NÜVE SANAYİ MALZEMELERİ İMALAT VE TİCARET A.Ş.

FN 300 - FN 400 - FN 500
FN 400 P – FN 500 P

DRY HEAT STERILIZERS/OVENS

USER'S MANUAL

$C\epsilon$ 1984

Z14.K 25 236   Rev. No: 07 Rev. Date: 06/2017

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.

➢ **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.**

➢ **INFORMATION CONTAINED IN THIS DOCUMENT IS THE PROPERTY OF NÜVE. IT MAY NOT BE DUPLICATED OR DISTRIBUTED WITHOUT PERMISSION.**

Dear Nüve 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.

Information contained in this document is the property of Nüve. It may not be duplicated or distributed without its permission.

Lifetime of the device is 10 years.

PLEASE REGISTER ONLINE TO VALIDATE WARRANTY:
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 FN Series Dry Heat Sterilizers/Ovens are designed to sterilize metal and glass materials and heat or dry samples in laboratories. They offer excellent sterilization, drying and heating conditions. Glass, metal and other materials can be sterilized in FN Series Dry Heat Sterilizers.

They maintain temperatures between 70°C and 250°C and keep the temperature stable within the given tolerances.

FN 300/400/500 Dry Heat Sterilizers/Ovens provide homogeneous temperature distribution by means of the sheet heaters placed onto three outer surfaces of the useful volume.

Differently from FN 300/400/500, inner sides of FN 400P and FN 500P are made of stainless steel and their heaters are circular heaters which provide the homogeneity of the temperature by the circulation fans placed on their centers.

The insulation of the Dry Heat Sterilizers/Ovens not only provides economical working conditions but also helps to achieve the excellent homogeneity.

The FN series Dry Heat Sterilizers/Ovens provide precise operation conditions with the PID microprocessor controlled system and with the timer. Adjustable safety thermostat offers an additional safety.

Microprocessor control system will shut down the temperature sensor and in case of malfunctions that may occur in the control system, alarm system will be activated and the user is warned visually and audibly. The study data are recorded in the memory and can be transferred to external USB memory. At the same time, unauthorized persons have been blocked permission to change parameters with improved password menu.

The FN series dry heat sterilizer/ovens are manufactured according to the following standards,

ISO 9001:2015, ISO 13485:2016, EN ISO 14971:2012, MDD 93 / 42 / EEC (2007/47/EC), EN 60601 – 1, EN 60601 – 1 – 2, EN 60601 – 1 – 6, EN 62304, EN ISO 15223 – 1, EN 61000–6–3, EN 62366 – 1, EN 50419.

This device is in compliance with WEEE Regulation.

Do not operate the instrument for purposes other than main purpose.

The instrument is only to be used by authorized people after the user's manual has been read carefully. Only technical personnel can handle the product in case of a breakdown.

SECTION 2

TECHNICAL SPECIFICATIONS

2.1 TECHNICAL SPECIFICATIONS TABLE

	FN 300	FN 400	FN 400P*	FN 500	FN 500P*
Temperature Range	70°C / 250°C				
Temperature Sensor	Fe-Const				
Control System	PID Programmable Microprocessor				
Temperature set & display sensitivity	1°C				
Temperature variation(100°C-150°C)	±2°C				
Temperature fluctuation	±1°C				
Thermostat Working Accuracy	±1°C				
Timer	1 minute + 99.9 hours + Hold Position				
No of shelves (standard/max.)	2/6	2/7	2/7	2/10	2/10
Safety thermostat	Gas expansion thermostat (50°C-300°C)				
Power consumption	500 W	800 W	850 W	1600 W	1550 W
Power Supply	230V, 50/60 Hz				
Memory	3000 data*				
Useful volume	22 liters	44 liters	42 liters	120 liters	110 liters
Internal material	Anodic-oxidated aluminum	Anodic-oxidated aluminum	Stainless Steel	Anodic-oxidated aluminum	Stainless Steel
External material	Epoxy-polyester painted steel				
Internal dim.s (wxdxh) mm	300x240x300	420x320x360	420x280x360	500x480x500	500x445x500
External dim.s (wxdxh) mm	555x380x460	705x475x540	705x505x540	785x630x680	790x665x680
Packing dims.(wxdxh)mm	650x470x550	790x580x615	790x580x760	870x740x860	870x740x860
Net/Packed weight	24 / 29	37 / 43	39 / 45	55 / 65	66 / 74

*Shows the number of lines for each work done. Temperature, time and if there is error code consist of 1 line.

**Differently from EN 400 and EN 500, inner sides of EN 400P and EN 500P are made of stainless steel and their heaters are circular heaters which provide the homogeneity of the temperature by the circulation fans placed on their centers.

2.2 OPTIONAL ACCESSORIES

- **R 01 014** Al. shelf for FN 300
- **R 01 136** Mesh type shelf for FN 400
- **R 01 126** Mesh type shelf for FN 400P
- **R 01 135** Mesh type shelf for FN 500
- **R 01 111** Mesh type shelf for FN 500P
- **K 23 031** Shelf carrier for FN 300
- **K 23 047** Shelf carrier for FN 400
- **K 23 048** Shelf carrier for FN 400P
- **K 23 046** Shelf carrier for FN 500
- **K 23 040** Shelf carrier for FN 500P

Note: 2 pcs. Shelf carrier should be ordered for each shelf.

