thermo scientific

Thermo Scientific Sorvall ST 8FR Centrifuge

Instruction Manual

50152023-g • 04 / 2022

Thermo Fisher SCIENTIFIC

Table of Contents

Preface

Before using the centrifuge, read through this instruction manual carefully and follow the instructions. Not following the instructions and safety information in this instruction manual will result in the expiration of the sellers warranty.

Intended Use

The centrifuge is intended for the separation of liquid human specimens, such as blood or urine, collected in IVD specimen receptacles.

The centrifuge is used in in-vitro diagnostic processes to support the collection of information regarding diseases and other physiological or pathological states, such as immunological or hematological screening (e.g. measurement of free hemoglobulin).

The semi-automated centrifuge is intended to be used in medical laboratories by trained personal.

Items Supplied

The Thermo Scientific™ Sorvall™ ST 8FR centrifuge is supplied without a rotor.

Size and relation of graphics are not showing real dimensions and are just for visual identification.

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

Item	Quantity
Thermo Scientific Sorvall ST 8FR centrifuge	1
Power supply cable	1
Bubble level	1
Wrench (30 mm)	1
Instruction manual	2

Signal Words and Colors

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 (e.g. messages relating to property damage).

Precautions

Observe the safety instructions. Not following these instructions can cause damage.

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

WARNING

As safety zone maintain a clear radius of at least 30 cm around the centrifuge. Stay out of the safety zone during centrifugation. Do not place any dangerous substances within this safety zone. Implement measures which ensure that no one can approach the centrifuge for longer than absolutely necessary while it is running.

CAUTION

Due to the air friction the temperature of rotor may raise 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.

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.

Set Up Conditions

WARNING

Plug the centrifuge only into sockets which have been properly grounded.

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

The mains plug must be freely accessible at any time.

Shutdown

The mains plug must be freely accessible at any time.

Press the STOP key to shut down the centrifuge.

Turn off the centrifuge at the main switch.

Pull out the power supply plug or disconnect the power supply.

Preparation

WARNING

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

NOTICE

- Use only with a rotor that has been properly installed. Follow the instructions in section "Rotor Installation" on page 25.
- Do not use a rotor or accessories that show any signs of corrosion or cracks.
- Contact customer service for further advice or inspections.
- Use only with a rotor that has been properly loaded.
- Never overload the rotor.
- Always balance the samples.
- Use only rotors and accessories for this centrifuge that have been approved by Thermo Fisher Scientific.
- Make sure the rotor is locked properly into place before operating the centrifuge.
- Do not use a damaged rotor. Replace the rotor, if it was dropped.

Hazardous Substances

WARNING

- Especially when working with corrosive samples (salt solutions, acids, bases), the accessory parts and vessel have to be cleaned thoroughly.
- Do not centrifuge explosive or flammable materials or substances.
- The centrifuge is not inert or 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 any hazardous materials are centrifugated, 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 (“Disinfection” on page 43).
- 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.
- In case of rotor failure the centrifuge can be damaged. The coolant can escape. Ventilate the room well and leave it. Inform customer service.
- **If a hazardous situation occurs, turn off the power supply to the centrifuge and leave the area immediately.**

Operation

WARNING

- Never use the centrifuge if parts of its cover panels are damaged or missing.
- Do not move the centrifuge while it is running.
- Do not place anything on top of the centrifuge during a run. The centrifuge door is opened automatically after a run.
- Do not lean on the centrifuge during the centrifugation.
- In any case of severe mechanical failure, such as a rotor crash, the centrifuge is not aerosol-tight. In case of rotor failure the centrifuge can be damaged. Leave the room. Inform customer service.

CAUTION

- Never open the centrifuge door until the rotor has come to a complete stop and this has been confirmed in the display.
- The emergency door release may be used in emergencies only to recover the samples from the centrifuge, e.g. during a power failure (“Mechanical Emergency Door Release” on page 47).

Maintenance

WARNING

- The centrifuge housing is not to be opened by the operator.
- Do not change or replace mechanical or electrical components. Changing or replacing components can result in death or serious injury.

Symbols used on the Centrifuge

This symbol refers to general hazards.

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 information on hazards, described within the manual.

This symbol demands to disconnect mains before transporting or servicing the centrifuge.

This symbol demands to check, if the rotor is installed correctly by lifting it slightly at the handle. See “Rotor Installation” on page 25.

Symbols used in the Manual

This symbol refers to general hazards.

This symbol refers to biological hazards.

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

I. Technical Specifications

1. Technical Data

Thermo Scientific Sorvall ST 8FR Centrifuge

Environmental Conditions	For interior use 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	0.35 kWh; 1170 Btu/h; 1140 kJ/h
Over voltage Category	II
Pollution Degree	2
IP	20
Running Time	99 h, 59 min, hold
Maximum Speed n_{max}	17850 rpm
Minimum Speed n_{min}	300 rpm
Maximum RCF Value at n_{max}	30279 x g
Noise Level at Maximum Speed[1]	< 55 dB (A); measured with TX-150 rotor
Maximum Kinetic Energy	10.1 kJ

Dimensions	
Height (open door / closed door)	1170–1220 mm / 790–840 mm
Width	465 mm
Depth	520 mm
Weight[2]	87.0 kg

[1] Front Side Measurement, 1 m in front of the instrument at 1.6 m height.

[2] Without Rotor.

Available Thermo Scientific Rotors

Article No.	Description
75005701	TX-150 swinging bucket rotor
75005702	TX-150 round buckets
75005703	TX-150 50mL conical buckets
75005704	TX100S clinical swinging bucket rotor with sealed carriers
75005705	TX100 clinical swinging bucket rotor with carriers
75005706	M10 microplate swinging bucket rotor
75005723	M10 buckets
75005721	M10 sealed buckets
75005600	MT12 microtube swinging bucket rotor
75005709	HIGHConic III fixed angle rotor
75003623	CLINIConic fixed angle rotor
75005715	MicroClick 24x2 microtube rotor
75005719	MicroClick 30x2 microtube rotor
75003602	Microliter 48x2 sealed rotor
75005720	8x8 PCR Strip rotor
75005733	Hematocrit rotor
75003694	8 x 50 mL Individually Sealed rotor
75005765	MicroClick 18x5 microtube rotor

2. Directives, Standards and Guidelines

Region	Directive	Standard
Europe 220-230 V, 50 / 60 Hz 230 V, 50 / 60 Hz	98/79/EC In Vitro Diagnostics (EU) 2017/746* In Vitro Diagnostics Medical Devices 2011/65/EU Directive on the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS) Protective goals of: 2006/42/EC Machinery 2014/35/EU Low Voltage 2014/30/EU Electromagnetic Compatibility (EMC)	EN 61010-1 EN 61010-2-020 EN 61010-2-101 EN 61326-2-6 EN 61326-1 Class B EN ISO 14971 EN ISO 13485
USA & Canada 220-230 V, 50 / 60 Hz 120 V, 60 Hz	FDA listed Product code JQC: centrifuges for clinical use Device class 1	ANSI/UL 61010-1 UL 61010-2-020 UL 61010-2-101 EN ISO 14971 EN ISO 13485
Japan 100 V, 50 / 60 Hz **China** 230 V, 50 / 60 Hz 208-240 V, 50 / 60 Hz	CFDA listed	IEC 61010-1 IEC 61010-2-020 IEC 61010-2-101 IEC 61326-2-6 IEC 61326-1 Class B EN ISO 14971 EN ISO 13485

* dependent on EU implementation date

3. Mains Supply and Refrigerant

The following table contains an overview of the electrical connection data and about the refrigerant. The electrical connection data is to be taken into consideration, when selecting the mains connection socket.

