [→ IV–1]

9. Remove a Rotor

WARNING

Risk of cuts through fast rotating rotor lid.

Do not open the centrifuge door while the rotor assembly spins.

Only when the rotor assembly has stopped, use the mechanical emergency centrifuge door release.

NOTICE

Two people are necessary to remove the rotor because of its weight.

1. Open the centrifuge door.

   The centrifuge door can only be opened when the centrifuge is switched on.

   Press the **Open Door** button on the touchscreen. The centrifuge door will be automatically opened.

   CAUTION *Do not use the mechanical emergency door release as regular procedure to open the centrifuge. Use the mechanical emergency door release only if a malfunction or power failure occurs and only when you have made sure that the rotor stopped spinning.* *[→ V-1]*

2. Remove the rotor lid. The lid might feel stuck on the rotor body. While lifting it rotate the rotor lid by holding it at its rotor lid knob.

Figure III–11: Remove rotor lid from rotor body

3. Unload the rotor.
4. Use the rotor locking tool (097-1406) to disengage the rotor locking screw.

Figure III–12: Disengage the rotor locking screw from drive shaft

5. Grab the rotor without the rotor lid on the inner groove with your hands. Remove the rotor body from the drive shaft.

   NOTICE *Two persons are necessary for this procedure because of the weight of a rotor.*

   CAUTION *The centrifuge drive can be damaged if the rotor body falls on it.*

Figure III–13: Remove the rotor

10. Switch off the Centrifuge

Turn off the power supply switch located on right side of the centrifuge.

IV

Maintenance and Care

1. Cleaning Intervals

For the sake of personal, environmental and material protection, you must clean and if necessary disinfect the centrifuge and its accessories on a regular basis.

2. Basics

CAUTION

Not rated procedures or agents could deteriorate the materials of the centrifuge and lead to malfunction.
Refrain from using any other cleaning or decontamination procedure, if you are not entirely sure that the intended procedure is safe for the equipment.
Use only cleaning agents that will not damage the equipment. In doubt contact the manufacturer of the cleaning agent.
If in doubt, contact Thermo Fisher Scientific.

- Use warm water with a neutral detergent that is suitable for use with the materials. If in doubt contact the manufacturer of the cleaning agent.
- Never use caustic cleaning agents such as soap suds, phosphoric acid, bleaching solutions or scrubbing powder.
- Remove rotor and clean centrifugation chamber with a small amount of cleaning agent on a clean cloth.
- Use a soft brush without metal bristles to remove stubborn residue.
  Afterwards rinse with a small amount of distilled water and remove any remains with absorbent towels.
- Use only disinfectants with a pH of 6-8.

2. 1. Rotor and Components Inspection

CAUTION Do not run any rotor or accessories with sign of damage.
It is recommend that you have rotors and accessories inspected yearly as part of your routine service to ensure safety.

After thoroughly cleaning the rotors, they must be inspected for damage, wear and corrosion.

NOTICE *Usage beyond these limits might lead to rotor failure, sample loss and damage to the centrifuge.*

Metal Parts

Ensure that the protective coating is complete. It can be removed through wear and chemical attack and can lead to unseen corrosions. In case of corrosion, such as rust or white / metallic pitting, the rotor or accessories must be removed from service immediately.

Plastic Parts

Check for signs of plastic crazing, fading, bruising or cracking. In case of damage the inspected item must be removed from service immediately.

Cycles of Rotors

The centrifuge counts cycles for a rotor type. The centrifuge does not count the cycles of the bottles. You have to count the cycles of the bottles using your own method. The centrifuge can not detect the change or replacement of rotors of the same type or bottles.

You can check the number of cycles for a rotor type on the user interface of the centrifuge. The rotor log saves the information of the used rotors. Press **Settings** (gears symbol), then **Runs** and then **Rotor Log** to see the information. Besides the values of the rotor an information about the number of cycles completed by this rotor type in this centrifuge is shown.

For detailed instructions and information refer to the separate manual for the Thermo Scientific Centri-Touch User Interface.

3. Cleaning

CAUTION Before using any cleaning methods, users should check with the manufacturer of the cleaning agents that the proposed method will not damage the equipment.

CAUTION Drive and door lock can be damaged by entering liquids. Do not allow liquids, especially organic solvents, to get on the drive shaft, the drive bearings or the centrifuge door locks.
Organic solvents break down the grease in the motor bearing. The drive shaft could lock up.

Clean as follows:

1. Clean rotor and accessories outside of the centrifugation chamber.
2. Separate rotor and accessories to allow thorough cleaning.
3. Rinse rotor and all accessories with warm water and a neutral detergent that is suitable for use with the materials. If in doubt contact the manufacturer of the cleaning agent.
4. Use a soft brush without metal bristles to remove stubborn residue.
5. Rinse rotor and all accessories with distilled water.
6. Place the rotors on a plastic grate with their cavities pointing down, to enable the cavities to fully drain and dry.
7. Dry all of the rotors and accessories after cleaning with a cloth or with air.
8. Inspect the rotor and accessories for signs of damages. [→ IV–2]

3. 1. Touchscreen

1. Pull out the power supply plug.
2. Clean the touchscreen using a dry microfiber cloth.
3. If necessary moisten the microfiber cloth and wipe the touchscreen again.

3. 2. Filter Mat

CAUTION

Do not touch the edges of the housing with your hands when the grid is removed.

Cutting damage can occur if you touch the edges due to their sharpness.

The centrifuge has one filter mat to prevent dust from entering the centrifuge. To clean the centrifuge proceed as follows:

1. Remove the 4 screws of the grid ① on the right side of the centrifuge.
2. Remove the grid ② and the filter mat.
3. Use a vacuum cleaner on both sides of the filter mat.
4. Insert the filter mat again.
5. Reinstall the grid.

