

USER MANUAL



MPW-150R

Read before use!

Serial number of centrifuges:

For centrifuges with serial no (SN): **10150R058824** – ...

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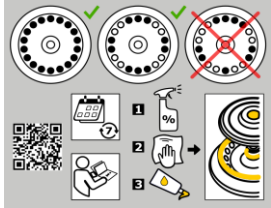


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1 Symbols and designations




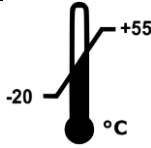

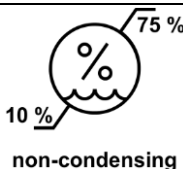


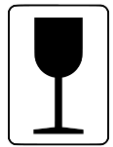



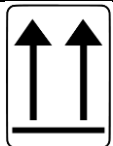
1.1 Designations used in the manual

	WARNING! General hazards		Symbol for identifying an in vitro diagnostic medical device
	WARNING! Risk of crushing injury		CE mark
	DANGER! Risk of electric shock		Symbol indicating disposal method
	DANGER! Biological hazard		Please read the instruction manual before using the device
	DANGER! Risk of explosion with possible serious injury or death		Manufacturer information

1.2 Markings on the device

<i>Symbol</i>	<i>Explanation</i>	<i>Location</i>
	Information about the direction of rotation of the rotor	Under the centrifuge lid
	Information on where and how to use the emergency lid opening mechanism	On the side of the centrifuge next to the emergency opening of the lid
	Reminder for proper rotor maintenance and Information about correct and incorrect filling of rotors	Under the centrifuge lid
 <p>Uwaga! Przed awaryjnym otwarciem pokrywy, wyłączyć urządzenie i odłączyć kabel zasilający. Odczekać 10 min i/lub zaglądnąć przez wziernik, upewnić się, że wirnik nie obraca się, a następnie otworzyć pokrywę.</p> <p>Attention! Before emergency opening the cover, switch off the mains power switch and disconnect the power cord. Wait 10 min and/or looking through the sight glass, make sure that the rotor is not rotating.</p>	Information about the place of danger	On the side of the centrifuge next to the emergency opening of the lid
 <p>CAUTION! UWAGA!</p> <p>Tighten the rotor fixing screw with the provided key. Dokręcić śrubę mocującą wirnik za pomocą dostarczonego klucza.</p>	Information reminding you to properly tighten the rotor screw	Under the centrifuge lid

1.3 Markings on the packaging

	Device catalog number		Maximum number of pieces in a stack
	Serial number of the device		Temperature limit
	Date of manufacture of the device		Humidity limit
	Manufacturer's data		CE mark
	Delicate, handle with care!		Green dot
	Protect from moisture!		Packaging made of recyclable materials
	Top of the load		

2 Application

- The **MPW-150R** centrifuge is a bench-top non-automatic laboratory centrifuge with cooling.
- The devices are intended for In Vitro Diagnostics (IVD). This means that it is an in vitro diagnostic medical device - in accordance with the Regulation 2017/746 of the European Parliament and of the Council (EU) of 5 April 2017 on in vitro diagnostic medical devices and repealing Directive 98/79/EC and Commission Decision 2010 /227/EU.
- The centrifuge is used to separate aqueous solutions and suspensions of samples with a density not higher than **1.2g/cm³** taken from human, animal and plant organisms into components of different densities under the influence of centrifugal force, in order to provide information about their biological state and to other analytical work.
- The design of the centrifuge ensures ease of use, safe operation and a wide range of applications in medical, biochemical and other laboratories.
- The centrifuge is not biotight, therefore, when centrifuging preparations that require biotightness, containers and rotors with a biotightness certificate should be used.

3 Technical specification

manufacturer	"MPW MED. INSTRUMENTS" SPÓŁDZIELNIA PRACY, Boremłowska 46 Street, 04-347 Warszawa				
type	MPW - 150R				
cat. no. (REF)	10150R/2-5	10150R/1-6/100	10150R/1-6/110	10150R/1-6	10150R/1-6/127
mains voltage (L1+N+PE)	230V	100V	110V	120V	127V
	±10%	±5%			
frequency, ±1%	50 Hz	60Hz			
Power consumption (max)	430W	430W			
current protection	T 6,3 A	T 10 A			
cooling medium	R452A				
capacity (max)	90ml (6x15ml)				
Speed (rpm)	90 ÷ 15000 rpm (step 1 rpm)				
g-force (RCF)	21382 x g (step 1 x g)				
kinetic energy (max.)	6900 J				
running time	00:00:01 ÷ 99:59:59 – [h. : min : s] (1s step)				
time counting	since start button is pressed / since preselected speed is reached				
short time operation mode (SHORT)	yes				
continuous operation mode (HOLD)	yes				
menu languages	English, Spanish, Italian, Portuguese, German, Russian, Polish, Swedish, French, Czech				
number of programs	100				
adjustable temperature	-20 ÷ 40°C* (step 1°C)				
initial cooling (FASTCOOL)	yes				
guaranteed temperature with max. rotor speed	≤4°C				
cooling without centrifuging	yes				
acceleration (ACEL)	10 linear characteristics				
deceleration (DECEL)	10 linear characteristics				
USB communication	no				
electromagnetic compatibility	accordance with EN 61326-2-6:2006				
Degree of protection: (according to PN-EN 60034-5:2021-01)	IP20				
noise level	≤60dB				
weight	approx. 30,5 kg	approx. 33kg			
dimensions:					
height (H)	285 mm				
width (W)	299 mm				
depth (D)	595 mm				
height with open lid (H _{oc})	565 mm				

*time and possibility of obtaining a set temperature is dependent on multiple factors , including rotor type, established RPM, ambient temperature; accuracy: - ±1°C appropriate for place of temperature sensor

3.1 Environmental conditions


- The device may only be used indoors.
- The permissible ambient temperature is 2°C to 40°C.
- Maximum allowed relative humidity 80% at temperature up to 31°C decreasing linearly to 50% relative humidity at 40°C.
- The mains voltage fluctuations must not exceed ± 10% of the nominal voltage.
- Maximum altitude 2,000 m above sea level.
- Overvoltage category II.
- Pollution degree 2.

4 Installation


4.1 Content of package

name	pcs	cat. no.
centrifuge MPW-150R (depending on voltage version)	1	10150R/2-5; 10150R/1-6; 10150R/1-6/100; 10150R/1-6/110; 10150R/1-6/127
rotor fixing screw	1	17142
rotor key	1	17099T
key for emergency lock release	1	18640
power cord 230V / power cord 120V	1	17866/17867
fuse WTA T10 250V / WTA T6,3 250V	2	17863/17862
petroleum jelly 20ml	1	17201
user manual	1	See page 1



4.2 Location selection

	<p>WARNING! Risk of damage to the device.</p> <ul style="list-style-type: none">▪ The table intended for the centrifuge operation should be adapted to the weight of the device, clean, stable and free from vibrations, and have a flat, levelled top.▪ In accordance with the EN 61010-2-020 standard, leave a safety distance of 30 cm from the operating device. Keep a distance from walls and other devices. Do not place any objects in this area.▪ The centrifuge should be positioned so that access to the mains switch is not difficult.▪ Do not use the device near strong, unshielded, high-frequency electromagnetic sources as they may interfere with its proper operation.▪ Do not install the centrifuge near heat sources (e.g. radiators).▪ Avoid direct sunlight.▪ Ensure adequate ventilation of the room.▪ During centrifugation, it is forbidden to stay in the safety zone, i.e. 30 cm distance around the centrifuge, or to leave objects, e.g. glassware, inside this zone.▪ It is forbidden to place any objects on the centrifuge.▪ Never use the centrifuge on trolleys or on single stands if they may start to move during operation or are inappropriate for the size of the centrifuge.
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4.3 Preparation for installation

	<p>WARNING! Risk of injury or damage to the device.</p> <ul style="list-style-type: none">▪ After changing the storage location of the device (from cold to warm), wait until the device warms up to ambient temperature to avoid damage to electronic components due to condensation.▪ It is important to allow enough time for the device to dry before restarting it (min. 4 hours).▪ Lifting and carrying the device may result in injuries due to its heavy weight.
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	<ul style="list-style-type: none"> ▪ The centrifuge should be lifted and transported with a sufficient number of people (min. 2). Use a transport aid to move the centrifuge. ▪ Lift the device from below, near its feet.
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 	<p>WARNING! Risk of electric shock or fire.</p> <ul style="list-style-type: none"> ▪ The centrifuge may only be operated in a building that complies with applicable national regulations and standards. In particular, it must be ensured that power supply circuits located upstream of the device's internal protection are not loaded in an unauthorized manner. This can be ensured by using additional interrupters or other suitable fuse elements in the building installation. ▪ The voltage and frequency of the power source must comply with the requirements specified on the device nameplate. ▪ The power socket must be earthed with a protective conductor (PE). ▪ During operation, there must be easy access to the power switch and the device that cuts off the electrical network (e.g. residual current device). ▪ Only use the power cord supplied with the centrifuge. ▪ Before turning on the device, make sure it is properly connected to the power source.
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4.4 Unpacking the device

- 1) Open the package.
- 2) Remove the box containing the accessories.
- 3) Remove the centrifuge from the box and remove the foil (keep the packaging and packing material for service shipment).
- 4) Make sure that all the items are included in the package (table in the "Package contents" section).
- 5) Place the device on a suitable laboratory table.

4.5 Centrifuge installation

- 1) Check whether the mains voltage and frequency meet the requirements given on the nameplate of the device.
- 2) Connect the power cord to the centrifuge power socket (on the rear wall of the centrifuge) and to the power source.

4.6 First start of the centrifuge

- 1) Wait at least 4 hours for the unit to reach ambient temperature to avoid compressor failure or damage to electronic components due to condensation.
- 2) Turn on the centrifuge power using the mains switch located on the side wall of the device.
- 3) Open the cover according to the section **Opening and closing the cover**.
- 4) Install the rotor according to the section **Placing the rotor and accessories in the centrifuge**.
- 5) Set centrifugation parameters according to the sections **Centrifuging** and **Parameters of centrifugation**.

4.7 Turning on the centrifuge

To turn on the centrifuge, set the mains power switch to position 1. After the start-up process is complete, the centrifuge is ready to operate.


4.8 Turning off the centrifuge


Prerequisites:

- The centrifugation cycle is complete.
- The device cover is open.

1) Turn off the device using the mains power switch located on the side wall of the device.

4.9 Opening and closing the cover


	<p>ATTENTION !</p> <ul style="list-style-type: none">▪ The cover can only be opened when the centrifuge is at rest (the rotor is not rotating).▪ Centrifugation can only be started with the lid closed.
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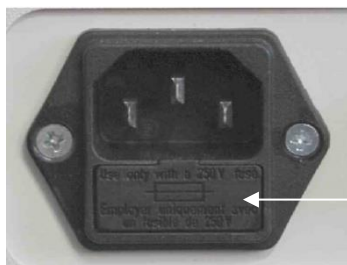
	<p>WARNING! Risk of injury.</p> <ul style="list-style-type: none">▪ Do not put your hands between the cover and the housing when closing the centrifuge cover.
---	---

1) Press the **COVER** button  to open the cover.

2) To close the lid, press it down with both hands until the lock engages.

4.10 Current protection

	<p>The centrifuge is equipped with current protection (safety fuse). Fuse is situated in the plug-in socket unit at back wall of the centrifuge.</p>
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Safety fuse

Fig.1 Plug-in socket unit


5 Safety notes

5.1 General remarks


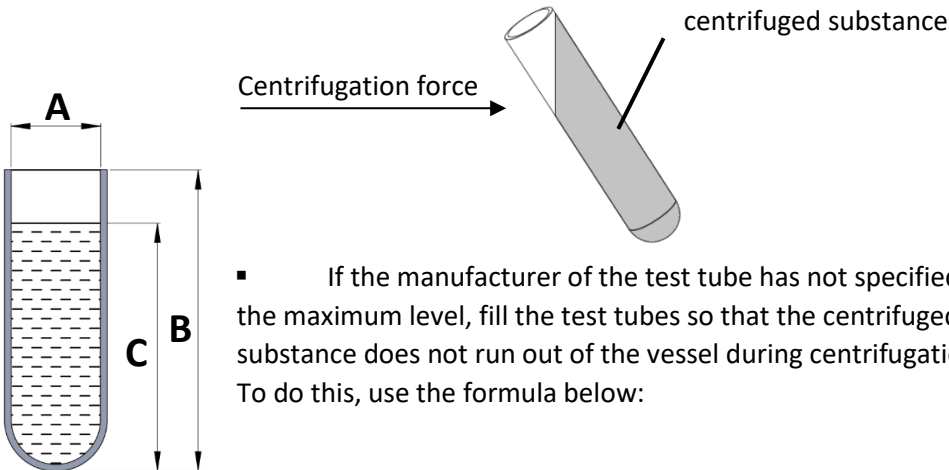
	<ul style="list-style-type: none">▪ The laboratory centrifuge may be operated only by qualified laboratory personnel, after reading the operating manual.▪ The operating instructions are part of the product.▪ The operating manual should always be kept in the vicinity of the centrifuge.▪ The centrifuge cannot be operated contrary to its purpose.▪ If the centrifuge is used in a manner inconsistent with the manufacturer's guidelines, the safety of its use may be impaired.▪ For centrifugation in the centrifuge, only containers and inserts provided in the list of equipment and centrifuge tubes, the diameter, length and strength of which are appropriate, should be used. The use of test tubes not included in the list should
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	<p>be agreed with MPW MED. INSTRUMENTS or its authorized representatives.</p> <ul style="list-style-type: none"> Pay attention to the quality and appropriate thickness of the glass test tubes walls. Glass tubes should be centrifuge tubes, and their use in the centrifuge should be made dependent on the following guidelines: <table border="1"> <tr> <th>glass tubes</th><th>max RCF in angular rotors</th></tr> <tr> <td>5-10 ml</td><td>3000 x g</td></tr> <tr> <td>30-100 ml</td><td>spinning not allowed</td></tr> </table> <ul style="list-style-type: none"> Weighing the filled test tubes into the rotor is recommended. This will allow to minimize the differences in mass between them, and as a result to avoid the negative impact of vibrations on the engine suspension and to reduce noise levels during the operation of the centrifuge. 	glass tubes	max RCF in angular rotors	5-10 ml	3000 x g	30-100 ml	spinning not allowed
glass tubes	max RCF in angular rotors						
5-10 ml	3000 x g						
30-100 ml	spinning not allowed						

