



NÜVE SANAYİ MALZEMELERİ İMALAT VE TİCARET A.Ş.

NF 1200 / 1200 R

**MULTI PURPOSE BENCH TOP
CENTRIFUGES**

SERVICE MANUAL



CONTENTS	Page
SECTION 1 INTRODUCTION	
1.1. Purpose of Service Manual	3
1.2. General Purpose of the Unit	3
SECTION 2 OPERATING PRINCIPLES	
2.1. General Overview	4
2.2. Explanations of Functions	4
2.2.1. Power Supply	4
2.2.2. Main PCB	4
2.2.3. Control Panel	5
2.2.4. Refrigeration System (for NF 1200R)	6
SECTION 3 SERVICING	
3.1. General View	7
3.2. General Failure	8
3.3. Imbalance Adjustment	11
3.4. Refrigeration Systems Failures	10
3.4.1. Checking the System for Leakage	10
3.4.2. Vacuuming the System	10
3.4.3. Charging Gas to the System	12
SECTION 4 SPARE PART REPLACING	
4.1. Access to Control Units	13
4.2. Replacing the Main PCB	13
4.3. Replacing Control and Display Board	13
4.4. Replacing Temperature Sensor (for NF 1200 R)	13
4.5. Replacing Plastic Panel	13
4.6. Replacing Condenser Cooling Fan (for NF 1200 R)	13
4.7. Replacing Imbalance Detector	14
4.8. Replacing Gas Spring	14
4.9. Replacing Lid Locking Bobbin	14
4.10. Replacing Lid Lock	14
4.11. Replacing Lid Locking Switch	15
4.12. Replacing Optical Sensor	15
4.13. Replacing Motor	15
SECTION 5 DRAWINGS AND DIAGRAMS	
5.1. NF 1200 Electrical Circuit Diagram	18
5.2. NF 1200 R Electrical Circuit Diagram	19
SECTION 6 SPARE PART LIST	
Spare Part List	24

SECTION 1

INTRODUCTION

1.1. PURPOSE OF THE SERVICE MANUAL

This manual includes servicing and maintenance information for NF 1200 and NF 1200R. It is only to be used by technicians who were formerly trained by Nuve. This manual includes operating principles, diagnosing and repairing methods and the spare part replacing information.

In the case that any problem which is not identified in this manual arises, please contact Nuve factory.

Factory:
Esenboga Yolu 22. Km.
Akyurt 06287 ANKARA TURKEY
Tel: 00 90 312 399 28 30 (3 lines)
Fax: 00 90 312 399 21 97
e-mail: service@nuve.com.tr

1.2. GENERAL PRESENTATION

The NF 1200 and NF 1200R multi-purpose bench top centrifuges are microprocessor controlled units. The microprocessor controlled PCB and display board are placed on the front panel. Both centrifuges are equipped with the locking system which prevents the lid from opening while the rotor is spinning. The refrigeration system for NF 1200R is located at the right side of the centrifugation bowl.

SECTION 2

OPERATING PRINCIPLES

2.1. GENERAL OVERVIEW

NF 1200 centrifuges are split into two main components,

- Power supply
- Control unit

NF 1200 R centrifuges are split into three main components,

- Power supply
- Control unit
- Refrigeration unit

2.2. EXPLANATIONS FOR THE FUNCTIONS

2.2.1. Power Supply

The power consumption values of the centrifuges are listed below,

	Glass Fuse	Power Consumption	Power Supply
NF 1200	4 A	500 W	230 V AC
NF 1200 R	10 A	800 W	230 V AC

2.2.2. Main PCB

The microprocessor controlled PCB sends the speed information of the tri-phase induction motor to the inverter. It compares the information provided by the optical sensor with the set spinning speed information, sends the required frequency information to the inverter and the inverter regulates the voltage frequency supplied to the motor to increase or decrease the speed.

The thermostat which is placed between the motor windings prevents the motor from over temperature by stopping it if excess heat occurs (the temperature exceeds 105°C). This safety feature protects the motor and the centrifuge against over temperature.

