



NF 3000R

HIGH CAPACITY REFRIGERATED CENTRIFUGE

USER'S MANUAL

CE 1984

MANUFACTURER

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BEFORE OPERATING THE INSTRUMENT THIS MANUAL SHOULD BE READ CAREFULLY.

THE VALIDITY OF THE GUARANTEE IS SUBJECT TO THE OBSERVATION OF THE INSTRUCTIONS AND PRECAUTIONS DESCRIBED IN THIS MANUAL.

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WARRANTY CERTIFICATE

- 1 Nüve warrants that the equipment delivered is free from defects during material and workmanship. This warranty is provided for a period of two years. The warranty period begins from the delivery date.
- 2 Warranty does not apply to parts normally consumed during operation or general maintenance or any adjustments described in the operating instructions provided with the equipment.
- 3 Nüve does not accept any liability in the case where the goods are not used in accordance with their proper intent.
- 4 The warranty may not be claimed for damages occurred during the shipment, for damages resulting from improper handling or use, the defects in maintenance, negligence, bad functioning of auxiliary equipment, in the case of force majeure or accident and incorrect power supply.
- 5 In the event of failure, Nüve shall be under no liability for any injury, or any loss or damage as the result of the failure other than the guarantee conditions.

DEAR NUVE USER

We would like to take this opportunity to thank you for preferring this Nüve product. Please read the operating instructions carefully and keep them handy for future reference.

Please detain the packing material until you see that the unit is in good condition and it is operating properly. If an external or internal damage is observed, contact the transportation company immediately and report the damage. According to ICC regulations, this responsibility belongs to the customer.

While you are operating the instrument please;

- obey all the warning labels,
- do not remove the warning labels,
- do not operate damaged instrument,
- do not operate the instrument with a damaged cable,
- do not move the instrument during operation.

In case of a problem contact your Nüve agent for an authorized service or maintenance.

The validity of the guarantee is subject to compliance with the instructions and precautions described in this manual.


Nüve reserves the right to improve or change the design of its products without any obligation to modify previously manufactured products.

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PLEASE REGISTER ONLINE TO VALIDATE YOUR WARRANTY

You can register your device by scanning the QR code on your device or by logging into the **mynuve.info** page.

After reaching the page, click on the "Sign up" link.

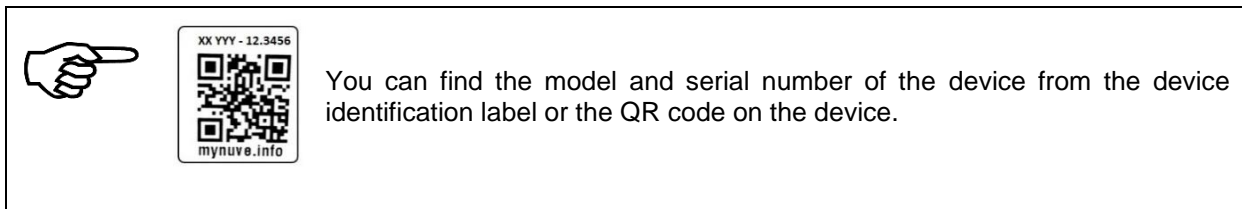


The screenshot shows the MyNuve.info website interface. At the top right, there are flags for Turkey and the United Kingdom. The MyNuve.info logo is on the left, with a navigation menu containing links for Home, Contact, Technical Support Request, and Customer Satisfaction Survey. A central text box explains that users must register to start their warranty and provides a 'Sign up' link. Below this, a login form is visible with fields for 'Username or email' and 'Password', a 'Remember Me' checkbox, a 'Log in' button, and links for 'Forgot Login?' and 'Sign up'. A blue arrow points to the 'Sign up' link.

After entering the requested information on the page that opens, you can register your device by clicking the **Sign up** button.

If you have more than one device, you can add as many devices as you want by clicking the **+ Add Product** button.

After the registration process is completed, a confirmation e-mail will be sent to you. When you click on the confirmation link in the incoming e-mail, the registration process will be confirmed. You can access documents related to your product (user manual, catalog etc.) by scanning the QR code or entering your e-mail and password information at **mynuve.info**.



The diagram shows a hand pointing to a QR code and an identification label. The label contains the text 'XX YYY - 12.3456' and 'mynuve.info'.

You can find the model and serial number of the device from the device identification label or the QR code on the device.

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SECTION 1 – INTRODUCTION

1.1. USE AND FUNCTION

NF 3000R centrifuges are designed to separate materials of different density by centrifugal force. It works on the principle of settling the particles in the liquid to the bottom with the force created by the rotational movement. It is also provided for the separation of blood in the blood bag into platelet, plasma and blood components by centrifugal force.

NF 3000R centrifuge devices are designed for use in hospital and university laboratories, small blood centers, hematological, veterinary and food laboratories, pharmaceutical and chemical industry laboratories, food laboratories, forensic laboratories, oil laboratories, paternity and daily test laboratories.

Different rotors can be attached to the device according to the desired performance and the tubes worked. Control system; Provides display and control of speed (in RPM or RCF), acceleration, braking stage and run time.

The NF 3000R centrifuge device is equipped with a cooling system that allows working in the range of -10 °C, 40 °C.

NF 3000R CENTRIFUGES ARE MANUFACTURED ACCORDING TO THE FOLLOWING STANDARDS;

EN 61010-1, EN 61326-1, EN 61010-2-020, EN ISO 15223-1, EN 62304, EN 62366, EN ISO 14971.

THIS DEVICE IS IN COMPLIANCE WITH WEEE REGULATION.

SECTION 2 – TECHNICAL SPECIFICATIONS

2.1. TECHNICAL SPECIFICATIONS TABLE

TECH. SPECS.	NF 3000R		
	Rotor Type	RPM	RCF
Maximum Capacity/RPM/RCF	4x750ml	4600	4637
	30x1.5/2ml	15000	24904
	50x1.5/2ml	15000	22136/24904
Control System	N-Prime™ Programmable Microprocessor Control		
Display	N-Wise™ - 7" Touch Screen (800x480)		
Programs	Pre-Cooling Program + 99 Custom Program		
Speed Range	500 – 15.000 RPM		
Speed Step	10 RPM		
Speed Accuracy	± 30 RPM		
Timer Range	01 – 99 Min. + HOLD Position		
Timer Step	1 Min.		
Acceleration Rate	10 count (0: slow 9: fast)		
Braking Rate	10 count (0: slow 9: fast)		
Memory	3 GB		
Motor	Maintenance Free Induction Motor		
Power Supply	230 V, 50Hz		
Temp. Range	- 10°C / 40°C		
Refrigerant Liquid	R452a		
Temp. Accuracy	1°C		
Temp. Performance	4°C at 4100RPM (for swing-out rotor)*		
Max. Power	2000 W		
Ext. Dim. (WxDxH)	905x715x415 mm		
Packing Dim. (WxDxH)	1040x820x600 mm		
Net / Gross Weight	135 kg / 170 kg		
*There is the explanation about Cooling performance at Chapter 5.8			

2.2. ACCESSORIES FOR NF 3000R

B50 036	SWING-OUT ROTOR
G51 044	SEALING CAP – SET OF BUCKETS
G51 050	35x5ml RIA – SET OF INSERTS
G51 045	22x5ml – SET OF INSERTS
G51 051	22x7ml – SET OF INSERTS
G51 046	19x15ml – SET OF INSERTS
G51 047	13x15ml Conical – SET OF INSERTS
G51 052	9x25ml – SET OF INSERTS
G51 048	5x50ml Conical – SET OF INSERTS
G51 053	4x50ml Circle – SET OF INSERTS
G51 049	5x50ml Skirted – SET OF INSERTS
G51 054	4x80ml – SET OF INSERTS
G51 055	1x200ml – SET OF INSERTS
G51 056	1x250ml – SET OF INSERTS
G51 043	SET OF BUCKETS FOR BLOOD BAG
G03 055	SET OF INSERTS FOR BLOOD BAG
K04 532	COVER OF BUCKETS
B50 037	ANGLE ROTOR 30x1,5/2 ml
B50 042	ANGLE ROTOR 50x1,5/2 ml
<p>* The capacity of the bags used in the triple blood bag set should have a maximum volume of 450 ml.</p> <p>* G51 043 basket set accessory includes G03 055 and K04 532 accessories.</p>	