5.2 Placing the rotor and accessories in the centrifuge



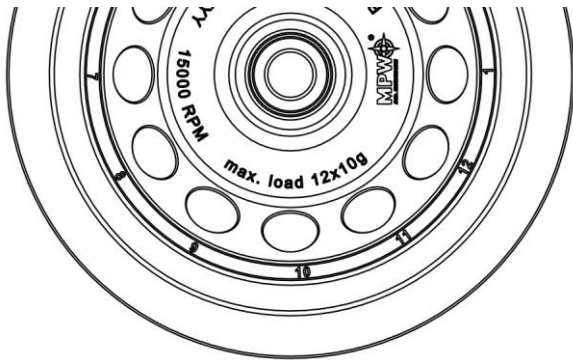
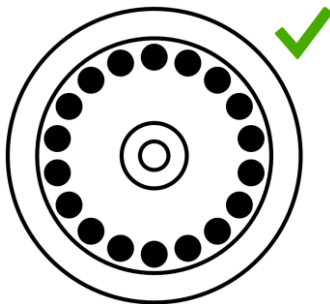
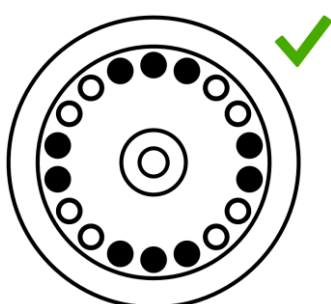

	<ul style="list-style-type: none"> Connect the centrifuge to the power supply (mains socket at the back of the centrifuge). Turn on the centrifuge (switch on the side of the centrifuge). Open the cover of the centrifuge by pressing the COVER key. Before installing the rotor, check that the rotating chamber is free from any contamination. If there is dust, glass splinters, liquid residues, etc., remove them. The rotor can fall if not handled properly, therefore it should always be handled and placed in the centrifuge using both hands. Place the rotor on the motor axis by sliding it onto the cone as far as it will go (keeping the coaxially between the rotor and the motor axis). Screw the screw fixing the rotor into the motor axis (clockwise), and then tighten it firmly with the rotor key. Fill the rotor with containers / hangers / test tubes according to recommendations in section Filling the rotor. In order to replace the rotor, first remove the tubes and containers from it, unscrew the screw securing the rotor with the enclosed rotor key, counterclockwise, then using both hands, grab the rotor on opposite sides and remove it from the motor axis. Install another rotor as described above instructions.
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5.3 Filling tubes





	<ul style="list-style-type: none"> Fill test tubes outside the centrifuge. <div style="text-align: center;">  </div> <ul style="list-style-type: none"> If the manufacturer of the test tube has not specified the maximum level, fill the test tubes so that the centrifuged substance does not run out of the vessel during centrifugation. To do this, use the formula below:
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	$C < B - \frac{A}{2}$ <p> A – internal tube diameter B – tube height C – max liquid level </p>
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5.4 Filling the rotor


	<p>CAUTION!</p> <p>Angle rotors must be used with a suitable cover which must be screwed securely onto the rotor. The rotor and the cover are marked with the same catalogue number (REF) to eliminate the risk of incorrect selection when you have several types of rotors.</p>	
	<ul style="list-style-type: none">▪ Check that the impeller is seated correctly and firmly bolted to the motor shaft.▪ Do not exceed the maximum rotor load (information is provided on the rotor). <p>An example of the marking on the angular rotor:</p>  <p>max. load 12x10g - means that 12 test tubes weighing 10 g each can be placed in the rotor.</p> <ul style="list-style-type: none">▪ To ensure symmetrical loading, insert test tubes of the same type and weight in pairs into opposite openings of the rotor. If reduction inserts are used, they should also be placed in the holes opposite to each other in pairs of the same type.	
<p>Examples of correct and incorrect arrangement of test tubes in the rotor:</p>		
		

5.5 Safety hints


	<p>ROTOR MAINTENANCE</p> <ul style="list-style-type: none"> ▪ In order to increase the durability of gaskets, threaded places, rotor pins, undercuts for pins in containers, they must be cleaned, and then it is necessary to lubricate them with the technical petroleum jelly supplied with the device (catalogue number 17201). ▪ Use only accessories that are in good technical condition.
	<p>HU EQUIPMENT MAINTENANCE</p> <ul style="list-style-type: none"> ▪ Make sure the sealing rings (rubber) are lightly coated with grease to maintain tightness. Use high vacuum silicone grease, e.g. type "C" by LUBRINA.
	<p>HAZARDOUS MATERIALS</p> <ul style="list-style-type: none"> ▪ Infectious materials should be centrifuged only in containers / rotors with covers. ▪ It is not allowed to centrifuge toxic or infectious materials if the rotor or test tube seal is damaged. ▪ Appropriate disinfection procedures should always be carried out, if hazardous substances have contaminated the centrifuge or its accessories.
	<p>EXPLOSIVE, FLAMMABLE MATERIALS</p> <ul style="list-style-type: none"> ▪ It is not allowed to centrifuge explosive and inflammable materials. ▪ Do not centrifuge substances that could create a potentially explosive atmosphere as a result of the high energy supply during centrifugation. ▪ The centrifuge must not be used in an explosive atmosphere. ▪ It is not allowed to centrifuge materials that may generate flammable or explosive mixtures when exposed to air.

5.6 Operating conditions

	<p>GENERAL REMARKS</p> <ul style="list-style-type: none"> ▪ Only original equipment of centrifuges and spare parts should be used. ▪ In case of a malfunction of the centrifuge, the MPW MED factory service should be used. INSTRUMENTS or its authorized representatives. ▪ It is not allowed to start the centrifuge if it is not installed correctly or the rotor and accessories are not properly mounted. ▪ The centrifuge must not be transported with the rotor installed on the motor shaft. ▪ Fill the rotor equipment to the same weight in order to prevent unbalance of the centrifuge (point Filling the rotor).
	<p>START-UP</p> <ul style="list-style-type: none"> ▪ Before switching on the device, carefully read all sections of this manual in order to ensure the correct operation of the device and to avoid damage to the device or its accessories.

	<p>CENTRIFUGAL SUBSTANCES</p> <ul style="list-style-type: none"> ▪ Rotors are designed for centrifuging liquids with an average density of 1.2 g / cm³ or less. This applies to centrifugation at maximum speed. If liquids with a higher density are to be used, be sure to enter the density value in the PARAM / DENSITY tab in order to reduce the available spin speed.
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5.7 Equipment life

	<ul style="list-style-type: none">▪ Each centrifugation cycle during which the rotor has been accelerated and decelerated is considered a work cycle, regardless of the speed and duration.▪ Do not use rotors whose maximum number of cycles has already been exceeded or after the maximum service life of the centrifuge has elapsed (the service life of the device is 10 years from the date of purchase of the device), depending on which comes first.▪ The number of permissible and completed cycles for a given rotor can be found in the centrifuge menu - Menu/Rotor cycles (description in the chapter Rotor cycles). The centrifuge log records data on the types of rotors used.▪ The user should record the work cycles for rotors and containers using their own method. The centrifuge does not recognize changes or replacements of rotors or containers of the same type.▪ The permissible number of cycles or the working time of rotors is also specified in the following table:	
Type of equipment	Allowed number of cycles	Permitted work period
Rotors from the list (see Attachments)	15000	10 years of centrifuge operation




5.8 Service life of rubber suspension components of the drive unit

The shelf life of the rubber suspension components of the drive unit is **5 years** (counted from the date of purchase). After this time, they must be replaced with new ones.


5.9 Work safety

The centrifuge should be inspected by an authorized service at least once a year (after the warranty period). The reason for more frequent inspections may be special circumstances, e.g. a corrosive environment. The tests should end with the issuance of a validation protocol specifying the verification of the technical condition of the laboratory centrifuge.

The centrifuge is accompanied by a **technical passport**, in which entries should be made from the performed service activities such as: repairs, technical inspections, and replacement of components and equipment with a specified durability date (suspension, rotors, containers). Exceeding the service life of components with a specified durability date (suspension, rotors, containers) will result in a negative assessment of the centrifuge during annual inspections.

	<p>CONTROLS CONDUCTED BY THE OPERATOR</p> <ul style="list-style-type: none"> ▪ Centrifuge accessories, especially structural changes, corrosion, initial cracks, abrasion of metal parts. ▪ Bolted connections. ▪ Inspection of rotor and container seals, if any. Particular attention should be paid to rubber elements (seals). In the event of any damage or visible structural changes, they should be immediately replaced with new ones. ▪ Control of the performance of annual post-warranty inspections of the technical condition of the centrifuge. ▪ During centrifugation, it is not allowed to lift, shift the centrifuge or rest on it. ▪ During centrifugation one must not stay in the safety zone, i.e., 30 cm distance around the centrifuge, nor leave any objects, e.g., glass vessels, inside this zone. ▪ It is not allowed to put any objects on the centrifuge.
	<p>OPENING THE COVER DURING SPINNING</p> <ul style="list-style-type: none"> ▪ It is not allowed to use the emergency cover opening during centrifuging, because it may result in loss of health or life.
	<p>HANDLING OF ROTORS</p> <ul style="list-style-type: none"> ▪ It is not allowed to use accessories (rotors, lids, containers, hangers and round carriers) with signs of corrosion or other mechanical damage. ▪ It is not allowed to centrifuge substances of high corrosive aggressiveness, which may damage the materials and reduce the mechanical properties of rotors, buckets and round carriers. ▪ It is not allowed to centrifuge rotors with removed or loose covers.

5.10 Unbalance

	<p>Unbalance causes noise, vibration during operation and has a negative effect on the driveline (engine and suspension). The more precisely the process of balancing the feed to the rotor is carried out, the smoother the centrifuge will run and the longer the useful life of the drive system will be. Moreover, thanks to the correct balancing, an excellent level of separation of the centrifuged substance is achieved since the separated components will not be picked up again by vibrations.</p>
---	---

The centrifuge is equipped with a rotor imbalance sensor. In the event of its activation, the centrifugation process is stopped by quick braking and an error message is displayed. Erasing the error message is possible by pressing one of the following buttons: **BACK, STOP, COVER, SET** and **▲ ▼ ◀ ▶**.

Make sure that the rotor has been properly loaded - places in the rotor must be equipped with identically filled containers, inserts and test tubes so as to obtain the best possible weight balance (see chapter **Filling the rotor**). If necessary, correct the load distribution and / or, in the case of horizontal rotors, clean and lubricate the rotor pins, then restart the spin.

5.11 Emergency stop

At any time during centrifugation, it is possible to interrupt the process and stop the centrifugation with the fastest rotor characteristics. This is done by pressing the stop button twice (**2x STOP**).

Pressing the **STOP** key once will stop the spinning with the braking characteristics set in the program. The message about interrupted centrifuging can be cancelled with the following buttons: **BACK, STOP, COVER, SET** and **▲ ▼ ◀ ▶**.

5.12 Residual risk

The centrifuge is built according to the state-of-the-art and the recognized safety regulations. Nevertheless, still remain some level of residual risk due to improper operation and malfunctions. It is possible to decrease residual risk by strictly applying user manual conditions and correcting malfunction which could threaten safety, immediately.

