Instruction manual SMART

Laboratory incubators

models: **CLN 15, CLN 32, CLN 53, CLN 115, CLN 180, CLN 240**
CLW 15, CLW 32, CLW 53, CLW 115, CLW 180, CLW 240, CLW 400, CLW 750, CLW 1000

Drying ovens

models: **SLN 15, SLN 32, SLN 53, SLN 75, SLN 115, SLN 180, SLN 240**
SLW 15, SLW 32, SLW 53, SLW 75, SLW 115, SLW 180, SLW 240, SLW 400, SLW 750, SLW 1000

Drying ovens with nitrogen blow

models: **SLWN1 15, SLWN1 32, SLWN1 53, SLWN1 115, SLWN1 240**
SLWN2 15, SLWN2 32, SLWN2 53, SLWN2 115, SLWN2 240

Laboratory sterilizers

models: **SRN 53, SRN 115, SRN 240**
SRW 53, SRW 115, SRW 240, SRW 400, SRW 750, SRW 1000

Pass-through sterilizers

models: **SRWP 115, SRWP 240**

Before using the equipment, please read carefully this instruction manual!

Version 1.30

Issued 2.01.2023

PN-EN ISO 9001
ISOCERT CERTYFIKAT

CE

Manufacturer's address:

POL-EKO A.Polok-Kowalska sp.k.
ul. Kokoszycka 172 C
44-300 Wodzisław Śląski
Country of origin: Polska

As a manufacturer, we inform you that we took the necessary measures to ensure that this device fully meets your expectations and is reliable for a long period of use. Due to the continuous improvement of our products, as well as the expansion of our offer, any suggestions regarding additional functions and equipment functioning are welcome. Visit our homepage www.pol-eko.com.pl/home-en/

Equipment disposal

This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste. Instead it's your responsibility to correctly dispose of your equipment at lifecycle -end by handling it over to an authorized facility for separate collection and recycling. It's also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect from health hazards the persons involved in the disposal and recycling of the equipment. For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment.
By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

Thank you!

Contents

1. INTENDED USE AND IMPORTANT INFORMATION FOR THE USER

CL laboratory incubators, SL drying ovens, SR laboratory sterilizers are laboratory devices designed for incubation, drying and sterilization with hot air of samples at following temperature ranges:

- laboratory incubators CL: 5°C above ambient temperature … +100°C
- drying ovens SL: 5°C above ambient temperature … +300°C
- laboratory sterilizers SR: 5°C above ambient temperature … +250°C
- pass-through laboratory sterilizers SRWP: 5°C above ambient temperature … +250°C
- SLWN drying ovens with nitrogen or other inert gas blow (with a dozen exchanges per hour): 5°C above ambient temperature … +250°C. When used as a standard drying oven, the temperature range is: 5°C above ambient temperature … +300°C

Laboratory incubators, drying ovens and laboratory sterilizers have an electric heating system. All devices are controlled by a precise SMART controller, thanks to which the set temperature is maintained with good fluctuation and variation. The devices are available in the following versions:

- with natural (N) air convection: models CLN, SLN, SRN
- forced (W) air convection: models CLW, SLW, SLWN, SRW (in the chamber there is one or more fans, depending on unit's capacity, which force air movement – for devices with forced air circulation, the symbol  appears on the screen.

Drying ovens with nitrogen flow, SLWN1 and SLWN2 models are used, among others, for the determination of total moisture in hard coal according to the **PN-ISO 589:2006** norm which requires that coal samples susceptible to oxidation should be dried at a temperature of + 105°C in a drying oven with a nitrogen flow.
Requirements for the use of the equipment are given in point 6 of the norm. A drying oven with nitrogen flow should be used to control the temperature in the range of + 105°C to + 110°C with the additional possibility of blowing with a stream of dry nitrogen at a flow rate of about 15 volumes of the drying oven per hour. For detailed information on the available models and equipment, see *Section 9*.

The meaning of information symbols

	**This symbol means that failure to follow the instructions could endanger people's health or life, or damage the device. The manufacturer is not liable for damages resulting from non-compliance with the instructions contained in the manual.**
	**Applies to SL and SR: when operating at high temperatures (over 200°C), the door and the unit housing may be hot.**
	This symbol indicates helpful tips.

To guarantee your security and the longevity of the unit, please comply with the following rules:

1.	**The unit cannot be installed:** • outside, • in damp places or places which can be easily flooded, • near flammable or volatile substances, • near acids or in corrosive environments.
2.	**It is forbidden to:** • store inflammable or volatile substances inside the unit – equipment is not made in an explosion-proof version, • touch live parts of the unit, • operate the unit with wet hands,

	• put water vessels on the unit, • climb on the unit, • overload the shelves (the maximum load is described in technical data).
3.	**<u>You should:</u>** • place samples in such a way to provide proper air circulation in the chamber, • open the door for the shortest period of time to reduce temperature fluctuations, • secure samples from being blown out by the chamber fan e.g powdery samples, • always check that the doors are closed correctly, • use only mains with earth to avoid electric shocks, • unplug the power cable holding the protective cover and not the cable itself, • disconnect the unit from the mains before undertaking any repairs or maintenance work (in order to not lose the warranty during its duration, all repairs should be carried out by an authorized service), • protect the power cable and the plug from any damage, • disconnect the power plug before moving the unit, • disconnect the power plug if the device will not be used for a long period of time, • disconnect the unit and protect it from reconnecting if it has any visual fault.

	**The manufacturer is not responsible for corrosion, damage to electronics or other elements of the equipment caused by placing inside substances that have an adverse effect on the materials from which it was made.**

Failure to comply with the above recommendations may result in damage to the device or deterioration of technical parameters, as well as loss of warranty.

2. PACKAGE CONTENTS

Drying ovens (SL) and laboratory incubators (CL) in SMART version are delivered with:

Device	SL/CL									
Capacity	**15**	**32**	**53**	**75**	**115**	**180**	**240**	**400**	**750**	**1000**
Shelves [pcs.]	1	1	2	2	2	3	3	3	5	6
Slides [pcs.]	2	2	4	4	4	6	6	6	10	12
Power cord [pcs.]	1	1	1	1	1	1	1	1	1	1
								SL - INTEGRATED		
Rubber cap [pcs.]	x	x	1	1	1	1	1	1	1	1
Key for door lock [pcs.]	2	2	2	2	2	2	2	2	2	2
Wrench (13mm) for wheels adjustment [pcs.]	x	x	x	x	x	x	x	1	1	1
Quality Control Certificate [pcs.]	1	1	1	1	1	1	1	1	1	1

Laboratory sterilizers (SR) in SMART version are delivered with:

Device	SR					
Capacity	**53**	**115**	**240**	**400**	**750**	**1000**
Shelves [pcs.]	2	2	3	3	5	6
Slides [pcs.]	4	4	6	6	10	12
Power cord [pcs.]	1	1	1	1	1	1
Rubber cap [pcs.]	1	1	1	1	1	1
Key for door lock [pcs.]	2	2	2	2	2	2
Wrench (13mm) for wheels adjustment [pcs.]	x	x	x	1	1	1

Quality Control Certificate [pcs.]	1	1	1	1	1	1

Pass-through sterilizers (SRWP) in SMART version are delivered with:

Device	**SRWP**	
Capacity	**115**	**240**
Shelves [pcs.]	2	3
Slides [pcs.]	4	6
Power cord [pcs.]	1	1
Rubber cap [pcs.]	1	1
Key for door lock [pcs.]	4	4
Stand	1	1
Masking element	2	2
Quality Control Certificate [pcs.]	1	1

3. BEFORE THE FIRST USE

The manufacturer sends the device protected by cardboard profiles and foil. The device should be transported in **an upright position** and the package should be secured against sliding during transport.

	**After receiving the device, visually assess its condition and equipment in the presence of the person delivering the goods. A courier company is responsible for any damage caused during transport.**

	**After transporting the device at a temperature below 10°C, wait at least 2 hours before connecting it to the mains.**

On the surface of unit's components made of stainless steel, slight discoloration may occur. It is a result of the technologies used in the production of metal sheet in accordance with the requirements of PN-EN 10088-2 standard and it is not a defect of the unit.

	**In SL drying ovens, SR sterilizers and CL laboratory incubators there's a ventilation air-flap at the back of the device. Hot air comes out of the air-flap during operation of the device. The manufacturer recommends using a non-flammable insulation screen on the wall or increasing the distance from the wall. Failure to do so may result in permanent damage to the wall, and in extreme cases even a fire.**

	**Applies to drying ovens (SL, SLWN) and sterilizers (SR, SRWP). Before first boot, it is recommended to turn on the device for 3 hours at the set temperature of 250°C. There might be a specific smell coming out from the interior of the chamber and this is not a malfunction.**

The place of installation of the unit should meet the following conditions:

- ambient temperature +10°C...+28°C,
- recommended relative humidity of the ambient air up to 60%,
- the unit has not been designed to work in highly dusty environments,
- ensure proper ventilation in the room,
- the device should be placed on a hard and stable surface,
- the unit should be placed at least 100mm away from the walls,
- the height of the room must be at least 300mm greater than the height of the unit,
- the unit is not designed to be built-in,

- the place of installation of the device should be equipped with a socket with parameters suitable for the device.

If you don't comply with the above recommendations, the unit may get broken or it may worsen the technical parameters such as:

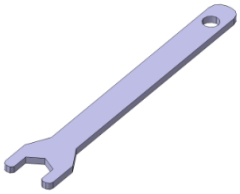
- **temperature fluctuation,**
- **temperature variation,**
- **power consumption**

and may result in loss of warranty.

Wheels / leveling feet

	**If the device has been equipped with wheels or leveling feet:** • **in the case of wheels after placing the unit at its destination, secure the device against movement by locking the wheels** • **in the case of feet, after placing the device in the destination, they should be leveled.**

If the device is equipped with wheels, they must be locked and leveled. For this purpose use the red knob mounted in the wheel housing. At the beginning, the knob can be turned by hand, if it encounters resistance, use a 13 size wrench.



	**Leveling wheels are ONLY for positioning the device at its destination. They can not be used to transport the device!**

If the device is to be placed on a table (option) or base (option) which is equipped with the wheels with a lock, the wheels MUST be locked after placing the table / base in its final destination.

Electric installation

	**Power supply of the equipment is indicated on a rating plate on the unit. Connect the device to a socket with ground in order to avoid electric shocks in case of the unit's failure.**

The installation should be protected by a 16A slow-blow fuse and equipped with a residual current device.

3.1. Installation of shelves

To install the shelf or to change its position, follow these steps:

Install the shelf slide at the selected height by inserting it into perforations on the wall of the device. Do the same with the slide on the opposite wall.

Slide the shelf into the installed shelf slides. Now, the shelf is correctly installed!

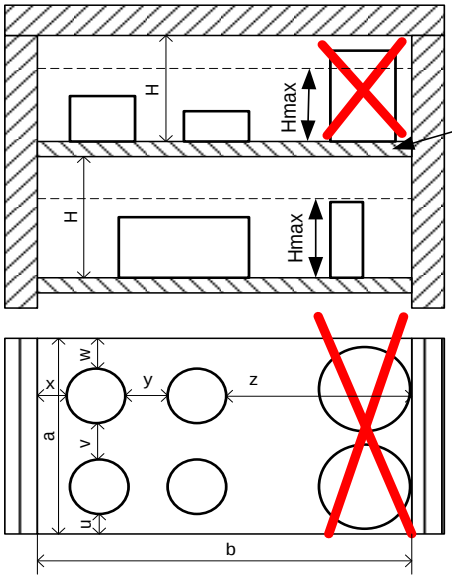
To remove a shelf, perform the above steps in reverse order.

3.2. Remarks on the placement of samples

To provide proper air circulation and stable conditions in which the samples are stored in the chamber, it is necessary to keep the following rules:

- the max height of the samples should not exceed 1/3 of the space between the shelves,
- approx. 1/3 of the width and depth of the shelf should remain empty, while the distances between the samples, as well as between the samples and the wall should be approximately equal.

The picture below is an example of the placement of samples in the chamber.



Front view

Shelf

Hmax = 2/3H

Top view

u+v+w > 1/3 a

x+y+z > 1/3 b

u□v□w

x□y□z

Following the above rules will provide best optimal parameters of temperature fluctuation and variation.

3.3. Closing chamber door

The external solid door of the units CL, SL and SR have two-point lock and open door sensor. If the door has not been closed properly, audible alarm will sound. You can set delay door alarm by: 30s, 1 min, 2 min, 5 min or 10 min *(see Section 6.14).*

4. DESCRIPTION OF THE DEVICE

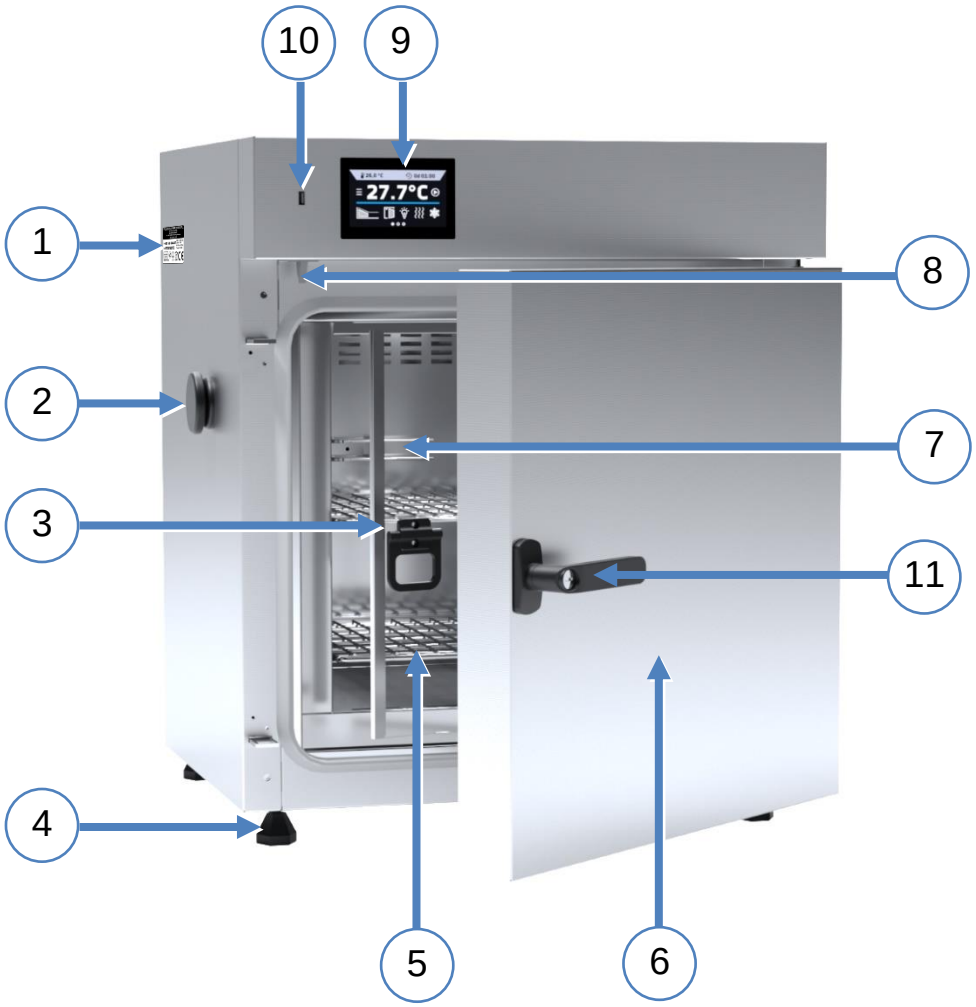
SMART models are equipped with a PID microprocessor temperature controller and a 4.3 inch color touch screen with a resolution of 800x480.