GENERAL PRESENTATION

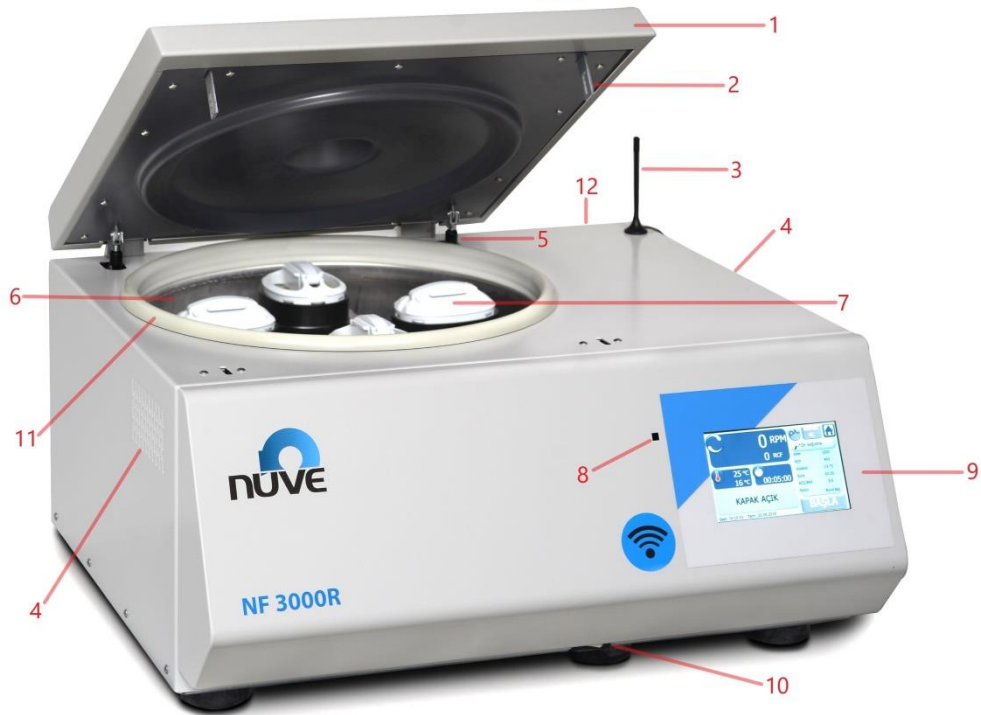


Figure 1 – NF 3000R

1	LID	7	Rotor&Bucket
2	LID Lock	8	Manual LID Opening Hole
3	Wi-Fi Antenna	9	Control Unit
4	Cooling Ventilation	10	ON/OFF Switch
5	LID Damper	11	LID Gasket
6	Chamber	12	Power Cable

2.3. ROTOR SELECTION TABLE

Swing-Out Rotor and Accessories

ROTOR	DESCRIPTION	CAPACITY	MAX. TUBE DIM (MM)	RAD. (MM)	MAX RPM	MAX. RCF
B50 036	Swing-Out	4x750 ml		196	4600	4637
	Set of 4 Bucket	1x750 ml				
	Set of 4 Inserts	35x5 ml-Ria	12	196		
	Set of 4 Inserts	22x5 ml	12			
	Set of 4 Inserts	22x7 ml	12			
	Set of 4 Inserts	19x15 ml	16			
	Set of 4 Inserts	13x15 ml-Conical Bottom	17			
	Set of 4 Inserts	9x25 ml	24			
	Set of 4 Inserts	5x50 ml-Conical Bottom	30	194	4600	4589
	Set of 4 Inserts	4x50 ml-Circle Bottom	34	196	4600	4637
	Set of 4 Inserts	5x50 ml-Skirted Bottom	30	194	4600	4589
	Set of 4 Inserts	4x80 ml	38	196	4600	4637
	Set of 4 Inserts	1x200 ml	60			
	Set of 4 Inserts	1x250 ml	62			
	Set of 4 Bucket	4x Üçlü Kan Torbası	-			
	Set of 4 Inserts	4x Üçlü Kan Torbası	-			

Angle Rotor and Accessories

ROTOR	DESCRIPTION	CAPACITY	MAX. TUBE DIM (MM)	RAD. (MM)	MAX RPM	MAX. RCF
B50 037	Angle Rotor	30x1,5/2 ml	11	99	15000	24904
B50 042	Angle Rotor	50x1,5/2 ml	11	88/99 mm (inner/outer)	15000	22136/24904 (inner/outer)

2.4. PRECAUTIONS AND USAGE LIMITATIONS

- Do not use the device for any purpose other than the usage purpose.
- Prior to first use, the user's manual should be read and the device is only to be used by authorized and trained personnel. Only authorized technical personnel handle the product in case of any failure.
- The working bench should be durable to the device weight and vibration isolated.
- Mains supply should be appropriate to power of the device and grounded.
- Do not put any foreign material on the device and do not work with foreign materials when the device is powered and the lid is open.
- Do not move and any physical intervention to the device. while it is running.

- According to the standard IEC 61010-2-020, anyone and any hazardous materials should not be in the 300 mm safety zone while centrifuge is running.
- Ensure that the rotor is placed correctly prior to usage.
- Do not open the lid while rotor is spinning.
- Use only the the spare parts, rotors and accessories which are supplied by NUVE.
- Load the rotor according to the explanations in the user's manual.
- Start the device after ensuring the rotor is loaded correctly.
- The rotor, basket and body should not be used after dropping the accessories. Technical service personnel should be informed.
- Do not use rotors and accessories with corrosion and mechanical damages.
- Use tubes whose sizes are suitable to the rotor and accessories.
- Tubes which are used in the centrifuge should not be deformed by the effect of the centrifuge force.
- Use glass tubes to balance, if glass tubes are used. Use plastics tubes to balance, if plastics tubes are used.
- Do not start the device unless tubes are in balance.
- Imbalance loading may cause mixing the samples, broken tubes, and damages on the rotor and motor shaft.
- Apply the manual lid opening procedure in the case of power cut or in the case of any error.
- Do not use the centrifuge in areas which are in explosive danger.
- Do not centrifuge the explosive, flammable, radioactive, corrosive materials and the materials which may react with each other.
- The centrifuge and the rotor are not microbiologically leak-proof. Use tubes with leak-proof covers, if hazardous, toxic and pathogenic microorganisms are centrifuged.
- Review Section 7 for risks of contamination in work with toxic and pathogenic microorganisms.
- Do not use corrosive materials which may be harmful for the device integrity, rotor and accessories.
- Drain the condensate that accumulates in the cell, which will be formed as a result of the cooled works, regularly from the hose at the back of the device. Dry with a dry cloth in cases where you cannot evacuate.
- Cleaning and decontamination are required before the device, rotor and accessories are repaired or transferred to the Service Personnel.
- Do not leave the lid of the device open for more than 1 minute after using the pre-cooling program. Start the program you will be working on quickly.



If mentioned warnings are not considered, nüve will not be responsible from their results.

SECTION 3 – SYMBOLS

	Symbol in the operating instructions: Attention, general hazard area. This symbol refers to safety relevant warnings and indicates possibly dangerous situations. The non-adherence to these warnings can lead to material damage and injury to personal.
	Symbol in the operating instructions: This symbol refers to important circumstances.
	Onaylanmış Kuruluş: KİWA BELGELENDİRME HİZMETLERİ A.Ş. (İTOSB) İstanbul Tuzla Organize Sanayi Bölgesi Tepeören Mevkii 34957 Tuzla-İstanbul / TÜRKİYE
	To identify the manufacturer of a product.
	To indicate the date on which a product was manufactured.
	This product is subject to the directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) of the European Parliament and of the EU Council of Ministers.
	Before operating the instrument this manual should be read carefully.
	Symbol on the product label: This symbol identifies the catalog information of the product.
	Symbol on the product label: This symbol identifies the serial number of the product.
	Symbol on the product label: This symbol identifies that the product is a medical device.
	Symbol on the product label: This symbol identifies the Unique Device Identifier of the product.