4. Disinfection

WARNING

Do not touch infected parts.

Hazardous infection is possible when touching the contaminated rotor and centrifuge parts. Infectious material can get into the centrifuge when a tube breaks or as a result of spills.

In case of contamination, make sure that no one is put at risk.

Disinfect the affected parts immediately.

CAUTION

Equipment can be damaged by inappropriate disinfection methods or agents.

Make sure that the disinfection agent or the method will not damage the equipment. In doubt contact the manufacturer of the disinfection agent.

Observe the safety precautions and handling instructions for the disinfection agents used.

After disinfection:

1. Rinse the centrifuge and all affected accessories with water.
2. Allow to fully drain and dry.

5. Decontamination

WARNING

Do not touch contaminated parts.

Exposure to radiation is possible when touching the contaminated rotor and centrifuge parts. Radioactive material can get into the centrifuge when a tube breaks or as a result of spills.

In case of contamination, make sure that no one is put at risk.

Decontaminate the affected parts immediately.

CAUTION

Equipment can be damaged by inappropriate decontamination methods or agents.

Make sure that the decontamination agent or the method will not damage the equipment. In doubt contact the manufacturer of the decontamination agent.

Observe the safety precautions and handling instructions for the decontamination agents used.

After decontamination:

1. Rinse the centrifuge and all affected accessories with water.
2. Allow to fully drain and dry.

6. Autoclaving

⚠ **CAUTION**	Never exceed the permitted temperature and duration when autoclaving.

NOTICE	No chemical additives are permitted in the steam.

Within the list of components marked parts can be autoclaved at 121 °C for 20 min. [→ A–3]

Make sure that the necessary sterility is achieved according to your requirements.

7. Maintenance

7. 1. Preventive Maintenance

In order to keep this product able to perform the intended application in a reliable and safe state, ongoing preventive maintenance is necessary in accordance with the following recommended schedule:

- For rotors and accessories mind the information in the Rotor and Components chapter.[→ IV–2]
- The anti-vibration mounts need to be replaced every 3 years.
- The centrifuge needs to be decommissioned after 15 years or 150000 cycles, whichever comes first.

CAUTION *Usage beyond these limits might affect the safety of the overall system.*

7. 2. Service

The anti vibration mounts (50151096) need to be replaced every three years by a Thermo Fisher Scientific authorized service technician or earlier if noticed. If the anti vibration mounts are not replaced within this period the performance of the centrifuge can decrease.

NOTICE *In the worst case the centrifuge, the used accessories and the samples can be damaged.*

Thermo Fisher Scientific recommends having the centrifuge and accessories serviced once a year by an authorized service technician. The service technician checks the following:

- electrical equipment;
- suitability of set-up site;
- centrifuge door lock and safety system;
- rotor;
- fixation of rotor and drive shaft of the centrifuge;
- protective casing;
- anti-vibration mounts.

Before service, centrifuge and rotors should be thoroughly cleaned and decontaminated to ensure full and safe inspection can be completed.

Thermo Fisher Scientific offers inspection and service contracts for this work. Any necessary repairs are performed for free during the warranty period and afterwards for a charge. That is only valid if the centrifuge has only been maintained by an authorized Thermo Fisher Scientific service technician.

8. Shipping and Disposal

WARNING When removing the centrifuge and accessories from use for disposal you have to clean and if necessary disinfect or decontaminate the entire system. In doubt contact the Thermo Fisher Scientific customer service.

For the disposal of the centrifuge mind the regulations in your country. Contact the Thermo Fisher Scientific Customer Service for the disposal of the centrifuge. For contact information check the back page of this manual or visit www.thermofisher.com/centrifuge

For the countries of the European Union the disposal is regulated by the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2012/19/EU.

Mind the information on transport and shipping. [→ I–2] [→ I–6]

V

Troubleshooting

1. Mechanical Emergency Door Release

WARNING

Serious injuries can occur, if you touch a spinning rotor with your hands or tools.
A rotor can still be spinning after a power failure occurs.
Do not open the centrifuge before the rotor has stopped spinning. Do not touch a spinning rotor. Never use your hands or tools to stop a spinning rotor.

During a power failure, you will not be able to open the centrifuge door with the regular electric centrifuge door release. A mechanical override is provided to allow sample recovery in the case of an emergency. The mechanical override should be used only in emergencies and **after the rotor has come to a complete stop**.

Always wait until the rotor has come to a stop without braking. The brake does not work without power supply. The deceleration process lasts much longer than usual.

Proceed as follows:

1. **Wait until the rotor has stopped.** It can take longer than 100 minutes.

   Use the sight glass in the centrifuge door to make sure that the rotor has stopped. The handle of the rotor lid has a marking, that shows a line, if the rotor has stopped.

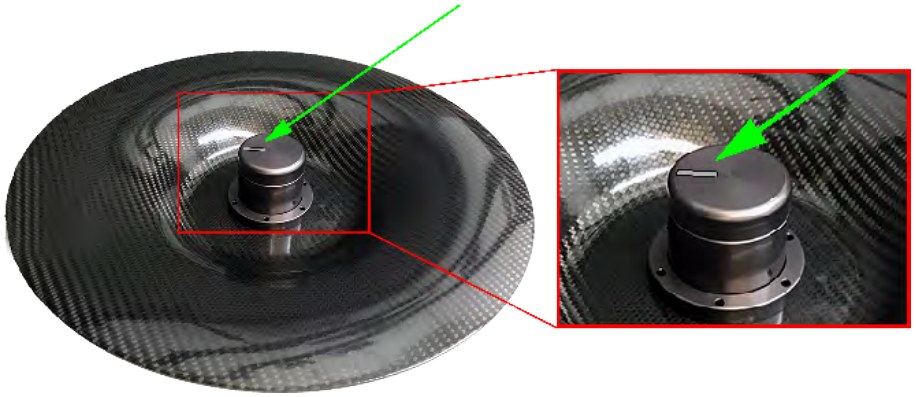


Figure V–1: Marking on rotor lid

2. Pull out the power supply plug.
3. On both sides of the housing are two white plastic plugs. Get these two white plastic plugs out of both sides of the housing. Pull the release cords on both sides to trigger the mechanical centrifuge door release. The centrifuge door needs to be lifted manually. You need some force to lift the centrifuge door manually.