5.13 Obligation to report a serious device incident

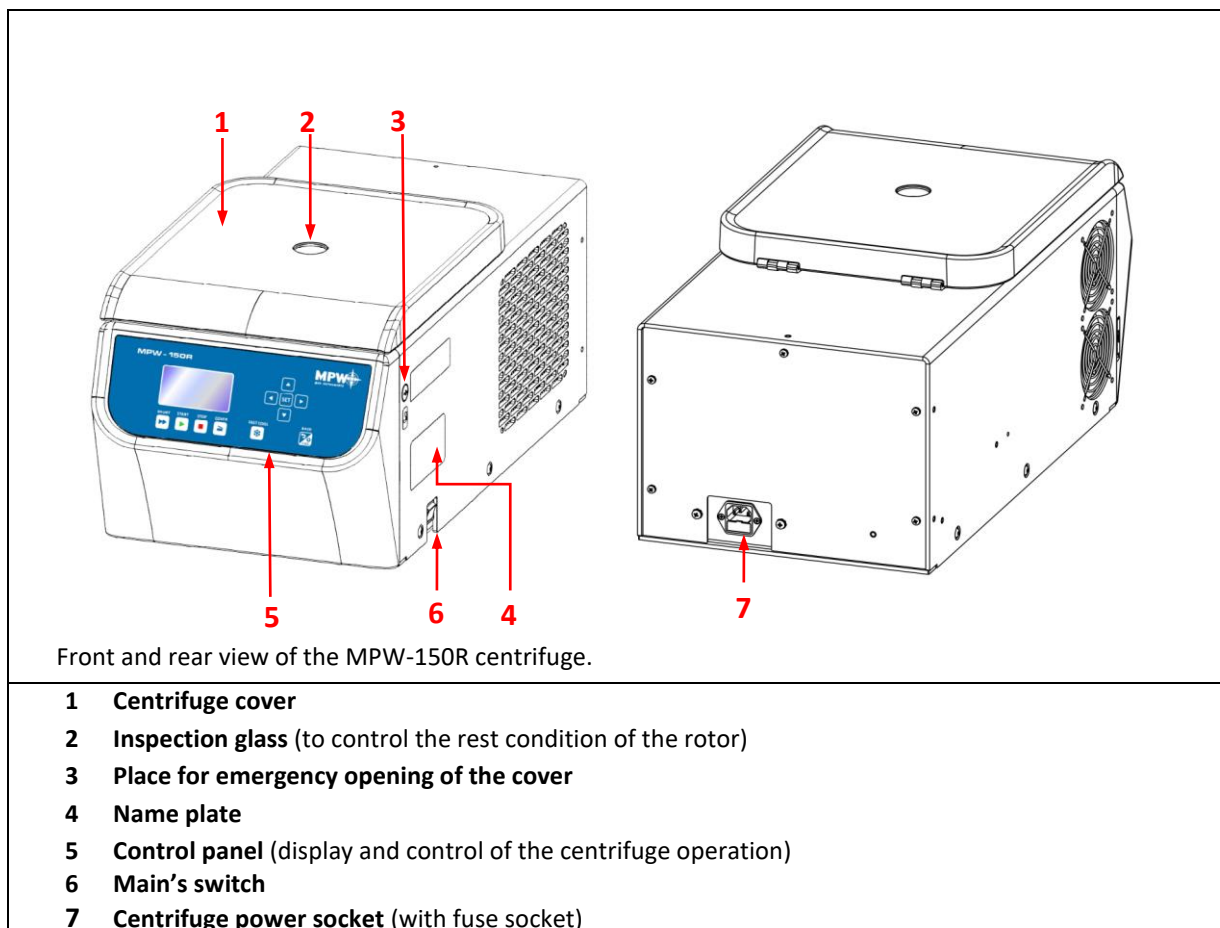
Any serious incident related to the device should be reported to the manufacturer and the competent authority of the Member State where the user or patient resides.

6 Product description

6.1 Product Design and Appearance

A new generation of MPW MED laboratory centrifuges. INSTRUMENTS is equipped with modern microprocessor controllers, very durable and quiet brushless asynchronous induction motors and equipment that meets the user's requirements.

The centrifuge has a rigid self-supporting structure. The housing is made of aluminum sheet, the back is made of steel sheet, the rotating chamber is made of stainless steel. The front part and the cover are made of ABS plastic. The lid is mounted on metal hinge axles and is secured against opening during spinning thanks to the use of an electric lock.



6.2 Name plate

Data regarding the device should be read from the nameplate located on the side wall of the centrifuge next to the power switch (the image below is an example).

The nameplate for the MPW-150R centrifuge contains the following information:

- 1** Model: MPW-150R
- 2** REF: 10150R/2-5
- 3** n: 15000 rpm
- 4** AC: 230 V
- 5** P: 430 W
- 6** Kinetic energy: 6900 J
- 7** SN: 10150R000124
- 8** CE, IVD, and other regulatory symbols
- 9** Rated frequency: 50 Hz
- 10** Current protection: T 6,3 A
- 11** Manufacturer's logo: MPW MED. INSTRUMENTS
- 12** Manufacturer's information: "MPW MED. INSTRUMENTS" SPÓŁDZIELNIA PRACY, ul. Boremlowska 46, 04-347 Warszawa, POLAND
- 13** Information about the refrigerant: R452A / 0,165 kg / 0,36 t eq CO₂ / GWP 2141 / 27 bar, fluorinated greenhouse gas in hermetically sealed refrigeration system
- 14** Density of centrifuged substance: 1,2 g/ml
- 15** UDI code carrier – data matrix (AIDC) with human-readable presentation (HRI)
- 16** Date of production: 2024-01-08

1 Centrifuge model 2 Catalog number 3 Maximum speed 4 Rated voltage 5 Maximum rated power 6 Kinetic energy 7 Serial number 8 Approval marks and symbols (explained in chapter 1)	9 Rated frequency 10 Current protection 11 Manufacturer's logo 12 Manufacturer's information 13 Information about the refrigerant (refrigerated centrifuges only) 14 Density of centrifuged substance 15 UDI code carrier – data matrix (AIDC) with human-readable presentation (HRI) 16 Date of production
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6.3 Control device

The microprocessor control unit of the centrifuge ensures broad possibilities of providing, realisation and reading of work parameters.

6.4 Setting parameters

Data setting and read-out system forms hermetically closed keyboard with distinctly accessible operation points. Easily readable displays signalling individual performed operations facilitate operator's programming and recording of parameters and condition of the centrifuge.

6.5 Safety features

6.5.1 Cover lock

The centrifuge can be started only with properly closed cover. While the cover can be opened only after stopping the rotor. In case of emergency opening of the cover during operation, the centrifuge will be immediately switched-off and the rotor will brake till complete stopping. During cover closing it is prohibited to press any buttons. Do not place fingers into closing area during cover closing.



6.5.2 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.

6.5.3 Rotor verification and checking compatibility with set program

Directly after starting centrifuging, a unit verifies the type of the rotor applied and in the case of its incompatibility with the type indicated in the application or absence of the rotor, the spinning process shall be stopped with simultaneous displaying the error message. The conformity of the type of the rotor is signalled with a single audible signal. In case auto identification (see Other) option is checked, proper rotor will be automatically chosen, without user engagement.

6.5.4 Rest state inspection

Opening the centrifuge lid with the **COVER** key is possible only when the rotor is at rest. Check that the symbol  described in the **Display** chapter is visible on the screen. Use the sight glass on the cover to make sure the impeller is not turning. When the rotor brakes, the symbol  described in the **Display** section is visible. Emergency opening of the cover during rotor spinning is not allowed.

6.5.5 Checking of excessive temperature

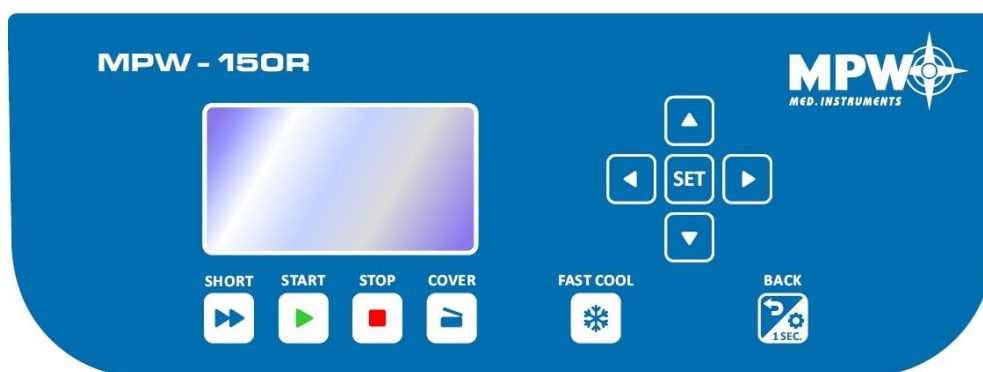
If temperature in rotation chamber exceeds 50°C caused by, for example, malfunction of cooling system, drive will be switched off and error message will be displayed. The reboot is only possible after chilling device.

7 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.

7.1 Control panel

The control panel placed on the front casing serves the purpose of controlling centrifuge operation.



Control panel


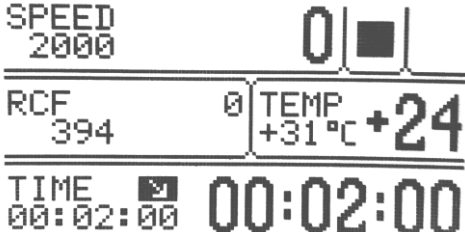


	SHORT ¹	short-time centrifuging
	START	start centrifugation run
	STOP ²	end centrifugation run
	COVER	cover opening
	FAST COOL	start fast cooling mode
	BACK RPM/RCF	exit the current menu / cancelling switching between SPEED display mode and RCF display mode
	UP	navigation in menu / increasing values
	DOWN	navigation in menu / decreasing values
	LEFT	navigation in menu
	RIGHT	navigation in menu
	SET	changing parameters / confirming changes

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



² First-time pressing will make stopping centrifuging with acceleration characteristics set in the current program, second-time pressing will make braking as fast as possible.

7.2 Display

The display is located in the centre of the control panel. The main screen variants are presented below.

	<p>After switching on centrifuge, welcome screen appears. After disappearing the welcome screen, it is possible to setting up parameters.</p>
	<p>Simplified display mode is set as default, there is possible to switch to normal (see chapter 9.3) display mode (with two sub modes shown below).</p>
<p align="center">Normal display</p>	
<p align="center">RPM display mode</p>	<p align="center">RCF display mode</p>
	

Switching between RPM and RCF display mode

	<p>For normal display switching between RPM and RCF display mode may be obtain by pressing and keeping key by 1s :</p>  <p>then one should choose demand mode.</p>
---	---

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

	changing values		
	density > 1,2 g/cm ³		
	centrifuging radius changed		
	counting time down (decreasing)		counting time up (increasing)
	centrifuging		centrifuging (with automatic cover opening)
	rotor stopped / closed cover		rotor stopped / opened lid
	braking		fastest decelerating
	rotor identification		
	thermal chamber		
	temperature delay		
	time delay		
	currently enlarged digits of TIME field		
	drop-down list		
	temporarily disabled		
	locked		
	time counting (blinking)		
	disabled option		active option

7.3 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) – appears. Via keys mark SPEED field (highlighted). Press SET – blinking. With choose demanded value. Via choose order of magnitude of changing value (highlighted). Repeat above two steps for other orders of magnitude. Confirm settings by pressing SET. Press BACK.
<p>When RPM is changed, RCF is automatically corrected.</p>	




Exemplary change of **RCF** setting:

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

Switching between SPEED and RCF.

	<p>On the screen appear an additional window, in which:</p> <ul style="list-style-type: none"> Via ▲▼ keys mark field . Press SET. <p>Change of screen mode will be active to switch off the centrifuge</p>
Switching between basic and simplified screens is described in Main screen modes .	

Exemplary change of **TIME** setting:

	<ul style="list-style-type: none"> Press SET (to enter edit mode) -  appears. Via ▲▼◀▶ keys mark TIME field (highlighted).
<p>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 -  blinking. With ▲▼ choose demanded value. Via ◀▶ choose order of magnitude of changing value (highlighted). Repeat above two steps for other orders of magnitude. Confirm settings by pressing SET. Exit edit mode by pressing BACK.
<p>00:02:00</p>	<p>set value</p>
<p>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.

Exemplary change of **TEMP** setting:

	<ul style="list-style-type: none"> Press SET (to enter edit mode) – appears. Via ▲▼◀▶ keys mark TEMP field (highlighted). Press SET key. With ▲▼ choose demanded value. Confirm settings by pressing SET. Press BACK.
--	---

7.4 Users programs

	<p>After switching centrifuge on, program that was used in previous session is being loaded. If any program was not used in previous session, centrifuge resume the last chosen parameters.</p>
--	---

Program choosing:


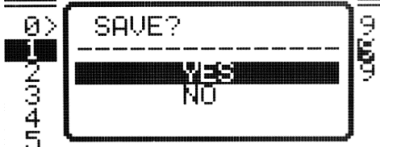

Simplified display mode

	<ul style="list-style-type: none"> Press and hold by 1 second. Choose PROG with ▲▼ Press SET. Execute points described follow (below Normal display mode description)
--	--

Normal display mode

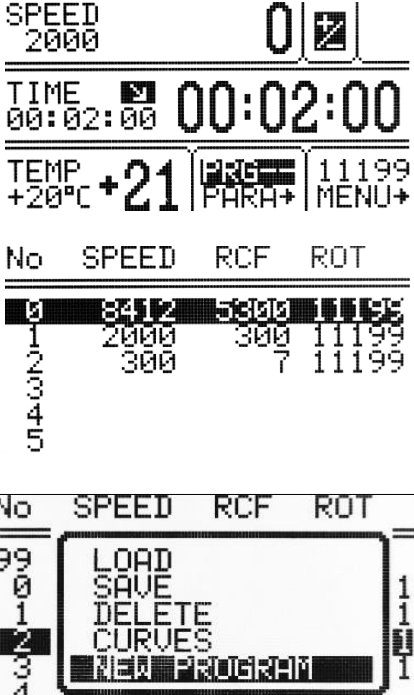
	<ul style="list-style-type: none"> Press SET key – appears. Via ▲▼◀▶ keys mark PRG-- field (highlighted) Press SET key – list of programs is visible.
--	---

	<ul style="list-style-type: none"> Via ▲▼ choose demanded program. Confirm with SET key.
--	--

	<p>LOAD, SAVE, DELETE, CURVES, NEW PROGRAM refer chosen program which is marked by ►.</p>
	<p>SAVE – save settings as a program (confirm by selecting YES and pressing SET)</p>
	<p>DELETE – delete program (confirm by selecting YES and pressing SET)</p>
	<p>NEW PROGRAM– enter to create new program mode (as below)</p>

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

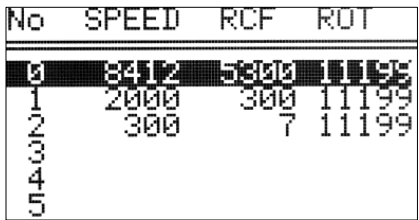
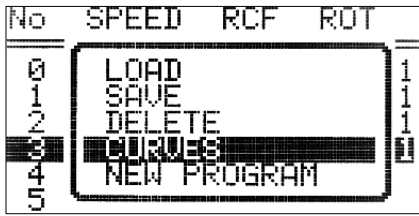
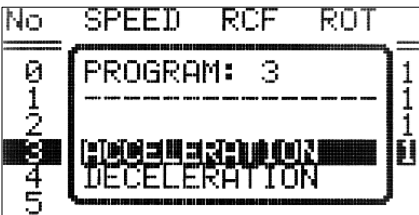
Creating a new program:

	<ul style="list-style-type: none"> ▪ Press SET key. ▪ Via ▲▼◀▶ keys mark PRG -- field (blinking). ▪ Press SET key. List of programs is visible, choose demanded position (number of program). ▪ Press SET key- menu of program settings will appear. ▪ Choose NEW PROGRAM press SET and BACK, and then set demanded parameters of centrifuging (look chapter “6. Centrifuging”). ▪ In case you want to register new program, back to the PRG -- menu and save it as described before.
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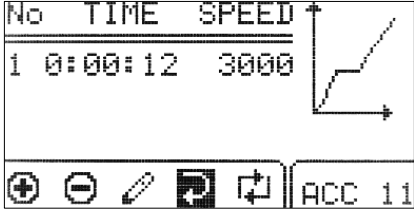

Changing parameters during centrifuging

There is a possibility to change parameters: **SPEED, RCF, TIME, and TEMP** during centrifuging. Such modifications inactivate currently running program. Modification during run is represented by **PRG --** symbol (instead of the program number).