2.3 GENERAL PRESENTATION
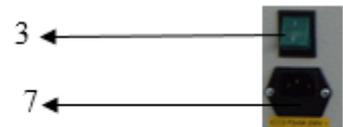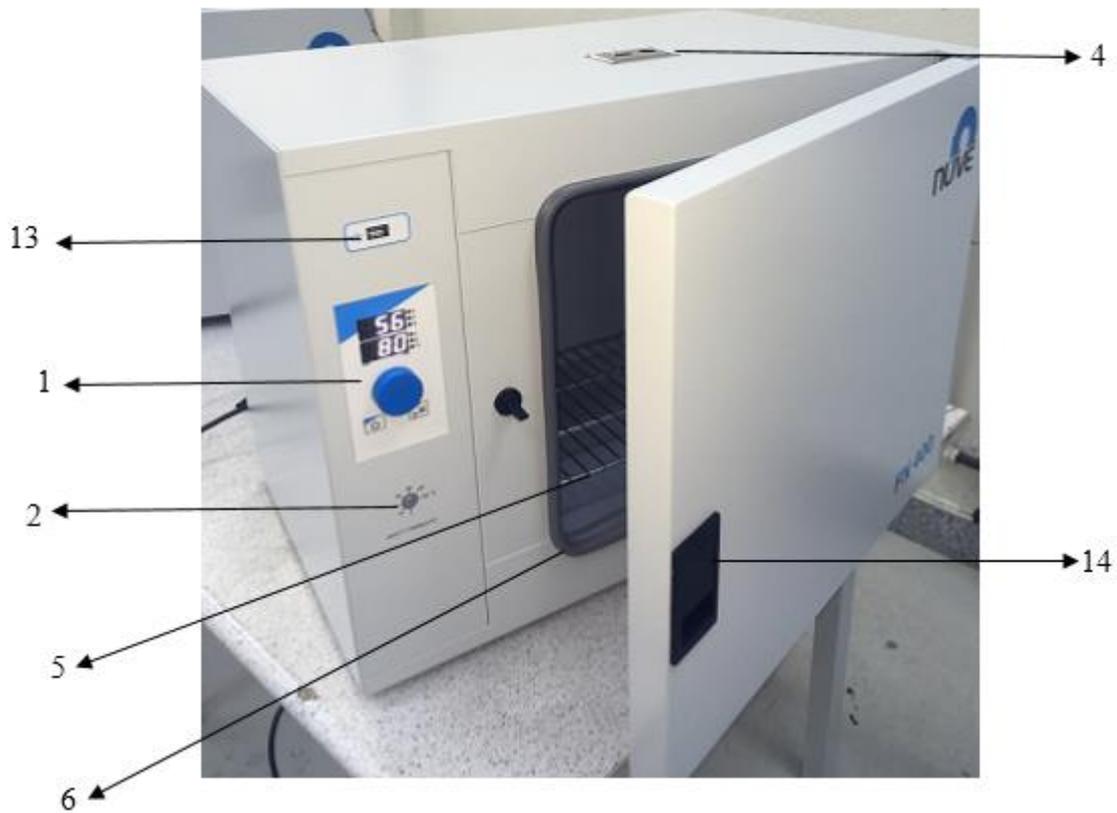
Fıgure 1: Inner side of FN 400 P / 500 P

1. Control panel	8. Shelf carrier holder
2. Safety thermostat	9. Shelf carrier
3. On / Off switch	10. Circulation fan
4. Ventilation hole	11. Heater
5. Shelf	12. Heater protecting sheet
6. Chamber gasket	13. Input USB
7.Mains supply inlet and the fuses	14. Door handle

SECTION 3

INSTALLATION PROCEDURE

3.1 LIFTING AND TRANSPORT

Because of the heavy weight of the Dry Heat Sterilizer/Oven, all lifting and transport must be carried out using proper handling equipment. The Dry Heat Sterilizer/Oven must be supported from underneath and never turned over.

3.2 UNPACKING

Remove the packing cardboard box and the second nylon packing around the Dry Heat Sterilizer. The below written are provided with the instrument, please check them;
- User's manual
- 1 piece electrical cable
- 2 pieces of shelves
- 1 pieces of warranty
- 1 pieces of shelf carriers

3.3 POSITIONING

- Check that no damage has occurred during transport.
- Lift the dry heat sterilizer/oven underneath and carry it to its place carefully.
- Balance the Dry Heat Sterilizer/Oven on the four pedestals. If necessary, provide stable standing by adjusting the pedestal heights.
- Insert the shelf carriers and then the shelves.

Check the followings,

- The proposed site is suitable for users,
- The dry heat sterilizer/oven does not occupy the utilisation space of others or damage them.

3.4 ENVIRONMENTAL CONDITIONS

Please pay special attention to the followings,

> At most 70% of the surface area of the shelves should be used in order to obtain a uniform temperature distribution.

- Indoor use only
- Temperature from 5°C to 40°C
- Humidity level %80 up to 22°C
- Maximum height 2000m.
- Temperature range for maximum performance: 15ºC / 25ºC

3.5 MAINS SUPPLY

- The dry heat sterilizer/oven requires 230, 50 / 60 Hz.

