M-UNIVERSAL
M-DIAGNOSTIC
M-SCIENCE

MPW®
MED. INSTRUMENTS

PDF

Broşură pag. 1

M-UNIVERSAL	M-DIAGNOSTIC	M-SCIENCE
230V 50/60Hz; 120 50/60Hz (opcja /option 100, 110, 127V 50/60Hz)	230V 50/60Hz; 120 50/60Hz (opcja /option 100, 110, 127V 50/60Hz)	230V 50/60Hz; 120 50/60Hz (opcja /option 100, 110, 127V 50/60Hz)
230 W	190 W	230 W
500 ml 24 x kapilary/capillaries 75mm	500 ml 4 x CYTO	100 ml 24 x kapilary/capillaries 75mm
90 ÷ 18 000 RPM, krok/step 1 RPM	90 ÷ 6 000 RPM, krok/step 1 RPM	90 ÷ 18 000 RPM, krok/step 1 RPM
24 270 x g	4 630 x g	24 270 x g
1s ÷ 99h 59min 59s, ∞, krok/step 1s	1s ÷ 99h 59min 59s, ∞, krok/step 1s	1s ÷ 99h 59min 59s, ∞, krok/step 1s
299 x 357 x 451mm (HxWxD) 572mm wys. z otwartą pokrywą/ with open cover	299 x 357 x 451mm (HxWxD) 572mm wys. z otwartą pokrywą/ with open cover	299 x 357 x 451mm (HxWxD) 572mm wys. z otwartą pokrywą/ with open cover
~ 22/24,2kg (230V/120V)	~ 22/23kg (230V/120V)	~ 20/21,5kg (230V/120V)
102MU/2-56 (230V 50/60-Hz) 102MU/1-56 (120V 50/60-Hz)	102MD/2-56 (230V 50/60-Hz) 102MD/1-56 (120V 50/60-Hz)	102MS/2-56 (230V 50/60-Hz) 102MS/1-56 (120V 50/60-Hz)

S1

S6

S7

S2

S4

ka MPW M-UNIVERSAL - szerokiej gamie wirników aszenia umożliwia właściwe towanie próbki do wykonania o rutynowych badań medycz- weterynaryjnych, rozpoczęcia terapii m.in. w medycynie racyjnej lub przy zastosowa- nych systemów do pozyski- RP, jak również do podjęcia badań w tym naukowych, ych, kosmetologii i wielu

Wirówka MPW M-DIAGNOSTIC - dzięki szerokiej gamie wyposażenia (wirniki kątowe i horyzontalne) umożliwia wykonywanie rutyno- wych badań: pełna morfologia, biochemia, koagulogia, mocze, hematokryt, parazytologia, hema- tologia, diagnostyka nowotworów (CYTO), badanie nasienia i inne.

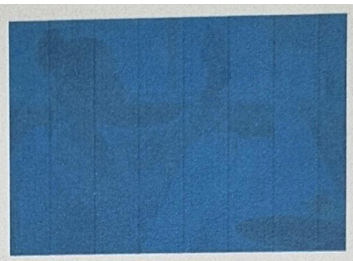
Wirówka MPW M-SCIENCE - szyb- kobrotowe rotory kątowe pozwalają na pracę z probówkami o pojemności od 0,2 ml do 10ml osiągając duże przyspieszenia (do maks. 24 270 x g), co sprzyja poprawnemu roz- dzieleniu niejednorodnej mieszaniny i efektywnemu odwirowaniu badanej próbki np. przy izolacji, oczyszczaniu i ocenie jakości kwasów nukleino- wych (DNA, RNA), analizach moleku- larnych i innych.

uge MPW M-UNIVERSAL - wide range of rotors and ories this centrifuge enables preparation of the sample for utine medical and veterinary unch of various therapies ng in regenerative medicine g different systems to acquire well as to perform other h including scientific, clinical h, research in cosmetology

Centrifuge MPW M-DIAGNOSTIC - with its wide range of accessories (angle and horizontal rotors) this centrifuge is suitable for perform- ing routine tests: complete mor- phology, biochemistry, coagulation tests, urine, hematocrit, parasitol- ogy, hemtology, cancer diagnos- tics (CYTO), semen analysis and more.