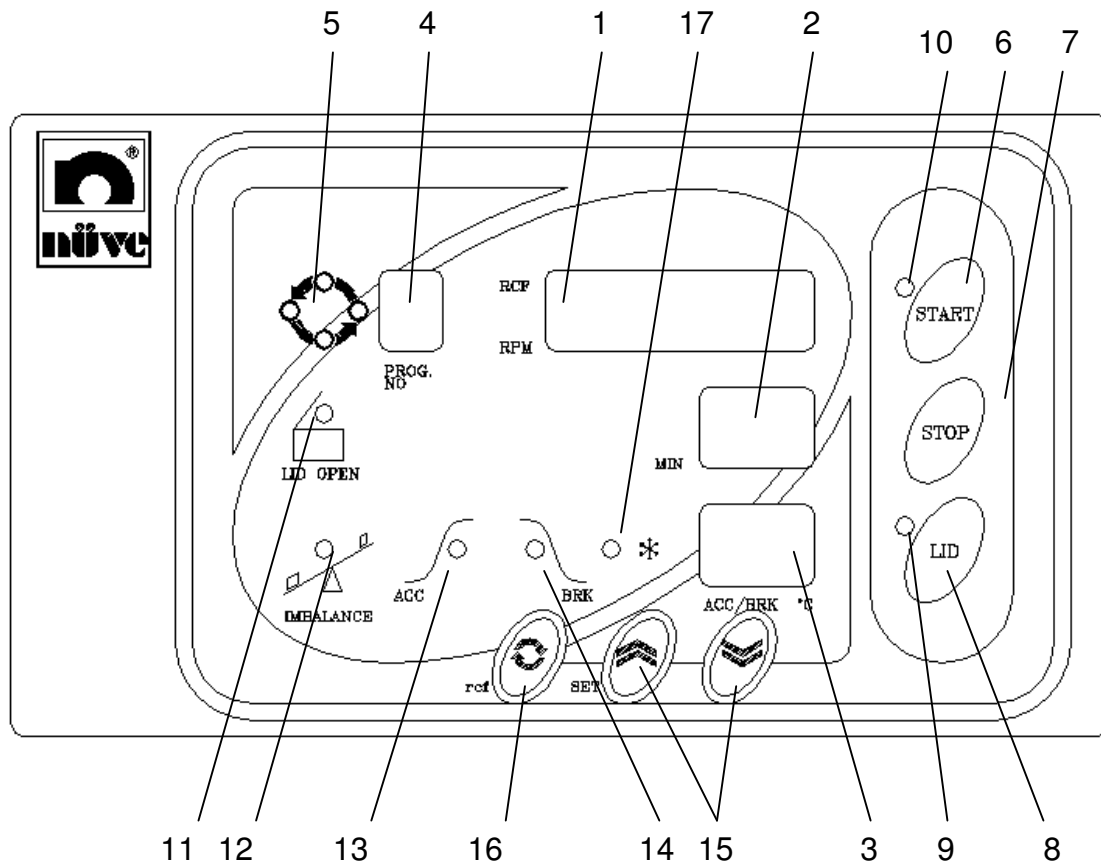
The imbalance detector placed on the motor disc under the motor senses unbearable imbalance and sends signal to the main PCB to stop the spinning of the rotor to protect the centrifuge.

The centrifuge does not operate if the lid remains open. The signal sent to the main PCB by the lid switch informs the user that the lid is open or close. The lid remains locked during the spinning of the rotor.

The temperature sensor in the NF 1200 R senses the temperature in the bowl and sends the information to the main PCB. The main PCB controls the refrigeration system to keep the temperature at set point.

2.2.3. Control Panel

The figure below shows the buttons and leds of the display. Please see user's manual for further information about the functions of the buttons and leds.



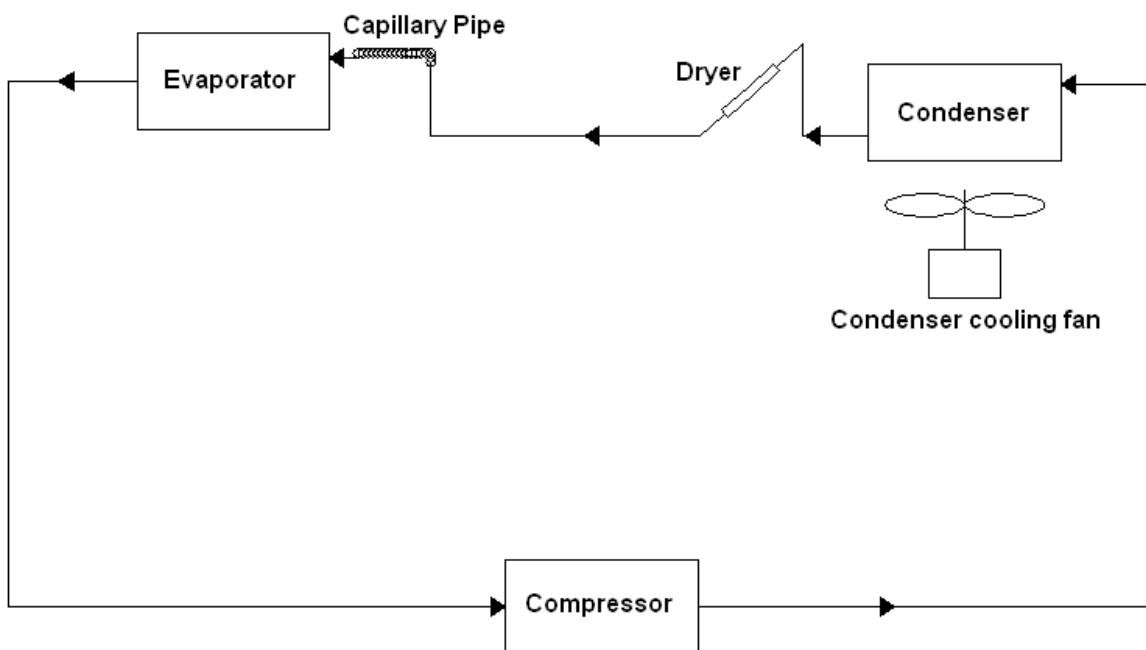
1. Speed display
2. Time display
3. ACC/ BRK/°C acceleration, breaking, temperature display (°C for NF 1200R)
4. Program number display
5. "Spinning rotor " warning leds
6. Start button
7. Stop button
8. Lid opening button

9. Lid button led
10. Start button led
11. "Lid Open" led
12. Imbalance led
13. ACC (acceleration) led
14. BRK (breaking) led
15. Value increase & decrease buttons
16. Function button
17. "Refrigeration on" led (for NF 1200 R)

2.2.4. Refrigeration System (for NF 1200 R)

The refrigerator fluid is circulated in the closed system to cool down the temperature of the bowl. The components of the system are below,

- Compressor
- Condenser cooling fan
- Condenser
- Dryer
- Capillary pipe
- Evaporator



SECTION 3

SERVICING

ATTENTION : Before servicing, please take all necessary precautions both for your own and for environment's safety. Please respect to the warnings on the centrifuge!!