- Please make sure that the supplied mains matches the required power ratings. If no, provide an extra line to support.

- **Always plug the Dry Heat Sterilizer/Oven 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.**

3.5.1 Prior to Operation

Check the followings,

- Make sure that the safety thermostat is adjusted to the temperature which is higher than the set temperature.
- Liquids are not heated in sealed containers.
- The boiling points of the samples are higher than the set temperature.
- The freezing points of the samples are lower than the set temperature.
- The liquids which may expand during heating do not overflow from their containers.
- The set temperature does not destroy the structure of the samples.
- The vapours and gases which are generated during the operation are not harmful to human health or flammable or explosive.
- The instruments, which will be dried up and heated, should not be combustible and explosive, especially please kindly check that.

IF MENTIONED WARNINGS ARE NOT CONSIDERED, NUVE WILL NOT BE RESPONSIBLE FROM THEIR RESULTS.

SECTION 4

OPERATING PRINCIPLES

4.1 SWITCHING ON

- Push on/off switch.
- See that the microprocessor control system activates.
- Learn the functıon of the control and display panel(Section 4.2).
- Section 4.3 and section 4.4, according to the program will run and run please.

4.2 CONTROL PANEL
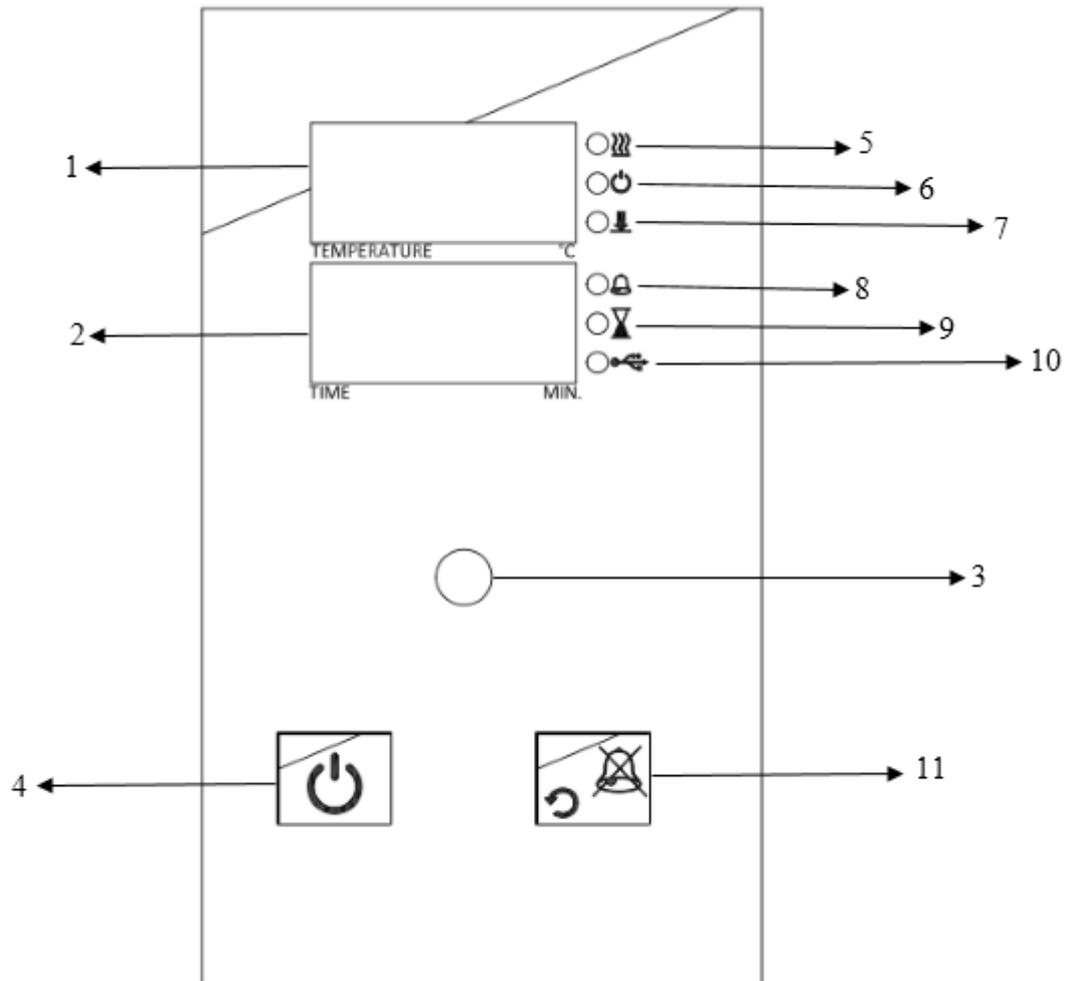
1. Temperature display
2. Time display
3. Encoder button
4. Start / Stop button
5. Heating lamp

6. "Operating the program" lamp
7. Data transfer lamp
8. Alarm led
9. "End of the program" lamp
10. Usb lamp

11. Back / Alarm mute button

4.2.1 Explanations and Functions for Display and Control Panel

01-Temperature Display
This display shows
Sterilization chamber temperature during "stand-by" and during the operation (thermometer position),
During program preparation, the temperature setting values or the alarm setting values,
Failure codes,
EoF warning when power is interrupted,
The set temperature values and alarm values.

