Powering the microelectronics of tomorrow

USER MANUAL

XTPL® Cartridge Loading Equipment

Version 1.0

Powered by

MPW® MED. INSTRUMENTS

Date: 20.03.2025

xtpl.com

doc. no 20.055XTPL.EN

Read before use!

Serial number of centrifuges: ……..

For centrifuges with serial no (SN): **10055093624** – …

CE RUO

This manual was prepared with special care. MPW MED. INSTRUMENTS may change the manual at any time and without notice because of improvements, typographical errors, or improvements to facilities

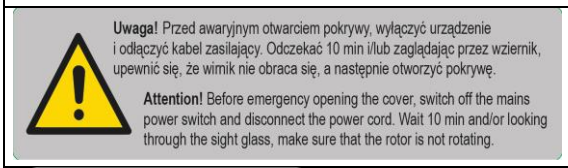
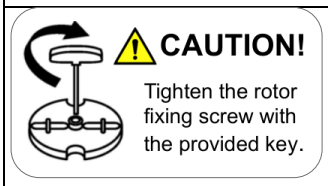
You can find the current version of the user manual on our website under:

www.mpw.pl DOWNLOAD section (one should choose demanded language version of website).

1. Symbols used in the manual and on the device

Symbol	Explanation
	WARNING! Warning of potential injury or health risk
	WARNING! Risk of crushing injury
	DANGER! Risk of electric shock with potential for severe injury or death as a consequence
	DANGER! Biohazard with potential for risk to health or death as a consequence
	DANGER! Risk of explosion with potential for severe injury or death as a consequence
	Symbol identifying a device for research use only. Not for use in diagnostic procedures.
	CE mark
	Symbol informing about the method of disposal
	Please read the instruction manual before you start working with the device
	Manufacturer's data

1.1. Markings on the device

Symbol	*Explanation*	*Location*
	Information about the direction of rotation of the rotor	Under the centrifuge lid
	Information about the place of danger	On the side of the centrifuge next to the emergency opening of the lid
	Information reminding about the proper tightening of the rotor screw	Under the centrifuge lid

2. Application

- The XTPL CARTRIDGE LOADING EQUIPMENT is a tabletop, non-automatic laboratory centrifuge.
- 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 analysis 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 data

manufacturer	"MPW MED. INSTRUMENTS" SPÓŁDZIELNIA PRACY 46 Boremlowska Street, 04-347 Warsaw – Poland
type	**XTPL CARTRIDGE LOADING EQUIPMENT**
cat. no (REF)	10055XTPL/12-56
mains voltage (L1+N+PE)	100V -5% / 230V +10%
frequency	50/60 Hz
maximum power consumption	30 W
overcurrent protection	fuse WTA-T 3,15A 250V
capacity (max.)	2 x XTPL Cartridge
rotational speed range	2500 rpm
maximum acceleration – RCF	300 x g
kinetic energy (max.)	40 J
time range	00:15 ÷ 99:59 [min.:sec.]
electromagnetic compatibility	according to EN 61326-2-6:2006
degree of protection (according to PN-EN 60034-5:2021-01)	IP 20
protection zone	300 mm
dimensions: height (H) width (W) depth (D)	 180 mm 220 mm 270 mm
noise level	≤ 56 dBA
weight of centrifuge	approx. 5kg

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. The contents of the package

name	pcs	catalogue number
XTPL CARTRIDGE LOADING EQUIPMENT	1	10055XTPL/12-56
Rotor	1	11146
Rotor fixing screw	1	17167
Rotor key	1	17099T
Spanner for emergency opening of the cover	1	17162
Power cord	1	17866
Fuses WTA-T 3,15 A 250 V	2	18676
Technical vaseline 20ml	1	17201
User manual	1	See page 1

4.2. Location selection

WARNING! Risk of damage to the device.

- 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.

4.3. Preparation for installation

WARNING! Risk of injury or damage to the device.

- 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).
- Lift the device from below, near its feet.

WARNING! Risk of electric shock or fire.

- 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 the power cord included with the centrifuge can be used.
- Before turning on the device, make sure it is properly connected to the power source.

Step 1. Open the package.

Step 2. Remove the centrifuge from the box and remove the foil (keep the packaging and packing material for service shipment).

Step 3. Place the device on a suitable laboratory table.

4.4. Centrifuge installation

Step 1. Check whether the mains voltage and frequency meet the requirements given on the nameplate of the device.

Step 2. Connect the power cord to the centrifuge power socket (on the rear wall of the centrifuge) and to the power source.

4.5. Starting the centrifuge

Step 3. Wait at least 4 hours for the unit to reach ambient temperature to avoid damage to electronic components due to condensation.

Step 4. Turn on the centrifuge power using the mains switch located on the side wall of the device.

Step 5. Open the cover according to the section ***Opening and closing the cover***.

Step 6. Install the rotor according to the section ***Placing the rotor and accessories in the centrifuge.***

Step 7. Set centrifugation parameters according to the sections ***Centrifuging.***

4.6. Opening and closing the cover

ATTENTION !

- 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.

WARNING! Risk of injury.

- Do not put your hands between the cover and the housing when closing the centrifuge cover.

Step 8. Press the **COVER** button 

to open the cover.

Step 9. To close the lid, press it down with both hands until the lock engages.

4.7. Current protection

The centrifuge is equipped with thermal current protection. Fuse is situated in the plug-in socket unit at back wall of the centrifuge.

5. Safety notes

5.1. General remarks

- The centrifuge may be operated only by qualified 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.

5.2. Placing the rotor and accessories in the centrifuge

- 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 according to recommendations in section ***Filling the cartridges into the rotor***.
- In order to replace the rotor, first remove the **cartridge** from it, unscrew the screw fixing 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.

6. Cartridge loading procedure

6.1. Cartridge description

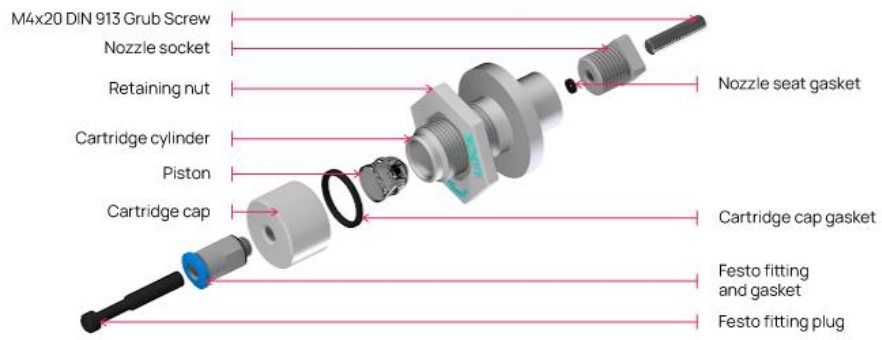


Fig. 1. Cartridge components

- Cartridge:
    - M4 bolt
    - Nozzle socket
    - Nozzle socket gaskets
    - Cartridge cylinder
    - Retaining nut
    - NORDSON EFD OPTIMUM single use piston
    - Cartridge cap
    - Cartridge cap gasket
    - FESTO fitting
    - FESTO fitting gasket
    - FESTO fitting plug

6.2. Necessary items

- Spaner for cartridge cap and cartridge cylinder
- 1 ml syringe
- Syringe plug
- Parafilm

- Compressed gas for cleaning (dusting) with ancillaries enabling safe use:
    - Air (ISO 8573 -1 1.4.1) or
    - Nitrogen tank .
- XTPL Cartridge Loading Equipment
- Base for cartridge filling
- M2.5x30 bolt
- 25 ml beaker
- Tweezers for reaching in small crevices
- Counterbalance:
    - M4 bolt
    - Nozzle socket
    - Nozzle socket gaskets
    - Cartridge cylinder
- Isopropyl alcohol p.a.
- Personal Protective Equipment:
    - Safety glasses;
    - Gloves:
        - EN 374 cartridge filling and cleaning,
    - Laboratory apron;
    - Laboratory footwear.