3.1. General View

The failures can be diagnosed easily with the following tables.

Most of the arising problems can be confirmed by a multimeter.

The components on the main PCB must not be replaced even the failure is caused by one of the components on the main PCB. In this case, please send the failed PCB to factory service along with a note on which the failure explanations are written.

Before replacing the PCB or any control element, please make sure that the failure is not caused by loose wire and terminal connections.

3.2. GENERAL FAILURE

FAILURE	PROBABLE CAUSES	SOLUTIONS
1. The on/off switch is on but the led is not on and the display is blank.	Power inlet failure.	Check the mains supply. Check for weak connection in the socket and in the other terminal connections.
	Glass fuse has blown.	Replace the glass fuse and check all parts of the centrifuge for short circuit.
2. The on/off switch and its led are on but the display is blank or Some segments do not turn on.	The main PCB/display PCB connection cable is not fitted well or it is loose.	Disconnect the cable and re-connect it carefully.
	The cable is defective.	Replace the cable.
	The display board is defective.	Replace the display board.
3. The on/off switch is off but its led is on.	The cables of the switch is connected in reverse.	Check the connections and adjust them.
4. The fuses blow frequently.	Short-circuit exists.	Check the electrical terminals and their cables for a possible short circuit.
	(For NF 1200 R)	Check the refrigeration unit (the compressor and the condenser cooling fan) for a possible short-circuit. Replace the relevant component if short-circuit exists.
5. The lid can not be opened.	Locking system failure	Check the whole system.
		Replace the lock.
	The locking bobbin is defective.	Check it and replace if necessary.
	The gas spring is defective.	Check it and replace if necessary.
6. The centrifuge does not spin the rotor after the START has been pushed.	The "Lid Open" led does not turn off.	Check the locking switch, replace it if it is defective.
	The locking pin does not press on the locking switch tightly.	Check the locking system. If the pin does not press on the switch tightly, adjust the pin.
7. "Err 1" appears.	Imbalance occurs.	Unload the rotor and re-load paying attention to the balance.
	Imbalance adjustment fails.	Make the adjustment again.(See 3.3)
	The imbalance detector fails.	Replace the detector.
	The main PCB fails.	Replace the main PCB.

FAILURE	PROBABLE CAUSES	SOLUTIONS
8. "Err 2" appears.	Excess heat occurs in the motor windings.	Make the centrifuge wait on stand-by for approximately 30 minutes.
	The motor cooling fan is defective (for NF 1200).	Check the fan and replace it if necessary.
	The motor is defective.	Replace the motor.
9. "Err 3" appears.	The mains voltage is lower than 198 V lower limit.	Check the supplied voltage.
	The optical sensor is defective.	Replace the optical sensor.
	The main PCB is defective.	Replace the main PCB.
10. "Err 4" appears.	The lid has been opened during the centrifugation.	Close the lid and re-start the centrifuge after the rotor has stopped.
	The locking system is defective.	Check that the locking pin presses on the lock switch tightly while the lid remains closed. Replace the locking switch.
11. "Err 5" appears. (for NF 1200 R)	Temperature sensor endings are loose or broken.	Check the temperature sensor/main PCB connection and adjust it if necessary. Replace the temperature sensor.
12. "Err 6" appears.	The inverter is defective.	Replace it.
13. The condenser cooling fan does not work (for NF 1200 R).	The motor cable connection terminals are loose or broken.	Check if the terminals are connected properly.
	The motor windings are broken or they are burned.	Check that the windings with a multimeter and replace the motor if needed.
	The motor shaft is stuck.	Rotate the shaft by hand. If it is too tight to rotate, replace the motor.

FAILURE	PROBABLE CAUSES	SOLUTIONS
14. The compressor does not work (for NF 1200 R).	The compressor cable connections terminals are loose or broken.	Check the terminals and tighten them.
	The compressor protection thermic is defective.	Replace the thermic.
	Cooling terminal on the main PCB does not outlet to the SSR (solid state relay).	Check the outlet with a multimeter. If 12 V DC does not exist, replace the main PCB.
	The compressor windings are burned.	Replace the compressor.
	The compressor relay is defective.	Replace the relay.
15. The temperature does not drop down the set value (For NF 1200 R).	The condenser serpentine are dusty.	Clean the serpentine to remove dust.
	The cooling terminal on the main PCB does not outlet to the SSR (solid state relay).	Check the outlet with a multimeter. If 12 V DC does not exist, replace the main PCB
	The condenser cooling fan does not work.	See no 13.
	The compressor does not work.	See no 14.
	There is leakage in refrigeration system.	See section 3.4.

3.3. Imbalance Adjustment

- Fit the swing out rotor and the accessories but do not load them.
- Push STOP until you see “A” on the program number display (approx. 20 seconds).
- Make the value on the time display “70” by using “Value Increase” and “Value Decrease” keys.
- Push the function button once, “B” appears on the program no display. Push the “Value Increase” and “Value Decrease” buttons to make the value on the time display “1” .
- Push the “Function” button once, “C” appears on the program number display. The imbalance value (for example 22) is shown on the speed display and the imbalance change value (for example 5) is shown on the time display. Push start to operate the centrifuge while the values remain on the displays. The centrifuge will operate at 2000 rpm for 2 minutes and the measured imbalance value will be shown on the speed display. (The speed value can be seen by pushing the function button)
- Push STOP to save the measured imbalance value.
- Push the “Function” button once, “D” appears on the program display. Push the “Function” button again and come back to the normal mode.
- Open the lid, make an imbalance of 7 grams and operate the centrifuge. Observe that the centrifuge shows “Err1” imbalance error code before it reaches 2000 rpm. If it does not do so, go to “C” position and decrease the imbalance change value. Push the function button to save the new value. Repeat this step by making an imbalance to check the system.

