Serial number .....

Production year .....

"MPW MED. INSTRUMENTS"
SPÓŁDZIELNIA PRACY
PL - 04-347 Warsaw/Poland
46 Boremlowska Street
Phone: (+48 22) 610 81 07 Service
Fax: (+48 22) 610 55 36

01-06-2009

USER MANUAL

Catalogue number 20056/Eng

LABORATORY CENTRIFUGE

(MICROCENTRIFUGE)

M P W – 5 6

Read this instruction before using the equipment!

CE IVD

Contents

Warning sings and hazard icons.

WARNING
Warning of potential injury or health risk.

DANGER
Risk of electric shock with potential for severe injury or death as a consequence.

DANGER
Biohazard with potential for risk to health or death as a consequence.

DANGER
Risk of explosion with potential for severe injury or death as a consequence.

1. Application.

The MPW-56 is the laboratory centrifuge for *in vitro* diagnostic (IVD). Its construction ensures easy operation, safe work and wide range of applications in laboratories engaged in routine medical analyses, biochemical research works etc. It is intended for separation of mixtures, suspensions and systemic fluids into constituents of different densities under influence of the centrifugal force. This centrifuge is not biotight and therefore during centrifugation preparations requiring biotightness one has to use closed and sealed containers and rotors. In the centrifuge it is prohibited to centrifuge caustic, inflammable and explosive preparations.

2. Technical data.

Manufacturer:	***"MPW MED. INSTRUMENTS" SPÓŁDZIELNIA PRACY 46 Boremlowska Street, Warsaw/Poland***
Type:	***MPW-56***
Mains L1+N+PE V/Hz ±10%	100÷230 V 50/60 Hz,
Maximum power consumption	70 W
Maximum speed	6000 rpm
Maximum capacity	120 ml
Maximum acceleration	3340 x g
Time range	00:15÷99:59 [min÷sec] (resolution 1 sec.)
Interference level	PN-EN-55011
Noise level	56 dB
Physical data:	
Depth	270 mm
Width	220 mm
Height	180 mm
Weight	4 kg
Environmental conditions:	PN-EN-61010-1 p. 1.4.1.
Ambient temperature	+2º ÷40° C
Relative humidity at ambient temperature	< 80 %
Installation category	II PN-EN 61010 -1
Degree of pollution	2 PN-EN 61010 - 1
Protection zone	300 mm

2.1. Accessories.

2.1.1. Basic accessories (being enclosed to every centrifuge).

Cat. No.	Type of accessories	
17168	Complete clamp	pcs 1
17099L	Spanner for the rotor	pcs 1
17162	Spanner for emergency opening of the cover	pcs 1
17860	Fuses WTA-T 3,15 A 250 V	pcs 2
17866	Power cord 230 V	pcs 1
17867	Power cord 115 V (optionally)	pcs 1
20056/ENG	Operating Instruction	pcs 1

2.1.2. Optional accessories.
Depending on customer's needs the MPW-56 centrifuge can be provided with below specified accessories:

ANGLE ROTORS

Cat. No	Type of rotor	Angle	Rotor capacity	Max rpm	RCF	r_{max} [cm]	r_{min} [cm]
11140	Angle rotor	30°	6 x 15/10 ml	6000	3340	8,3	3,0
11141	Angle rotor	30°	8 x 15 ml	6000	3340	8,3	3,0
11201	Angle rotor HSL	45°	(2x8, 2x4)x0,2 ml	6000	2253	5,6	3,8
11202	Angle rotor HSL	45°	12x2,2/1,5 ml	6000	2616	6,5	3,0
11203	Angle rotor HSL	45°	18x0,5 ml	6000	2375	5,9	3,8
11204	Angle rotor HSL	45°	24x2,2/1,5 ml	6000	2616	6,5	2,5
12205	Hematocrit rotor		24 capillary tubes 1,3x50 mm, 19 µl	6000	2495	6,2	1,2

Displayed RCF is being converting for the radius of the rotor 11140 or 11141. RCF parameter for the other rotors is being presented above.

[HSL - hermetically sealed lid]

BUCKETS

Catalog no	Application
13080	Bucket ϕ 17,7x87 mm with rubber pad for15/10 ml test tubes (ϕ 17x120 mm);
13081	Bucket ϕ 17,7x65 mm with rubber pad for 10/6/5 ml test tubes (ϕ 17x85 mm);

ROUND CARRIERS

Catalog no	Application
14082	Round carrier ϕ13,3 for 7/6/5 ml test tubes (ϕ13,3x100 mm);
14083*	Round carrier ϕ13,3 for 7/6/5 ml test tubes (ϕ13,3x100 mm);
14084	Round carrier for 0,5 ml test tubes (ϕ 10,8/8,0 mm);
14126	Round carrier for 0,4 ml test tubes (ϕ 10,8/5,7 mm) for rotor 11202;
14133	Round carrier for 0,2 ml test tubes (ϕ 10,8/6,2 mm);
14134	Round carrier for 0,2 ml test tubes (ϕ 7,8/6,2 mm);

TEST TUBES

Catalog no	Specification
15048	Polypropylene test tube 15 ml in bucket 13080.
15050	Polypropylene test tube 15 ml Falcon with cap (ϕ 17/21x120 mm) for bucket 13080;
15053	Polypropylene test tube 10 ml with cap (ϕ 16/19x100 mm);
15054	Polypropylene test tube 6 ml with cap (ϕ 11,7/13,5x92 mm);
15101	Microhematocrite capillary tubes, heparinized (1,3x50mm);
15118	Glass tube 10 ml (ϕ 16x100 mm) for bucket 13080;
15119	Glass tube 7 ml (ϕ 12x100 mm) for round carrier 14082 in bucket 13080;
15120	Glass tube 5 ml (ϕ 12x75 mm) for round carrier 14082 in bucket 13081;
15121	Polypropylene test tube 10 ml with cap (ϕ 17/19x70 mm) for bucket 13081;
15122	Polypropylene PCR test tube 8x0,2 ml (ϕ 6x21 mm) with integrated caps;
15123	Polypropylene test tube 2,2 ml with cap (ϕ 10,8x43 mm);
15124	Polypropylene test tube 0,4 ml with cap (ϕ 5,7x46 mm) for round carrier 14126;
15125	Polypropylene test tube 0,2 ml PCR (ϕ 6x21 mm);