Labels on the product:



SECTION 4 – INSTALLATION

4.1. LIFTING AND TRANSPORT

Because of the heavy weight of the centrifuge, all lifting and transport must be carried out using proper handling equipment. The centrifuge should be lifted from underneath and never be turned over.

4.2. UNPACKING

Remove the packing cardboard box and the second nylon packing around the centrifuge. The below written are provided with the instrument, please check them;

- 1 ea. User's Manual
- 1 ea. Warranty certification
- 1 ea. Power Cable
- 1 ea. T Shaped 5mm Allen (manual lid opening tool)
- Lubricant oil

4.3. POSITIONING

- Check that no damage has occurred during transport.
- Check that the positioning is suitable for users.
- Lift the centrifuge (use proper handling equipment if necessary) underneath and carry it to its place.
- The bench-top must be rigid enough to support the weight and vibrations.
- Leave 30 cm. free space on the every side of the centrifuge.
- Check that the centrifuge is stable on its four pads.
- Open the lid by using unlocking tool and check no substances left in the bowl.
- The user should be able to follow the centrifuge during the operation
- Make sure that the centrifuge does not occupy the utilization space of nearby equipment or do damage to them.
- Check that your power line is suitable for the power of the device (230 V, 50/60 Hz grounded socket), if not, use a new line.
- In order to avoid any imbalance during centrifugation, the device must be placed in a straight-parallel manner to the floor. You can use the spirit level when balancing the device.



According to the standard IEC 61010-2-020, anyone and any hazardous materials should not be in the 300 mm safety zone while centrifuge is running.



The centrifuges are designed to operate safely under the following conditions:

- Indoor use only
- Ambient temperature: 5 °C to 25 °C.
- Maximum relative humidity of 80% for temperature up to 22 °C.
- Maximum altitude: 2000 m.
- Temperature for maximum performance: 15 °C / 25 °C.

4.4. MAIN SUPPLY

The centrifuge requires 230 V, 50 Hz. Please make sure that the supplied mains match the required power ratings. If no, provide an extra line to support.



Always plug the sterilizer/ovens to properly earthed sockets.



A supply fitted with a circuit breaker should be used for protection against indirect contact in case of an insulation fault.

SECTION 5 – OPERATING UNIT

5.1. OPERATING

- Open the lid and check that there is no sample in the instrument.
- Turn the centrifuges on by using On/Off switch.
- See that the display and control panel activates.
- Learn the functions of the control panel (See Part 5.2).
- Set the values and start the operation (See Part 5.4)

5.2. DISPLAY AND CONTROL UNIT

5.2.1 MAIN MENU

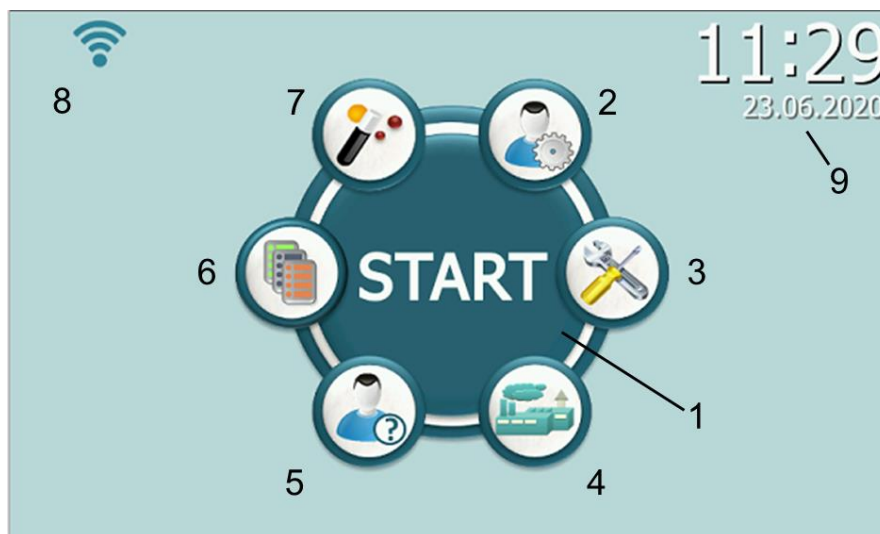


Figure 2 – Main Menu

01-START

It is used to entering to the working screen.

02-User's Setting

03-Service

04-Factory Setting

05-Info/Help

06-Memory

07-Programs

08-Wi-Fi, Cloud Situation Icon

09-Date/Time

5.2.2 WORKING SCREEN

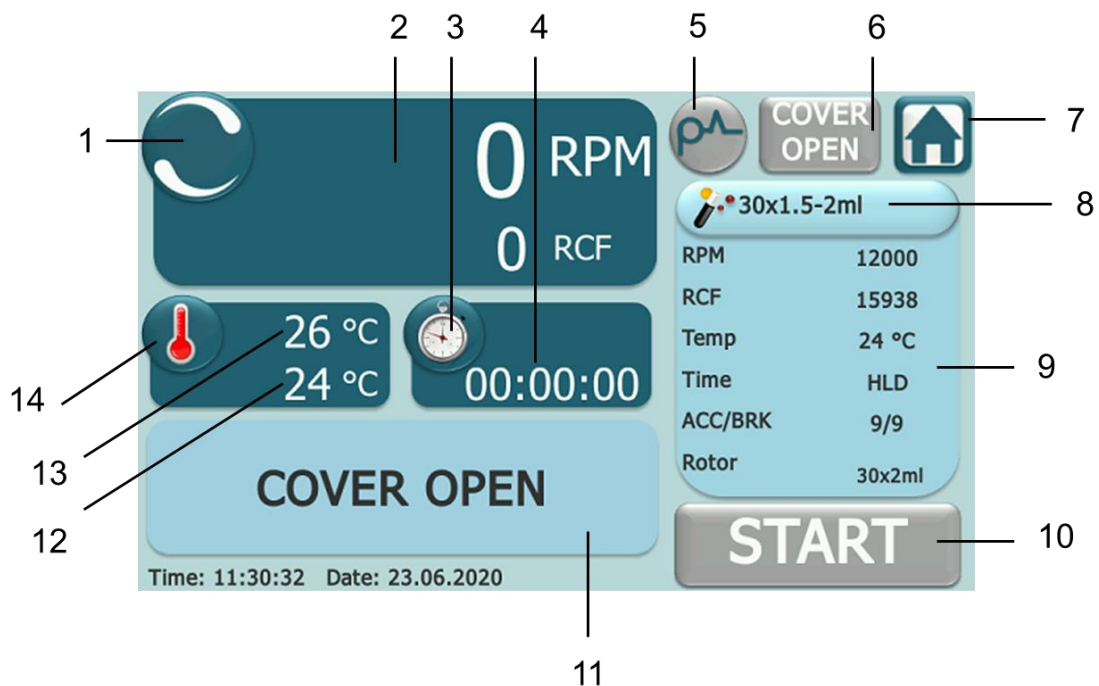


Figure 3 – Working Screen

01-Working Animation

It shows the motor/rotor are spinning.

02-Speed

It shows the RPM / RCF values read from the device. For the area of RPM / RCF values, the selection varies according to the unit value that it has chosen.

03-Time Button

The forward / backward counting preference of the time parameter entered via the button is changed.

04-Time Display

Hour: minute: second

05-PULSE

Device “READY” PULSE feature is activated. It is active if it is green, it is passive if it is gray.

06-LID Button

It is used to open the door in cases where the door is suitable for opening. It is active if it is green, it is passive if it is gray.

07-Main Menu Button

If the device is working, it is passive.

08-Programs

Reachable to pre-set programs.

09-Program Detail

Details of the selected program.

10-Function Button

Start(green), Stop(red), Delay(yellow) and if it is gray, it is passive.

11-Status Display

It shows tp notifications, errors and working phases.

12-Chamber Temperature

It is the chamber temperature. It is not the temperature of sample. Please be careful for this while setting the temperature!

13-Condenser/Ambient Temperature

14-Temperature Button

It hides the condenser temperature.

