



NF400/NF400R

BENCH TOP CENTRIFUGE

USER'S MANUAL

MANUFACTURER

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 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.
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 - **THE VALIDITY OF THE GUARANTEE IS SUBJECT TO THE OBSERVATION OF THE INSTRUCTIONS AND PRECAUTIONS DESCRIBED IN THIS MANUAL.**
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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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To register your warranty online, please visit our web page www.nuve.com.tr and fill in **WARRANTY REGISTRATION FORM.**

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SECTION 1 – INTRODUCTION

1.1. USE AND FUNCTION

The NF 400/400R bench top centrifuges are designed for daily routine centrifugation requirements. The performance and capacity of NF 400/400R are ideal for the separation of blood samples, urine particles sedimentation and for carrying out the other routine applications in small and medium sized laboratories.

NF 400 is a ventilated model that ensures minimum temperature increase in sample by means of the continuous air flow system through the air channels in the lid.

Refrigerated model NF 400R offers wide range of temperature control between $-9\text{ }^{\circ}\text{C}$ and $40\text{ }^{\circ}\text{C}$ for heat sensitive samples and also provides constant sample temperature. The powerful cooling system can maintain $+4\text{ }^{\circ}\text{C}$ even at maximum speed for biologically active samples.

By means of the programmable microprocessor control system speed (RPM or RCF), time, acceleration/braking rate and temperature (for NF 400R) could be programmed and the 'pulse' function provides the operator to run the programs of short duration.

It ensures safe processes by means of the locking system which does not allow the centrifuge to operate if the lid is open and which does not allow the rotor to spin if the lid is not closed.

The lid locking system which does not allow the centrifuge to operate if the lid is open, which also does not allow the lid to be opened while the rotor is spinning and the possibility to open the lid by pushing only one key when the program ends, provide safe and easy working conditions. There are audible and visible alarms to inform the operator when the lid is open, when the program ends and when any error conditions occur. In case of a power failure, the lid could be opened manually by using a manual lid opening tool.

The NF series centrifuges are manufactured according to the following standards,

EN 61010-1, EN 61010-2-020, EN 61000-6-3, EN 50419, EN 61326-1.

This device is in compliance with WEEE Regulation.

SECTION 2 – TECHNICAL SPECIFICATIONS

2.1. TECHNICAL SPECIFICATIONS TABLE

Technical Specifications	NF 400	NF 400R
Maximum speed	4100 rpm	
Maximum RCF	2819xg	
Maximum tube capacity	Swing-out: 4x100 ml Angle: 16 x 15 ml	
Control system	Programmable Microprocessor Control	
Speed set range	1,000 - 4,100 rpm	
Speed set step	10 rpm	
Operating speed accuracy	± 20 rpm	
Timer set range	1-99 minutes and hold position	
Timer set step	1 minute	
Acceleration Rate	1: Slowest 5: Fastest	
Braking Rate	1: Slowest 5: Fastest	
Temperature range	-9 °C / +40 °C	
Refrigerant liquid	R134a	
Temperature set step	1 °C	
Motor	Induction Motor	
Supply Values	230V 50/60 Hz	
Power Consumption	450 W	750 W
External Dim.s (WXDXH) mm.	380x465x335	680x510x380
Packing Dim.s (WXDXH) mm.	440x525x440	740x650x570
Net / Packed weight (kg)	26 / 32	59 / 77