4.1. Design of CL, SL, SR, SRWP devices

Below there's a picture showing CL, SL, SR, SRWP type devices (exemplary picture) with a description of the important components of the device.

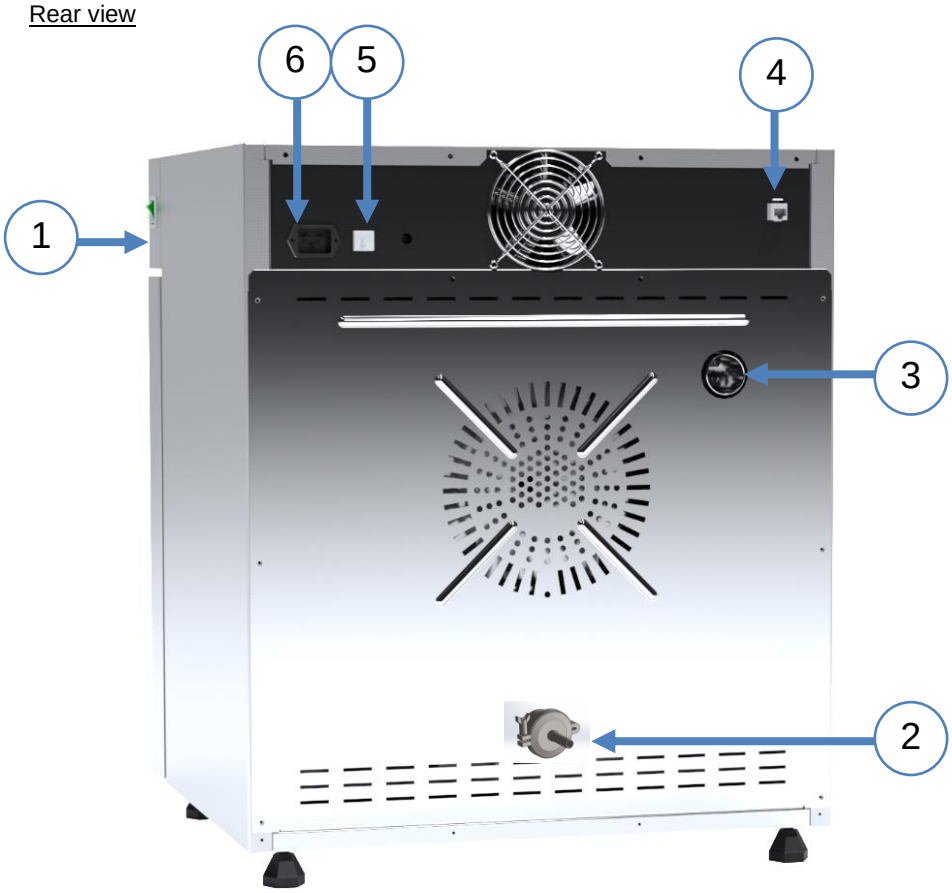
The elements of the device are shown on the basis of a CLN 53.

Front view



1) rating plate
2) access port ø30mm for external sensor
3) internal glass door (for CL)
4) adjustable feet
5) shelf
6) external solid door
7) temperature sensors
8) open door sensor
9) touch control panel
10) USB port
11) handle with key lock

Rear view

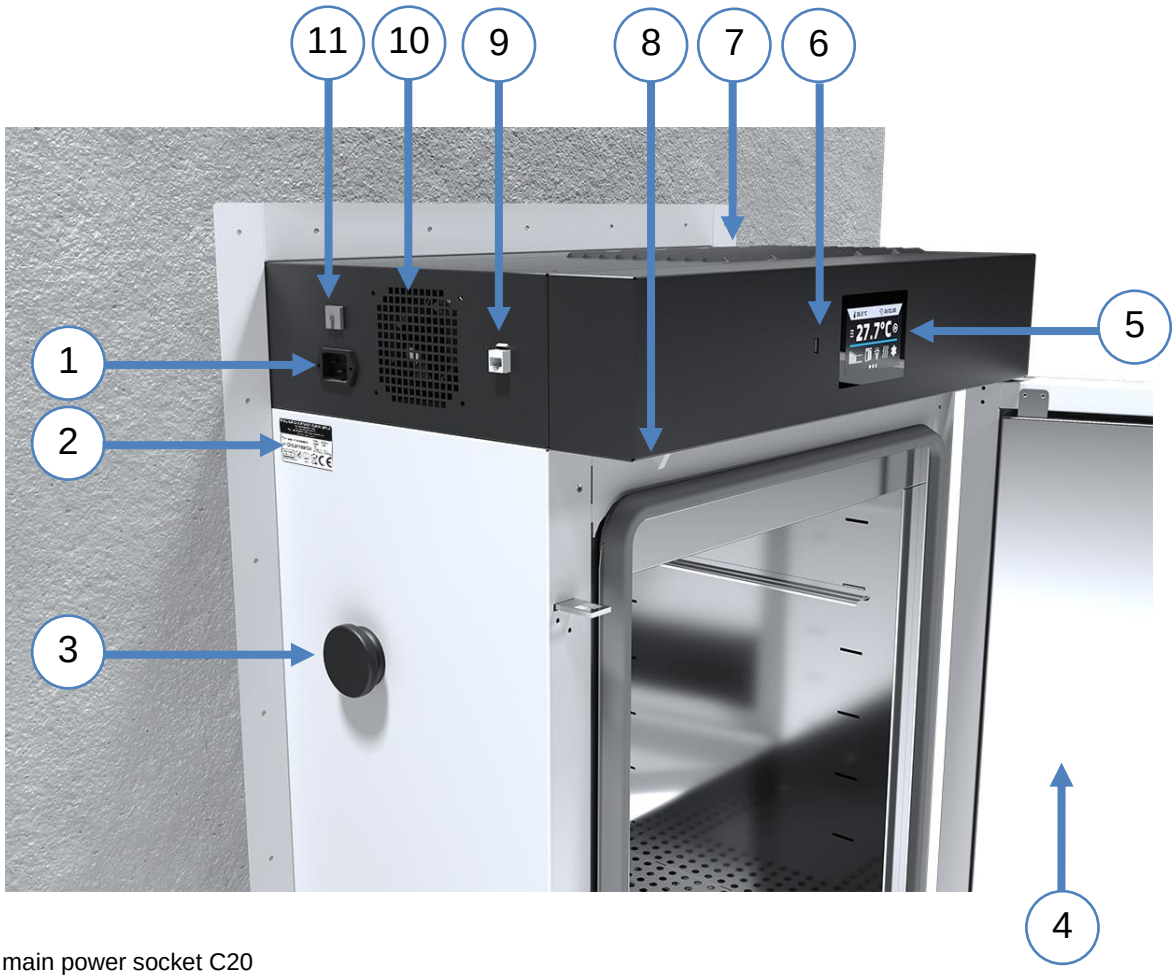


1) main switch
2) connector for connecting a hose with nitrogen (only for SLWN models)
3) air-flap
4) LAN port
5) fuse
6) main power socket C20

4.2. Design of SRWP devices

Below there's a picture of pass-through sterilizer (exemplary photo) with a description of the important components of the device.

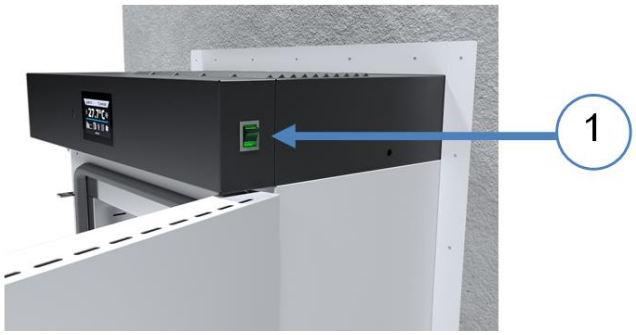
Front view



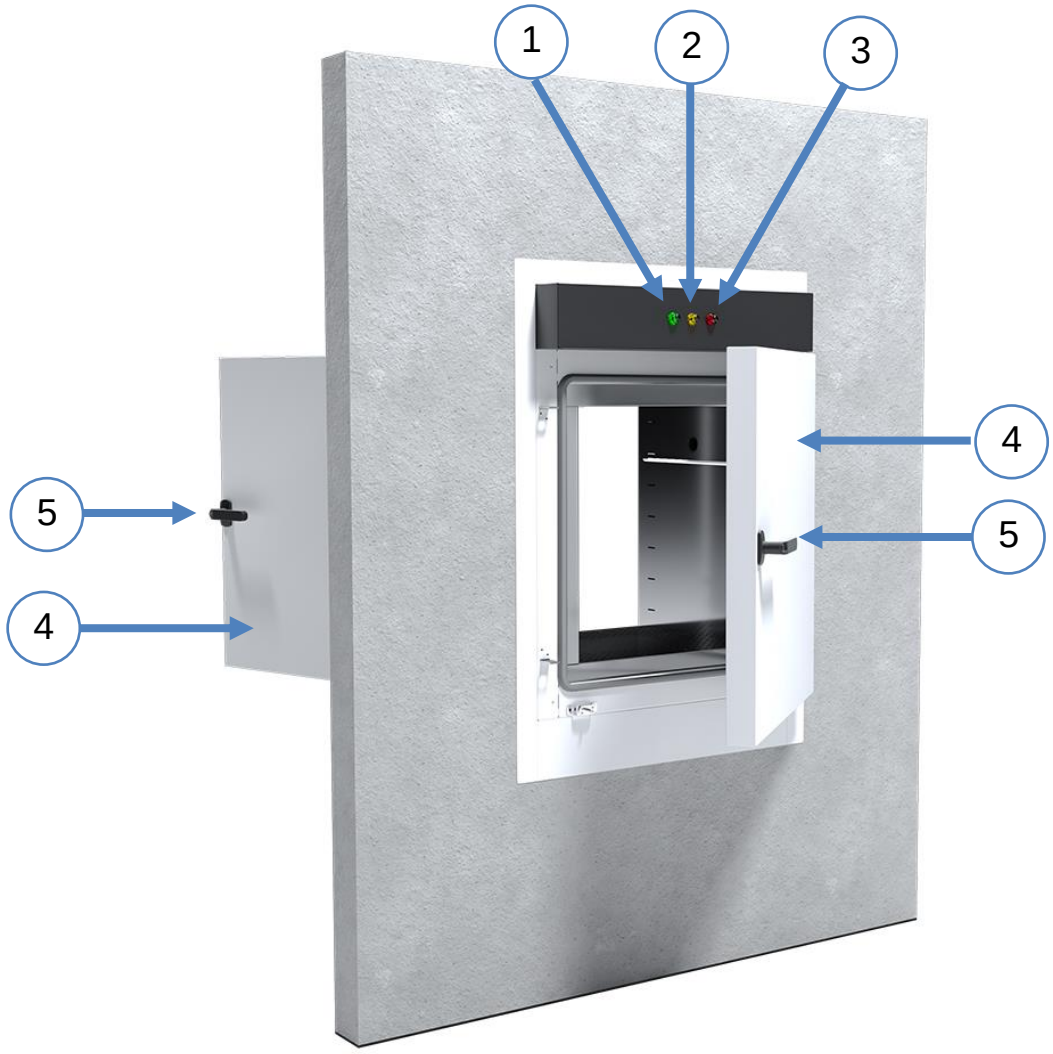
1) main power socket C20
2) rating plate
3) access port ø30mm for external sensor
4) external solid door with handle with a key lock
5) touch control panel
6) USB port
7) ventilation grille
8) open door sensor
9) fuse
10) electronics cooling fan
11) LAN port

Side view

1) main switch



Rear view



1) green diode – lights up when the device is turned on
2) yellow diode - pulsates when the set temperature is being reached; lights up when the set temperature is reached
3) red diode - it lights up in the event of an alarm
4) external solid door
5) handle with a key lock

5. DEVICE EQUIPMENT (STANDARD AND OPTIONAL)

5.1. External door with viewing window (optionally for CL, SL, SR)

The external door with a viewing window is an optional equipment for CL, SL, SR models (except for CL/SL 15,32).

In SL drying ovens with door with viewing window, the maximum operating temperature is lowered to +250°C at the factory.

During operation, when the temperature inside the chamber is high, do not touch components of the external door with viewing window, as there is a risk of burns. Use protective gloves to protect yourself against the effects of burns from hot components.

5.2. Internal glass door (standard for CL)

Internal glass door is a standard equipment in CL laboratory incubators. To open and close the door use the plastic handle attached to the glass.

During operation, when the temperature inside the chamber is high, do not touch the internal components and glass door, as there is a risk of burns. Use protective gloves to protect yourself against the effects of burns from hot components.

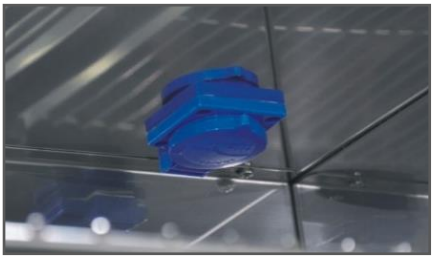
We do not recommend installing and removing internal glass door. Incorrect assembly or disassembly may result in damage to the glass and injury to the user.

5.3. HEPA filter (optionally for all units)

The HEPA filter is an optional accessory for CL incubators, SL drying ovens and sterilizers. HEPA filter is used where the highest standards of clean air are required. The equipment at the production stage is adapted to the installation of the filter. The filter has H13 class to PN-EN1822-1:2019 norm. It's located at the rear of the unit. The filter itself is delivered separately. You should place it in the square filter cover so the black gasket is outside, then screw the cover to the rear wall of the unit. Please ensure that the distance between the filter and wall is not less than 100mm.

5.4. Internal socket (optionally for CL)

An internal socket with grounding and IP44 protection is an optional equipment for CL laboratory incubators. The internal socket (depending on the model: 230V 50Hz / 230V 60Hz / 115V 60Hz) is intended for EU plugs or plugs type B. The socket can be used to connect electrical devices inside the device.



	The maximum permissible load of all sockets inside the device (max. 3 pcs.) is 200 [W].

	In laboratory incubators with internal socket the maximum operating temperature is lowered to +70°C at the factory.