5.2.3 USER'S SETTING

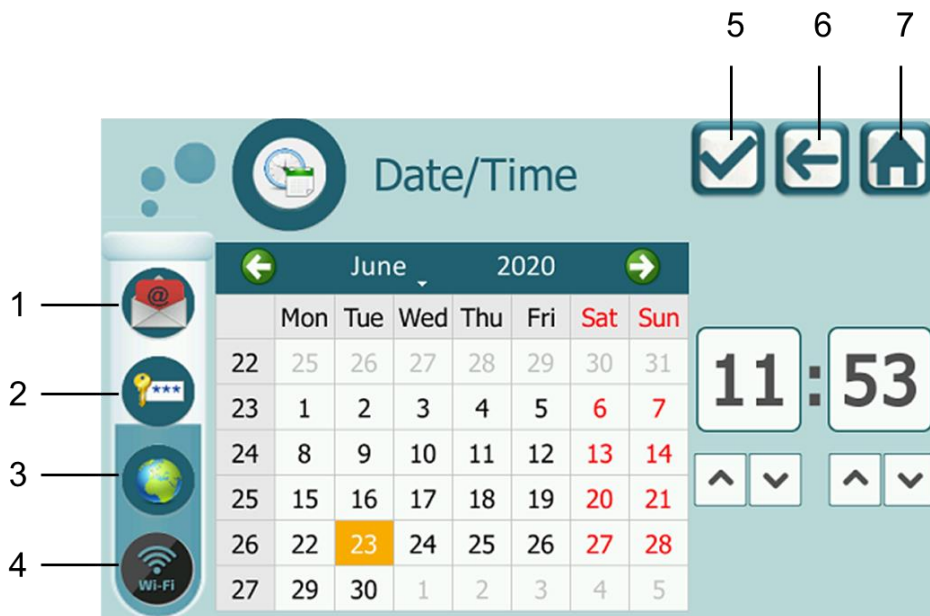


Figure 4 – User's Setting

01-E-Mail Setting

02-Password(Authorization) Setting

It is the password-changing menu of Admins and Operators.

When the device is installed, the admin and operator passwords are as follows:



Admin: "0000"
Operator 1: "1111"
Operator 2: "2222"

It is recommended to change passwords after device setup.

03-Language

04-Wi-Fi Setting

SSID(Wi-Fi name) and password.

05-Confirm Button

Back to the main menu with saving any changes.

06-Back(ESC) Button

Back to the main menu without saving any changes.

07-Main Menu Button

Back to the main menu without saving any changes.

5.2.4 MEMORY

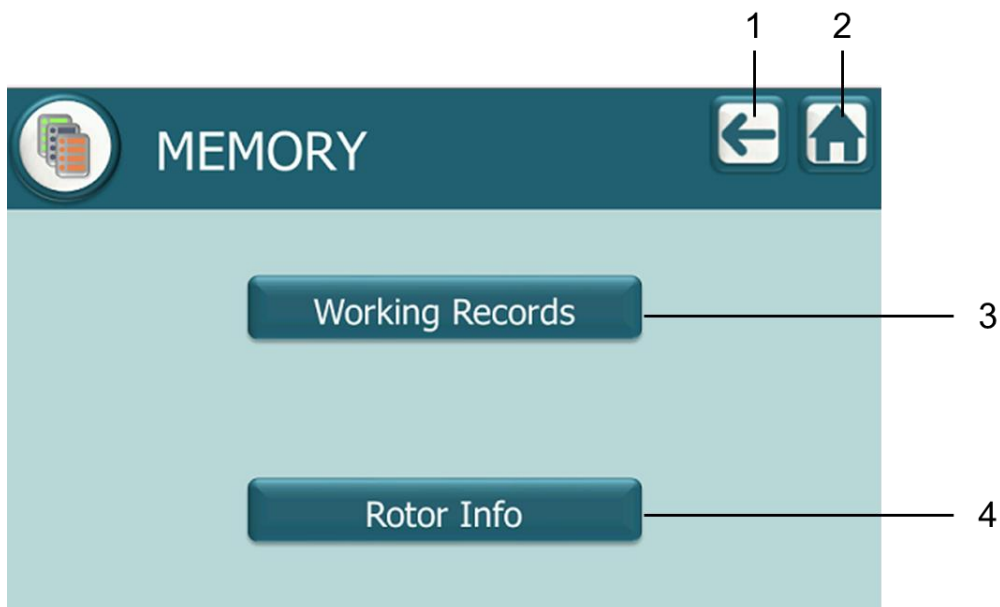


Figure 5 – Memory

01-Working Records

Working records are transferred to USB in this menu

02-Rotor Info

Rotor Cycle Info

03-Back(ESC) Button

04-Main Menu Button

5.2.5 INFO/HELP

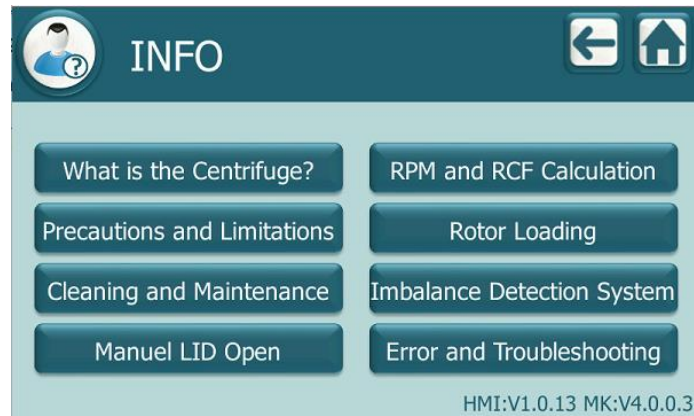


Figure 6 – Info/Help

There is also some information in the user manual that adapts to the easy use. Also the menu shows HMI and MK software version.

5.2.6 PROGRAMS



Figure 7 – Program List

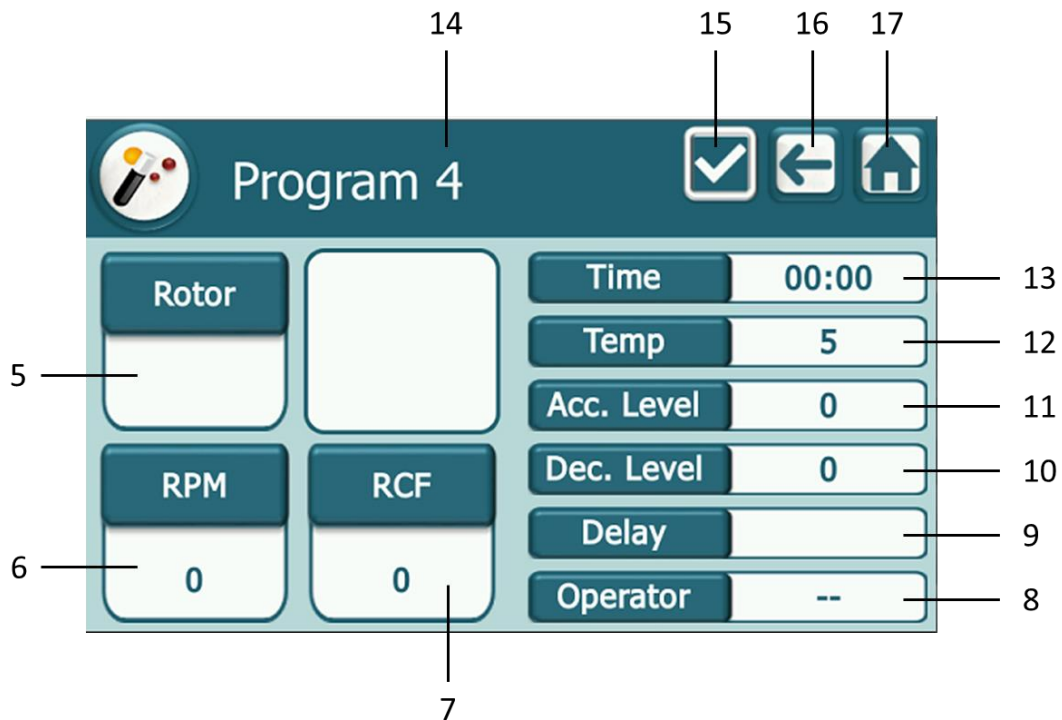


Figure 8

01-Forward/Backward

It changes the page.

