



HAWK R





User Manual

Please read this before use

The MSE logo, consisting of the letters 'MSE' in white on a dark blue oval background.

MSE

SIGNS

	WARNING! Warning of potential injury or health risk.
	DANGER! Risk of electric shock with potential for severe injury or death as a consequence.
	DANGER! Biohazard with potential for risk to health or death as a consequence.
	DANGER! Risk of explosion with potential for severe injury or death as a consequence.

This manual was prepared with special care. MSE Centrifuges Ltd may change the manual at any time and without notice because of improvements, typographical errors, inaccuracies of current information or improvements to facilities.

You can find the current version of the user manual on our website under: www.msecentrifuges.com
DOWNLOADS section.

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1 Application

The HAWK R centrifuges are table top laboratory centrifuge for in vitro diagnostic (IVD). Devices are used for separation samples taken from people's, animal's and plant's components of different densities, under the influence of the centrifugal force, to provide information about their biological state.

Its construction ensures easy operation, safe work and wide range of applications at laboratories engaged in routine medical analyses, biochemical research works etc.

In the centrifuge, it is prohibited to centrifuge caustic, inflammable and explosive preparations.

2 Technical specification

Manufacturer	MSE Centrifuges Ltd, Mytogen House, 11 Browning Road, Heathfield TN21 8DB						
Type	HAWK R						
mains voltage (L1+N+PE)		230V		100V	110V	120V	127V
		±10%		±5%			
mains frequency,		50Hz	60Hz	60Hz			
current protection [A]		T 10A					
cooling medium		R507 (CFC/HCFC free)					
	HAWK R						
capacity (max.)	500 ml						
speed – RPM	90 ÷ 18000 rpm (step 1 rpm)						
force – RCF	24270 x g (step 1 x g)						
kinetic energy (max.)	8800 Nm						
running time	00:00:01 ÷ 99:59:59 – [hours, min., sec] (step 1s)						
time counting	since start button is pressed / since preselected speed is reached						
short-time operation mode – SHORT	yes						
continuous operation mode – HOLD	yes						
user programmes	100						
adjustable temperature	-20 ÷ 55°C* (step 1°C)						
initial cooling/heating PROG 99 (90 ÷ 2500 RPM)	yes / yes						
guaranteed temperature with max. rotor speed	- ≤4°C						
cooling/heating without centrifuging	yes / yes						
cooling/heating with centrifuging	yes / yes						
acceleration (ACEL)	10 linear curves						
deceleration (DECEL)	10 linear curves						
programmable non-linear curves: acceleration	10						
deceleration	10						
USB communication	yes						
Electromagnetic compatibility	according to PN-EN 61326-1:2006						
ambient conditions	PN-EN 61010-1 (p.1.4.1)						
set-up site	indoors only						
ambient temperature	2° ÷ 40°C						
humidity (maximum relative humidity)	< 80%						
installation category	II	EN 61010-1					
pollution degree	2	EN 61010-1					
safety area	300 mm						
degree of protection	IP20						
height (H)	320 mm						
width (W)	365 mm						
depth (D)	660 mm						
height with open lid (H _{oc})	665 mm						
noise level							
power consumption	800W						
weight 230V	48,5 kg						
weight 120V	52,2 kg						

*It is possible to obtain a set temperature dependent on multiple factors , including: rotor type, established RPM, ambient temperature; accuracy: - ±1°C appropriate for place of temperature sensor

Menu languages: ENGLISH, FRECNH, GERMAN, SPANISH, ITALIAN, PORTUGUESE, RUSSIAN, SWEDISH, CZECH, POLISH,

3 Installation

Open the package. Remove the box containing the accessories. Take out centrifuge from the container. Keep the box and packing materials in case of service shipping.

3.1 Content of the package


Name	pcs.	cat no.
centrifuge HAWK R	1	see name plate
complete clamp	1	17142
spanner for the rotor	1	17099T
spanner for emergency opening of the lid	1	17642
power cord 230V / 120V	1	17866/17867
fuse WTA T 4A / WTA T10A	2	17861/17863
Vaseline 20ml	1	17201
USB A-A cable	1	16655
user manual	1	HAWK R

3.2 Location




- Ensure safe location.
- The centrifuge should not be located near source of heat and should not be subjected to direct sunlight.
- Centrifuge should be placed on a stable and flat-levelled table top.
- Centrifuge should be set horizontally on a rigid base.
- It is necessary to ensure a ventilation zone of the minimum 30cm round the centrifuge from every direction. Do not veil ventilation holes !
- Table for centrifuge should posses safety zone of the minimum 30cm round the centrifuge from every direction (safety needs in case of malfunction according to EN 61010-020).
- Table for centrifuge should be free of containments before locating of centrifuge.
- Passed parameters of the centrifuge are referring to the above named temperatures (see 2.Technical specification).
- At the change of the place from cold to warm one, condensation of water will occur inside the centrifuge. It is important then that sufficient time be provided for drying the centrifuge prior to starting the centrifuge again (min. 4 hours).
- Do not position the centrifuge so that it is difficult to operate the power switch.
- Supply voltage given on the name plate has to be consistent with local supply voltage. MSE Centrifuges laboratory centrifuges are 1st class safety devices and they are provided with the three-core cable with the plug resistant to dynamic loadings. Mains socket have to be provided with the safety pin (protective earth (PE)).

	<ul style="list-style-type: none"> ▪ It is recommended to install emergency cut-out that shall be located far from the centrifuge, near the exit or beyond the room.
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	<ul style="list-style-type: none"> ▪ Before switching on, check whether the centrifuge is connected to power supply correctly. It is obligatory to use only power cord recommended by manufacturer (17866 for 230V, 17867 for 120V) ▪ Before using, check whether the device is correctly installed.
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3.3 Current protection


	<p>The centrifuge is equipped with thermal current protection. Fuse is situated in the plug-in socket unit at the back of the centrifuge.</p>
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4 Safety notes

4.1 *Operating personnel*

	<p>Laboratory centrifuge can be operated by laboratory personnel after getting acquainted with the user manual.</p> <p>User manual shall be always held near the centrifuge.</p> <p>The centrifuge can not be misused.</p> <p>If the centrifuge is used in a manner not specified by the manufacturer, the protection provided by the device may be impaired.</p>
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4.2 *Guarantee*

	<p>The guarantee period is 24 months (unless otherwise specified in the purchase documents).</p> <p>The service life of the centrifuge specified by the manufacturer amounts to 10 years.</p> <p>After termination of the guarantee period, it is necessary to carry out yearly technical inspections of the centrifuge.</p> <p>The Manufacturer reserves the right to make technical changes in manufactured products.</p> <p>The maximum period of storage for unused centrifuge is 1 year. After this period, a service involving a technical inspection of the centrifuge by an authorized engineer should be carried out.</p>
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4.3 Loading the rotor

Fix the rotor firmly on the motor axis.

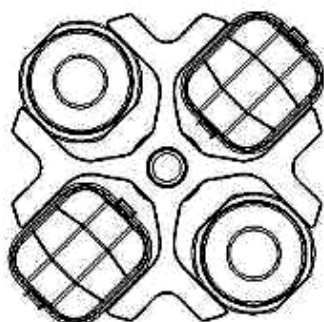
Avoid unbalance.

Load opposite buckets with the same accessories.

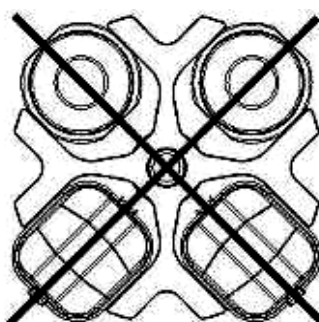
Centrifugation of the test tubes of different sizes:

- There is a possibility to centrifuge test tubes of different sizes; however, it is absolutely necessary in such cases that opposite buckets and round carriers be the same.
- Mass of different containers with test tubes spun at the same time has to be comparable. Swing-out rotors must be equipped with all (two or four – dependent to type of rotor) buckets.

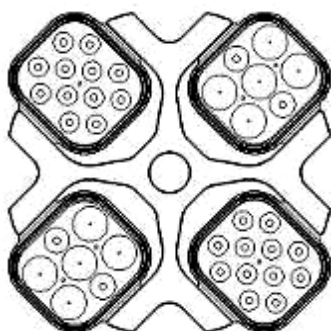
Lubricate the swing-out rotor journal pins.



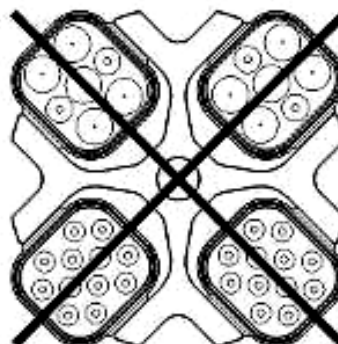
CORRECT



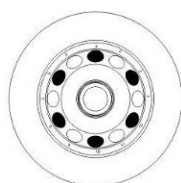
WRONG



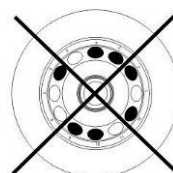
CORRECT



WRONG




CORRECT






WRONG


It is necessary to insert test tubes symmetrically on the opposite sides.

	<p>FILLING TUBES</p> <p>Fill test tubes outside the centrifuge.</p> <p>Please pay special attention to the quality and proper thickness of the glass test tubes walls. Those shall be test tubes for centrifuges.</p> <p>Fill test tubes outside the centrifuge.</p>
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4.4 Safety hints


	<p>ROTORS MAINTENANCE</p> <p>Lubricate the swing-out rotor journal pins.</p> <p>Use only accessories in good condition.</p> <p>Protect equipment against corrosion using accurate preventive maintenance.</p>
	<p>HS ACCESSORIES MAINTENANCE</p> <p>Make sure that rubber O-rings are lightly coated with silicone grease. Use high vacuum grease, e.g. type „C” by LUBRINA.</p>


	<p>HAZARDOUS MATERIALS</p> <p>MSE Centrifuges' accessories are not biotight. For centrifuging infectious materials, it is necessary to use hermetically closed tubes meeting the demands of biotightness, in order to prevent germs migration into the centrifuge and beyond it.</p> <p>It is not allowed to subject to centrifugation toxic or infectious materials with damaged leak proof seals of the rotor or test-tube. Proper disinfection procedures have to be carried out when dangerous substances contaminated the centrifuge or its accessories.</p>
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	<p>EXPLOSIVE AND COMBUSTIBLE MATERIALS</p> <p>It is not allowed to centrifuge explosive and inflammable materials.</p> <p>It is not allowed to centrifuge substances prone to reacting in result of supplying high energy during centrifugation. The centrifuge can not be operated in explosion-endangered areas.</p> <p>It is not allowed to centrifuge materials capable of generating inflammable or explosive mixtures when subjected to air.</p>
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4.5 Maintenance conditions

	<p>START-UP</p> <p>Prior to switching the centrifuge on, the user should read carefully all sections of this user manual in order to ensure smooth operation and avoid damages of this device or its accessories.</p> <p>In order to protect the centrifuge against unbalance, fill in the test tubes up to the same weight.</p>
	<p>TRANSPORTATION</p> <p>Centrifuge must not be transported with the rotor mounted on the shaft..</p>
	<p>GENERAL HINTS</p> <p>Original rotors, tubes and spare parts must be used.</p> <p>In case of faulty operation of the centrifuge, the user should ask MSE Centrifuges for assistance in servicing.</p> <p>It is not allowed to switch the centrifuge on if it is not installed properly or rotor is not fitted correctly.</p>
	<p>CENTRIFUGES SUBSTANCES</p> <p>It isn't allowed to exceed load limit set by the manufacturer. Rotors are intended for fluids of average homogeneous density equal to 1,2 g/cm³ or smaller when centrifugation is carried out at maximum speed. When fluids of higher density shall be used, then it is necessary to change the density of the centrifuges sample in PARAM/DENSITY field.</p>

	<p>INSPECTION PROCEDURES CARRIED OUT BY THE OPERATOR</p> <p>The User has to pay special attention to the fact that key centrifuge parts are not damaged. This is specifically important as for:</p> <ol style="list-style-type: none"> 1. Centrifuge accessories and especially structural changes such as corrosion, preliminary cracks, abrasion of metal parts. 2. Screw connections. 3. Inspection of seals of the buckets if such are used. Special attention must be paid to all of the rubber (seals) parts. In the case of damage or visible structural changes defective parts must be replaced for new immediately (Set of seals Cat. No. 18591 available from the manufacturer). 4. Control of execution of the guarantee yearly technical inspection of the centrifuge (after lapse of guarantee). <p>Only the manufacturer-specified buckets, included in the equipment list, as well as centrifuge tubes, which diameter, length and durability are suitable, should be used for spinning in this centrifuge. The use of equipment made by other manufacturers should be consulted with the manufacturer of the centrifuge.</p> <p>Do not lift or shift the centrifuge during operation or rest on it.</p> <p>Do stay outside of the safety zone during operation (within 30 cm distance) around the centrifuge and do not leave any accessories within this zone, e.g. glass vessels.</p> <p>Do not put any objects on the centrifuge.</p>
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	<p>LID OPENING</p>
	<p>It is not allowed to open the lid manually in emergency procedure when rotor is still turning.</p>


	ROTORS
	<p>It is not allowed to use the rotors and round carriers with signs of corrosion or other mechanical defects.</p> <p>It is not allowed to centrifuge highly corrosive substances which may cause material impairment and lower mechanical properties of rotor and round carriers.</p> <p>It is not allowed to use rotors and accessories not admitted by the manufacturer. Let to use commercial glass and plastic test tubes, which are destined to centrifuging in this laboratory centrifuge. One should absolutely not use poor quality elements. Cracking of glass vessels and test tubes could result in dangerous vibration of the centrifuge.</p> <p>It is not allowed to carry out centrifugation with the rotor caps taken off or not driven tight.</p>

4.6 Unbalance

The centrifuge is provided with the rotor unbalance sensor and when activated, the centrifugation process will be stopped through fast braking and at the same time an error message will be displayed. Cancellation of this error is possible only through pressing **BACK** key after the rotor has stopped.

The user must check that the rotor was correctly loaded, close the lid and restart the programme. In order to protect the rotor against improper work, it has to be loaded with identically filled buckets, carriers, test-tubes etc. for getting the best balance possible (see section 4.3).

Then close the lid and restart the programme.

	<p>Unbalance causes noise and vibrations during operation, and adversely affects power transmission system (motor, shock absorbers). The better balance, the smoother will be for the centrifuge operation and therefore the longer life of the instrument. Moreover, the ideal separation level is then obtained, as correctly separated constituents would not be moved up by vibration.</p>
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Emergency stop

At any time during the centrifuging, it is possible to interrupt the process and fast stop the rotor. Single-time pressing of the **STOP** key will make centrifuging stop with acceleration characteristics set in the programme (after pressing the **SET** or **STOP** key, the device returns to the main screen). Pressing and holding it up to 1s will make the centrifuging stop with the strictest feature.