	**Always make sure that the safety rules for working with electrical devices are followed!**

5.5. Door lock (standard for all units)

All devices have a key lock. In the models CL, SL, SR, SRWP the key lock is situated in the door handle. Two keys are supplied with the device (hung on the back of the device). Together with SRWP model 4 keys are provided.

5.6. Access port for external sensor (standard for all units)

A Ø30 mm access port can be used to insert an external temperature sensor for independent temperature control inside the device. The access port has been secured with a rubber plug. The plug should cover the access port while the unit is operating. If multiple cables have been inserted through the access port and it is not possible to use the plug, secure the access port with adhesive tape. If you leave the access port open, it may affect temperature fluctuation and variation inside the chamber.

5.7. Open door alarm (standard for all units)

All units have been equipped with an open door sensor. If you open the door, the icon: 

will appear (the number above the icon presents open door counter. Press the icon to cancel the counter. The counter is also cancelled by turning of the device). If the door remains open longer than the time set by the user (30s, 1 min, 2 min, 5 min, 10 min) an acoustic signal, red pulsating alarm bar and *„open door"* alarm with active status will appear.

Open door sensor

In SRWP pass-through sterilizers, the open door sensor is located on the front and back of the device - the open door alarm is activated for the front and rear door.

5.8. Internal light (optionally for all units)

Internal light is optional for CL, SL, SR and SRWP devices. Internal light is integrated with an open door sensor. When the light switches on, the icon  will appear on the display. For devices with door with viewing window, pressing the icon  allows you to turn the light ON or OFF (the light is not integrated with the open door sensor).

In incubators with internal light, the maximum operating temperature is lowered to + 70°C at the factory. In drying ovens with internal light, the maximum operating temperature is factory reduced to + 250°C.

5.9. USB port (standard for all units)

The USB port on the front panel is used only to transfer data from the device's internal memory to the flash drive. To do this, insert the flash drive into the USB port on the front panel and then:

- go to the main menu ,
- go to the data record ,
- press and choose type of the file: *.csv, or *.plkx.
- press . Data has been copied.

	After copying the data to the USB flash drive, before removing it from the USB socket, it should be unmounted by pressing the icon in the top drop-down list *(Figure 1)*. If the pendrive is not unmounted after connecting to the computer, a message about pendrive damage may be displayed with a repair proposal, when actually the pendrive is not damaged

Figure 1 Unmounting USB flash drive

Data saved in the * .csv file can be opened in a spreadsheet. Data saved as * .plkx can be opened in the Lab Desk program (additionally paid option). This program allows, among others, for data preview in the form of a table or a graph. It also allows you to prepare a statistic report for a selected range of data, more information *Section 6.9*.

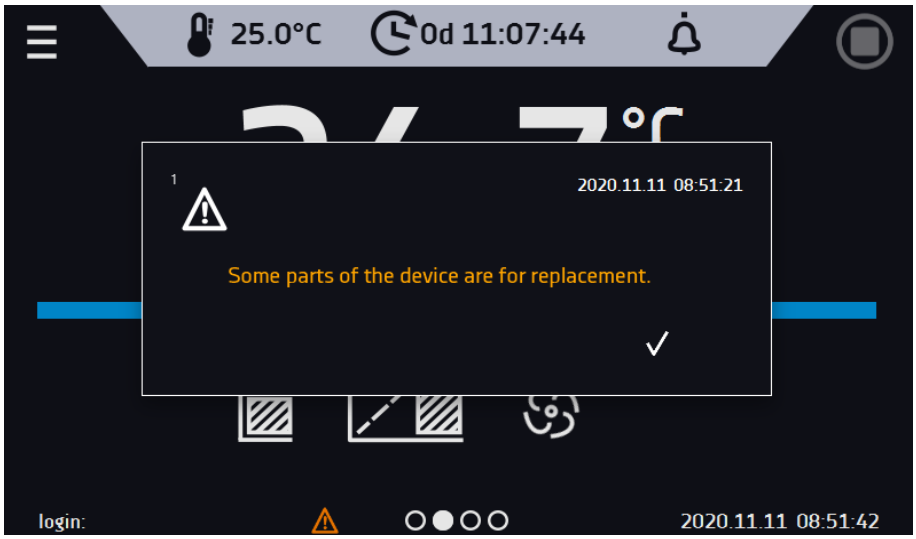
5.10. Display battery backup (optionally for CL, SL, SLWN, SR, SRWP)

Units in the SMART version can be optionally equipped with a battery backup of the display. The power loss and switching to the battery backup display mode is signaled by a pulsating red frame around the display and a sound signal (if it is turned on). In the battery backup display mode, all parameters are displayed, ie temperature. Other alarms, e.g. exceeding the temperature range, are also signaled.

In order to extend the battery life, the display is dimmed all the time. Batteries are automatically charged in AC mode.

	Batteries should be replaced every 12 months. When it is time to replace the battery, a message will appear on the display, see *Figure 2.* During the warranty period, the replacement should be performed by an authorized service. Otherwise, you will lose your warranty.

Figure 2 Battery replacement message



5.11. Consumables

Consumables during normal operation are:

- silicone door seal - in all units,
- chamber fan - in equipment with forced air convection,
- interior lighting bulb - in units with the option of interior lighting.

6. DEVICE OPERATION

This symbol means that a given window can be moved in the direction shown in the picture.

6.1. External memory (USB flash drive)

The external memory (USB flash drive) allows to copy: instruction manual, data record, event log and service log from the device memory. Before first use, the USB flash drive should be formatted in the FAT 32 file system. Insert the device in the USB slot on the front of the device next to the display. Wait a few seconds, the correct reading is indicated by the message *„USB flashdrive connected"* at the bottom of the screen.

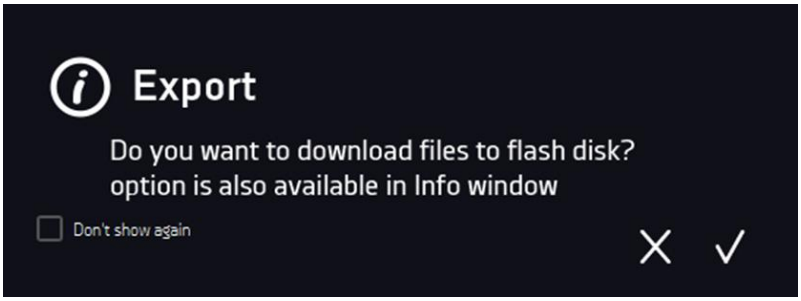
	After copying the data to the USB flash drive, before removing it from the USB socket, it should be unmounted (see *Section 5.8.*).

	USB slot is used to connect **only** a flash memory – a pendrive or a card reader with a memory card. Connecting any other device (e.g. external hard drive) without consultation is not authorized by the manufacturer and may damage the USB slot.

6.2. First boot

During the first boot, the screen *(Figure 3)* will display information about saving the "Download" folder (with instruction manual in pdf format) on the USB flash drive. In order to do it, insert the USB flash drive and wait a second for hardware detection, then press ☑.
If you press ☒ you quit downloading the folder. The window will appear again during the next boot. You can tick „Don't show again" so that the window will not be displayed after switching on the device. You can always download the "Download" folder in the Info submenu. More information *Section 6.11.*

Figure 3 Downloading files



6.3. Main screen

After switching on the device, the main screen *(Figure 4)* appears. It contains the information about the device status. After starting the program, additional information appears on the screen *(Figure 5)*.

Figure 4 Main screen

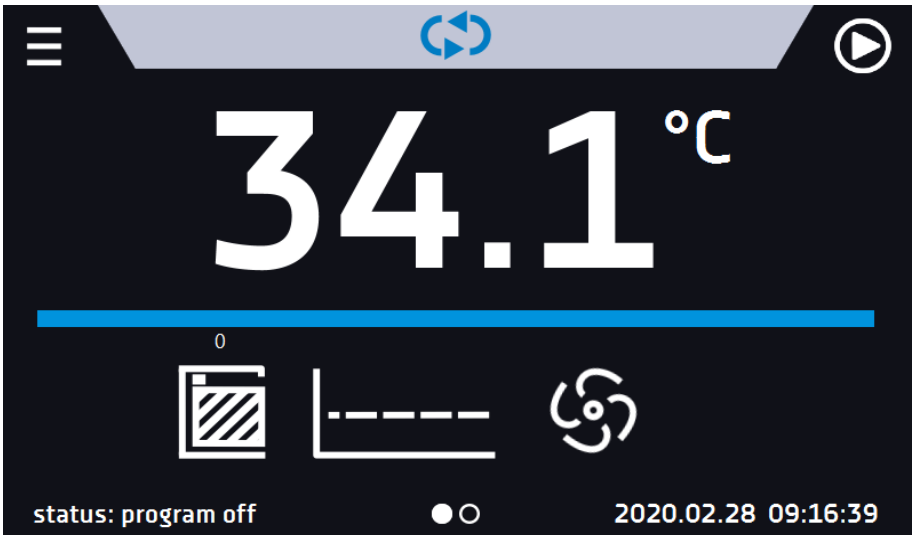
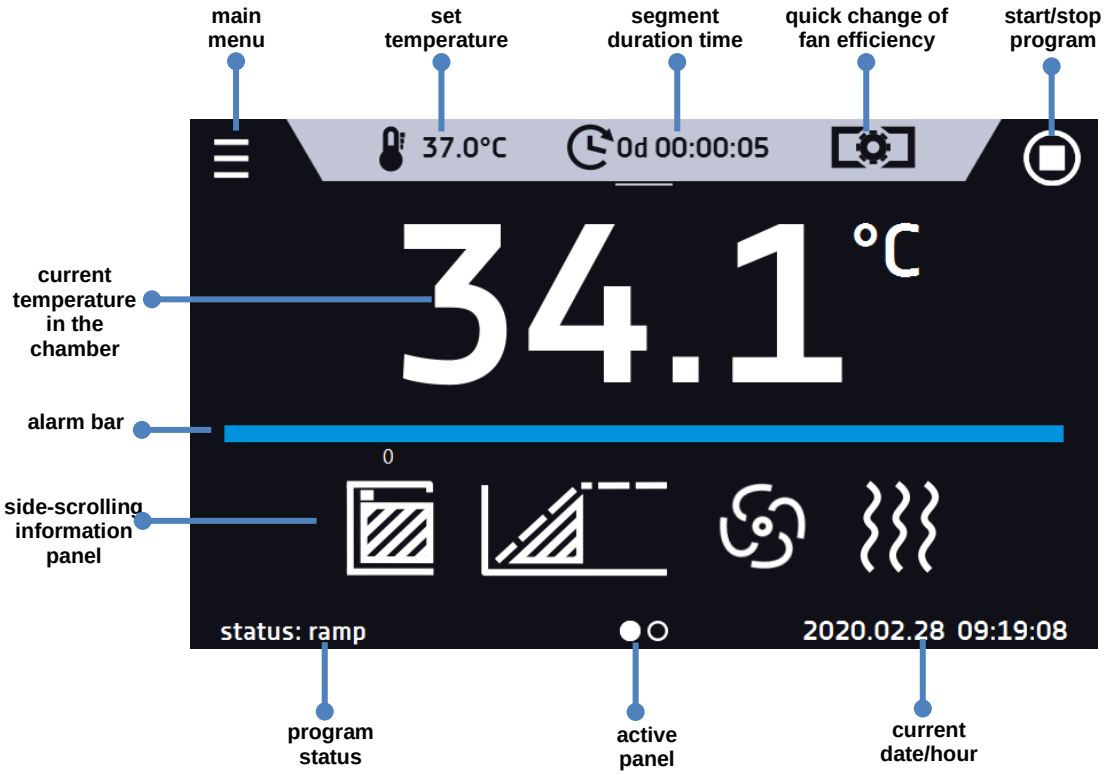


Figure 5 Main screen – running program



6.3.1. Information panel

There are two different windows in the information panel. Switching between them is done by swiping the finger left or right.

Figure 6 Information panel

The icon indicates information about which window is active.

6.3.1.1. Alarms panel

The icon which is on the second page of the information panel, allows you to go to the alarms panel.

Figure 7 Icon: Alarms panel

In the alarms panel *(Figure 8)* there's a list with active alarms or the alarms that have occurred but have not been confirmed. When the alarm is active, the alarm bar is red and the alarm event is displayed in the list with the status "active". When the alarm event stops, the state changes to "inactive".

- "**delete**" button – confirms and removes the alarm from the list (only inactive alarms can be deleted),
- "**confirm**" button – confirms an alarm,
- "**details**" button – displays a preview of all instances of selected alarm *(Figure 9)*.

Figure 8 Alarms panel

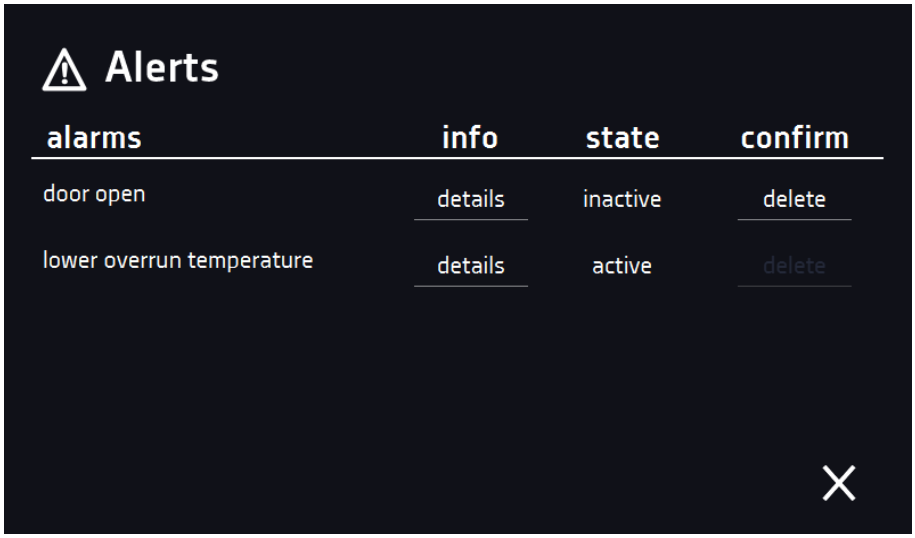
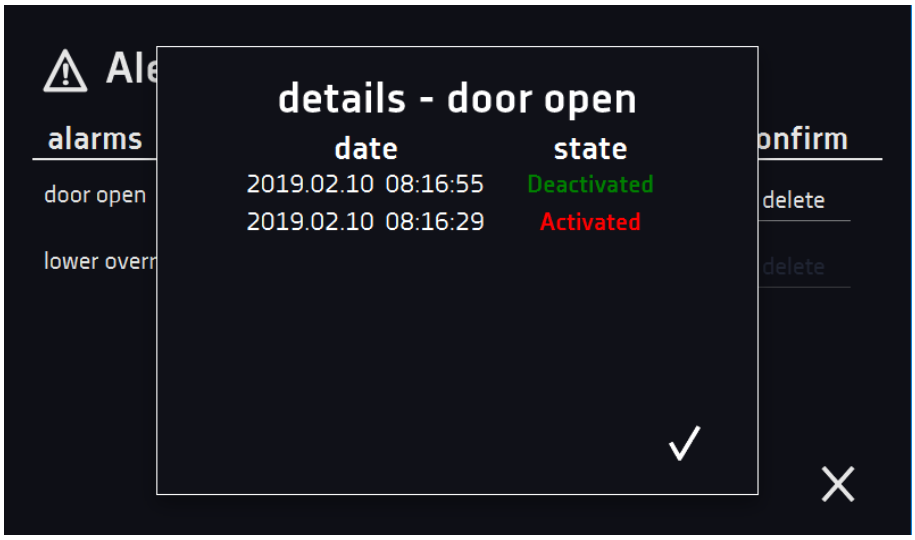