15127	Polypropylene test tube 0,5 ml with cap (ϕ 7,8x30 mm);
15128	Polypropylene test tube 1,5 ml with cap (ϕ 10,8x39 mm);
15130	Polypropylene PCR test tube 8x0,2 ml (ϕ 6x21 mm) with separate caps;
15131	Polypropylene PCR test tube 4x0,2 ml (ϕ 6x21 mm);
15419	Polypropylene test tube 5 ml (ϕ 12x75 mm) for round carrier 14082 and bucket 13081;

OTHER ACCESSORIES

Catalog no	Specification
16098	Capillary tube stoppers;
16135	Hematocrite reader – flat
16150	Hematocrite reader - round

*-while stock last

2.2. Exploitation materials.

For operating in centrifuge one should use only original company's buckets comprised in the specification of accessories as well as test-tubes for centrifuges of proper diameter, length and strength. Utilization of test-tubes of other makes shall be agreed upon with manufacturer of the centrifuge. For cleaning and disinfecting one should to use agents generally used in the health service, such as e.g. *Aerodesina-2000, Lysoformin 3000, Melseptol, Melsept SF, Sanepidex, Cutasept F.*

3. Installation.

3.1. Unpacking of the centrifuge.

Open the package. Take out the cardboard box containing the accessories. Take out the centrifuge from the package. Keep the package and packing materials at hand for possible transport at a later date.

3.2. Location.

The centrifuge shall not be located near the radiators and shall not be subjected to direct sunlight. The table for the centrifuge shall be stable and shall have flat-leveled table top. It is necessary to ensure the safety zone around the centrifuge of the minimum 30 cm from every direction. Normal operating conditions ambient temperature is from 15° C to 35° C. Passed parameters of the spinner are referring to above named temperatures. At the change of the place from cold for warm condensation of water will occur inside the centrifuge. It is important then that sufficient time shall be provided for drying the centrifuge prior to repeat starting the centrifuge (minimum 4 hours).

3.3. Connection to mains.

Supply voltage given on the rating plate has to be consistent with local supply voltage. MPW MED. INSTRUMENTS laboratory centrifuges are in I safety class devices and they are provided with the three-core cable with the plug resistant to dynamic loadings. Mains socket shall be provided with the safety pin. It is recommended to install emergency cut-out that shall be installed far from the centrifuge, near the emergency exit or beyond the room.
Supply voltage 100÷230 V 50/60 Hz.

Before switching on check whether the centrifuge is connected to power supply correctly. Check centrifuge before usage whether she is installed correctly.

3.4. Fuses.

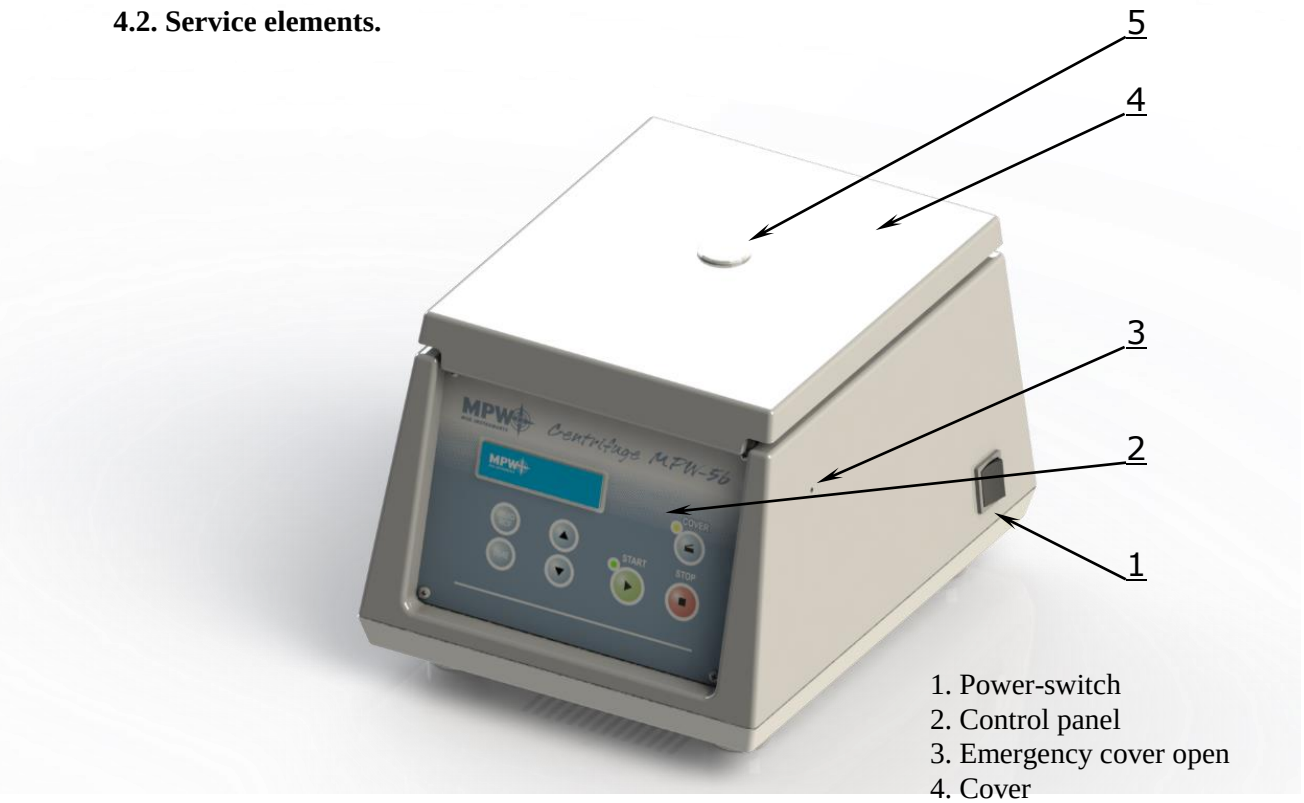
The centrifuge has standard protection with the WTA-T 3,15 A 250 V fuse. Fuse is situated in the plug-in socket unit at back wall of the centrifuge.