2.2. ACCESSORIES FOR NF 400/400R

A 08 062	Puller for rotor removal
B 50 024	RA 100 Swiing-out rotor 4*100 ml , 4.100rpm , 2.819 x g
G 51 001	Set of 4 inserts 1x100 ml
G 51 002	Set of 4 inserts 1x50 ml cocinal
G 51 003	Set of 4 inserts 4x15 ml
G 51 004	Set of 4 inserts 2 x15 ml cocinal
G 51 005	Set of 4 inserts 4x5 ml
B 50 018	MP 100 microtitre plate rotor 4.100 rpm, 2.011x g
B 50 028	RS 240 Angle rotor 16x15 ml , 4.100 rpm, 2.142xg
G 03 012	Adaptor for 1.5 / 2 ml tubes (Should be ordered according to the capacity of the rotor)
G 03 014	Adaptor for 13 x 100 mm vacuumed / non - vacuumed rotor (Should be ordered according to the capacity of the rotor)
G 03 015	Adaptor for 13 x 75 mm vacuumed / non- vacuumed rotor (Should be ordered according to the capacity of the rotor)

2.3. GENERAL PRESENTATION



Figure 1 - NF400 Front



Figure 2 - NF400R Front

1	LID	6	Manual LID opening hole
2	Lock pin	7	Control panel
3	Gas spring	8	Bowl
4	Lid Gasket	9	Electrical cables inlet, On / off switch and fuses
5	Rotor	10	Cooling unit (Only NF400R)

2.4. ROTOR SELECTION TABLE

Swing – Out Rotor And Accessories;

Rotor	Description	Capacity	Max.Tube Dia.(mm)	Radius (mm)	Max. Speed (rpm)	Max. RCF xg	Rotor Type
RA100	Swing-out Rotor	4x100ml		150	4,100	2,819	SC415
	Set of 4 buckets	1x100ml	46.5	143	4,100	2,687	SC400
	Set of 4 inserts	1x50ml conical	30	147	4,100	2,763	SC450
	Set of 4 inserts	4x15ml	17	139	4,100	2,612	S1615
	Set of 4 inserts	2x15ml conical	17	150	4,100	2,819	SC415
	Set of 4 inserts	4x7ml	13	139	4,100	2,612	S1615
	Set of 4 inserts	4x5ml	13	114	4,100	2,142	S1657
MP100	Microtitre Plate Rotor	2x1 microtitre plates		107	4,100	2,011	nPLAt

Angle Rotor Accessories;

Rotor	Description	Capacity	Max.Tube Dia(mm)	Max. Radius (mm)	Max.Speed (rpm)	Max RCFxg	Rotor Type
RS240	Angle Rotor	16x15ml	17	114	4,100	2.142	A1615

Adaptor For Angle Rotor;

Tube Type	Max. Tube Dia. (mm)
1.5/2 ml microtubes	11
5 ml vacuumed/non vacuumed tubes	13
7 ml vacuumed/vacuumed tubes	13

2.5. 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.
- Ensure that the rotor is placed correctly prior to usage.
- 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.
- Do not move the device while it is running.
- Do not open the lid while rotor is spinning.
- Apply the manual lid opening procedure in the case of power cut or in the case of any error.
- 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.
- 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.
- Do not use corrosive materials which may be harmful for the device integrity, rotor and accessories.
- Do not use rotors and accessories with corrosion and mechanical damages.
- Mains supply should be appropriate to power of the device and grounded.
- 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.



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.

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
- 1ea. Warranty certification
- 1 ea. power cable
- 1 ea. manual lid opening tool
- 1 ea. 24 socket wrench
- 1 ea. Wrench
- 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. Check that the centrifuge is stable on its four pads.
- 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.
- Open the lid by using unlocking tool and check no substances left in the bowl. (See the manual lid opening section 5.7)
- Make sure that the centrifuge does not occupy the utilization space of nearby equipment or do damage to them.
- The user should be able to follow the centrifuge during the operation.