Figure 9 Alarm details



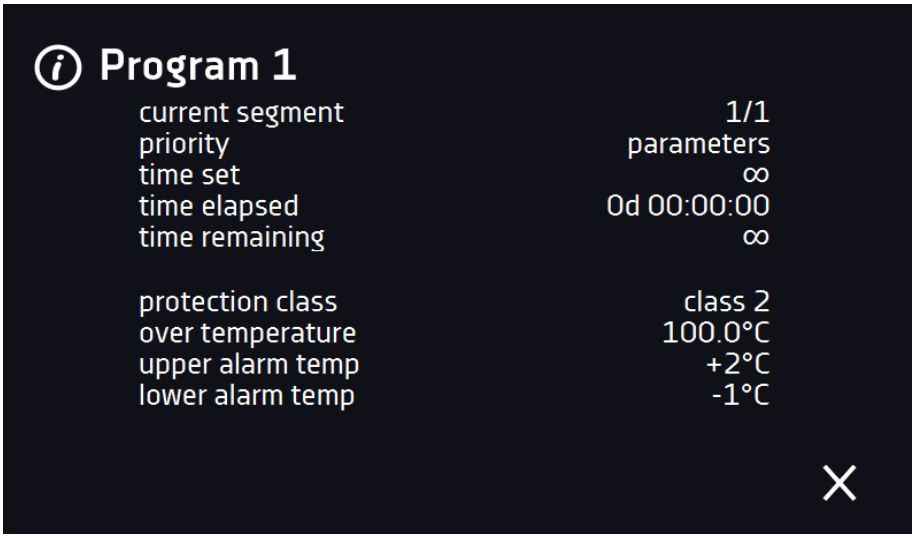
6.3.1.2. Status panel

The icon which is on the second page of the information panel, allows you to go to the status panel.

Figure 10 Icon: Statusu panel

The status of the device is indicated also by description.

Figure 11 Status – description



program name	the name of running program
current segment	currently running segment / total number of segments in the program
priority	of time or parameters
time set	set time of running segment
time elapsed	elapsed time since the segment has started
time remaining	remaining time until the end of the segment
current loop	currently performing cycle/ total number of cycles to perform
protection class over temperature under temperature	information about the protection temperature of a running or completed program. The protection parameters can be set in the program parameters
upper alarm temp lower alarm temp	information about set alarms, separately for upper and lower alarm temperature. Setting of the alarms

6.3.2. The meaning of icons and symbols

	The icon allows you to go to the main screen.
	Automatic return to the home screen. Factory setting: disabled.
	The icon allows you to go to the main menu.
	Automatic screen lock. Factory setting: disabled.
	Unmounting the USB flash drive before removing it from the USB socket.
	Internal light is switched on. The icon appears in the devices with the internal light (OWW). Light switched off – icon inactive. By clicking the icon  on the status panel you can manually turn on / off the light (applies to devices with the door with viewing window).
	Closed door, open door. The number above the icon presents open door counter. Press the icon to cancel the counter. The counter is also cancelled by turning of the device
	In the devices with forced air convection (CLW, SLW, SRW, SRWP): fan icon. Rotating icon shows that the fan is running. Quick Change function - clicking the icon allows you to change the fan efficiency (without editing the program) in the range of 0% ... 100% for CLW/SLW/SRW/SRWP 15-115) or 10%...100% for CLW/SLW/SRWP 180-1000.
	Ramp status: Chamber is currently heating up.
	Set temperature is reached.
	The program will start on the given date / time. Start delay activated.
	Icon is visible only when the chamber is heating up.
	Available when the program is running. Clicking the icon allows you to quickly change the set temperature (Quick Change function).
	When the program is running, click the icon to quickly change the time of program duration (Quick Change function). Indicates the time that has elapsed from the program start.
	Countdown of the time remaining to the end of the program.
	The arrow icon allows navigation between: segments, program parameters and summary.

	Starting the selected program. In the list of programs - the program is running.
	Stopping the program.
	Adding a new program to the program list. The user can create up to 5 programs.
	Editing the selected program from the list. In the program list, a new program has been created but not approved yet.
	Removing selected program from the list.
	Going to alarms panel.
	Going to the status panel with information about the program parameters.
	Going to the menu to create, edit, delete and start programs.
	Canceling adding or editing of the program. Canceling changes.
	Editing individual program segments (the program can have max. 6 segments).
	Immediate start of the program selected from the program list.
	Delayed start of the program from the list of programs. The program starts according to the set date and time.
	Going to the SMART program (Quick Program function).
	Turning off the alarm sound. Critical alarms (i.e. damage to the temperature sensor, temperature, protection etc.) continue emitting a sound.
	When the program is running, click the icon to quickly change the fan efficiency (Quick Change function).
	In the program editing/creating mode: the degree of air-flap opening. In the operating mode (program started) clicking on the icon allows you to quickly change the degree of opening of the air-flap without having to edit the program.
	Active STM function (Smart Temperature Monitor) informs the user about the problem of reaching or maintaining the set temperature. • white color - option enabled, the program is stopped • blue color - option enabled, the program is running • red color - warning about problems with reaching / maintaining the temperature

6.3.3. Upper expandable and configurable menu

When the program is running, in the upper part of the main screen there's a bar menu with parameter icons (temperature, time, fan efficiency - for CLW, SLW, SRW, SRWP and degree of opening of the air-flap) which can be quickly changed (Quick Change).

Depending on the model, after swiping your finger down *(Figure 12, Figure 13)* you will see icons for all parameters which can be quickly changed (more information *Section 6.7.*). Among the options available in the bar you will find the following icons:

-  USB flash drive unmounting – more information *Section 5.9.*
-  mute option. Critical alarms (i.e. damage to the temperature sensor, temperature, protection etc.) continue emitting a sound, see *Section 6.14.1.*
- Quick Change (more information *Section 6.7.*) of:
  -  program duration time,
  -  set temperature,
  -  fan efficiency and degree of opening of the air-flap.

Figure 12 Upper menu when the program is running

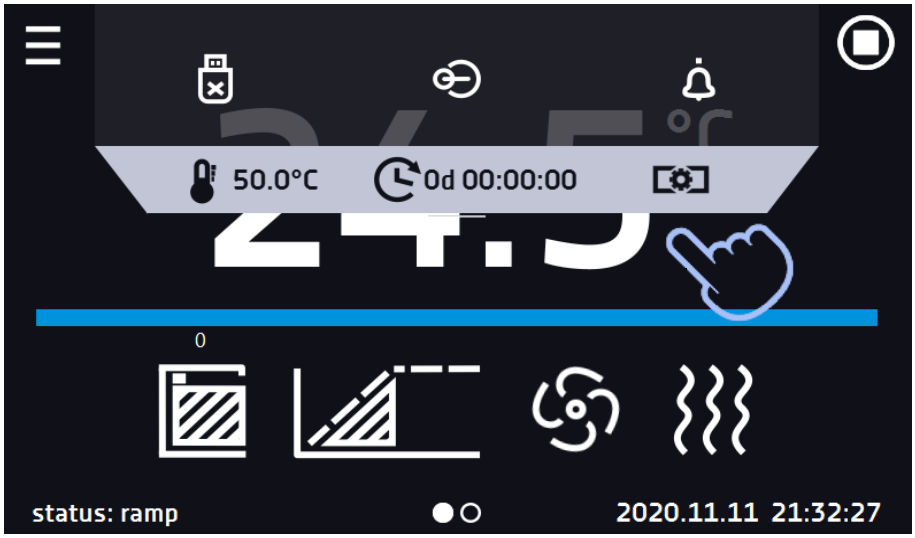
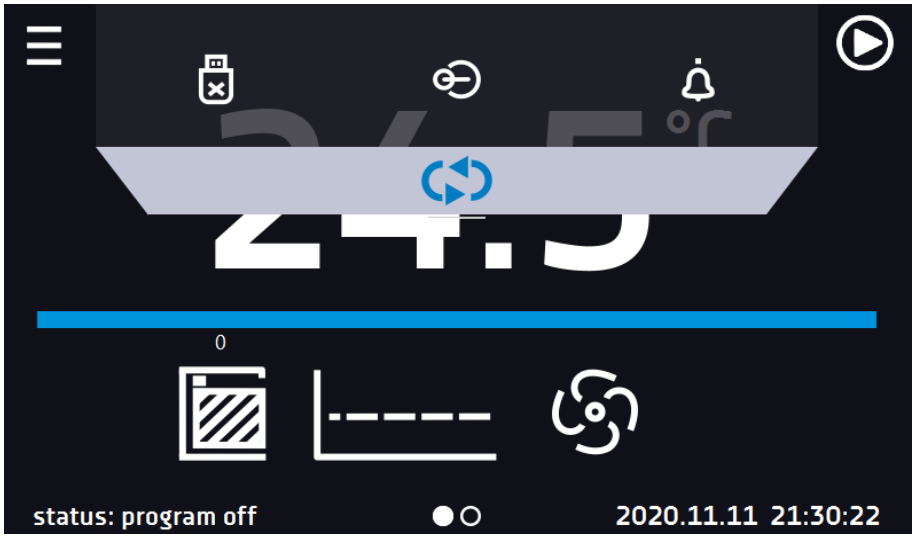
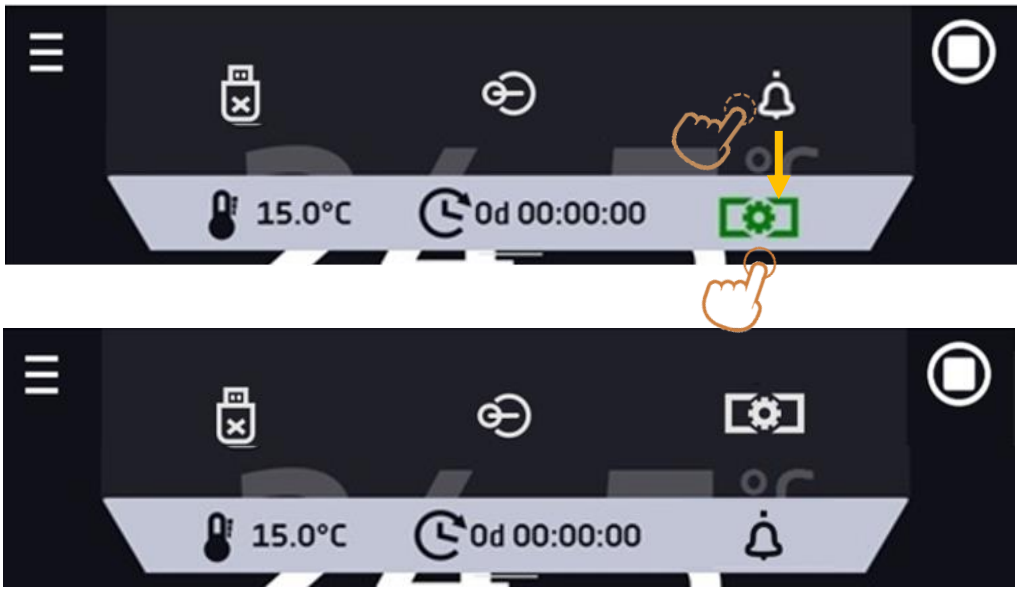


Figure 13 Upper menu when the program is stopped



Positions available on the upper bar can be personalized. Just drag the selected icon to a new location *(Figure 14)*

Figure 14 Changing icon´s position



6.3.4. Alarm bar

The Alrm Bar is a quick visual information about the device status. The colour of the bar indicates the status of the device:

– blue - the device is working properly

– red bar and pulsating frame – active alarm

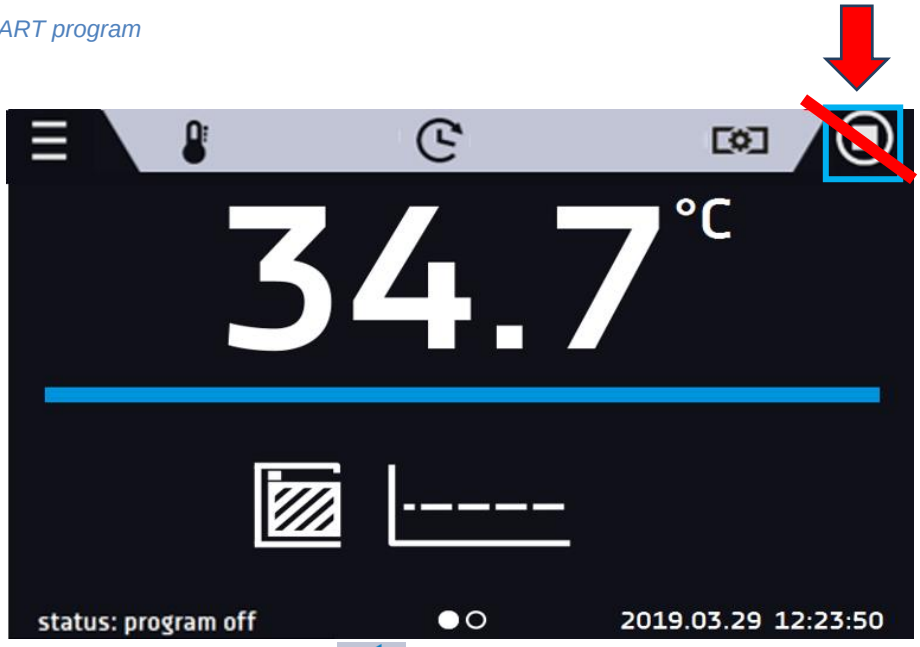
6.4. Quick Program

Quick program allows you to quickly start the program from the main screen position without having to enter to the menu ☰.

The Quick program has several features that guarantee its uninterrupted operation:

- you can not set the duration of the program - time is always set to infinity,
- if the display fails, the program continues,
- after the power supply is resumed (after its failure), the program continues,
- to prevent the program from stopping accidentally, the STOP button was removed from the main window *(Figure 15)*.

Figure 15 SMART program



In order to go to Quick program click the icon  in the main screen. By clicking the appropriate icon you can set:

-  temperature *(Figure 16)*
-  fan efficiency
-  degree of opening of the air-flap

Clicking the icon  starts the program in continuous mode (time set to infinity).