Figure V–2: Position of the mechanical emergency door release

4. Put the release cords back into the centrifuge and put the white plastic plugs back into the centrifuge housing.
5. Reconnect the centrifuge to the power supply when the power failure has ended.

2. Ice Formation

Warm humid air in combination with a cold centrifugation chamber can lead to formation of ice.

To remove the ice out of the centrifugation chamber:

1. Open the centrifuge door.
2. Remove the rotor. [→ 🗎 III–11]
3. Let the ice melt.

   NOTICE *Do not use any sharp tools, aggressive liquids or fire to fasten the melting process. If necessary use warm water to fasten the melting process.*
4. Remove the water from the centrifugation chamber.

   You can use the drain box (75007730) to remove the water from the centrifugation chamber. [→ 🗎 III–10]
5. Clean the centrifuge chamber. [→ 🗎 IV–1]

3. Troubleshooting by Guide

CAUTION If problems occur other than those listed in this table, service technician must be contacted.

If an error occurs, follow the instructions on the touchscreen. Error messages have a red colored background.

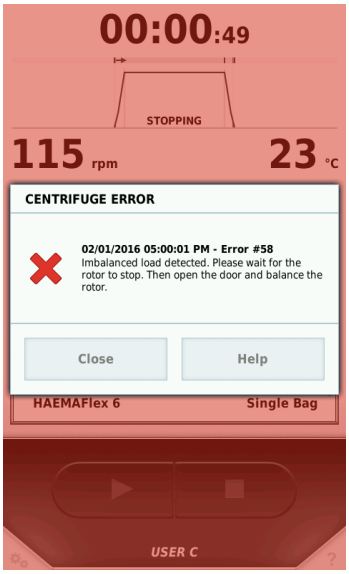


Figure V–3: Example for an error message

Error Message	Description	Troubleshooting
E-1 to E-97		Switch the centrifuge off and on again. Move the drive shaft slightly towards the front of the centrifuge. If the error message still shows, contact a service technician.
E-98	Centrifuge can not be operated. Centrifuge run can not be started or centrifuge is braking.	Imbalance detected. Check the loading of the rotor. Check the lubrication of the trunnion bolts of the rotor body. Switch the centrifuge off and on again. If the error message still shows, contact a service technician.
E-99		Switch the centrifuge off and on again. If the error message still shows, contact a service technician.

Table V–1: Error messages

4. Information for the Customer Service

If you need to contact a service technician, please provide the order no. and the serial no. of your centrifuge. This information can be found on the back near the inlet for the power supply cable.

To identify the software version, proceed as follows:

1. Switch on the centrifuge.
2. Open the configuration menu.
3. Select **Configuration**.
4. Select **Device**.

   Now you can read all required data.

A

Technical Specifications

Environmental Conditions	Altitudes of up to 3000 m above sea level Max. relative humidity 80 % up to 31 °C; decreasing linearly to 50 % relative humidity at 40 °C
Environmental Conditions during Storage and Shipping	Temperature: -10 °C to 55 °C Humidity: 15 % to 85 %
Permissible Ambient Temperature during Operation	2 °C to 35 °C

Average Heat Dissipation	2.3 KW/h
Overvoltage Category	II
Pollution Degree	2
IP	20
Running Time	99 h 59 min 59 sec (1 second increment)
Maximum Speed n_{max}	6250 rpm
Minimum Speed n_{min}	300 rpm
Maximum RCF Value at n_{max}	12000 x g
Noise Level at Maximum Speed[1]	60 dB (A)
Maximum Kinetic Energy	386 KJ
Temperature Setting Range	-20 °C to 30 °C

Dimensions	
Height (open door / closed door)	1750 mm / 1015 mm (68.9 in / 39.4 in)
Width	816 mm (32.1 in)
Depth (with mains connection)	
200, 208, 220, 230, 240 V, 50/60 Hz	950 mm (36.7 in)
380, 400, 415 V, 50/60 Hz	990 mm (38.9 in)
Weight[2]	
200, 208, 220, 230, 240 V, 50/60 Hz	481 kg (1060 lb)
380, 400, 415 V, 50/60 Hz	466 kg (1027 lb)

[1] 1 m in front of the instrument at 1.6 m height.

[2] Without rotor.