Unit	Thermo Scientific Sorvall ST 8FR centrifuge		
Article No.	**75007206**	**75007207**	**75007208**
Mains Voltage	100 V ±10 %	120 V ±10 %	220–230 V ±10 %
Frequency	50 / 60 Hz	60 Hz	50 / 60 Hz
Rated Current	10 A	8 A	4 A
Power Consumption	850 W	700 W	750 W
Equipment Fuse	15 AT	15 AT	15 AT
Building Fuse	15 AT	15 AT	16 AT
Refrigerant	R-134a	R-134a	R-134a
Quantity	0.350 kg	0.350 kg	0.375 kg
Pressure	26 bar	26 bar	21 bar
GWP	1430	1430	1430
CO_2e	0.50 t	0.50 t	0.54 t

Contains fluorinated greenhouse gases in a hermetically sealed system.

II. Transport and Set Up

1. Before Setting Up

1. Check the centrifuge and the packaging for any shipping damage. Inform the shipping company and Thermo Fisher Scientific immediately if any damage is discovered.

2. Remove the packaging.

   NOTICE Dispose the packaging. Do not reuse it.

3. Check, if the items supplied are complete ("Items Supplied" on page 6).

   If the items supplied are incomplete, please contact Thermo Fisher Scientific.

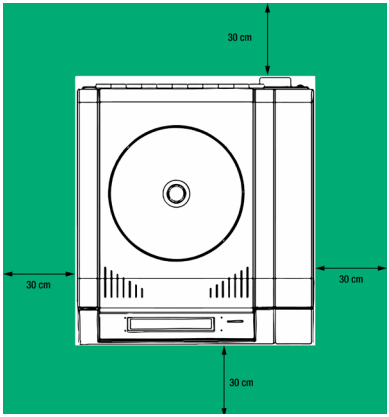
2. Location

CAUTION	UV rays reduce the stability of plastics. Do not subject the centrifuge, rotor and plastic accessories to direct sunlight.

The centrifuge is only to be operated indoors.

The set-up location must fulfill the following requirements:

- A safety zone of at least 30 cm must be maintained around the centrifuge. People and hazardous substances must be kept out of this safety zone while centrifuging.



- The supporting structure must:
  - » be stable and free of resonance,
  - » be suitable for horizontal setup of the centrifuge,
  - » hold the weight of the centrifuge.
- The centrifuge is not to be exposed to heat and strong sunlight.
- The set-up location must be well-ventilated at all times.
- The set-up location should be checked for electromagnetic compatibility.

3. Transporting

CAUTION Always lift the centrifuge from both sides. Never lift the centrifuge by its front panel, its back panel or at its door.

NOTICE Always remove the rotor before moving the centrifuge. If you do not remove the rotor, you might damage the centrifuge drive or drive shaft.

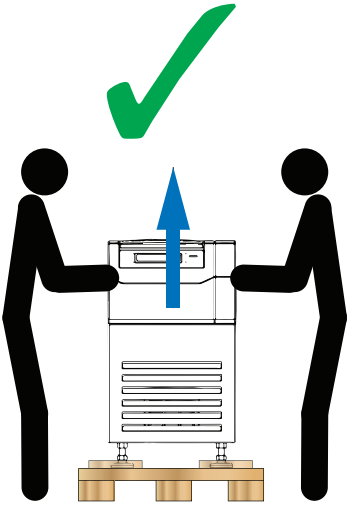
Due to its weight, the centrifuge must be carried by two people. Always lift the centrifuge by using the handles. Transport the centrifuge upright and with the centrifuge door closed.

1. Lift the centrifuge from the pallet.

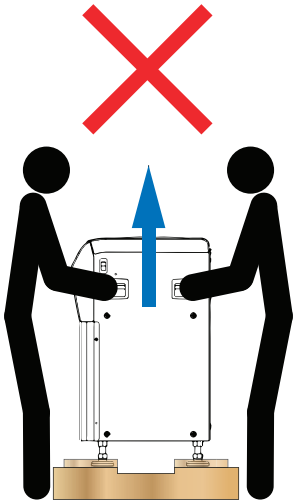
   Two people are needed for lifting and moving the centrifuge.

   NOTICE Make sure that you lift the centrifuge while standing at the sides of the centrifuge with the handles. Don't lift it while standing at the front and backside of the centrifuge.

Correct



Incorrect

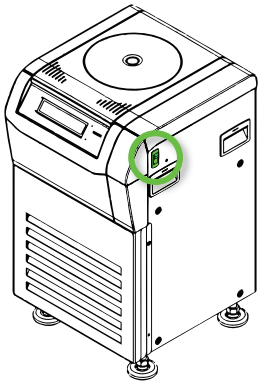


2. Move the centrifuge to the location, where you want to operate it.

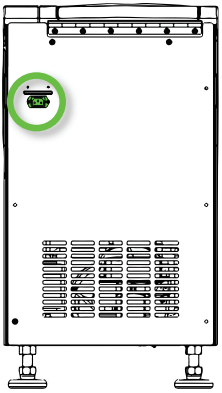
4. Mains Connection

WARNING Plug the centrifuge into grounded electrical sockets only.

1. Turn off the power supply switch located on the right side when you stand before the centrifuge.



2. Check whether the cable complies with the safety standards of your country.
3. Make sure that the voltage and frequency correspond to the figures on the rating plate.
4. Establish the connection to the power supply with the power supply cable.



5. Leveling

NOTICE

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.

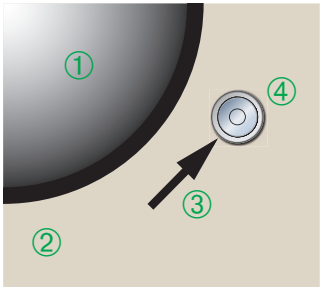
Do not put anything below the centrifuge feet to level the centrifuge.

The wrench (30 mm) and the bubble level are required for leveling the centrifuge.