02-Program

It reaches the program setting page and program details.

03-Back(ESC) Button

04-Main Menu Button

05-Rotor List

06-RPM Value

RPM value is entered with numpad keyboard.

07-RCF Value

RCF value is entered with numpad keyboard.

08- Authorization

Authorization for the program.

09-Delay Time

Date and time for the delay program.

10-Deceleration Value

11-Acceleration Value

12-Chamber Temperature Value

It is the chamber temperature. It is not the temperature of sample. Please be careful for this while setting the temperature!

13-Centrifuge Time

14- Program Name

It is entered with keyboard.

15- Confirm Button

Back to the main menu with saving any changes. It is passive when the program parameters keyboard(pop-up keyboard) is opened.

! So firstly close the open keyboard(pop-up keyboard).

16- Back(ESC) Button

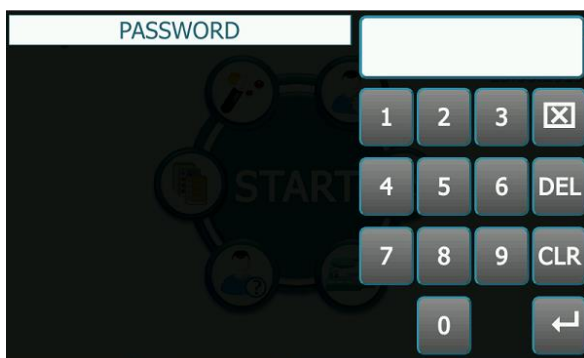
Back to the main menu without saving any changes.

17- Main Menu Button

Back to the main menu without saving any changes.

5.3. MAKING A PROGRAM

Determine the rotor type of the program, RPM / RCF values, time to work, temperature to work, acceleration and deceleration, standby and operator options. Please review chapter 5.2.6 before making the program preparation.



Select the Programs menu from the main menu. Login with your password.



Choose from 99 customizable programs.



The program screen you selected will be as shown in the figure. Set the options you selected step by step.



Select the Rotor tab. Select the rotor you have determined from the list in the pop-up windows that comes up. Use the scrollbar to move up and down the list.



Select the RPM tab. Enter the value you set on the numerical keyboard (numpad) that comes up.

The value you enter as RPM will be automatically converted as RCF..

To work on the RCF value, select the RCF tab and follow the same steps..



Select the Time tab. Enter the value you set on the numerical keyboard (numpad) that comes up.

Enter the time value according to as shown in the figure.



Select the Temperature tab. Enter the value you set on the numerical keyboard (numpad) that comes up.

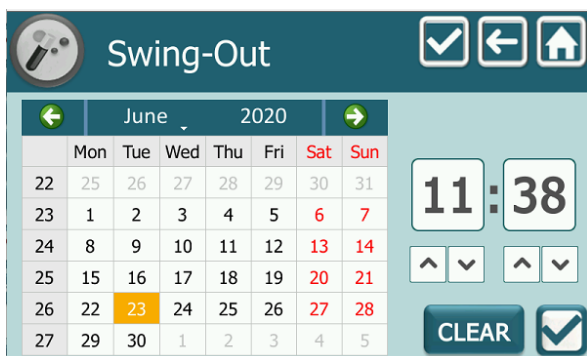
It is the chamber temperature. It is not the temperature of sample. Please be careful for this while setting the temperature!



Select the ACC level tab. Enter the value you set on the numerical keyboard (numpad) that comes up.

Follow the same steps to enter the deceleration value.

Ideal acceleration and deceleration value is 7 (seven). It is not recommended to study above this value unless there is a contrary statement in the literature knowledge of the studies to be conducted.



Select the Waiting tab. Enter the value you set on the date / time screen that comes up and press the confirm button to exit. To cancel the standby state, press the CLEAR button to exit.



Select the Operator tab. Select the operator to work with the program.



If you want to change the program name, select the place where the program name is written, enter the name you specify with the keyboard and save it with ENTER.



After making all the program settings, save by pressing the CONFIRM button.

If you press the BACK or MAIN MENU button, you will exit without saving..

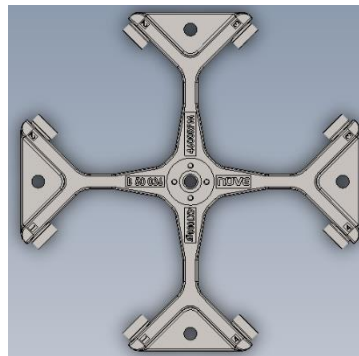


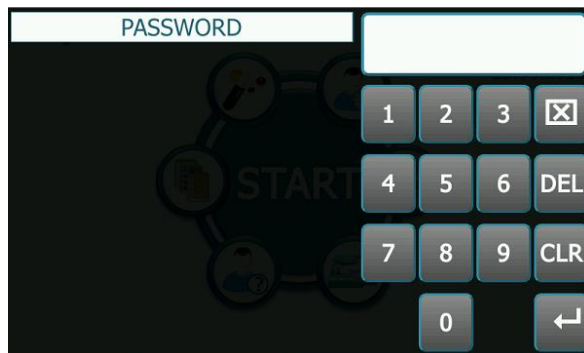
Figure 9



The correct rotor type should be selected in order to see the correct RCF values during the run.

5.4 SELECTING THE MEMORIZED PROGRAM

- Apply power to the device with on-off switch.
- See that the control panel is operational.



Select the START menu from the main menu. Login with your password.



Place your samples and close the lid of the device.



Select the program you want to work from the list of programs that comes up by pressing the PROGRAMS button.



Check the device from the STATUS DISPLAY. With the device in the READY position, start the device by pressing the FUNCTION BUTTON (START).



You can follow the device and process phases on the STATUS DISPLAY.

Also, when you want to stop the device, you can stop the device by pressing the FUNCTION BUTTON (STOP).



After the process, the device will give an audible warning. After hearing the warning, check the device on the STATUS DISPLAY. If it is the end of the process, open the device cover by pressing the OPEN LID (LID) button.

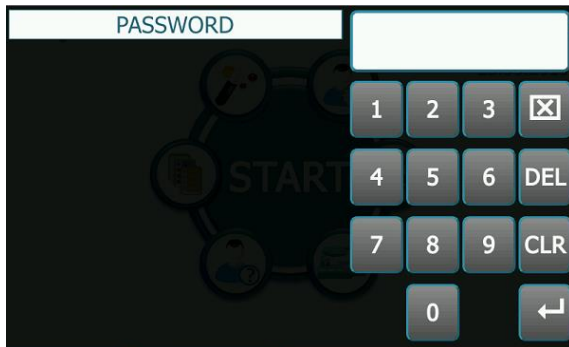


Pre-Cooling;

If the program temperature you are working on NF 3000R is lower than the ambient temperature, run the Pre-Cooling process without sample before the program you will run to achieve maximum performance. When the value on the screen reaches the set temperature, stop the program.

5.4.1 PULSE MODE

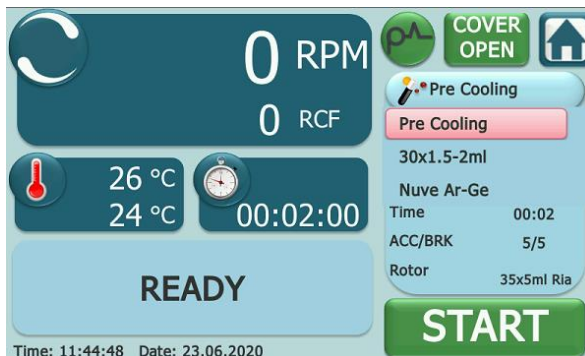
- Load the rotor with samples by paying attention to the dynamic and static balances.
- Set the all parameters for program (See Chapter 5.3).
- Apply power to the device with on-off switch.
- See that the control panel is operational.



Select the START menu from the main menu. Login with your password.



Place your samples and close the lid of the device.



Select the program you want to work from the list of programs that comes up by pressing the PROGRAMS button.



Check the device from the STATUS DISPLAY. With the device in the READY position, start the device by pressing the PULSE button. You can reach the desired speed by HOLDING down the PULSE button within the RPM speed limits you set.