Centrifuge MPW M-SCIENCE - high-speed angle rotors are suitable for test tubes of 0.2 ml to 10 ml capacity and achieve high accelera- tions (up to 24 270 x g) which helps proper separation of inhomogene- ous mixture and effective centrifu- gation of the sample, for instance at isolation, purification and quality assessment of nucleic acids (DNA, RNA), molecular and other analysis.

Brzozuè pag. 2



MD	MS	MU	RPM max.	RCF max.		
	MS	MU	18 000	24 270	12 x 2/1,5ml	11193
		MU	5 000	3 494	8 x 50ml Falcon®	11213
		MU	14 000	19 064	12 x 5ml	11216
MD		MU	6 000	4 226	10 x 15/10ml	11217
	MS	MU	15 100	21 158	24 x 2/1,5ml	11461
	MS	MU	14 000	18 188	36 x 2/1,5ml	11462
MD		MU	4 500	2 965	30 x 15/10ml	11501
	MS	MU	14 000	15 558	10 x 10ml	11715
	MS	MU	14 000	15 339	4x6 x 0,2ml PCR	11716
		MU	6 300	5 014	4 x 100ml	11718
MD			5 000	3 634	4 x 50ml Orthokli- ne®vet	11720
MD		MU	5 500	4 058	12 x 15/10ml	11740
MD		MU	5 500	3 889	12 x 30/25ml	11743
MD		MU	4 500	2 830	10 x 50ml Falcon®	11744
MD		MU	5 000	3 354	24 x 15/10ml	11745
MD		MU	6 000	4 427	6 x 50ml Falcon®	11746
		MU	14 600	20 257	24 x 2/1,5ml	11760
	MS		13 500	17 319	24 x 2/1,5ml	11760
	MS	MU	12 000	13 684	20 x 1,8/1,6ml Cryo Sarstedt®	11943
	MS	MU	12 000	13 684	12 x 5ml Eppendorf	11944
MD		MU	4 100	2 594	8 x 15ml	12194
MD		MU	4 000	2 504	4 x 100ml	12200
MD		MU	3 000	916	2 x 1 MTP (standard)	12218
	MS	MU	13 000	16 816	24 kapilary/capillaries 75mm	12300
	MS	MU	13 000	16 816	24 kapilary/capillaries 75mm	12300C
MD			2 500	769	4 x 2,2ml CYTO	12452

PROBÓWKI DO KRWI															
Ø x L / mm	13 x 100	13 x 100	13 x 100	13 x 75	13 x 75	15 x 92	15 x 92	13 x 90	15 x 75	11 x 92	13 x 75	13 x 85	11 x 66	17 x 54,2	10,8 x 45
	BD Vacutainer®	Greiner Vacuette®	BD Vacutainer® Vacutte®	BD Vacutainer®	Greiner Vacuette®	Sarstedt S-Monovette®	Sarstedt S-Monovette®	Sarstedt S-Monovette®	Sarstedt S-Monovette®	Sarstedt S-Monovette®	Sarstedt S-Monovette®	Sarstedt S-Monovette®	Sarstedt S-Monovette®	Eppendorf®	Eppendorf®
	2,5 - 11	7-9	3,5 - 6; 8 - 7	1,6 - 4,3	1 - 4,5	9; 10	7,5; 8,5; 9,5	4,9; 5,6	4; 4,3; 5,5	4,5; 5	2,7; 3; 4; 4,3	2,6; 2,8; 3,4; 3,6	1,6; 2; 2,7; 3; 3,1	5	2
	BLOOD COLLECTION TUBES														
	8	8	8		8	8	8	8			8			8	
	10	10	10	10	10	10	10		10	10	10	10	10		
	30	30	30	30	30	30	30		30	30	30	30	30		
	12	12	12	12	12	12	12		12	12	12	12	12		
										12					
	10	10	10		10	10	10	10			10			10	
	24	24	24	24	24	24	24		24	24	24	24	24		
	6	6	6		6	6	6	6			6			6	
															24
															24
														12; 6	
	8, 6	8, 6	8, 6	8, 6	8, 6	8	8	8	8	8	8	8	8		
	28, 20, 8	28, 20, 8	32, 8	48, 32, 8	48, 32, 8	20, 8	28, 20, 8	32	28, 20, 8	48, 32, 8	32, 8	48, 32, 8	48, 8		40

Łatwiejszy dostęp do komory wirowania wykonanej ze stali nierdzewnej.