Level the centrifuge as follows:

1. Open the centrifuge door. See “Open the Centrifuge Door” on page 24.

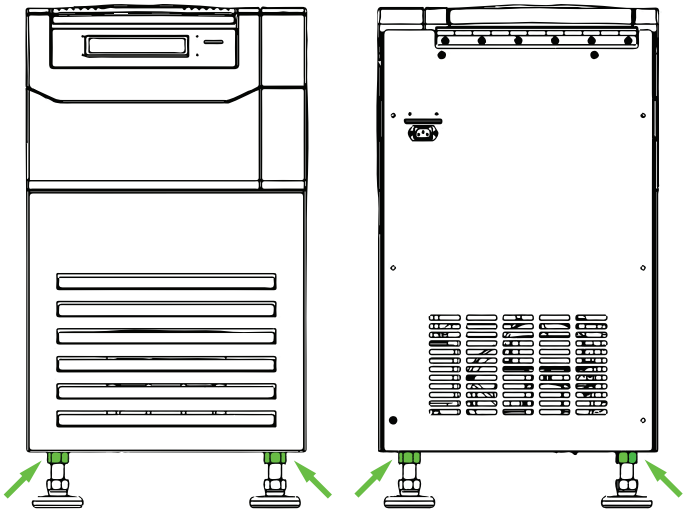
2. Put the bubble level near the arrow showing the rotation direction.



①	Centrifugation chamber
②	Centrifuge desk (centrifuge door open)
③	Arrow showing the rotation direction
④	Bubble level

3. Adjust the centrifuge feet until the bubble in the level is fully in the circle mark.

   To adjust a centrifuge foot, you need to unscrew the upper lock nut and adjust the centrifuge foot to the proper height. Having adjusted a foot make sure to fasten the upper lock nut against the centrifuge bottom before adjusting another one.



NOTICE Make sure that each upper lock nut of all 4 centrifuge feet are fastened against the centrifuge bottom.

If the centrifuge feet are not fastened imbalance can occur possibly causing a crash. 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.

Excellent Acceptable Unacceptable

6. Storage

WARNING

When removing the centrifuge and accessories from use, clean and additionally disinfect or decontaminate the entire system if biological or chemical substances were used. If in doubt contact the Thermo Fisher Scientific customer service.

- Before storing the centrifuge and the accessories it must be cleaned and if necessary disinfected and decontaminated.
  Centrifuge, rotor, buckets and accessories have to be thoroughly dried before storage.
- Store the centrifuge in a clean, dust-free location.
- Be sure to place the centrifuge on its feet.
- Avoid storing the centrifuge in direct sunlight.

7. Shipping

WARNING

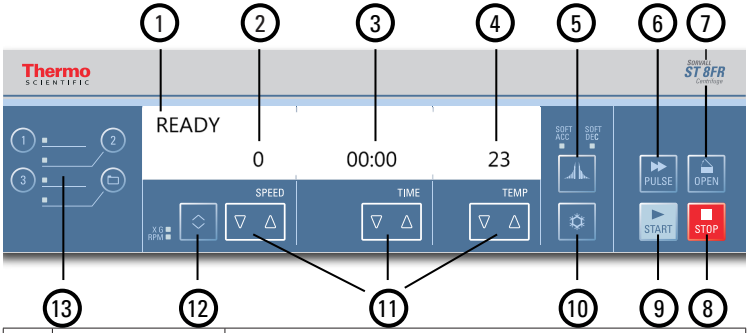
Before shipping the centrifuge and accessories you have to clean and additionally disinfect or decontaminate the entire system if biological or chemical substances were used. In doubt contact the Thermo Fisher Scientific customer service.

Before shipping the centrifuge please keep the following in mind:

- The centrifuge must be cleaned and decontaminated.
- The decontamination must be confirmed with a decontamination certificate. Contact customer service for more details.

III. Control Panel

Sorvall ST 8FR



No.	Function	Display Controls
1	Status	The status of the centrifuge is displayed here.
2	Speed / RCF Value	The speed (rpm) or RCF value (x g) is displayed here.
3	Running Time	The running time is displayed here.
4	Temperature	The temperature is displayed here.
5	Acceleration / Deceleration Profiles	Press the key multiple times to cycle through the available profiles.
6	PULSE Key	Press the PULSE key to immediately start the centrifugation run and accelerate up to the maximal permissible end speed (depending on the used rotor). Releasing the key initiates a stopping process according to the set acceleration and braking curve.
7	OPEN Key	Press the OPEN key to activate the automatic door release (possible only if device is switched on and if the rotor is fully stopped). “Mechanical Emergency Door Release” on page 47.
8	STOP Key	Press the STOP key to manually end the centrifugation run.
9	START Key	Press the START key to start a centrifugation run or to accept the current settings.
10	SNOWFLAKE Key	Use the key for pretempering the centrifuge chamber.
11	Arrow Keys	Use these keys in order to modify the displayed value.
12	TOGGLE Key for Speed / RCF Value	Use the TOGGLE key to change the display mode. (Speed / RCF Value).
13	Program Keys	Use the Program Keys to save and load programs. “Programs” on page 30.

IV. Operation

1. Switching on the Centrifuge

1. Turn on the power switch of the centrifuge.

   The device performs a self-check of its software.

   a. When the centrifuge door is closed the display shows:

READY		
0	00:00	23

   The speed and time displays read “0” and “00:00”; the current temperature inside the centrifugation chamber is displayed.

   b. When the centrifuge door is open the display shows:

DOOR OPEN		
8000	HOLD	10

   The set values for speed, time and temperature are displayed.

2. Open the Centrifuge Door

CAUTION

Open the centrifuge only when the rotor stopped spinning. The display shows the current speed also during a failure.

Never reach into the centrifugation chamber while the rotor is spinning.

CAUTION

Injuries may occur from a declining centrifuge door gas spring. If the pressure of the centrifuge door gas spring is not sufficient the centrifuge door will not stay open and can fall down. Pay attention on the functionality of the centrifuge door gas spring.

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

Press the OPEN key on the control panel.

The functionality of a centrifuge door gas spring declines with the time and frequency of use. Pay attention on the functionality of the centrifuge door gas spring.

How to check the functionality of the centrifuge door gas spring:

1. Open the centrifuge door and check if the centrifuge door stays open. The centrifuge door gas spring balances the weight of the centrifuge door and keeps the centrifuge door open. If the centrifuge door does not stay open, contact the customer service.

2. Check, if the centrifuge door gas spring is damaged. If the housing of the centrifuge door gas spring is damaged, contact the customer service.

If an error occurs, i.e. during a power failure, it is possible to open the centrifuge door using the mechanical emergency lid lock: "Mechanical Emergency Door Release" on page 47.

3. Rotor Installation

NOTICE Unapproved or incorrectly combined accessories can cause serious damage to the centrifuge.

The approved rotors for the Thermo Scientific Sorvall ST 8FR are listed in section "Available Thermo Scientific Rotors" on page 13. Use only the rotors from this list in the centrifuge. Permitted accessories are listed in the rotor manuals.