4. Description of the centrifuge.

4.1. General description.

New generation of MPW MED. INSTRUMENTS laboratory centrifuges is provided with the modern microprocessor control systems, very durable and quiet asynchronous brushless motors and accessories consistent with the modern requirements of user.

4.2. Service elements.



1. Power-switch
2. Control panel
3. Emergency cover open
4. Cover
5. Inspection glass

Drawing No.1. General view

5. Safe working conditions.

5.1. Servicing personnel.

The MPW-56 laboratory centrifuge can be operated by laboratory personnel after getting acquainted with Operating Instruction.

Operating Instruction shall be held all the time near the centrifuge.
Operating Instruction must be kept close always at hand!!!

5.2. Guarantee and operational use period.

Guarantee period for the MPW-56 centrifuge amounts to minimum 24 months.
Principles are specified in guarantee certificate. The service life of the centrifuge specified by the manufacturer amounts to 10 years.

After termination of guarantee period it is necessary carry out yearly technical inspection of the centrifuge by service authorized by manufacturer.

The manufacturer reserves the right to make modifications at produced goods.

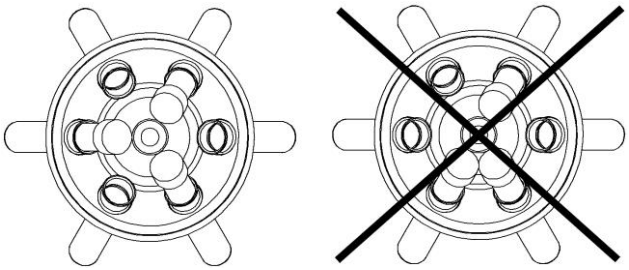
5.3. Safekeeping period.

Maximum period of storage of not used centrifuge amounts to 1 year. After this period one should carry out technical inspection of the centrifuge by service authorized by manufacturer.

5.4. Hints on centrifuging.

- **Set the centrifuge in horizontal position on rigid base.**
- **Ensure safe positioning location.**
- **Ensure free space around the centrifuge (amounting to at least 30 cm left free).**
- **Ensure sufficient ventilation.**
- **Fix the rotor on the motor axis firmly.**

- **Avoid unbalance.**
- **Load opposite buckets with the same accessories.**
- **Centrifugation of the test tubes of different dimensions.**
  The possibility to centrifuge test tubes of different dimensions is existing; however, it is absolutely necessary in such cases that opposite buckets and round carriers have to be the same.
- **It is necessary to insert test tubes symmetrically.**



- **Fill test tubes beyond the centrifuge.**
- **Please pay special attention to the quality and proper thickness of the glass test tubes walls. Those shall be test tubes for centrifuges of proper strength 5000 x g.**
- **Fill in the test tubes with the same weight, in order to protect the centrifuge against unbalance.**

- **Use only accessories kept in good condition.**
- **Protect equipment against corrosion using accurate preventive maintenance.**

- **Infectious materials could be processed in closed test tubes only.**

- **It is prohibited to centrifuge explosive and inflammable materials.**
- **It is prohibited to centrifuge substances prone to reacting in result of supplying high energy during centrifugation.**

5.5. Hazards and precautions

- **Prior to starting the trial of switching the centrifuge on, one shall read exactly all sections of this instruction in order to ensure smooth run of operation, avoiding damages of this device or its accessories.**

- **Centrifuge shall not be operated by unqualified personnel.**

- **Centrifuge must not be transported with the rotor mounted on the shaft.**

- **One must use original rotors, test-tubes and spare parts only.**

- **In case of faulty operation of the centrifuge one shall ask of assistance of service of MPW MED. INSTRUMENTS or its authorized representatives.**

- **It is prohibited to switch the centrifuge on if it is not installed properly or rotor is not fitted correctly.**

- **The centrifuge must not be operated in places where explosion hazard appears as it is not explosion-proof make.**
- **It is prohibited to subject to centrifuge materials, which subjected to action of air, could generate inflammable or explosive mixtures.**

- **It is prohibited to subject to centrifuge toxic or infectious materials with damaged leak proof seals of the rotor or test-tube. Proper disinfections procedures have to be carried out when dangerous substances contaminated the centrifuge or its accessories.**

- **It isn't allowed to open the cover - manually in emergency procedure, when rotor is still turning.**

- **It isn't allowed to exceed load limit set by the manufacturer. Rotors are intended for fluids of average homogeneous density equal to 1.2 g/cm^3 or smaller when centrifugation is carried out at maximum speed. When fluids of higher density shall be used, then it is necessary to limit speed (see point 7.4.3 “Maximum load”).**

- **It isn't allowed to use the rotors and round carriers with signs of corrosion or other mechanical defects.**
- **It isn’t allowed to centrifuge substances of high corrosion aggressiveness, which could cause material impairment and lower mechanical properties of rotor and round carriers.**
- **It isn’t allowed to use rotors and accessories that one not admitted by the manufacturer. Let to use commercial glass and plastic test tubes, which are destined to centrifuging in this laboratory centrifuge. It is distinct warning against using poor quality elements. Cracking of vessels could result in dangerous unbalance.**