6.3. Cartridge filling

6.3.1. CARTRIDGE LOADING

To refill the cartridge with CL85 paste, follow the steps below:

Step 1. Wear personal protective equipment according to chapter 6.1 and facility regulations.

Step 2. Make sure all the tools according to point 6.1 and 6.2 are available.

Step 3. Prepare a syringe with CL85 paste and empty, clean cartridge.

Step 4. Perform a visual inspection of the cartridge. Check if there are visible mechanical damages/imperfections (e.g. scratches) on the cartridge cylinder. If the cartridge is damaged, replace it before proceeding.

Step 5. Ensure that the user is familiar with chapters 3- 7 of the instruction. If an abnormality is detected, refrain from scooping the cartridge with paste and immediately inform your supervisor of the situation.

Step 6. Ensure that the compressed gas cylinder status is according to the facility regulations. If an abnormality is detected, refrain from filling the cartridge with paste and immediately inform your supervisor of the situation.

Step 7. Enable the flow of the compressed gas.

Step 8. Clean the cartridge according to the cleaning procedure as described in chapter 9.3. If the cartridge is already clean, dust the cartridge cylinder entrance hole with compressed gas.

Step 9. On the side of the exit hole of the cartridge cylinder install following items:

- nozzle seat gasket,
- nozzle seat,
- M4 screw.

If the cartridge has the above components, make sure that the nozzle seat gasket (Fig.2) has been correctly installed in the cartridge cylinder exit hole. This should be done by unscrewing the nozzle seat together with the M4 screw, and then reassembling the mentioned components.

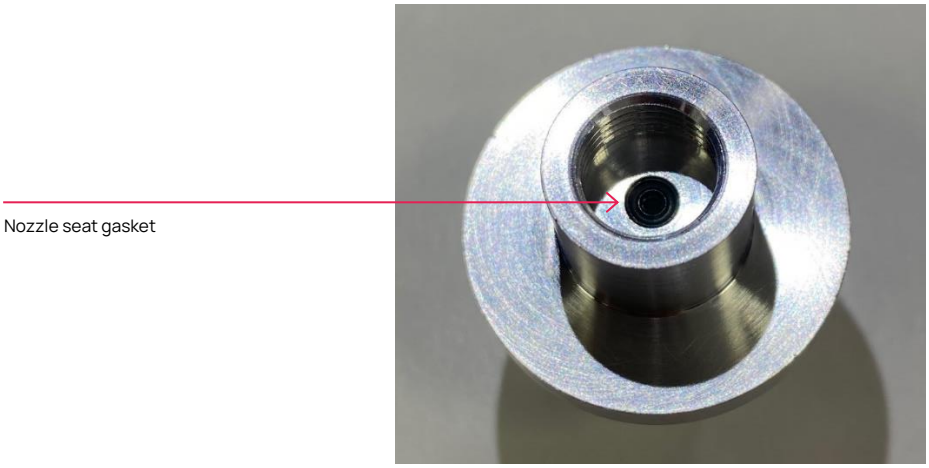


Fig. 2. Correctly installed nozzle seat gasket

Fig. 3. Nozzle seat assembly with the help of the wrench.

Step 10. Place the cartridge in the holder plate with the opening for piston facing up.

Step 11. Transfer the CL85 from the bulk syringe to the 1ml syringe.

Step 12. From the 1 ml syringe, squeeze a very small amount of paste, about 0.02 ml of formulation, onto a piece of paper/glass. In order to remove possible contaminations and prime the paste into the outlet

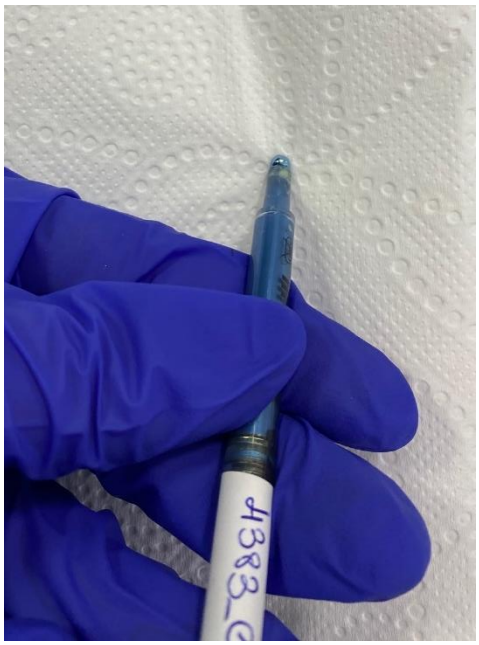


Fig. 4. Squeezing minimal amount of paste out of the syringe.

Step 13. Place the syringe with the formulation in the entrance hole of the cartridge cylinder (Fig.5).

Step 14. Holding the syringe slightly above the base of the cartridge and without touching the walls of the cylinder, slowly press the syringe plunger.

NOTE: During this operation, hold the syringe in one place. Do not lift the syringe while squeezing out the paste, this risks contaminating the walls of the cylinder.

Fig. 5. Filling of the cartridge from the syringe

Step 15. After squeezing the entire volume of CL85 paste from the syringe into the cylinder, gently and slowly remove the syringe from the cylinder.

NOTE: During this operation, be careful not to dirty the cylinder walls.

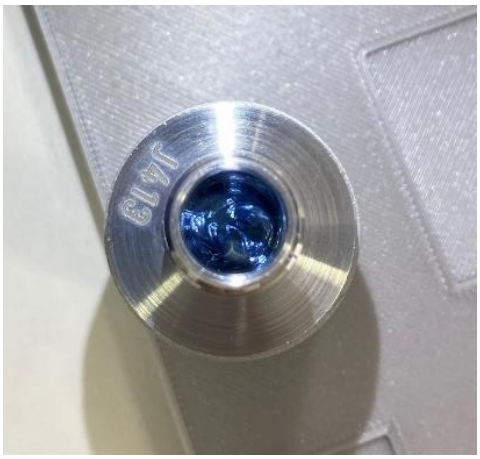


Fig. 6. Cartridge filled with paste prior to centrifuging, with clean cylinder walls.

Step 16. Place the filled cartridge cylinder in the centrifuge, following the chapter 6.4.

Step 17. Set the following parameters on the centrifuge: 2000 RPM, 10 minutes, following the chapter 8.

Step 18. Start the spin cycle by pressing the START button, following the chapter 8.

Step 19. When the centrifuge completes the work cycle, open the centrifuge lid.

Step 20. Remove the centrifuged cartridge from the centrifuge.

Step 21. Place the centrifuged cartridge in the holder located on the cartridge board, in such a way that the cartridge cylinder's input hole faces up and the output hole faces down (Fig.7).

Fig. 7. The entrance hole of the cartridge cylinder with centrifuged paste.

Step 22. Pour about 5 ml of isopropyl alcohol into a 25 ml beaker.

Step 23. In the hole of the piston gently screw in the M2.5x30 screw.

CAUTION: Be careful not to puncture the piston when inserting the screw. When the piston is punctured, you should:

a. Dispose of the punctured piston in the waste garbage can specifically designated for this purpose,
b. Prepare a new piston,
c. Repeat the steps from step 24.

NOTE: When performing steps 23 – 26 keep the piston in one hand- the piston can be contaminated when put aside.

Step 24. Clean the piston with isopropyl alcohol.

Step 25. Dry the piston with compressed gas.

Step 26. Insert the piston scooped onto an M2.5x 30 bolt into the entry hole of the cartridge cylinder, (Fig.8).