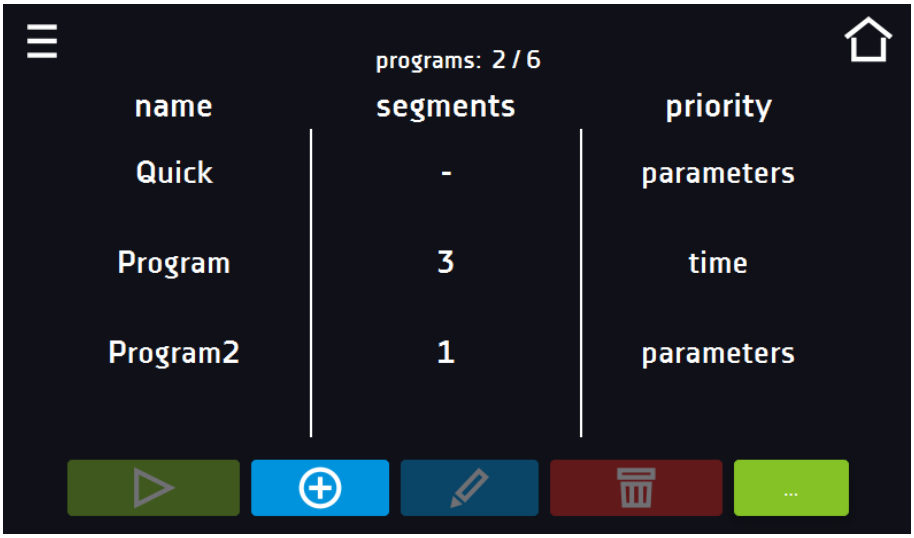
Figure 16 Starting the Quick Program

Stopping a Quick program has been made difficult on purpose (this prevents the program from being stopped accidentally) – to stop a program, you have to go to the menu , click the program window and keep pressing STOP button for 5 seconds.

The over and under temperature protections are set automatically: the over temperature protection is the set temperature + 5°C, the under temperature protection is the set temperature -5°C.
When the Quick program is running you can change the parameters (temperature, fan, air-flap) by pressing the icon or . During next launch of the Quick program, your previous settings will be remembered.

After configuriation of the Quick Program, it appears in the programs list *(Figure 17)*. Quick Program is displayed at the top of the list by default.

Figure 17 Quick program on programs list



In Quick Program editing mode, you can change:

- settings of the data recording interval,
- settings of the protection class.

When the program is running you can change the parameters (temperature, air-flap and fan if available) by pressing the icon or . During next launch of the Quick program, your previous settings will be remembered.

6.5. Programs

In this panel *(Figure 18)* you can run the selected program, add a new one, edit the program or delete it. The user can create 5 independent programs.

Start the selected program

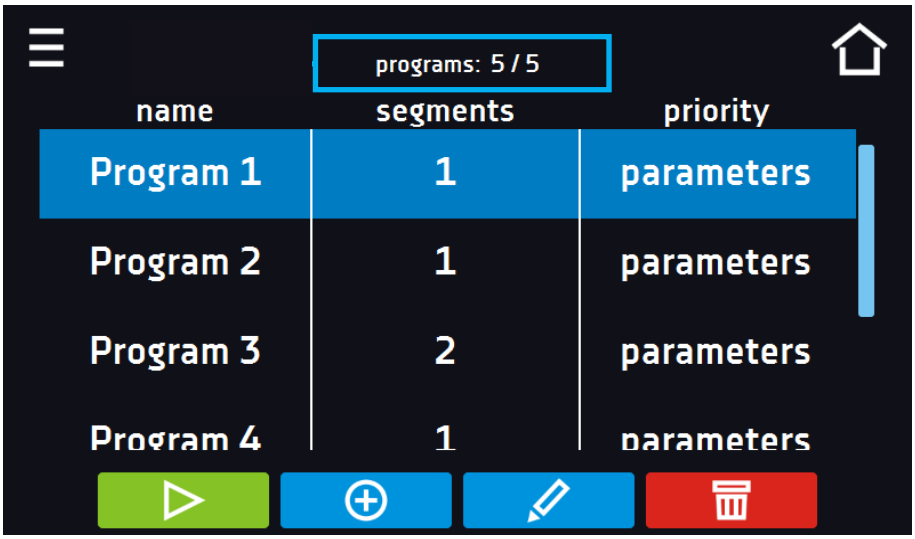
Stop the program

Add a new program

Edit the selected program

Delete the selected program

Figure 18 List of programs



Information on the number of created programs / the maximum number of programs that can be created is at the top of the screen (programs: 5/5).

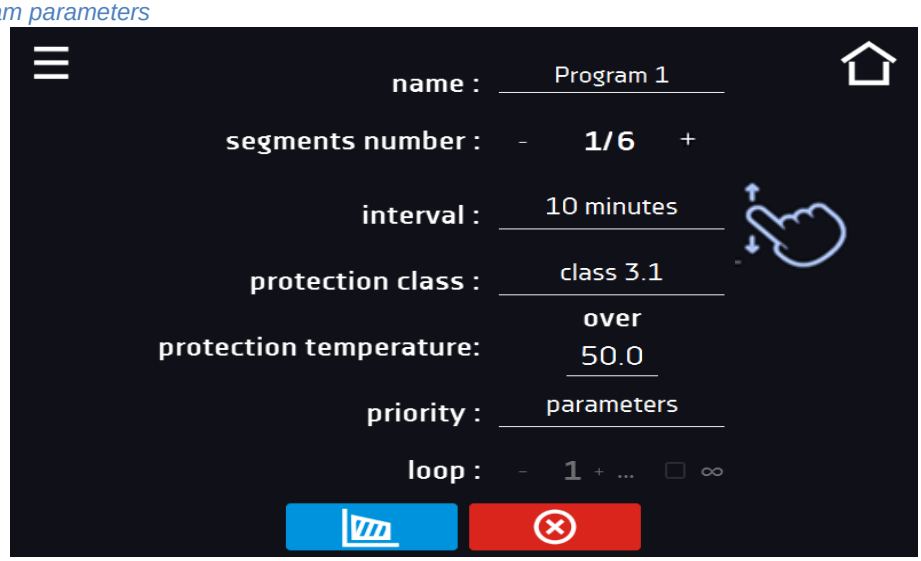
6.5.1. Creating / editing a program

Press the button or , and a panel with program parameters will appear *(Figure 19)*.
The program name is given automatically and it can't be changed.
In this panel you can set:

- **Segments number** – max. 6 segments
- **Interval** – frequency of saving the data in the data record (1 min, 2 min, 5 min, 10 min, 15 min, 30 min, 1 h)
- **Protection class** – more information *Section 6.5.3.*
- **Protection temperature** – temperature range for the protection class, more information *Section 6.5.4.*
- **Priority** – the priority of time or parameters, more information *Section 6.5.5.*
- **Loop** – the number of program repetitions, more information *Section 6.5.6.*
- **Bolt** - locking the door opening (only in SR)

	It is not possible to disable the bolt in SRWP pass-through sterilizers.

Figure 19 Program parameters



Cancels adding or editing of the program.

Going to the edition of program segments.

	With more parameters, the window can be scrolled up and down.

6.5.2. Segments edition

For each of the 5 programs, you can set maximum 6-segment time-temperature profiles that allow you to gradually increase or decrease the incubation temperature of the samples. This can e.g. protect the sample from so-called thermal shock. Example of program operation with programmed segments:

Program 1

segment1: temp. 30°C, time 2 hours (after reaching the temperature 30°C, it is maintained for 2 hours)
segment2: temp. 40°C, time 3 hours (after reaching the temperature 40°C, it is maintained for 3 hours)
segment3: temp. 50°C, time 3 hours (after reaching the temperature 50°C, it is maintained for 3 hours)
segment4: temp. 60°C, time 2 hours (after reaching the temperature 60°C, it is maintained for 2 hours)
segment5: temp. 70°C, time 2 hours (after reaching the temperature 70°C, it is maintained for 2 hours)
segment6: temp. 80°C, time 1 hours (after reaching the temperature 80°C, it is maintained for 1 hour)

Press the buton  and the first program segment will appear *(Figure 20)*.

In this window you can set:

- **temperature –** target temperature which the device is to achieve in this segment (can't be higher than over temperature protection -5°C),
- **time –** the time of maintaining the set temperature ([d hh:mm]) in days, hours and minutes. It is possible to select continuous work ∞ in the last segment,
- **ramp time** – the time of reaching the set temperature ([d hh:mm]) in days, hours, minutes,
- **fan** - fan efficiency in percent,
- **air-flap** – degree of opening of the air-flap,
- **fan ramp** – fan efficiency when reaching the set temperature,
- **air-flap ramp** - degree of opening of the air-flap when reaching the set temperature.

The active value is highlighted in blue. The item highlighted in red means that the value is out of range and you should enter another one, e.g. the temperature is above / below the operating range of the device or the protection temperature.

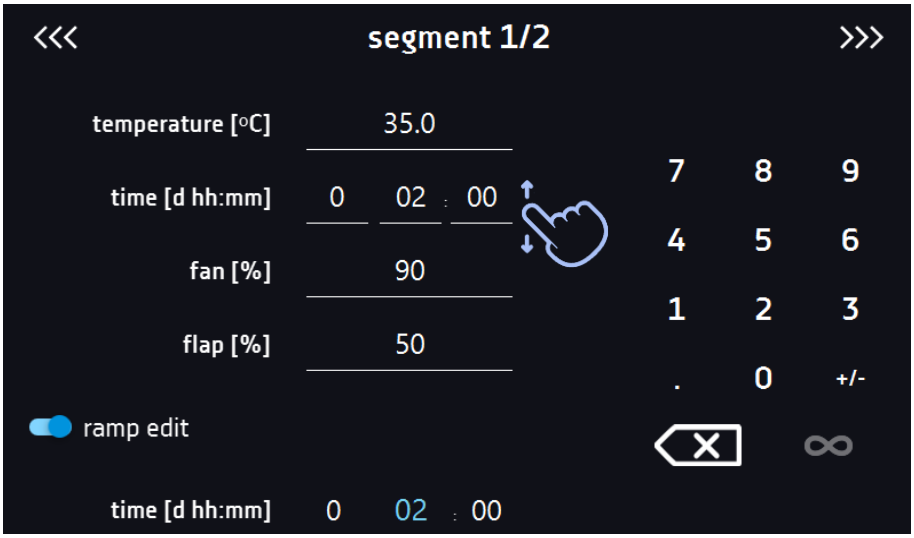
	The fan efficiency set to 100% is the default value. Reducing the fan efficiency may cause improper operation of the device, e.g. worse fluctuation and variation of temperature.

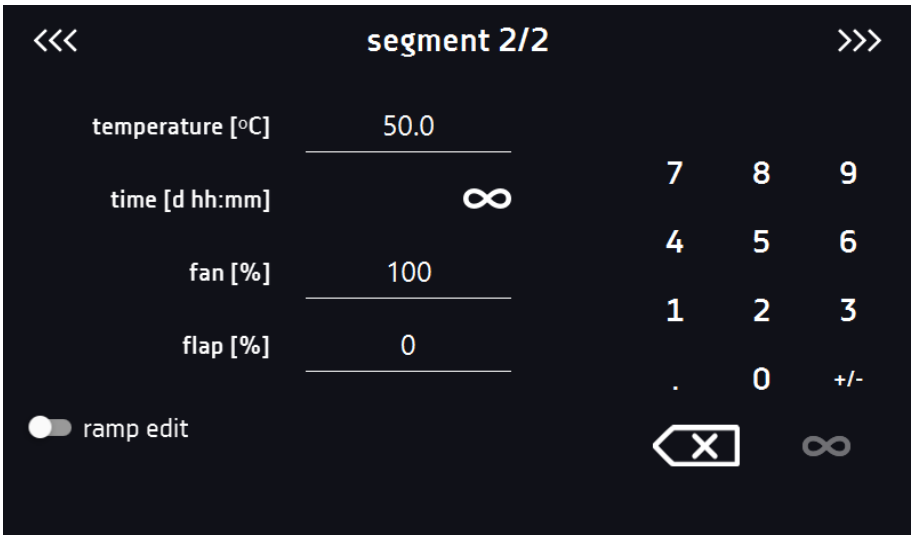
	Ramp time - setting a short time will not accelerate reaching the ramp, but the ramp will be reached in the shortest possible time depending on the set temperature, ambient conditions and the possibilities of the heating system in the device.

The ramp parameters are factory set in accordance with the manufacturer's instructions. If it is necessary to set individual parameters when reaching the segment temperature, activate the ramp edition field ramp edit and set your own values.

	With more parameters, the window can be scrolled up and down.

Figure 20 Program segment edition



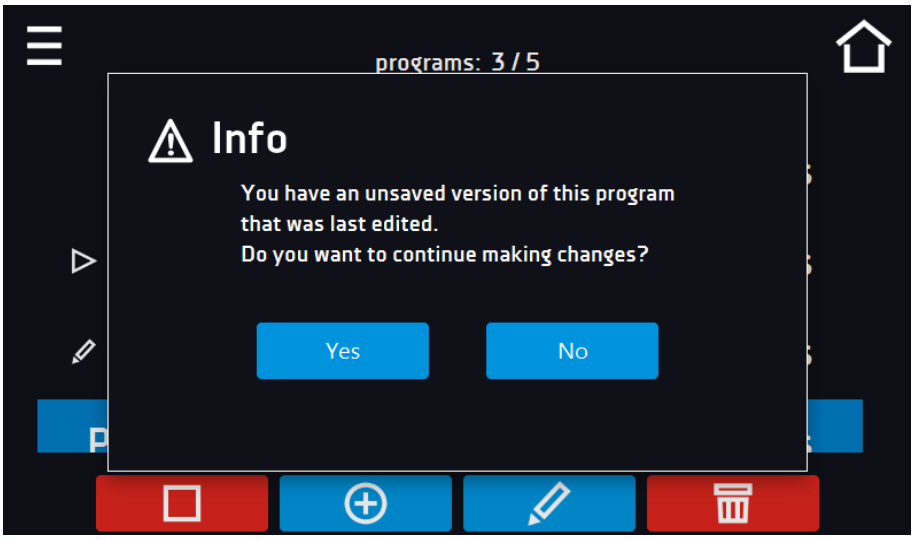


The navigation between: segments, program parameters and summary is done by touching the icon  .

	If, when editing a program, you automatically return to the home screen, the edited program will not be lost, but saved as a draft (see below).