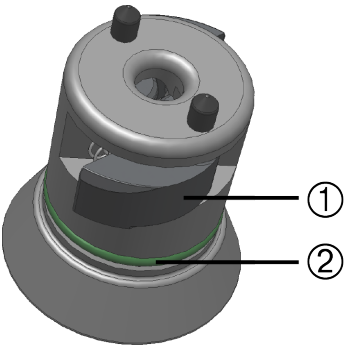
The centrifuge is equipped with the Thermo Scientific™ Auto-Lock™ system.

This system is used to automatically lock the rotor to the centrifuge drive. The rotor does not have to be bolted on to the centrifuge drive.

Proceed as follows:

1. Open the centrifuge door and if necessary remove any dust, foreign objects or residue from the chamber.

Auto-Lock and O-Ring must be clean and undamaged.



1	Auto-Lock
2	O-Ring

2. Place the rotor over the centrifuge spindle and lower vertically and slowly down the centrifuge spindle. If necessary a light push may be required to ensure connection.

   The rotor clicks automatically into place.

   NOTICE Do not force the rotor on the centrifuge drive. If the rotor is very light, then it may be necessary to press it onto the centrifuge drive with little pressure.

3. Check if the rotor is properly installed by lifting it slightly on the handle or from beneath the rotor. If the rotor can be pulled up, then it must be reconnected to the centrifuge spindle.

   NOTICE If the rotor cannot be properly locked in place after several attempts, then the Auto-Lock is defective and you are not permitted to operate the rotor. Check for any damage to the rotor and the spindle: Damaged rotors must not be used. Keep the centrifuge spindle area of the rotor clear of objects. If in doubt please call Thermo Fisher Scientific Customer Service.

   NOTICE Check that the rotor is properly locked on the centrifuge spindle before each use by pulling it at its handle or from beneath the rotor. The rotor has to be locked tight.

4. If available close the rotor with the rotor lid.

   Check the according rotor manual for further details on requirements and methods of closure.

   CAUTION Be sure to check all sealing before starting any aerosol-tight applications. See the information in the rotor instruction manual.

5. Close the centrifuge door.

4. Close the Centrifuge Door

CAUTION	Do not reach into the gap between the centrifuge door and the housing.

NOTICE	The centrifuge door should audibly click into place.

Ensure that the centrifuge platform is clear from objects.

Keep hands and objects well clear of the underside and side of the centrifuge door when closing.

Close the centrifuge door by pressing down on it lightly in the middle or on both sides of it. The centrifuge door mechanism will click and lock in place. Lids should not be slammed as excessive force may cause damage or disrupt samples.

5. Settings

Acceleration / Deceleration Profiles

The centrifuge offers you 2 profiles: standard and soft. The setting is displayed above the Acceleration / Deceleration Profiles key.

Press the Acceleration / Deceleration Profiles key to cycle through and set the available profiles. The LEDs show the chosen settings. The last selected profile is saved and will be restored after a restart of the centrifuge.

LED Light Settings	Description
OFF	Acceleration and Deceleration with max. Power = Standard
SOFT ACC	Acceleration = Soft
SOFT DEC	Deceleration = Soft
SOFT ACC and SOFT DEC	Acceleration and Deceleration = Soft

NOTICE In case fo an error the deceleration profile can be set off to prevent damage.

Selecting Speed / RCF

RPM stands for Revolutions Per Minute.

RCF stands for Relative Centrifugal Force and allows better transfer of protocols between centrifuges and rotors of differing size.

Ensure that the rpm or RCF is correctly set.

1. Press the TOGGLE key below the SPEED display to cycle through the rpm / RCF selection.

   The LED light will indicate if “RPM“ or “RCF” is selected.

   RPM / RCF can be viewed during a run by pressing the toggle button.

2. Enter the desired value by holding the arrow keys below SPEED in the corresponding direction, until the desired value shows. First RPM / RCF will change in steps of 10. Holding a key pressed will change the speed then in steps of 100 and then in steps of 1000.

   Press the START key to accept or wait 4 seconds until the centrifuge automatically saves the chosen values. Moving to setting time or temperature also automatically stores the set value.

NOTICE The minimum motor speed is 300 rpm. Any extremely low rcf settings will be automatically increased to the minimum rcf at 300 rpm.

Explanation of RCF-Value

The relative centrifugal force (RCF) is given as a multiple of the force of gravity g. It is a unit less 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 or bottom of the bucket.

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

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

Setting the Running Time

1. Press the TIME arrow keys. This allows to change the set time using the arrow keys until the desired time is displayed.

   First runtime will change in steps of 10 second. Holding a key pressed will change the runtime by steps of single minutes, followed by steps of 10 minutes, followed by steps of single hours and at least by steps of 10 hours. This will continue until the limit of 99 hours and 59 minutes

is reached.

Enter the desired runtime in hh:mm or mm:ss.

	Min:Sec
TIMER	00:30

2. Press the START key to accept or wait 4 seconds until the centrifuge automatically saves the chosen values. Moving to setting speed / RCF or temperature also automatically stores the set value.

Continuous Operation

1. Press either arrow keys until HOLD is displayed.
2. Press the START key to accept or wait 4 seconds until the centrifuge automatically saves the chosen values. During continuous operation, the centrifuge will continue running until you stop it manually.

Selecting the Temperature

You can select temperatures between -10 °C and +40 °C.

To set the temperature, proceed as follows:

Press the TEMPERATURE arrow keys. This allows to change the set temperature using the arrow keys until the desired temperature is displayed. Temperature will change in steps of single degrees Celsius.

	°C
Temperature	10

Prewarming or Precooling the Centrifuge

Ensure the rotor, buckets and accessories are correctly in place and securely attached in the chamber. For setting the pretemp value for the centrifuge proceed as follows:

1. Press the SNOWFLAKE key in order to open the temperature selection menu.

   The display shows the message “Pre-Temp”.

2. Enter the desired value by pressing the TEMP arrow keys, until the desired value shows.

	°C
Pre-Temp	27

3. Press the START key.

Pre-Warming		°C
6548	00:30	17

4. The centrifuge motor will run at a specific speed defined by the rotor. This improves air circulation within the centrifugation chamber, resulting in improved temperature control throughout the centrifugation chamber and rotor. According to the set values the air within the centrifugation chamber is heated or cooled to the preset temperature.

5. When the set temperature is reached, the centrifuge will beep and continue to hold the temperature.

   Press the STOP key to end the prewarming or precooling.
   The display shows the current temperature inside the centrifugation chamber.

6. Programs

The centrifuge is able to save up to 99 programs. It is only possible to save a program if the centrifuge is in standstill. Loading or saving of programs is not possible if a rotor is spinning.

Saving a Program

Modify the speed, time and temperature to the desired setting.

For Direct Access Programs 1, 2, 3

Press and hold the desired program key 1,2 or 3 for 4 seconds.