3.4. Refrigeration System Failures

Attention: The possible failures of the refrigerated systems should be fix by the trained and experienced service technicians.

3.4.1. Checking the System for Leakage

1. Discharge the refrigeration gas circulating in the system (see 3.4.2)
2. Connect the gas manifold’s maximum pressure manometer pipe to the compressor service line.
3. Charge nitrogen gas to the system.
4. Check the welding points and the compressor service lines valves with a leakage detector or soap foam.
5. Discharge the gas after you have found the leakage point. Fix it.
6. Re-charge nitrogen to the system to re-check the system.
7. If no leakage exits, discharge the nitrogen.

3.4.2. Vacuuming the System

1. Connect the gas manifold’s maximum pressure hose to the vacuum pump, the minimum pressure hose to the compressor service line and the gas charge hose to the gas cylinder.
2. Open the minimum and maximum pressure valves.
3. Operate the vacuum pump and vacuum the system for at least 60 minutes.
4. Stop the vacuum pump after you have closed the maximum pressure valve.

3.4.3. Charging Gas to the System

1. Set the centrifuge to 0°C.
2. Open the valve on the gas cylinder to charge gas to the system and operate the centrifuge.
3. Charge refrigerant gas R134a and close the valve.
4. Observe the refrigeration performance and add a little more gas if necessary.

SECTION 4

REPLACEMENT OF SPARE PARTS

Attention: Disconnect the centrifuge from the mains before replacing any part!!

4.1. Access to the Control Units

- Remove the front panel screws and take the panel out.
- Remove the screws of the rear cover sheet and take the sheet out.

4.2. Replacing the main PCB

- Disconnect all terminals on the main PCB which are connected to the clamps.
- Disconnect the main PCB ending of the main PCB / display PCB connection cable.
- Remove four screws of the main PCB.
- Place the new PCB and screw it.
- Make the connections according to the electric circuit diagram.
- Connect the main PCB/ display PCB connection cable.

4.3. Replacing Control and Display PCB

- Disconnect the display PCB ending of the main PCB/display PCB connection cable.
- Remove four screws of the display PCB and take the PCB out.
- Place the new display PCB on the front panel. Fix it with the screws.
- Check that the buttons and the leds meet their places on the plastic panel.
- Connect the main PCB/ display PCB connection cable.

4.4. Replacing Temperature Sensor(NF 1200 R)

- Remove the temperature sensor endings from the main PCB.
- Remove the temperature sensor connection nut from the bowl bottom.
- Pull the sensor through the bowl and take it out.
- Place the new sensor by passing it through the bowl, tighten its nut to fix it. Make the necessary connections according to the electrical circuit diagram.

4.5. Replacing Plastic Panel

- Remove the plastic panel from the front panel.
- Clean the panel surface with alcohol.
- Paste the new panel, make sure that the displays meet their places.

4.6. Replacing Condenser Cooling Fan (NF 1200 R)

- Disconnect the fan motor cables.

- Remove three screws of the fan motor –condenser connection and take the fan motor out.
- Take the fan motor fitting base and fix the new motor on to it.
- Mount the base on which the new fan motor is fixed and make the cable connections.

4.7. Replacing Imbalance Detector

- Disconnect the imbalance detector - main PCB connection.
- Remove the imbalance detector which is fitted on the motor disc.
- Fit the new detector.
- Make the main PCB connections of the new detector.

4.8. Replacing Gas Spring

- Remove the back cover.
- Separate the gas spring from the body by removing the bolt.
- Push the pin, which passes through the gas spring-lid connection hole, with a shaft, remove it and release the connection.
- Make the lid connection of the new gas spring first.
- Then adjust the lid opening angle, check the opening and make the body connection.

4.9. Replacing Lid Locking Bobbin

- Remove the front panel.
- Disconnect the locking bobbin - main PCB connection.
- Disconnect the locking switch - main PCB connection.
- Remove the locking-unlocking movement arm.
- Remove the complete locking system connection sheet by removing the two connections nuts.
- Remove the locking bobbin fixing screws.
- Fix the new locking bobbin.
- Make the connections of the locking bobbin shaft and locking-unlocking movement arm.
- Connect the locking bobbin to the main PCB.

4.10. Replacing Lid Lock

- Remove the front panel.
- Disconnect the locking bobbin and the main PCB.
- Disconnect the locking switch and the main PCB.
- Remove locking-unlocking movement arm.
- Take the complete locking system connection sheet out by removing the 2 connection nuts.
- Remove the fixing screws of the lid lock and take the lid out.
- Fix the new lid.
- Adjust the locking switch.

4.11. Replacing Lid Locking Switch

- Remove the front panel.
- Disconnect the locking bobbin and main PCB.
- Disconnect the locking switch and the main PCB.
- Remove the locking-unlocking movement arm.
- Remove the complete locking system connection sheet by removing its two nuts.
- Remove the locking switch screws and take the lock switch out.
- Fix the new locking switch.
- Make the main PCB connections of the new switch.
- Adjust the switch.