After switching to the program edition, the information about the possibility of continuing changes in the program settings appears *(Figure 21).*

Figure 21

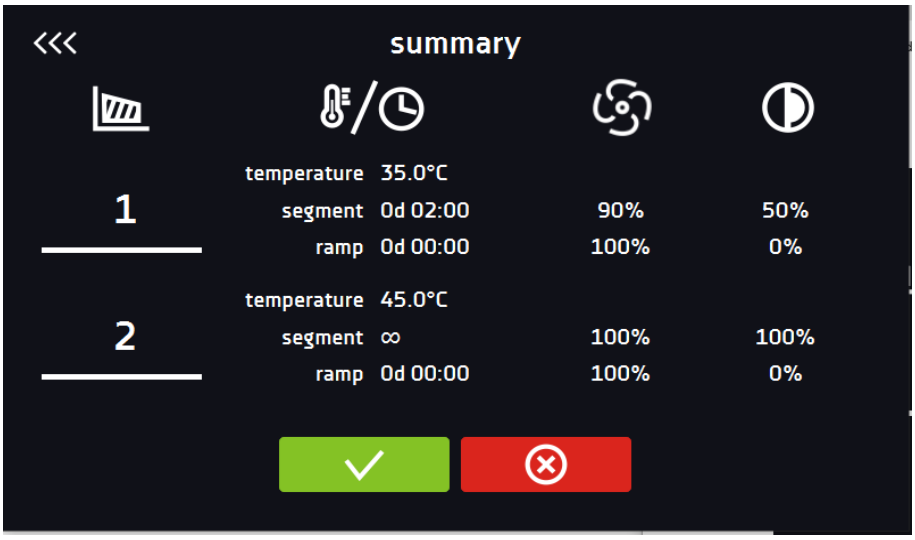


6.5.2.1. Summary of segments

In the segments summary *(Figure 22)* all segments can be seen along with introduced parameters:

- number of segments,
- temperature, duration time, target time of reaching temperature of a given segment,
- fan efficiency,
- degree of opening of the air-flap

Figure 22 The summary of the segment



Confirms and saves the changes.

Cancels the entered changes in the segments and goes to program parameters.

With more parameters, the window can be scrolled up and down.

6.5.3. Protection class

The device is equipped with sample protection – temperature protection which is carried out on the basis of the temperature value measured by an independent temperature sensor, the so-called security sensor. The main aim of sample protection is to protect against uncontrolled rise or fall of temperature. When activated, the relay disconnects the heating circuit.

Figure 23 Confirmation of protection alarm class 2.0

For devices with heating system there are two protection classes:

Standard protection class:
Class 2.0 according to DIN 12880 – the user programs the protection temperature and once it's exceeded, the heaters are cut off. To restart the device, the user must turn the device off and on. The temperature in the chamber must naturally return to a temperature below the protection temperature.

Optionally:
Class 3.1 according to DIN 12880 – the user programs the protection temperature and once it's exceeded (caused by a failure), the heaters are cut off. When the temperature returns to the allowed range, the device resumes operation.

The set temperature in the segment cannot be higher than the over temperature protection minus 2°C, e.g. the over temperature protection is 50°C, therefore the maximum set temperature in the segment that can be set is 48°C.

6.5.4. Temperature protection class 3.1 (optionally)

The temperature protection value for protection class 3.1 is:

- from the set temperature + 2°C to the maximum operating temperature of the device + 10°C.

For units with heating, the lower limit of the temperature setting must be considered, i.e. 5°C above the ambient temperature.

6.5.5. Priority

Can be set in terms of:

Parameters:

In the program without ramp – the device starts the countdown of the segment time when the set temperature is reached.
In the program with ramp – first, the device counts down the time of the ramp and then proceeds to the segment countdown when the set temperature is reached. Regardless of whether the time of ramp elapsed.

It may happen that the device failed to reach the set temperature within the set time because the reaching time was too short. In such situation the reaching time will be prolonged and the segment's time countdown will start when the set temperature will be reached.

Time:

In the program without ramp – the device starts counting down the segment time when the program is started. Regardless of whether the temperature has been reached.
In the program with ramp – first, the device counts down the ramp time and after its expiry it proceeds to the countdown of the segment time. Regardless of whether the temperature has been reached.

It may happen that the time of reaching was too short and the device failed to reach the set temperature within the set time. Then the countdown of the segment time will start before reaching the set temperature. Thus, the actual time of device operating in the set temperature will be shortened.

6.5.6. Loop

The option is available if the number of segments is equal to 2 or more. When the program finishes the last segment, the device starts the program again from the first segment. You can define if the program should be carried out once (loop: 1) or multiple times (loop: 2 to 255). In order to set the program to be carried out continuously, tick the „∞" option. If the time of the last segment is set to infinity, it will be treated as infinite only in the last cycle. In other cycles it will be treated as 0.

Example:
Loop:3
segment1: temp. 30°C, time 2 h
segment2: temp. 40°C, time 2 h,
segment3: temp. 80°C, time „∞"

The device will run segment1 and segment2 three times and then will go to segment3 which will last indefinitely. CL incubators and SL drying ovens do not have a cooling system, so the temperature in the chamber decreases naturally.

6.5.7. SR and SRWP devices – factory predefined sterilization programs

The SR and SRWP sterilizers have 3 predefined sterilization programs created at the factory:

Program 1: temperature 160°C, duration time 2 h
Program 2: temperature 180°C, duration time 45 min
Program 3: temperature 200°C duration time 30 min

Predefined programs can NOT be deleted. Moreover:

- you can't change settings of the air-flap – it's always closed during sterilization,
- you can't change the door lock settings which are always blocked during sterilization,
- at the start of the program the door must be closed – they are automatically locked,
- in the event of a door lock failure while the program is running, the program will stop (a message and a record in the event log will appear),
- when the program is started, the ventilation air-flap is autimatically closed and user is not able to change air-flap settings during program operation.

In addition to the predefined sterilization programs, **5** regular programs are available to the user. They can be freely configured including settings of the air-flap and door lock.

In the event of a power supply failure or program interruption, after restarting the device, the sterilization program is restarted (runs from the beginning) - this ensures that the sterilization parameters (time and temperature) are preserved.

6.6. Starting the program

The created program can be started in two ways:

6.6.1. The first way

- Go to the main menu and press the icon „programs” *(Figure 24)*.
- Then select the program you want to activate and press „start” button *(Figure 25)*.

Figure 24 Main menu

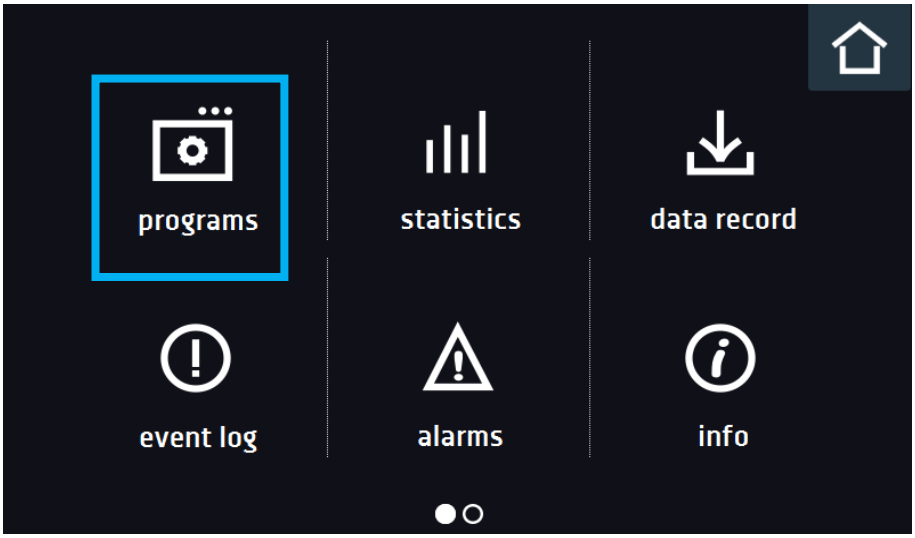
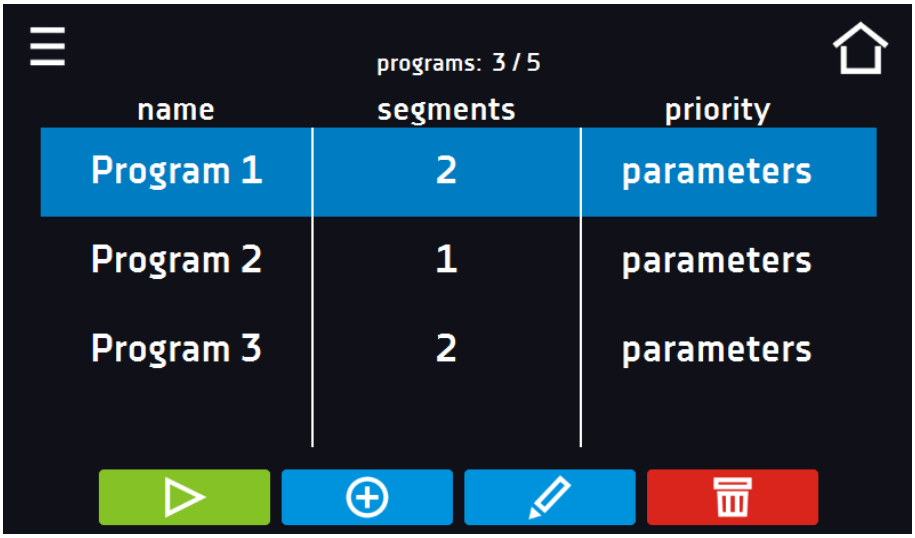
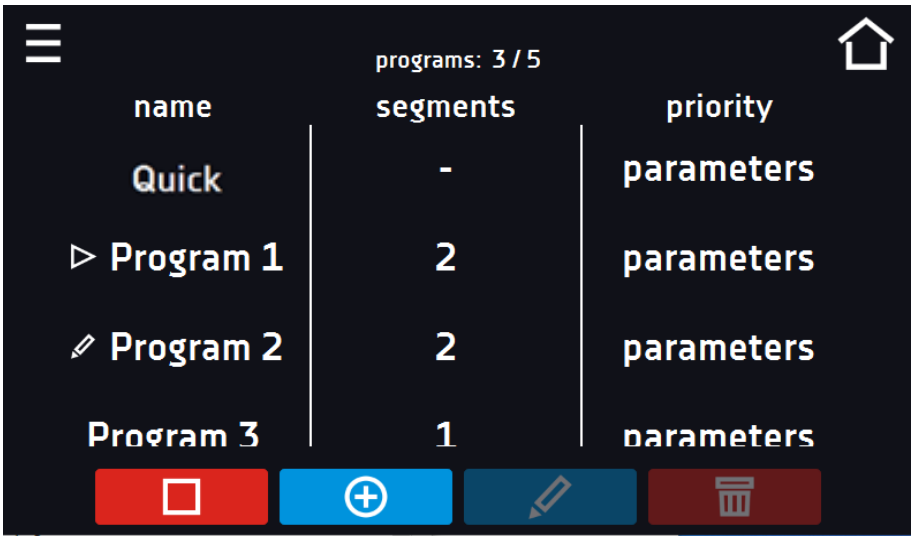


Figure 25 Program management menu



If the program is running, the symbol appears next to the program name on the list. The symbol means that the program has been edited, but the changes have not been confirmed *(Figure 26).*

Figure 26 List of programs with the selected status



6.6.2. The second way

- In the main screen *(Figure 27)* press the icon in the upper right corner .
- Select the program you want to start *(Figure 28)*. You have two additional options to start the program:

Immediate start of the program.

Scheduled program start according to the set date and time.

Figure 27 Main screen

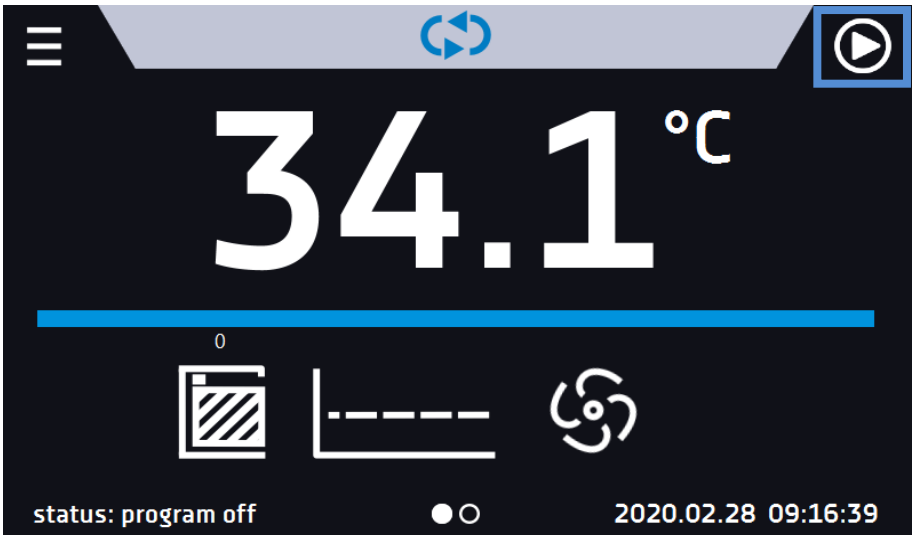
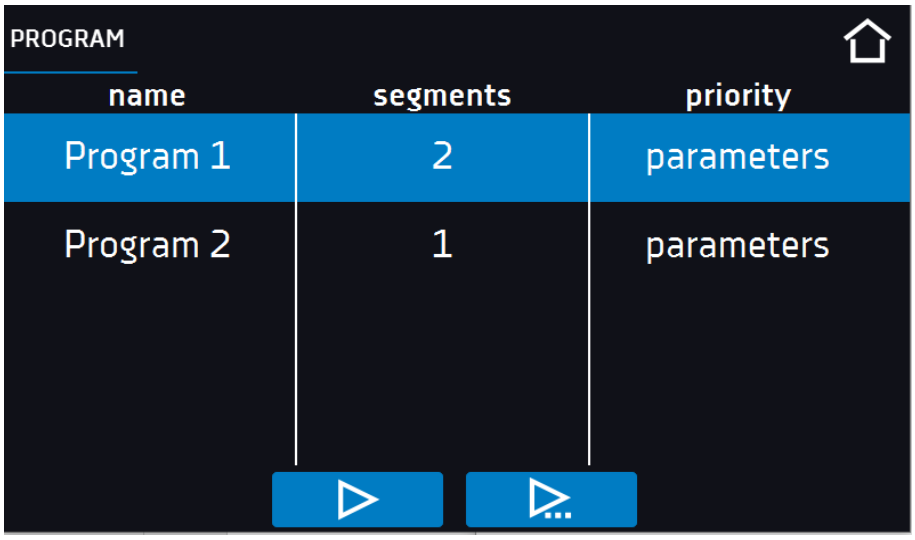


Figure 28 Selection of the program from the list



	A delayed start of backdated program is possible (up to 7 days back). This is possible for the programs with time priority. Program segments that would last from the back date to the current date will be skipped.

If the program is running, the symbol ▷ appears next to the program name on the list.

6.7. Quick Change of parameters

	Although the ramp time has been included in the program, the Quick Change of parameters will take place immediately while the temperature is being reached.