4.7 Residual risk

The centrifuge is built according to state-of-the-art and recognised safety regulations. Nevertheless, some level of residual risk remains in case of improper operation and malfunctions. It is possible to decrease the residual risk by applying the user manual conditions and correcting any malfunction which could threaten safety in a prompt fashion.

5 Operating

5.1 Centrifuge overview

The new generation of MSE centrifuges laboratory centrifuges is provided with state-of-the-art microprocessor control systems, very durable and quiet asynchronous brushless motors and accessories consistent with requirements of the present-day user.

5.2 Centrifuge description

Fig.1. General view

1. Power switch
2. USB
3. Control panel
4. Lid
5. Inspection glass
6. Point of emergency lid opening

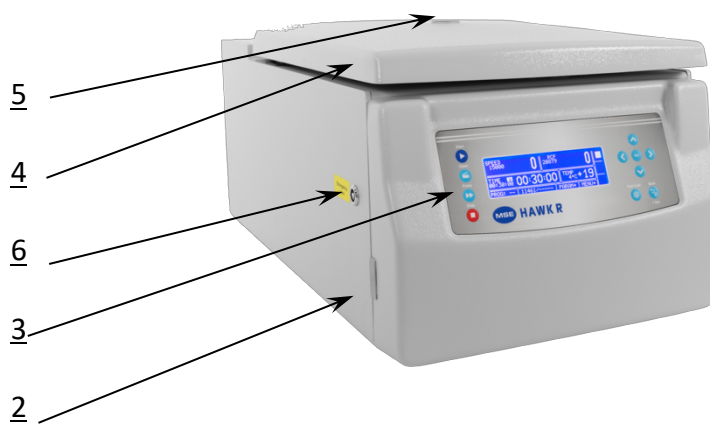


Fig.2. Right side of centrifuge

1. Motor axle
2. Rotor
3. Rotor lid
4. Complete clamp

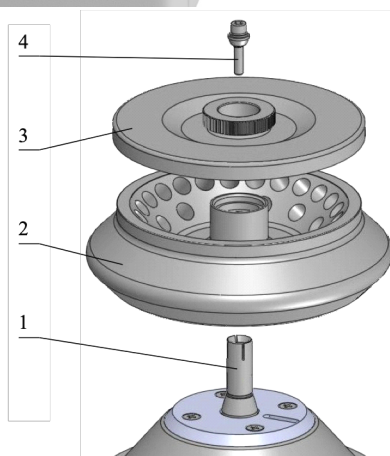
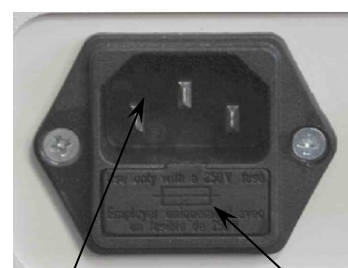


Fig.3. Assembly of angle rotor

Fig.4. Mains socket back of the centrifuge

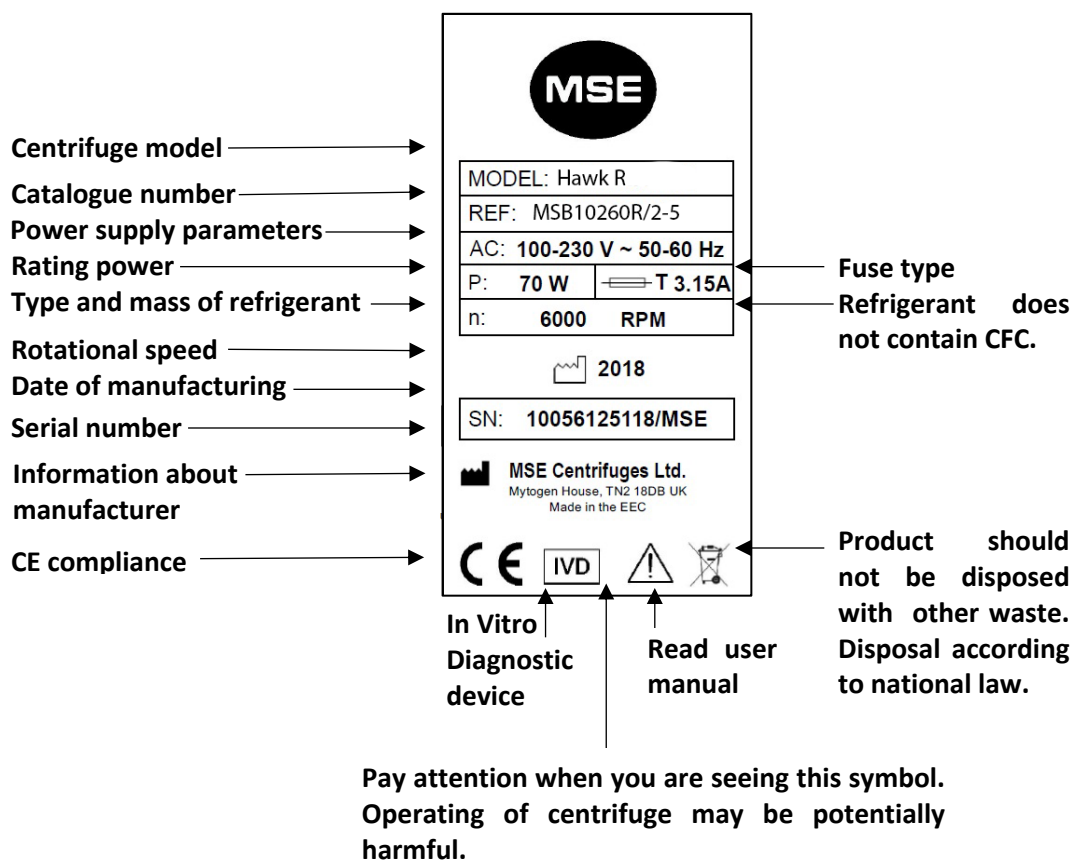


1. Plug-in socket
2. Fuse socket

5.3 Construction

The centrifuge has a rigid self-supporting structure. The housing is made of sheet aluminium, the back is made of steel sheet. The front and lid are made of ABS type plastic. The lid is fixed on steel axles hinges and from the front it is locked with an electromagnetic lock blocking all possibility of opening during centrifugation. The rotation chamber casing is made of thick steel sheet. The rotation chamber is made of stainless steel sheet.

5.4 Name plate



5.5 Rotor and accessories installation

- Connect the centrifuge to the mains (master switch on the back side of the centrifuge).
- Turn on the centrifuge (button on the side of the centrifuge).
- Open the lid of the centrifuge by pressing the **LID** key (see section Centrifuging/Control Panel). Prior to putting the rotor in, the user has to check that the rotating chamber is free of impurities, e.g. such as dust, glass splinters, residues of fluids which must be taken away.

The user will need to fit the rotor on the motor shaft driving it home on the cone.

Screw-in the clamp for fixing the rotor (clockwise) and screw it tightly home with the supplied spanner for the rotor.

Swing-out rotors have to be provided with the buckets in all seats. The user must bear in mind that every buckets swings individually. Bucket suspension studs should be lubricated periodically with petroleum jelly.

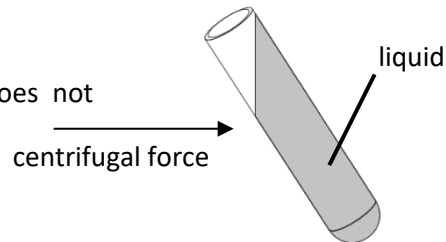
In case of rotors designed with a lid, they must not be used without it. Rotor lids must be securely closed. Rotor lids ensure smaller drags of the rotors, proper setting of the test-tubes and airtight sealing.

The user should only use buckets intended for selected types of the rotor.

Fill test tubes outside the centrifuge.

In case of centrifuging in an angled rotor, test tubes (buckets) have to be filled properly in order to prevent from pouring fluids during centrifuging.

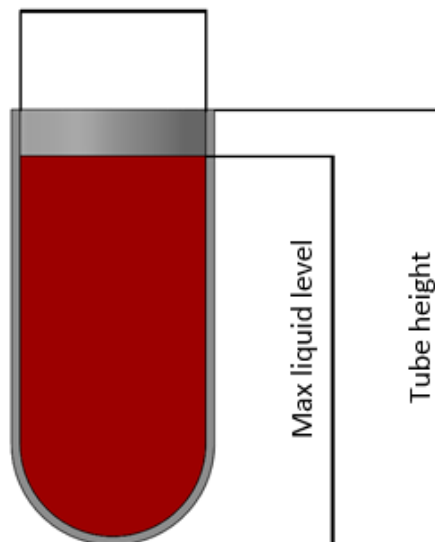
Tubes must be filled so that the material does not escape.



The user shall fill tubes according to formula:

$$\text{Max liquid level} < \text{Tube height} - \frac{\text{Internal tube diameter}}{2}$$

Internal tube diameter



Additionally, please observe the manufacturer's restrictions about the filling of the test tube.



It is recommended to equalize vessels loads as much as possible in order to ensure minimal vibrations during operation.

In order to prolong the lifetime of the rotor and gaskets, rotors should be lubricated with maintenance oil, while gaskets and threaded parts should be lubricated with petroleum jelly.

For replacement of the rotor, the user will need to unscrew the clamp and then grab the rotor with both hands at opposite sides, taking it away from drive shaft by pulling it up.

5.6 Control device

The microprocessor control unit of the centrifuge ensures a broad spectrum of work parameters.

5.7 *Setting parameters*

Data setting and easily readable displays facilitate the operator's programming and recording of parameters and condition of the centrifuge.

The centrifuge is provided with the USB interface that enables connection of the centrifuge to an external PC unit with a printer for the recording of the centrifugation parameters.

5.8 *Safety features*

Lid lock

The centrifuge can only be started if the lid is closed properly. The lid can only be opened after the rotor has stopped. In case of activation of the emergency opening of the lid during operation, the centrifuge drive will be immediately switched-off and the rotor will brake till a complete stop is achieved.

Unbalance detecting

When loads of opposite buckets or carriers in rotors are unbalanced, the drive will be switched-off during acceleration or operation of the centrifuge – and the error message will be displayed.

Rotor verification and checking compatibility with loaded programme

Upon starting centrifuging, the unit verifies the type of rotor applied and in the case of its incompatibility with the type indicated in the application or absence of the rotor, the spinning process will stop and an error message will appear. The conformity of the type of the rotor is signalled with a single audible signal. If the autoidentification (see 9.8 Other) option is checked, the right rotor will be automatically chosen, without user input.

Rest state inspection

The opening of the centrifuge's lid by pressing the cover button is possible only when the rotor is in the state of rest. Use the cover glass in the lid to ensure that the rotor is in the rest state. When the rotor is being stopped, the braking symbol (see 6.2) is visible and goes off when it is stopped. Emergency lid opening while the rotor is running is prohibited.

Checking of excessive temperature

If the temperature in rotation chamber exceeds 50°C (MPW-260) / 65°C (MPW-260R/RH) caused by, for example, a malfunction of the cooling system, the drive will be switched off and an error message will be displayed. The reboot is only possible after the device has chilled.

5.9 *Increase in temperature*

In uncooled centrifuges, the temperature in the rotor chamber, rotor and sample can increase to above 40°C, based on the run time, g-force (rcf)/speed and ambient temperature.

6 Centrifuging

Power switching ON/OFF is carried out with master switch situated on the right side wall of the centrifuge. All settings on the centrifuge are done by means of the control panel.

6.1 Control panel

The control panel placed on the front casing is used to control the centrifuge operation.



Control panel




	SHORT ¹	short-time centrifuging
	START	start centrifugation run
	STOP ²	end centrifugation run
	LID	lid opening
	FAST COOL	start fast cooling mode (MPW-260R and MPW-260RH only)
	BACK/ OPTIONS	exit the current menu / enter to submenu of options (keep held down within 1 s.)
	UP	navigation in menu / increasing values
	DOWN	navigation in menu / decreasing values
	LEFT	navigation in menu
	RIGHT	navigation in menu
SET	SET	changing parameters / confirming changes

¹ the centrifuge is working as long as the key is pressed













²pressing once – will make the centrifuging stop with acceleration characteristics set in the current programme, pressing twice – will make the centrifuging as fast as possible (quickest characteristic). During the setting of the parameters, pressing twice allows to exit zones on the primary screen without introducing changes.













6.2 Display

The display is located in the centre of the control panel. The main screen variants are presented below. In the user manual, sample screens are shown. Flashing of field on display mean it is ready to set. Flashing of field is visualised as highlighted in the user manual.

	<p>After switching the centrifuge on, the welcome screen appears following which it is possible to set up parameters.</p>
	<p>Simplified display mode is set as default, it is possible to switch to normal (see chapter 9.3).</p>
	<p>Normal display contains an expanded number of settings visible during operation.</p>
<p>Detailed information on display modes is provided in chapter 9.3.</p>	

SPEED	rotor speed	assigned/measured
RCF	relative centrifugal force	assigned/measured
TIME	centrifuging time	assigned/measured
TEMP	temperature	assigned/measured
PRG	programme no.	
11199	rotor no.	
PARAM	parameters of the centrifuge	
MENU	configuration menu	

	changing values		
	user multi sections curve		
	density > 1,2 g/cm ³		
	centrifuging radius changed		
	counting time down (decreasing)		counting time up (increasing)
	cooling to assigned temperature		
	FAST COOL mode cooling		
	centrifuging		centrifuging (with automatic lid opening)
	rotor stopped / closed lid		rotor stopped / opened lid




	braking		fastest decelerating
	rotor identification		
	thermal chamber		
	temperature delay		
	time delay		
	drop-down list		
	temporarily disabled		
	locked		
	time counting (flashing)		
	disabled option		active option

6.3 Setting up RPM, RCF, time, temperature




On the main screen, it is possible to set:

rotating speed - RPM	SPEED
relative centrifugal force (multiple of g-force)	RCF
centrifuging time	TIME
centrifuging temperature	TEMP

Exemplary change of **SPEED** setting:




	<ul style="list-style-type: none"> Press SET (to enter edit mode) – . Via ▲▼◀▶ keys mark SPEED field (flashing). Press SET  flashing. Via ◀▶ choose order of magnitude of changing value (flashing). With ▲▼ choose demanded value. Repeat above two steps for other orders of magnitude. Confirm settings by pressing SET. Press BACK.
<ul style="list-style-type: none"> When RPM is changed, RCF is automatically corrected. 	