02-Time Display
This display shows the values set for time during program preparation. Also; this display shows he time values in the control of the settings.

03-Encoder Button
The encoder button has two physical movements. The button turn clockwise and anticlockwise to increase or decrease the temperature and time values of the program. Also, the button press for select / confirm.

04-Start / Stop Button
Used button to start the device to operating at set values or to stop the operation.

05-Heating Lamp
The led is "on" during heating, it indicates that the heating process is carried out.

06-"Operating The Program" Lamp
A lamp indicating that the program is running as soon as the device is started.

07-Data Transfer Lamp
The lamp indicates that the records are transferred in the memory or the file is transferred during software update.

08-Alarm Led
This led flashes when there is a warning or error on the device.

09-"End of The Program" Lamp
It is a warning lamp that indicates that the running program is finished.

10-Usb Lamp
This lamp is on when connected to a USB external memory.

☞ The device supports up to **8 GB** of external memory.

11-Back / Alarm Mute Button
This button is used to silence audible alarms in case of error and cancel the changes in the menu.

4.3 PREPARATION OF USER SETTINGS

The device has a password protected menu. The password is set to "000" when the device first starts. Follow the below steps to change the password, update current date / time information and access the operator's menu where other settings are made.

↕	Wait by pressing the encoder button.

	Lift your hand when you see "oP" on the temperature display and again press the encoder button. If the device has a menu protection password, password screen "oPS" will come on the temperature display.
	You enter the set password to turn the encoder button right and left. (The password will not be asked if the device is newly installed.) Confirm the password by pressing the encoder button. Observe that the parameter numbers on the temperature display change with each pressing the encoder button. For operator menu parameter descriptions (see section 4.3.1). You can set the parameter values by turning the encoder button right or left on time display.
	Again press the encoder button and confirm the set value. Press the back button to return the work screen.

4.3.1 oP Operator Menu Parameters

1: Recording Period: This time is recording period of temperature and error information.
2: Lid Alarm Time: Not used for all FN models.
3: Lid Alarm Range: Not used for all FN models.
4: Timer Set Band: When the read temperature reaches the "Set Temperature - TIMER SET BAND" value, the time starts counting backwards.
5: Buzzer ON/OFF: The alarm sound on/off 0: OFF 1: ON
6: Date Setting - Year: Two digits are displayed the year information of date. If updating is necessary, change.
7: Date Setting - Month: The month information of date is displayed. If updating is necessary, change.
8: Date Setting - Day: The day information of date is displayed. If updating is necessary, change.
9: Time Setting - Hour: The hour information of time is displayed. If updating is necessary, change.
A: Time Setting - Minute: The minute information of time is displayed. If updating is necessary, change.
B: Time Setting – Second: The second information of time is displayed. If updating is necessary, change.
C: Date / Time Update: 0: No change 1: Update date / time according to the entered values. The entered values are considered as current Date / Time information when 5, 6, 7, 8, 9, A parameters are changed and B parameter is set to 1.
D: Password: The password used to enter the operator parameters. This password used when you want to change the set values. No password if 0 is selected.

4.4 PROGRAMMING SUMMARY

You can set the steam sterilizer on stand-by. Follow the below steps to set and save the values.

	Push the encoder button

↑	
(●)	By pushing the encoder button select SET menu.
3 TEMPERATURE °C	See that second LED flashes in the temperature display, again push the encoder button.
3 TEMPERATURE °C	See the parameter flashing on the temperature display.
(●)	By turning the encoder button set operating temperature value.
↑	Push the encoder button and save set value.
3 ALr TEMPERATURE °C TIME MIN.	See the parameter flashing on the temperature display.
(●)	By turning the encoder button set operating Set alarm value. If the temperature is out of Set alarm value, audible and visual alarm will be activated.
↑	Push the encoder button and save set value.
(●	Turn the encoder button to the right.
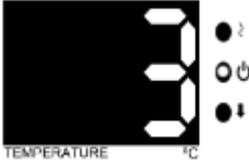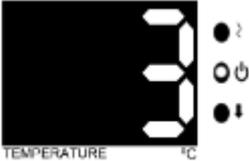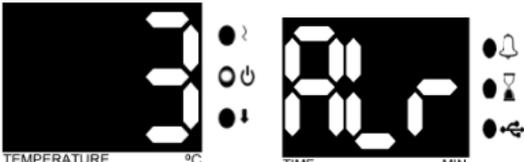
	See that second LED flashes in the time display, again push the encoder button.
	See the parameter flashing on the time display.
	By turning the encoder button set operating time value (01 minute to 99 hours 54 minutes or Hold).
	Push the encoder button and save set value. See 'dLY' in the temperature display.
	By turning the encoder button set operating delay time value. If 'Off' is selected, heating will start without delay. If any numerical value is selected; After pressing Start, it starts heating after the set delay time (01 minute to 99 hours 54 minutes).
	Push the encoder button and save set value.
	Push 'the start button' and start the program.
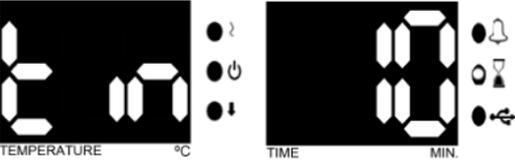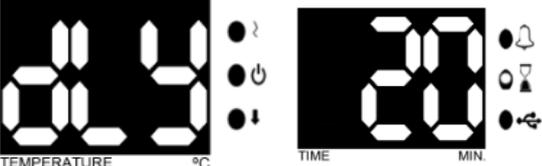
NOTE:	In order to display the set values during the operation, push the encoder button once. The values set on the temperature display and the time display of the device will appear for 5 seconds.