- **It isn’t allowed to lift or shift the centrifuge during operation and rest on it.**
- **It isn’t allowed to stay in the safety zone within 30 cm distance around the centrifuge neither leave within this zone some things, e.g. glass vessels.**
- **It isn’t allowed to put any objects on the centrifuge.**

6. Operation of the centrifuge.

6.1. Mounting of the rotor and accessories.

1. Connect the centrifuge to the mains (plug-in socket at back of the centrifuge).
2. Switch on the centrifuge by master switch at the right of the centrifuge.
3. Open the cover of the centrifuge by pressing the **COVER** key. Prior to putting the rotor in one has to check if rotating chamber is free of impurities, e.g. such as dust, glass splinters, residues of fluids that must be taken away.
4. One shall fit the rotor on the motor shaft driving it home on the cone.
5. Screw-in the bolt for fixing the rotor (clockwise) and screw it tightly home with the supplied spanner for the rotor.
6. One should use only buckets intended for selected types of the rotor - see p. 2.1. "Accessories".
7. Fill test tubes beyond the centrifuge.
8. Test tubes (buckets) have to be filled properly in order to avoid overflows.
9.  ***CAUTION**: Centrifuge will tolerate small weight differences occurring during loading of rotors. However it is recommended to equalize vessels loads as much as possible in order to ensure minimal vibrations during operation.*
10. For replacement of the rotor one shall remove test tubes and buckets, release clamping by several turns of the bolt and then using both hands grab the rotor at opposite sides taking it away from drive shaft by pulling it up.

6.2. Construction and safety measures.

The centrifuge has rigid self-supporting structure. Housing was made of ABS type plastic. Cover is fixed on steel axles of hinges and from the front is locked with electromagnetic lock blocking possible opening during centrifugation. Bowl forming the rotation chamber is made of plastic.

6.3. Drive.

Drive constitutes induction motor of low noise level.

6.4. Data input and output.

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

6.5. Controls.

The microprocessor setup of the control applied to the centrifuge is ensuring broad chances to give and of the realization of work parameters, it is:

- ⇢ selection of rotational speed within 100 ÷ 6000 rpm at 100 rpm interval;
- ⇢ centrifugation time within 0÷60 minutes at 15 sec interval;

6.6. Safety devices.

Apart from the above described passive devices and safety measures there exist as well active devices and elements as follows:

6.6.1. Cover lock.

The centrifuge can be started only with properly closed cover. In turn the cover can be opened only after stopping the rotor by **COVER** key. In the case of emergency opening of the cover during operation the centrifuge will be immediately switched-off and the rotor will brake till complete stop. With opened cover (**COVER** diode is shinning) drive is completely disconnected from the power that makes impossible to start the centrifuge.

6.6.2. Rest state inspection.

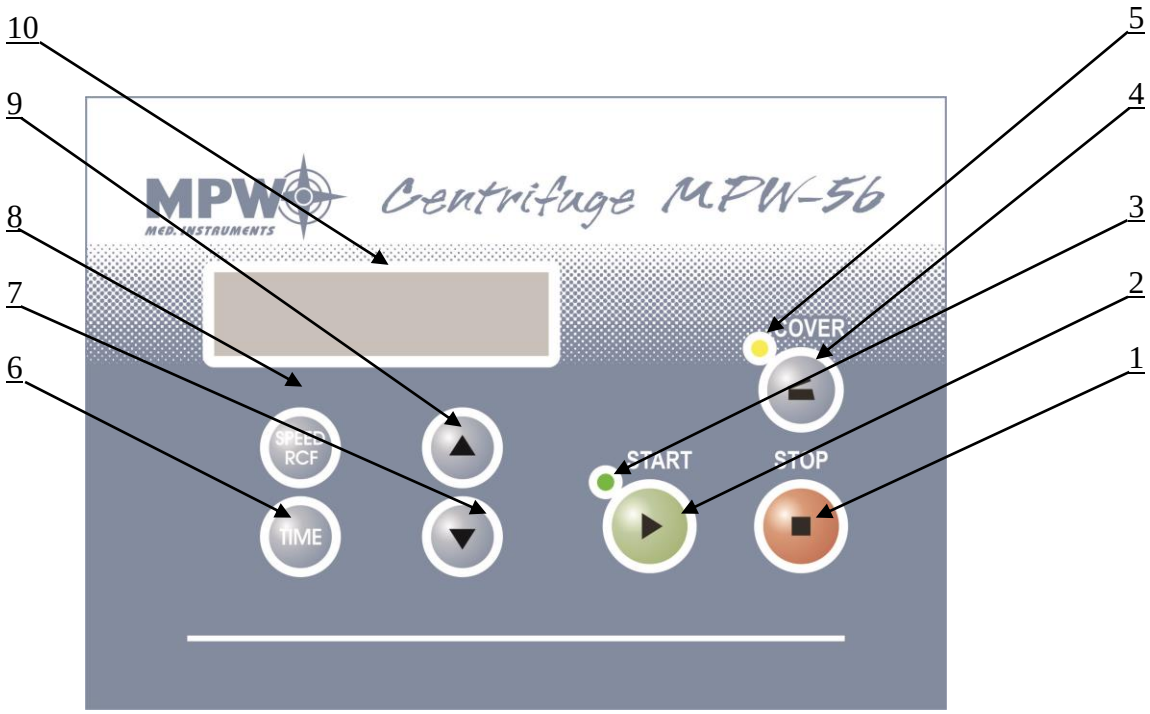
Opening of the centrifuge's cover is possible only with the rotor in the state of rest. This state is being checked by the microprocessor which recognizes and signals the rest state prior to opening the cover.

7. Description of the centrifuge operating elements.

Power switching ON/OFF is carried out with master switch situated on right side of the centrifuge. All settings on the centrifuge are done by means of the control panel. Panel comprises control keys, LCD display and signalling diodes.