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 / 60 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 5.3)

5.2. DISPLAY AND CONTROL PANEL

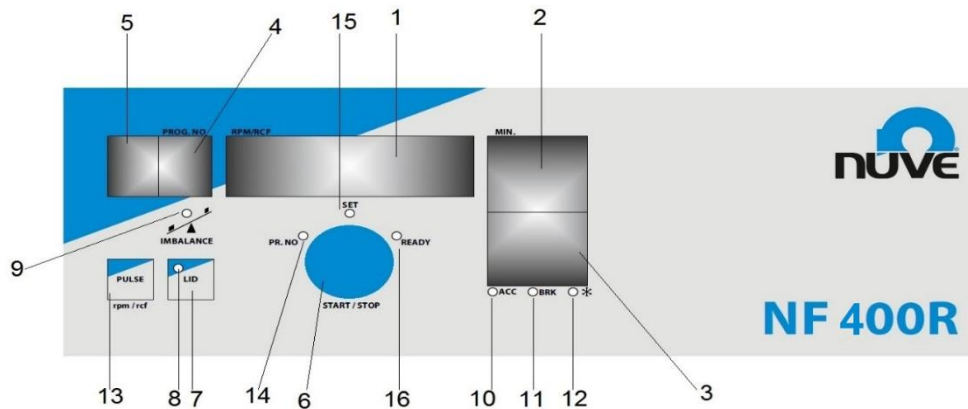


Figure 3 - Control Panel

01- Status Display

Display of speed (500 – 4100 rpm) or display of RCF (0 – 2819 xg) during the run, rotor type during programming and error code.

02- Time Display

Display of the run time from 1 min. to 99 min. and hold position (H).

03- Acceleration/Brake/Temperature Display

Display of the acceleration and brake rates from 0 to 5, for NF 400 R it also displays the bowl temperature during programming and the run.

04- Program No Display

Display of the program number from 0 to 9.

05- Running Indicator Leds

The 4 leds light up consecutively during the run to indicate the spinning of the rotor.

06- ENCODER Button

This has two functional move. Turn clockwise and opposite clockwise, reach program menu, set value and “READY” situation. By turning the Encoder button increase or decrease values during programming stage. When Led is “READY” situation, by pushing Encoder button start device. Stops the run by starting the braking phase manually.

07-LID Key

Opens the lid if the lid indicator lights up.

08- LID Indicator Led

It turns on if the lid remains open or is not properly closed.

09- Imbalance Indicator Led

It is activated if imbalance occurs. Brake is applied immediately.

10- Acceleration Indicator Led

It turns on while the acceleration rate is being programmed and while the rotor is accelerating.

11- Braking Indicator Led

This indicator turns on while the braking rate is being programmed and while the rotor is braking.

12- Cooling Indicator Led*

It indicates that the cooling system functions. During programming, it indicates that the temperature value is being set on Acc/Br/Temp Display (3).

* It is not valid for NF 400 model.

13- PULSE Button

PULSE mode on if pushing button by during READY situation. It is pushed to see the RPM or RCF value on the speed display during the run, to pass among the displays and to store the programmed values.

14- Program Number Led

It indicates that the user is on the program menu.

15- Set Menu Led





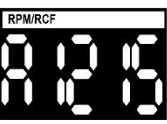

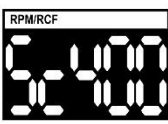



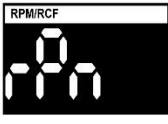

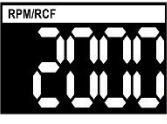

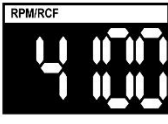

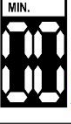















It indicates that the user is on the set value menu.

16- READY Led

It indicates that the device ready to run.

5.3. MAKING A NEW PROGRAM

Determine the rotor type, the speed and time, the acceleration and braking rates.