4.12. Replacing Optical Sensor

- Remove the front panel and the back cover sheet.
- Disconnect the motor feeder, optical sensor, motor over speed detector, imbalance detector and main PCB connections.
- Disconnect the gas spring-body connection.
- Remove the lid with the gas spring by removing the lid hinges' body connections.
- Pull the bowl gasket to remove.
- Take the body cover sheet out by removing the screws.
- Remove the motor dust protection rubber carefully.
- Take the bowl out by removing the two connection screws in NF 1200. You can not separate the bowl from the body in NF 1200 R as the refrigeration system can not be removed.
- a) For NF 1200. Remove the complete motor by disconnecting the motor connection bolt from the bottom of the centrifuge in NF 1200.
- b) For NF 1200 R. Remove the complete motor by lifting the bowl upwards and pulling the motor downwards.
- Take the rubber buffer out by removing its screws.
- Take the optical sensor out by removing the two screws.
- Fix the new optical sensor. Check to make sure that the optical disc does not hit the optical sensor sensing surfaces while it is spinning with the motor.

4.13. Replacing Motor

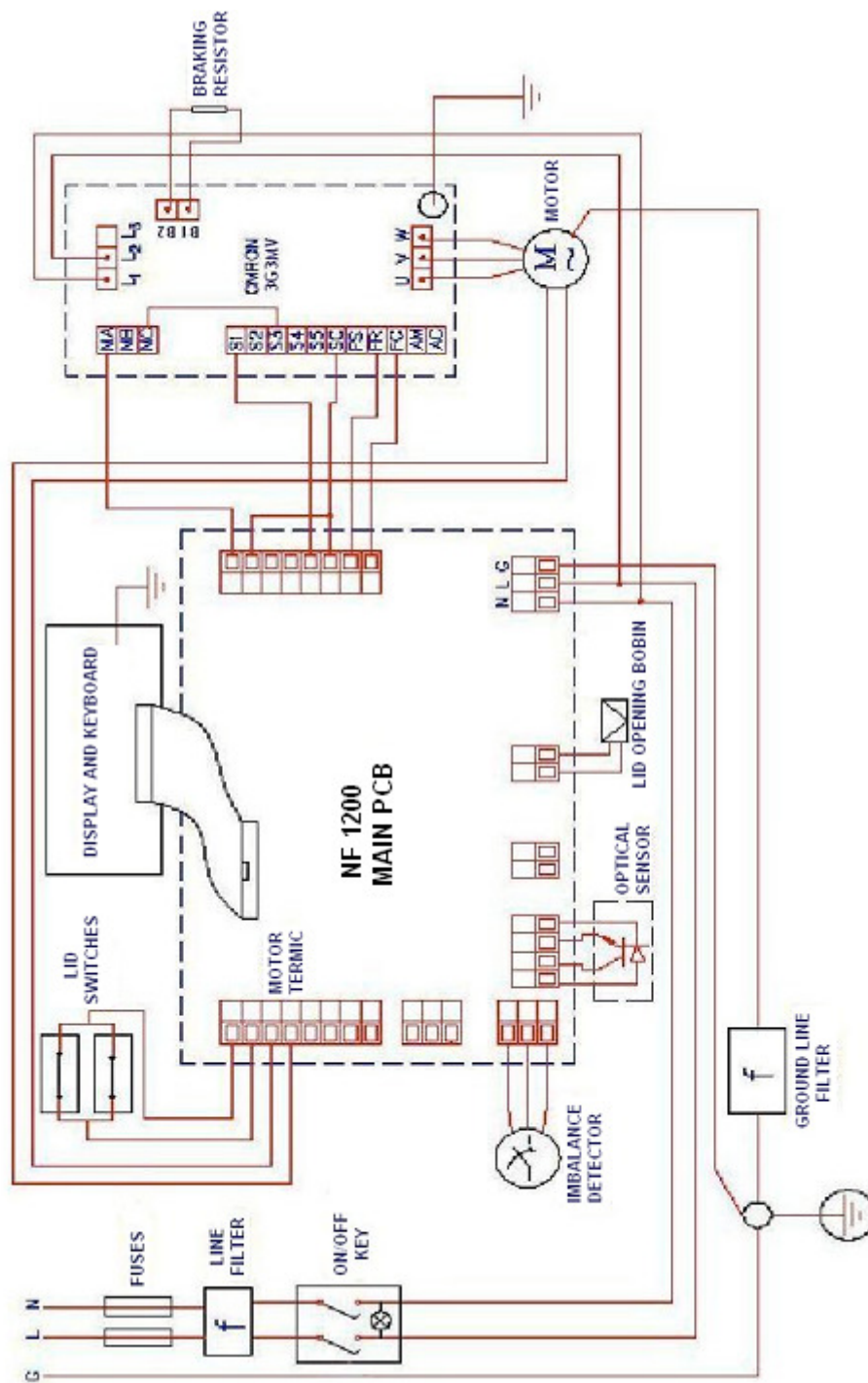
- Remove the front panel and the back cover sheet.
- Disconnect the motor feeder, optical sensor, motor over speed detector, imbalance detector and main PCB connections.
- Disconnect the gas spring-body connection.
- Remove the lid with the gas spring by removing the lid hinges' body connections.
- Pull the bowl gasket to remove.
- Take the body cover sheet out by removing the screws.
- Remove the motor dust protection rubber carefully.
- Take the bowl out by removing two connection screws in NF 1200. You can not separate the bowl from the body in NF 1200 R as the refrigeration system cannot be removed.

- a)For NF 1200. Remove the complete motor by disconnecting the motor connection bolt from the bottom of the centrifuge in NF 1200.
- b)For NF 1200 R. Remove the complete motor by lifting the bowl upwards and pulling the motor downwards.
- Take the rubber buffer out by removing its screws.
- Remove the optical sensor and the optical disc which is on the motor shaft.
- Take the motor disc out by removing four connection screws.
- Remove the bearing protection cover.
- Fix the new complete motor.