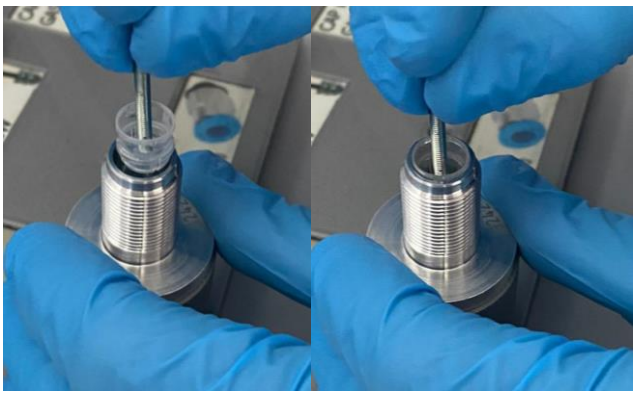


Fig. 8. The method of inserting the piston impaled on the M2.5x30 screw into the input hole of the cartridge cylinder.

Step 27. Pressing on the M2.5x30 screw, push the piston into the center of the cartridge cylinder entry hole until you notice the paste is completely adhered to the front of the piston (Fig.9).

Fig. 9. Correct insertion of the piston into the entry hole of the cartridge cylinder. Complete adhesion of the paste to the front of the piston is observed.

Step 28. In a circular motion, unscrew the M2.5x30 screw located in the piston hole.

NOTE: When removing the screw, be very precise so as not to change the position of the piston attached to the cartridge cylinder.

Step 29. Apply the retaining nut to the cartridge. Screw the retaining ring onto the cartridge cylinder so that the word "LOCK" is facing up.

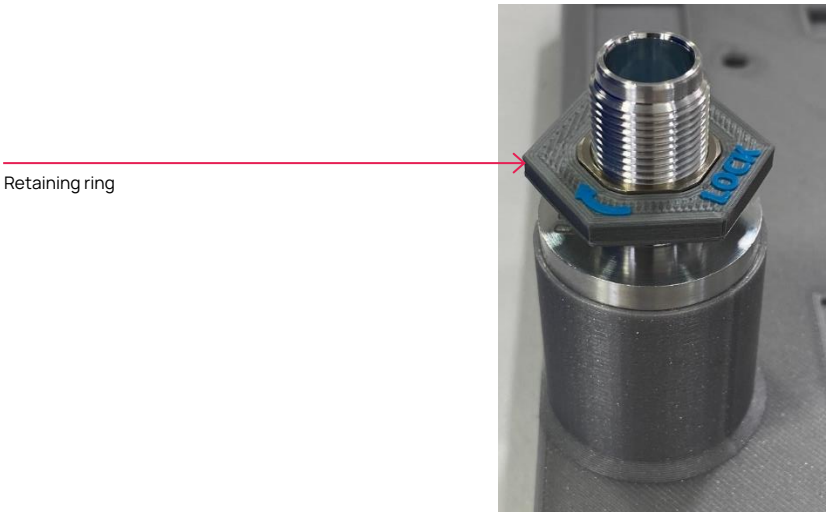


Fig. 10. Retaining ring installed.

Step 30. Ensure that the cartridge cap gasket is present in the cartridge cap hole.

NOTE: Make sure that the gasket is seated perfectly in the groove of the nut (Fig.12). If the gasket is not perfectly seated in the groove of the nut, correct the position with tweezers.

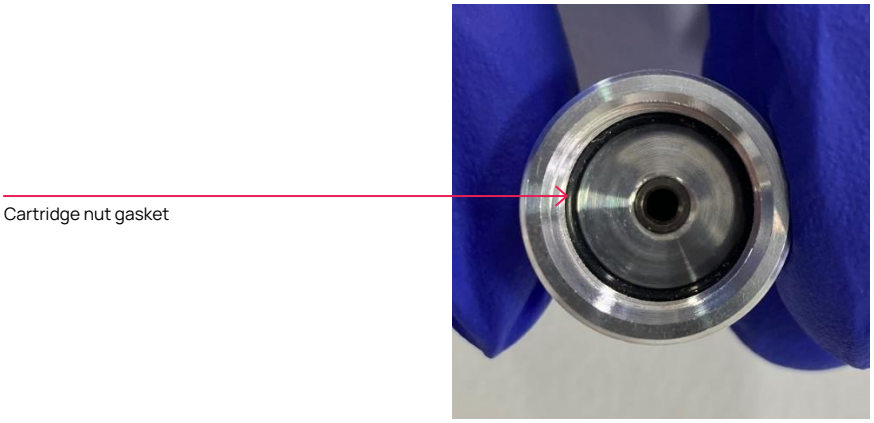


Fig. 11.Correctly installed cartridge nut gasket in the cartridge nut groove.

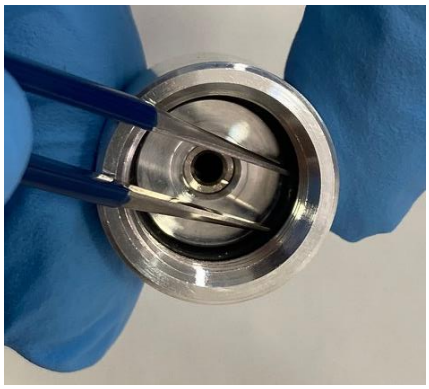


Fig. 12. Seating an incorrectly placed gasket with tweezers.

Step 31. Ensure that the FESTO fitting includes the FESTO fitting gasket.

NOTE: Ensure that the gasket is placed as shown in Fig. 13.

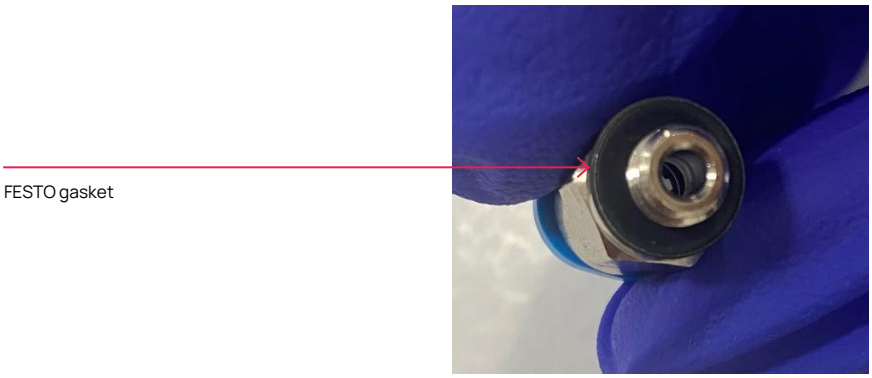


Fig. 13. Correctly installed gasket for FESTO connector.

Step 32. Install the plug into the FESTO fitting. Push the FESTO fitting plug into the FESTO fitting receptacle (Fig.14) as far as it will go, as indicated by the arrow (Fig.15).

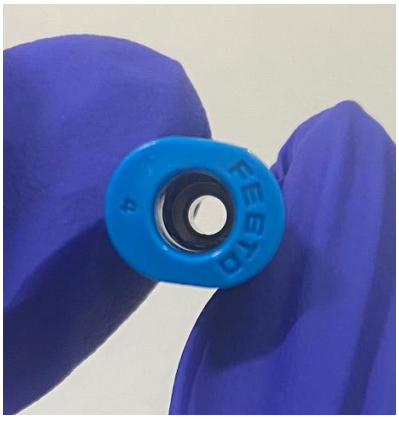


Fig. 14. FESTO connector entry hole marking.

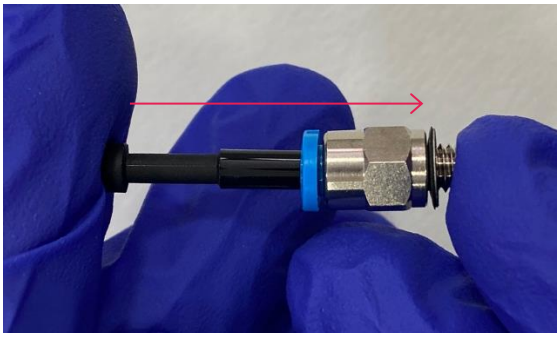


Fig. 15. Installation of the FESTO connector plug into the input hole of the FESTO connector with the direction of the push.

Step 33. FESTO fitting with the gasket and plug installed, screw into the cartridge nut.