For Programs 4-99

1. Press the folder key for 4 seconds. Use the SPEED arrow keys, to scroll through until the desired number is selected.

2. Press the START key to confirm.

3. The program can now be named using up to 12 alphanumeric characters. Use the SPEED arrow keys to scroll through the characters. Use the TIME arrow keys to move left or right.

4. Press the START key to confirm and save the program or wait 10 sec until the program is saved automatically.

To abort at any point press the STOP key.

Loading a Program

For Direct Access Programs 1, 2, 3

Press one of the direct access program keys 1, 2, 3.

For Programs 4-99

Press the folder key. Use the SPEED arrow keys to scroll through until the desired program is selected.

Programs Only Mode

When using the Programs Only mode it is only possible to load programs, start and stop centrifugation runs and open the centrifuge door. Any other functions are deactivated.

To use the Programs Only mode it needs to be activated within the user menu. See "User Menu" on page 36.

7. Centrifugation

Maximum Loading

The rotor can run at high speeds. Each rotor is specifically designed to run at its maximum speed with a defined load. The safety system of the centrifuge requires that you do not overload the rotor. The rotor is designed to work with solution with a density of up to 1.2 g/cm³. Above this density or if total load is above the maximum weight the following steps should 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

Once the rotor has been properly installed, the main switch turned on and the centrifuge door losed, you may start centrifuging.

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.

Refer to the manufacturers data sheets for further information.

CAUTION Make sure that the length and width of the tubes are fitting into the adapter and cavities. Do not use tubes that are too short or too thick for the adapter and the cavities.

Before a Run

1. Read and observe the precautions and the safety instructions in this instruction manual.

As safety zone maintain a clear radius of at least 30 cm around the centrifuge. Stay out of the safety zone during centrifugation. Do not place any dangerous substances within this safety zone. Implement measures which ensure that no one can approach the centrifuge for longer than absolutely necessary while it is running.

2. Check the rotor and all accessories for damages such as cracks or scratches.
3. Check the centrifugation chamber and the centrifuge drive.
4. Check the rotor suitability: „Chemical Compatibility Chart“ on page 51.
5. Make sure that the buckets are in correct position.

Set the parameters for the centrifugation. For details: “Settings” on page 27.

Starting the Centrifugation

Press the START key on the control panel. The centrifuge accelerates to the set speed with the time display active.

If the speed setting is higher than the maximum permissible speed or RCF-value for the particular rotor, then after starting the display will show the message “Limit” – followed by the maximum RPM- or RCF-value of the inserted rotor once the centrifuge has been started.

Within 10 seconds of the message it is possible to accept the highest RPM / RCF of the inserted rotor by pressing START. The centrifuge will then continue run for the set time and at the set

temperature. If no action is taken within 10 seconds, the centrifuge will decelerate until the rotor is stopped. The speed will be automatically set to the maximum speed of the installed rotor. The message can only be reset by opening the centrifuge door.

If no action is taken, the centrifuge will decelerate until stop, then the centrifuge door should be opened and the rotor checked.

Imbalance Indicator

The centrifuge is fitted with an imbalance detector, to ensure safety. If an imbalance is detected an error message “Imbalance load” will be displayed.

Imbalance at high speed may indicate a tube breakage or leak or rotor crash. Therefore additional care should be taken depending on the samples loaded.

The run will terminate.

Once the run is stopped, the rotor and load should be checked, ensuring that all buckets are greased and can swing free and that the tubes are balanced by following the rotor instruction manual. For information on troubleshooting, see “Troubleshooting” on page 47.

Stopping the Centrifugation

With Set Time

If the run time is preset, the centrifuge will run at the selected speed until the desired run time is reached. It will then automatically decelerate and stop. Once stopped “RUN COMPLETED” will be displayed and if selected the display will flash and the centrifuge will beep.

Access to the chamber and rotor can be gained by pressing the OPEN key. If selected the door will open automatically.

You can also stop the centrifuging program manually at any time by pressing the STOP key. The message “RUN STOPPED BY USER” will be displayed.

Continuous Operation

If you selected continuous operation („Continuous Operation“ on page 29), you will have to stop the centrifugation manually. Press the STOP key on the control panel.

The centrifuge will decelerated at the set rate. The message “RUN COMPLETED” will be displayed.

After pressing the OPEN key, the centrifuge door will open and you can remove the centrifuged samples.

8. Short-term Centrifugation

For quick centrifugation, the centrifuge has a PULSE-function.

By holding down the PULSE key, spinning will start at the set acceleration rate, continue at maximum rotor speed until the key is released. The rotor then decelerates at the set selected deceleration rate. Any rpm or RCF entered beforehand is overridden. When stopped previous set values are restored.

NOTICE The centrifuge accelerates to maximum speed according to the rotor used.

Check carefully whether you have to maintain a certain speed for your application.

During the acceleration process, time is counted forwards in seconds. The reading stays displayed until the centrifuge door is opened.

9. Removing the Rotor

To remove the rotor, proceed as follows:

1. Open the centrifuge door.

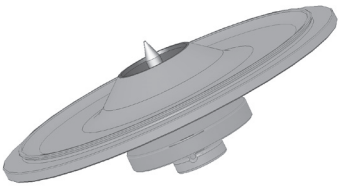
2. Grab the rotor handle and fully depress the Auto-Lock button. At the same time, pull the rotor vertically upwards and remove it from the centrifuge spindle. Make sure not to tilt the rotor while doing this.

10. Aerosol-tight Rotors

CAUTION Skin can be pierced by sharp mandrel tip.
Do not touch the mandrel.

NOTICE Rotors supplied with a lid for aerosol-tight applications come with a mandrel, which belongs to the Auto-Lock. Be sure not to place the lid onto this mandrel to prevent it from being damaged.

For your protection when using an aerosol tight lid the rotor should only be removed with the lid closed.



11. Switch off the Centrifuge

To switch off the centrifuge push the mains switch to “0”.