- In the PULSE mode, the rotor operates according to the set acceleration and braking values you set.
- While operating in Pulse mode, press the PULSE BUTTON and start counting from the moment the rotor starts to accelerate. When you take your hand out of the PULSE BUTTON, it will stop counting by braking.
- You can reach the desired speed by pressing and holding the PULSE BUTTON within the RPM speed limits you have set.

5.4.2 PRE COOLING PROGRAM

In Pre-Cooling program, rotor, temperature, duration and waiting options can be changed. When working with the Pre-Cooling program, follow the steps in Chapter 5.4.

Do not forget to select Pre-Cooling program from the program list. Also work without sample.

- Do not leave the lid of the device open for more than 1 minute after using the pre-cooling program. Start the program you will be working on quickly.



Figure 10



At hold position, the rotor keeps spinning until the FUNCTION BUTTON (STOP) is pushed. After the FUNCTION BUTTON has been pushed, the rotor brakes according to the set brake rate.



Please open the lid after every operation, otherwise the centrifuge cannot be run again.

5.5 END OF OPERATION

At the end of the cooling operation with the NF 3000R centrifuges, dry with a non-wool soft cloth or paper towel at the centrifuge cell. (When the end of cooling operation with NF 3000R, has a puddle at the centrifuge cell. So dry to water with paper towel and soft cloth.)

5.6 SAFETY INTERLOCK SYSTEM

The safety interlock system prevents opening of the lid when the rotor is spinning.

The centrifuge does not operate until the lid is closed and the lid remains locked until the rotor stops spinning.



If power failure occurs, access to the samples is possible by opening the lid with a special tool. Please see the manual lid opening section for further information.

5.7 IMBALANCE DETECTION SYSTEM

The imbalance detection system of the NF 3000R centrifuges operates electronically when an unacceptable imbalance occurs. In this case the brake is applied immediately.

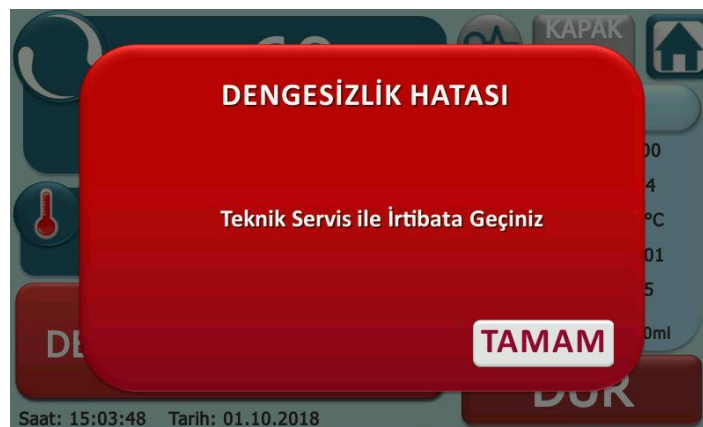


Figure 11

Imbalance status is notified to the user by notification on the Status Notification Screen (See 5.2.2) and as shown in Figure 10.

The lid cannot be opened until the rotor stops spinning. The centrifuge can only be started after the lid has been opened and the rotor has been re-loaded correctly.

To avoid facing imbalance problem, please make sure to insert the tubes correctly.

5.8 COOLING SETTING

The device has a cooling system that allows it to operate at temperatures between -10°C and + 40°C. Since there is no heating system in the device, the temperature setting is used only as a cooling process to the desired degree.

It is recommended to apply the Pre-Cooling process before each cooling operation to be performed on the device. Environmental conditions for each cooling operation are explained in Section 4.3.

The temperature commitment is + 4°C for the swing-out rotor at 4100 RPM speed. However, in order to achieve this value, it is absolutely necessary to apply Pre-Cooling process. Setting value for Pre-Cooling operation is 2500 RPM, -10°C and 30 minutes. After a Pre-Cooling process with these settings, the temperature value of + 4°C at 4100 RPM speed may fluctuate ± 3 °C. This fluctuation value is valid for 25 minutes, an increase in fluctuation may be observed in longer operations.

Other temperature-speed values for the swing-out rotor are as follows. You can shape your work according to these values.

RPM VALUE	TEMPERATURE RANGE TO WORK
500 RPM	+5°C - +40°C
1000 RPM	0°C - +40°C
1500 RPM	-10°C - +40°C
2000 RPM	-10°C - +40°C
2500 RPM	-10°C - +40°C
3000 RPM	-10°C - +40°C
3500 RPM	-5°C - +40°C
4100 RPM	+4°C - +40°C

5.9 MANUAL LID OPENING

- In case of power cut or any breakdown, the centrifuge can be opened manually to access the samples.
- Switch off the instrument.
- Insert the manual lid opening tool (allen key) into the hole on the front side of the instrument (see the general view drawing).
- Push the tool keeping it horizontal until the lid opens.
- Turn left or right side the tool, and open the lid.
- **After opening the lid manually, turn off and on device.**

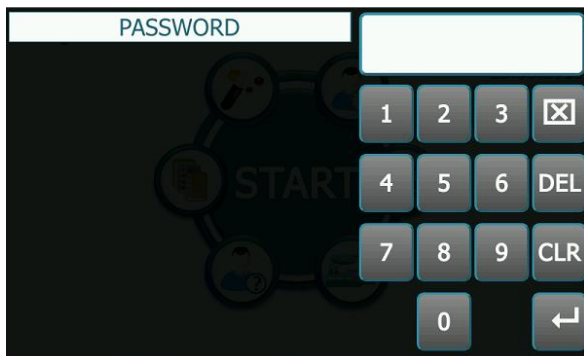


Before opening the lid manually, make sure that the rotor already stopped spinning. Upon opening the lid, lift it by hand and observe the rotor. If the rotor is still spinning, close the lid and wait approximately 10 minutes before repeating the operation. This operation must be carried by someone who is informed of the danger and of the precautions which must be undertaken.

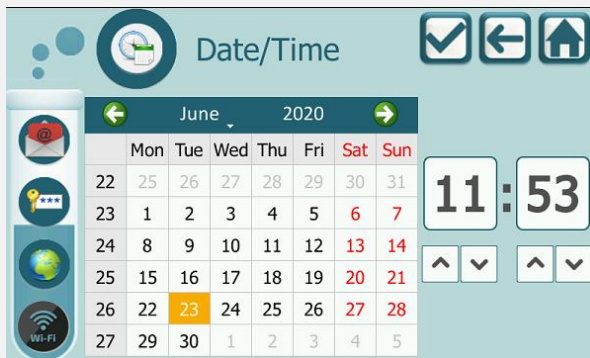


After opening the lid manually, turn off and on device.

5.10 USER'S SETTING



Select the USER'S SETTING menu from the main menu. Login with your password.

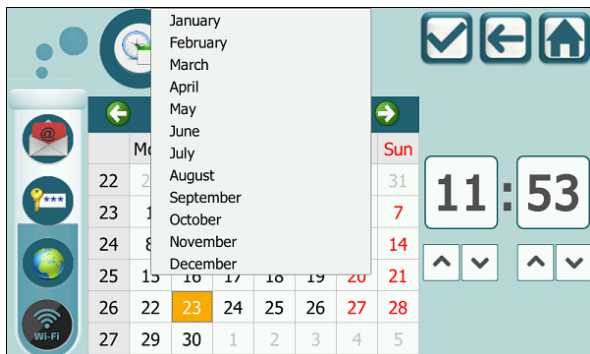


Click on the Date / Time icon to adjust the Date and Time settings.

You can make your selection with the green forward / backward arrows to select "Month".

To enter "year", you can select the place it wrote and make your selection with the up / down arrows.

You can choose the "Day" by clicking on the calendar.



You can also select the "Month" selection on the pop-up screen that appears.

Use the up / down arrows for the clock settings.



When you click on the language icon, Language Options will be displayed.

Choose one of the languages.



Select the place it wrote for the e-mail address, enter the name you specified with the keyboard and save it with ENTER.