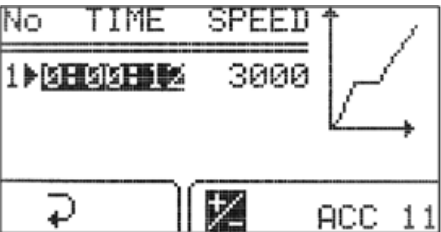

7.5 Creator of acceleration and deceleration curves

PROG/CURVES	
 	<ul style="list-style-type: none"> With ▲▼ keys choose saved program 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 Confirm selection by pressing SET.

7.5.1 Acceleration characteristic, creation of episode 1

<p>Displayed alternately SPEED and 3000 (example):</p>  	No	section no. (max. 4)
	TIME	total acceleration time
	SPEED	final RPM
	ACC	characteristic's no. (10-19)
	⊕	adding a new section
	⊖	deleting last section
	✎	editing sections
	↶	exiting from characteristics wizard
	↷	switching RPM/RCF
	📈	entering graph view

After entering the curve wizard, the symbol ↶ is highlighted. Pressing **SET** and selecting "**NO**" in response to the question "**SAVE?**" will return to the **PROG → CURVES** menu without making changes to the starting characteristics. To start editing the one-segment characteristics, select the icon ✎ with the ◀▶ keys and press the **SET** key.

		editing value (flashing means editing the given value)
	<ul style="list-style-type: none"> Press SET With ▲▼◀▶ choose time for section 	

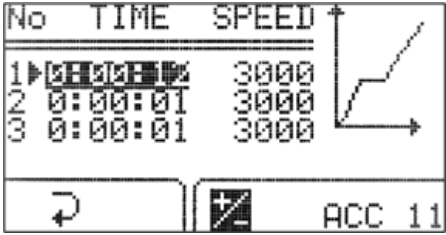
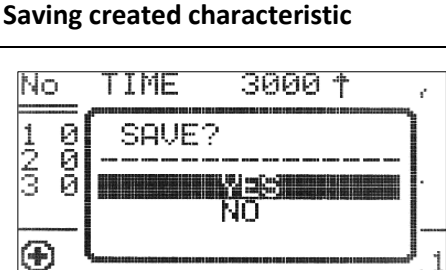
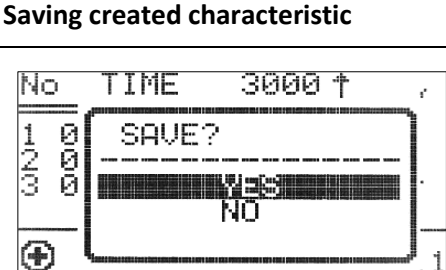
	<ul style="list-style-type: none"> ▪ Press SET ▪ It is not possible to edit the maximum speed value. To do this, more sections have to be created, but the last section will always have the maximum set speed and cannot be changed. ▪ Select ↶ with ▼ ◀ buttons and press SET to finish editing characteristics.
--	---

7.5.2 Adding and editing sections - acceleration

To program next sections, select the ⊕ icon with the ◀▶ buttons and press **SET**. A new section (sections) will appear with a time of 1 second and a speed equal to the maximum speed.

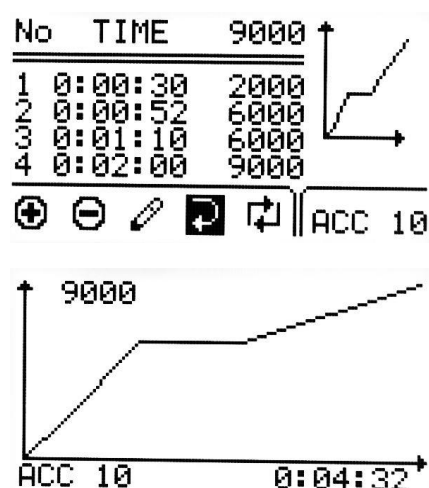
To start editing a newly added section (sections), select the ✎ icon with the ◀▶ buttons and press **SET**, and follow the instructions given below.

After entering the profile section editing menu, the time value of the first section will be highlighted (see the picture below).


	<p>The maximum speed value for the section cannot be higher than the maximum speed value for the characteristic (for the last section).</p>
	<ul style="list-style-type: none"> ▪ With ▲▼◀▶ highlight time or speed for desired section ▪ Press SET ▪ With ▲▼◀▶ choose value ▪ Press SET ▪ Repeat until setting all the sections ▪ To finish editing characteristic with ▲▼◀▶ choose ↶ and press SET. Finishing edition can be also done by pressing BACK button.
<p>Saving created characteristic</p>	
	<ul style="list-style-type: none"> ▪ Select the ↶ icon with the ◀▶ buttons and press SET ▪ In the "Save?" window, use ▲▼ buttons to select YES to confirm saving the characteristic or NO, to exit without saving ▪ Press SET

7.5.3 Acceleration graph

An example of given parameters and a diagram:

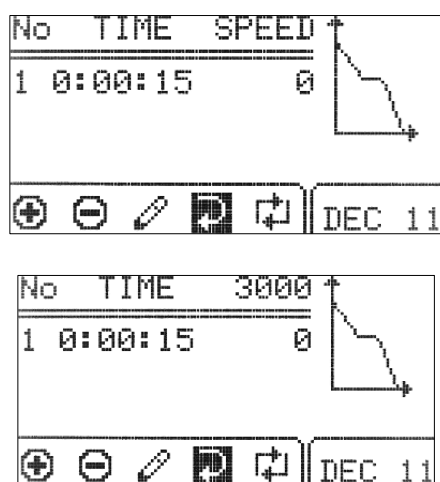



After the time value programming is completed, the **TIME + SPEED** segment of the user's startup characteristic can be displayed graphically. The set section of the characteristic curve is illustrated on the graph, which can be displayed by



selecting the icon  with the ◀▶ keys and pressing the **SET** key.

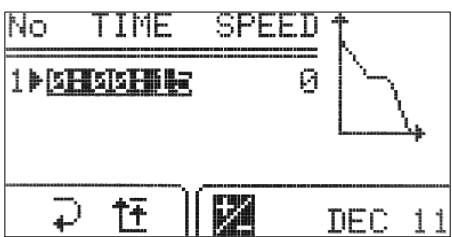

7.5.4 Deceleration characteristic, creation of episode 1




SPEED or **3000** displayed (example):






No	section no. (max. 4)
TIME	total acceleration time
SPEED	final RPM
DEC	characteristic's no. (10-19)
⊕	adding a new section
⊖	deleting last section
✎	editing sections
↺	exiting from characteristics menu
↻	switching RPM/RCF
	entering graph view




After entering the curve wizard, the symbol  is highlighted. Pressing **SET** and selecting "NO" in response to the question "**SAVE?**" will return to the **PROG → CURVES** menu without making changes to the starting characteristics. To start editing the one-segment characteristics, select the icon  with the ◀▶ keys and press the **SET** key.

	 editing value (flashing means editing the given value)
	<ul style="list-style-type: none"> Press SET With ▲▼◀▶ choose time for section Press SET To edit speed It is not possible to edit the minimum speed value. To do this, more legends must be created, but the last leg will always be "0".

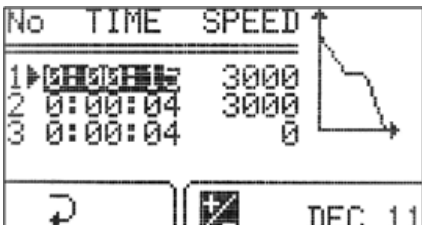









	<ul style="list-style-type: none"> Select  with   buttons and press SET to finish editing characteristics
--	--

7.5.5 Adding and editing sections - deceleration

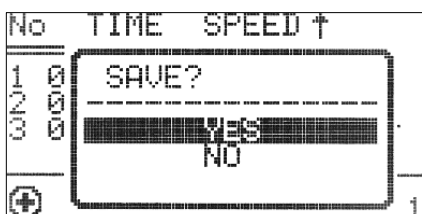





In order to program successive periods, select the icon  with the   keys and press the **SET** key. A new segment (or segments - after successive presses of SET) will appear with the time and speed equal to the minimum speed - "0".

To start editing the newly added sections, select the icon  with the   buttons, press **SET** and make the settings as described below.

After entering the profile section editing menu, the time value of the first section will be highlighted (see the picture below).

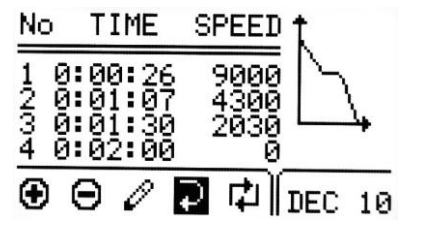




	<p>The speed value of the last segment will always be "0".</p> <ul style="list-style-type: none"> With    highlight time or speed for desired section Press SET With   choose value Press SET Repeat until setting all the sections To finish editing characteristic with    choose  and press SET. Finishing edition can be also done by pressing BACK button
---	---

SAVING CREATED CHARACTERISTIC

	<ul style="list-style-type: none"> Select the  icon with the   buttons and press SET In the "Save?" window, use   buttons to select YES to confirm saving the characteristic or NO, to exit without saving Press SET
---	--

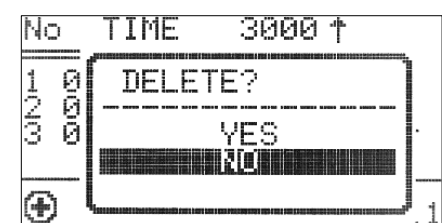
7.5.6 Deceleration graph






An example of given parameters and a diagram:

 	<p>After programming the time value, you can graphically display the TIME + SPEED segment of the user's braking characteristic. The set section of the characteristic curve is illustrated on the graph, which can be displayed by selecting the icon  with the   keys and pressing the SET key.</p>
--	---

7.5.7 Deleting sections

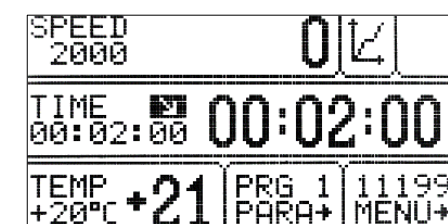
In the characteristic's wizard:




- Select the  icon with the   buttons and press **SET**
- In the "Delete?" window, use   buttons to select YES to confirm deleting the characteristic section or NO to cancel
- Press **SET**

7.6 Programs with user characteristics

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

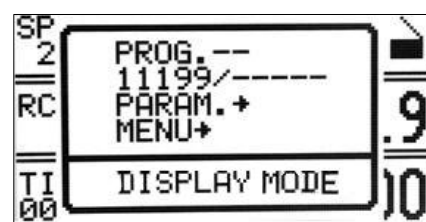





Icon  signals that program with user acceleration/deceleration characteristics are loaded.

A change in any parameter entails the deactivation of the multi-section's curves mode.

7.7 Rotor and bucket choosing






Simplified display mode







- Press and hold  by 1 second.
- Choose rotor number (exemplary **11199/-----**) with  .
- Press **SET**.
- Execute points described follow (below **Normal display mode** description)

Normal display mode



- Press **SET**— appears.
- Via     mark rotor choosing field.
- Press **SET** (Rotors and buckets list will appear).

ROTOR	BUCKET	SPEED
11199	-----	15000
11461	-----	15000
11716	-----	15000
11760	-----	14000
11942	-----	6000
11943	-----	15000

- Via   keys mark demanded rotor number
- Confirm by pressing **SET**.
- If a bucket can be selected:
 - With   select demanded bucket number.
 - Press **SET**.
- Press **BACK** to close edition mode.

RCF	RMAX	RMIN
> 16854	87	40
20879	83	40
17608	70	40
20160	92	40
3542	88	50
21382	85	51

- With ◀▶ keys one may switch between screens of rotors parameters

- It is possible to set **AUTOMATIC ROTOR IDENTIFICATION**. The procedure is described in subsection "Other".

7.8 SHORT mode

SHORT MODE – short work mode (centrifuging with pressed **SHORT** key)



- 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.
- Centrifuging is stopped after releasing the **SHORT** key.

7.9 Finishing the centrifuging

- When preselected time is reached, centrifugation will end automatically.