PROGRAM SETTING	 <p>By turning the Encoder button select SET menu.</p>	 <p>Push the Encoder button.</p>	 <p>The display flashes. By turning the Encoder button increase or decrease the value.</p>	 <p>Push the Encoder button and save the value.</p>
ROTOR TYPE SETTING	 <p>The display flashes. By turning the Encoder button increase or decrease rotor type.</p>		 <p>Push the Encoder button and save the value.</p>	
RPM / RCF	 <p>The display flashes. By turning the Encoder button select RCF or RPM.</p>		 <p>Push the Encoder button and save the value.</p>	
SPEED SETTING	 <p>The display flashes. By turning the Encoder button increase or decrease run speed.</p>		 <p>Push the Encoder button and save the value.</p>	
TIME SETTING	 <p>The display flashes. By turning the Encoder button set operating time value.</p>		 <p>Push the Encoder button and save the value.</p>	
ACCELERATION SETTING	 <p>Acceleration led turns on and the display flashes. By turning the Encoder button set acceleration level.</p>		 <p>Push the Encoder button and save the value.</p>	
BRAKE SETTING	 <p>Brake led turns on and the display flashes. By turning the Encoder button set brake level.</p>		 <p>Push the Encoder button and save the value.</p>	
TEMPERATURE SETTING (THIS STEP IS VALID FOR COOLING MODEL.)	 <p>Cooling indicator led turns on, the display flashes. By turning the Encoder button increase or decrease temperature value.</p>		 <p>Push the Encoder button and save the value.</p>	

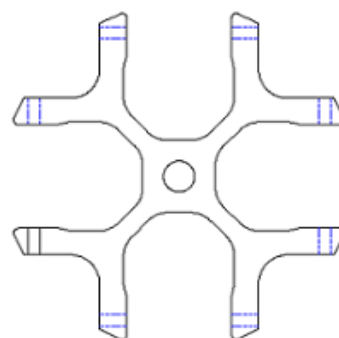
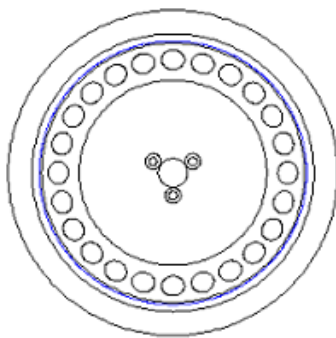


Figure 4 - Angle Rotor (left), Swing-out Rotor (right)



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

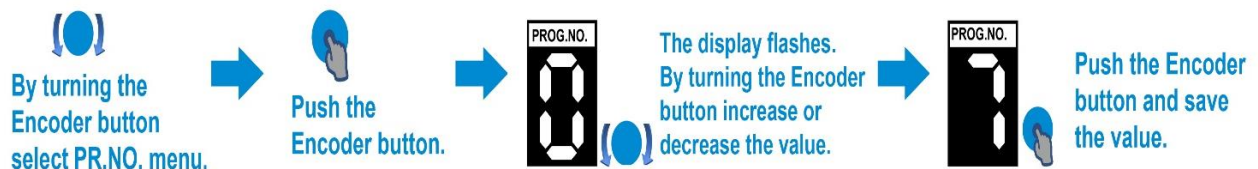


Pre Cooling;

While operating the NF 400 R centrifuge at sub-ambient temperatures, in order to get the maximum performance, without loading the rotor run the centrifuge at 1.500 rpm, at a temperature which is 3° C lower than the required temperature and at hold position until you see that the temperature inside the bowl drops to the required temperature. Then, stop the centrifuge, load your samples and start centrifugation.

5.3.1 SELECTING THE MEMORIZED PROGRAM

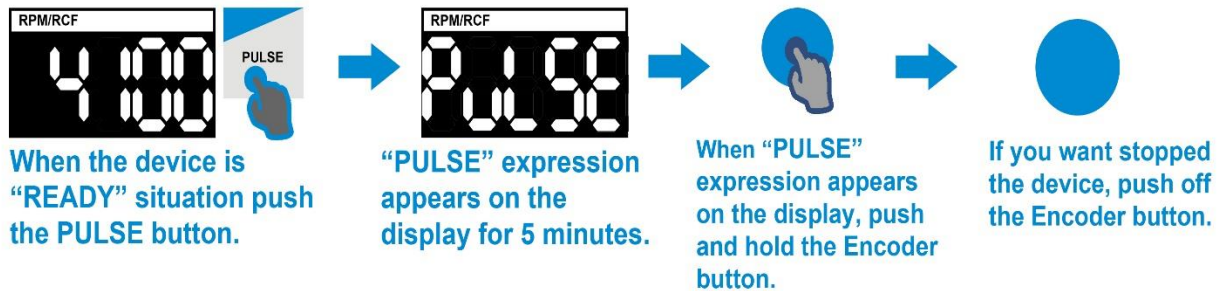
Select the requested program number at stand-by position by turning Encoder button (6) value increase and decrease. All values related to the selected program will be shown on the relevant displays. Check that all values are correct.