Step 34. Install the cartridge nut with the cartridge nut gasket and FESTO fitting on the cartridge cylinder entry hole, and then tighten, for this purpose:

a. Prepare the wrenches to tighten the cartridge nut (Fig.16),

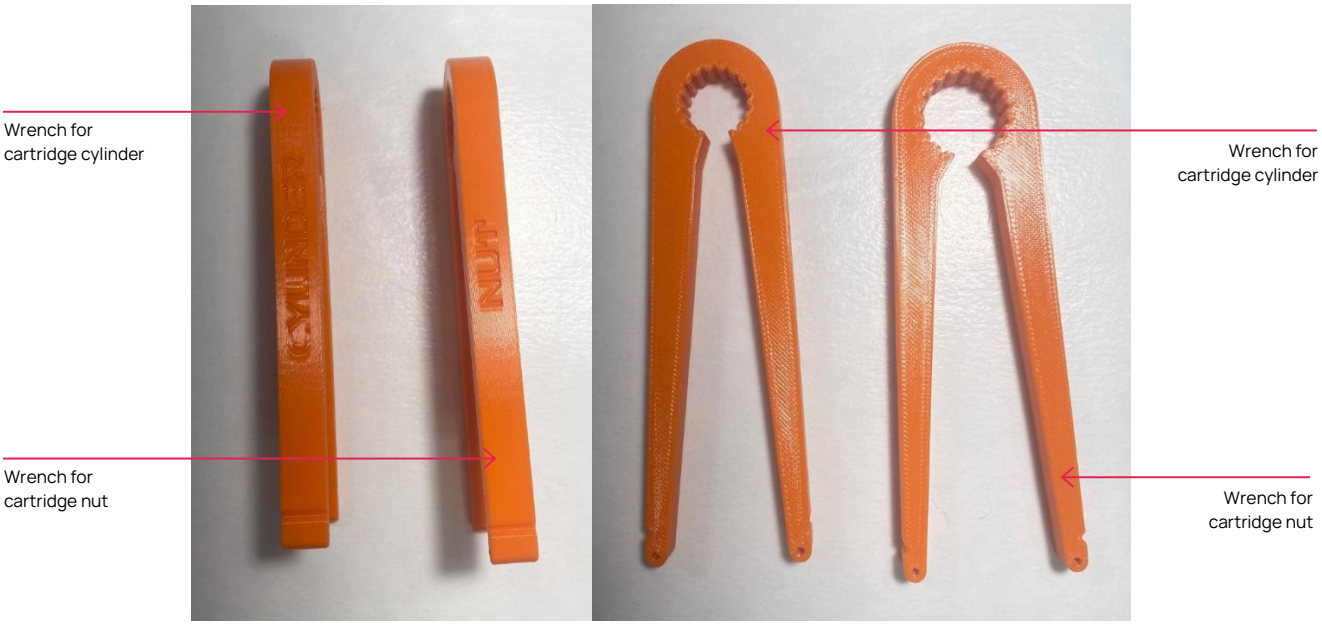


Fig. 16. Wrenches for tightening the cartridge nut: for cartridge cylinder and for cartridge nut.

b. Put wrench marked 'cylinder' on the cartridge cylinder according to Fig.17,

c. Put the cartridge nut on the cartridge cylinder entry hole, and then screw on,

d. Install wrench marked 'nut' on the cartridge nut according to Fig.17,

Fig. 17. Putting the B wrench on the cartridge nut.

e. Squeeze the 'cylinder' wrench and try to hold steady in one position,

f. Squeeze the 'nut' wrench firmly and make rotary movements until the key begins to turn in one place,

g. Remove both key.

Step 35. Use provided gauge to check if the cartridge has been tightened.

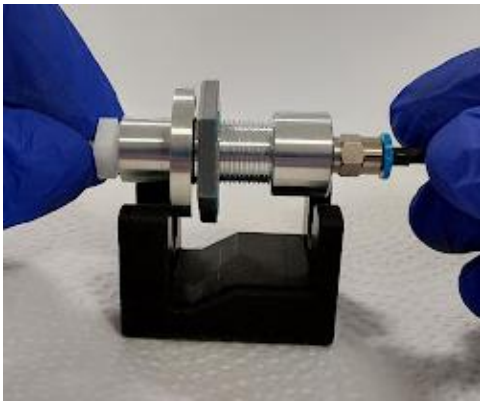


Fig. 18. Inserting the cartridge into the gauge. Notice correct orientation.

Fig. 19. Correctly tightened cartridge

Fig. 20. Incorrectly tightened cartridge will not ft into the gauge.

Step 36. Prepare a zipper bag into which the prepared cartridge will fit.

Step 37. When storing the cartridge, make sure following information are kept with the cartridge as a good practice:

- Cartridge number (found on the cylinder of the cartridge, begins with the letter J [e.g., J242]),
- The date on which the cartridge was filled with the CL85 formulation,
- Formulation number,
- Number of fillings of the cartridge – the cartridge should be used up to 10 times before discarding.

Step 38. Place the prepared cartridge in a zipper pouch.

Step 39. The cartridge is ready to be used Store in the refrigerator at 4-5 ℃.

Step 40. After finishing the procedure of cartridge filling with CL85 formulation, clean up the workstation:

- Dispose of the syringe of CL85 paste in the designated bin in accordance to the facility guidelines,
- Dispose of used gloves, paper towels in the designated bin in accordance to the facility guidelines,
- Pour the isopropyl alcohol residue into the designated container in accordance to the facility guidelines,
- Dispose of any leftover piston grease oil in the designated bin in accordance to the facility guidelines.

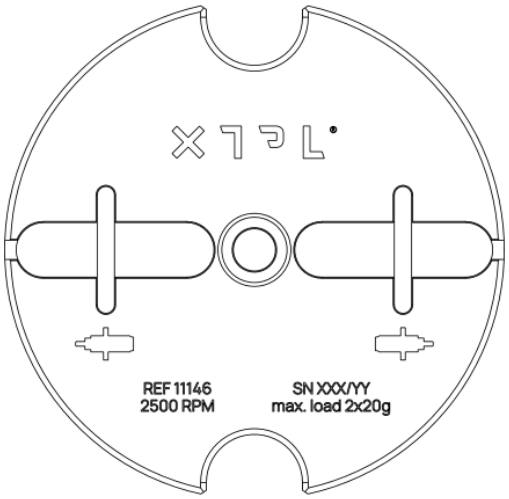
Step 41. Cap the compressed gas cylinder.

6.4. Filling cartridges into the rotor

- Fill cartridge outside the centrifuge as per chapter 6.3.
- If you need to spin 1 cartridge, place the counterweight in the second rotor slot.

- Filling the cartridges into rotor

- 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).
- An example of the marking on the rotor:



- max. load 2x20g - means that 2 cartridges with a total weight of 20 g each can be placed in the rotor.
- To ensure symmetrical loading, insert cartridges of the same type and weight in pairs into opposite openings of the rotor.

Fig. 21. Cartridge and counterweight (or second cartridge) correctly placed.

6.5. Safety hints

	**ROTOR MAINTENANCE** • In order to increase the durability of gaskets, threaded places, they must be cleaned, and then it is necessary to lubricate them with the technical petroleum jelly supplied with the device. • Use only accessories that are in good technical condition.
	**HAZARDOUS MATERIALS** • It is not allowed to centrifuge toxic or infectious materials if the cartridge seal is damaged. • Appropriate disinfection procedures should always be carried out, if hazardous substances have contaminated the centrifuge or its accessories.
	**EXPLOSIVE, FLAMMABLE MATERIALS** • 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.

6.6. Operating conditions

	**GENERAL REMARKS** • Only original equipment of centrifuges and spare parts should be used. • In case of a malfunction of the centrifuge, the XTPL Customer Care should be contacted 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 with 2 cartridges of the same weight in order to prevent unbalance of the centrifuge (point ***Filling the cartridges into the rotor***).
	**START-UP** • 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.