WARNİNG!!

NOTE: During the operation of the program, the time starts to count up after the instrument has reached to the set temperature.

4.5 COMPLETION OF THE WORK

- See that the program is over (See "End" and "End of the program lamp").
- Take the samples out. Be careful while handling the samples after the operation as they can be hot.
- Wipe the chamber surface if needed when the chamber is cold enough.
- You may leave the incubator at stand-by position or switch it off.
- Operating records are transferred to the usb port attached a USB memory.

NOTE :	The usb led and the data transfer led on the control panel turn on during transfer of data in memory and the transfer process starts automatically. Do not remove external memory from usb port without the data transfer led turn off and the audible alarm finished.

NOTE :	Records are transferred to external memory when external memory is connected to the Usb port.

ATTENTION !!!

If the unit is in START position in case of the open door, it will keep operating and the heaters will be over-heated. Besides, the heaters and other components may be defected. Please be careful.

The samples may be hot after the operation, please be careful while handling them!!

SECTION 5

PERIODIC MAINTENANCE AND CLEANING

5.1 PERIODIC MAINTENANCE

- The Dry Heat Sterilizer/Oven does not require any periodical maintenance which is carried out by the operator.
- Please contact to Nüve agent for an authorised service or maintenance.

5.2 CLEANING

- After unplugging the equipment and the equipment is at the room temperature, wipe down the chamber to remove any undesirable effects of the operation, for example spillage.
- You may use a soft brush to clean the chamber.
- For the external body, you may use a piece of cloth. Mild detergent use is recommended to remove difficult dust and dirt.
- Protect your chamber against rust coming from outside.

PLEASE BE AWARE OF THE UNDESİRABLE EFFECTS OF THE CHEMİCALS AND BE CAREFUL WHİLE APPLYİNG THEM.

SECTION 6

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 dismounted from electric/electronic parts and disposed off in accordance with applicable local regulations.

SECTION 7

TROUBLESHOOTING

If the Dry Heat Sterilizer/Oven does not operate, check the followings,

- The on/off switch is on,
- The plug is plugged-in properly,
- The plug is not defective,
- The mains supply is present,
- Fuses of the instrument are sound,
- The fuse of the installation on which the plug is mounted is not defective

The incubator does not heat, check the followings,

- The program is started,
- The safety thermostat is adjusted higher than set temperature.

7.1 ERROR CODES EXPLANATIONS

Er1
The temperature sensor endings are broken. The error code flashes on the temperature display and an audible alarm sounds.

Er2
An electronic failure occurs in the microprocessor. The error code flashes on the temperature display and an audible alarm sounds.

Er3
The temperature sensor measures a temperature higher than 147°C.The error code is shown on the temperature display and an audible alarm sounds.

Er4
The temperature sensor endings are connected in reverse. The error code flashes on the temperature display and an audible alarm sounds.

EoF
This error code appears if any probable power cut causes when the sterilization phase "EoF" flashes and the audible alarm sounds on the temperature display.

IN CASE OF ANY ERROR, THE PROGRAM İS STOPPED AUTOMATİCALLY AND İMMEDİATELY.

PLEASE CONTACT TO AN AUTHORIZED NUVE AGENT TO SEEK TECHNICAL HELP IF AN ERROR OCCURS.