Table A–1: Technical Data Thermo Scientific Sorvall BIOS A and Sorvall BIOS A Heavy Duty

1. Directives, Standards and Guidelines

Centrifuge	Region	Directive	Standard
Thermo Scientific Sorvall BIOS A Thermo Scientific Sorvall BIOS A Heavy Duty	**Europe** 3-Phase 380, 400, 415 V, 50 Hz	**2006/42/EC** Machinery **2014/35/EU** Low Voltage (Protective Goals) **2014/30/EU** Electromagnetic Compatibility (EMC) **2011/65/EU RoHS** Directive on the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment	EN 61010-1 IEC 61010-2-020 EN 61326-1 Class B EN ISO 14971 EN ISO 9001
	USA & Canada Single Phase 208, 230, 240 V, 60 Hz		ANSI/UL 61010-1 IEC 61010-2-020 IEC 61326-1 Class B EN ISO 14971 EN ISO 9001
	Japan Single Phase 200 V, 50 / 60 Hz **China** 3-Phase 380 V, 50 Hz		IEC 61010-1 IEC 61010-2-020 IEC 61326-1 Class B EN ISO 14971 EN ISO 9001

Table A–2: Directives, Standards and Guidelines Sorvall BIOS A and Sorvall BIOS A Heavy Duty

2. Refrigerants

Article No.	Centrifuge	Refrigerant	Quantity	Pressure	GWP	CO_2e
75007698	Thermo Scientific Sorvall BIOS A	R-449A	1.96 kg	34 bar	1 397	2.74 t
75007699	Thermo Scientific Sorvall BIOS A	R-449A	1.96 kg	34 bar	1 397	2.74 t
75007700	Thermo Scientific Sorvall BIOS A Heavy Duty	R-449A	1.96 kg	34 bar	1 397	2.74 t

Contains fluorinated greenhouse gases in a hermetically sealed system.

Table A–3: Refrigerants used in the Sorvall BIOS A and Sorvall BIOS A Heavy Duty

3. Mains Supply

The following data is to be taken into consideration, when selecting the mains connection socket.

Mains Voltage	Frequency	Rated Current	Power Consumption	Building Fuse[1]	Equipment Fuse
200 V	50 Hz	32.0 A	6000 W	50[3] A	40 A
208 V	50 Hz	31.0 A	6000 W	50[3] A	40 A
220 V	50 Hz	29.0 A	6000 W	50[3] A	40 A
230 V	50 Hz	28.0 A	6000 W	50[3] A	40 A
240 V	50 Hz	27.0 A	6000 W	50[3] A	40 A
200 V	60 Hz	32.0 A	6400 W	50[3] A	40 A
208 V	60 Hz	31.0 A	6400 W	50[3] A	40 A
220 V	60 Hz	29.0 A	6400 W	50[3] A	40 A
230 V	60 Hz	28.0 A	6400 W	50[3] A	40 A
240 V	60 Hz	27.0 A	6400 W	50[3] A	40 A
380 V	50 Hz	16.0 A	5800 W	32[2] A	25 A
400 V	50 Hz	15.0 A	5800 W	32[2] A	25 A
415 V	50 Hz	14.0 A	5800 W	32[2] A	25 A
380 V	60 Hz	16.0 A	6100 W	32[2] A	25 A
400 V	60 Hz	15.0 A	6100 W	32[2] A	25 A
415 V	60 Hz	14.0 A	6100 W	32[2] A	25 A

[1] For the 200, 208, 220, 230, 240 V units the inrush current is 120 A for up to 1 second during the refrigeration start period. For the 380, 400, 415 V units it is 60 A. Circuit breakers, whether thermal or magnetic actuated, must have a delay type applicable for the start of motors.

[2] For 380, 400, 415 V, 3-phase (unbalanced load, no neutral used) use a 32 A Trip Char. C circuit breaker (D or K are also applicable).

[3] For North America: use for example GES-9888 50 A.

Table A–4: Mains Supply

4. Components

Article No.	Description	Autoclavable (121 °C, 20 min; ✘ = no, ✔ = yes)
75007742	Centri-Log Plus	✘
75007740	Sample Tracking Kit	✘
75007741	Networking Access Kit	✘
75007730	Drain Box (600 x 400 x 50 mm)	✘
096-101001	**Fiberlite F6-10x1000 LEX Rotor**	✘
010-1491	Fiberlite 1000 mL Super-speed Bottle Assembly Pack of 2, PPCO	✔
010-1492	Fiberlite 1000 mL Super-speed Bottle Assembly Pack of 2, PC	✔
010-1661	1000 mL SteriBIOS Bottle (set of 4)	✘
099-101001	Rotor Lid Assembly	✘
020-101001	Rotor Care Kit	✘

Table A–5: Components

B

Rotors

Items Supplied for Rotor

Article No.	Item	Quantity
096-101001	**Thermo Scientific Fiberlite F6-10x1000 LEX Rotor**	**1**
099-101001	**Lid Assembly**	**1**
020-101001	**Rotor Care Kit**	**1**
097-1403	1L Closure Tool	1
097-1406	10x1000 LEX Polars 5 mm tie-down T-Wrench	1
50155111	**Information Card**	**1**

Table B–1: Items supplied for rotor

Fiberlite F6-10x1000 LEX Rotor

Technical Data

	Sorvall BIOS A / Sorvall BIOS A Heavy Duty	
Centrifuge Voltage	**200, 208, 220, 230, 240 V**	**380, 400, 415 V**
Rotor Capacity	10 x 1 000 ml	10 x 1 000 ml
Maximum Speed n_{max}	6 250 rpm	6 250 rpm
Maximum RCF-Value at n_{max}	12 000 x g	12 000 x g
K-Factor at n_{max}	5 135	5 135
Radius max. / min.	274 mm / 124 mm	274 mm / 124 mm
Angle	25°	25°
Maximum Speed at 4 °C	5 500 rpm	5 500 rpm
Sample Temperature at Max. Speed (Ambient temperature of 23 °C, run time 90 minutes)	50 Hz: 14 °C 60 Hz: 14 °C	50 Hz: 14 °C 60 Hz: 14 °C
Aerosol-tight	No	No
Weight	32.0 kg (70.5 lb)	
Rotor Body (empty)	30.7 kg (67.9 lb)	
Rotor Lid	1.3 kg (2.9 lb)	