6.7. Equipment life

	• The equipment must not be used after the maximum period of use, which is 10 years, has elapsed.

6.8. Work safety

The centrifuge should be inspected by an authorized service at least once a year (after the warranty period). Special circumstances, e.g., corrosive environment, may be the reason for more frequent checks. Tests should end with issuing a validation protocol, which specifies checking the technical condition of a centrifuge.

It is recommended to create a document that records all repairs and inspections. This document should be kept in the place where the centrifuge is used.

	**CONTROLS CONDUCTED BY THE OPERATOR** The operator must pay attention to the fact that the parts of the centrifuge, important from the safety point of view, are not damaged. This remark applies to:

	• Centrifuge accessories, especially structural changes, corrosion, initial cracks, abrasion of metal parts. • Bolted connections. • 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.
	**OPENING THE COVER DURING SPINNING** • It is not allowed to use the emergency cover opening during centrifuging, because it may result in loss of health or life.

6.9. Unbalance

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 any key (STOP, COVER, and ▲ ▼) after stopping the rotor.

Make sure that the rotor has been properly loaded - places in the rotor must be equipped with identically filled containers, inserts and test tubes in order to obtain the best possible weight balance (see chapter Filling the cartridges into the rotor).

Then close the lid and restart the spin cycle.

	Unbalance causes noise, vibrations during operation and has a negative effect on the driveline (engine, shock absorbers). 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, an excellent level of separation of the swirl material is achieved, since the already separated components will not be picked up again by vibrations.

6.10. 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.

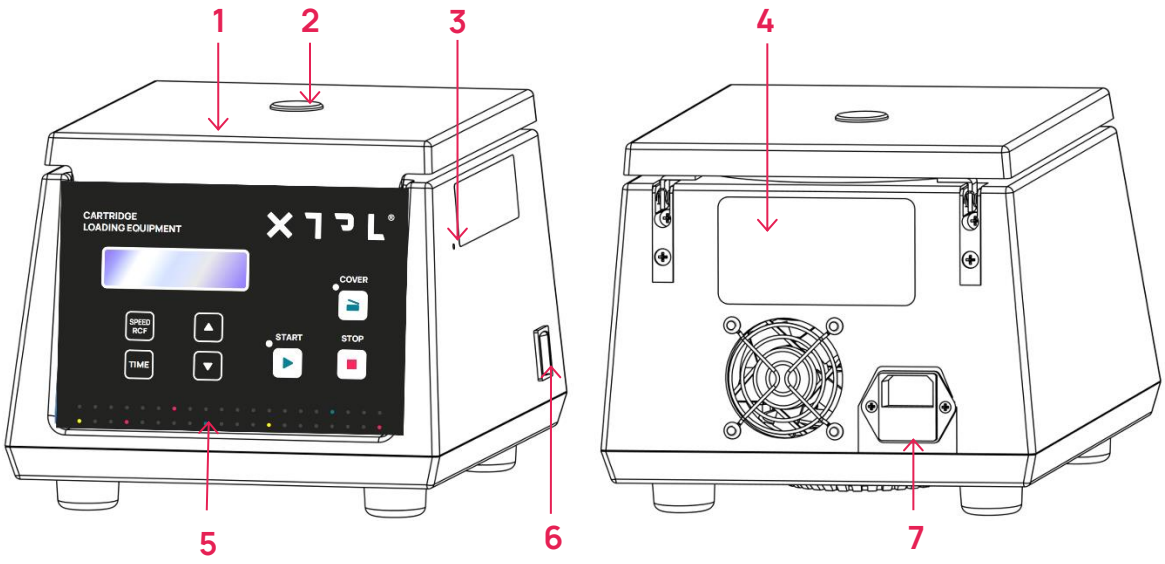
6.11. Obligation to report a serious device incident

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.

7. Product description

7.1. Product Design and Appearance

The XTPL cartridge loading equipment is equipped with modern microprocessor controllers, very durable and quiet brushless asynchronous motors and equipment that meets modern user requirements. The centrifuge has rigid self-supporting structure. Housing was made of ABS type plastic. Cover is locked with electromagnetic lock blocking possible opening during centrifugation. Rotation chamber casing was made of thick steel sheet. The rotation chamber bowl is made of plastic. Rotors are made of aluminum.

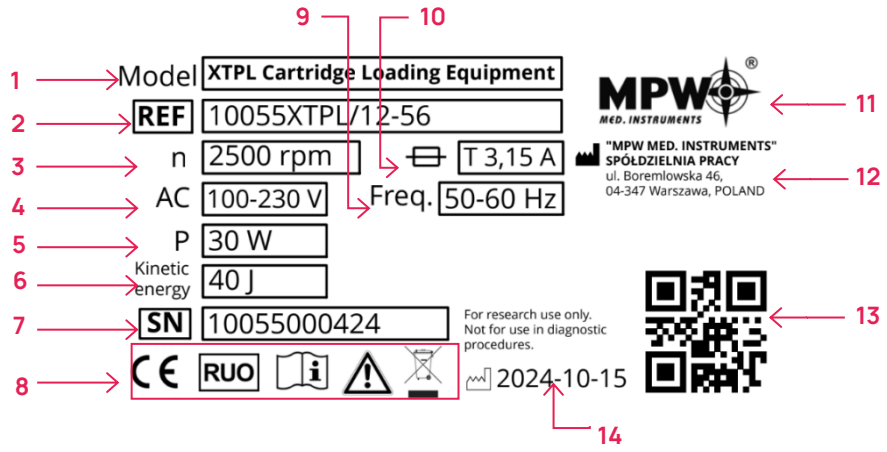


Front and rear view of the cartridge loading kit

1 Centrifuge lid
2 Inspection glass (to control the rest condition of the rotor)
3 Emergency cover release
4 Name plate
5 Control panel (display and control of the centrifuge operation)
6 Main's switch
7 Centrifuge power socket (with fuse socket)

7.2. Name plate

The data concerning the device should be read from the rating plate located on the rear wall of the centrifuge (the picture below is an example).



1	Centrifuge model	9	Rated frequency
2	Catalogue number	10	Current protection
3	Maximum speed	11	Manufacturer's logo
4	Rated voltage	12	Manufacturer's information
5	Maximum rated power	13	QR code for serial number
6	Kinetic energy	14	Date of production
7	Serial number		
8	Approval marks and symbols (explained in chapter 1)		

7.3. Control device

The microprocessor control system used in the centrifuge provides a wide range of setting and implementing operating parameters, i.e.:

- selection of the spin speed from 100 to 2500 RPM, every 100 RPM or RCF x g,
- selection of the centrifugation time from 15 seconds to 99 minutes 45 seconds.

7.4. Setting parameters

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

7.5. Safety features

7.5.1. COVER LOCK

The centrifuge can be started only with properly closed cover. The cover can only be opened after the rotor has stopped. In case of emergency opening of the cover during operation, the centrifuge will be immediately switched off and the rotor will be braked to a complete stop. When the cover is open (the **COVER** diode is on), the drive is completely disconnected from the power supply, which makes it impossible to start the centrifuge.

7.5.2. 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 **U** sign will be displayed.

7.5.3. REST STATE INSPECTION

Opening of the centrifuge's cover is possible only with the rotor in the state of rest. This state is being checked by the microprocessor which recognizes and signals with **S** sign on the display the rest state prior to opening the cover.

7.6. Increase a temperature

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

8. Centrifuging

The power is turned on or off using the mains power switch on the right side of the centrifuge. All centrifuge settings are made using the control panel. The panel contains control keys and a display.

8.1. Control panel

The control panel located on the front wall of the casing is used to control the operation of the centrifuge.