Change of **RCF** setting example:



 <p>The screenshot shows the device's main menu. At the top, 'SPEED 2000' is displayed. Below it, 'TIME 00:02:00' and 'TEMP 20°C +20' are shown. The 'RCF' field is highlighted with a flashing cursor. The bottom of the screen shows 'PROG: -- 11199/-----' and 'PARAM+ MENU+'.</p>	<ul style="list-style-type: none"> ▪ Press SET (to enter edit mode) –  appears. ▪ Via ▲▼◀▶ keys mark RCF field (flashing). ▪ Press SET- flashing. ▪ Via ◀▶ choose order of magnitude of changing value (flashing). ▪ With ▲▼ choose demanded value. ▪ Repeat above two steps for other orders of magnitude. ▪ Confirm settings by pressing SET. ▪ Press BACK.
---	---

- When RCF is changed, RPM is automatically corrected.


Change of **TIME** setting example:



 <p>The screenshot shows the device's main menu. At the top, 'SPEED 2000' is displayed. Below it, 'TIME 00:02:00' and 'TEMP 20°C +20' are shown. The 'TIME' field is highlighted with a flashing cursor. The bottom of the screen shows 'PROG: -- 11199/-----' and 'PARAM+ MENU+'.</p>	<ul style="list-style-type: none"> ▪ Press SET (to enter edit mode) -  appears. ▪ Via ▲▼◀▶ keys, select TIME field (flashing).
<p style="text-align: center;">00:02:00 [hh : mm : ss]</p> <p>e.g.: centrifuging time – 2 minutes 00 seconds</p>	<ul style="list-style-type: none"> ▪ Press SET- flashing. ▪ Via ◀▶ choose order of magnitude (flashing). ▪ With ▲▼ choose required value. ▪ Repeat above two steps for other orders of magnitude. ▪ Confirm settings by pressing SET. ▪ Exit edit mode by pressing BACK.
<p style="text-align: center;">00:02:00</p>	<p>set value</p>
<p style="text-align: center;">02:00</p>	<p>current value (most significant digits)</p>

HOLD mode	continuous run mode
	<ul style="list-style-type: none"> To run centrifuging in HOLD mode set 00:00:00 time. To end centrifuging in HOLD mode press STOP.

Change of TEMP setting example:	
	<ul style="list-style-type: none"> Press SET (to enter edit mode) –  appears. Via ▲▼◀▶ keys, select TEMP field (flashing). Press SET key. With ▲▼ choose required value. Confirm settings by pressing SET. Press BACK.


6.4 Users programmes

	<p>After switching the centrifuge on, the last programme used will load automatically. If no programme was not used in previous session, the centrifuge will revert to the last choosen parameters.</p>
---	---

Selecting a programme:	
Enter the programme selection mode via the simplified display :	
	<ul style="list-style-type: none"> Press and hold  by 1 second. Choose PROG with ▲▼ Press SET.

Entering the programme selection mode for the **normal display**:




- Press **SET** key –  appears.
- Via **▲▼◀▶** keys mark **PRG-** – field (highlighted)
- Press **SET** key – list of programmes is visible.

Programme selection mode tab:

No	SPEED	RCF	TIME	TEMP	ACC	DEC	ROT
0	4590	2826	HOLD	20	0	0	11740
1	4590	2826	00:01:00	20	0	0	11740
2	5090	3476	00:02:00	20	0	0	11740
3							
4							
5							

- Via **▲▼** choose required programme.
- Confirm with **SET** key.

No	SPEED		C	DEC	ROT
0	4590	LOAD			
1	4590	SAVE	0	0	11740
2	5090	DELETE	0	0	11740
3		CURVES	0	0	11740
4		NEW PROGRAM			
5					

LOAD, SAVE, DELETE, NEW PROGRAM
selected programme is marked by .

No	SPEED		C	DEC	ROT
0	4590	SAVE ?			
1	4590		0	0	11740
2	5090		0	0	11740
3			0	0	11740
4		YES			
5		NO			

SAVE – save settings as a programme
(confirm by selecting **YES** and pressing **SET**)

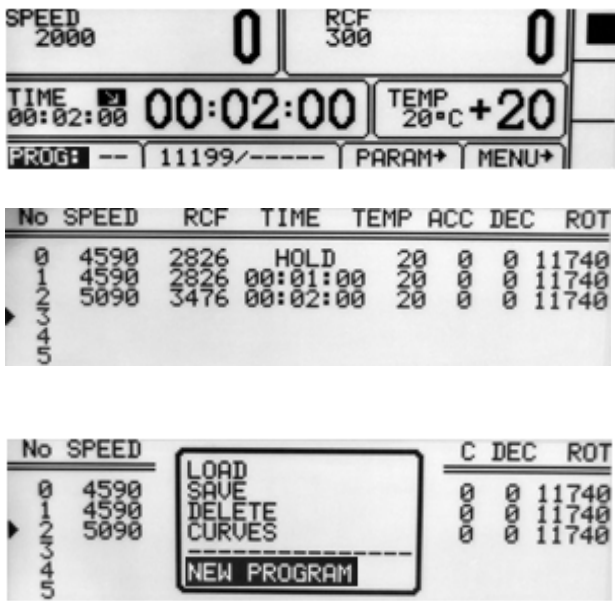
No	SPEED		C	DEC	ROT
0	4590	DELETE ?			
1	4590		0	0	11740
2	5090		0	0	11740
3			0	0	11740
4		YES			
5		NO			

DELETE – delete programme (confirm by selecting **YES** and pressing **SET**)

No	SPEED		C	DEC	ROT
0	4590	LOAD			
1	4590	SAVE	0	0	11740
2	5090	DELETE	0	0	11740
3		CURVES	0	0	11740
4		NEW PROGRAM			
5					

NEW PROGRAM – enter to create new programme mode (as below)

Creating a new programme:



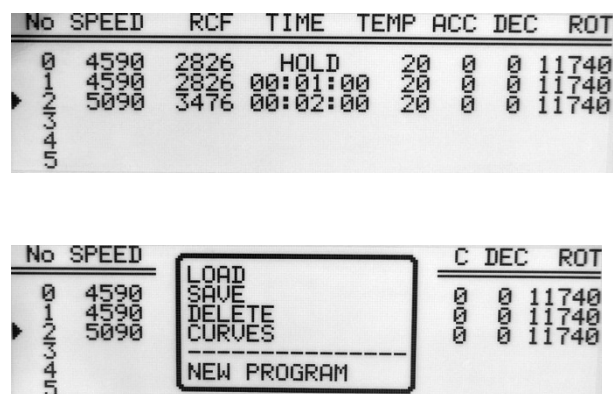
- Press **SET** key.
- Via ▲▼◀▶ keys mark **PROG** field (flashing).
- Press **SET** key. List of programmes is visible, choose position (programme number).
- Press **SET** key - programme menu settings will appear.
- Choose **NEW PROGRAMME** press **SET** and **BACK**, and then set requested parameters of centrifuging (see chapter 6. Centrifuging).
- If you want to register a new programme, revert to the **PROG** menu and save it as described before.

▪ Changing parameters during centrifuging

There is a possibility to change parameters: **SPEED, RCF, TIME, TEMP** during centrifuging. Such modifications inactivate the current running programme. When a programme has been set, a modification during run is represented by **PROG --** symbol (instead of the programme number).

User multi-section **acceleration/deceleration** characteristics

CURVES – create acceleration or deceleration characteristics

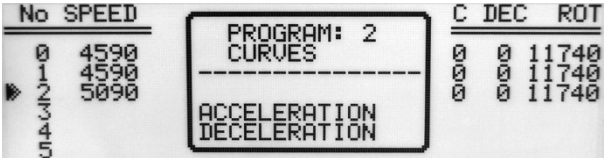


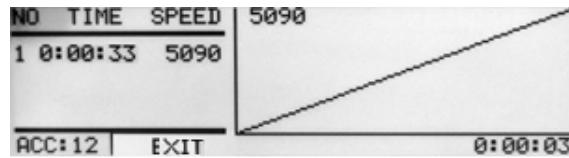
With ▲▼ keys, choose saved programme for which you intend to create the acceleration or deceleration characteristics (marked with symbol ▮).

Press **SET**.

With ▲▼ keys choose **CURVES**.

- Press **SET** - the selection frame is displayed.

	<ul style="list-style-type: none"> With ▲▼ keys choose ACCELERATION to create acceleration characteristics or DECELERATION to create deceleration characteristics <p>Confirm selection by pressing SET.</p>
---	---

Acceleration characteristics	PROG / CURVES / ACCELERATION	
After choosing PROG → CURVES → ACCELERATION , the window of the features' wizard will be displayed: Current acceleration characteristic connected with the loaded programme will be displayed on the screen.		
	NO.	section no. (max. 4)
	TIME	total acceleration time
	SPEED	final RPM
	ACC:12	characteristics no. (10-19)

The **EXIT** field will flash. Pressing the **SET** key will cause returning to the **PROG → CURVES** fold, without making changes in the acceleration characteristics. Press ▲ to start programming "1" section.

„1" SECTION

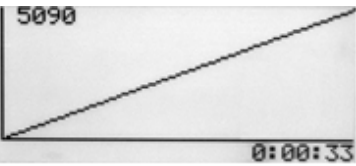
Press **SET**.

- With ▲▼, choose time for section, press **SET**.
- With ▲▼ choose speed for section, press **SET**.

The set speed value is limited by the maximum speed of the rotor connected with the edited programme. After the end of programming, the speed and the graphical displaying of the section will appear under **TIME+SPEED** of the user's acceleration selected features.

After programming section 1, there is a possibility to programme the next section, number 2. It is possible also to abandon the programming: with **UP/DOWN** keys, choose the **EXIT** option (it will flash) and save (press the **SET**) only the acceleration characteristics of 1 section with **TIME/SPEED** parameters described in the line 1.

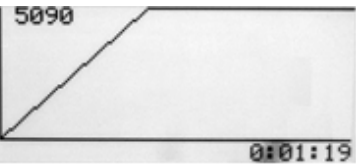
„2” SECTION

NO TIME SPEED	5090	
1 0:00:33 5090	5090	
2 0:00:00 5090	5090	
ACC:12 EXIT		
0:00:33		

Programming of new section is possible (the whole line 2 is flashing). Programming as in the case of section 1. It is also possible to abandon the programming: with **UP/DOWN** keys, choose the **EXIT** option (it will flash) and save (press the **SET**) only the acceleration characteristics of 1 section with **TIME/SPEED** parameters described in the line 1.

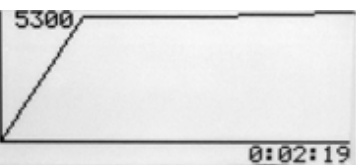
The minimal speed of the next section of acceleration characteristics is equal to the speed of the previously programmed section.

„3” SECTION

NO TIME SPEED	5090	
1 0:00:33 5090	5090	
2 0:00:46 5090	5090	
3 0:00:00 5090	5090	
ACC:12 EXIT		
0:01:19		

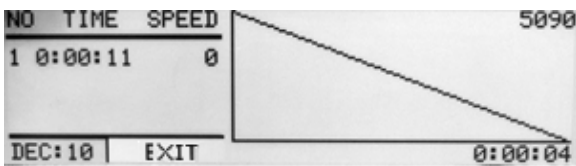
Programming of new section possible (the whole line 3 is flashing). Programming as in the case of section 1. It is also possible to abandon the programming: with **▲▼** keys, choose the **EXIT** option (it will flash) and save (press the **SET**) only the acceleration characteristics of 2 section with **TIME/SPEED** parameters described in the line 1 and 2.

„4” SECTION

NO TIME SPEED	5300	
1 0:00:33 5090	5090	
2 0:00:46 5090	5090	
3 0:01:00 5300	5300	
4 0:00:00 5300	5300	
ACC:12 EXIT		
0:02:19		

Programming of new section is possible (the whole line 4 is flashing). Programming as in the case of section 1. It is also possible to abandon the programming: with **▲▼** keys, choose the **EXIT** option (it will flash) and save (press the **SET**) only the acceleration characteristics of 3 section with **TIME/SPEED** parameters described in the line 1, 2 and 3.

Repeated attempts to re-programme previous sections of the acceleration characteristics will cause a factory reset.

Deceleration characteristics:	PROG / CURVES / DECELERATION		
<p>After choosing PROG → CURVES → DECELERATION the window of the characteristics wizard will be displayed:</p> <p>Default deceleration characteristics connected with the loaded programme will be displayed on the screen. Creating of deceleration characteristics takes place a little differently than acceleration characteristics.</p>			
	NO.	section no. (max. 4)	
	TIME	total acceleration time	
	SPEED	final RPM	
	DEC:10	characteristics no. (10-19)	

Initially, the **EXIT** field is flashing. Pressing the **SET** key will cause a return to the **PROG → CURVES**, without making changes in the deceleration characteristics. Press **▲** to start programming “1” section.

„1” SECTION

Press **SET**.

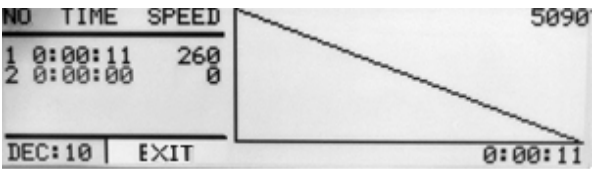
With **▲ ▼** choose time for section, press **SET**.

With **▲ ▼** choose speed for section, press **SET**.

In order to complete the creation of the deceleration curve, it is necessary for the speed of the last of programmed sections of the curve to be equal = 0. Otherwise the curves wizard will not enable the end of programming (it will be impossible to select the EXIT option).

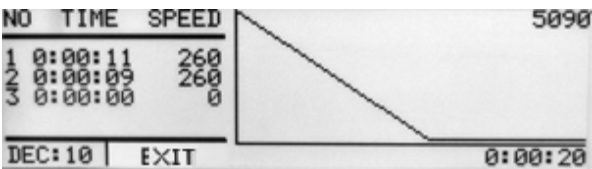
After programming the section 1, there is a possibility to programme the next section, number 2. You can opt out of the following sections by pressing **EXIT**.

„2” SECTION

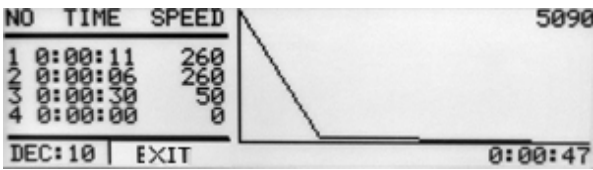
	<p>New section programming is possible (the whole line 2 is flashing). Programming as in the case of the section 1. To stop creating the deceleration curve at the stage of two sections, it is necessary to set the speed in section 2 to 0 and press the SET key and then choose EXIT and press SET.</p>
---	---

The maximum speed of the next section of deceleration characteristic is equal to the speed programmed already of the previous section.