Table B–2: F6-10x1000 mL with 1000 mL Bottles,PPCO

Chemical Compatibility Chart

CHEMICAL / MATERIAL	Aluminum	Anodic Coating for Aluminum	Buna N	Cellulose Acetate Butyrate	Polyurethane Rotor Paint	Composite Carbon Fiber/Epoxy	Delrin™	Ethylene Propylene	Glass	Neoprene	Noryl™	Nylon	PET, Polyclear™, Clear Crimp™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polythermide	Polyethylene	Polypropylene	Polysulfone	Polyvinil Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
2-mercaptoethanol	S	S	U	/	S	M	S	/	S	U	S	S	U	S	S	/	S	S	S	S	U	S	S	S	S	S	S
Acetaldehyde	S	/	U	U	/	/	/	M	/	U	/	/	/	M	U	U	U	M	M	/	M	S	U	/	S	/	U
Acetone	M	S	U	U	S	U	M	S	S	U	U	S	U	S	U	U	U	S	S	U	U	S	M	M	S	U	U
Acetonitrile	S	S	U	/	S	M	S	/	S	S	U	S	U	M	U	U	/	S	M	U	U	S	S	S	S	U	U
Alconox™	U	U	S	/	S	S	S	/	S	S	S	S	S	S	M	S	S	S	S	S	S	S	S	S	S	S	U
Allyl Alcohol	/	/	/	U	/	/	S	/	/	/	/	S	/	S	S	M	S	S	S	/	M	S	/	/	S	/	/
Aluminum Chloride	U	U	S	S	S	S	U	S	S	S	S	M	S	S	S	S	/	S	S	S	S	S	M	U	U	S	S
Formic Acid (100%)	/	S	M	U	/	/	U	/	/	/	/	U	/	S	M	U	U	S	S	/	U	S	/	U	S	/	U
Ammonium Acetate	S	S	U	/	S	S	S	/	S	S	S	S	S	S	S	U	/	S	S	S	S	S	S	S	S	S	S
Ammonium Carbonate	M	S	U	S	S	S	S	S	S	S	S	S	S	S	U	U	/	S	S	S	S	S	S	M	S	S	S
Ammonium Hydroxide (10%)	U	U	S	U	S	S	M	S	S	S	S	S	/	S	U	M	S	S	S	S	S	S	S	S	S	M	S
Ammonium Hydroxide (28%)	U	U	S	U	S	U	M	S	S	S	S	S	U	S	U	M	S	S	S	S	S	S	S	S	S	M	S
Ammonium Hydroxide (conc.)	U	U	U	U	S	U	M	S	/	S	/	S	U	S	U	U	S	S	S	/	M	S	S	S	S	/	U
Ammonium Phosphate	U	/	S	/	S	S	S	S	S	S	S	S	/	S	S	M	/	S	S	S	S	S	S	M	S	S	S
Ammonium Sulfate	U	M	S	/	S	S	U	S	S	S	S	S	S	S	S	S	/	S	S	S	S	S	S	U	S	S	U

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Chemical Compatibility Chart

CHEMICAL \ MATERIAL	Alluminum	Anodic Coating for Aluminum	Buna N	Cellulose Acetate Butyrate	Polyurethane Rotor Paint	Composite Carbon Fiber/Epoxy	Delrin™	Ethylene Propylene	Glass	Neoprene	Noryl™	Nylon	PET, Polyclear™, Clear Crimp™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polythermide	Polyethylene	Polypropylene	Polysulfone	Polyvinil Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
Amyl Alcohol	S	/	M	U	/	/	S	S	/	M	/	S	/	M	S	S	S	S	M	/	/	/	U	/	S	/	M
Aniline	S	S	U	U	S	U	S	M	S	U	U	U	U	U	U	U	/	S	M	U	U	S	S	S	S	U	S
Sodium Hydroxide (<1%)	U	/	M	S	S	S	/	/	S	M	S	S	/	S	M	M	S	S	S	S	S	S	M	S	S	/	U
Sodium Hydroxide (10%)	U	/	M	U	/	/	U	/	M	M	S	S	U	S	U	U	S	S	S	S	S	S	M	S	S	/	U
Barium Salts	M	U	S	/	S	S	S	S	S	S	S	S	S	S	S	M	/	S	S	S	S	S	S	M	S	S	S
Benzene	S	S	U	U	S	U	M	U	S	U	U	S	U	U	U	M	U	M	U	U	U	S	U	U	S	U	S
Benzyl Alcohol	S	/	U	U	/	/	M	M	/	M	/	S	U	U	U	U	U	U	U	/	M	S	M	/	S	/	S
Boric Acid	U	S	S	M	S	S	U	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S
Cesium Acetate	M	/	S	/	S	S	S	/	S	S	S	S	/	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Cesium Bromide	M	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Cesium Chloride	M	S	S	U	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Cesium Formate	M	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Cesium Iodide	M	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Cesium Sulfate	M	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Chloroform	U	U	U	U	S	S	M	U	S	U	U	M	U	M	U	U	U	M	M	U	U	S	U	U	U	M	S