Easier access to the centrifuge chamber made of stainless steel.

CECHY	FEATURES
nowoczesny wygląd	modern design
niski poziom hałasu	low noise level
bezobsługowy silnik indukcyjny	maintenance-free induction motor
nowoczesny układ programowania	modern software system
duży wyświetlacz graficzny LCD - wygaszanie ekranu po okresie bezczynności S13	large graphic LCD - blanking the screen after a period of inactivity
2 tryby ekranu (uproszczony i standardowy)	2 screen modes (simplified and normal)
10 języków menu (PL, EN, ES, IT, PT, DE, RU, FR, SE, CZ)	10 menu languages (PL, EN, ES, IT, PT, DE, RU, FR, SE, CZ)
alarmy wizualne i dźwiękowe sygnalizujące stan pracy S9	visual and sound alerts of different notifications
100 programów użytkownika	100 user programs
10 charakterystyk rozpędzania/hamowania	10 acceleration/deceleration curves
regulacja prędkości lub RCF S3	speed or RCF adjustment
manualne ustawianie promienia wirowania (z automatyczną korektą RCF)	manual centrifugal radius adjustment (with automatic RCF correction)
zliczanie czasu od naciśnięcia klawisza start lub od osiągnięcia zadanej prędkości	time calculation from start key pressing or from reaching preselected speed
zliczanie czasu rosnąco lub malejąco	ascending or descenging time counting
tryb pracy ciągłej - HOLD	continuous operation mode - HOLD
praca w trybie SHORT	SHORT time operation mode
zmiana parametrów podczas wirowania	changing of parameters during centrifuging
automatyczna identyfikacja wirnika	automatic rotor recognition
automatyczne otwieranie pokrywy S12	automatic lid opening
blokowanie wybranych funkcji, ochrona dostępu przy użyciu hasła	selected functions blocking, password protection
efektywny system wentylacji	effective ventilation system
komora wirowania ze stali nierdzewnej	stainless steel rotor chamber
BEZPIECZEŃSTWO	**SAFETY**
czujnik niewyważenia S10	unbalance sensor
blokada pokrywy podczas wirowania S8	lid locking during rotor running
blokada startu przy otwartej pokrywie	start blocking at opened lid
awaryjne otwieranie pokrywy	emergency lid lock release
produkt zgodny z normami EN-61010-1 i EN-	product conforming with the EN-61010-1

Broszura pag. 3

3 Technical specification

manufacturer	"MPW MED. INSTRUMENTS" SPÓŁDZIELNIA PRACY, Boremlowska 46 Street, 04-347 Warszawa														
type	MPW M-DIAGNOSTIC					MPW M-SCIENCE					MPW M-UNIVERSAL				
cat. number (REF)	102MD/2-56	102MD/1-56/100	102MD/1-56/110	102MD/1-56	102MD/1-56/127	102MS/2-56	102MS/1-56/100	102MS/1-56/110	102MS/1-56	102MS/1-56/127	102MU/2-56	102MU/1-56/100	102MU/1-56/110	102MU/1-56	102MU/1-56/127
mains voltage (L1+N+PE)	230V	100V	110V	120V	127V	230V	100V	110V	120V	127V	230V	100V	110V	120V	127V
	±10%	±5%				±10%	±5%				±10%	±5%			
mains frequency	50Hz	60Hz				50Hz	60Hz				50Hz	60Hz			
connected load (max.)	190W					230W									
current protection [A]	T 4A	T 8A				T 4A	T 8A				T 4A	T 8A			
capacity (max.)	500 ml					100ml					500ml				
speed – RPM	90 ÷ 6000 rpm (step 1 rpm)					90 ÷ 18000 rpm (step 1 rpm)									
force – RCF	4830 x g (step 1 x g)					24270 x g (step 1 x g)									
kinetic energy (max.)	5000 J					11000 J									
running time	00:00:01 ÷ 99:59:59 – [h. : min : s] (1s step)														
time counting	since start button is pressed / since preselected speed is reached														
short-time operation mode – SHORT	yes														
continuous operation mode – HOLD	yes														
menu languages	Polish, English, German, Spanish, Italian, Portuguese, Russian, Swedish, French, Czech														
user programs	100														
acceleration (ACCEL)	10 linear curves														
deceleration (DECEL)	10 linear curves														
USB communication	no														
Electromagnetic compatibility	according to EN 61326-1:2006														
degree of protection (according to PN-EN 60034-5:2021-01)	IP20														
dimensions:															
height (H)	299 mm														
width (W)	357 mm														
depth (D)	451 mm														
height with open cover (H_{oc})	572 mm														
noise level	≤60dB														
weight 230V	approx. 22 kg					approx. 20 kg					approx. 22 kg				
weight 120V	approx. 23,7 kg					approx. 21,5 kg					approx. 24,2 kg				