SPEED 2000	0	■
TIM 00:	CYCLE FINISHED	15
TEMP +5°C	+15	PRG-- 11716 PARA+ MENU+



- Before lapsing preselected time, one may stop centrifugation. Pressing **STOP** for the first time will stop centrifuging with the characteristic set-in loaded program.
↓ symbol will be shown.



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











SPEED 2000	0	■
TIM 00:	CYCLE INTERRUPTED !	00
TEMP +5°C	+15	PRG-- 11716 PARA+ MENU+

- The message about cancel of centrifuging can be delete with the **STOP, SET, COVER, ▲▼◀▶** or **BACK** key.


8 Temperature control



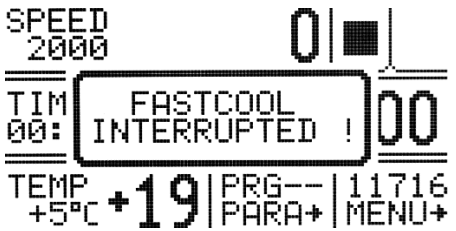
Centrifuge is equipped with ecological refrigerating system with temperature control. During centrifugation, there may appear differences in temperature on the display and temperature of the samples in the rotor. It depends on thermal conductivity of the rotor, and samples, centrifugation time, initial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

Exemplary change of **TEMP** setting:


	<ul style="list-style-type: none"> Press SET (to enter edit mode) –  appears. Via     keys mark TEMP field (highlighted). Press SET. Via   set value. Confirm via SET key.
	<p>When chamber is being cooled,  symbol is visible on the screen (blinking).</p>

8.1 Initial cooling during centrifuging - FAST COOL

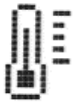
	<ul style="list-style-type: none"> The parameters allowable to change at FAST COOL mode: <ul style="list-style-type: none"> temperature (lower than current temperature shown by centrifuge) In order to centrifuging reduced temperature samples (e.g., storage in the external refrigerator) centrifuge chamber,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

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


8.2 Initial cooling without centrifuging – THERMAL CHAMBER

	PARA → THERMAL CHAMBER
	<ul style="list-style-type: none"> There is possible to run centrifuge in THERMAL CHAMBER mode – cooling (rotor is at standstill). How to enable THERMAL CHAMBER is described in “Thermal chamber” chapter.

8.3 Cooling in “START DELAY – OF TEMPERATURE” mode

	PARA → START DELAY/OF TEMPERATURE
	<ul style="list-style-type: none"> Centrifuging process will start, when preselected temperature is reached. How to enable run START DELAY – OF TEMPERATURE function is described in “Start delay – of temperature” chapter.

8.4 Cooling in „SHORT” mode



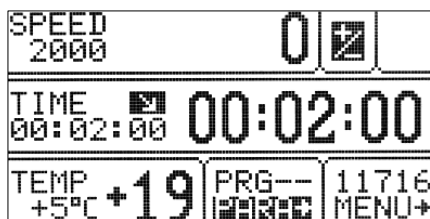
	<ul style="list-style-type: none"> Cooling feature is available in SHORT mode. How to enable run centrifugation in SHORT mode is described in “SHORT mode”.
---	--

8.5 Cooling notes

MPW-150R centrifuge is equipped with an efficient cooling system. It allows obtaining selected temperatures in the chamber even at maximum spin speed or fast obtaining desired temperatures (e.g., +4°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.

9 Parameters of centrifugation

This chapter contains exemplary screens of MPW-260R centrifuge (screens for MPW-260 – without cooling – do not include temperature field).

Simplified display	
	<ul style="list-style-type: none"> Press and hold  by 1 second. Choose PARAM. with ▲ ▼ Press SET.
Normal display	
	<ul style="list-style-type: none"> Press SET. With ▲ ▼ ◀ ▶ keys select PARAM. Press SET.
<ul style="list-style-type: none"> It is possible to switch between two different screens via ◀ ▶ ▲ ▼ keys in PARAMETERS field. 	


<div> <div>PARAMETERS1/2</div> <div> <div>ACCELERATION</div> <div>DECELERATION</div> <div>RADIUSmm70</div> <div>DENSITYg/cm³1.2</div> <div>TEMP.OFFSET°C0</div> <div>CHAMBER DEL.min1</div> </div> </div>	<div> <div>PARAMETERS2/2</div> <div> <div>THERMAL CHAMBER</div> <div>AUTOM. LID OPENING</div> <div>START DELAY</div> </div> </div>
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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/cm³)	sample density [g/cm³]
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 cover after centrifuging automatically
START DELAY	starting delayed (after pressing START)

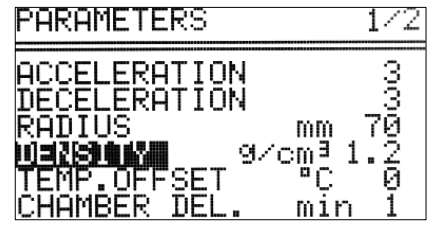
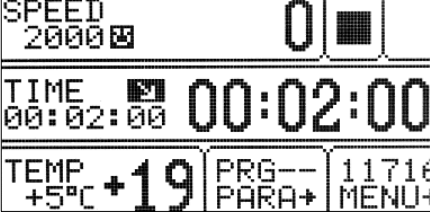

9.1 Acceleration/deceleration – changing characteristics

<div> <div>PARAMETERS1/2</div> <div> <div>ACCELERATION</div> <div>DECELERATION</div> <div>RADIUSmm70</div> <div>DENSITYg/cm³1.2</div> <div>TEMP.OFFSET°C0</div> <div>CHAMBER DEL.min1</div> </div> </div>	<ul style="list-style-type: none"> With ▲▼ keys select ACCELERATION or DECELERATION. Press SET. With ▲▼ keys select demanded number of characteristics. Press SET. <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>
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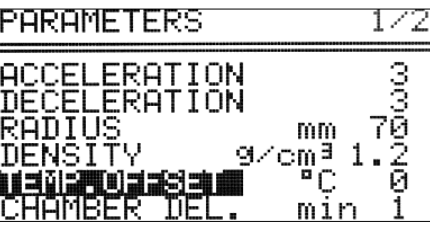



9.2 Radius

<div> <div>PARAMETERS1/2</div> <div> <div>ACCELERATION</div> <div>DECELERATION</div> <div>RADIUSmm70</div> <div>DENSITYg/cm³1.2</div> <div>TEMP.OFFSET°C0</div> <div>CHAMBER DEL.min1</div> </div> </div>	<p>RADIUS [mm] - control of the radius of the rotor within the range from R_{min} to R_{max}. Available values depend on chosen rotor. Radius corrections serve for more precise control RCF, exemplary when user need to know real RCF in half length of test tube.</p> <ul style="list-style-type: none"> To change the rotor radius, select RADIUS [mm] with ▲▼ keys. Press SET. Set demanded value by pressing ▲▼. Press SET.
<div> <div>RCF300000</div> <div>0</div> <div>TIME00:02:0000:02:00</div> <div>TEMP+5°C+19</div> <div>PRG--11716</div> <div>MENU+</div> </div>	<p>When radius correction is activated,  symbol is visible on the screen.</p> <p>Reducing of the rotor radius resulting change of displayed RCF value.</p>


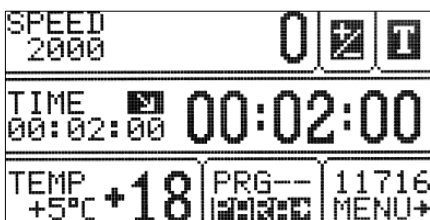
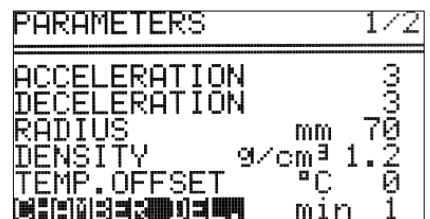
9.3 Sample density

 <p>PARAMETERS 1/2</p> <p>ACCELERATION 3</p> <p>DECELERATION 3</p> <p>RADIUS mm 70</p> <p>DENSITY g/cm³ 1.2</p> <p>TEMP.OFFSET °C 0</p> <p>CHAMBER DEL. min 1</p>	<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. Set demanded value by pressing ▲▼. Press SET.
 <p>SPEED 2000 0</p> <p>TIME 00:02:00 00:02:00</p> <p>TEMP +5°C +19 PRG-- 11716</p> <p>PARA+ MENU+</p>	<p>When density is changed,  symbol is visible on the screen.</p> <p>Changing of DENSITY value is obligatory when density of sample placed into rotor is higher than 1.2 g/cm³. Change of DENSITY value led to decreasing maximum value of accessible speed.</p>


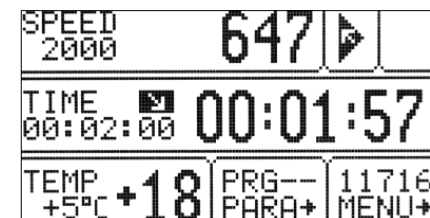
9.4 Temperature offset

 <p>PARAMETERS 1/2</p> <p>ACCELERATION 3</p> <p>DECELERATION 3</p> <p>RADIUS mm 70</p> <p>DENSITY g/cm³ 1.2</p> <p>TEMP.OFFSET °C 0</p> <p>CHAMBER DEL. min 1</p>	<p>Temperature offsets serve for more precise control of real sample temperature. It can be helpful in case 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!</p> <p>The use of the offset cannot extend the temperature range achieved by the centrifuge.</p> <p>Function description</p> <p>At a set temperature of 20°C and the set offset value equal to -5°C, cooling system will actually strive 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 range from -20°C to 20°C.</p>
 <p>SPEED 2000 176</p> <p>TIME 00:02:00 00 01 59</p> <p>TEMP +5°C +21 PRG-- 11716</p> <p>PARA+ MENU+</p>	<p>Activation of the function is signalled on the main screen with  or  depending on the offset value sign.</p>



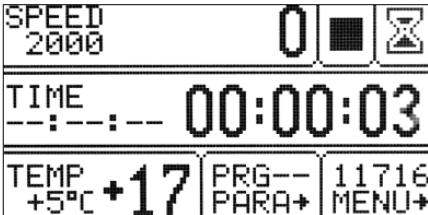

9.5 Thermal chamber

Cooling without centrifuging.	THERMAL CHAMBER
 <p>PARAMETERS 2/2</p> <p><input checked="" type="checkbox"/> THERMAL CHAMBER</p> <p><input type="checkbox"/> AUTOM. LID OPENING</p> <p><input type="checkbox"/> START DELAY</p>	<ul style="list-style-type: none"> With ▲▼◀▶ keys select THERMAL CHAMBER. Press SET (to turn on/off). With ▲▼ keys select temperature value. Set demanded value (0°C÷40°C) by pressing ▲▼. Confirm selection by pressing SET. <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>SPEED 2000 0 [T]</p> <p>TIME 00:02:00 00:02:00</p> <p>TEMP +5°C +18 PRG-- 11716</p>	<p>When 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 cover terminates THERMAL CHAMBER function (closing cover back turns it on).</p>
 <p>PARAMETERS 1/2</p> <p>ACCELERATION 3</p> <p>DECELERATION 3</p> <p>RADIUS mm 70</p> <p>DENSITY g/cm³ 1.2</p> <p>TEMP. OFFSET °C 0</p> <p><input checked="" type="checkbox"/> CHAMBER DEL min 1</p>	<p>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). Press SET.
<ul style="list-style-type: none"> The function is activated automatically after confirmation and with the lid closed. The function is interrupted when the lid is opened, and the function resumes when the lid is closed again. If the THERMAL CHAMBER function is enabled during the centrifugation cycle, at the end of this cycle, the THERMAL CHAMBER function is activated until the lid is opened. Unlike other parameters, the THERMAL CHAMBER function can be turned on only when the centrifuge is stopped. 	



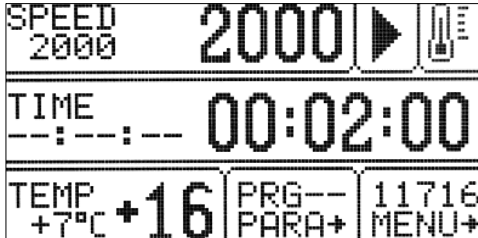

9.6 Automatic lid opening

Automatic lid opening	AUTOMATIC LID OPENING
 <p>PARAMETERS 2/2</p> <p><input type="checkbox"/> THERM. CHAMB.</p> <p><input checked="" type="checkbox"/> AUTOM. LID OPENING</p> <p><input type="checkbox"/> START DELAY</p>	<ul style="list-style-type: none"> When centrifuge process is finished, cover will be opened automatically for set option AUTOM. LID OPENING. When centrifuging is terminated by pressing STOP, opening cover is possible by pressing COVER.
 <p>SPEED 2000 647 ▶</p> <p>TIME 00:01:57 00:01:57</p> <p>TEMP +5°C +18 PRG-- 11716</p>	<p>▶ symbol means that OPEN LID AFTER RUN is active.</p>

9.7 Start delay - of time

	Start centrifuging since preselected delay is reached.	STARY DELAY / OF TIME
	<ul style="list-style-type: none">With ▲▼ keys select START DELAY. Press SET. Start delay can be set from 0:00:01 to 9:59:59.With ▲▼ keys select OF TIME. Press SET and ► and then SET.With ▲▼ keys set demanded value.Confirm by pressing SET.Press BACK to escape edit mode.	
	When START DELAY function is activated,  symbol is visible on the screen.	
<ul style="list-style-type: none">START DELAY / OF TIME function can be stopped at any moment by pressing STOP.		
<ul style="list-style-type: none">START DELAY / OF TIME function cannot be run when START DELAY / OF TEMP. is activated.		