SECTION 8

ELECTRICAL CIRCUIT DIAGRAMS

10.1 FN 300   ELECTRICAL CIRCUIT DIAGRAMS
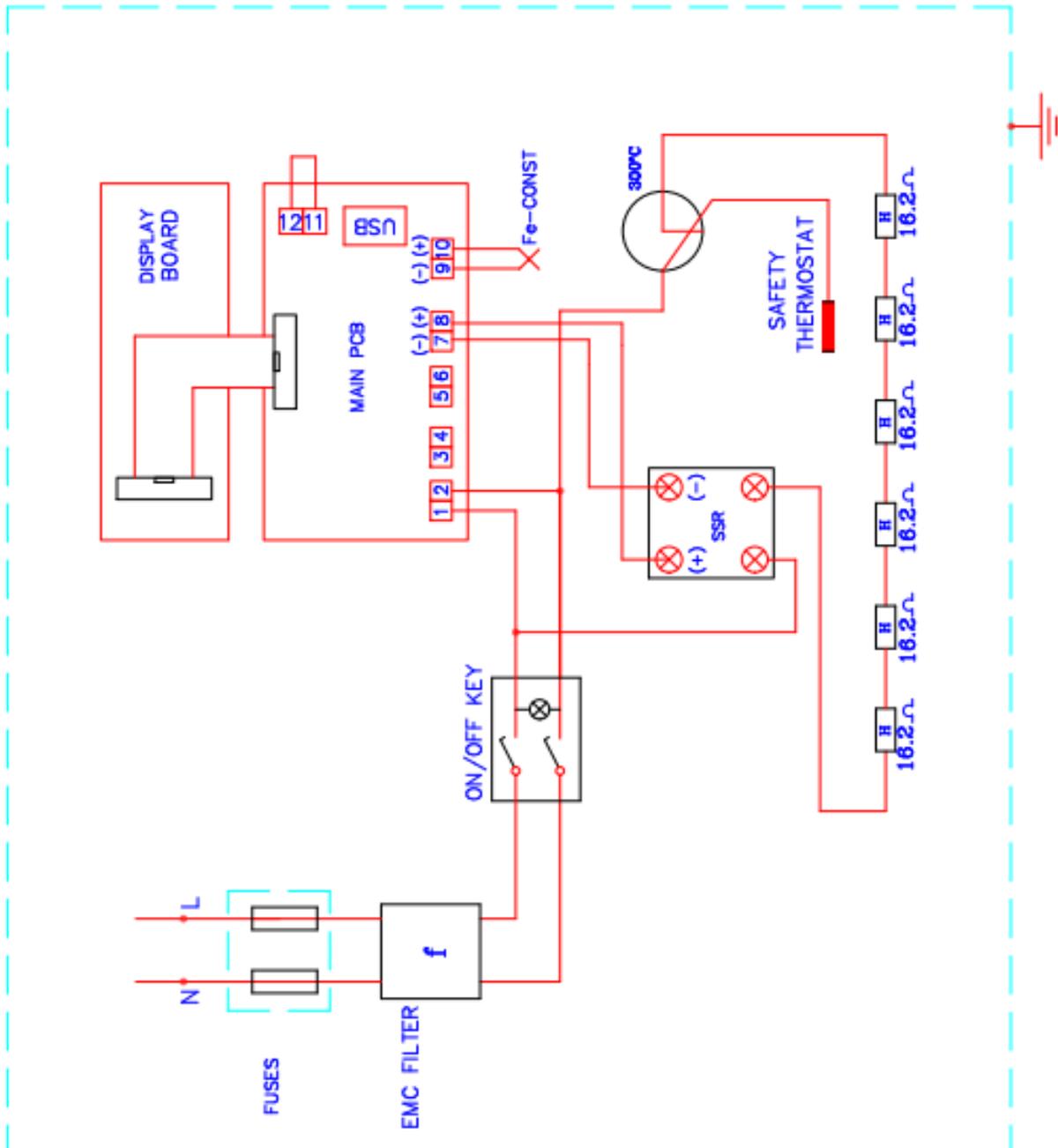
10.2 FN 400 ELECTRICAL CIRCUIT DIAGRAMS
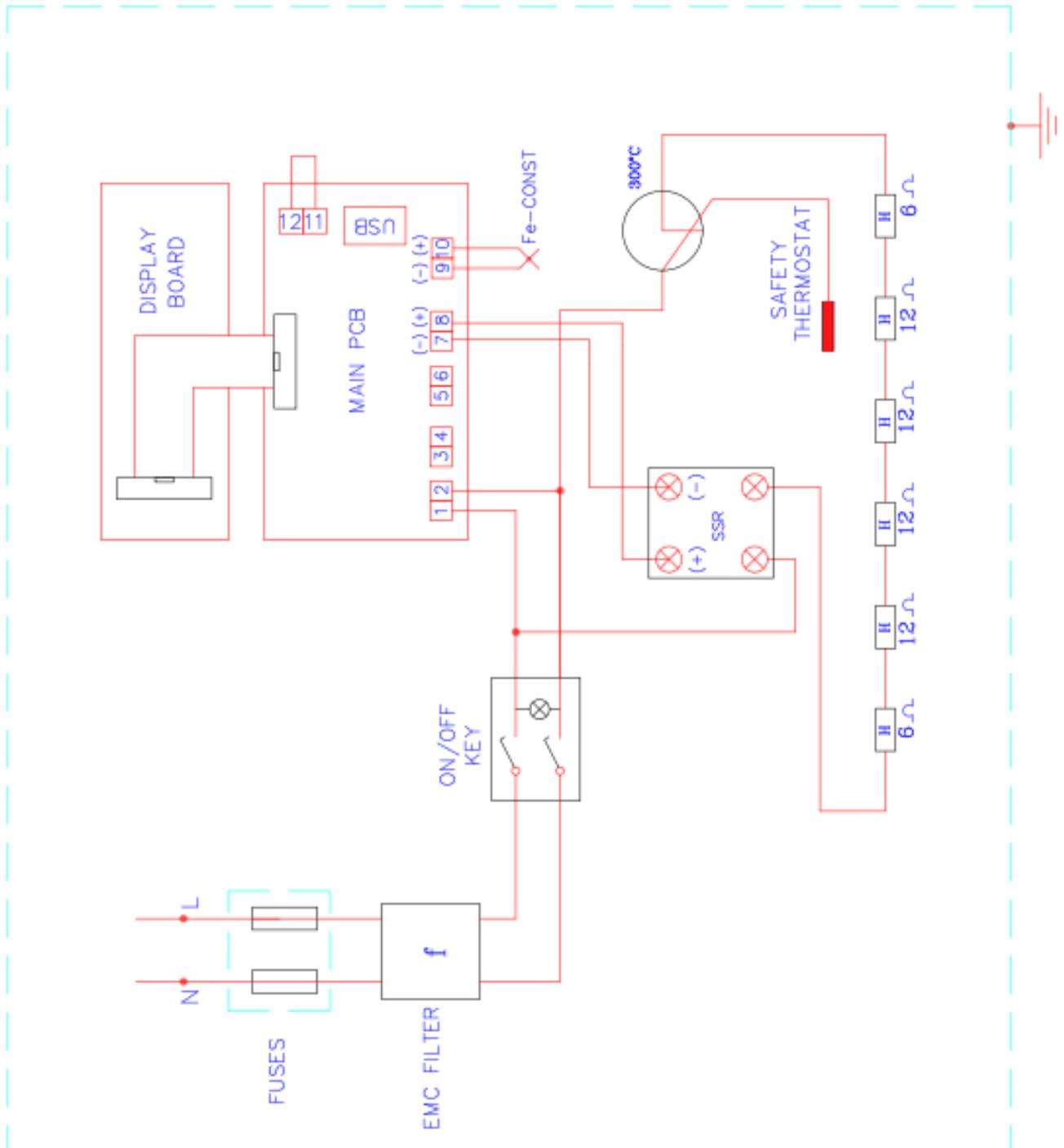
10.3 FN 500 ELECTRICAL CIRCUIT DIAGRAMS
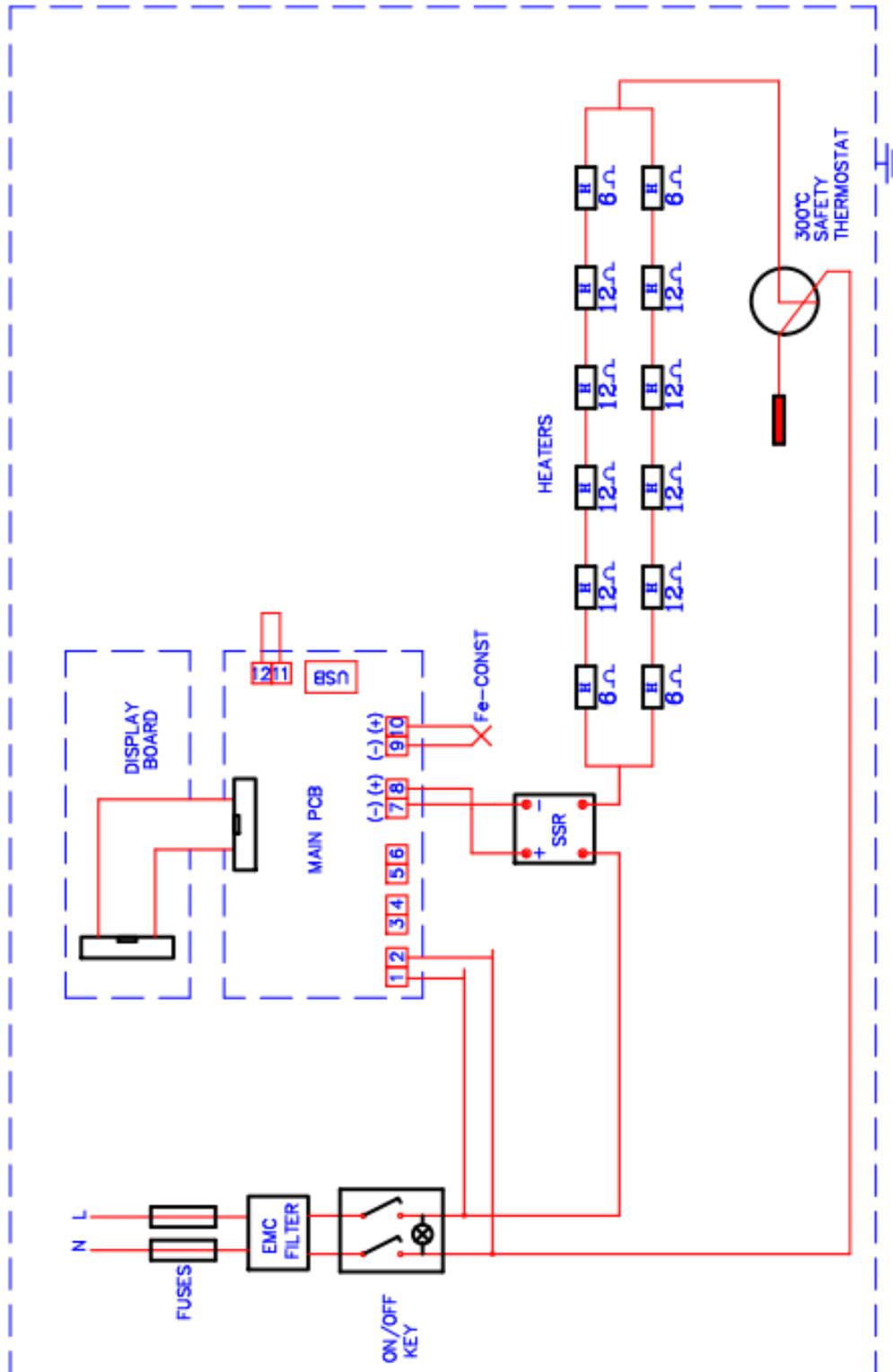
10.4 FN 400P - 500P ELECTRICAL CIRCUIT DIAGRAMS