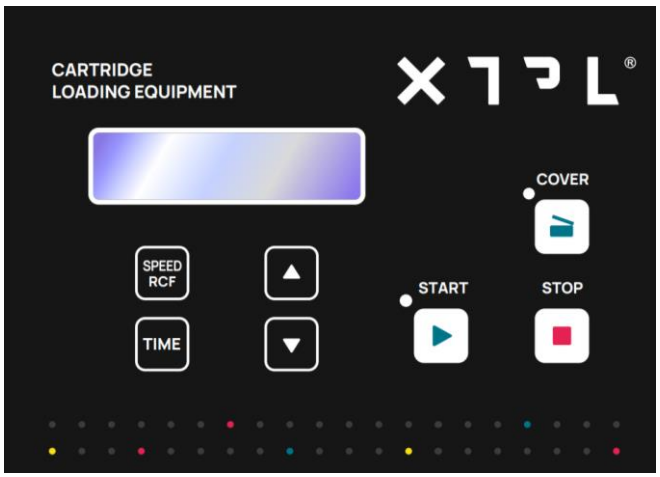


Fig. 22. Control panel

	Start centrifuging	Blinking of the LED diode next to the START key indicates the rotation of the rotor. The centrifuge can be started if: • the cover is closed (a dot will appear on the display, • the LED diode on the COVER key is off
	Stop centrifuging	Interrupt the centrifugation at any time and break the rotor. After pressing the key, the display shows the arrow ↓ indicating the rotor braking and the number of the performed braking characteristics. - end of the rotor braking process - the **S** (Stop) sign lights up on the display, which also signals this state with a sound
	Cover opening	Opening the cover or its incorrect closing is signaled by the diode lighting, the key is active only when the rotor is not rotating. The cover can be opened only when the rotor stops, the **S** symbol will be displayed on the display and the centrifuge signals the possibility of opening the cover with five short beeps. **ATTENTION!** The centrifuge cannot be opened when the = sign, signaling the possibility of changing the parameter value, is active, even despite the stopped rotor.

 	Increase / decrease values	• The function key fields are used to change the program as well as to set their individual parameters such as: **speed, RCF, time, acceleration and deceleration characteristics**. • After pressing the key corresponding to the called function, the equal sign "=" appears on the display instead of the colon ":" after the letter corresponding to the given function. It means that the value of a given parameter can be changed by buttons: down arrow or up arrow. • The possibility of changing the parameter value is signaled by the "=" sign and is active for three seconds. This is the time when you should start setting the desired value. Three seconds after setting the desired value of a given parameter, this value will be saved in the program or after selecting a given program it will be set as active.
	Spin speed / RCF	• change the spin speed • pressing the key again will switch the programming mode from setting speed to setting **RCF** value
	Spin time	• Programming the centrifugation time (from 15s to 99min 45s). • Setting the - -m - -s symbol over 99min 45s **will cause the continuous operation of the centrifuge.**

8.2. Sound signals

The sound signal complements the information provided optically.

- One short beep - confirmation of the executed command (e.g., increasing the parameter etc.)
- Two short beeps - signals that the command cannot be carried out (e.g., Increasing the spin speed above 2500).
- One long beep - signals the start of the following processes:
- Braking after pressing the STOP key,
- Starting work in short mode and braking after releasing the SHORT key,
- Five short beeps - the rotor stops, the cover can be opened,
- Five short beeps and one long beep - signaling readiness for operation after switching the power on.

8.3. Display

The centrifuge has readable display LCD, on which are showing information being referred to the actual condition of the system.

The information about the centrifuge type, program version and internet address are displaying at once after switching supply on for three seconds.

Fig. 23. LCD Display at startup.

The parameters used during the last spin will then be displayed.

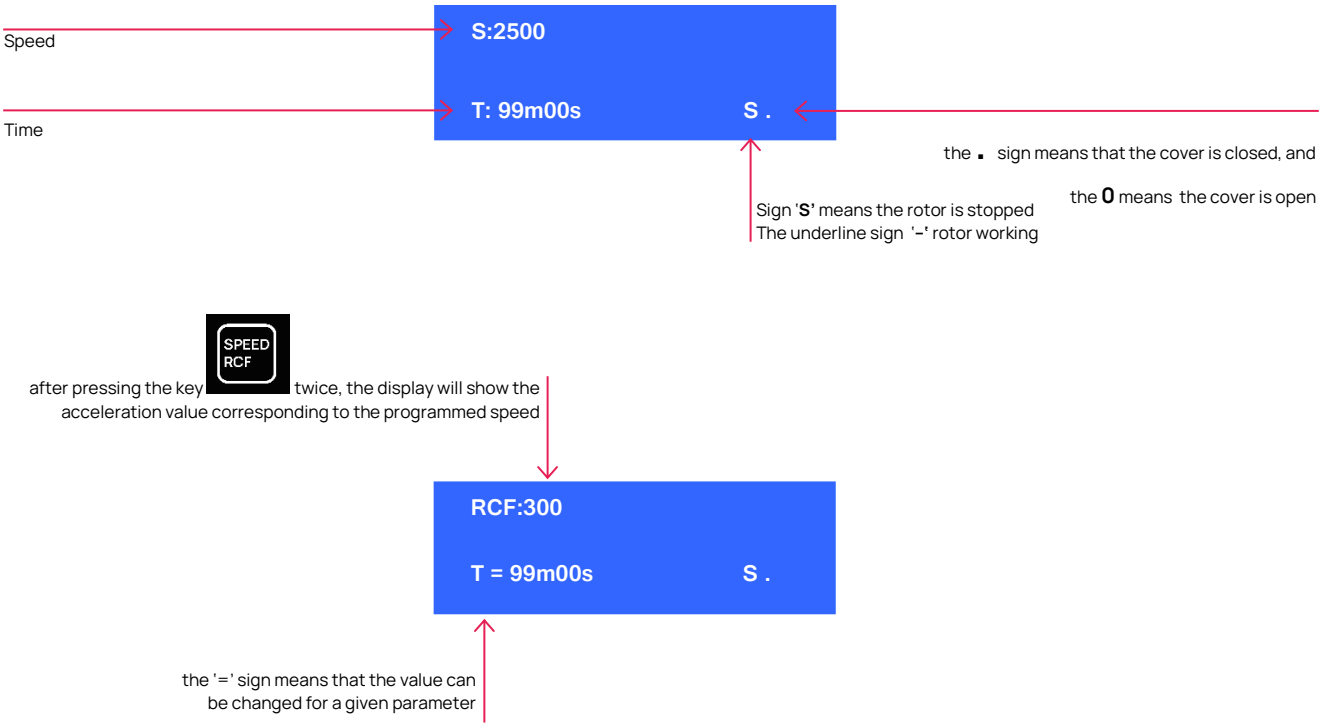


Fig. 24. LCD Display parameters indication.

The program parameters cannot be changed during the centrifuge operation, but its further implementation can be interrupted by pressing the **STOP** key.

8.4. Spin starts

After familiarizing yourself with the operating elements, programming and preparation of the centrifuge for operation, set the program, then close the cover and press the START key 

. The centrifuge starts and runs the programmed program

8.5. Spin stops

The centrifugation is stopped automatically after the execution of the program. If you want to terminate the execution of a given program earlier, you can do it by pressing the STOP key 

. After finishing work, remember to turn off the centrifuge power supply with the main switch located on the side of the centrifuge

8.6. Mathematical relations

8.6.1. RCF – RELATIVE CENTRIPETAL FORCE

RCF acceleration is the acceleration generated by the rotary motion of the rotor acting upon tested product and it can be calculated according to the formula:

$$RCF = 11{,}18 \times r \times (n/1000)^2$$

RCF [x g], r [cm], n [rpm]

Depending on the distance of particles of the tested product from the axis of rotation, one can establish with use of the above formula the minimum RCF, average RCF or maximum RCF. On the basis of pre-set RCF value and given radius of the bottom of the bucket one can calculate with it the rotational speed to be set in the program of centrifuging. Selection of the time of sedimentation and the RCF value shall be carried out experimentally for any given product.

Once every 100 rpm, an electronic circuit automatically calculates and displays RCF value. In order to program required RCF value one shall use nomogram or change the rotational speed, matching displayed value to required acceleration value.