- Load the rotor with samples by paying attention to the dynamic and static balances.
- Close the lid, see that the lid open warning led (8) turns off.
- See that the READY led (16) turns on and push Encoder button (6).
- The rotor starts accelerating according to the set value and the acceleration led turns on. The set speed or RCF value is displayed during the set time duration. (RPM or RCF screen will appear in every 3 seconds). For the operations whose speeds are higher than 2.000 rpm, the rotor accelerates according to the set acceleration value up to 2.000 rpm and then continues accelerating with the highest acceleration value, 5 to reach the set speed. As the speed reaches the set value, “-“ sign appears on the acc/brk/temp display (3).
- The elapsed time is counted down as the centrifugation starts.
- When the time display shows “00”, the program ends, the breaking led turns on and the set break rate is shown at acc/brk/temp display (3). The rotor brakes with the highest break rate, 5 until it slows down to 2.000 rpm and continues braking according to the set braking value.
- The elapsed time until the rotor stops is counted and is shown at the time display. This is the time that passes until the rotor stops.
- When the speed display shows “0”, the “end” expression appears. The user is warned by an intermittently sounding alarm.
- Push the LID button (7) to open the lid.
- You may leave the centrifuge at stand-by position.

5.3.2 PULSE MODE

- Load the rotor with samples by paying attention to the dynamic and static balances.
- Set the all parameters for program (See 5.3)
- Close the lid, see that the lid open warning led (8) turns off.
- See that the READY led (16) turns on and push Encoder button (6).



- You can reach the desired speed by pressing and holding the Encoder button (6) within the RPM speed limits you have 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 Encoder button (6) and start counting from the moment the rotor starts to accelerate. When you take your hand out of the Encoder button, it will stop counting by braking.



You may display the RPM or RCF value on the speed display during the run by pushing the function button.



At hold position, the rotor keeps spinning until the Encoder button (6) is pushed. After the Encoder button has been pushed, the rotor brakes according to the set brake rate.



The centrifuge waits at the stand-by position with the program values of the last program.



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

5.4 END OF OPERATION

At the end of the cooling operation with the NF 400 R centrifuges, dry with a non-wool soft cloth or paper towel at the centrifuge cell. (When the end of cooling operation with NF400, has a puddle at the centrifuge cell. So dry to water with paper towel and soft cloth.)

5.5 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. The “Lid Open” indicator turns on to warn the user if the lid is not closed properly.



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 (5.7) for further information.

5.6 IMBALANCE DETECTION SYSTEM

The imbalance detection system of the NF 400 / NF 400 R centrifuges operates electronically when an unacceptable imbalance occurs. In this case the brake is applied immediately.

The “blncEer” imbalance error is displayed and the imbalance indicator (9) turns on. 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.

5.7 MANUAL LID OPENING

In case of power cut or any breakdown, the centrifuge can be opened manually to access the samples.

To open the lid manually:

- Power off the instrument
- Insert the manual lid opening tool into the hole at the left side of the instrument.
- Push the tool while keeping it vertically until the lid is opened.
- **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.

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.