7.1. Control panel.

For controlling centrifuge operation serves control panel placed on front casing wall.



Drawing No.2.Control panel

1. **STOP** key.
2. **START** key.
3. **START** diode.
4. **COVER** key.
5. **COVER** diode.
6. **TIME** key.
7. Decreasing key.
8. **SPEED/RCF** key.
9. Increasing key**.**
10. Display.

- **START** key [element No.2 on the Drawing No.2] can be used to:
  - — starting the centrifugation program with the parameters displayed on display,
  - — blinking DIODE on the **START** key [element No. 3] signalling rotary motion of rotor.

  The centrifuge can be activated if:
  - — the cover is closed (showing up of sign of the dot on the display [element No.10]),
  - — the DIODE is not shining on the **COVER** key [element No.5]

- **STOP** key [element No. 1] serves for aborting the actually running operation:
  - — interrupting centrifuge program in any program phase and braking the rotor.
  - — finishing of rotor braking process – on the display will shine sign **S** (Stop) also signalling this state by sound.

- **COVER** key [element No. 4] serves for:
  — open the centrifuge cover,
  Open or incorrectly closing the cover is signalling by shining DIODE, key is active only if the rotor is not centrifuging. The cover can be opened only if rotor is stopped, on the display will be displayed sign **S** and the centrifuge will signal possibility of opening cover by five short sounds.

ATTENTION: It is not possible to open of the centrifuge at moment when the sign = signalling of possibility to change the parameter value is active, even in spite of the stopped rotor.

- The field of functional keys serves for change the program as well for setting it's individual parameters such as: speed, RCF, time.
  — After pressing the key, the sign equal "**=**"appears on the display. It means that the value of given parameter can be changed by key: arrow down or arrow up.
  The possibility of changing the value of parameter is signalling by sign = and is active for a three seconds. It is time, when one should accede to set the demanded value. After three seconds from the setting of the demanded value of given parameter, this value will be saved in the program or after selection the given program will be set as active.

- Decreasing key, arrow down [element No. 7] serves for:
  — decreasing the values of parameters.

- Increasing key, arrow up [element No. 9] serves for:
  — increasing the values of parameters.

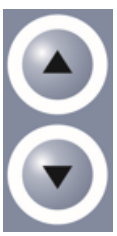
- **SPEED/RCF** key [element No. 8] serves for:
  — selecting the possibility of changing the centrifuging speed – SPEED
  (next pressing of the key switching-over the programming mode from speed to RCF values.)

Rotational speed can be setting from 100 rpm to 6000 rpm, with 100 rpm interval (RCF with 100xg interval)

Pressing button:

will occur entry to speed/RCF setting mode, switching between rpm and RCF setting follow with the next pressing the key

Setting the value is set in step at 100, using the buttons:

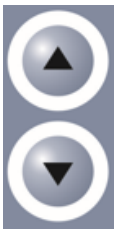


There are no actions for 3 seconds to exit the setting mode with saving setpoint.

- **TIME** key [element No. 6] serves for:
  — programming the centrifuging time in minutes from 15 sec to 99 min 59 sec, every 1 second

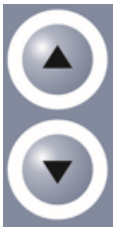
single pressing:

cause entry to time setting mode, the tens minuts digit will start blinking, it is possible to setting it with buttons:



next pressing:

cause switching between tens minutes digit, minutes digit, tens secunds digit and secunds digit, choosen digit will start blinking, and it is possible to set it with buttons:



No action for 3 seconds cause exit from setting mode with saving setpoint.

- LCD display [element No. 10]
  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.

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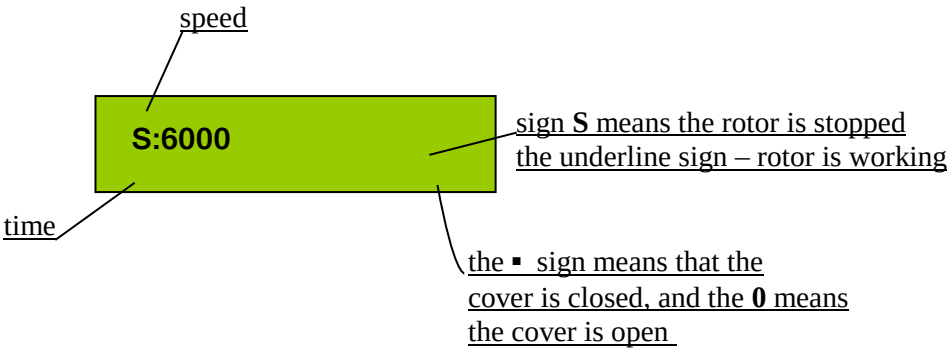
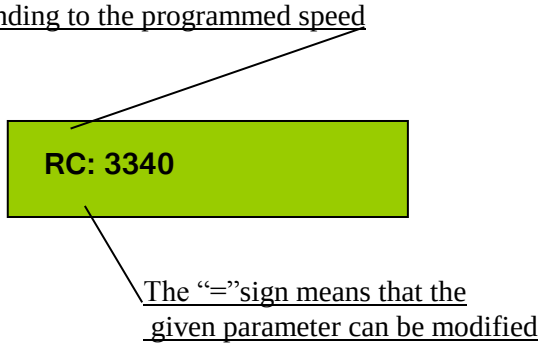
  — following the information about program has been lately made, the time and speed settings will be displayed.



after pressing the **SPEED/RCF** key twice
[element No. 8 on the Drawing No. 2.] the display shows the
acceleration value corresponding to the programmed speed



During operation of the centrifuge it's impossible to change the program parameters, but only interrupt its further realization with pressing the **STOP** key, [element No.1].

7.2. Switching the centrifuge on.

After acquainting with operation elements and preparing the centrifuge to operation one shall set the speed and time, next close the cover and press the **START** key. The centrifuge will start and realize the programmed parameters.