„3” SECTION

	<p>New section programming is possible (the whole line 3 is flashing). Programming as in the case of the section 1. To stop creating the deceleration curve at the stage of three sections, it is necessary to set the speed in section 3 to 0 and press the SET key and then choose EXIT and press SET.</p>
---	---



„4” SECTION

	<p>New section programming is possible (the whole line 4 is flashing). Programming as in the case of the section 1. If speed of the last section=0, it is possible to save the created characteristics by choosing the EXIT option with ▲▼ keys and pressing the SET key and then choose EXIT and press SET.</p>
---	--

Repeated attempt to programme previously programmed sections of the acceleration characteristics will cause a complete reset of the whole deceleration characteristics (with settings of the programme loaded to edition).





6.5 Programmes with user characteristics

Loading a modified programme in the **CURVES** fold is signalled by the icon on the main screen:

	<p>Icon  signals that a programme with user acceleration/deceleration characteristics is loaded.</p>
---	---

A change in any parameter will cause the deactivation of the multi-sections' curves mode.

6.6 Rotor choosing

Simplified display mode	
	<ul style="list-style-type: none"> Press and hold  for 1 second. Choose rotor number (example 11199/-----) with ▲▼. Press SET. follow points below in Normal display mode description
Normal display mode	
	<ul style="list-style-type: none"> Press SET—  appears. Via ▲▼◀▶ mark rotor choosing field.

NO	ROTOR	BUCKET	SPEED	RCF	RMAX	RMIN
1	11199	-----	18000	24270	67	35
2	11210	-----	5000	3997	143	60
3	11211	-----	5500	4498	133	87
4	11213	-----	5500	4227	125	79
5	11259	-----	15000	24400	97	65
6	11273	-----	12000	14006	87	54

- Press **SET** (Rotor list will appear).
- Via ▲ ▼ keys, select requested rotor number
- Confirm by press **SET**.
- Press **BACK**.

It is possible to set **AUTOMATIC ROTOR IDENTIFICATION**.

The procedure is described in subsection **9.8**.

6.7 SHORT mode



- The **SHORT** mode is activated by pressing and holding ►►(SHORT).
In SHORT mode, the centrifuge is working as long as the SHORT key is pressed or when set time is over.

6.8 Finishing the centrifuging

When preselected time is reached, centrifugation will end automatically.



x1

- Before the preselected time has lapsed, the user can stop centrifugation. Pressing **STOP** for the first time will stop centrifuging with the characteristic set in loaded programme. ▼ symbol will be shown.



x2

- Pressing **STOP** second time will stop centrifuging with the fastest characteristic. ▼ symbol will be shown.



- The message regarding the cancelling of centrifuging can be deleted with the **STOP, SET, LID, ▲ ▼ ◀ ▶** or **BACK** key.

6.9 Temporarily disabled functions

Functions written below can be temporarily disabled.

active	SPEED	RCF	TIME	TEMP	PROG —	—— / ——	PARAM	MENU
THERMAL CHAMBER	●	●	●	○	●	●	●	●
STANDARD CENTRIFUGING	●	●	●	●	●	○	●	○

● available
○ disabled

7 Temperature control



The centrifuge is equipped with ecological refrigerating system with temperature control. During centrifugation, some differences in temperature may appear on the display and temperature of the samples in the rotor. It depends on the thermal conductivity of the rotor, samples and centrifugation time, initial temperature of rotor and samples.

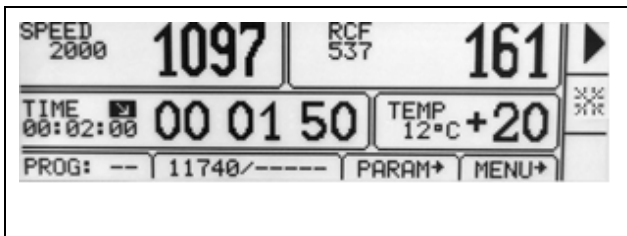


Change of **TEMP** setting example:

	<p>Press SET (to enter edit mode) – appears.</p> <p>Via ▲ ▼ ◀ ▶ keys mark TEMP field (flashing).</p> <p>Press SET key.</p> <p>With ▲ ▼ choose requested value (from -20°C to 40°C for 260R, from -20°C to 55°C for 260RH).</p> <p>Confirm settings by pressing SET.</p> <p>Press BACK.</p>
--	--

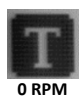
	<p>Cooling is indicated by the symbol (flashing).</p>
--	--

7.1 Initial cooling during centrifuging – **FAST COOL**


	<p>The parameters allowable to change at FAST COOL mode:</p> <ul style="list-style-type: none"> temperature (lower than current temperature shown by centrifuge) <p>In order to centrifuge reduced temperature samples (eg. storage in the external refrigerator) the centrifuge chamber, rotor and centrifuge container must be pre-cooling to the predetermined temperature. It causes minimalization of temperature differences.</p> <p>Initial cooling may be activated by FAST COOL key (lid must be closed – rotor is spinning at FAST COOL mode)</p> <p>When FAST COOL mode is active, cooling system is automatically set the the right parameters to obtain the requested temperature the fastest way.</p>
--	--

	<p>FAST COOL mode is marked by symbol  flashing in the right upper side of display.</p>
	<p>It is possible to exit FAST COOL mode at any time by pressing STOP key.</p> <p>Interruption of the function is signaled by a message.</p>


7.2 Initial cooling or heating without centrifuging – THERMAL CHAMBER

	PARAM → THERMAL CHAMBER
	<p>It is possible to run the centrifuge in the THERMAL CHAMBER mode - cooling for R, cooling and heating for RH (rotor is at standstill).</p> <p>How to enable the THERMAL CHAMBER is described in Parameters of the centrifugation chapter.</p>

7.3 Cooling or heating in “START DELAY – OF TEMPERATURE” mode

	PARAM → START DELAY – OF TEMPERATURE
	<p>Centrifuging process will start, when preselected temperature is reached.</p> <p>How to enable run START DELAY – OF TEMPERATURE function is described in Parameters of the centrifugation chapter.</p>




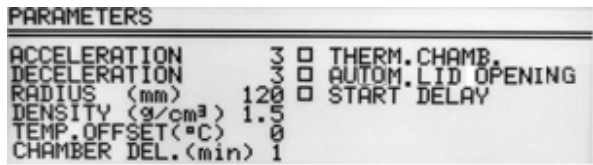
7.4 Cooling or heating in „SHORT” mode

	<p>Cooling and heating features are available in SHORT mode.</p> <p>How to enable run centrifugation in SHORT mode is described in the Centrifugation/SHORT mode.</p>
---	--

7.5 Cooling and heating notes

Centrifuges with cooling are equipped with an efficient cooling system. It allows to obtain selected temperatures in the chamber even at maximum spin speed or fast obtaining desired temperatures (e.g. 4°C and 36°C). Note that time and possibility of obtaining a set temperature is dependent on multiple factors, including: the power of the cooling system, the shape of the rotor, the rotor speed, ambient temperature, etc. The accuracy of the temperature stability of $\pm 1^{\circ}\text{C}$ is determined by the installation place of the temperature sensor.

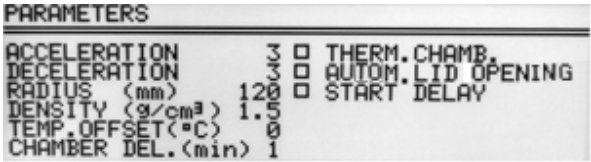
8 Parameters of centrifugation

Simplified display	
	<ul style="list-style-type: none"> Press and hold  by 1 second. Choose PARAM. with ▲ ▼ Press SET. <p>Follow points described below (Normal display mode description)</p>
Normal display	
	<p>Press SET.</p> <p>With ▲ ▼ ◀ ▶ keys select PARAM.</p> <p>Press SET.</p>
	

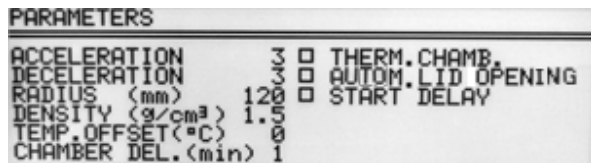

ACCELERATION	chosen acc. characteristic (0-the fastest, 9-the slowest)
DECELERATION	chosen dec. characteristic (0-the fastest, 9-the slowest)
RADIUS [mm]	current rotor radius [mm]
DENSITY (g/cm ³)	sample density [g/cm ³]
TEMP. OFFSET (°C)	value of temperature correction
CHAMBER DEL. (min)	delay between set thermal chamber mode and start it

THERMAL CHAMBER	cooling of the chamber without centrifuging
AUTOM. LID OPENING	opening lid after centrifuging automatically
START DELAY	starting delayed (after pressing START)

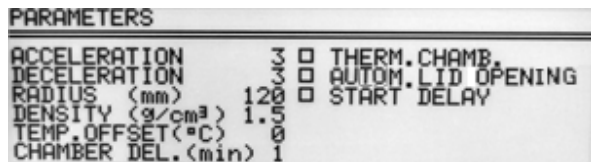
8.1 Acceleration/deceleration – changing characteristics



 <pre> PARAMETERS ACCELERATION 3 <input type="checkbox"/> THERM.CHAMB. DECELERATION 3 <input type="checkbox"/> AUTOM.LID OPENING RADIUS (mm) 120 <input type="checkbox"/> START DELAY DENSITY (g/cm³) 1.5 TEMP.OFFSET(°C) 0 CHAMBER DEL.(min) 1 </pre>	<p>With ▲▼ keys, select ACCELERATION or DECELERATION.</p> <p>Press SET.</p> <p>With ▲▼ keys select required number of characteristics.</p> <p>Press SET.</p> <p>ACCELERATION –10 (0 ÷ 9), linear accelerating characteristics assigned to every rotor. 0-the fastest acceleration, 9-the slowest acceleration.</p> <p>DECELERATION – 10 (0 ÷ 9), linear decelerating characteristics assigned to every rotor. 0-the fastest deceleration, 9-the slowest deceleration.</p>
---	---

8.2 Radius

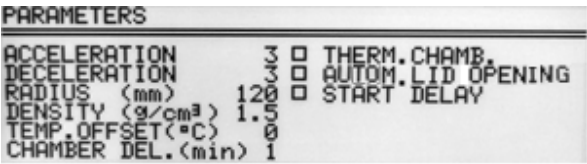
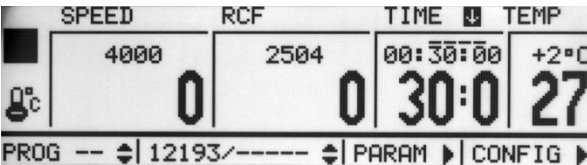


 <pre> PARAMETERS ACCELERATION 3 <input type="checkbox"/> THERM.CHAMB. DECELERATION 3 <input type="checkbox"/> AUTOM.LID OPENING RADIUS (mm) 120 <input type="checkbox"/> START DELAY DENSITY (g/cm³) 1.5 TEMP.OFFSET(°C) 0 CHAMBER DEL.(min) 1 </pre>	<p>RADIUS [mm] - control of the radius of the rotor within the range from R_{min} to R_{max}. Available values depends on the chosen rotor. Radius correction allows for more precise control RCF, for example when user needs to know the real RCF in half length of the test tube.</p> <p>To change the rotor radius select RADIUS [mm] with ▲▼ keys.</p> <p>Press SET.</p> <p>Set demanded value by pressing ▲▼.</p> <p>Press SET.</p>
 <pre> SPEED 2000 0 RCF 496 0 TIME 00:02:00 TEMP 12°C +20 PROG: -- 11740/----- PARAM+ MENU+ </pre>	<p>When radius correction is activated, R symbol is visible on the screen.</p> <p>Reducing of the rotor radius results in a change of displayed RCF value.</p>

8.3 Sample density

 <pre> PARAMETERS ACCELERATION 3 <input type="checkbox"/> THERM.CHAMB. DECELERATION 3 <input type="checkbox"/> AUTOM.LID OPENING RADIUS (mm) 120 <input type="checkbox"/> START DELAY DENSITY (g/cm³) 1.5 TEMP.OFFSET(°C) 0 CHAMBER DEL.(min) 1 </pre>	<p>DENSITY (g/cm³) – default density is set to 1,2 g/cm³</p> <p>To change the density (possible values 1,2÷9,9 g/cm³):</p> <ul style="list-style-type: none"> Via ▲▼ keys select DENSITY (g/cm³) Press SET.
---	--

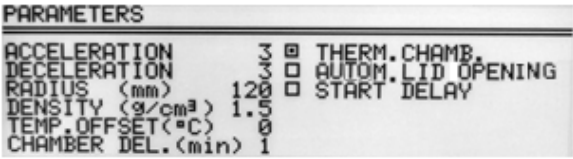

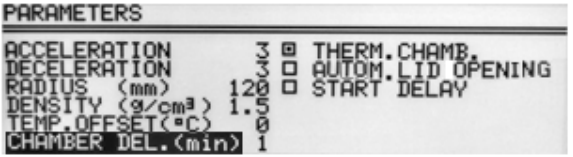
	<ul style="list-style-type: none"> Set requested value by pressing ▲▼. Press SET.
	<p>When density is changed,  symbol is visible on the screen.</p> <p>Changing of DENSITY value is compulsory when density of sample placed into rotor is higher than 1.2 g/cm³. A change of DENSITY value leads to a decreasing maximum value of accessible speed.</p>

8.4 Temperature offset

	<p>Temperature offset allows for a more precise control of real sample temperature. It can be helpful in case of high/low initial temperature samples or high volume samples.</p> <ul style="list-style-type: none"> With ▲▼ keys, select TEMP. OFFSET. Press SET. Use the ▲▼ keys to select the difference between the temperature that the cooling system will aim for, and set temperature. Confirm selection by pressing SET. <p>Attention! The use of the offset cannot extend the temperature range achieved by the centrifuge.</p> <p>Function description At a set temperature of 20°C and the set offset value equal to -5°C, the cooling system will actually aim to reach 15°C. With a setpoint temperature of 20°C and a set offset value of 5°C, the system will actually try to reach 25°C.</p> <p>The temperature displayed on the main screen is corrected for offset value.</p> <p>Offset can be selected from the range of -20°C to + 20°C.</p>
	<p>Activation of the function is signalled on the main screen with  or  depending on the offset value sign.</p>

8.5 Thermal chamber

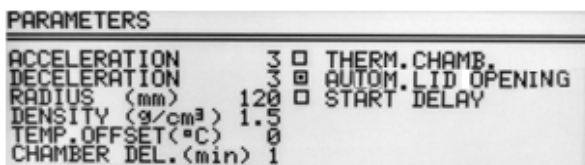




Cooling without centrifuging.	THERMAL CHAMBER
	<p>With ▲ ▼ ◀ ▶ keys, select THERMAL CHAMBER. Press SET (to turn on/off).</p> <p>With ▲ ▼ keys, select temperature value. Set requested value (0°C÷40°C) by pressing ▲ ▼. Confirm selection by pressing SET.</p> <p>Attention, in the centrifuge without heating, do not set the thermal chamber to a value higher than currently indicated by the centrifuge.</p>
	<p>When the THERMAL CHAMBER function is activated, T symbol is visible on the screen.</p> <p>Changing temperature from the main screen is not possible.</p> <p>Opening the lid terminates the THERMAL CHAMBER function (closing lid back turns it on).</p>
	<p>The thermal chamber is activated with delay.</p> <ul style="list-style-type: none"> • Set time of delaying by select CHAMBER DEL. ▪ Press SET. ▪ With ▲ ▼ keys select demanded value (1-5 min). <p>Press SET.</p>

If **THERMAL CHAMBER** is turned on (in **PARAM**) and centrifugation completes, **THERMAL CHAMBER** will activate itself.