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.

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	maximum service life has passed, whichever comes first. ▪ The number of permissible cycles for a given rotor can be found in Menu / Rotor cycles (see the ***Rotor cycles*** section).

5.8 *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 laboratory 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. ▪ Inspection of rotor and container seals, if any. Particular attention should be paid to rubber elements (seals). In the event of any damage or visible structural changes, they should be immediately replaced with new ones. ▪ Control of the performance of annual post-warranty inspections of the technical condition of the centrifuge.
	▪ During centrifugation, it is not allowed to lift, shift the centrifuge or rest on it. ▪ During centrifugation one must not stay in the safety zone, i.e., 30 cm distance around the centrifuge, nor leave any objects, e.g., glass vessels, inside this zone. ▪ It is not allowed to put any objects on the centrifuge.
⚠	**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.
⚠	**HANDLING OF ROTORS** ▪ It is not allowed to use accessories (rotors, lids, containers, hangers and round carriers) with signs of corrosion or other mechanical damage. ▪ It is not allowed to centrifuge substances of high corrosive aggressiveness, which may damage the materials and reduce the mechanical properties of rotors, buckets and round carriers. ▪ It is not allowed to centrifuge rotors with removed or loose covers.

S10 **5.9 *Unbalance***

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

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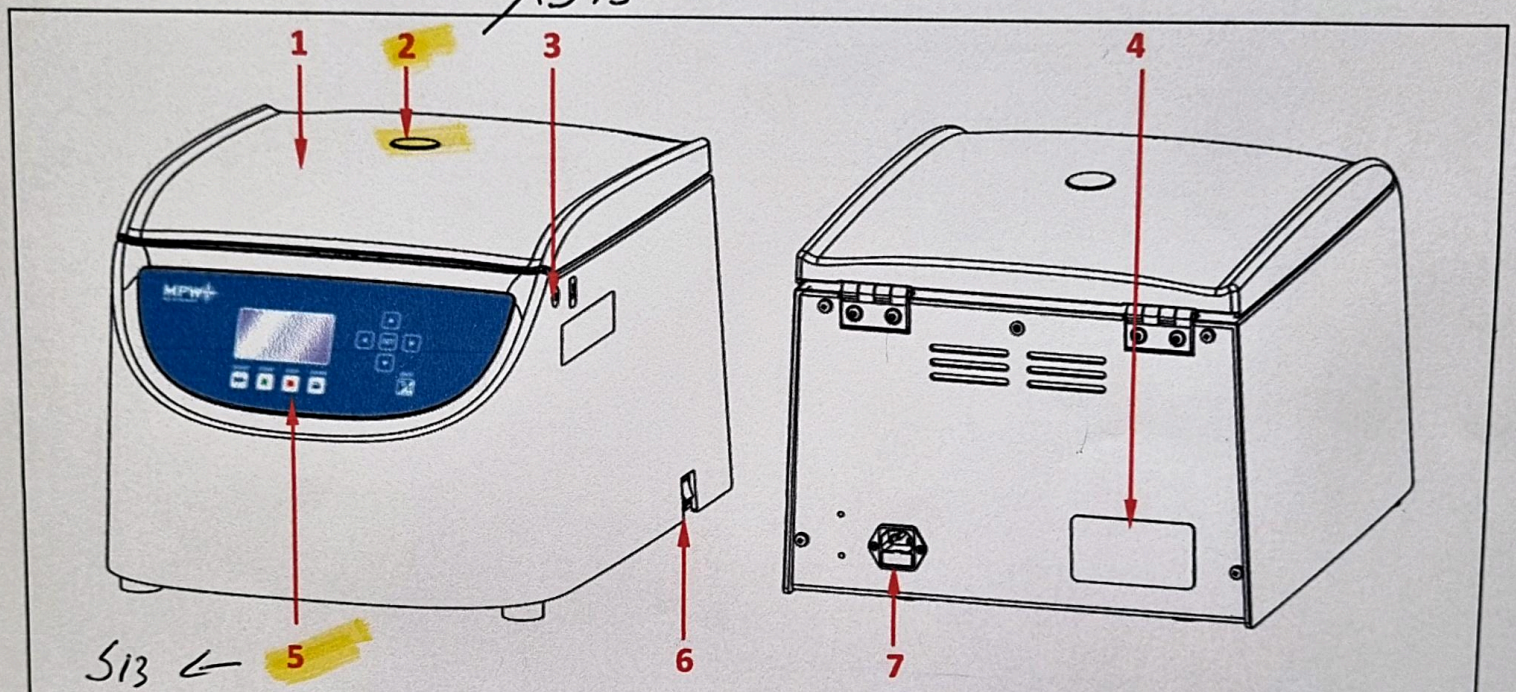
6 Product description