7.3. Switching the centrifuge off.

The centrifuge is automatically switching off when the program is realized. It is possible to finish earlier the realization of given program by pressing the **STOP** key. After ending the centrifugation process one should remember to switch off the centrifuge using the main switch [element No.1, Drawing 1] being located on the right side of centrifuge.

7.4. Mathematical relations.

7.4.1. RCF – relative centripetal force.

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

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

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

Depending on the distance of particles of the tested product from the axis of rotation one can find from above formula minimum RCF, average RCF or maximum RCF. On the basis of preset RCF value and given radius of the bottom in the bucket one can calculate from the formula 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 a given product.
Once every 100 rpm electronic circuit automatically calculates and displays RCF value. In order to program required RCF value one shall use nomogram (Drawing No. 3) or change rotational speed matching displayed value to required acceleration value.

7.4.2. Nomogram of relationship - rotational speed/centrifuging radius/RCF – Drawing No. 3.

7.4.3. 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 that is being calculated from the formula:

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

8. Cleaning, disinfection, maintenance.

CAUTION! It is necessary to use protective gloves during following work.

8.1. Cleaning of the centrifuge.

For cleaning shall be used water with soap or other water soluble mild detergent. One should to avoid corrosion inducing substances and aggressive substances. It is prohibited to use alkaline solutions, inflammable solvents or agents containing abrasive particles. Using wiping cloth remove from the rotor chamber condensate or residues of the products. It is recommended to keep the cover opened when the centrifuge does not work in order to expel the moisture.

8.2. Cleaning of the accessories.

In order to ensure safety operation one shall in regular way carry out periodical maintenance of the accessories. Manufactured rotors, buckets and round carriers have to withstand steady high stresses originated from the field of gravitation. Chemical reactions as well as corrosion (combination of variable pressure and chemical reactions) can cause corrosion or 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 the corrosion, given part (rotor, bucket, etc.) shall be immediately replaced. In order to prevent corrosion one has to clean regularly the rotor with the fastening bolt, buckets and round carriers. Cleaning of the accessories shall be carried out outside of the centrifuge once every week or still better after each use. Then those parts shall be dried using soft fabric or in the chamber drier at ca. 50° C.

Especially prone to the corrosion are parts made of aluminium. For cleaning them one should use very neutral agent of pH value from 6 to 8. It is forbidden to use alkaline agent of pH above 8. In this way substantially is increased useful service life and diminished susceptibility to corrosion. Accurate maintenance increases as well service life and protects against premature rotor failures. Corrosion and damages resulting from insufficient maintenance could not be object of claims lodged against the manufacturer.

8.3. Glass tube cracking.

In the case of glass tube cracking all debris shall be accurately removed, and then rubber inserts shall be exactly cleaned or possibly replaced. Otherwise one has to take into account following possibilities:

- Glass particles left in the rubber cushion (pad) will cause once more glass cracking.
- Glass particles left in the rotor chamber cause plastic abrasion because of strong air circulation.

This dust will not only contaminate the centrifuge chamber, rotor, buckets, carriers and centrifuged material but will cause as well damages of surfaces of the accessories, rotors and the rotation chamber. For complete removal of glass particles and metal dust from the rotor chamber it is recommended to place on the bowl strip of vaseline (from the top down to bottom). Then rotor shall operate for several minutes at speed 200 – 2500 rpm. Glass and particles will collect on lubricated area and could be easily removed with the piece of cloth together with the grease. This operation can be repeated in case of need.

8.4. Sterilization and disinfections of the rotating chamber and accessories.

One can use all standard disinfectants. The centrifuges and accessories are constructed from various materials and one should to take into account possible variety of materials. During sterilization by means of steam one should to consider temperature resistance of individual materials.

STERILIZATION

	Sterilization* temp. 121 °C, time 20 min	Radiation – β/γ 25 kGy	Gas (ethylene oxide)	Chemical compounds (formalin, ethanol)
PS	no	yes	no	yes
SAN	no	no	yes	yes
PMMA	no	yes	no	yes
PC	yes[1)]	yes	yes	yes
PVC	no [2)]	no	yes	yes
POM	yes [1)]	yes	yes	yes
PE-LD	no	yes	yes	yes
PE-HD	no	yes	yes	yes
PP	yes	yes	yes	yes
PMP	yes	yes	yes	yes
ECTFE/ETFE	yes	no	yes	yes
PTFE	yes	no	yes	yes
FEP/PFA	yes	no	yes	yes
FKM	yes	-	yes	yes
EPDM	yes	-	yes	yes
NR	no	no	yes	yes
SI	yes	no	yes	yes

* Laboratory vessels have to before the sterilization in the autoclave be exactly cleaned and rinsed with the distilled water. It is always necessary to remove closures from containers!

1) The frequent steam sterilization is reducing mechanical durability! PC test tubes are able to become useless.
2) Except PCV hose which are resistant to the steam sterilization in the temperature 121 °C.

Abbreviations of names of characterized plastics

PS:	Polystyrene
SAN:	Styrene-acrylonitrile
PMMA:	Polymethyl methacrylate
PC:	Polycarbon
PVC:	Polyvinyl chloride
POM:	Acetal polyoxymethylenel
PE-LD:	Low density polyethylene
PE-HD:	High density polyethylene
PP:	Polypropylene
PMP:	Polymethylpentene
ECTFE:	Ethylene/chlorotrifluoroethylene
ETFE:	Ethylene/tetrafluoroethylene
PTFE:	Polytetrafluoroethylene
FEP:	Tetrafluoroethylene/perfluoropropylene
PFA	Tetrafluoroethylene/perfluoroalkylvinylether
FKM	Fluorcarbon rubber
EPDM:	Ethylene propylene diene
NR:	Natural rubber
SI:	Silicon rubber

We would like to add that for centrifuging for instance infectious materials it is necessary to use hermetically closed buckets in order to protect their migration into the centrifuge.