8.6.2. NOMOGRAM OF RELATIONSHIP - ROTATIONAL SPEED/CENTRIFUGING RADIUS/RCF

The dependence nomogram – speed / radius / RCF is included in the appendix to this manual.

8.6.3. MAXIMUM LOAD

In order to avoid overloading of the rotor one shall observe maximum load which is recorded on every rotor. Maximum permissible load is reached when all test-tubes are filled with the fluid with 1.2 g/cm^3 density.

If density of the centrifuged liquid is higher than 1.2 g/cm^3, then test-tubes could be filled only partially or one shall limit operation speed of the centrifuge, which is being calculated from the formula:

n perm = n max * $\sqrt{\frac{1,2}{\gamma}}$; γ = specific gravity $\left[\frac{G}{cm^3}\right]$; n_{max} [maximum rotational speed - rpm]

9. Maintenance

9.1. Cleaning of the centrifuge

- **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 condition of the rotor fixing screw thread. If damaged, it must be replaced.
- Check the centrifuging chamber whether it is damaged. In case of damage, it cannot be longer put into operation. Notify authorized service workshop.

9.2. Maintenance of centrifuge elements

- In order to increase the durability of threaded places, they should be lubricated with technical petroleum jelly.

Cleaning of the equipment

- 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.

9.3. Cartridge cleaning

9.3.1. NECESSARY ITEMS

- Isopropanol,
- Acetone,
- Glass beaker 1000ml x2,
- Hypodermic needle 18 GA,
- Paper towels,
- Dust-free polyester-cellulose cleanroom wipers 10 x 10 cm (EAN: 5908272000955, WIP-0604),
- Ultrasonic cleaner – must be able to receive 1000ml beaker,
- Compressed gas tank with ancillaries enabling safe use.

9.3.2. WORKPLACE PREPARATION

Step 1. Dress up with a lab coat and wear gloves.

Step 2. Prepare two beakers and a needle.

Step 3. Lay out a paper towel on the table.

Step 4. Ensure that the compressed nitrogen cylinder status is according to the facility regulations. If an abnormality is detected, refrain from continuing the procedure and immediately inform your supervisor of the situation.

9.3.3. CLEANING PROCEDURE

Step 1. Unscrew the pressure inlet together with the plug from the cartridge nut. These two components will not be cleaned in an ultrasonic cleaner. If you see they are dirty from silver paste CL85, you can wipe them with a dust-free cloth dipped in isopropanol.

Step 2. Put a pressure inlet together with the plug in string bags.

Step 3. Unscrew the nut, plug screw, thread of the nozzle, and stabilizing ring so that the cartridge cylinder itself remains.

Step 4. The stabilizing ring will not be washed in the ultrasonic cleaner - if you notice that it is dirty from the CL85 silver paste, you can wipe it with a dust-free cloth dipped in isopropanol.

Step 5. Put the retaining nut in a string bag.

Step 6. Using a needle, remove the cap gasket from the cartridge cap by uplifting (Fig. 28).

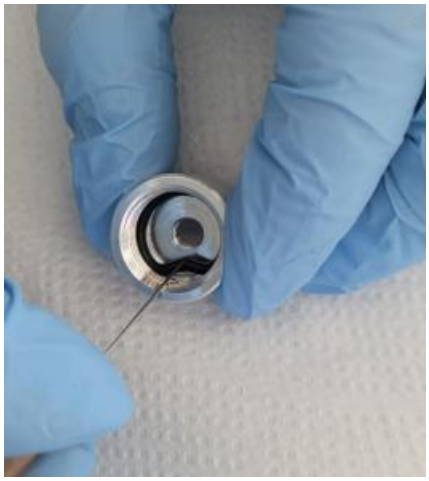


Fig. 25. Removal cap gasket by needle.

Step 7. Dispose of used gasket in a designated bin in accordance to the facility guidelines.

Step 8. Using a needle, remove the thread of the nozzle gasket from the cartridge cylinder (Fig. 29).

Before After

Fig. 26. Before and after removal of thread of the nozzle gasket.

Step 9. Dispose of used gasket in designated bin in accordance to the facility guidelines.

Step 10. Insert the needle into the cartridge from the exit hole of the cartridge cylinder and gently push out the piston (Fig. 30). If necessary, use tweezers to catch the piston.

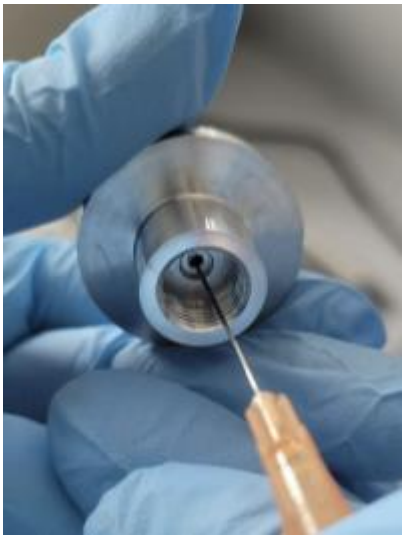


Fig. 27. Removal of piston by needle.

Step 11. Dispose of used pistons in designated bin in accordance to the facility guidelines.

Step 12. Perform a visual inspection of the cartridge. Check if there are visible mechanical damages/imperfections (e.g. scratches and fractures) on the cartridge cylinder. If the cartridge or a component is damaged, replace it before proceeding.

Step 13. Place the cartridge nut in one beaker and the plug screw and thread of the nozzle in the other. If the thread of the nozzle is clean - no traces of silver paste CL85 can be seen on it, you can put it in the beaker in which the nut is located.

Step 14. Using a paper towel, remove as much of the CL85 silver paste from the cartridge cylinder as possible.

Step 15. Insert the cartridge cylinder into the beaker containing the thread of the nozzle and the plug screw.

5 cartridges can be cleaned simultaneously in one beaker with all dedicated components.

Step 16. Pour isopropanol into both beakers to such a level that all the components of the cartridges are below the surface of the isopropanol.

Step 17. Place the beaker in the ultrasonic cleaner - the water level in the ultrasonic cleaner must be higher than the isopropanol level in the beaker.

Step 18. Switch on the ultrasonic cleaner by setting the time for 15 minutes.

Step 19. Repeat steps 16 and 17 for the second beaker.

Step 20. After cleaning, remove the cartridge components and lay them on a paper towel.

Step 21. Pour used isopropanol into the designated container in accordance to the facility guidelines

Step 22. Clean the beakers thoroughly.

Step 23. Repeat steps 13-21 until the isopropanol in the beaker is clear after washing in the ultrasound cleaner.

Step 24. If the isopropanol in the beaker is clear, remove the cartridge components from the isopropanol one at a time and thoroughly dry them using compressed nitrogen.

Step 25. Place the dried cartridge components in string bags.

Step 26. Pour used isopropanol into designated bin in accordance to the facility guidelines.

Step 27. Wash beakers thoroughly with soap and water. Then rinse with acetone.

Step 28. Clean up your work area. Dispose of used paper towels and needles in designated bin in accordance to the facility guidelines.

9.4. Sterilization

Plastics - legend to abbreviations

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

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	C2H4O (ethylene oxide)	formalin, ethanol
PS	●	○	●
SAN	○	●	●
PMMA	●	○	●
PC	●	●	●
PVC	○	●	●
POM	●	●	●
PE-LD	●	●	●
PE-HD	●	●	●
PP	●	●	●
PMP	●	●	●
ECTFE, ETFE	○	●	●

PTFE	○	●	●
FEP, PFA	○	●	●
FKM	○	●	●
EPDM	○	●	●
NR	○	●	●
SI	○	●	●

●	may be used
○	cannot be used

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

9.4.1. AUTOCLAVING

- Rotors can be sterilized in autoclave with temperature 121°C during 20 min (215 kPa).
- During sterilization (autoclaved) by means of steam one should consider temperature resistance of individual materials.
- 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

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

9.5. Chemical resistance

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

FKM	●	○	○	○	○	○	●	○/●	○/●	○/●	○/●	○/●
EPDM	●	●	○/●	○	○/●	●	●	○/●	○	○	○	●
NR	○/●	●	○/●	○	○	○	○/●	○	○	○	○	●
SI	○/●	●	○/●	○	○	○	○/●	○	○	○	○	○/●

●	very good	Permanent action of the substance does not cause damage 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!