9.8 Start delay – of temperature

	Start centrifuging time counting since preselected temperature is reached.	START DELAY / OF TEMP.
	<ul style="list-style-type: none">With ▲▼◀▶ keys mark START DELAY.Press SET.With ▲▼◀▶ keys mark OF TEMP.Press SET.Press ►, press SET.With ▲▼ keys set demanded value of temperature.Press SET.Exit edit mode by press BACK.	
	<p>When START DELAY – OF TEMPERATURE is turned on,  symbol is visible on the screen.</p>	
<ul style="list-style-type: none">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 set by user speed.		
<ul style="list-style-type: none">The delay starts - from the temperature can be interrupted at any time by pressing the STOP key.		
<ul style="list-style-type: none">START DELAY / OF TEMP. function cannot be run when START DELAY / OF TIME is activated.		

9.9 Temporarily disabled functions

Functions written below can be temporarily disabled.

active	SPEED	RCF	TIME	TEMP	PROG —	— / —	PARAM	MENU
THERMAL CHAMBER	•	•	•	○	•	•	•	•

During the spin cycle

active	SPEED	RCF	TIME	TEMP	PROG —	— / —	PARAM	MENU
STANDARD SPIN	•	•	•	○	•	○	•	•
ACC/DEC 10-19	○	○	•	•	○	○	•	•

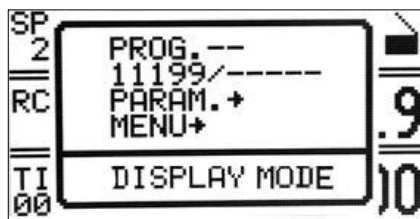
When setting parameters


active	SPEED	RCF	TIME	TEMP	PROG —	— / —	PARAM	MENU
STANDARD SPIN	○	○	○	○	•	○	○	•
ACC/DEC 10-19	○	○	•	•	•	○	•	•

- available
- disabled

10 Menu

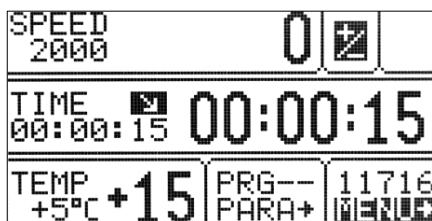
Simplified display



- Press and hold  by 1 second.
- Choose **MENU** with ▲▼
- Press **SET**.

Execute points described follow (below **Normal display mode** description)

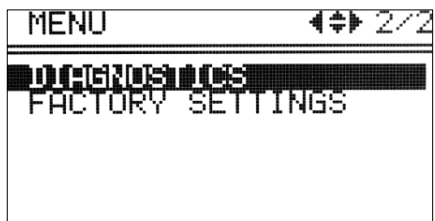
Normal display



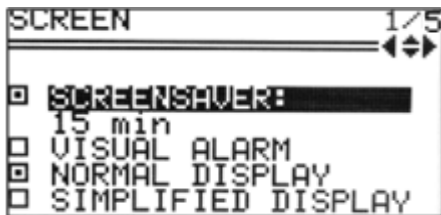
- Press **SET**.
- With ▲▼◀▶ keys select **MENU**.
- Press **SET**.



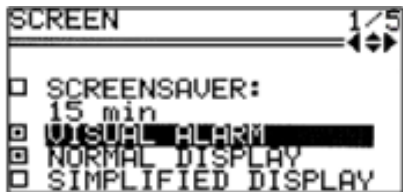
- To navigate in **MENU** use ▲▼◀▶ keys.
- To enter menu press **SET**.

	
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

10.1 Screen saver

Setting time of screen saver	MENU/ CONFIGURATION / SCREEN
	<ul style="list-style-type: none"> With ▲▼◀▶ keys select SCREENSAVER. Press SET and then ▼ and SET. With ▲▼ keys select demanded value from 1 to 60 minutes. Mark selection by pressing SET. Leave the menu by pressing BACK.

10.2 Visual alarm

Visual alarm	MENU/CONFIGURATION/ SCREEN
	<ul style="list-style-type: none"> Via ▲▼ keys choose VISUAL ALARM Mark it by pressing SET. <p>VISUAL ALARM cause blinking screen after ending of centrifuging or after message occurring.</p>

10.3 Types of main screen


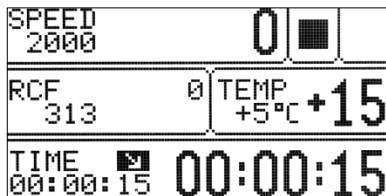
To ensure optimal adaptation to the user's preferences, work is possible in two basic screen modes.

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

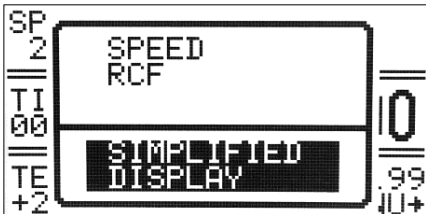
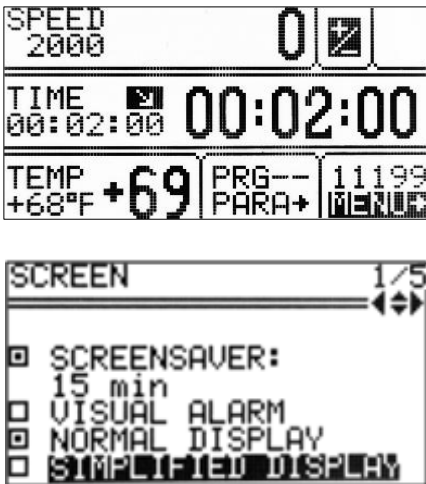

SIMPLIFIED DISPLAY - contains only the most important parameters visible on the display.

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

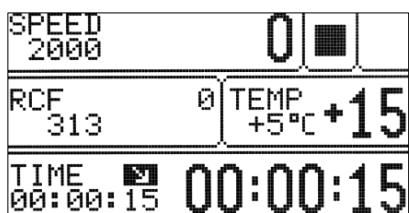

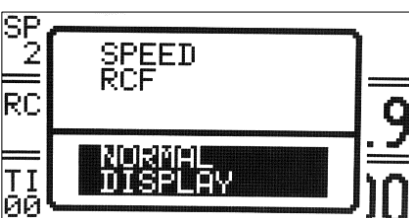
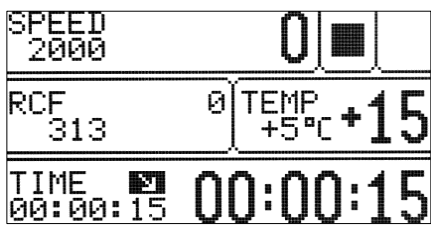
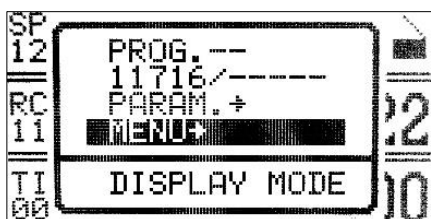

By default, the **SIMPLIFIED DISPLAY** is set.

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.

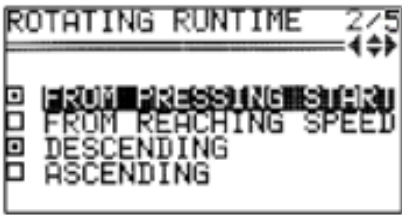
10.3.1 Switching the normal display to simplified display

Method I	
	<ul style="list-style-type: none"> Press the BACK button for 1 sec. to return to the basic display (a short menu is displayed on the screen), then: Via ▲▼ keys select SIMPLIFIED DISPLAY. Press SET.
Method II	
	<ul style="list-style-type: none"> Press SET –  appears. Via ▲▼◀▶ keys select MENU. Press SET. Via ▲▼ keys select CONFIGURATION tab. Press SET. Via ◀▶ keys select SCREEN tab. Via ▲▼ keys select SIMPLIFIED DISPLAY. Press SET. Leave menu via BACK key.

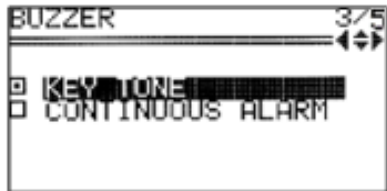
10.3.2 Switching the simplified screen to normal display

Method I	
	<ul style="list-style-type: none"> Press the BACK button for 1 sec.
	<ul style="list-style-type: none"> Via ▲▼ keys select DISPLAY MODE (highlighted). Press SET.
	<ul style="list-style-type: none"> Then choose NORMAL DISPLAY via ▲▼ keys. Press SET.
Method II	
	<ul style="list-style-type: none"> Press the BACK button for 1 sec.
	<ul style="list-style-type: none"> Via ▲▼ keys select MENU (highlighted). Press SET.
	<ul style="list-style-type: none"> Via ▲▼ keys select CONFIGURATION tab. Press SET. Via ◀▶ keys select SCREEN tab. Via ▲▼ keys select NORMAL DISPLAY. Press SET. Leave menu via BACK key.

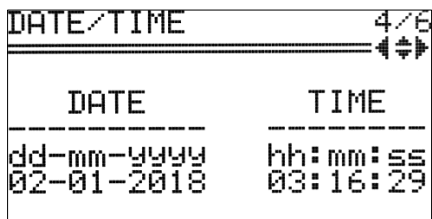
10.4 Rotating runtime

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

10.5 Buzzer


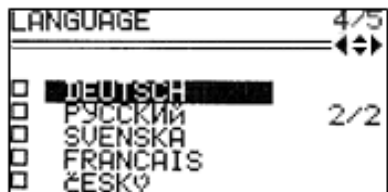
Switching ON/OFF short audible signals accompanying every pressing of any key. Switching ON/OFF signals after centrifuging.	MENU/ CONFIGURATION / BUZZER
	<ul style="list-style-type: none"> With ▲▼ keys select demanded option. Mark selection by pressing SET. <p>A continuous alarm means the emission of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

10.6 Date/time*

Setting up time and date	MENU/ CONFIGURATION / DATE/TIME
	<ul style="list-style-type: none"> Press SET. Via ◀▶ keys choose demanded value. Via ▲▼ keys change chosen value. Confirm by pressing SET. Repeat above steps for other values. Press BACK.
<ul style="list-style-type: none"> Set date and time are still active even after restart of centrifuge. 	

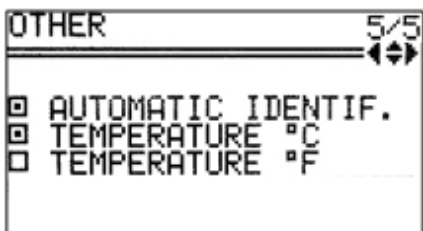
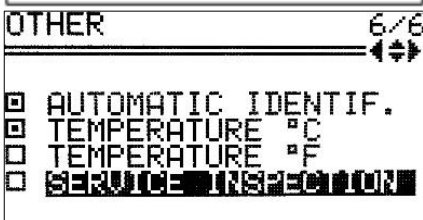
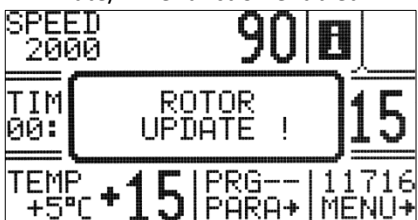
* In selected models the function is not available.

10.7 Language

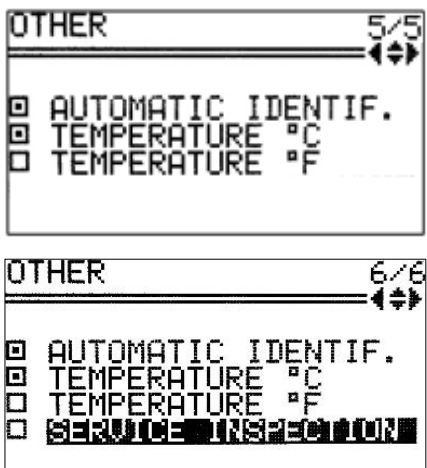
Changing menu language	MENU / CONFIGURATION / LANGUAGE
 	<ul style="list-style-type: none"> Via ▲▼ keys choose demanded menu language Mark it by pressing SET.

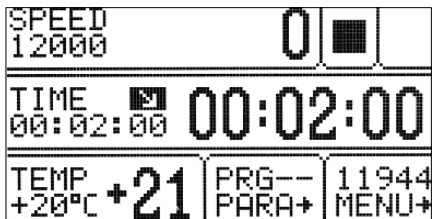

10.8 Other

10.8.1 Rotor automatic identification


	MENU / CONFIGURATION / OTHER
  <p>Screen view available on models with the Date/Time function enabled</p> 	<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 “Rotor and bucket choosing”.</p> <p>The AUTOMATIC IDENTIF. is turned on by default.</p> <p>To enable/unable the function:</p> <ul style="list-style-type: none"> Via ▲▼ keys choose <input type="checkbox"/> AUTOMATIC IDENTIF. Press SET (<input type="checkbox"/> change to <input checked="" type="checkbox"/> or conversely). <p>Autoidentification is not active for work in the loaded program mode.</p>

10.8.2 Selecting the temperature unit

MENU / CONFIGURATION / OTHER	
 <p>Screen view available on models with the Date/Time function enabled</p>	<p>The TEMPERATURE in °C is turned on by default.</p> <p>To change the temperature unit:</p> <ul style="list-style-type: none"> Via ▲▼ keys select unit Confirm by pressing SET.