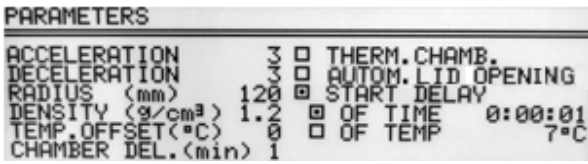


THERMAL CHAMBER can be only activated when no other programme is running.

8.6 Automatic lid opening

Automatic lid opening	AUTOMATIC LID OPENING
 <pre> PARAMETERS ACCELERATION 3 □ THERM. CHAMB. DECELERATION 3 □ AUTOM. LID OPENING RADIUS (mm) 120 □ START DELAY DENSITY (g/cm³) 1.5 TEMP. OFFSET(°C) 0 CHAMBER DEL.(min) 1 </pre>	<p>When the centrifuge process is finished, the lid will be open automatically via set option AUTOM. LID OPENING.</p> <p>When centrifuging is terminated by pressing STOP, opening the lid is possible by pressing LID.</p>

	<p> symbol means that OPEN LID AFTER RUN is active.</p>
--	--

8.7 Start delay - time

	<p>Start centrifuging after preselected delay is reached.</p>	<p>START DELAY / TIME</p>
 <pre> PARAMETERS ACCELERATION 3 □ THERM. CHAMB. DECELERATION 3 □ AUTOM. LID OPENING RADIUS (mm) 120 □ START DELAY DENSITY (g/cm³) 1.2 □ OF TIME 0:00:01 TEMP. OFFSET(°C) 0 □ OF TEMP 7°C CHAMBER DEL.(min) 1 </pre>	<p>With ▲ ▼ keys, select START DELAY. Press SET.</p> <p>Start delay can be set from 0 : 00 : 01 to 9 : 59 : 59.</p> <p>With ▲ ▼ keys, select OF TIME. Press SET and ▶ and then SET.</p> <p>With ▲ ▼ keys, set demanded value.</p> <p>Confirm by pressing SET.</p> <p>Press BACK to escape edit mode.</p>	
	<p>When START DELAY function is activated,  symbol is visible on the screen.</p>	





START DELAY / **OF TIME** function cannot be run when START DELAY / **OF TEMP.** is activated.

8.8 Start delay – of temperature



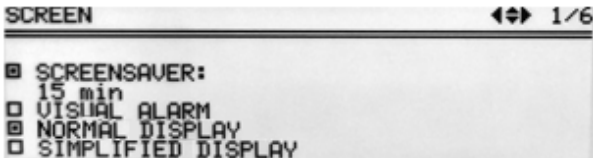
	Start centrifuging time counting after preselected temperature is reached.	START DELAY / OF TEMP.
	<p>With ▲▼◀▶ keys, select START DELAY. Press SET.</p> <p>With ▲▼◀▶ keys, select OF TEMP. Press SET.</p> <p>Press ▶, press SET.</p> <p>With ▲▼ keys, set required value of temperature. Press SET.</p> <ul style="list-style-type: none"> Exit edit mode by pressing BACK. 	
	<p>When START DELAY – OF TEMPERATURE is turned on, symbol is visible on the screen.</p>	
<p>When the function is active, the speed can be reduced to the optimum values for the FAST COOL function. When the set speed is lower than the optimum value, the rotor rotates at the speed set by the user.</p>		
<p>START DELAY / OF TEMP. This function cannot be run when START DELAY / OF TIME is activated.</p>		

9 Menu

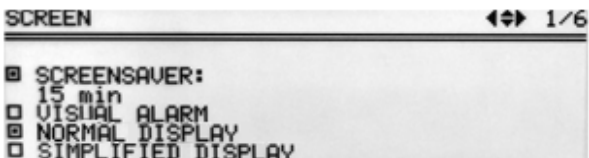
Simplified display	
	<ul style="list-style-type: none"> Press and hold  for 1 second. Choose MENU with ▲ ▼ Press SET. <p>Execute points described below (Normal display mode description)</p>
Normal display	
	<p>Press SET.</p> <p>With ▲ ▼ ◀ ▶ keys, select MENU.</p> <p>Press SET.</p>
	<p>To navigate in MENU, use ▲ ▼ ◀ ▶ keys. To enter menu, press SET.</p>

CONFIGURATION	centrifuge configuration
PASSWORD	password protection
LAST 10-CYCLES	10 last centrifugation cycles history
CYCLES	total working time of centrifuge, total number of working cycles
ROTOR RUNTIME	counting time of work and cycles amount for each rotor
CONTACT US	manufacturer's details
DIAGNOSTICS	error codes (service field)
FACTORY SETTINGS	restore factory settings

9.1 Screen saver

Setting time of screen saver	MENU/ CONFIGURATION / SCREEN
	<p>With ▲▼◀▶ keys, select SCREENSAVER.</p> <p>Press SET and then ▼ and SET .</p> <p>With ▲▼ keys select, requested value from 1 to 60 minutes.</p> <p>Mark selection by pressing SET.</p> <p>Leave the menu by pressing BACK.</p>

9.2 Visual alarm

Visual alarm	MENU/CONFIGURATION/ SCREEN
	<p>Via ▲▼ keys, choose VISUAL ALARM</p> <p>Mark it by pressing SET.</p> <p>VISUAL ALARM will cause the screen to flash after the end of the centrifuging or after a message.</p>

9.3 Types of main screen

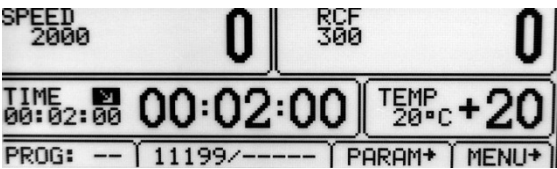

To ensure optimal adaptation to the user's preferences, work is possible in two basic screen modes.

NORMAL DISPLAY - contains an expanded number of parameters visible on the display.

SIMPLIFIED DISPLAY - contains only the most important parameters visible on the display.



For each of the above modes, you can choose priority RPM display or RCF.

By default, the **SIMPLIFIED DISPLAY** is set



Types of main screen	
NORMAL DISPLAY	SIMPLIFIED DISPLAY
	

Switch between the SPEED (RPM) and RCF display priority modes	
<ul style="list-style-type: none"> In the NORMAL DISPLAY mode, selecting the SPEED or RCF display mode is obtained by pressing and holding BACK for 1 sec. then use the ▲ ▼ buttons to select the desired mode (SPEED or RCF) and press SET. 	<ul style="list-style-type: none"> In the SIMPLIFIED DISPLAY mode, the selection of the SPEED or RCF display mode is obtained by pressing and holding the BACK key for 1 second. then use ▲ ▼ keys to select DISPLAY MODE, press SET, and then use ▲ ▼ keys to select the desired mode (SPEED or RCF) and press SET.

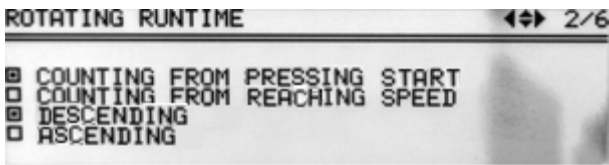
9.3.1 Switching the normal display to simplified display

	Press the BACK button for 1 sec. then: Via ▲ ▼ keys select SIMPLIFIED DISPLAY . Press SET .
	


9.3.2 Switching the simplified screen to normal display

	Press the BACK button for 1 sec .
	Via ▲ ▼ keys select DISPLAY MODE (flashing). Press SET . Then choose NORMAL DISPLAY and press SET .

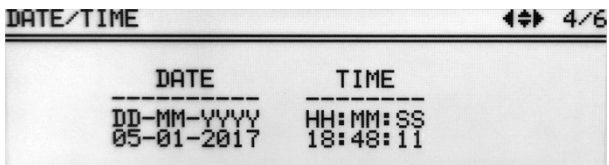
9.4 Rotating runtime

Way of time counting	MENU/CONFIGURATION/ ROTATING RUNTIME
	<ul style="list-style-type: none"> Via ▲▼, choose requested option. Mark it by pressing SET.
Counting from: Pressing start → COUNTING AFTER ROTOR IS IDENTIFIED Reaching speed → COUNTING FROM ASSIGNED SPEED	
Presenting mode: Descending → COUNTING DOWN Ascending → COUNTING UP	

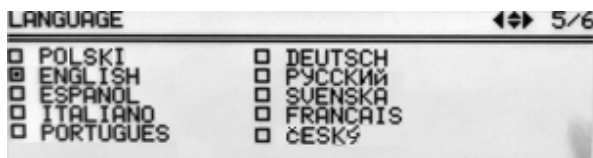
9.5 Buzzer

Switching ON/OFF , short audible signals accompanying every pressing of any key. Switching ON/OFF signals after centrifuging.	MENU/ CONFIGURATION / BUZZER
	With ▲▼ keys, select preferred option. <ul style="list-style-type: none"> Mark selection by pressing SET. A continuous alarm means the emission of short beeps after the end of the spin, until the message about the end of the work cycle is deleted.
Warning signals are always switched on.	

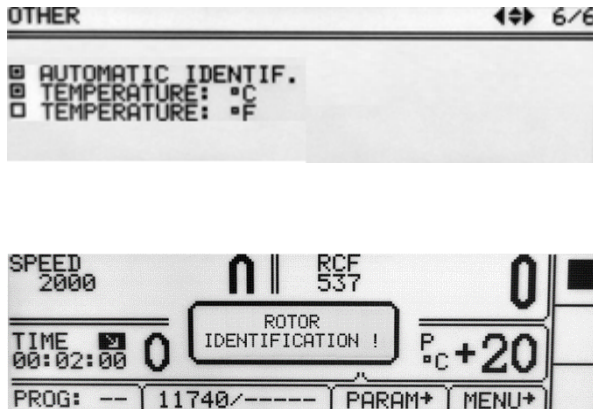
9.6 Date/time

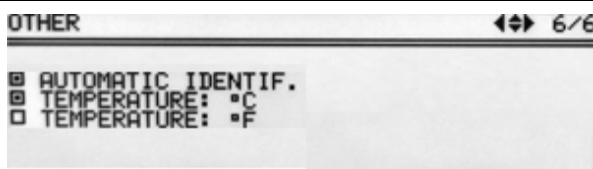
Setting up time and date	MENU/ CONFIGURATION / DATE/TIME
	<ul style="list-style-type: none"> Press SET. Via ◀▶ keys, choose requested value. Via ▲▼ keys, change to preferred value. Confirm by pressing SET .
Set date and time are still active even after restart of the centrifuge.	



9.7 Language

Changing menu language	MENU / CONFIGURATION / LANGUAGE
	<p>Via ▲▼ keys, choose preferred menu language</p> <p>Select it by pressing SET.</p>

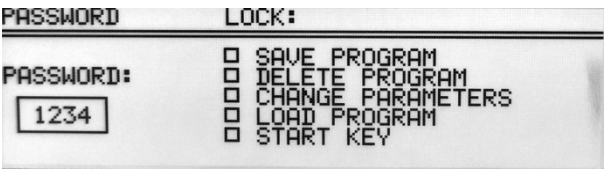
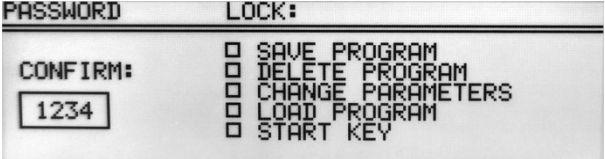
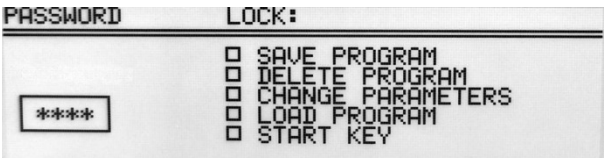

9.8 Other

Rotor automatic identification	MENU / CONFIGURATION / OTHER
	<p>Thanks to the automatic rotor identification, the centrifuge automatically identifies the rotor in the chamber. Rotor identification is indicated by the message.</p> <p>When the function is deactivated, it is necessary to manually select the desired rotor as described in "6.7 Choosing rotors".</p> <p>The AUTOMATIC IDENTIF. is turned on by default.</p> <p>To enable/disable the function:</p> <ul style="list-style-type: none"> Via ▲▼ keys choose <ul style="list-style-type: none"> <input type="checkbox"/> AUTOMATIC IDENTIF. Press SET (<input type="checkbox"/> change to <input checked="" type="checkbox"/> or conversely).

Choice of temperature unit	MENU / CONFIGURATION / OTHER
	<p>The TEMPERATURE in °C is turned on by default.</p> <p>To change the temperature unit:</p> <p>Via ▲▼ keys select unit</p> <p>Confirm by pressing SET.</p>

TEMPERATURE IN °C	TEMPERATURE IN °F
	

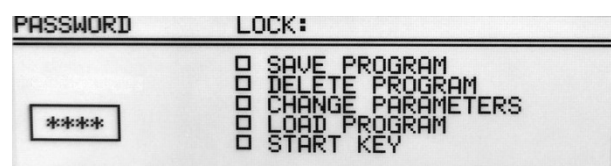
9.9 Password

Setting up password	MENU / PASSWORD
<p>To prevent unauthorised use, a PASSWORD can be set.</p> <p>Note: No PASSWORD is set by default.</p> <p>The PASSWORD can be set as follows when the rotor is at a standstill.</p>	
	<ul style="list-style-type: none"> Press the ▲▼ keys to select PASSWORD: (flashing) Press SET. Press ► <p>With the ◀▶ keys, set the valid place of the PASSWORD. With the ▲▼ keys, set correct value.</p> <p>Repeat above steps for all places.</p> <ul style="list-style-type: none"> Press SET.
	<p>As a confirmation, repeat instructions described above.</p>
<p>When the PASSWORD is set, the Key sign is displayed in the CODE zone. It is also displayed in the main menu (lower right corner of the screen).</p>	
	
<p>From then on, access to the MENU is possible after entering the password.</p> <p>In case of incorrect password, it will show message: ACCESS DENIED!</p>	

To delete the PASSWORD, “0000” must be set.