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.

10. Troubleshooting

10.1. Correction of errors

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 the case of short-duration power failure the rotor is decelerate.

Please find below the most frequent faults and their repair methods.

1. Lack of the display:	**Remedies:**
Is mains socket live ?	Check mains socket fuse.
Is supply cable plugged into socket ?	Plug correctly supply cable.
Is input fuse good ?	Replace input fuse (rated data on rating plate).

Is master switch switched ON ?	Switch ON power supply.
Above was checked and still there is not display active.	Call service.
2. Centrifuge does not start:	**Remedies:**
START key pushing does not generate reaction or single tone only	
P message is displayed	Call service
LED diode of cover is shining	Close cover. The lock has to be locked with typical sound. He has to the sign of the dot appear on the display. If the diode is not switching off one shall call service.
LED diode of “Start” key is shining	Switch power supply OFF/ON. If fault still persists then call service.
The digit of display parameters is blinking	Push the “Stop” key which has been recorded program. If fault still persists then call service.
3. Centrifuge starts but does not accelerate	**Remedies:**
E symbol displayed after stopping. Drive overload	Wait for 15 minutes and switch again after opening and closing the cover.
4. One cannot open the cover:	**Remedies:**
With the attempt opening cover is audible buzzing of the lock.	One should lift up till the yellow LED ”Cover” is switching on. Failed spring of cover lifting or bended the lock striker. One should bend the striker or call service.
LED diode “Cover” is not shining and the centrifuge not swirling.	Lock is failed. Call service.

10.2. Emergency cover release

	**EMERGENCY COVER RELEASE** **Attention!** *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.* To do this, insert the key for emergency opening of the cover into the hole on the right side of the housing, and then push it until the lock is released and the cover is opened. The emergency opening of the cover can be used e.g., in the event of a power failure, failure of the control panel, etc.

11. 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

	• 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.

12. Transport and storage

- Store the device only in a closed and dry room.
- Remove rotor from centrifuge before transport.
- Use the original packaging and transport protection for transport.

12.1. 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

13. 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.

14. List of changes in the manual

Version 1.0	Initial issue

15. 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 entries in the Waste Database

Customer Care

XTPL S.A.

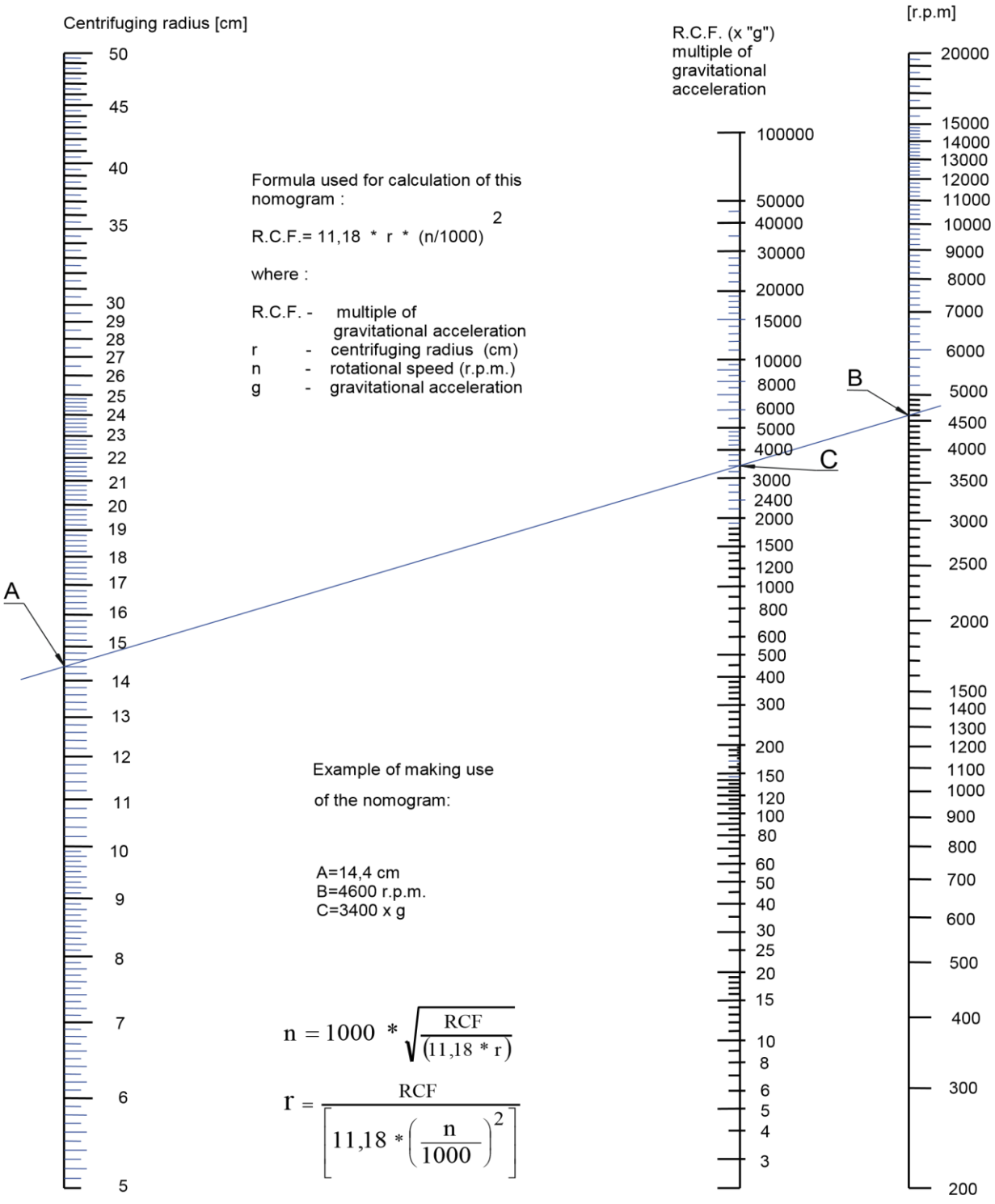
Legnicka 48 E
54-066 Wrocław, Poland

www.xtpl.com
support@xtpl.com
+48 71 707 22 04

Mon - Fri 08:00 - 16:00 CEST / Warsaw time

16. Appendices

16.1. Nomogram RPM / RCF



16.2. Declaration of conformity

MPW® MED. INSTRUMENTS

CE

DECLARATION OF CONFORMITY

Product name: XTPL Cartridge Loading Equipment

Product type: Laboratory centrifuge

Catalogue number: 10055XTPL/12-56

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

Product complies with the requirements:

- **Directive 2014/35/UE (LVD), including the requirements of harmonized standards:**

EN 60204-1:2018
EN 60529:1991
EN 60529:1991+A1:2000
EN 60529:1991+A2:2013
EN 60529:1991+AC:2016-12
EN 60529:1991+A2:2013+AC:2019-02
EN 61010-1:2010
EN 61010-1:2010+A1: 2019
EN 61010-1:201+A1:2019+AC:2019-04
EN 61010-2-020:2006
EN 61121-2:2007
EN IEC 61293:2020
EN 61310-1:2008
EN 61310-2:2008
EN 61310-3:2008

- **Directive 2014/30/UE (EMC)**
- **Directive 2011/65/UE (RoHS 2)**

"MPW MED. INSTRUMENTS"
SPÓŁDZIELNIA PRACY
Warsaw, 46 Boremlowska Street
applies Quality Management System in line with
PN-EN ISO 9001:2015, PN-EN ISO 13485:2016

Halina Ducka
Vice-President of the Management Board

Łukasz Sałański
President of the Management Board

Warsaw, 2025.03.18

no. 10055XTPL/12-56.en