	
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10.8.3 Service inspection*


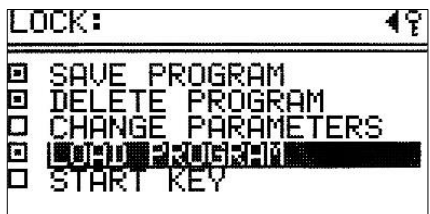
MENU / CONFIGURATION / OTHER	
	<p>There is a possibility to turn on a message reminding user to perform the inspection, with the option to define the date of the inspection when the message will be displayed.</p> <p>To enable/disable the function:</p> <ul style="list-style-type: none"> Via ▲▼ keys choose <input type="checkbox"/> SERVICE INSPECTION. Press SET (<input type="checkbox"/> change to <input checked="" type="checkbox"/> or conversely). <p>A new field will appear with the date of the inspection (on that day message will be displayed).</p> <p>To edit the date:</p> <ul style="list-style-type: none"> Via ▲▼ keys select date field. Press SET. Via ▲▼◀▶ keys choose value. Confirm by pressing SET.

* This function is only available in models with the Date/Time tab active.

10.9 Password

MENU / PASSWORD	
<p>To prevent from an unauthorized 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 SET. Icon  starts blinking. With ◀▶ keys set the valid place of the PASSWORD. With ▲▼ keys set correct value. Repeat above steps for all places. Press SET.
	<ul style="list-style-type: none"> As a confirmation repeat instructions described above.
<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>	
	
<ul style="list-style-type: none"> From then on, access to the MENU is possible after entering the password. In case of incorrect password, it will show message: ACCESS DENIED! 	
<ul style="list-style-type: none"> To delete the PASSWORD, "0000" must be set (after previously entering current password). If the PASSWORD is forgotten, the emergency code "7654" should be used to clear password and remove all locks. 	

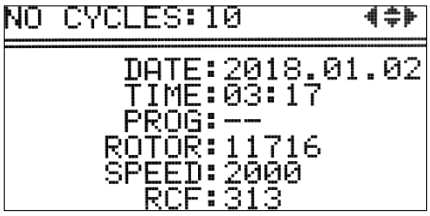
Setting up locks

	<ul style="list-style-type: none"> With ▲▼ keys choose a lock. Mark a lock by pressing SET. Repeat above steps for desired locks. Leave menu with BACK key.
	<ul style="list-style-type: none"> In the LOCK menu, press ◀ and then SET.

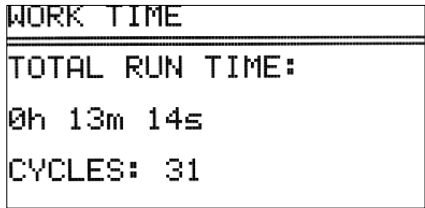
	disabled*	description
SAVE PROGRAM	button	no programs can be saved
DELETE PROGRAM	button	no programs can be deleted saving programs on position where one was already stored is disabled
CHANGE PARAMETERS	fields: SPEED RCF TIME TEMP PROG— —— / —— PARAM PROG	parameters cannot be modified
LOAD PROGRAM	button	no programs can be called up
START KEY	key	centrifugation cannot be started

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

10.10 Last 10 cycles

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

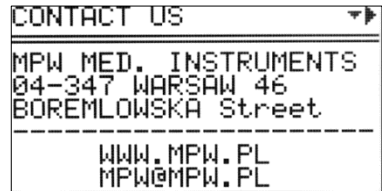
10.11 Work time

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> <ul style="list-style-type: none"> total working (centrifugation) time working cycles counter

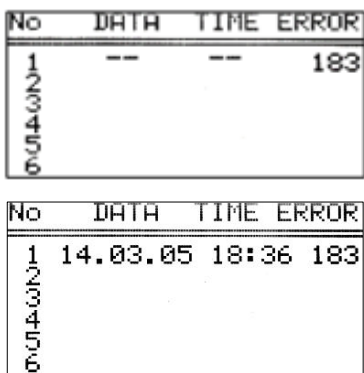
10.12 Rotor runtime

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																		
<div>▶ ROTOR CYCLES NOM.C.</div> <table><tr><td>✓ 11199</td><td>0</td><td>15000</td></tr><tr><td>✓ 11461</td><td>0</td><td>15000</td></tr><tr><td>✓ 11716</td><td>15</td><td>15000</td></tr><tr><td>✓ 11760</td><td>0</td><td>15000</td></tr><tr><td>✓ 11942</td><td>11</td><td>15000</td></tr><tr><td>✓ 11943</td><td>0</td><td>15000</td></tr></table>	✓ 11199	0	15000	✓ 11461	0	15000	✓ 11716	15	15000	✓ 11760	0	15000	✓ 11942	11	15000	✓ 11943	0	15000	<p>CYCLES – the number of centrifuging the rotor has performed, NOM.C. – permissible number of centrifuging for the rotor.</p> <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 <p>It is not allowed to use rotors marked as worn. They should be replaced with new ones.</p>
✓ 11199	0	15000																	
✓ 11461	0	15000																	
✓ 11716	15	15000																	
✓ 11760	0	15000																	
✓ 11942	11	15000																	
✓ 11943	0	15000																	

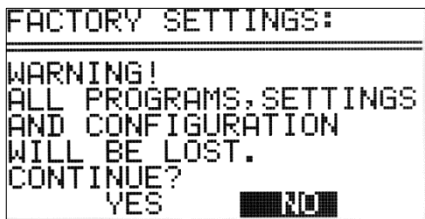
10.13 Contact us

Information about the type of the centrifuge, firmware version, and contact details.	MENU / CONTACT US
	<ul style="list-style-type: none"> The list can be scrolled using ▲▼ keys. To exit press BACK key.

10.14Diagnostics


Information about errors arisen in working of the centrifuge (for service).	MENU / DIAGNOSTICS
 <p>Screen view available on models with the Date/Time function enabled</p>	Intended for service purposes!

10.15Factory settings


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

11 Maintenance


11.1 Cleaning of the centrifuge

	<ul style="list-style-type: none"> Pull the mains plug before cleaning. Before any cleaning or decontamination process other than that is recommended by the manufacturer, the user has to ask the manufacturer if the planned process does not damage the device For cleaning, water with soap or other water-soluble mild detergent shall be used. One should avoid corrosive and aggressive substances. It is prohibited to use alkaline solutions, inflammable solvents or agents containing abrasive particles. Do not lubricate the centrifuge motor shaft. The unused centrifuge should have cover opened. Once a week Using wiping cloth, remove condensate or residues of the products from the rotor chamber. Once a month Check the rotor fixing screw thread. In case of damage, replaced it. Check the centrifuging chamber whether it is damaged. In case of damage, it cannot be longer put into operation. Notify authorized service workshop.
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11.2 Maintenance of centrifuge elements

	<p>The rotor pins shall be always 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

	<ul style="list-style-type: none"> ▪ In order to ensure safe operation, one shall carry out in regular way periodical maintenance of the accessories. ▪ 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. ▪ In case of observation of surface damage, crevice or other change, as well as the corrosion, the given part (rotor, bucket, etc.) shall be immediately replaced. ▪ The rotor, including the fixing screw, buckets and round carriers must be regularly cleaned to prevent corrosion. ▪ Cleaning of the accessories shall be carried out outside of the centrifuge once every week or still better after each use. For cleaning them one should use neutral agent of pH value 6÷8. It is forbidden to use alkaline agent of pH > 8. Then, those parts shall be dried using soft fabric or in the chamber drier at ca. 50°C. ▪ Angle rotor should be placed on a fabric with holes facing down, for effective drying. ▪ Do not use bleach on plastic parts of the rotor. ▪ 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. ▪ Do not use bleach on plastic parts of the rotor. ▪ According to laboratory standards, minimize the immersion time in each solution. ▪ Especially prone to the corrosion are parts made of aluminum. ▪ Corrosion and damages resulting from insufficient maintenance could not be subject of claims lodged against the manufacturer. ▪ The unused rotor should have the lid removed.
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HS accessories maintenance.

	<ul style="list-style-type: none"> ▪ Check the general condition of seals. ▪ Make sure that rubber O-rings are lightly coated with silicone grease. Use high vacuum grease, e.g., type „C” by LUBRINA. ▪ In order to maintain hermetic sealing, it is recommended to replace the sealing rings after each autoclaving. ▪ Store hermetically sealed rotors and buckets with the lids removed.
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11.3 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/perfluoro propylene

PVC	polyvinyl chloride	PFA	tetrafluoroethylene/perfluoroalkylvinylether
POM	acetal polyoxymethylene	FKM	fluorocarbon rubber
PE-LD	low density polyethylene	EPDM	ethylene propylene diene
PE-HD	high density polyethylene	NR	natural rubber
PP	polypropylene	SI	silicon rubber
PMP	polymethyl pentene		

One can use all standard disinfectants. Centrifuges and devices are made of different materials, one should consider their variety.

	radiation β radiation γ 25 kGy	C_2H_4O (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*).

11.3.1 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 one should consider 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 reduces 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 etc.
- Pressure in closed containers can cause plastic deformation or explosion.
- Prior to autoclaving the rotors and accessories, thoroughly wash 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.

11.4 Chemical resistance



Chemical resistance of plastics

	aldehydes	cyclic alcohols	esters	ether	ketones	strong or concentrated acids	weak or diluted acids	oxidizing substances	cyclic hydrocarbons	aromatics	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 through 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 the period of 7-30 days (e.g., puffing up, softening, reduced mechanical durability, discolouring).
○	limited	The material should not have the continuous contact with the substance. The immediate occurrence of damage is possible (e.g., the loss of mechanical durability, deformation, discolouring, bursting, dissolving).








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

Do not use bleach on plastic parts of the rotor.

	DANGER! MPW accessories are not biotight. For centrifuging 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.
	User is responsible for proper disinfections of the centrifuge if some dangerous material was spilled inside or outside of the centrifuge. During the above mentioned works one must wear safety gloves.

12 Troubleshooting

Majority of faults could be removed by switching the centrifuge OFF and then ON. After switching the centrifuge ON, there shall be displayed parameters of the recently implemented program and sound signals comprising four successive tones shall be generated. In case of short-duration power failure the centrifuge terminates the cycle and displays PROGRAM ERROR code.

problem	question	remedy
Centrifuge does not start	<i>Is supply cable plugged into mains?</i>	<i>Plugs 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 are proof for cycle in progress and motor does not start)	<i>Is  symbol displayed?</i>	Wait till rotor stops and the  symbol goes off.
	<i>Is  symbol displayed?</i>	Close cover.  symbol must switch off.
	<i>Is  symbol blinking?</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 shall be balanced.
	<i>Inclined centrifuge.</i>	Centrifuge shall 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 cover.
(motor error)	<i>After stopping error rotor message is displayed</i>	Check if rotor number in started program 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 program
It is not possible to open the cover	<i> symbol on the display is blinking, after pressing COVER key single tone is audible</i>	Rotor is still rotating. Wait for stopping of the rotor and displaying of the  symbol.
	<i>The sensor is connected correctly, and the error is still applying.</i>	Call service.
Mains failure during run	<i>The message will be displayed on the display about the decay of tension.</i>	Wait for stopping of the rotor, 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>	Open the cover. Wait for the centrifuge to cool down.

12.1 Messages


Screen messages that may occur during operation.	
MESSAGE	EXPLANATION
"SPEED OF ROTOR" "IDENTIFICATION <> 90 RPM"	Please try start centrifuging again, if error still occur, contact manufacturer's authorized 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, is rotor mounted in the centrifuge chamber. If it is right contact manufacturer's authorized service.
"INCORRECT ROTOR NUMBER !"	Change rotor number in centrifuge settings or use autoidentification.
"WRONG DIRECTION OF ROTATION" "OR UNKNOWN ROTOR !"	Make sure if correct rotor for centrifuge is mounted. List of accessories is described in chapter 15.
"PLEASE CLOSE THE LID" "HAND !"	Necessity of manually closing the lid.
"ROTOR STOPPING !" "Please wait..."	Initializing after mains failure with rotating rotor, wait until rotor stop.

Emergency messages

In case of emergency messages (centrifuge is not working properly) contact the manufacturer's authorized service center.

MESSAGE
"OVERHEATING MOTOR !" "INVERTER ERROR !"
"INVERTER SERIAL BUS ERROR !"
"TEMPERATURE SENSOR ERROR"
"PRESSURE CONTROL FAILURE!"
"OPENING COVER in RUN!"
"SPEED METER ERROR"
"I2C BUS ERROR"
"OVERHEATING CENTRIFUGE !"
"ROTOR OVERSPEED !"
"COVER LOCK MALFUNCTION !"

12.2 Emergency cover release


	<p>EMERGENCY COVER RELEASE</p> <p>Attention! <i>The cover may be opened in emergency only when the rotor is at rest. Before emergency opening the cover, switch off the mains power switch and disconnect the power cord. Wait 10 min and/or looking through the sight glass, make sure that the rotor is not rotating.</i></p> <p>There is a plug on the right-hand side, which must be unscrewed counterclockwise using the emergency lid release key (catalogue no. 18640). Then pull on the cap until the cover is open.</p> <p>The emergency opening of the cover can be used, for example, in the event of a power failure, failure of the control panel, etc.</p>
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13 Guarantee


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

Repairs should be carried out in authorized service workshops, granted with the MPW Certificate.

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

	<ul style="list-style-type: none">▪ Guarantee period amounts to 24 months (unless otherwise specified in the purchase documents).▪ Guarantee conditions are described in guaranteed card.▪ The service life of the centrifuge specified by the manufacturer amounts to 10 years.▪ After 24 months from the start of the warranty period (date of purchase), a technical inspection of the centrifuge should be carried out (validation) by an authorized service of the manufacturer. Subsequent inspections should be carried out at annual intervals.▪ Maximum period of storage of not used centrifuge amounts to 1 year. After this period, a service authorized by manufacturer should carry out technical inspection of the centrifuge.▪ Manufacturer reserves the right to make technical changes in manufactured products.
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14 Transport and storage

	CAUTION! Due to the heavy weight of the device, lifting and carrying it may cause injury to the spine.
	<ul style="list-style-type: none">▪ Store the device only in a closed and dry room.▪ Remove rotor from centrifuge before transport.▪ Lift and carry with the adequate number of people.▪ Use transport equipment.▪ Use the original packaging and transport protection for transport.