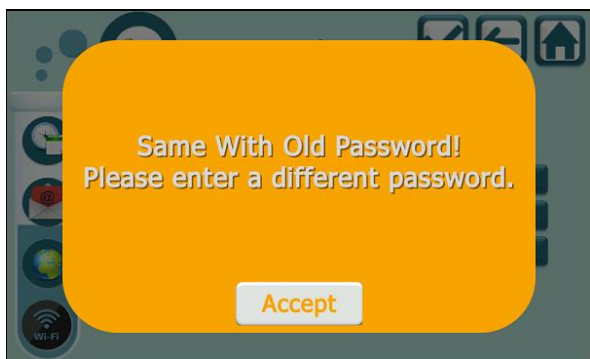
Enter the e-mail addresses according to as shown in the figure.

If you want to use the E-Mail feature, set the STATUS tab to ON.



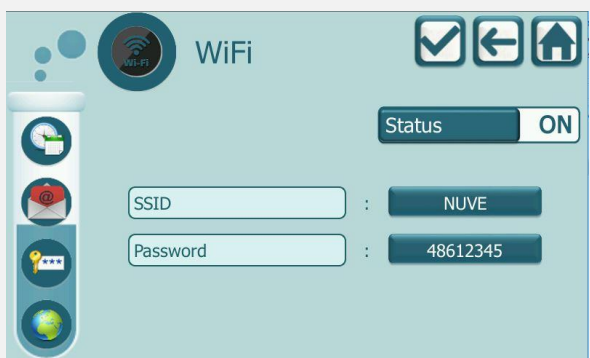
To enter a password, select the place where it typed, enter the name you specify with the keyboard and save it with ENTER.

All users' passwords must be different.



When choosing a password, do not select the old password of the user you have chosen.

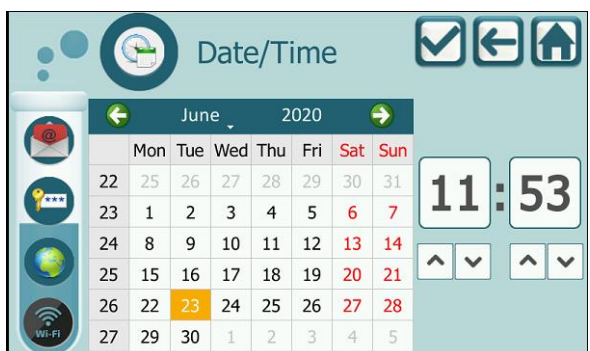
Also, you cannot use the same password as other users.



If you want to change the SSID (WiFi name) name you use, select the location where the SSID name is written, enter the name you specify with the keyboard and save it with ENTER.

To enter a password, select the place where it typed, enter the name you specify with the keyboard and save it with ENTER.

If you want to use the WiFi, set the STATUS tab to ON.



After making all user settings, save by pressing the CONFIRM BUTTON.

If you press the BACK or MAIN MENU button, you will exit without saving..

SECTION 6 – OPERATING PRINCIPLES

6.1 PREPARATION OF THE ROTOR TO RUN

Before installation, check the rotor for corrosion and cleanliness.

Chemical corrosion or mechanical corrosion may do severe damage to the rotor and the centrifuge. Particles which are stuck inside the inserts cause the breakage of tubes and lead to major imbalance please check to make sure that no particles are left on the rotor.

The central hole of the rotor and the motor shaft should also be clean and dry before all centrifugal operations and they must be kept in that way all the time.

6.2 LOADING

The most important condition of an efficient centrifugation is to balance the tubes properly. Loading must be done by meeting the requisites of static and dynamic balance.

Static Balance: This balance states that diametrically oppositely replaced weights are almost the same. In application, the liquid level in the tubes should be at the same height to balance the load.

Dynamic Balance: This balance states that diametrically oppositely replaced center of the gravity of tubes are symmetrical with respect to spinning axis of the rotor.

- Although in hospitals the samples having almost the same densities are centrifuged, in industry, samples having different densities may be centrifuged. In this case, the dynamic balance becomes more important factor than the static balance is.
- If the number of tubes to be centrifuged is less than the capacity of the rotor, the tubes must be placed oppositely. If an odd number of tubes is centrifuged, a water filled tube at the same weight should be used for balancing.



Imbalance of the rotor may cause major damage to the rotor and centrifuge.



Never attempt to introduce liquids into the tube inserts.



Balance the rotor with glass tubes if you use glass tubes for centrifugation.
Balance the rotor with plastic tubes if you use plastic tubes for centrifugation.



Always use tubes which can withstand to the set speeds.

Examples of the proper and improper loading are shown below.

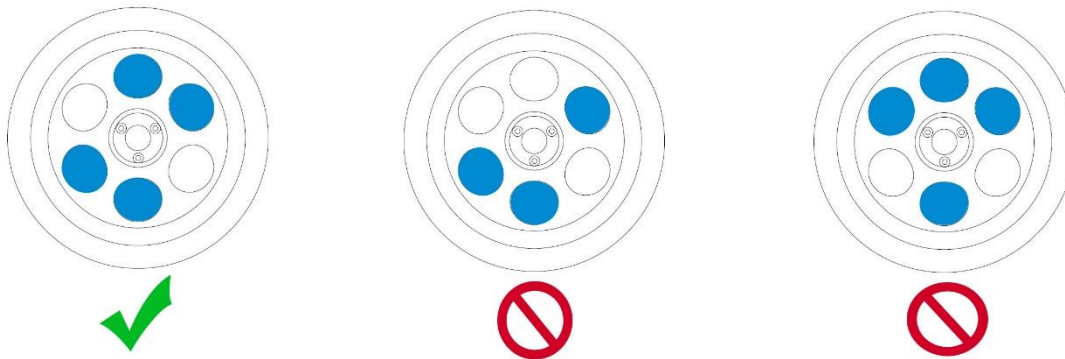


Figure 12

6.2.1 BLOOD BAG LOADING

- Blood is taken into a closed and sterile triple bag system.
- The declared size is filled up to **450 ml** in the blood bag.
- After the transfer to the blood bag, the blood left in the bag mouth with the hose should be flowed into the bag.
- Therefore, after taking blood from the donor, it should be kept upright at room temperature (20-24 ° C) for about 2 hours.



If the procedure is not followed, the debris remaining in the tubing mixes with the upper platelet / plasma after centrifugation. Product quality is negatively affected.

- The blood is placed in the carrier and placed in the baskets and then it must be balanced in order not to get imbalance error in the device.
- The baskets are weighed with precision weighing.
- Mutual baskets are equalized by weights to balance. (See Figure 13). Balancing weights are put into the carrier. Only put the carrier in the baskets.



Figure 13 – Weighed Baskets

- After this procedure is applied, the samples are placed on the carrier mutually symmetrically. (See Figure 14).

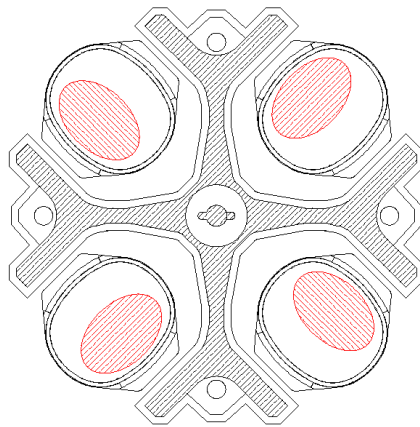


Figure 14



If a working (cooled) operation is made below room temperature, it is recommended to run "Pre-Cooling" program with baskets only before centrifugation.

After the pre-cooling is provided with the cell temperature, weights are placed in the baskets with balanced weights and the pre-set program is run.

6.3 ROTOR INSTALLATION

- Put some light oil on the drive head to prevent sticking.
- Be careful that the gap on the rotor fits on the notch of drive shaft (See Figure 6).
- Screw the shaft nut with socket wrench to the clockwise direction. Make sure that shaft nut is screwed tightly, but do not expose over-force to the socket wrench while screwing.
- For swing-out rotors, lubricate the pins where the buckets are hanged.
- Place the buckets to the rotor.
- Connect the centrifuge to the power supply.