Rotors, buckets and round carriers can be sterilized in autoclave with temperature 121° – 124° C and pressure 215 kPa during 15 min. Disinfectants and cleaning agents generally used in medical care should be used in this centrifuge (e.g. *Aerodesina-2000, Lysoformin 3000, Melseptol, Melsept SF, Sanepidex, Cutasept F*).

User is responsible for proper disinfections of the centrifuge, if some dangerous material was spilled inside or outside of the centrifuge.
During above mentioned works one must wear safety gloves.

9. Emergency conditions – service.

9.1. Fault finding.

Majority of faults could be cancelled by switching the centrifuge **OFF** and then **ON**. In the case of short-duration power failure the centrifuge terminates cycle. To centrifuging after power failure one should pressing the **START** key.

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?	*Plugs 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*
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.*
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 being 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 can not open the cover:	**Remedies:**
With the attempt opening cover is audible buzzing of the lock.	*One should lift up till the yellow "Cover" is switching on. Failed spring of cover lifting or bended the lock striker. One should bend the striker or call service.*
diode "Cover" is not shining and the centrifuge not swirling.	*Lock is failed. Call service.*

Emergency cover release

In the case of e.g. mains failure it is possible to open the cover hand. Place the key 17162 into the hole on the right side of the casing and push in. The cover will be opened.

The cover can be unlock and opened only when the rotor is in the rest state.

9.2. Work safety inspection.

It is necessary for safety reason to inspection the centrifuge carried out by the authorized service at least once a year after the period of warranty. The reason for more frequent inspections could be corrosion inducing environment. Examinations should end with issuing "Report of validation, the check on the technical state of the laboratory centrifuge". Is being recommended to establish "Technical passport" or "Log of the apparatus", whom every repairs and reviews are being registered in. Both these documents should to deposit in the place of use the centrifuge.

9.3. Inspection procedures carried out by the operator.

Operator has to pay special attention to the fact that the centrifuge parts important because of safety reasons are not damaged.

This remark is specifically important for:

1. Motor suspension
2. Motor axis concentricity
3. Centrifuge accessories and especially structural changes, corrosion, preliminary cracks, abrasion of metal parts.
4. Screw joints.
5. Inspection of the rotor assembly.
6. Control for guarantee yearly technical inspection of the centrifuge

Only the manufacturer-specified holders, included on the equipment list, as well as centrifuge capillaries, which diameter, length and durability are suitable, should be used for spinning in this centrifuge. The use of equipment made by other manufacturers should be consulted with the manufacturer of the centrifuge. Disinfectants and cleaning agents generally used in medical care should be used in this centrifuge (e.g. *Aerodesina-2000, Lysoformin 3000, Melseptol, Melsept SF, Sanepidex, Cutasept F*).

10. Repair conditions.

Manufacturer grants to the Buyer a guarantee on conditions specified in the Guarantee Certificate. Buyer forfeits the right to guarantee repair when using the device inconsistently with the Operating Instruction provisions, when damage resulted from the User 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,

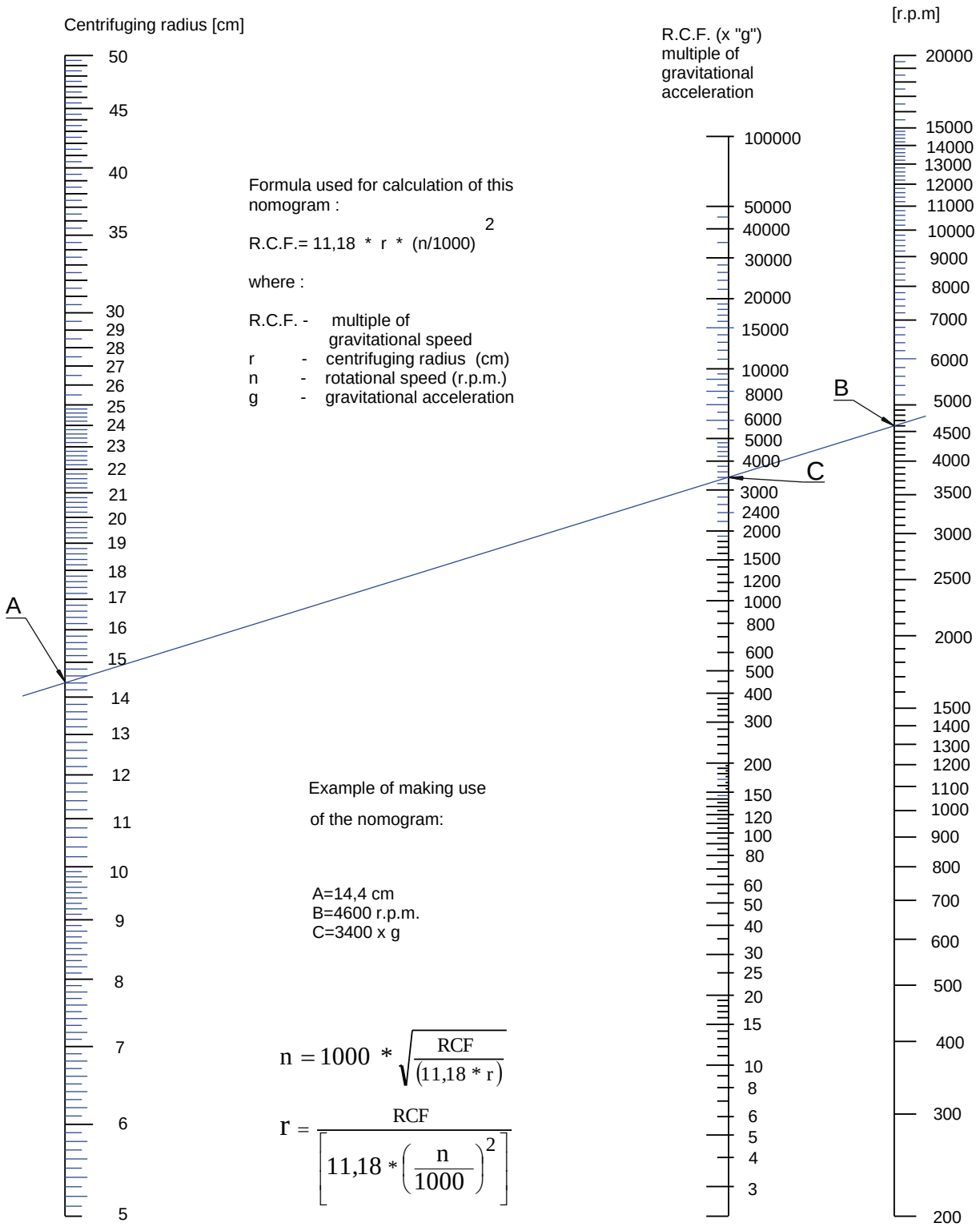
11. Manufacturer's data.