6.7.1. Quick change of set temperature

In order to quickly change the value of set temperature of a running program, press the icon in the main screen *(Figure 29)*. The value of the temperature should be selected by scrolling the list up or down *(Figure 29).* Click ✓ to confirm the change. **The temperature can't be higher than the over temperature protection -2°C and lower than the under temperature protection +2°C.**

Figure 29 Quick change of set temperature

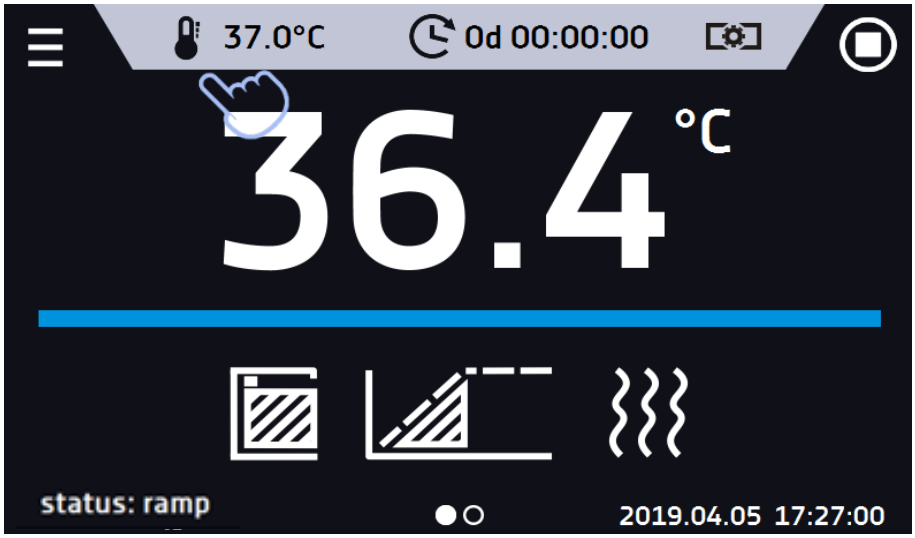
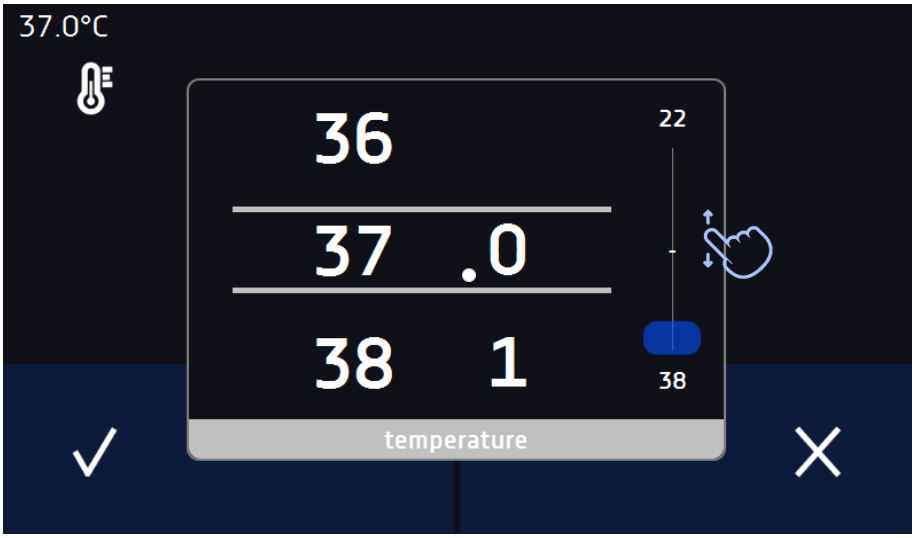


Figure 30 Quick change of set temperature



6.7.2. Quick change of set time

In order to quickly change the duration time of a running program, press the icon in the main screen *(Figure 31).* Select the number of days, hours and minutes by scrolling the list up or down *(Figure 32).* Click to confirm the change. To set the continuous work press ∞.

To change the way of displaying the time, press::

– to display the elapsed time

– to display the remaining time

To change only the way of displaying, you do not have to confirm it by .

Figure 31 Quick change of set time

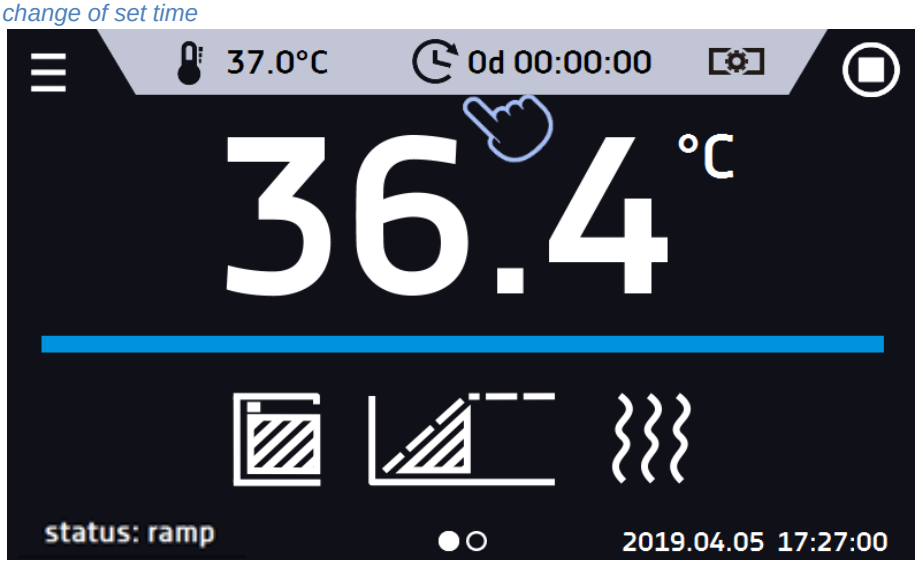
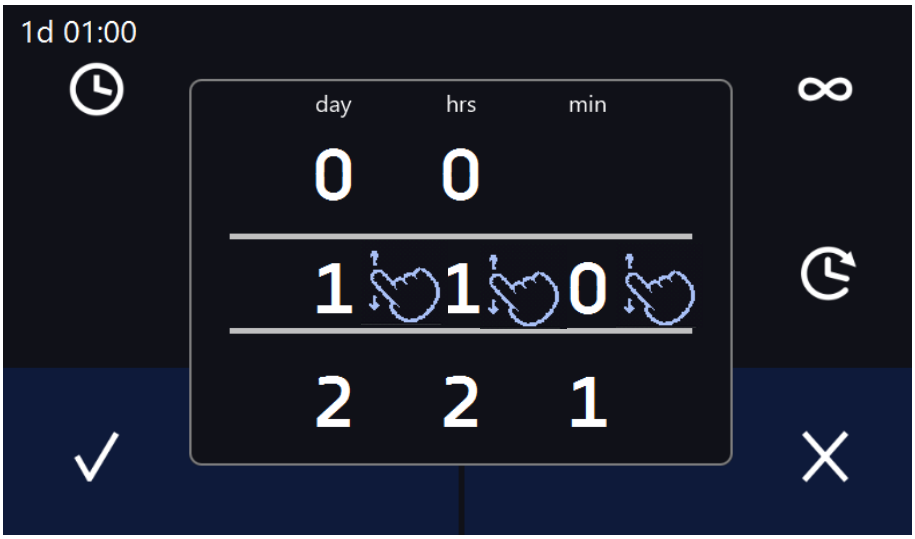


Figure 32 Quick change of set time



6.7.3. Quick change of fan efficiency and degree of air-flap opening

In order to quickly change the fan efficiency and/or degree of air-flap opening, press the icon in the main screen *(Figure 33)*. The value should be selected by scrolling the list up or down *(Figure 34)*. Press to confirm the change.

Figure 33 Quick change of fan efficiency and / or degree of air-flap opening

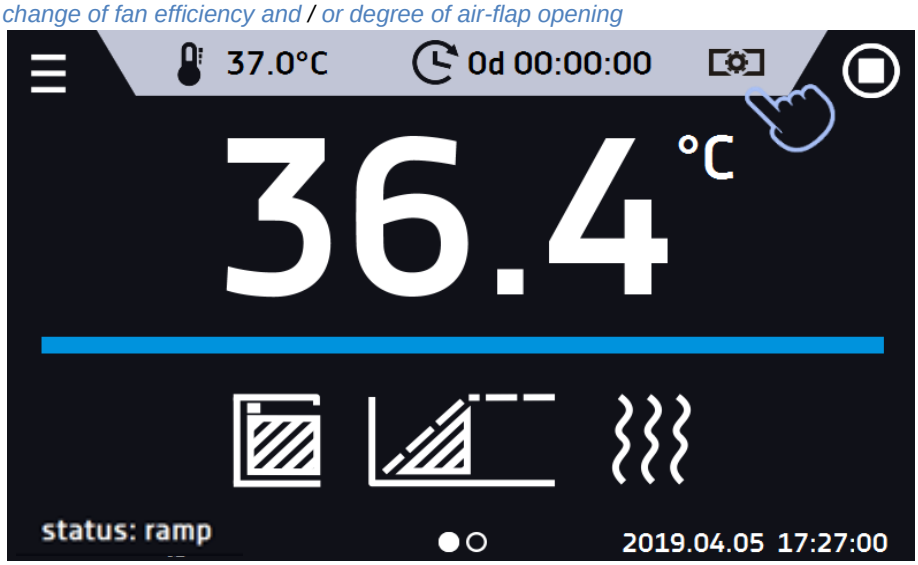
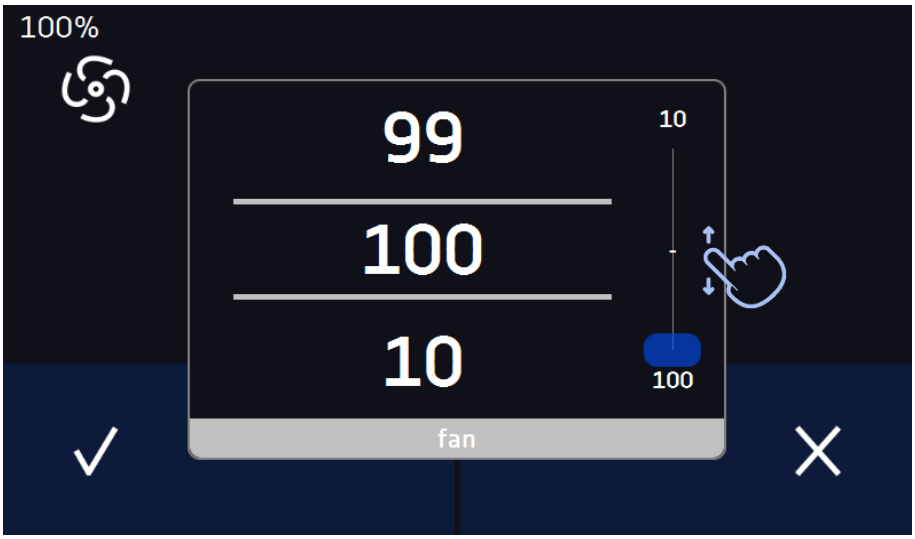


Figure 34 Quick change of fan efficiency and / or degree of air-flap opening



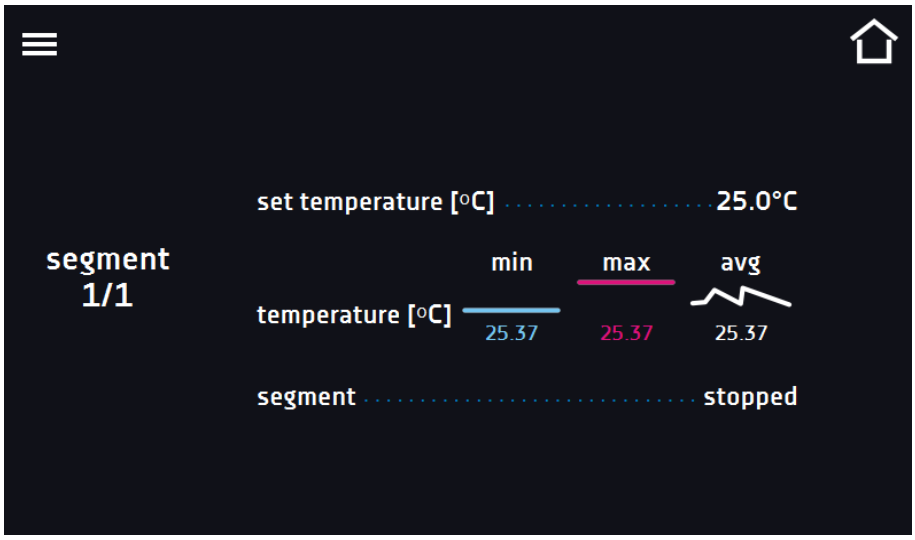
6.8. Statistics

Go to the main menu and press the icon . This panel *(Figure 35)* displays statistics of the currently running program or program that has ended. Statistics are calculated separately for each segment. Data logging for calculation starts after 30 seconds from reaching the set temperature in the segment. Further data is registered every 1 minute.
The following information is available:

- **set temperature [°C] –** set temperature in the segment,
- **minimum temperature [°C] –** the lowest recorded temperature,
- **maximum temperature [°C] –** the highest recorded temperature,
- **average temperature [°C] –** average temperature
- **segment –** status of the segment:
  - **in progress –** currently running segment (data is being constantly updated),
  - **finished –** the segment has been completed,
  - **interrupted –** the segment was interrupted by the user before the set time has elapsed,
- **segment 1/2 –** the number of the currently overviewing segment / number of the currently performed or completed segment. Navigating between the segments is done by swiping your finger up or down.

	You cannot overview the segment data that has not started yet.

Figure 35 Statistics



6.9. Data record

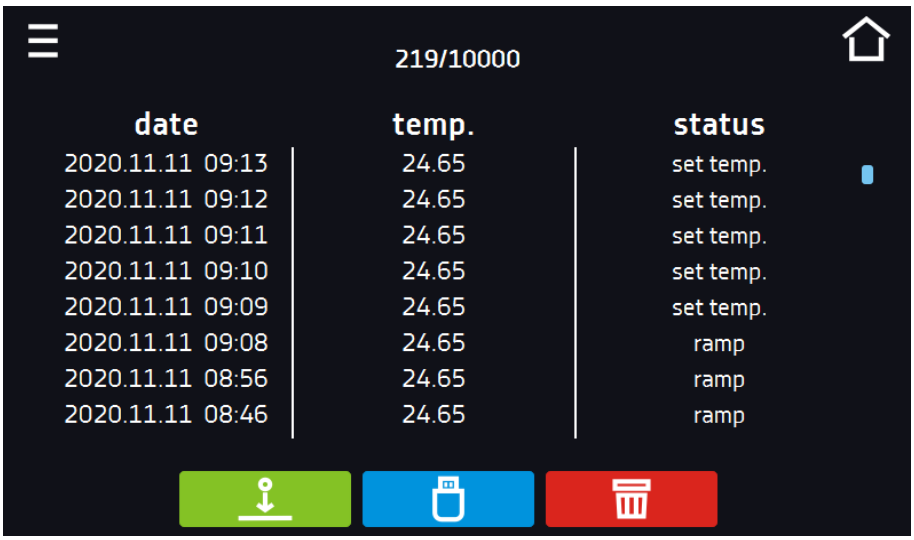
Go to the main menu and press the icon . Data record window *(Figure 36)* contains the following information:

- time and date of sample registration [date],
- temperature value measured with the main sensor in the chamber [temp.].