If the **PASSWORD** is forgotten, the emergency code “7654” should be used to clear password and remove all locks.

Setting up locks



With the ▲ ▼ keys, choose a lock.

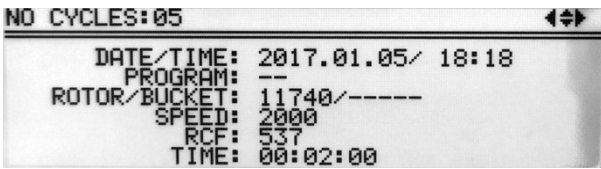
Select a lock by pressing **SET**.

- Repeat above steps for desired locks.
- Leave menu with **BACK** key.

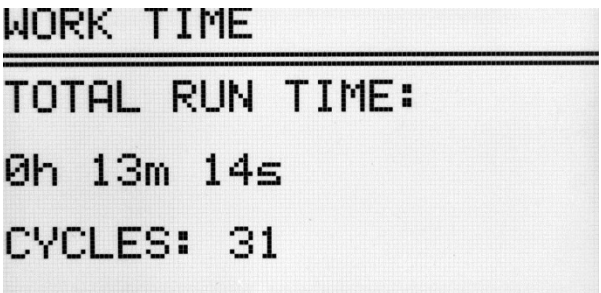
	Disabled*	Description
SAVE PROGRAM	SAVE button	<ul style="list-style-type: none"> ▪ no programmes can be saved
DELETE PROGRAM	DELETE button	no programmes can be deleted saving programmes on position where one was already stored is disabled
CHANGE PARAMETERS	fields: 	parameters can not be modified
LOAD PROGRAM	LOAD button	no programmes can be called up
START KEY	START key	centrifugation can not be started

* Executing disabled procedures is only possible after entering the correct password

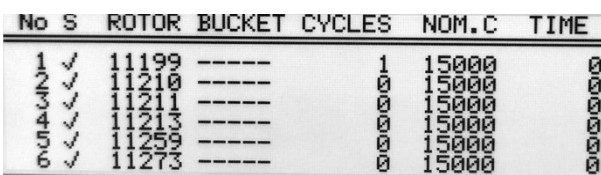
9.10 Last 10 cycles

Information concerning parameters of last 10 centrifuging cycles.	MENU / LAST 10 CYCLES
	<p>Number of cycles can be changed by ◀▶ keys.</p> <p>The list can be scrolled using ▲▼ keys.</p> <ul style="list-style-type: none"> To exit press SET/BACK key

9.11 Work time

Total working time of centrifuge and quantity of working cycles.	MENU / WORK TIME
	<p>In the WORK TIME menu, the following statistics are displayed:</p> <p>total working (centrifugation) time</p> <p>working cycles counter</p>

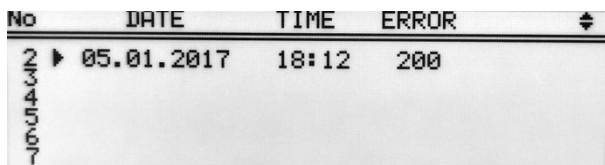
9.12 Rotor runtime

Information about the time of centrifuging and of the quantity of the working cycles of each rotor. The table also contains icons warning of the duty of execution of validation.	MENU / ROTOR RUNTIME
	<ul style="list-style-type: none"> The list can be scrolled using ▲▼ keys. To exit press BACK key. <p>Symbols:</p> <ul style="list-style-type: none"> ✓ – more than 100 cycles left ⏸ – less than 100 cycles left ⚠ – worn rotor

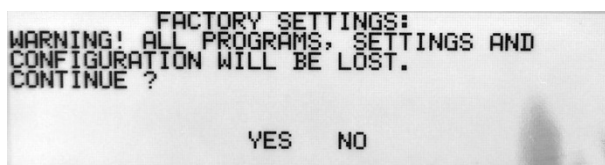
9.13 *Contact us*

Information about the type of the centrifuge, firmware version, and contact details.	MENU / CONTACT US
	The list can be scrolled using ▲ ▼ keys. To exit press BACK key.

9.14 *Diagnostics*


Information about errors arisen in working of the centrifuge (for service).	MENU / DIAGNOSTICS
	Intended for service purposes!

9.15 *Factory settings*


Restoring factory settings.	MENU/ FACTORY SETTINGS
All settings of user programmes will be deleted.	
	<ul style="list-style-type: none"> Via ◀▶ keys, choose YES or NO. Confirm by pressing SET.

10 Maintenance


10.1 *Cleaning of the centrifuge*

	<p>Pull the mains plug before cleaning.</p> <p>Before any cleaning or decontamination process other than that is recommended by the manufacturer, the user should consult the manufacturer to ensure that the planned process will not damage the device.</p> <p>For cleaning, water with soap or other water soluble mild detergent should be used.</p> <p>Corrosive and aggressive substances should be avoided. It is prohibited to use alkaline solutions, inflammable solvents or agents containing abrasive particles.</p> <p>Do not lubricate the centrifuge motor shaft.</p> <p>The unused centrifuge should have its lid opened.</p> <p>Once a week</p> <p>Using a wiping cloth, remove condensate or residues of the products from the rotor chamber.</p> <p>Once a month</p> <ul style="list-style-type: none">▪ Check the rotor clamping thread. In case of damage, replace it.▪ Check the centrifuging chamber for damage. In case of damage, it can no longer be used. Notify authorised service workshop.
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10.2 *Maintenance of centrifuge elements*


	<p>The rotor pins should always be lubricated with petroleum jelly.</p> <p>In this way, the uniform deflection of the buckets and quiet centrifuge operation is ensured.</p>
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Cleaning of the accessories

	<p>In order to ensure safe operation, the user should carry out regular and periodical maintenance of the accessories.</p> <p>Rotors, buckets and round carriers have to withstand high stresses originating from the centrifugal force. Chemical reactions as well as corrosion (combination of variable pressure and chemical reactions) can cause destruction of metals. Hard to observe surface cracks increase gradually and weaken material without visible symptoms.</p>
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	<ul style="list-style-type: none"> ▪ In case of surface damage, crevice or other change, as well as corrosion of any given part (rotor, bucket, etc.), the part should be immediately replaced. <p>Clamping rotor, containers and reducer inserts must be cleaned regularly to prevent corrosion.</p> <p>Cleaning of the accessories should be carried out outside of the centrifuge at least once a week or better still after each use. To clean them, the user should use neutral agent of pH value 6÷8. It is forbidden to use alkaline agent of pH > 8. Those parts should then be dried using soft fabric or in the chamber drier at ca. 50°C.</p> <p>The angle rotor should be placed on a fabric with holes facing down, for effective drying.</p> <p>Do not use bleach on plastic parts of the rotor.</p> <p>In this way, the useful service life of the device is substantially increased and susceptibility to corrosion is diminished. Accurate maintenance increases the service life as well and protects against premature rotor failures.</p> <p>Do not use bleach on plastic parts of the rotor.</p> <p>According to laboratory standards, minimize the immersion time in each solution.</p> <p>Especially prone to the corrosion are parts made of aluminium.</p> <p>Corrosion and damages resulting from insufficient maintenance may not be subject of claims lodged against the manufacturer.</p> <p>The unused rotor should have the lid removed.</p>
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▪ **HS accessories maintenance.**

	<p>Check the general condition of seals.</p> <p>Make sure that rubber O-rings are lightly coated with silicone grease. Use high vacuum grease, e.g. type „C” by LUBRINA.</p> <p>In order to maintain hermetic sealing, it is recommended to replace the sealing rings after each autoclaving.</p> <p>Store hermetically sealed rotors and buckets with the lids removed.</p>
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10.3 Sterilization

Plastics - legend to abbreviations

PS	polystyrene	ECTFE	ethylene/chlorotrifluoroethylene
SAN	styrene-acrylonitrile	ETFE	ethylene/tetrafluoroethylene
PMMA	polymethyl methacrylate	PTFE	Polytetrafluoroethylene
PC	polycarbonate	FEP	tetrafluoroethylene/perfluoropropylene
PVC	polyvinyl chloride	PFA	tetrafluoroethylene/perfluoroalkylvinylether
POM	acetal polyoxymethylenel	FKM	fluorcarbon rubber
PE-LD	low density polyethylene	EPDM	ethylene propylene diene
PE-HD	high density polyethylene	NR	natural rubber
PP	polypropylene	SI	silicon rubber
PMP	polymethylpentene		

All standard disinfectants can be used. Centrifuges and devices are made of different materials and the user should consider their variety.

	radiation β radiation γ 25 kGy	C₂H₄O (ethylene oxide)	formalin, ethanol
PS	●	○	●
SAN	○	●	●
PMMA	●	○	●
PC	●	●	●
PVC	○	●	●
POM	●	●	●
PE-LD	●	●	●
PE-HD	●	●	●
PP	●	●	●
PMP	●	●	●
ECTFE, ETFE	○	●	●
PTFE	○	●	●
FEP, PFA	○	●	●
FKM	○	●	●
EPDM	○	●	●
NR	○	●	●
SI	○	●	●

- may be used
- cannot be used

In the centrifuge, disinfectants and cleaning agents generally used in medical care should be used (e.g. Aerodesina-2000, Lysoformin 3000, Melseptol, Melsept SF, Sanepidex, Cutasept F).

10.3.1 Autoclaving

- Rotors, buckets and round carriers can be sterilized in autoclave with temperature 121°C during 20 min (215 kPa), unless otherwise specified in the OPTIONAL ACCESSORY.
- During sterilization (autoclaved) by means of steam, the user should consider the temperature resistance of individual materials.
- Deformation of the accessories (carriers or lids made of plastic) may occur during autoclaving.
- Do not autoclave disposable materials (e.g. tubes, cyto-container).
- The life of the accessory depends on the frequency of autoclaving and use.
- Autoclaving reduce lifespan of plastic components. They should be replaced if any signs of damage are visible, including a change in colour or shape or when leakage occurs, etc.
- Pressure in closed containers can cause plastic deformation or explosion.
- Prior to autoclaving the rotors and accessories, wash thoroughly and rinse with distilled water.
- Never exceed the permissible autoclaving temperature and time.
- If you want to keep the hermetic seals, replace the sealing rings after each autoclave.

Chemical resistance of plastics

	autoclaving 121 °C, 20 min		autoclaving 121 °C, 20 min
PS	○	PMP	●
SAN	○	ECTFE, ETFE	●
PMMA	○	PTFE	●
PC	●	FEP, PFA	●
PVC	○ ¹⁾	FKM	●
POM	●	EPDM	●
PE-LD	○	NR	○
PE-HD	○	SI	●
PP	●		

- may be used
- cannot be used

1) Except PVC hoses which are resistant to the steam sterilization in the temperature 121°C.

10.4 Chemical resistance



Chemical resistance of plastics

	aldehydes	cyclic alcohols	esters	ether	ketones	strong or concentrated acids	weak or diluted acids	oxidizing substances	cyclic hydrocarbons	ahs	haloid hydrocarbons	alkalis
PS	○	●	○	○	○	○/●	○/●	○	○	○	○	●
SAN	○	●	○	○	○	○	○/●	○	○	○	○	●
PMMA	○/●	●	○	○	○	○	○/●	○	○/●	○	○	○
PC	○/●	●	○	○	○	○	○/●	○	○/●	○	○	○
PVC	○	●	○	○	○	●	●	○	●	○	○	●
POM	○/●	●	○	●	●	○	○	○	●	●	●	●
PE-LD		●	●	●	○/●	●	●	○	●	●	●	●
PE-HD	●	●	○/●	○/●	○/●	●	●	○	●	○/●	○/●	●
PP	●	●	○/●	○/●	○/●	●	●	○	●	○/●	○/●	●
PMP	○/●	●	○/●		○/●	●	●	○	○/●	○	○	●
ECTFE ETFE	●	●	●	●	○	●	●	●	●	●	●	●
PTFE FEP PFA	●	●	●	●	●	●	●	●	●	●	●	●
FKM	●	○	○	○	○	○	●	○/●	○/●	○/●	○/●	○/●
EPDM	●	●	○/●	○	○/●	●	●	○/●	○	○	○	●
NR	○/●	●	○/●	○	○	○	○/●	○	○	○	○	●
SI	○/●	●	○/●	○	○	○	○/●	○	○	○	○	○/●

●	very good	Permanent action of the substance does not cause damage over 30 days. The material is able to be resistant through years
○/●	good to limited	Continuous action of the substance causes insignificant and partly reversible damage through a period of 7-30 days (e.g. puffing up, softening, reduced mechanical durability, discolouring).
○	limited	The material should not have continuous contact with the substance. Immediate occurrence of damage is possible (e.g. the loss of mechanical durability, deformation, discolouring, bursting, dissolving).








Rubber inserts shall be thoroughly cleaned or possibly replaced. Centrifuges and accessories are made of different materials.

Do not use bleach on plastic parts of the rotor.

	DANGER! MSE Centrifuges accessories are not biotight. For the centrifuging of infectious materials, it is necessary to use hermetically closed tubes meeting demands of biotightness, in order to prevent germs migration into the centrifuge and beyond it.
	The user is responsible for proper disinfections of the centrifuge, if some dangerous material is spilled inside or outside of the centrifuge. During the above mentioned works, the user must wear safety gloves.

11 Troubleshooting

The majority of faults can be removed by switching the centrifuge OFF and then ON. After switching the centrifuge ON, parameters of the last programme will be displayed and sound signals comprising four successive tones will be generated. In case of a short power failure, the centrifuge will terminate the cycle and display the PROGRAMME ERROR code.


Problem	question	remedy
Centrifuge does not start	<i>Is supply cable plugged into mains?</i>	<i>Plug supply cable correctly.</i>
	<i>Is master switch ON?</i>	<i>Switch ON power supply.</i>
Motor error is displayed		Call service.
Centrifuge does not start (indications show cycle in progress but motor does not start)	<i>Is  symbol displayed?</i>	Wait till rotor stops and the  symbol goes off.
	<i>Is  symbol displayed?</i>	Close lid.  symbol must switch off.
	<i>Is  symbol flashing?</i>	Centrifugation cycle in progress, press STOP key or wait till cycle ends.
Centrifuge does not accelerate (unbalance error)	<i>Unequal rotor load.</i>	Centrifuge load needs to be balanced.
	<i>Inclined centrifuge.</i>	Centrifuge needs to be levelled.
	<i>Faulty drive (mechanical damage).</i>	Call service.
	<i>Was centrifuge displaced during operation.</i>	Switch ON the centrifuge again after opening and closing the lid.
(motor error)	<i>After stopping error rotor message is displayed</i>	Check if rotor number in started programme is consistent with the number of the rotor installed in the centrifuge. Check rotor status (if there are coding magnets inserted)
	<i>Centrifuge does not recognize the rotor and does not stop.</i>	Switch the centrifuge OFF, then ON and check correctness of loaded programme
It is not possible to open the lid	<i> symbol on the display is flashing, after pressing LID key single tone is audible</i>	Rotor is still rotating. Wait for rotor to stop and the  symbol to display.
	<i>The sensor is connected correctly and the error still shows.</i>	Call service.
Mains failure during run	<i>Message on the decay of tension will be displayed.</i>	Wait for the rotor to stop, clear the error by pressing the SET key.
Temperature sensor error	<i>The overheating message will be displayed.</i>	Switch the centrifuge OFF, then ON.
		Call service.
Error of the exceeding the temperature (50°C) in the chamber	<i>The overheating message will be displayed.</i>	Call service.