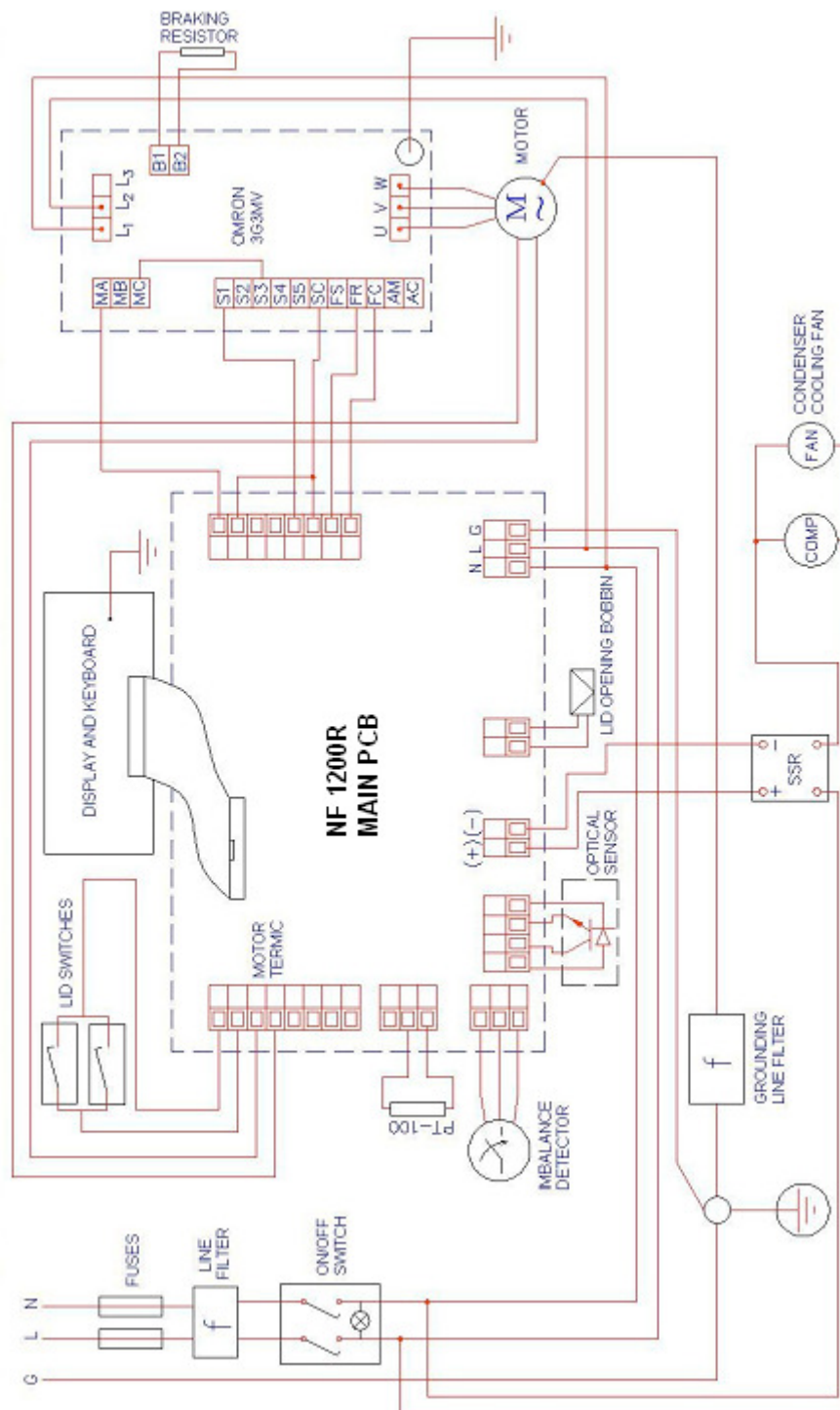
SECTION 5

DRAWINGS AND ELECTRICAL CIRCUIT DIAGRAMS

5.1. NF 1200 ELECTRICAL CIRCUIT DIAGRAM