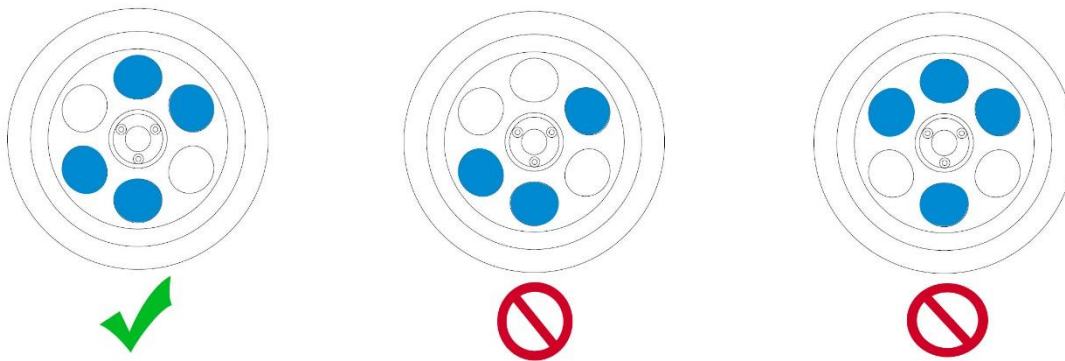


Figure 5

6.3 ROTOR INSTALLATION

- Put some light oil on the drive head to prevent sticking.
- Be careful that the rotor fits on the 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.

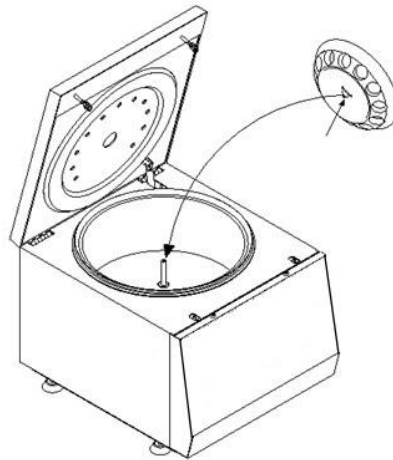


Figure 6

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

- 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.
- 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.
- 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.
- Make sure that no deposit remains at the bottom of the bucket because the pressure of a flask or tube from above during centrifugation will certainly increase the chance of corrosion.

7.2 STERILIZATION

- Apply alcohol, for example %70 ethanol or isopropanol, for 10 minutes against bacteria and viruses.
- The rotors and buckets may be autoclaved at 121°C and under 215 kPa pressure for 20 minutes but please do not forget to remove all accessories.
- 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 CLEANING

- Disconnect the centrifuge before cleaning.
- There is no need of daily cleaning unless a tube breakage occurs or any liquid spills.

7.5 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 currently valid local regulations governing disposal must be observed. It is in the responsibility of the user to arrange proper disposal of the individual components.

Applicable local regulations for disposal have to be carefully observed.

The instruments and electronic accessories (without batteries, power packs etc.) must be disposed off according to the regulations for the disposal of electronic components.

Batteries, power packs and similar power source have to be dismantled from electric/electronic parts and disposed off in accordance with applicable local regulations.

BÖLÜM 9 – TROUBLESHOOTING

If the centrifuge fails to operate,

Check that,

- 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.

In case of below written failures, related error codes shown on the speed display, motor starts braking.

Err 3 : The communication between the display & the control PCB and the motor driver PCB fails.

Err 4 : Motor overheat failure. Please wait for the motor to cool down and start the centrifuge again.

Err 5 : This failure occurs when the temperature sensor endings are broken or the temperature sensor is defective. (For NF 400R)

Err 6 : Motor driving PCB is defective.