6.1 *Product Design and Appearance*

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

The centrifuge has a rigid self-supporting structure. The housing and cover are made of ABS plastic, the base is made of steel sheet, and the centrifugation chamber is made of stainless steel. The cover is mounted on steel hinge axles, and from the front it is secured against opening it during rotation with an electromagnetic lock.



Front and rear view of the MPW M-UNIVERSAL centrifuge.

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

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6.6 *Increase in temperature*

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

7 Centrifuging

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

7.1 *Control panel*

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

S13

Control panel

S11 S12 S3

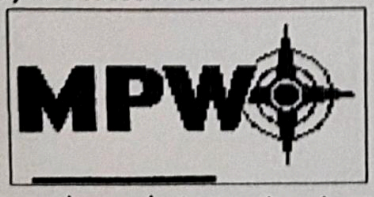
	SHORT[1]	short-time centrifuging
	START	start centrifugation run
	STOP[2]	end centrifugation run
	COVER	cover opening
	BACK/OPTIONS	exit the current menu / cancelling switching between rpm display mode and RCF display mode
	UP	navigation in menu / increasing values
	DOWN	navigation in menu / decreasing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

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

[2] first-time pressing press – will make stopping centrifuging with acceleration characteristics set in the current program (confirm message with pressing **STOP** or **BACK** key),
second-time pressing – will make the centrifuging as fast as possible

7.2 *Display*

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



After switching on Centrifuge, welcome screen appears. When welcome screen disappears, it is possible to setting up parameters.

The user can choose between two types of screen.
The **SIMPLIFIED SCREEN** is set by default.

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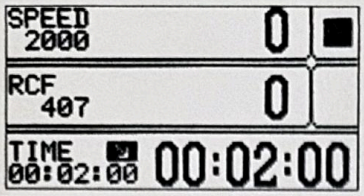
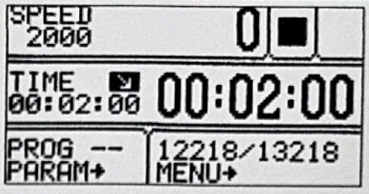
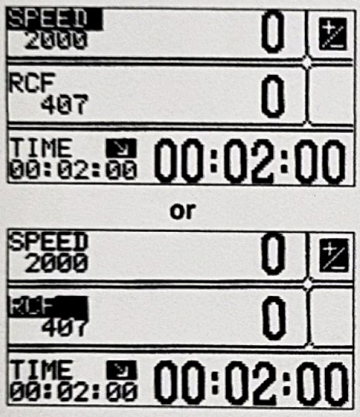
TYPES OF MAIN SCREEN	
SIMPLIFIED DISPLAY (setting default)	NORMAL DISPLAY
	