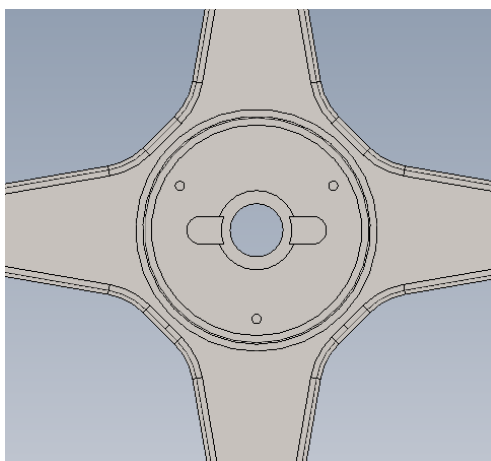


Figure 15 – Gap on the Rotor

6.4 DRIVE SYSTEM

- The rotor is driven by a three phase asynchronous motor. The microprocessor control system assures the correct drive speed.
- The force applied to the rotor is directly related to the shape of the rotor, the swing-out rotor receives more load than the angle rotor does. Longer radius and more accessories increase the load of the rotor and decrease the spinning speed.
- The centrifuge does not allow the rotor to spin at a speed which it cannot resist mechanically.
- Please make that sure the correct type of rotor is selected during programming.

SECTION 7 – CLEANING AND PERIODIC MAINTENANCE

7.1 PERIODIC MAINTENANCE

- Use personal protective equipment (gloves, gowns, masks, goggles or face shields) prior to any periodical maintenance.
- Disconnect the power cable and after the maintenance check the presence of the mains grounding line.
- Rotors should be washed after every use, especially if a spillage has occurred, in warm water containing a few drops of liquid soap. (A mild washing liquid is ideal as a cleaner).
- Rotors and other accessories must be clean if any spillage or chemicals occur.
- You may use a nylon brush to clean the buckets and tube inserts of the rotor.
- **Do not use metal brushes.**
- Dry the rotor with a piece of soft absorber cloth. Please make sure that the buckets and inserts are well dried, you may use hair dryer.
- Please do not leave the rotor on a metal surface, particularly stainless steel as electrochemical reactions set off easily with the aluminum or magnesium in the rotor.
- Check that there are no physical deformations in the operating cell at all maintenance and operation. In the event of a problem, contact only qualified technical personnel.
- In the event of liquid spillage or tube breakage, the rotor, goddesses and adapters must be well washed. Particular attention should be given to the tube particles which may remain in the gems and adapters. Be sure that such particles do not remain within the gods and adapters. Otherwise, these particles will cause the tube to break again.
- The buckets of the swing-out rotors should be greased frequently with the oil provided with the centrifuge. Please remove the light oil from the pins and put a small amount of fresh oil every time you grease. This will ensure free swinging of the buckets. Most of the imbalance problems are mostly raised by the users who do not clean and oil the pins.



Equipment or parts in contact with biological samples (patient samples, etc.) should be evaluated in such a way as to cause infection. Before any technical service, all parts must be disinfected in case of contamination. The device must be disinfected to be taken out of the laboratory for service. Disinfection should be carried out by trained personnel who have taken all necessary measures.

7.2 STERILIZATION

- Apply alcohol, for example %70 ethanol or isopropanol, for 10 minutes against bacteria and viruses.
- **The rotors and buckets which made of polypropylene material should be disinfected against microorganisms with appropriate disinfection methods. It is recommended that other rotors and buckets connected to the rotors should be sterilized using the appropriate sterilization method.**
- Do not use formaldehyde for the sterilization process.
- Phenol is a corrosive substance and should never be used.
- Glutaraldehyde is a toxic substance and increases the rate of fatty acid in the body.

7.3 CORROSION INFORMATION

- Nuve rotors which are made of aluminum are designed to spin at proper RCFs for many years. When used properly, their resistance to corrosion and their life span increases and the imbalance problems decrease.
- All accessories should be checked thoroughly and regularly as almost all laboratories already have the conditions which lead to corrosion easily.

7.3.1 CHEMICAL CORROSION

This type of corrosion is caused by chemical reactions. The electrolyte liquid on the surface of the material is the main cause of the chemical reaction. If that electrolyte liquid is allowed to stay at the surface, corrosion occurs. First, discoloration appears and then the metal pitting. Aluminum easily reacts with the ionic solutions.

The other causes of corrosion are as follows,

- Chemical vapors in the laboratory environment which dissolve in the water on the rotor (in refrigerated centrifuges)
- Corrosive liquids which overflow from overfilled and unsealed tubes. (the liquids which spread out during centrifugation)
- Contaminated and non-cleaned buckets, tubes and bottles.



If the centrifuged samples are corrosive, only rinsing with water is not sufficient. The residuals dissolve in the water and humidity on the rotor and in the buckets.



Some particles may stick to the tubes, buckets and adapters. These particles crash and do harm to anodized surface during centrifugation and ease the occurrence of corrosion.

7.3.2 STRESS CORROSION

- This type of corrosion is caused by the force of the centrifugation of the corrosive chemical which is already in contact with the alloy. As the aluminum alloy contacts with

the corrosive chemical, the stress corrosion starts. This type of corrosion is even more dangerous than the chemical corrosion as the effects of this corrosion are microscopic and very difficult to observe in the course of time.

- The corrosive material is pushed against the aluminum alloy by the centrifugation “g” force during the centrifugation. This situation causes the stress corrosion to occur more quickly than the chemical corrosion does. Microscopic cracks occur under the force of the centrifugation.
- Every centrifugation causes the aluminum rotor to be attacked by the chemical more and more and eventually micro-cracks decrease the resistance of the rotor against the centrifugation force. Fortunately, no crash occurs just after the first micro-cracks have appeared as the rotors are manufactured according to the high safety limits.
- The corrosion of the small amount of corrosive materials does not result in severe cracks but weakens the mechanical resistance of the rotor in the course of time.

7.4 ELECTRICITY

Centrifuged at high voltages are present behind the panels. These panels are electrically disconnecting Do not open the centrifuge.

SECTION 8 – DISPOSAL MANAGEMENT CONCEPT

The user is responsible for properly evaluating each part as waste. Parts that are considered to be infected must be disinfected before disposal, using methods that are valid and appropriate (steam sterilization, chemical methods).

SECTION 9 – TROUBLESHOOTING

If the centrifuge fails to operate;

- The on/off switch is on,
- The fuses are sound,
- The plug is not defective,
- The centrifuge is well connected to the supply, the electricity installation is not defective,
- Power is supplied.

In case of below written failures, related error codes are shown.

Communication Error

Indicates that communication between the MK board and HMI board is broken on the device. Check the communication cable between the cards.

Motor Overheat Error(ERR NTC Input)

Motor overheat fault has occurred. Turn off your device and let it rest for 20 minutes. Check the motor temperature on the shaft. If it is hot, continue to rest the device.

Driver Error(ERR Driver)

A malfunction has occurred in the motor drive unit. Turn off the device with the on / off switch after the engine has stopped, then switch it on again after a few minutes.If the malfunction persists, the drive unit has failed, contact technical service.

Imbalance Error(ERR Imbalance)

It is imbalance (imbalanced load) error. Check whether the weights in the baskets or sample slots are equal.

Chamber Temperature Sensor Connection Error(SBR PT Cell)

It occurs when the ends of the temperature sensor are broken.

Condenser Temperature Sensor Connection Error SBR PT Condenser

It occurs when the ends of the temperature sensor are broken.

LID Open Error(ERR Cover Open)

The device occurs when the door position switches are defective.

Speed Error(ERR Speed)

The speed reader sensor may have malfunctioned. Check the RPM / RCF speed value on the screen. If the values cannot be read on the screen, the speed reader sensor has failed. If the values can be read on the screen, the motor is defective.

For both cases, contact the dealer where you purchased the device. Check the motor drive (inverter) after checking both conditions. This fault code also occurs when the mains voltage is too low.

LID Not Opened Error(ERR Cover Not Opened)

It is the error code seen in the case of the "unlocked" key entry on the cover lock board. Replace your door lock board.

LID Not Closed Error(ERR Cover Not Closed)

It is the error code seen in the case of the "locked" key entry on the cover lock board. Replace your door lock board.

SECTION 10 – ELECTRICAL CIRCUIT DIAGRAM