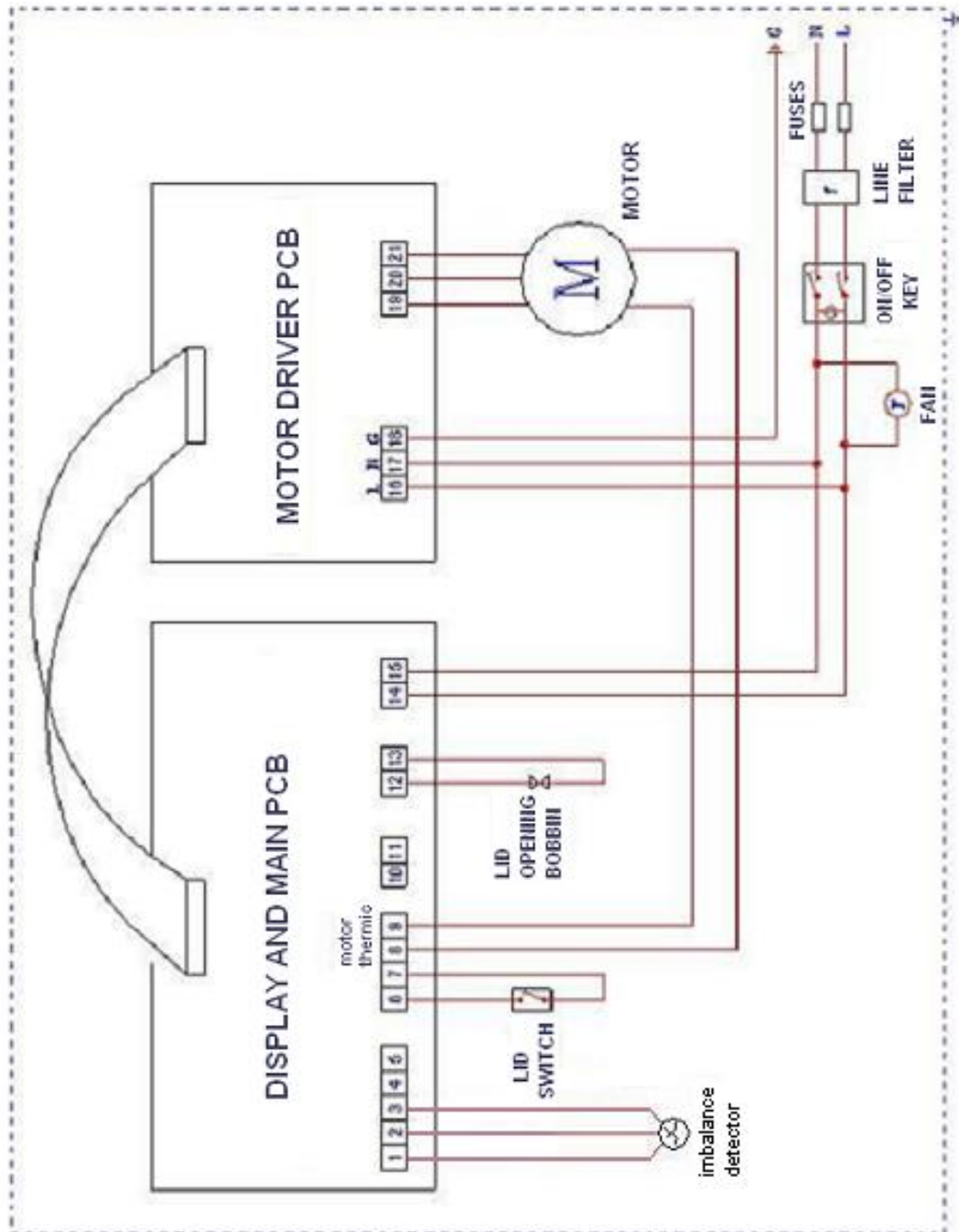
blncEEr : It is the imbalance error. This means the load is not distributed properly. Please balance the load statically and dynamically and check if the weights of the buckets are the same.