7.2.1 *Setting up RPM, RCF, TIME, temperature on the SIMPLIFIED DISPLAY*

On the screen, it is possible to set:

ROTATING SPEED - RPM	SPEED
RELATIVE CENTRIFUGAL FORCE	RCF
CENTRIFUGING TIME	TIME

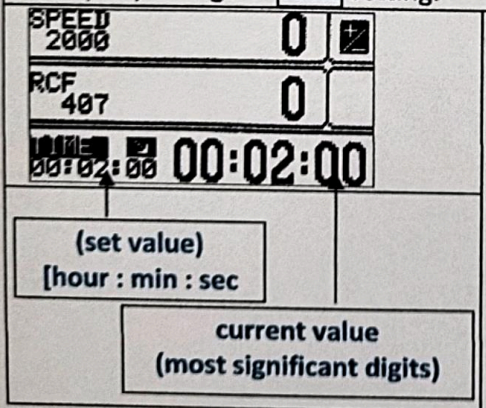
Exemplary change of **SPEED** or **RCF** setting:



- Press **SET** (to enter edit mode).
- With ▲▼ keys mark **SPEED** or **RCF** (the selected tab will be highlighted).
- Press **SET** (- blinking).
- Choose demanded order of magnitude by pressing ◄►.
- Set demanded value by pressing ▲▼.
  Repeat above two steps for other orders of magnitude.
- Confirm set value by pressing **SET**.
- Leave edit mode by pressing **BACK**.

When RPM is changed, RCF is automatically corrected, and vice versa.

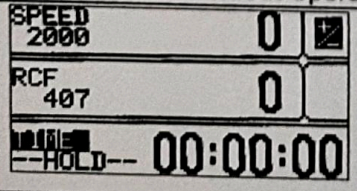
Exemplary change of **TIME** setting:



- Press **SET** (to enter edit mode).
- With ▲▼◄► keys mark **TIME**.
- Press **SET** (- blinking).
- Set demanded value by pressing ▲▼.
- Choose "hours", "minutes" or "seconds" by pressing ◄►, e.g.: **00**:02:00.
  Repeat above two steps for other orders of magnitude.
- Confirm set value by pressing **SET**.
- Leave edit mode by pressing **BACK**.

7.2.2 *Hold mode*

HOLD mode - Continuous operation mode .To end centrifuging in HOLD mode press **STOP**.



- To run centrifuging in **HOLD** mode set **00:00:00** time.

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MPW M-UNIVERSAL

13719

14024

[4] * 15 ml probówka z dnem stożkowym z zakrętką (17 x 120 mm), Falcon®; [15050], 15ml (17 x 120 mm)
15 ml tube, conical bottom, with cap (17 x 120 mm), Falcon®; [15050] 15ml Sarstedt®(17 x 120 mm)

14196

[4] 15040 100 ml probówka z pokrywką (45,2 x 103,7 mm)
100 ml tube with cap (45,2 x 103,7 mm)

14224

[4] 15055 30 ml probówka z pokrywką (25,4 x 103,2 mm)
30 ml tube with cap (25,4 x 103,2 mm)

[4] 15222 30 ml probówka z pokrywką (25 x 94mm), Sterilin®
30 ml tube with cap (25 x 94 mm), Sterilin®

[4] 15223 30 ml probówka z pokrywką (25 x 94 mm), Sterilin®
30 ml tube with cap (25 x 94 mm), Sterilin®

[4] * 30 ml Thermo Nalgene® Oak Ridge (25,5 x 94,3 mm)
30 ml Thermo Nalgene® Oak Ridge (25,5 x 94,3 mm)

14226

[4] * 50 ml probówka z dnem stożkowym z rantem (30 x 115 mm), Greiner®
50 ml tube, conical bottom, skirted (30 x 115 mm), Greiner®