11.1 Messages

Screen messages that may occur during operation.	
MESSAGE	EXPLANATION
"SPEED OF ROTOR" "IDENTIFICATION <> 90 RPM"	Please try start centrifuging again, if error still occurs, contact manufacturer's authorised service.
"IMBALANCE FAST STOP !" "PLEASE REMOVE CAUSE" "THEN RESTART"	Rotor is not balanced correctly, please balance rotor.
"NO ROTOR OR IDENTIFICATION" "SENSOR DAMAGED !"	Make sure that rotor is mounted correctly in the centrifuge chamber. If so, contact manufacturer's authorised service.
"INCORRECT ROTOR NUMBER !"	Change rotor number in centrifuge settings or use autoidentification.
"WRONG DIRECTION OF ROTATION" "OR UNKNOWN ROTOR !"	Make sure the correct rotor for centrifuge is mounted. List of accessories is described in chapter 15.
"PLEASE CLOSE THE LID" "HAND !"	Close lid manually.
"ROTOR STOPPING !" "Please wait..."	Initializing after mains failure with rotating rotor, wait until rotor stops.

Emergency messages In case of emergency messages (centrifuge is not working properly) contact the manufacturer's authorised service centre.
MESSAGE
"OVERHEATING MOTOR !" "INVERTER ERROR !"
"INVERTER SERIAL BUS ERROR !"
"TEMPERATURE SENSOR ERROR"
"PRESSURE CONTROL FAILURE!"
"OPENING LID in RUN!"
"SPEED METER ERROR"
"I2C BUS ERROR"
"OVERHEATING CENTRIFUGE !"
"ROTOR OVERSPEED !"
"LID LOCK MALFUNCTION !"

11.2 Emergency lid release

	<p>EMERGENCY LID RELEASE</p> <p>In case of mains failure, it is possible to open the lid manually. At first, one must be sure that rotor is not moving (use inspection glass). On the left-hand side of the casing, there is a lock. Insert emergency opening key (17642) into the lock and turn it counterclockwise.</p> <p>CAUTION! <i>The lid can be opened in emergency only when the rotor is at rest. You should check this by using the inspection glass provided in the lid.</i></p>
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12 Guarantee

Manufacturer grants the Buyer the guarantee on the conditions specified in the Guarantee Certificate. The Buyer forfeits the right to guarantee repair if using the device inconsistently with the User Manual provisions, when damage results from the User's fault.

Repairs should be carried out in authorised service workshops, granted with the MSE Certificate.

The centrifuge shall be sent to repair after decontaminating disinfections. Information about authorised service workshops can be obtained from the Manufacturer.

13 Disposal



When you are disposing of the device, the respective statutory rules must be observed.

Pursuant to guideline 2002/96/EC (WEEE), all devices supplied after August 13, 2005, may not be disposed as part of domestic waste.

The device belongs to the 8th group (medical devices) and is categorised in business to business field.

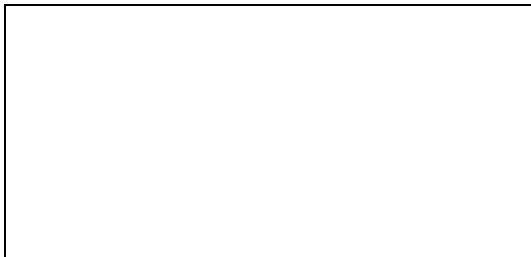


The icon of the crossed-out rubbish bin shows that the device may not be disposed as part of domestic waste. The waste disposal guidelines of the individual EC countries might vary. If necessary, contact your supplier.

14 Manufacturer's info

MSE CENTRIFUGES LIMITED	+44	1435 517000	sales
Mytogen House		1435 517004	service
11 Browning Road		1825 700471	fax
Heathfield			
TN21 8DB	http://	msecentrifuges.com	
United Kingdom	e-mail:	sales@msecentrifuges	

DISTRIBUTOR:



15 ANNEXES

Part No	OPTIONAL ACCESSORIES Name	Tube Ref
11199	Angle rotor 12 x 2/1.5ml. with Hermetically Sealed Lid (angle 45°) (max RPM: 18000 max RCF: 24270 x g R max: 6.7 cm)	15011.15128
14084	Round carrier for 0.5ml tube (O 8mm)	15127
14126	Round carrier for 0.4ml tube (O 5.8mm)	15124
14133	Round carrier for 0.2ml tube (O 6.2mm)	15125
11210C/A	Angle rotor 24 x 15/10ml. complete with buckets 13080 (O 17x100/120mm) (angle 30°) (max RPM: 5000 max RCF: 3996 x g R max: 14.3 cm)	15048.15050. 15053.15118
14082	Round carrier (O 13.3mm)	15119
11210C/B	Angle rotor 24 x 10ml. complete with buckets 13081 (O 17x70/85mm) (angle 30°) (max RPM: 5000 max RCF: 3996 x g R max: 14.3 cm)	15053
14082	Round carrier (O 13.3mm)	15054.15120. 15419
11211C/A	Angle rotor 10 x 50ml for Falcon® tubes. complete with Buckets 13275 or 13278 with PC caps 17151 (angle 30°) (max RPM: 5500 max RCF: 4498 x g R max: 13.3 cm)	15052. 15055. 15117
14248	Round carrier for 30/25ml tube (O 26x102mm)	15055. 15117
11211C/B	Angle rotor 10 x 50ml for Falcon® tubes. complete with Buckets 13276 (angle 30°) (max RPM: 5500 max RCF: 4498 x g R max: 13.3 cm)	15052
14035	Round carrier for 14ml tube (O 28.5/17x105mm) 25.00	15046
14036	Round carrier for 5ml tube (O 28.5/14x92mm)	
14043	Round carrier for 5ml tube (O 29/13x85mm)	15120. 15419
14071	Round carrier for 30ml tube (O 25x100mm)	15055. 15056. 15117. 15424
14089	Round carrier for 15ml Falcon® tube (O 17x120mm)	15050

14248	Round carrier for 30/25ml tube (O 26x102mm)	15055. 15117
11213C/A	Angle rotor 8 x 50ml for Falcon® tubes. complete with Buckets 13275 or 13278 with PC caps 17151 (angle 30°) (max RPM: 5500 max RCF: 4227 x g R max: 12.5 cm)	15051. 15052 (z/with 13275)
14248	Round carrier for 30/25ml tube (O 26x102mm)	15055. 15117
11213C/B	Angle rotor 8 x 50ml for Falcon® tubes. complete with Buckets 13276 (angle 30°) (max RPM: 5000 max RCF: 4227 x g R max: 12.5 cm)	15052
14035	Round carrier for 14ml tube (O 28.5/17x105mm)	15046
14036	Round carrier for 5ml tube (O 28.5/14x92mm)	
14043	Round carrier for 5ml tube (O 29/13x85mm)	15120. 15419
14071	Round carrier for 30ml tube (O 25x100mm)	15055. 15056. 15117. 15424
14089	Round carrier for 15ml Falcon® tube (O 17x120mm)	15050
14248	Round carrier for 30/25ml tube (O 26x102mm)	15055. 15117
11259	Angle rotor 30 x 2/1.5ml. with Hermetically Sealed Lid (angle 45°) (max RPM: 15000 max RCF: 24400 x g R max: 9.7 cm)	15011. 15128
14084	Round carrier for 0.5ml tube(O 8.0mm)	15127
14126	Round carrier for 0.4ml tube(O 5.8mm)	15124
14133	Round carrier for 0.2ml tube(O 6.2mm)	15125
11273	Angle rotor 8 x 30ml for Negene tubes. with Hermetically Sealed Lid (angle 30°) (max RPM: 12000 max RCF: 14006 x g R max: 8.7 cm)	15056
11456C/A	Angle rotor 36 x 15/10ml. complete with buckets 13080 (O 17x100/120mm) (angle 30°) (max RPM: 5000 max RCF: 3997 x g R max: 14.3 cm)	15048.15050. 15053.15118
14082	Round carrier	15119
11456C/B	Angle rotor 36 x 10ml. complete with buckets 13081 (O 17x70/85mm) (angle 30°) (max RPM: 5000 max RCF: 3996 x g R max: 14.3 cm)	15053
14082	Round carrier	15054.15120. 15419

11503C	Angle rotor 8 x BABCOCK® bottle (GERBER 5406). complete with 13504 buckets and 14505 round carriers (angle 40°) (max RPM: 2000 max RCF: 733 x g R max: 16.4 cm)	
11585	Angle rotor 12 x 8 x 0.2ml PCR-strip tubes. with Hermetically Sealed Lid (angle 45°) (max RPM: 14000 max RCF: 20817 x g R max: 9.5 cm)	15122. 15130
11586C	Angle rotor 6 x 85ml for Nalgene® tubes. complete with buckets 13587 (angle 35°) (max RPM: 7000 max RCF: 6081 x g R max: 11.1 cm)	15067
14855	Round carrier for 50ml Falcon® tube (O 30 x 120mm)	15052
14856	Round carrier 15ml for Falcon® tube (O 17 x 120mm)	15050
11718C	Angle rotor 4 x 100ml. complete with buckets 13719 (angle 30°) (max RPM: 6300 max RCF: 5014 x g R max: 11.3 cm)	
14024	Round carrier 15ml for Falcon® tube (O 17x120mm)	15050
14188	Pad (rubber) under 100/50/30/25ml glass	15052. 15115. 15116. 15117
14189C	Round carrier 50ml for Falcon® tube (O 30 x120mm) or Nalgene®. complete with rubber pad	15051. 15052
14190C	Round carrier 30/25ml (O 25.5 x100mm). complete with rubber pad 14188	15055. 15056. 15117
14192C	14192C Round carrier 50ml (O 35 x100mm). complete with rubber pad 14188	15116
14196	PA pad under 100ml PP tube	15040
14226	Round carrier for 50ml conical bottom tube. with skirt - GREINER® (O 13.1x100mm / max height of tube: 117mm)	
14249	Pad under 50ml conical bottom tube	
11740C/A	Angle rotor 12 x 15/10ml. complete with buckets 13080 (O 17x100/120mm) (angle 30°) (max RPM: 5500 max RCF: 4058 x g R max: 12 cm)	15048.15050. 15053.15118
14082	Round carrier (O 13.3mm)	15119
11740C/B	Angle rotor 12 x 10ml. complete with buckets 13081 (O 17x70/85mm) (angle 30°) (max RPM: 5500 max RCF: 4058 x g R max: 12 cm)	15053
14082	Round carrier (O 13.3mm)	15054.15120. 15419
11741C/A	Angle rotor 8 x 15/10ml. complete with buckets 13080 (O 17x100/120mm) (angle 30°) (max RPM: 6000 max RCF: 4226 x g R max: 10.5 cm)	15048.15050. 15053.15118
14082	Round carrier (O 13.3mm)	15119
11741C/B	Angle rotor 8 x 10ml. complete with buckets 13081 (O 17x70/85mm) (angle 30°) (max RPM: 6000 max RCF: 4226 x g R max: 10.5 cm)	15053
14082	Round carrier (O 13.3mm)	15054.15120.

		15419
11743C	Angle rotor 12 x 30/25ml. complete with buckets 13329 (angle 30°) (max RPM: 85500 max x RCF: 4058 x g R max: 12 cm)	15055. 15056
14255	Round carrier for 7ml tube (O 13/100mm)	15054. 15119
14256	Round carrier for 15/10ml tube (O 17/120mm)	15046. 15048. 15053. 15118
11746C	Angle rotor 6 x 50ml for Falcon® tubes. complete with buckets 13276 (angle 30°) (max RPM: 6000 max RCF: 4427 x g R max: 11 cm)	15052
14035	Round carrier for 14ml tube (O 28.5/17x105mm)	15046
14036	Round carrier for 5ml tube (O 28.5/14x92mm)	
14043	Round carrier for 5ml tube (O 29/13x85mm)	15120. 15419 15055. 15056. 15117. 15424
14071	Round carrier for 30ml tube (O 25x100mm)	15055. 15056. 15117. 15424
14089	Round carrier for 15ml Falcon® tube (O 17x120mm)	15050
14248	Round carrier for 30/25ml tube (O 26x102mm)	15055. 15117
11760	Angle rotor 24 x 2ml for filter tubes/spin columns. with Hermetically Sealed Lid (angle 45°) (max RPM: 15000 max RCF: 23143 x g R max: 9.2 cm)	15011. 15128
14084	Round carrier for 0.5ml tube(O 8.0mm)	15127
14126	Round carrier for 0.4ml tube (O 5.8mm)	15124
14133	Round carrier for 0.2ml tube (O 6.2mm)	15125
11944	Angle rotor 12 x 5ml for Eppendorf® tubes (angle 45°) (max RPM: 15000 max RCF: 21382 x g R max: 8.5 cm)	
12177	Swing-out rotor 4 x 250ml (max RPM: 5000 max RCF: 4724 x g R max: 16.9 cm)	
13174	Bucket 250ml (O 62x107mm)	15175. 15176
14017	Pad (PP) under round bottom bottle 250ml	15017
14120	Round carrier 2x30ml Sterilin® tubes (O 61x80mm)	
14151	Round carrier for 100ml tube (O 46x100mm) and for 14159 round carrier for 50ml round-bottom test tube	15115
14151C	Round carrier 14151 with 14159 round carrier for 50ml round-bottom test tube	
14152	Round carrier 50ml for Falcon® tube (O 30x120mm)	15052
14153	Round carrier 5 x 15ml for conical bottom tubes (O 17/22x120mm)	15050