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Chromic Acid (10%)	U	/	U	U	S	U	U	/	S	S	S	U	S	S	M	U	M	S	S	U	M	S	M	U	S	S	S
Chromic Acid (50%)	U	/	U	U	/	U	U	/	/	/	S	U	U	S	M	U	M	S	S	U	M	S	/	U	M	/	S
Cresol Mixture	S	S	U	/	/	/	S	/	S	U	U	U	U	U	U	/	/	U	U	/	U	S	S	S	S	U	S
Cyclohexane	S	S	S	/	S	S	S	U	S	U	S	S	U	U	U	M	S	M	U	M	M	S	U	M	M	U	S
Deoxycholate	S	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	S	S	S	S
Distilled Water	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Dextran	M	S	S	S	S	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	M	S	S	S
Diethyl Ether	S	S	U	U	S	S	S	U	S	U	U	S	U	U	U	U	U	U	U	U	U	S	S	S	S	M	U
Diethyl Ketone	S	/	U	U	/	/	M	/	S	U	/	S	/	M	U	U	U	M	M	/	U	S	/	/	S	U	U
Diethylpyro-carbonate	S	S	U	/	S	S	S	/	S	S	U	S	U	S	U	/	/	S	S	S	M	S	S	S	S	S	S
Dimethylsulfoxide	S	S	U	U	S	S	S	/	S	U	S	S	U	S	U	U	/	S	S	U	U	S	S	S	S	U	U
Dioxane	M	S	U	U	S	S	M	M	S	U	U	S	U	M	U	U	/	M	M	M	U	S	S	S	S	U	U
Ferric Chloride	U	U	S	/	/	/	M	S	/	M	/	S	/	S	/	/	/	S	S	/	/	/	M	U	S	/	S
Acetic Acid (Glacial)	S	S	U	U	S	S	U	M	S	U	S	U	U	U	U	U	M	S	U	M	U	S	U	U	S	/	U
Acetic Acid (5%)	S	S	M	S	S	S	M	S	S	S	S	S	M	S	S	S	S	S	S	S	M	S	S	M	S	S	M

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Acetic Acid (60%)	S	S	U	U	S	S	U	/	S	M	S	U	U	M	U	S	M	S	M	S	M	S	M	U	S	M	U
Ethyl Acetate	M	M	U	U	S	S	M	M	S	S	U	S	U	M	U	U	/	S	S	U	U	S	M	M	S	U	U
Ethyl Alcohol (50%)	S	S	S	S	S	S	M	S	S	S	S	S	U	S	U	S	S	S	S	S	S	S	S	M	S	M	U
Ethyl Alcohol (95%)	S	S	S	U	S	S	M	S	S	S	S	S	U	S	U	/	S	S	S	M	S	S	S	U	S	M	U
Ethylene Dichloride	S	/	U	U	/	/	S	M	/	U	U	S	U	U	U	U	U	U	U	/	U	S	U	/	S	/	S
Ethylene Glycol	S	S	S	S	S	S	S	S	S	S	S	S	/	S	U	S	S	S	S	S	S	S	S	M	S	M	S
Ethylene Oxide Vapor	S	/	U	/	/	U	/	/	S	U	/	S	/	S	M	/	/	S	S	S	U	S	U	S	S	S	U
Ficoll-Hypaque™	M	S	S	/	S	S	S	/	S	S	S	S	/	S	S	/	S	S	S	S	S	S	S	M	S	S	S
Hydrofluoric Acid (10%)	U	U	U	M	/	/	U	/	/	U	U	S	/	S	M	U	S	S	S	S	M	S	U	U	U	/	/
Hydrofluoric Acid (50%)	U	U	U	U	/	/	U	/	/	U	U	U	U	S	U	U	U	S	S	M	M	S	U	U	U	/	M
Hydrochloric Acid (conc.)	U	U	U	U	/	U	U	M	/	U	M	U	U	M	U	U	U	/	S	/	U	S	U	U	U	/	/
Formaldehyde (40%)	M	M	M	S	S	S	S	M	S	S	S	S	M	S	S	S	U	S	S	M	S	S	S	M	S	M	U
Glutaraldehyde	S	S	S	S	/	/	S	/	S	S	S	S	S	S	S	/	/	S	S	S	/	/	S	S	S	/	/
Glycerol	M	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	/	S	S	S	S	S	S	S	S	S	S
Guanidine Hydrochloride	U	U	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	U	S	S	S

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Haemo-Sol™	S	S	S	/	/	/	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	S	S	S	S
Hexane	S	S	S	/	S	S	S	/	S	S	U	S	U	M	U	S	S	U	S	S	M	S	U	S	S	U	S
Isobutyl Alcohol	/	/	M	U	/	/	S	S	/	U	/	S	U	S	S	M	S	S	S	/	S	S	S	/	S	/	S
Isopropyl Alcohol	M	M	M	U	S	S	S	S	S	U	S	S	U	S	U	M	S	S	S	S	S	S	S	M	M	M	S
Iodoacetic Acid	S	S	M	/	S	S	S	/	S	M	S	S	M	S	S	/	M	S	S	S	S	S	M	S	S	M	M
Potassium Bromide	U	S	S	/	S	S	S	/	S	S	S	S	S	S	S	S	S	S	S	/	S	S	S	M	S	S	S
Potassium Carbonate	M	U	S	S	S	S	S	/	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S	S	S
Potassium Chloride	U	S	S	/	S	S	S	S	S	S	S	S	S	S	S	/	S	S	S	S	S	S	S	U	S	S	S
Potassium Hydroxide (5%)	U	U	S	S	S	S	M	/	S	S	S	S	/	S	U	S	S	S	S	S	S	S	M	U	M	S	U
Potassium Hydroxide (conc.)	U	U	M	U	/	/	M	/	M	S	S	/	U	M	U	U	U	S	M	/	M	U	/	U	U	/	U
Potassium Permanganate	S	S	S	/	S	S	S	/	S	S	S	U	S	S	S	M	/	S	M	S	U	S	S	M	S	U	S
Calcium Chloride	M	U	S	S	S	S	S	S	S	S	S	S	S	S	M	S	/	S	S	S	S	S	S	M	S	S	S
Calcium Hypochlorite	M	/	U	/	S	M	M	S	/	M	/	S	/	S	M	S	/	S	S	S	M	S	M	U	S	/	S
Kerosene	S	S	S	/	S	S	S	U	S	M	U	S	U	M	M	S	/	M	M	M	S	S	U	S	S	U	S
Sodium Chloride (10%)	S	/	S	S	S	S	S	S	/	/	/	S	S	S	S	S	/	S	S	S	S	/	S	S	M	/	S