14189+14188

[4] 15051 50 ml Thermo Nalgene® Oak Ridge (28,8 x 106,7 mm)
50 ml Thermo Nalgene® Oak Ridge (28,8 x 106,7 mm)

[4] * 50 ml probówka z dnem stożkowym z zakrętką (30 x 117 mm), Falcon®; [15052] 50ml (30 x 117mm)
50 ml tube, conical bottom, with cap (30 x 117 mm), Falcon®; [15052] 50ml Sarstedt® (30 x 117 mm)

[4] * 50 ml probówka z dnem stożkowym bez rantu (30 x 115 mm), Greiner®
50 ml tube, conical bottom, without skirt (30 x 115 mm), Greiner®

[4] * 50 ml probówka Advanced Oak Ridge (29x102 mm), Herolab® nr 25 32 11
50 ml tube, Advanced Oak Ridge (29 x 102 mm), Herolab® no. 25 32 11

14190+14188

[4] 15055 30 ml probówka z pokrywką (25,4 x 103,2 mm)
30 ml tube with cap (25,4 x 103,2 mm)

S2 **11740**

RPM 5500 RCF 4058 Rmax 120 ∡ 30

13080

14082

[12] * BD Vacutainer® (13 x 100 mm), (4-7 ml)
[12] * Greiner Vacuette® (13 x 100 mm), (3,5-6 ml)
[12] * Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)
[12] * 7 ml probówka szklana (12 x 100 mm)
7 ml glass tube (12 x 100 mm)
RCF max.=3000 RPM max.=4729
[12] * 6 ml probówka z pokrywką (11,5 x 92 mm), Sarstedt®
6 ml tube with cap (11,5 x 92 mm), Sarstedt®
bez wkładki/without adapter
[12] 15046 14 ml probówka z pokrywką (16,8 x 113,7 mm), Sarstedt®
14 ml tube with cap (16,8 x 113,7 mm), Sarstedt®
[12] 15053 10 ml probówka z pokrywką (16 x 106 mm)
10 ml tube with cap (16 x 106 mm)
[12] S4* 15 ml probówka z dnem stożkowym z zakrętką (17 x 120 mm), Falcon®; [15050], 15ml (17 x 120 mm)
15 ml tube, conical bottom, with cap (17 x 120 mm), Falcon®; [15050] 15ml Sarstedt®(17 x 120 mm)
[12] * BD Vacutainer® (16 x 100 mm), (2,5-11 ml)
[12] * Greiner Vacuette® (16 x 100 mm), (7-9 ml)
[12] * Sarstedt S-Monovette® (15 x 92 mm), (7,5; 8,2; 8,5 ml)
[12] * Sarstedt S-Monovette® (16 x 92 mm), (9; 10 ml)
[12] 15118 10 ml probówka szklana (16 x 100 mm)
10 ml glass tube (16 x 100 mm)
RCF max.=3000 RPM max.=4729
[12] * 15 ml Thermo Nalgene® (16 x 113 mm)
15 ml Thermo Nalgene® (16 x 113 mm)
14082+14815
[12] * 5 ml probówka szklana (12 x 75 mm)
5 ml glass tube (12 x 75 mm)
RCF max.=3000 RPM max.=5154
14082+14815 Rmax 101 RCF 3416
[12] * BD Vacutainer® (13 x 75 mm), (1,6-5,3 ml)
[12] * Greiner Vacuette® (13 x 75 mm), (1-4,5 ml)
[12] * Sarstedt S-Monovette® (11 x 66 mm), (1,6; 2; 2,7; 3; 3,1 ml)
[12] * Sarstedt S-Monovette® (13 x 65 mm), (2,6; 2,9; 3,4; 3,8 ml)
[12] * Sarstedt S-Monovette® (13 x 75 mm), (2,7; 3; 4,3 ml)
14815 Rmax 101 RCF 3416
[12] 15121 10 ml probówka z dnem okrągłym i pokywką (17 x 70 mm)
10 ml tube, round bottom, with cap (17 x 70 mm)
[12] * Sarstedt S-Monovette® (15 x 75 mm), (4; 4,3; 5,5 ml)
[12] * 10 ml Thermo Nalgene® Oak Ridge (16 x 81,5 mm)

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