14154	Round carrier 9 x 5ml (O 13.5x81mm). hermetic type. Short	
14155	Round carrier 12 x 5/7ml (O 13x100mm). open type	15054. 15119. 15120. 15419
14156	Round carrier 8 x 15/10ml (O 17x120mm). hermetic type	15046. 15048. 15118
14157	Round carrier 4 x 15ml (O 61/17x122mm). round-bottom	15053.15118.
14158	Round carrier 12 x 2ml for Eppendorf® tubes (O 61/11x38.5mm)	13174. 13178
14160	Round carrier 3 x 30/25ml (O 61/25.5x100mm)	15116
14175	Pad (PP) under flat-bottom bottle 250ml	
14869	Pad (PP) under 175ml and 225ml FALCON® tubes	
13178C	Bucket 250ml. complete with 17179 cap (Al)	15015. 15017. 15040. 15046. 15048. 15050. 15052. 15053. 15054. 15115.
14017	Pad (PP) under round bottom bottle 250ml	15017
14151	Round carrier for 100ml tube (O 46x100mm) and for 14159 round carrier for 50ml round-bottom test tube	15115
14151C	Round carrier 14151 with 14159 round carrier for 50ml round-bottom test tube	
14152	Round carrier 50ml for Falcon® tube (O 30x120mm)	15052
14153	Round carrier 5 x 15ml for conical bottom tubes (O 17/22x120mm)	15050
14154	Round carrier 9 x 5ml (O 13.5x81mm). hermetic type. Short	
14155	Round carrier 12 x 5/7ml (O 13x100mm). open type	15054. 15119. 15120. 15419
14156	Round carrier 8 x 15/10ml (O 17x120mm). hermetic type	15046. 15048. 15118
14157	Round carrier 4 x 15ml (O 61/17x122mm). round-bottom	15053.15118.
14158	Round carrier 12 x 2ml for Eppendorf® tubes (O 61/11x38.5mm)	13174. 13178
14160	Round carrier 3 x 30/25ml (O 61/25.5x100mm)	15116
14175	Pad (PP) under flat-bottom bottle 250ml	
14869	Pad (PP) under 175ml and 225ml FALCON® tubes	
13180	Bucket 2 x 50ml for Falcon® tubes (O 30x120mm)	15050. 15052
14089	Round carrier for 15ml Falcon® tube (O 17x120mm)	15050
14868C/A	Eppendorf® z zatrzaskiwaną pokrywką lub nakrętką Round carrier 14868 with 14089 round carrier for 5ml Eppendorf® reaction cap or screw cap tube	

12285C	Microtiter. swing-out rotor head. complete with 2 buckets 13286 for microtiter plates or blocks (85x 130 x 60mm) (max RPM: 4500 max RCF: 2626 x g R max: 11.6 cm)	15102
12300	Hematocrite rotor for 24 capillaries 75mm (max RPM: 13000 max RCF: 16816 x g R max: 8.9 cm)	15098. 15100
16164	Hematocrite reader - round	
12436	Swing-out rotor 4 x 200ml (max RPM: 5200 max RCF: 4413 x g R max: 14.6 cm)	
13042	Bucket 2 x 50ml for Falcon® tubes (O 30 x120mm)	15050. 15052
13044	Hanger 4 x 15ml for Falcon® tubes. complete with 13080 buckets (O 17x100/120mm)	15048. 15050. 15053. 15118
14082	Round carrier (O 13.3mm)	15119
13045	Bucket 50ml for Falcon® tube (O 30x120mm)	15051
13437	Bucket 200ml (O 57/100mm)	15440
14072	Round carrier for 50ml tube (O 35x100mm)	15116
14106	Round carrier 7 x 7ml (O 13.5x100mm)	15054. 15119
14108	Round carrier 7 x 10ml (O 17x75mm). short	13437. 13438C
14109	Round carrier 7 x 5ml (O 13.5x75mm). short	15120. 15419
14110	Round carrier 7 x 15/10ml (O 17x110mm)	15046. 15048. 15118
14111	Round carrier 5 x 15ml (O 16.7x110mm)	15048*. 15053. 15118 *- linked only to 13437 and 13438 without lids
14113	Round carrier for 50ml Falcon® tube (O 30x120mm)	15052
14197	Round carrier 100ml (O 46x103.7mm)	15040. 15115
14441	Round carrier 12 x 7ml (O 12.1x100mm)	15119
14446	Round carrier 12 x 5ml (O 12.1x75mm). short	15120. 15419
14447	Round carrier 12 x 1.2ml for S-Monovette® tubes (O 9x66mm)	15016
14449	Round carrier 4 x 12ml (O 56.5/17.1x105). short	15046. 15053. 15118
14450	Round carrier 9 x 2/1.5ml (O 11x38.5mm)	15128
13438C	Round carrier 200ml. complete with lid 17111	15440
14072	Round carrier for 50ml tube (O 35x100mm)	15116
14104	Round carrier 100ml (O 45.5x100mm)	15115
14106	Round carrier 7 x 7ml (O 13.5x100mm)	15054. 15119

14108	Round carrier 7 x 10ml (O 17x75mm). short	13437. 13438C
14109	Round carrier 7 x 5ml (O 13.5x75mm). short	15120. 15419
14110	Round carrier 7 x 15/10ml (O 17x110mm)	15046. 15048. 15118
14111	Round carrier 5 x 15ml (O 16.7x110mm)	15048*. 15053. 15118 *- linked only to 13437 and 13438 without lids
14113	Round carrier for 50ml Falcon® tube (O 30x120mm)	15052
14197	Round carrier 100ml (O 46x103.7mm)	15040. 15115
14441	Round carrier 12 x 7ml (O 12.1x100mm)	15119
14446	Round carrier 12 x 5ml (O 12.1x75mm). short	15120. 15419
14447	Round carrier 12 x 1.2ml for S-Monovette® tubes (O 9x66mm)	15016
14449	Round carrier 4 x 12ml (O 56.5/17.1x105). short	15046. 15053. 15118
14450	Round carrier 9 x 2/1.5ml (O 11x38.5mm)	15128
13593	Bucket 100ml (O 45x94mm)	15040
14181	Round carrier 5 x 2/7ml (O 44.5/12.5x100mm)	13174. 13178
14186	Round carrier 4 x 7ml for Vacutainer® tubes (O 13.1x100mm)	15054. 15119. 15120. 15419
14187	Round carrier 4 x 15/10ml for Vacutainer® tubes (O 16.5x112mm)	15046. 15048. 15053. 15118
14188	Pad (rubber) under 100/50/30/25ml glass tubes	15052. 15115. 15116. 15117
14189C	Round carrier 50ml for Falcon® tube (O 30 x120mm) or Nalgene®. complete with rubber pad 14188	15051. 15052
14190C	Round carrier 30/25ml (O 25.5 x100mm). complete with rubber pad 14188	15055. 15056. 15117
14192C	Round carrier 50ml (O 35 x100mm). complete with rubber pad 14188	15116
14196	PA pad under 100ml PP tube	15040
14226	Round carrier for 50ml conical bottom tube. with skirt - GREINER® (O 13.1x100mm / max height of tube: 117mm)	
12451C	Microtiter. swing-out rotor head. complete with 2 buckets 13307 for microtiter plates or blocks (85 x 130 x 60mm) (max RPM: 3000 max RCF: 1036 x g R max: 10.3 cm)	15102

12452C	Cyto rotor. complete with 4 hangers 13606 (max RPM: 2500 max RCF: 768 x g R max: 10.7 cm)	
16610	Set of cyto-containers (included positions: 16610.15123.16614. 16616. 16617 - 100 pcs of each)	
12582C	Swing-out rotor 4 x 40ml for CPT tubes. complete with 13583 buckets and 17185 caps (AI) (max RPM: 3200 max RCF: 1809 x g R max: 15.8 cm)	
14181	Round carrier 5 x 2/7ml (O 44.5/12.5x100mm)	15054. 15119. 15120. 15419
14186	Round carrier 4 x 7ml for Vacutainer® tubes (O 13.1x100mm)	15054. 15119. 15120. 15419
14187	Round carrier 4 x 15/10ml for Vacutainer® tubes (O 16.5x112mm)	15046. 15048. 15053. 15118
14584	Round carrier 4 x 8ml for CPT tubes (O 16 x130mm)	

Item Ref	Name Test tubes
15011	Polypropylene tube 2ml (O 10.8x40mm). round - bottom
15017	Polycarbonate bottle 250ml (O 62x122mm). round bottom
15040	Polypropylene tube 100ml with cap (O 44.7/47x103.7mm)
15046	Polypropylene tube 14ml with cap (O 16.8/17.7x106mm)
15048	Polypropylene tube 15ml Nalgene® (O 16x113mm)
15050	Polypropylene tube 15ml with conical bottom
15051	Polypropylene tube 50ml Nalgene® (O 28.8x106.7mm)
15052	Polypropylene tube 50ml with conical bottom. with cap (O 29.5/34x117mm)
15053	Polypropylene tube 10ml with cap (O 16x100mm)
15054	Polypropylene tube 6ml with cap (O 11.7/13.5x95mm)
15055	Polypropylene tube 30ml with cap (O 24.9x103mm)
15056	Polycarbonate tube 30ml Nalgene® with cap (O 25.5x94mm)
15067	Polycarbonate tube 85ml Nalgene® with cap (O 37.8x106mm)
15098	Stopper for Capillaries
15100	Capillary tubes heparinized (1.4 x 75mm. 37µl)
15102	Microtiter plate with cap (85.5x127mm)
15115	Glass tube 100ml (O 45x100mm)
15116	Glass tube 50ml (O 35x100mm)
15117	Glass tube 25ml (O 25x100mm)
15118	Glass tube 10ml (O 16x100mm)
15119	Glass tube 7ml (O 12x100mm)
15120	Glass tube 5ml (O 12x75mm)
15122	Polypropylene PCR tube 8x0.2ml with integrated caps (O 6x21mm)
15124	Polypropylene tube 0.4ml with cap (O 5.7x46mm)
15125	Polypropylene tube 0.2ml PCR (O 6x21mm)
15127	Polypropylene tube 0.5ml with cap (O 7.8x30mm)
15128	Polypropylene tube 1.5ml with cap (O 10.8x39mm)
15130	Polypropylene PCR stripe 8x0.2ml (O 6x21mm)
15175	Polypropylene bottle 250ml Herolab (O 62x122mm)
15176	Polycarbonate bottle 250ml Herolab (O 62x122mm)
15419	Polypropylene tube 5ml (O12x85mm) with cap
15424	Polypropylene tube 30ml with cap (O 25.5x94mm)
15440	Polypropylene bottle 200ml with cap (O 56.5x113mm)

DECLARATION OF DECONTAMINATION

In order to protect our employees please fill out the declaration of decontamination fully before sending centrifuge back to MSE (repair).

1. Device

– type:

– serial No.:

2. Description of decontamination

(see user manual)

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.....
.....
.....

3. Decontamination carried out by:

– name:

4. Date and signature

.....

DECLARATION OF DECONTAMINATION

In order to protect our employees, please fill out the declaration of decontamination fully before sending back centrifuge to the MSE (return).

5. **Device**

– type:

– serial No.:

6. **Description of decontamination**

(see user manual)

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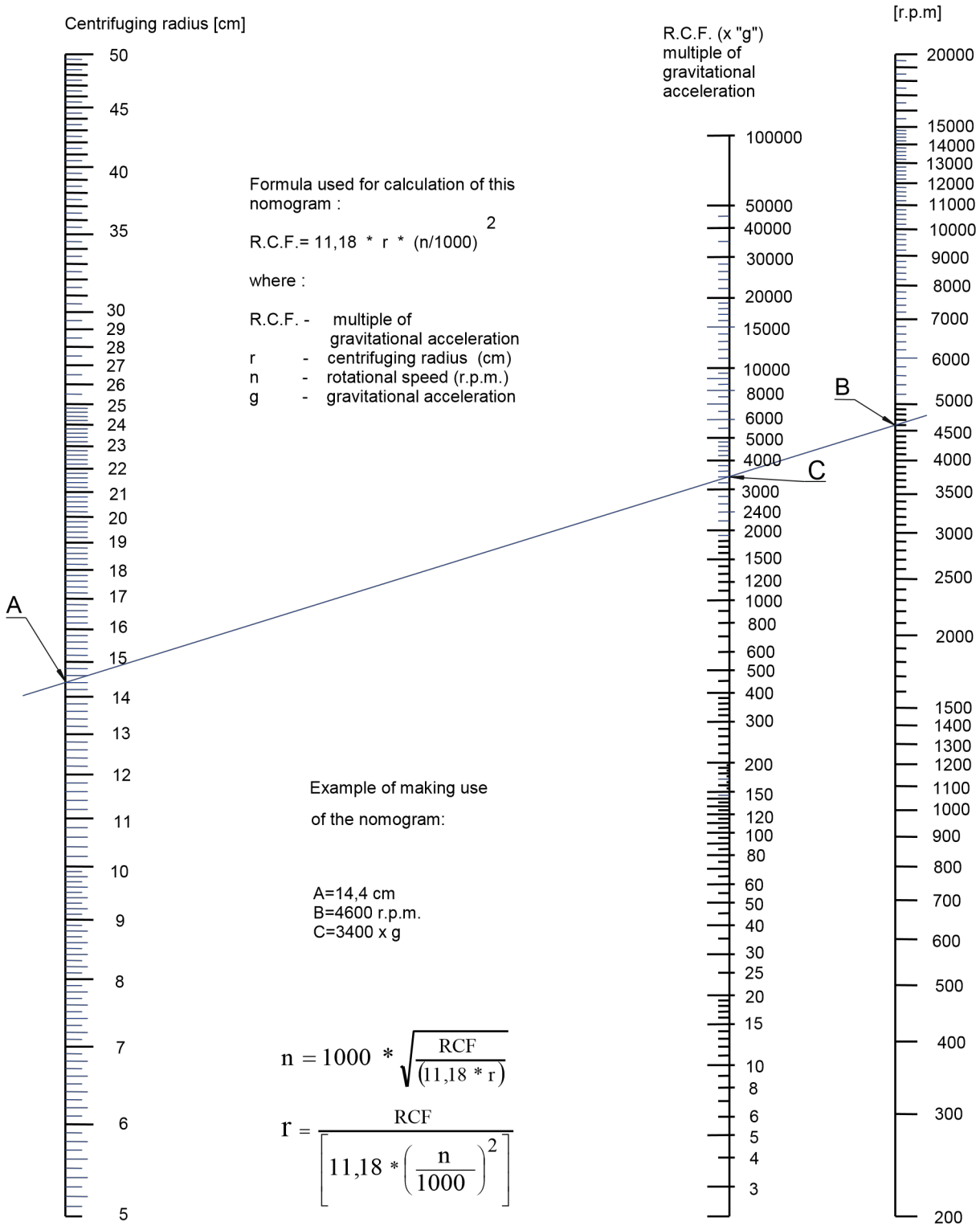
7. **Decontamination carried out by:**

– name:

8. **Date and signature**

.....

NOMOGRAM



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Refrigerated Micro Centrifuge

Maximum speed	18000 rpm
Maximum RCF	24270 xg
Maximum Volume	24 x 2/1.5ml

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Swing Out / Fixed Angle / Microplate

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Maximum Volume	4 x 250ml



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