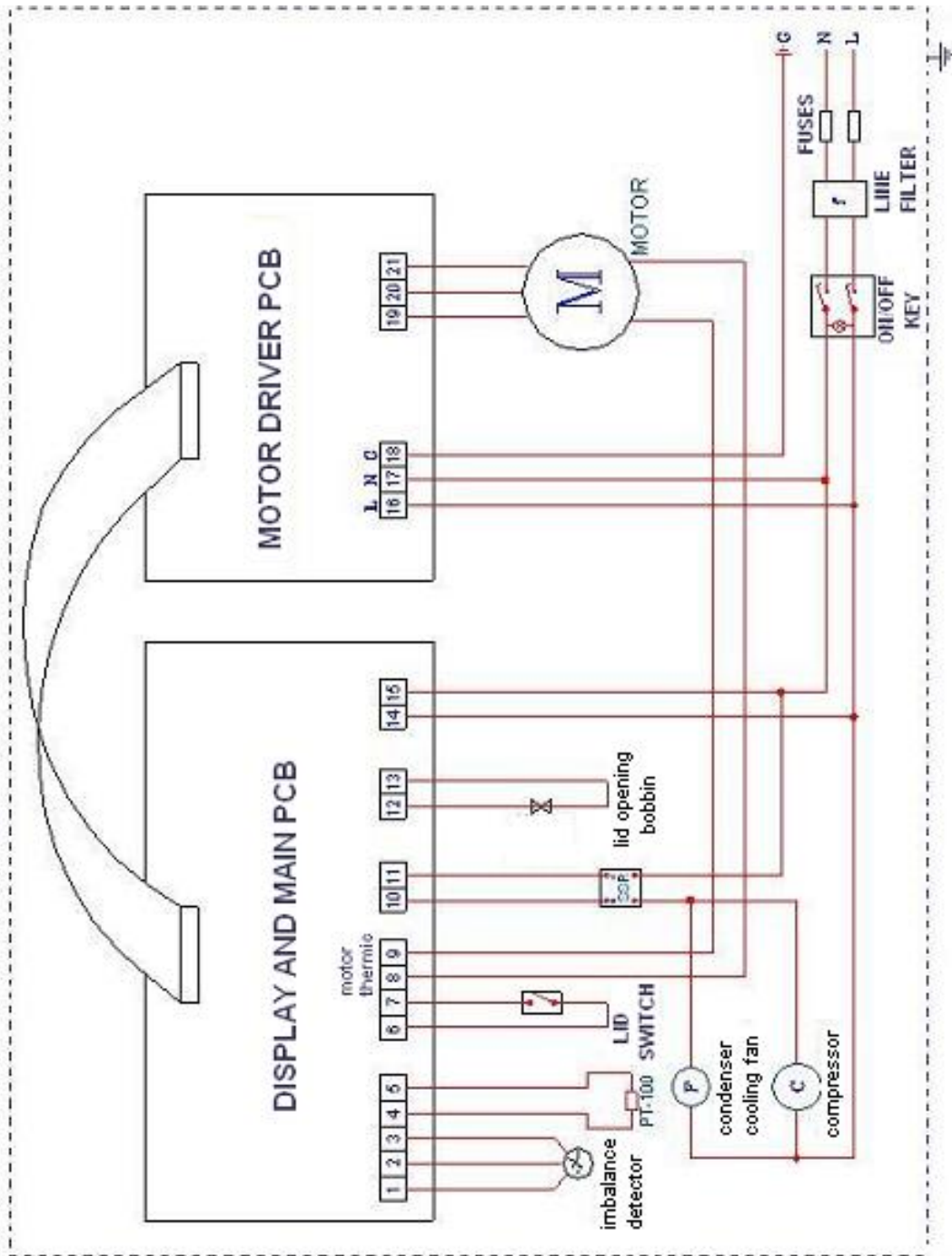
Lid open : This failure occurs when lid is opened during the centrifugation. Please close the lid properly and start the centrifuge again.

Eoff : It occurs in case of a power failure during the run. It disappears if you wait for 2 minutes or open and close the lid again.

Con: This is connection failure between main PCB and display.

SECTION 10 – ELECTRICAL CIRCUIT DIAGRAMS





SECTION 11 – WARNING LABEL



EARTHED FUSES