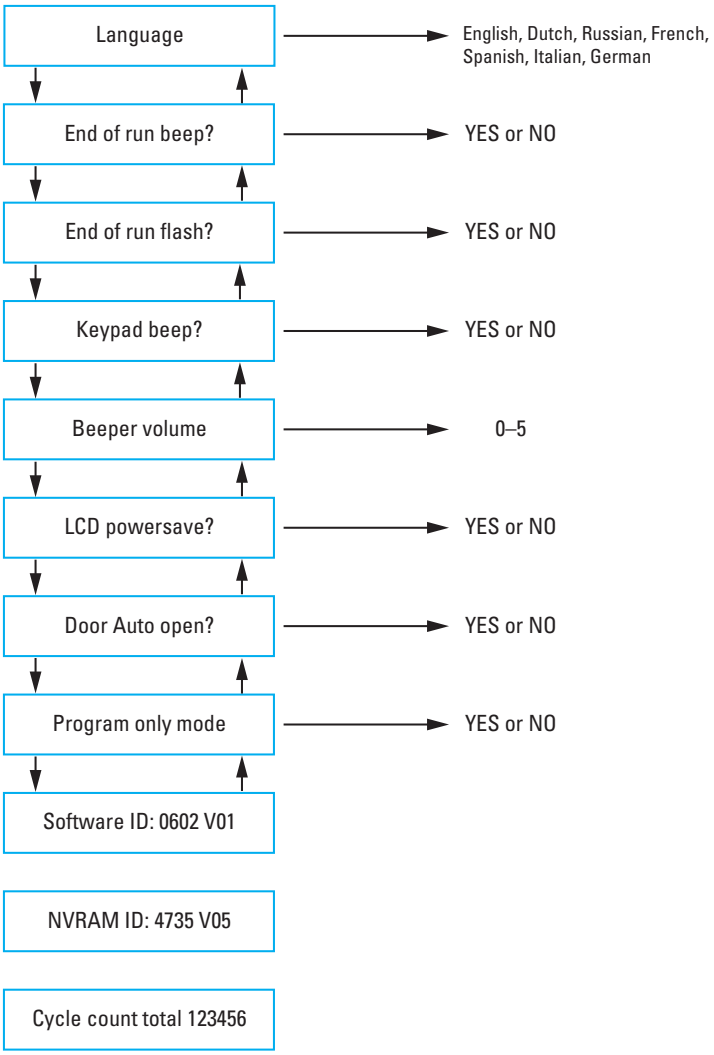
V. User Menu

To get into the user menu, press and hold any key on the front panel and switch on the centrifuge. Keep this key pressed until “ENTER USER MENU?” appears in the display. Navigate through the system menu using the TIME arrow keys.

Navigation within the User Menu

The user menu can be navigated using the SPEED arrow keys. The shown entry can be changed using the TIME and TEMP arrow keys. Press the START key to save this edit and quit the user menu. Press the STOP key to quit the user menu.
Software ID and NVRAM ID information are entries within the user menu.
Values shown at some entries in the picture below are only examples.

NOTICE A total number of cycles completed on the centrifuge is counted, since installation or a new main board was installed. Cycle counts should be periodically recorded to help identify the total number of runs a rotor has completed.


Language
English, Dutch, Russian, French, Spanish, Italian, German
End of run beep?
YES or NO
End of run flash?
YES or NO
Keypad beep?
YES or NO
Beeper volume
0–5
LCD powersave?
YES or NO
Door Auto open?
YES or NO
Program only mode
YES or NO
Software ID: 0602 V01
NVRAM ID: 4735 V05
Cycle count total 123456

VI. Maintenance and Care

1. Cleaning Intervals

For the sake of personal, environmental, and material protection, it is your duty to clean and if necessary disinfect the centrifuge 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 agents.
- Never use caustic cleaning agents such as soap suds, phosphoric acid, bleaching solutions or scrubbing powder.
- Remove rotor and clean bowl with a small amount of cleaning agent, applied to 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 excess with absorbent towels.
- Use only disinfectants with a pH of 6-8.

Rotors and Accessories Inspection

NOTICE

Do not use a rotor or accessories with signs of damage.

Make sure that rotor, buckets and accessories are within their service lifetime (age and cycles).

It is recommended to check rotors and accessories within a yearly routine inspection to ensure safety.

After thoroughly cleaning rotor and accessories, they should be inspected for damage and wear.

Metal Parts

Ensure that the black protective coating is complete. It can be removed through wear and chemical attack and can lead to unseen corrosions. Any signs of corrosions, such as rust or white / metallic pitting, the rotor or accessories should be immediately removed from service. Particular attention should be taken with the bottom of buckets on swing out rotors and tube cavities on fixed angle rotors.

Plastic Parts

Check for signs of plastic crazing, fading, bruising or cracking.

3. Cleaning

NOTICE Before using any cleaning methods except those recommended by the manufacturer, users should check with the manufacturer of the cleaning agents that the proposed method will not damage the equipment.

NOTICE 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, buckets and accessories outside of the centrifuge bowl.
2. Separate rotor, buckets, lids, adapters and tubes to allow thorough cleaning.
3. Rinse rotor and 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 agents. Clean away the grease from the rotor trunnions (pivot point for swinging buckets).
4. Use a soft brush without metal bristles to remove stubborn residue.
5. Rinse rotor and accessories with distilled water.
6. Place the rotor and buckets on a plastic grate with cavities pointing down, to allow fully drain and dry.
7. Dry rotor and accessories after cleaning with a cloth or in a warm air cabinet at a maximum temperature of 50 °C. If drying boxes are used, the temperature must never exceed 50 °C, since higher temperatures could damage the material and shorten the lifetime of the parts.

   Once clean and dry, inspect rotor and accessories.

   After cleaning, treat the entire surface of aluminum parts including the cavities with corrosion protection oil (70009824).

   Treat the bolt of the swing out rotor with bolt grease (75003786).

Cleaning the Filter Mat

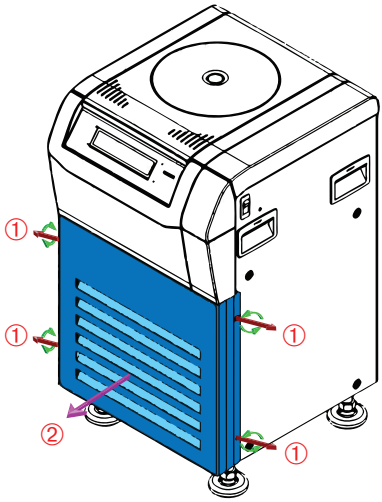
It is recommended that you clean the filter mat (50141352) regularly every six weeks. Depending on the environmental conditions it may be necessary to clean it more often.

How to clean the filter mat:

1. Remove the 4 screws holding the ventilation cover ① placed on the front of the centrifuge.

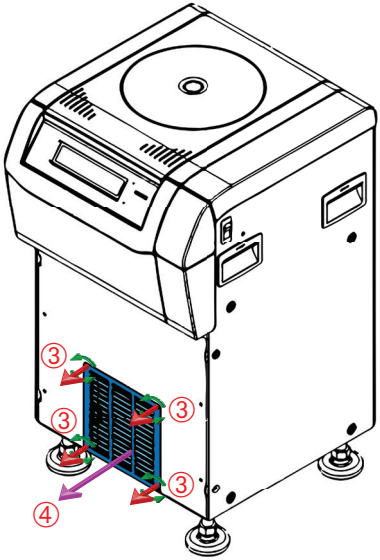
   CAUTION Hold the ventilation cover with one hand while unscrewing it. The ventilation cover is heavy and can cause minor injuries when falling down onto a hand or foot.

   Remove the ventilation cover ②.