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Sodium Chloride (sat'd)	U	/	S	U	S	S	S	/	/	/	/	S	S	S	S	S	/	S	S	/	S	/	S	S	M	/	S
Carbon Tetrachloride	U	U	M	S	S	U	M	U	S	U	U	S	U	M	U	S	S	M	M	S	M	M	M	M	U	S	S
Aqua Regia	U	/	U	U	/	/	U	/	/	/	/	/	U	U	U	U	U	U	U	/	/	/	/	/	S	/	M
Solution 555 (20%)	S	S	S	/	/	/	S	/	S	S	S	S	S	S	S	/	/	S	S	S	/	S	S	S	S	S	S
Magnesium Chloride	M	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	M	S	S	S
Mercaptoacetic Acid	U	S	U	/	S	M	S	/	S	M	S	U	U	U	U	/	S	U	U	S	M	S	U	S	S	S	S
Methyl Alcohol	S	S	S	U	S	S	M	S	S	S	S	S	U	S	U	M	S	S	S	S	S	S	S	M	S	M	U
Methylene Chloride	U	U	U	U	M	S	S	U	S	U	U	S	U	U	U	U	U	M	U	U	U	S	S	M	U	S	U
Methyl Ethyl Ketone	S	S	U	U	S	S	M	S	S	U	U	S	U	S	U	U	U	S	S	U	U	S	S	S	S	U	U
Metrizamide™	M	S	S	/	S	S	S	/	S	S	S	S	/	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Lactic Acid (100%)	/	/	S	/	/	/	/	/	/	M	S	U	/	S	S	S	M	S	S	/	M	S	M	S	S	/	S
Lactic Acid (20%)	/	/	S	S	/	/	/	/	/	M	S	M	/	S	S	S	S	S	S	S	M	S	M	S	S	/	S
N/Butyl Alcohol	S	/	S	U	/	/	S	/	/	S	M	/	U	S	M	S	S	S	S	M	M	S	M	/	S	/	S
N/Butyl Phthalate	S	S	U	/	S	S	S	/	S	U	U	S	U	U	U	M	/	U	U	S	U	S	M	M	S	U	S
N, N-Dimethylformamide	S	S	S	U	S	M	S	/	S	S	U	S	U	S	U	U	/	S	S	U	U	S	M	S	S	S	U

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Sodium Borate	M	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	/	S	S	S	S	S	S	M	S	S	S
Sodium Bromide	U	S	S	/	S	S	S	/	S	S	S	S	S	S	S	S	/	S	S	S	S	S	S	M	S	S	S
Sodium Carbonate (2%)	M	U	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S	S	S
Sodium Dodecyl Sulfate	S	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	S	S	S	S	S	S	S	S	S	S	S
Sodium Hypochlorite (5%)	U	U	M	S	S	M	U	S	S	M	S	S	S	M	S	S	S	S	M	S	S	S	M	U	S	M	S
Sodium Iodide	M	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Sodium Nitrate	S	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	/	S	S	S	S	S	U	S	S	S	S
Sodium Sulfate	U	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	M	S	S	S
Sodium Sulfide	S	/	S	S	/	/	/	S	/	/	/	S	S	S	U	U	/	/	S	/	/	/	S	S	M	/	S
Sodium Sulfite	S	S	S	/	S	S	S	S	M	S	S	S	S	S	S	M	/	S	S	S	S	S	S	S	S	S	S
Nickel Salts	U	S	S	S	S	S	/	S	S	S	/	/	S	S	S	S	/	S	S	S	S	S	S	M	S	S	S
Oils (Petroleum)	S	S	S	/	/	/	S	U	S	S	S	S	U	U	M	S	M	U	U	S	S	S	U	S	S	S	S
Oils (Other)	S	/	S	/	/	/	S	M	S	S	S	S	U	S	S	S	S	U	S	S	S	S	/	S	S	M	S
Oleic Acid	S	/	U	S	S	S	U	U	S	U	S	S	M	S	S	S	S	S	S	S	S	S	M	U	S	M	M
Oxalic Acid	U	U	M	S	S	S	U	S	S	S	S	S	U	S	U	S	S	S	S	S	S	S	S	U	M	S	S

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Perchloric Acid (10%)	U	/	U	/	S	U	U	/	S	M	M	/	/	M	U	M	S	M	M	/	M	S	U	/	S	/	S
Perchloric Acid (70%)	U	U	U	/	/	U	U	/	S	U	M	U	U	M	U	U	U	M	M	U	M	S	U	U	S	U	S
Phenol (5%)	U	S	U	/	S	M	M	/	S	U	M	U	U	S	U	M	S	M	S	U	U	S	U	M	M	M	S
Phenol (50%)	U	S	U	/	S	U	M	/	S	U	M	U	U	U	U	U	S	U	M	U	U	S	U	U	U	M	S
Phosphoric Acid (10%)	U	U	M	S	S	S	U	S	S	S	S	U	/	S	S	S	S	S	S	S	S	S	U	M	U	S	S
Phosphoric Acid (conc.)	U	U	M	M	/	/	U	S	/	M	S	U	U	M	M	S	S	S	M	S	M	S	U	M	U	/	S
Physiologic Media (Serum, Urine)	M	S	S	S	/	/	S	/	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Picric Acid	S	S	U	/	S	M	S	S	S	M	S	U	S	S	S	U	S	S	S	S	U	S	U	M	S	M	S
Pyridine (50%)	U	S	U	U	S	U	U	/	U	S	S	U	U	M	U	U	/	U	S	M	U	S	S	U	U	U	U
Rubidium Bromide	M	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Rubidium Chloride	M	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	S	S	S	S	M	S	S	S
Sucrose	M	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Sucrose, Alkaline	M	S	S	/	S	S	S	/	S	S	S	S	S	S	U	S	S	S	S	S	S	S	S	M	S	S	S
Sulfosalicylic Acid	U	U	S	S	S	S	S	/	S	S	S	U	S	S	S	/	S	S	S	/	S	S	S	U	S	S	S
Nitric Acid (10%)	U	S	U	S	S	U	U	/	S	U	S	U	/	S	S	S	S	S	S	S	S	S	M	S	S	S	S