14.1 Transport and storage conditions

	Storage (in the package)	Storage (without the package)	Transport
Temperature	-25 ÷ +55 °C	-5 ÷ +45 °C	-25 ÷ +60 °C (general) -20 ÷ +55 °C (air)
Relative humidity	10 ÷ 75 %	10 ÷ 75 %	10 ÷ 75 %
Pressure	70 ÷ 106 kPa	70 ÷ 106 kPa	30 ÷ 106 kPa

15 Disposal



- Dispose of the device in accordance with the applicable legal regulations in the country of use.
- In the countries of the European Community, the disposal of electrical equipment is regulated under the EU Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).
According to these regulations, centrifuges may not be collected together with municipal or household waste.
- Disposal regulations in individual EU countries may differ. In case of doubt, please contact the supplier of the device.

16 List of changes in the manual

Rev.	Release date	Description of changes
14	03.04.2023	Addition of markings used in the manual and on the device. Update of nameplate, CE declaration and equipment lists. Updating records regarding the intended use and disposal of the product. Removal of the RTC function.
15	16.06.2023	Updating of the description in the technical data table. Updating the CE declaration of conformity, equipment list and nameplate.
16	13.11.2023	Removal of the USB communication function.
17	09.01.2024	Updated equipment list and name plate.
18	06.12.2024	Updated chapters 1, 4, 5, 10 and 19. Restoration of Date/Time (RTC) function on selected units.

17 Manufacturer's info



„MPW MED. INSTRUMENTS” SPÓŁDZIELNIA PRACY

Boremlowska 46 Street

04-347 Warsaw

tel.(+48) 22 610 56 67 (sales department – POLAND)

(+48) 22 879 70 46 (sales department – outside POLAND)

(+48) 22 610 81 07 (service)

fax:(+48) 22 610 55 36

e-mail:mpw@mpw.pl

website:www.mpw.pl

000042924 - number of entry in the Waste Database

PL/CA01–01782 - identification number given by Office for Registration of Medicinal Products,
Medical Devices and Biocidal Products.

18 Distributor's info

DISTRIBUTOR:

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19 Annexes

A. Wyposażenie dodatkowe/Optional accessories				
MPW-150R				
WIRNIK / ROTOR				
PARAMETRY/PARAMETERS (RCF [x g], Rmax [mm], α [°])				
POJEMNIK/BUCKET				
WKŁADKA / ADAPTER				
[liczba probówek na wirnik/tubes per rotor] PROBÓWKA / TUBE				
11199				
	RPM 15000	RCF 16854	Rmax 67	α 45
bez pojemnika/without bucket				
bez wkładki/without adapter				
[12]	*	2-1,5 ml probówka (10,8x41,8 mm), Eppendorf®; [15011], 2 ml (10,8x41,8 mm); [15128], 1,5ml (10,8x40,5 mm)		
14084				
[12]	*	0,5 ml probówka PCR (7,8 x 31 mm) 0,5 ml PCR tube (7,8 x 31 mm)		
14126				
[12]	*	0,4 ml probówka PCR (5,7 x 48,6 mm) 0,4 ml PCR tube (5,7 x 48,6 mm)		
14133				
[12]	*	0,2 ml probówka PCR (6 x 21,6 mm) 0,2 ml PCR tube (6 x 21,6 mm)		
11461				
	RPM 15000	RCF 20879	Rmax 83	α 45
bez pojemnika/without bucket				
bez wkładki/without adapter				
[24]	*	2-1,5 ml probówka (10,8x41,8 mm), Eppendorf®; [15011], 2 ml (10,8x41,8 mm); [15128], 1,5ml (10,8x40,5 mm)		
14084				
[24]	*	0,5 ml probówka PCR (7,8 x 31 mm) 0,5 ml PCR tube (7,8 x 31 mm)		
14126				
[24]	*	0,4 ml probówka PCR (5,7 x 48,6 mm) 0,4 ml PCR tube (5,7 x 48,6 mm)		
14133				
[24]	*	0,2 ml probówka PCR (6 x 21,6 mm) 0,2 ml PCR tube (6 x 21,6 mm)		
11716				
	RPM 15000	RCF 17609	Rmax 70	α 45
bez pojemnika/without bucket				
bez wkładki/without adapter				
[4]	*	8 x 0,2 ml probówki szeregowo PCR-strip (10,2 x 72,4 mm) 8 x 0,2 ml PCR strip (10,2 x 72,4 mm)		
[32]	*	0,2 ml probówka PCR (6 x 21,6 mm) 0,2 ml PCR tube (6 x 21,6 mm)		
[4]	*	8 x 0,2 ml probówki szeregowo PCR strip (7,3 x 77,2 mm) 8 x 0,2 ml PCR strip (7,3 x 77,2 mm)		
[4]	*	4 x 0,2 ml probówki szeregowo PCR-strip (10,2 x 37,2 mm) 4 x 0,2 ml PCR strip (10,2 x 37,2 mm)		
11760				
	RPM 15000	RCF 21382	Rmax 85	α 45
bez pojemnika/without bucket				
bez wkładki/without adapter				
[24]	*	2-1,5 ml probówka (10,8x41,8 mm), Eppendorf®; [15011], 2 ml (10,8x41,8 mm); [15128], 1,5ml (10,8x40,5 mm)		
[24]	*	2 ml probówki z filtrem - spin columns (10,8 x 46 mm) 2 ml spin columns (with filter) (10,8 x 46 mm); [15011], 2 ml (10,8x41,8 mm); [15128], 1,5ml		
14084				
[24]	*	0,5 ml probówka PCR (7,8 x 31 mm) 0,5 ml PCR tube (7,8 x 31 mm)		
14126				
[24]	*	0,4 ml probówka PCR (5,7 x 48,6 mm) 0,4 ml PCR tube (5,7 x 48,6 mm)		

* probówka niedostępna w ofercie MPW lub dostępny odpowiednik (np.[15050]), patrz kolumna z prawej
tube is not offered by MPW or equivalent is available (e.g. [15050]), see column on the right

A. Wyposażenie dodatkowe/Optional accessories				
MPW-150R				
14133				
[24]	*	0,2 ml probówka PCR (6 x 21,6 mm) 0,2 ml PCR tube (6 x 21,6 mm)		
11943				
		RPM 15000	RCF 21382	Rmax 85 \neq 45
bez pojemnika/without bucket				
bez wkładki/without adapter				
[20]	*	1,6 ml probówka Cryo (12,3 x 46,5 mm) 1,6 ml Cryo tube (12,3 x 46,5 mm)		
[20]	*	1,8 ml probówka Cryo (12,3 x 46,5 mm) 1,8 ml Cryo tube (12,3 x 46,5 mm)		
11944				
		RPM 15000	RCF 21382	Rmax 85 \neq 45
bez pojemnika/without bucket				
bez wkładki/without adapter				
[6]	*	5 ml probówka z korkiem zakręcany (17 x 66 mm), Eppendorf® 5 ml tube with screw cap (17 x 66 mm), Eppendorf®		
[12]	*	5 ml probówka z korkiem wciskany (17 x 54,2 mm), Eppendorf® 5 ml tube with snap cap (17 x 54,2 mm), Eppendorf®		
11945				
		RPM 6000	RCF 3542	Rmax 88 \neq 30
13080				
14082				
[8]	*	BD Vacutainer® (13 x 100 mm), (4-7 ml)		
[8]	*	Greiner Vacuette® (13 x 100 mm), (3,5-6 ml)		
[8]	*	Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)		
[8]	*	7 ml probówka szklana (12 x 100 mm) 7 ml glass tube (12 x 100 mm) RCF max.=3000 RPM max.=5522		
bez wkładki/without adapter				
[8]	15046	14 ml probówka z pokrywką (16,8 x 113,7 mm), Sarstedt® 14 ml tube with cap (16,8 x 113,7 mm), Sarstedt®		
[8]	15053	10 ml probówka z pokrywką (16 x 106 mm) 10 ml tube with cap (16 x 106 mm)		
[8]	*	BD Vacutainer® (16 x 100 mm), (2,5-11 ml)		
[8]	*	Greiner Vacuette® (16 x 100 mm), (7-9 ml)		
[8]	*	Sarstedt S-Monovette® (15 x 92 mm), (7,5; 8,2; 8,5 ml)		
[8]	*	Sarstedt S-Monovette® (16 x 92 mm), (9; 10 ml)		
[8]	*	15 ml probówka z dnem stożkowym z zakrętką (17 x 120 mm), Falcon®; [15050], 15ml (17 x 120 mm) 15 ml tube, conical bottom, with cap (17 x 120 mm), Falcon®; [15050] 15ml Sarstedt®(17 x 120		
[8]	*	15 ml Thermo Nalgene® (16 x 113 mm) 15 ml Thermo Nalgene® (16 x 113 mm)		
[8]	*	10 ml probówka szklana (16 x 100 mm) 10 ml glass tube (16 x 100 mm) RCF max.=3000 RPM max.=5522		
14082+14815				
[8]	*	BD Vacutainer® (13 x 75 mm), (1,6-5,3 ml)		
[8]	*	Greiner Vacuette® (13 x 75 mm), (1-4,5 ml)		
[8]	*	Sarstedt S-Monovette® (11 x 66 mm), (1,6; 2; 2,7; 3; 3,1 ml)		
[8]	*	Sarstedt S-Monovette® (13 x 65 mm), (2,6; 2,9; 3,4; 3,8 ml)		
[8]	*	Sarstedt S-Monovette® (13 x 75 mm), (2,7; 3; 4,3 ml)		
[8]	*	5 ml probówka szklana (12 x 75 mm) 5 ml glass tube (12 x 75 mm) RCF max.=3000 RPM max.=5522		
14815				
[8]	15121	10 ml probówka z dnem okrągłym i pokrywka (17 x 70 mm) 10 ml tube, round bottom, with cap (17 x 70 mm)		
[8]	*	Sarstedt S-Monovette® (15 x 75 mm), (4; 4,3; 5,5 ml)		
[8]	*	10 ml Thermo Nalgene® Oak Ridge (16 x 81,5 mm)		
12300				
		RPM 13000	RCF 16816	Rmax 89 \neq 90
bez pojemnika/without bucket				
bez wkładki/without adapter				
[24]	*	37 µl kapilara hematokrytowa (1,4 x 75 mm) 37 µl micro-hematocrit capillary tube (1,4 x 75 mm)		
16164				

* probówka niedostępna w ofercie MPW lub dostępny odpowiednik (np.[15050]), patrz kolumna z prawej
tube is not offered by MPW or equivalent is available (e.g. [15050]), see column on the right

A. Wyposażenie dodatkowe/Optional accessories		
MPW-150R		
bez wkładki/without adapter		
[24]	*	37 µl kapilara hematokrytowa (1,4 x 75 mm)
		37 µl micro-hematocrit capillary tube (1,4 x 75 mm)
Suma końcowa		

EU DECLARATION OF CONFORMITY

This EU declaration of conformity is issued under the sole responsibility of the manufacturer.

Manufacturer: "MPW MED. INSTRUMENTS" SPÓŁDZIELNIA PRACY
46 Boremlowska Street, 04-347 Warsaw, Poland

The Quality Management System complies with the standards: PN-EN ISO 9001:2015, PN-EN ISO 13485:2016

SRN: PL-MF-000032831

Device name: Refrigerated laboratory centrifuge MPW-150R
(with the accessory indicated in the operating instructions provided with the centrifuge)

BASIC UDI-DI: 590538636-IVD-CEN-017-6L

Catalogue numbers: 10150R/2-5 10150R/1-6 10150R/1-6/100
10150R/1-6/110 10150R/1-6/127

The aforementioned device is in conformity with the following EU regulations and directives:

2017/746 (IVDR) REGULATION (EU) 2017/746 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 April 2017 on in vitro diagnostic medical devices and repealing Directive 98/79/EC and Commission Decision 2010/227/EU, including the changes published prior to the date of this declaration.

2011/65/EU (RoHS 2) DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, including the changes published prior to the date of this declaration.

Intended purpose: The device is intended for the separation of the mixtures of the liquid substances derived from the human body, including blood, urine, and other body fluids, and for the preparation of the samples intended for further in vitro diagnostics procedures.

Risk class: Class A
(in accordance with the rule 5 of Annex VIII of Regulation (EU) 2017/746).

The conformity assessment of the device and accessory has been carried out in accordance with Article 48(10) of Regulation (EU) 2017/746.

Wojciech Anisiewicz
Vice-President of the Management Board

Łukasz Szański
President of the Management Board

Warsaw, 23 January 2023

no. 10.150R.16o.en

DECLARATION OF DECONTAMINATION (repair)

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

If it is impossible to completely and effectively decontaminate the device, it should be treated in accordance with the regulations for medical waste.

1. Device:

– type:
– serial No.:

2. Description of decontamination

(see user manual)

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

3. Decontamination carried out by:

name:

4. Date and signature:

.....

DECLARATION OF DECONTAMINATION

(return)

In order to protect our employees please fill out the declaration of decontamination completely before sending centrifuge to the manufacturer (return).

If it is impossible to completely and effectively decontaminate the device, it should be treated in accordance with the regulations for medical waste.

1. Device:

– type:
– serial No.:

2. Description of decontamination

(see user manual)

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

3. Decontamination carried out by:

name:

4. Date and signature:

.....

NOMOGRAM