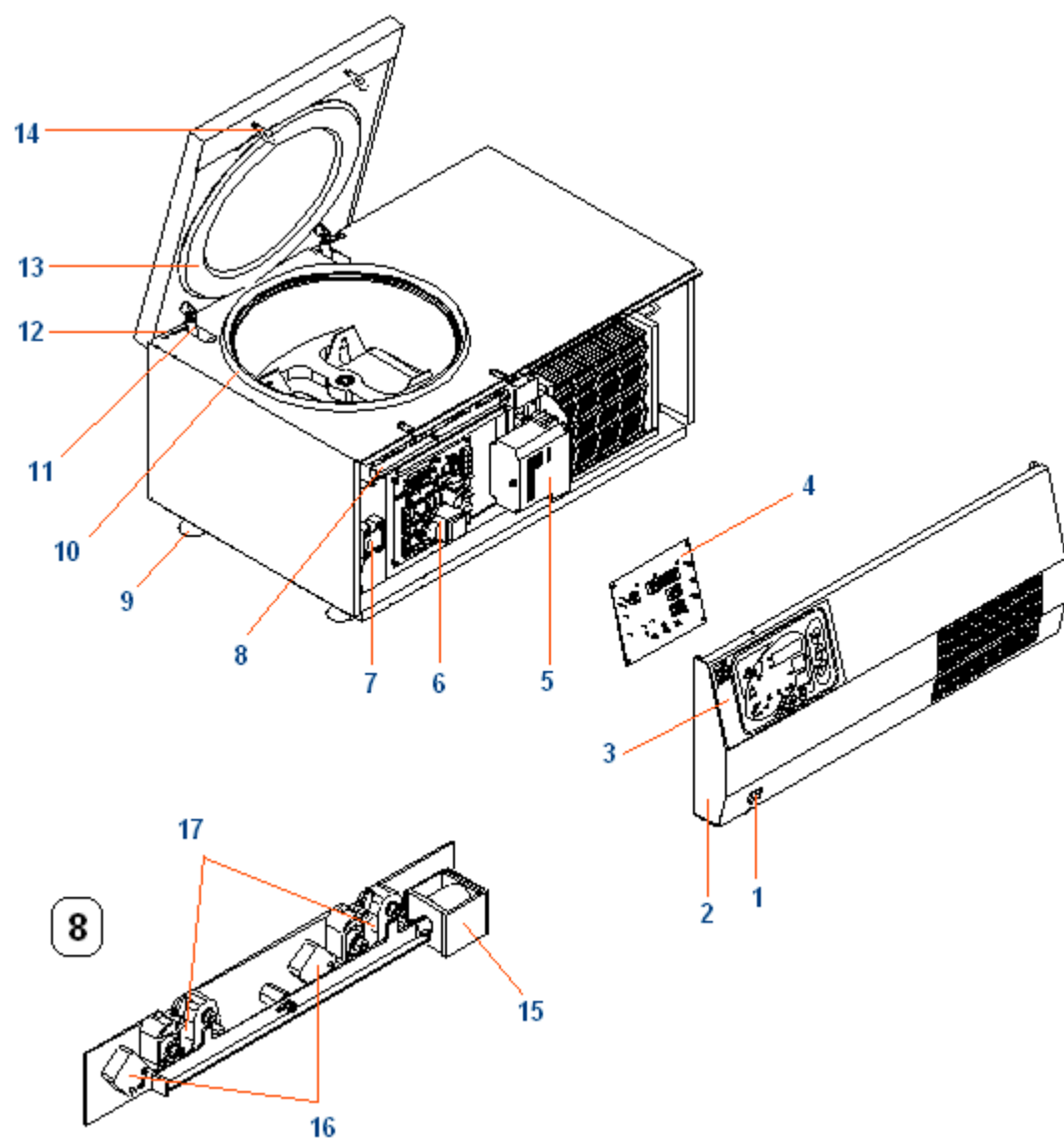


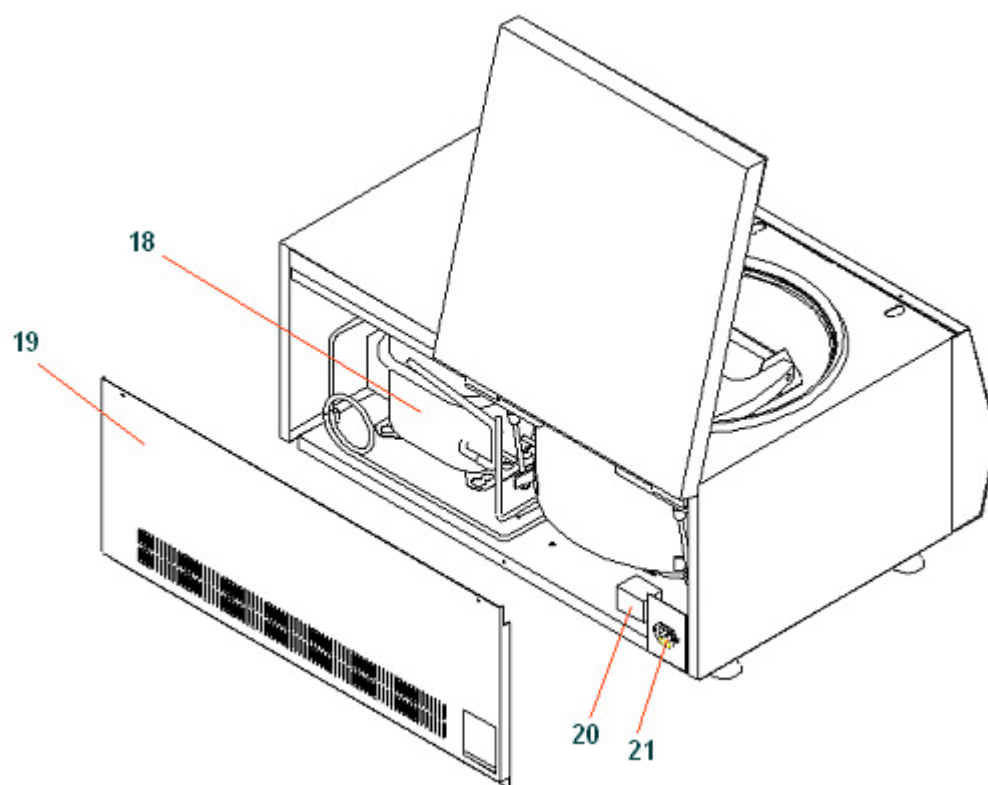
5.2. NF 1200 R ELECTRICAL CIRCUIT DIAGRAM