S	Satisfactory
M	Moderate attack, may be satisfactory for use in centrifuge depending on length of exposure, speed involved, etc.; suggest testing under actual conditions of use
U	Unsatisfactory, not recommended
/	Performance unknown; suggest testing, using sample to avoid loss of valuable material

Chemical Compatibility Chart

CHEMICAL \ MATERIAL	Aluminum	Anodic Coating for Aluminum	Buna N	Cellulose Acetate Butyrate	Polyurethane Rotor Paint	Composite Carbon Fiber/Epoxy	Delrin™	Ethylene Propylene	Glass	Neoprene	Noryl™	Nylon	PET, Polyclear™, Clear Crimp™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polythermide	Polyethylene	Polypropylene	Polysulfone	Polyvinil Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
Nitric Acid (50%)	U	S	U	M	S	U	U	/	S	U	S	U	U	M	M	U	M	M	M	S	S	S	U	S	S	M	S
Nitric Acid (95%)	U	/	U	U	/	U	U	/	/	U	U	U	U	M	U	U	U	U	M	U	U	S	U	S	S	/	S
Hydrochloric Acid (10%)	U	U	M	S	S	S	U	/	S	S	S	U	U	S	U	S	S	S	S	S	S	S	S	U	M	S	S
Hydrochloric Acid (50%)	U	U	U	U	S	U	U	/	S	M	S	U	U	M	U	U	S	S	S	S	M	S	M	U	U	M	M
Sulfuric Acid (10%)	M	U	U	S	S	U	U	/	S	S	M	U	S	S	S	S	S	S	S	S	S	S	U	U	U	S	S
Sulfuric Acid (50%)	M	U	U	U	S	U	U	/	S	S	M	U	U	S	U	U	M	S	S	S	S	S	U	U	U	M	S
Sulfuric Acid (conc.)	M	U	U	U	/	U	U	M	/	/	M	U	U	S	U	U	U	M	S	U	M	S	U	U	U	/	S
Stearic Acid	S	/	S	/	/	/	S	M	S	S	S	S	/	S	S	S	S	S	S	S	S	S	M	M	S	S	S
Tetrahydrofuran	S	S	U	U	S	U	U	M	S	U	U	S	U	U	U	/	M	U	U	U	U	S	U	S	S	U	U
Toluene	S	S	U	U	S	S	M	U	S	U	U	S	U	U	U	S	U	M	U	U	U	S	U	S	U	U	M
Trichloroacetic Acid	U	U	U	/	S	S	U	M	S	U	S	U	U	S	M	/	M	S	S	U	U	S	U	U	U	M	U
Trichloroethane	S	/	U	/	/	/	M	U	/	U	/	S	U	U	U	U	U	U	U	U	U	S	U	/	S	/	S
Trichloroethylene	/	/	U	U	/	/	/	U	/	U	/	S	U	U	U	U	U	U	U	U	U	S	U	/	U	/	S
Trisodium Phosphate	/	/	/	S	/	/	M	/	/	/	/	/	/	S	/	/	S	S	S	/	/	S	/	/	S	/	S
Tris Buffer (neutral pH)	U	S	S	S	S	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

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Chemical Compatibility Chart

CHEMICAL / MATERIAL	Aluminum	Anodic Coating for Aluminum	Buna N	Cellulose Acetate Butyrate	Polyurethane Rotor Paint	Composite Carbon Fiber/Epoxy	Delrin™	Ethylene Propylene	Glass	Neoprene	Noryl™	Nylon	PET[1], Polyclear™, Clear Crimp™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polythermide	Polyethylene	Polypropylene	Polysulfone	Polyvinil Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
Triton X/100™	S	S	S	/	S	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Urea	S	/	U	S	S	S	S	/	/	/	/	S	S	S	M	S	S	S	S	/	S	S	S	M	S	/	S
Hydrogen Peroxide (10%)	U	U	M	S	S	U	U	/	S	S	S	U	S	S	S	M	U	S	S	S	S	S	S	M	S	U	S
Hydrogen Peroxide (3%)	S	M	S	S	S	/	S	/	S	S	S	S	S	S	S	S	M	S	S	S	S	S	S	S	S	S	S
Xylene	S	S	U	S	S	S	M	U	S	U	U	U	U	U	U	M	U	M	U	U	U	S	U	M	S	U	S
Zinc Chloride	U	U	S	S	S	S	U	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S
Zinc Sulfate	U	S	S	/	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Citric Acid (10%)	M	S	S	M	S	S	M	S	S	S	S	S	S	S	S	S	M	S	S	S	S	S	S	S	S	S	S

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[1] Polyethlyeneterephtalate

Table C–1: Chemical Compatibility

NOTICE

Chemical resistance data is included only as a guide to product use. Because no organized chemical compatibility data exists for materials under the stress of centrifugation, when in doubt we recommend pretesting sample lots.

Index

thermo scientific

Thermo Scientific Sorvall BIOS A
Thermo Scientific Sorvall BIOS A Heavy Duty

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