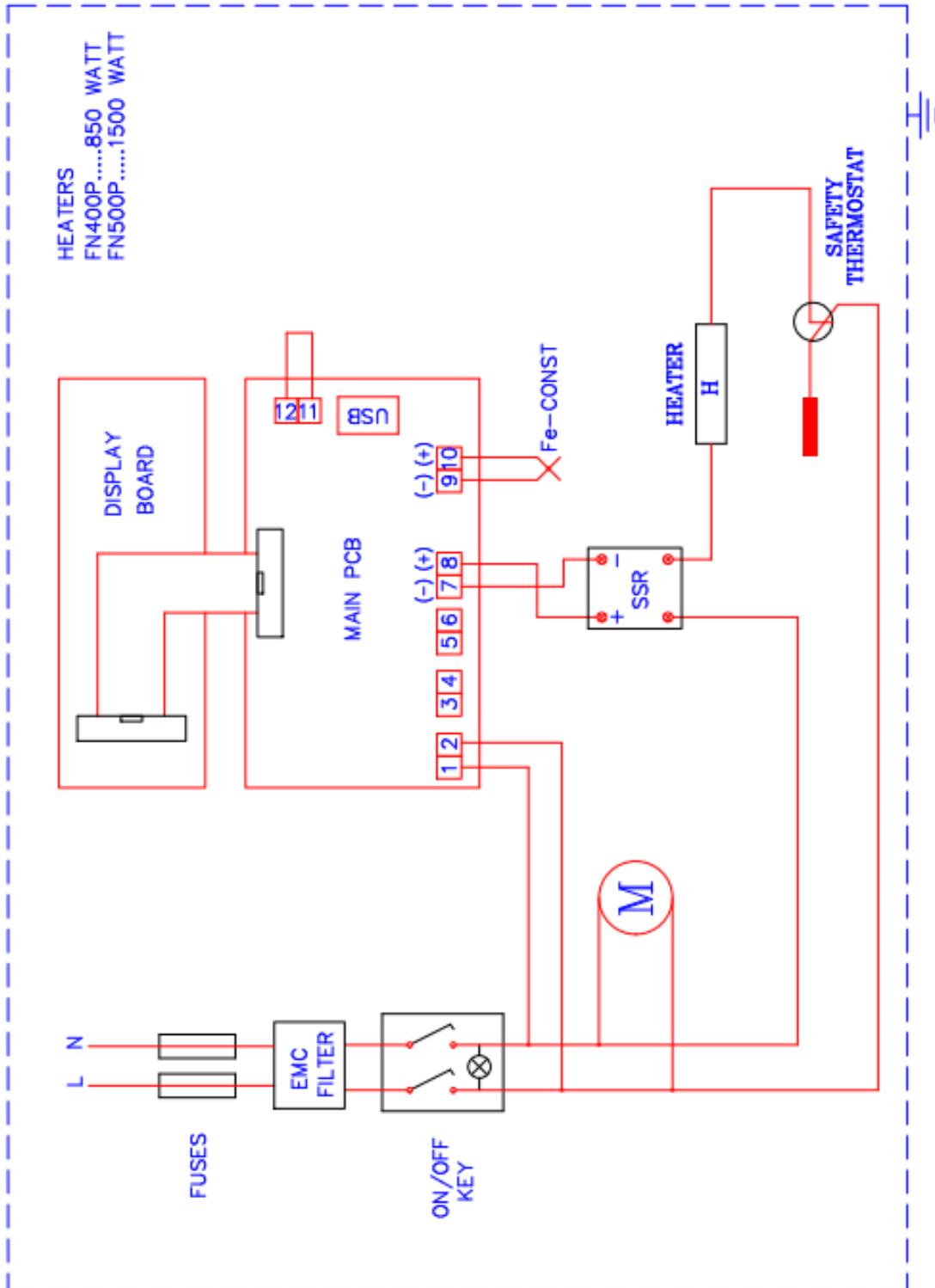
SECTION 9

WARNING LABELS

DO NOT OPERATE BEFORE READING THE INSTRUCTION MANUAL!.. **KULLANMA KILAVUZUNU OKUMADAN ÇALIŞTIRMAYINIZ!..** Z14.E 02 016	**CAUTION!** Always use earthed wall sockets. **DİKKAT!** Cihazı mutlaka topraklı prizde çalıştırınız. Z14.E 02 022
WARNING !.. DISCONNECT THE MAIN SUPPLY BEFORE REMOVING THE COVER. **DİKKAT !..** BU KAPAĞI AÇMADAN FİŞİ MUTLAKA PRİZDEN ÇIKARINIZ. Z14.E 02 015	**WARNING! HOT SURFACE** **DİKKAT! SICAK YÜZEY** Z14.E 02 007
GROUNDED PLUG	F2x10A 250V ~ **FN 500 - FN 500P** **FUSE (2×10A)**
F2x4A 250V ~ **FN 400 - FN 400P** **FUSE (2×4A)**	F2x3A 250V ~ **FN 300** **FUSE (2×3A)**