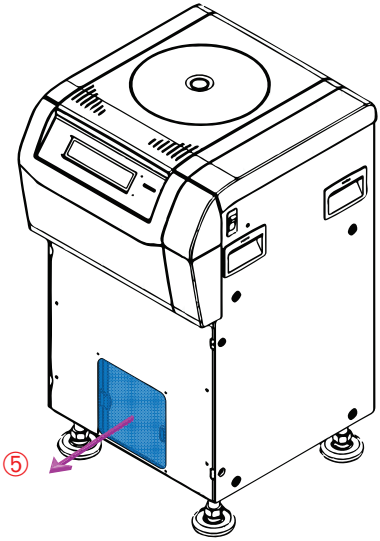


2. Remove the 4 screws holding the ventilation grid ③.

   Remove the ventilation grid ④.



3. Remove the filter mat ⑤.



4. Clean the filter mat by tapping off the dust. The filter mat can be rinsed with water, if needed. Dry the filter mat before using it again.

   NOTICE Moisture can damage electronics and lead to additional damages at the centrifuge. Only use dry filter mats.

5. Place the filter mat back on the capacitor.

6. Screw the ventilation grid onto the centrifuge.

7. Screw the ventilation cover back onto the centrifuge.

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 others are not put at risk.

Disinfect the affected parts immediately.

NOTICE

Equipment can be damaged by inappropriate disinfection methods or agents.

Before using any cleaning or disinfection methods except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.

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

After disinfection:

1. Rinse the centrifuge and all affected accessories with water.

2. Allow to fully drain and dry.

3. After disinfecting, treat the entire surface of aluminum parts including the cavities with corrosion protection oil (70009824).

   Treat the bolts of the swing out rotor with bolt grease.

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 others are not put at risk.

Decontaminate the affected parts immediately.

NOTICE

Equipment can be damaged by inappropriate decontamination methods or agents.

Before using any cleaning or decontamination methods except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.

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

After decontamination:

1. Rinse the centrifuge and all affected accessories with water.
2. Allow to fully drain and dry.
3. After decontaminating, treat the entire surface of aluminum parts including the cavities with corrosion protection oil (70009824).

   Treat the bolts of the swing out rotor with bolt grease.

6. Autoclaving

1. Before autoclaving clean rotor and accessories as described above.

2. Place the rotor on a flat surface.

- Rotors and adapter can be autoclaved at 121 °C.
- The maximum permissible autoclave cycle is 20 minutes at 121 °C.

NOTICE Never exceed the permitted temperature and duration when autoclaving. No chemical additives are permitted in the steam.

Clean the rotor before autoclaving and rinse it with distilled water. Remove all accessories (tubes, adapters) from the rotor.

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

7. Maintenance

Preventive Maintenance

CAUTION Usage beyond the rotor and lid latch lifetime limits might lead to sample loss and damage to the centrifuge.

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 rotor lifetime refer to the specific section within the rotor user manual.
- The lid latch is designed for 75 000 cycles of service.

Service

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 centrifuge drive
- protective casing

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.

This 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 additionally disinfect or decontaminate the entire system if biological or chemical substances were used. 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

Mind the information on transport and shipping (“Transport and Set Up” on page 16, “Shipping” on page 22).

VII. Troubleshooting

1. Mechanical Emergency Door Release

CAUTION

A spinning rotor can cause serious injuries when touched. In case of power outage the rotor can still be spinning.

Do not open the centrifuge before the rotor has stopped. Do not touch the spinning rotor. Do not brake the rotor using hands or other tools.

During a power failure, you will not be able to open the centrifuge door with the regular electric door release. A mechanical override is provided to allow sample recovery in the case of an emergency. This is only to be used 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 when there is no current. The braking process lasts much longer than usual.
Proceed as follows:

1. Make sure the rotor has stopped (view port in the centrifuge door).
2. Pull out the power supply plug. Keep the centrifuge horizontal at all times.
3. On the right side of the housing is one white plastic plug which can be removed from the plate with a small flat screwdriver. Once the plug is removed it will expose the release cord.

   Pull the release cord attached to it to trigger the mechanical door release. The lock releases the centrifuge door. The centrifuge door can be opened and the samples can be removed.

Reconnect the centrifuge to the power supply. Switch on the centrifuge.

2. Error Messages

NOTICE If problems occur not stated here, customer service must be contacted.

For error numbers shown that are not described in detail in the table, follow this procedure:

1. Restart the centrifuge.
2. If the error message shows again, contact the customer service.

Error number	Description	Troubleshooting
E-031	Temp High!	CAUTION Hot metal parts! Check, if the centrifuge is accessible. Be sure, that the room temperature is within the limits. Let the centrifuge cool down for 15 min. Be sure there is no condensed water in the centrifugation chamber. If the error message shows again, contact the customer service.
E-017 E-020 E-021 E-022 E-023 E-078 E-079 E-080 E-081	Read Manual	Wait until the rotor has stopped. Check, if the rotor is qualified for the centrifuge (check “Available Thermo Scientific Rotors” on page 13). Check, if the bottom of the rotor is damaged and if the rotor is placed on the Auto-Lock correctly. If the error message shows again, contact the customer service.

Error number	Description	Troubleshooting
E-019	Rotor Unknown	Restart the centrifuge. Check, if the rotor is qualified for the centrifuge (check "Available Thermo Scientific Rotors" on page 13). If the error message shows again, contact the customer service.
E-025 E-027	Read Manual	Check, if the centrifuge door is blocked. Restart the centrifuge. If the error message shows again, contact the customer service.
E-029 E-045	Read Manual	Check, if a rotor is installed. Check, if the rotor is qualified for the centrifuge (check "Available Thermo Scientific Rotors" on page 13). Restart the centrifuge. If the error message shows again, contact the customer service.
E-030	Power Failure	Check the power supply of the centrifuge. Make sure not to operate too many devices at one power source. Let the centrifuge cool down for 15 min. If the error message shows again, contact the customer service.
E-098	Imbalance Load	Check the load placed in the rotor. Check that the rotor cross bolts are greased well. Restart the centrifuge. If the error message shows again, contact the customer service.
E-060	Temp Low!	CAUTION Icy metal parts! Restart the centrifuge. Open the centrifuge door. Wait 120 min. Remove ice and water out of the centrifugation chamber. If the error message shows again, contact the customer service.

Error number	Description	Troubleshooting
E-046	Door Open!	Close the centrifuge door. Restart the centrifuge. If the error message shows again, contact the customer service.
E-099	Set Speed Too High	The installed rotor is not rated for the programmed speed. Check the programmed speed and the rotor.

3. When to contact Customer Service

If you need to contact the customer service, please provide the order no. and the serial no. of your centrifuge. This information can be found on the nameplate.

In addition the customer service also needs the software ID and the NVRAM ID. Both are available in the user menu. See "User Menu" on page 36.