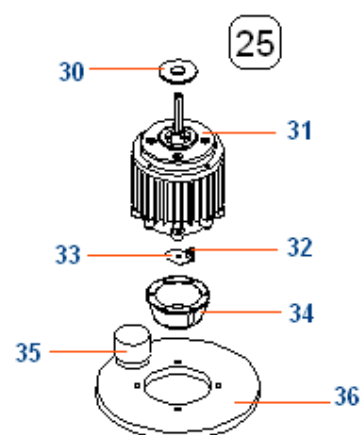
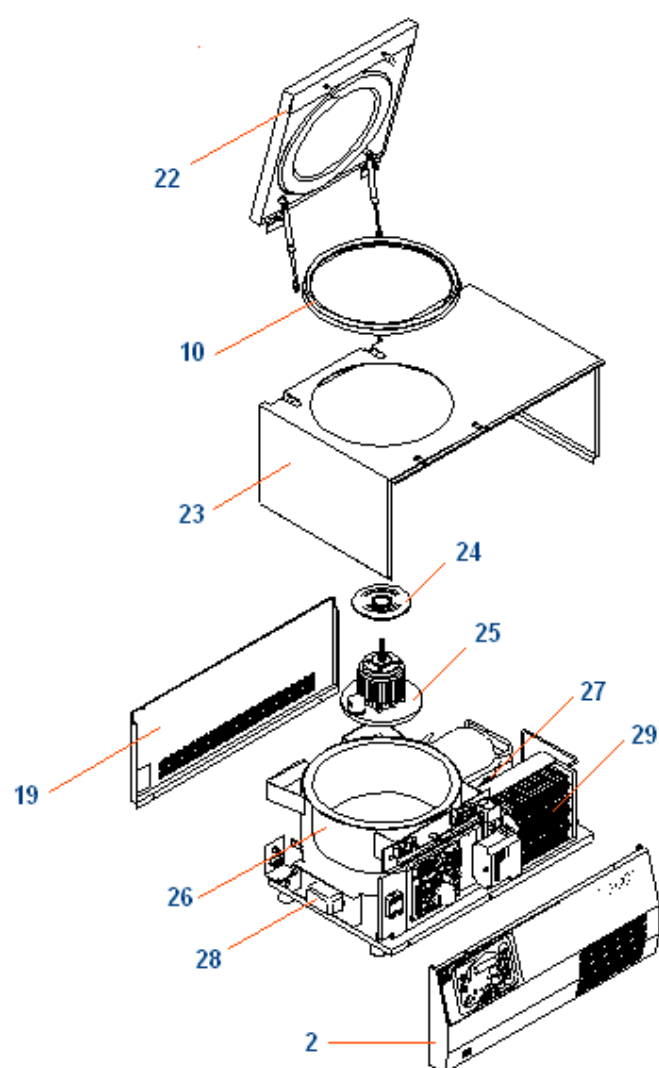


SECTION 6

SPARE PARTS







Spare Part List

N O	PART NAME	NF 1200		NF 1200R	
		PART CODE	Qty.	PART CODE	Qty.
1	On/Off switch	Z12. A 03 018	1	Z12. A 03 018	1
2	Front panel	Z11. P 02 116	1	Z11. P 02 195	1
3	Plastic panel	Z15. P 15 156	1	Z15. P 15 157	1
4	Control & Display Board	Z15. G 05 011	1	Z15. G 05 017	1
5	Inverter	Z12. I 06 002	1	Z12. I 06 002	1
6	Main PCB	Z15. E 05 069	1	Z15. E 05 071	1
7	Solid state relay (SSR)	-----	---	Z 12. R 07 013	1
8	Locking system	Z11. K 51 004	1	Z11. K 51 004	1
9	Fitting Pads	Z19. A 07 022	4	Z19. A 07 022	4
10	Bowl gasket	Z11. C 03 093	1	Z11. C 03 093	1
11	Gas spring	Z18. A 11 012	2	Z18. A 11 012	2
12	Hinge	Z21. M 03 026	2	Z21. M 03 026	2
13	Lid protector-plastic	Z15. P 15 140	1	Z15. P 15 111	1
14	Locking pin	Z18. K 27 041	1	Z18. K 27 041	1
15	Locking bobbin	Z12. B 06 007	1	Z12. B 06 007	1
16	Locking switch	Z17. A 03 037	1	Z17. A 03 037	1
17	Lock	Z17. K 27 039	1	Z17. K 27 039	1
18	Compressor	-----	---	Z12. E 03 021	1
19	Back cover sheet	Z11. P 03 249	1	Z11. P 03 317	1
20	Motor grounding line filter	Z12. F 06 028	1	Z12. F 06 028	1
21	Power supply inlet socket	Z12. S 13 010	1	Z12. S 13 010	1
22	Lid	Z11. K 50 020	1	Z11. K 50 031	1
23	Body sheet	Z11. G 04 140	1	Z11. G 04 174	1
24	Dust isolation rubber	Z15. L 02 014	1	Z15. L 02 014	1
25	Complete motor	Z11. M 51 093	1	Z11. M 51 093	1
26	Bowl	Z18. T 05 013	1	Z18. T 05 023	1
27	Condenser cooling fan	-----	---	Z15. M 06 066	1
28	Supply filter	Z15. F 06 020	1	Z15. F 06 020	1
29	Condenser	-----	---	Z18. K 20 007	1
30	Bearing protection cover	Z11. B 05 040	1	Z11. B 05 040	1
31	Asynchronous motor	Z19. M 06 077	1	Z19. M 06 077	1
32	Optical sensor disc	Z11. P 03 230	1	Z11. P 03 230	1
33	Optical sensor	Z12. O 04 011	1	Z12. O 04 011	1
34	Rubber buffer	Z19. T 03 006	1	Z19. T 03 006	1
35	Imbalance detector	Z15. D 01 002	1	Z15. D 01 002	1
36	Motor disc	Z18. F 02 017	1	Z18. F 02 017	1
	Asynchronous motor cooling fan	Z12. F 04 012	1	-----	---
	Temperature sensor	-----	---	Z15. I 01 042	1