MPW MED. INSTRUMENTS
Poland, PL - 04-347 Warsaw, 46 Boremlowska Street.

Tel.	(+ 48 22) 610 56 67	Export and sales department
	(+ 48 22) 610 81 07	Service department
Fax.	(+ 48 22) 610 55 36	
E-mail:	mpw@mpw.pl	
	www.mpw.pl	

12. Distributor information.

YOUR DISTRIBUTOR:



Drawing No. 3 – Nomogram.

13. Table of chemical resistance to the interaction of various categories of reagents of plastics

Groups of the substance in temp. 20°C	PS	SAN	PMMA	PC	PCV	POM	PE-LD	PE-HD	PP	PMP	ECTFE ETFE	PTFE FEP PFA	FKM	EPDM	NR	SI
Aldehydes	-	-	○	○	-	○	-	+	+	○	+	+	+	+	○	○
Cyclic alcohols	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+
Esters	-	-	-	-	-	-	+	○	○	○	+	+	-	○	○	○
Ether	-	-	-	-	-	+	+	○	○	-	+	+	-	-	-	-
Ketones	-	-	-	-	-	+	○	○	○	○	○	+	-	○	-	-
Strong or concentrated acids	○	-	-	-	+	-	+	+	+	+	+	+		+	-	-
Weak or diluted acids	○	○	○	○	+	-	+	+	+	+	+	+	+	+	○	○
Oxidizing acids or oxidizing substances	-	-	-	-	-	-	-	-	-	-	+	+	○	○	-	-
cyclic hydrocarbons	-	-	○	○	+	+	+	+	+	○	+	+	○	-	-	-
Ahs	-	-	-	-	-	+	+	○	○	-	+	+	○	-	-	-
Haloid hydrocarbons	-	-	-	-	-	+	+	○	○	-	+	+	○	-	-	-
Alkalis	+	+	-	-	+	+	+	+	+	+	+	+	○	+	+	○

+ = very good chemical resistance

Permanent action of the substance isn't causing damage through 30 days. The material is able to be resistant through years.

○ = chemical resistance of good to limited

Continuous action of the substance is causing insignificant damage through the period of 7-30 days, partly reversible (e.g. puffing up, softening, reduced mechanical durability, discoloring).

- = limited chemical resistance

The material isn't able to have the continuous contact with the substance. The immediate occurrence of damage is possible (e.g. the loss of mechanical durability, the deformation, discoloring, bursting, dissolving).

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POM:	Acetal polyoxymethylenel
PE-LD:	Low density polyethylene
PE-HD:	High density polyethylene
PP:	Polypropylene
PMP:	Polymethylpentene
ECTFE:	Ethylene/chlorotrifluoroethylene
ETFE:	Ethylene/tetrafluoroethylene
PTFE:	Polytetrafluoroethylene
FEP:	Tetrafluoroethylene/perfluoropropylene
PFA	Tetrafluoroethylene/perfluoroalkylvinylether
FKM	Fluorcarbon rubber
EPDM:	Ethylene propylene diene
NR:	Natural rubber
SI:	Silicon rubber

DECLARATION OF CONFORMITY

Product	**Laboratory centrifuge**
Model	**MPW-56**
Product classification on the basis of the Directive 98/79/EC	Non classified to list A or B and not for self-testing

Product complies with the requirements:

· Directive 98/79/EC (IVD), including the requirements of harmonised standards:

PN-EN ISO 13485:2012	PN-EN ISO 18113-3:2011
PN-EN ISO 13485:2012/AC:2013-03	PN-EN 61010-2-101:2005
PN-EN 13612:2006	PN-EN 61326-2-6:2013-08
PN-EN ISO 14971:2012	PN-EN ISO 62366:2008

· selected harmonized standards of Directive 2006/95/EC (LVD):

PN-EN 61010-1:2011	PN-EN 61010-2-020:2008

· Directive 2004/108/WE (EMC)

· standard PN-EN ISO 15223-1:2012

CZŁONEK ZARZĄDU
Wojciech Nojszewski

PREZES ZARZĄDU
mgr Hanna Malczyńska

„MPW MED. INSTRUMENTS"
SPÓŁDZIELNIA PRACY
w Warszawie

Warsaw, 13.11.2014

„MPW MED. INSTRUMENTS"
SPÓŁDZIELNIA PRACY
Warsaw, 46 Boremlowska Street
Quality policy in line with ISO 9001:2008
Certifying authority

Management System
TÜVRheinland CERTIFIED
www.tuv.com ID 0000023838

nr 10.056.03

DECLARATION OF DECONTAMINATION

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

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

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

5. **Device**
   – type: ……
   – serial No.: ……

6. **Description of decontamination**
   (see user manual)
   ……
   ……
   ……
   ……

7. **Decontamination carried out by:**
   – name: ……

8. **Date and signature** ……