Chemical Compatibility Chart

Chemical Compatibily 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	Polyethermide	Polyethylene	Polypropylene	Polysulfone	Polyvinyl Chloride	Ruton 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

Chemical Compatibily 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 Grip™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polyetherimide	Polyethylene	Polypropylene	Polysulfone	Polyvinyl Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
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	M	/	S	M	U	U	S	S	M	S	S	S
Ammonium Sulfate	U	M	S	/	S	S	U	S	S	S	S	S	S	S	S	S	/	S	M	U	U	S	S	U	S	S	U
Amyl Alcohol	S	/	M	U	/	/	S	S	/	M	/	S	/	M	S	S	S	S	M	U	U	/	U	/	S	/	M
Aniline	S	S	U	U	S	U	S	M	S	U	U	U	U	U	U	U	/	S	M	U	U	U	S	S	S	U	S
Sodium Hydroxide (<1%)	U	/	M	S	S	S	/	/	S	M	S	S	/	S	M	M	S	S	M	U	S	S	M	S	S	/	U
Sodium Hydroxide (10%)	U	/	M	U	/	/	U	/	M	M	S	S	U	S	U	U	S	S	S	U	S	S	M	S	S	/	U
Barium Salts	M	U	S	/	S	S	S	S	S	S	S	S	S	S	S	M	/	S	M	U	U	U	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	S	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

Chemical Compatibily 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 Grip™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polyetherimide	Polyethylene	Polypropylene	Polysulfone	Polyvinyl Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
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
Chromic Acid (10%)	U	/	U	U	S	U	U	/	S	S	S	U	S	S	M	U	M	S	S	/	U	M	S	U	S	S	S
Chromic Acid (50%)	U	/	U	U	/	U	U	/	/	/	S	U	U	S	M	U	M	S	S	/	U	S	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

Chemical Compatibily 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 Grip™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polyetherimide	Polyethylene	Polypropylene	Polysulfone	Polyvinyl Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
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	/	/	M	S	U	S	S	S	S	S	S	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	S	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
Acetic Acid (60%)	S	S	U	U	S	S	U	/	S	M	S	U	U	M	U	S	M	S	M	S	M	M	S	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	M	M	S	U	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	M	S	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	S	U	S	U
Ethylene Dichloride	S	/	U	U	/	/	S	M	/	U	U	S	U	U	U	U	U	U	U	/	U	S	U	/	S	/	S

Chemical Compatibily 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 Grip™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polyetherimide	Polyethylene	Polypropylene	Polysulfone	Polyvinyl Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
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	U	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	U	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	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
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
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

Chemical Compatibily 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 Grip™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polyetherimide	Polyethylene	Polypropylene	Polysulfone	Polyvinyl Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
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	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
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	S	S	S	S	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	/	M	M	M	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	U	S	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	S	M	/	S
Sodium Chloride (sat'd)	U	/	S	U	S	S	S	/	/	/	/	S	S	S	S	S	/	S	S	/	S	/	S	S	M	/	S

Chemical Compatibily 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 GRIMP™	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERAMIDE	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A™, TEFLON™	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON™	VITON™
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	/	/	/	/	/	S	/	M
SOLUTION 555 (20%)	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	U	S	S	S	S	M	S	S	S
MERCAPTOACETIC ACID	U	S	U	/	S	M	S	/	S	M	S	U	S	U	U	/	S	U	S	U	S	U	S	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	U	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	U	S	S	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

Chemical Compatibily 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 GRIMP™	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERMIDE	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINIL CHLORIDE	RULON A™, TEFLON™	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON™	VITON™
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
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	U	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

Chemical Compatibily 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 Grip™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polyetherimide	Polyethylene	Polypropylene	Polysulfone	Polyvinyl Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
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	M	S	S	M	S	M	U	S	M	M
Oxalic Acid	U	U	M	S	S	S	U	S	S	S	S	S	S	U	S	S	S	M	S	S	U	S	S	U	M	S	S
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	M	S	U	M	M	M	S
Phenol (50%)	U	S	U	/	S	U	M	/	S	U	M	U	U	U	U	U	S	M	U	U	M	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	/	/	S	U	S	S	S	U	U	U	U
Rubidium Bromide	M	S	S	/	S	S	S	/	S	S	S	S	S	S	S	/	/	S	S	M	S	S	S	M	S	S	S

Chemical Compatibily 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 GRIMP™	POLYALLOMER	POLYCARBONATE	POLYESTER, GLASS THERMOSET	POLYETHERAMIDE	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A™, TEFLON™	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON™	VITON™
RUBIDIUM CHLORIDE	M	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	S	S	S	S	S
NITRIC ACID (50%)	U	S	U	M	S	U	U	/	S	U	S	U	/	S	M	U	M	U	M	M	S	U	S	U	S	M	S
NITRIC ACID (95%)	U	/	U	U	/	U	U	/	/	U	U	U	U	M	U	U	U	S	S	M	S	U	S	U	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	U	S	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	U	M	U	M	M
SULFURIC ACID (10%)	M	U	U	S	S	U	U	/	S	S	M	U	S	S	U	U	S	S	S	S	S	S	U	S	U	S	S
SULFURIC ACID (50%)	M	U	U	U	S	U	U	/	S	S	M	U	U	S	U	M	U	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	U	S	S	M	M	S	S	S

Chemical Compatibily 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 Grip™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polyetherimide	Polyethylene	Polypropylene	Polysulfone	Polyvinyl Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
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	M	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	/	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
Triton X100™	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

Chemical Compatibily 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[1], Polyclear™, Clear Crimp™	Polyallomer	Polycarbonate	Polyester, Glass Thermoset	Polythermide	Polyethylene	Polypropylene	Polysulfone	Polyvinyl Chloride	Rulon A™, Teflon™	Silicone Rubber	Stainless Steel	Titanium	Tygon™	Viton™
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

[1] *Polyethlyeneterephtalate*

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.

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

IVD

Thermo Electron LED GmbH
Zweigniederlassung Osterode
Am Kalkberg, 37520 Osterode am Harz
Germany

thermofisher.com/centrifuge

Australia +61 39757 4300
Austria +43 1 801 40 0
Belgium +32 9 272 54 82
China +800 810 5118, +400 650 5118
France 02 2803 2180
Germany toll free 0800 1 536 376
Germany International +49 6184 906000
India toll free +1800 22 8374
India +91 22 6716 2200
Italy +39 02 95059 552
Japan +81 3 5826 1616
Korea +82 2 2023 0600
Netherlands +31 76 579 55 55
New Zealand +64 9 980 6700
Nordic / Baltic countries / CIS +358 10 329 2200
Russia +7 812 703 42 15, +7 495 739 76 41
Singapore +82 2 3420 8700
Spain / Portugal +34 93 223 09 18
Switzerland +41 44 454 12 12
United Kingdom / Ireland +44 870 609 9203
USA / Canada +1 866 984 3766
Other Asian countries +852 3107 7600
Countries not listed +49 6184 90 6000

en

50152023 is the original instruction manual.

ThermoFisher SCIENTIFIC