It is possible to register 10 000 data records for the max period of 6 months. If all the memory cells are full, the oldest ones are overwritten. The data appears in the table in the order they were added, not in chronological order by the date. The most recently added record is at the top. The samples are only registered when the program is running. The frequency of registration depends on the program parameters settings.

	When opening the data record, all data is downloaded. If the data download is interrupted by the user, press to continue downoading of the rest of the data.

Figure 36 Data record



Press to continue downloading data.

Recording data onto the USB flash drive. .csv files are available - separated by semicolon when opening e.g. with a spreadsheet, .plkx - opening with the Lab Desk application (option)

Before removing the USB flash drive from the USB port, it must be unmounted, see *Section 5.9.*

Deleting data *(Figure 38)*

Figure 37 Progress bar

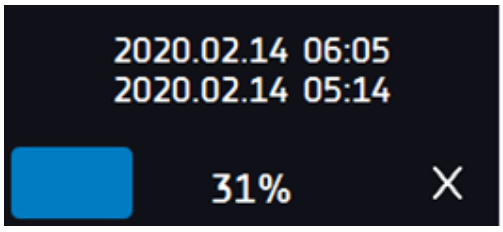
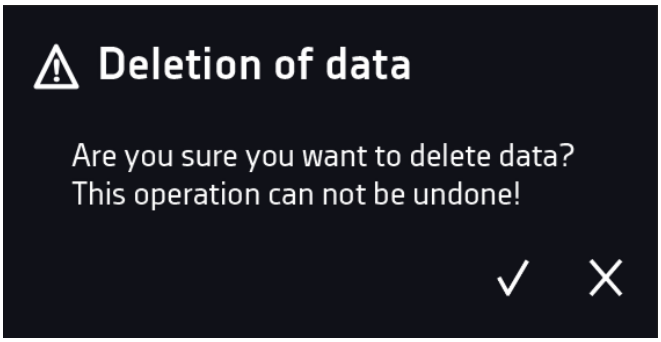


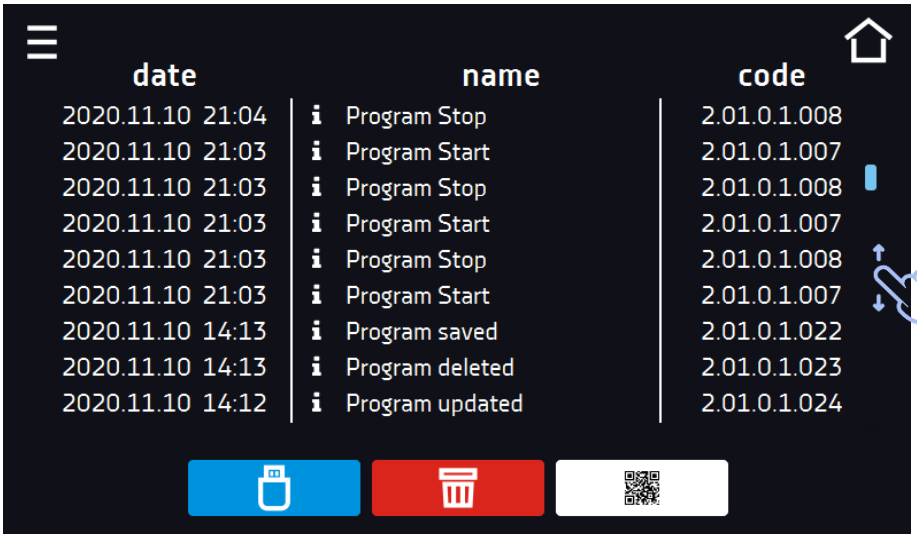
Figure 38 Deleting data



6.10. Event log

Go to the main menu and press the icon . The window displays information about registered events, alarms and errors.

Figure 39 Event log



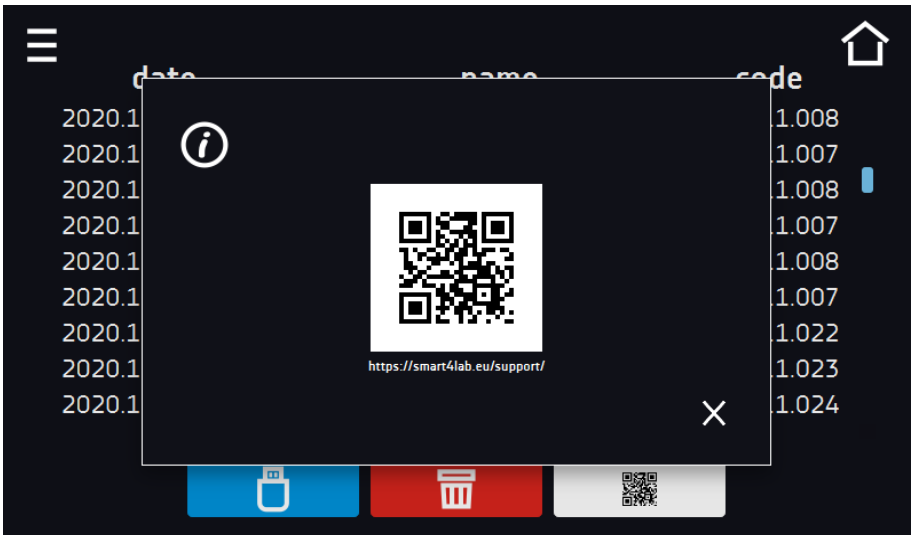
Recording data onto the USB flash drive. .csv files are available - separated by semicolon when opening e.g. with a spreadsheet, .plkx - opening with the LabDesk application (option)

Before removing the USB flash drive from the USB port, it must be unmounted, see *Section 5.9.*

Deleting data

QR code – opens smart4lab.eu (in the "Support" tab there are explanations of some of the information appearing in the event log). Press the symbol and enlarge the code QR, and then scan it with your smartphone

Figure 40 QR code



The events in the event log are sorted chronologically. However, it may happen that the event "Program restarted" will not be displayed according to the chronology but the date and time of the event will be correct. This is not an error.

Before removing the USB flash drive from the USB port, it must be unmounted, see *Section 5.9.*

Information signs in the event log:

Information event

Alarm event

Error

Warning

Possible events:

Program Start	starting the program
Program Stop	stopping the program
Program Edit	changing the program parameters
Program End	program is completed
DeviceOn	the device is switched on (on the main switch)
DeviceOff	the device is switched off (on the main switch)

Door opened	the door is opened
Open door alarm start	open door alarm has been activated
Door closed	the door is closed
Open door alarm stop	open door alarm has been deactivated
Program Restarted	program has been reasumed after power failure
Under Protection Start	under-temperature protection has been activated
Under Protection Stop	under-temperature protection has been finished
Upper temp. alarm Start	over- temperature protection has been activated
Upper temp. alarm End	over- temperature protection has been deactivated
Date/time change	date/time has been changed
Lower temp. alarm Start	activation of the alarm of exceeding the temperature below the set temperature
Lower temp. alarm End	deactivation of the alarm of exceeding the temperature below the set temperature
Upper temp. alarm Start	activation of the alarm of exceeding the temperature above the set temperature
Upper temp. alarm End	deactivation of the alarm of exceeding the temperature above the set temperature
Program saved	new program has been saved
Program deleted	program has been deleted
Program updated	program has been updated
Time Zone Changed	in the time settings the time zone has been changed
Temperature Correction Changed	main sensor temperature correction has been changed
Emergency stop of the program	the program has been automatically stopped – there was a situation that didn't allow the program to be continued. PLEASE CONTACT THE SERVICE
Start program cancelled, door is open	the program has not been started due to the door open, it only applies to running the predefined programs in SR sterilizers
Program aborted, door was opened	program stopped due to door opening, only applies to the predefined programs in SR sterilizers
Power Fail Start	power failure / device fuse blown out.
Power Fail Stop	power reasumed, returned to maintain program parameters

6.11. Info

Go to the main menu and press the icon . The panel contains the following information:

- name of device,
- device's temperature range
- serial number of the device
- Software version,
- manufacturer's address,
- manufacturer's website,
- QR code.

Figure 41 Info window (example)

* lower operating temperature limit is not lower than 5°C above ambient temperature (applies to CL / SL / SR / SRWP devices)

Press icon to save the “Download” folder (with instruction manual) on the USB flash drive. After inserting the flash drive into USB port wait few seconds until the information *“Flashdrive connected”* will appear on the display. Press the icon to write the service data on the USB flash drive – contact the service department for more information.

Press to go to the main screen.

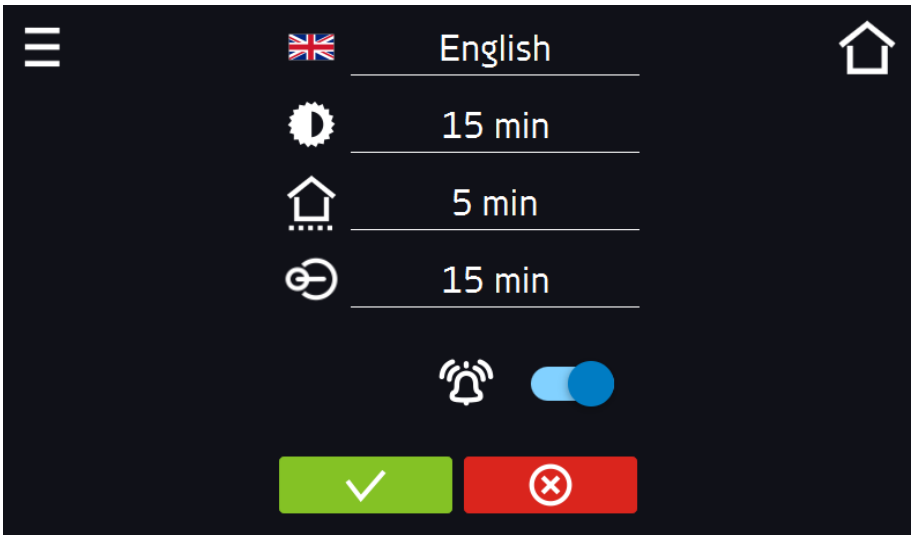
	Before removing the USB flash drive from the USB port, it must be unmounted, see *Section 5.9.*

6.12. User settings panel

Go to the main menu and press the icon . In this panel *(Figure 42)* you can:

	Change the name of the equipment – by default, the device serial number is entered.
English	Change the language in the equipment´s menu.
	Set the time after which the screen will be dimmed.
	Turn on/off the sound . Critical alarms will continue emitting a sound.
	Set the time after which the user will return to the home screen. Available settings: off, 1 min, 3 min, 5 min, 10 min.
	Set the automatic screen lock. Available settings: off, 5 min, 15 min, 30 min, 60 min. Factory setting: disabled.

Figure 42 User settings panel



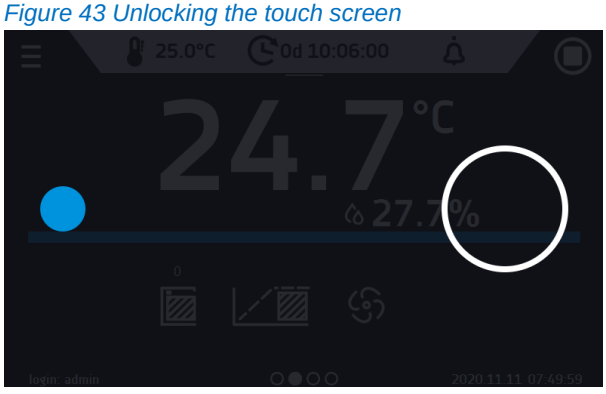
Confirms changes

Cancels the entered changes

6.12.1. Unlocking the touch screen

When the automatic touch screen lock is enabled *(Section 6.16)*, slide the blue circle into the white circle to unlock the screen.

Figure 43 Unlocking the touch screen



6.13. Time

Go to the main menu and press the icon . In this panel you can:

- change the date / system time

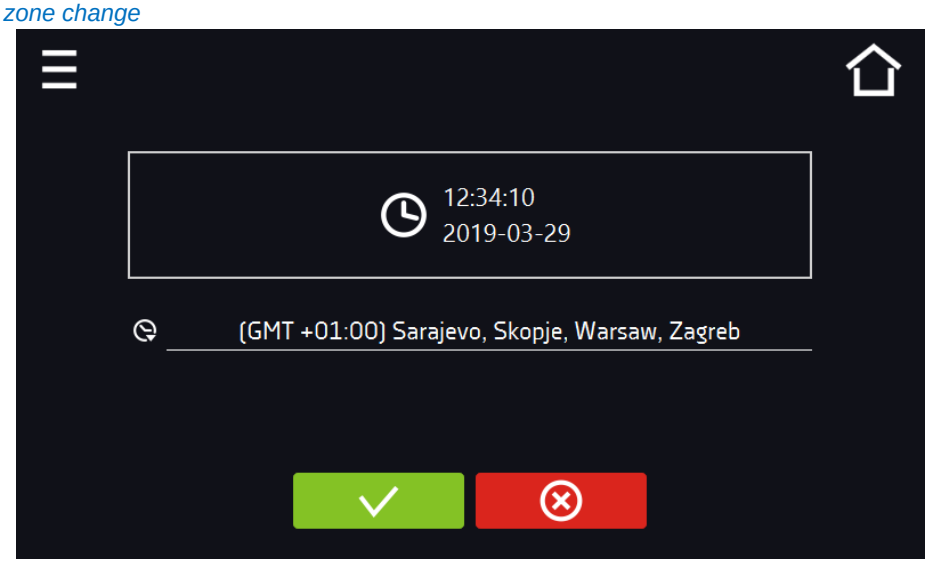
	If the date / system time is changed to the later date / time comparing with the data and events which are stored in the memory, they will remain in the register. If the date / system time is changed to the earlier date than the date / time which is stored in the memory, they will be transferred to the archive

After changing the date / system time the device will be restarted.

- change time zone - the change of time zone will not affect the date / time in data and events previously saved.

To change the date / system time it is necessary to press in the window *(Figure 44)*. The window will appear and you will be able to make changes *(Figure 45)*.

Figure 44 Time zone change



Confirms changes and restarts the device

Cancels the entered changes

Figure 45 Date / time change

6.14. Alarms

Go to the main menu and press the icon . You can set parameters related to alarms.

- **lower alarm** – an alarm will be activated if the temperature drops below the value given in this field,
- **upper alarm** – an alarm will be activated if the temperature rises above the value given in this field.

The lower and upper alarm can only be activated after reaching the set temperature.

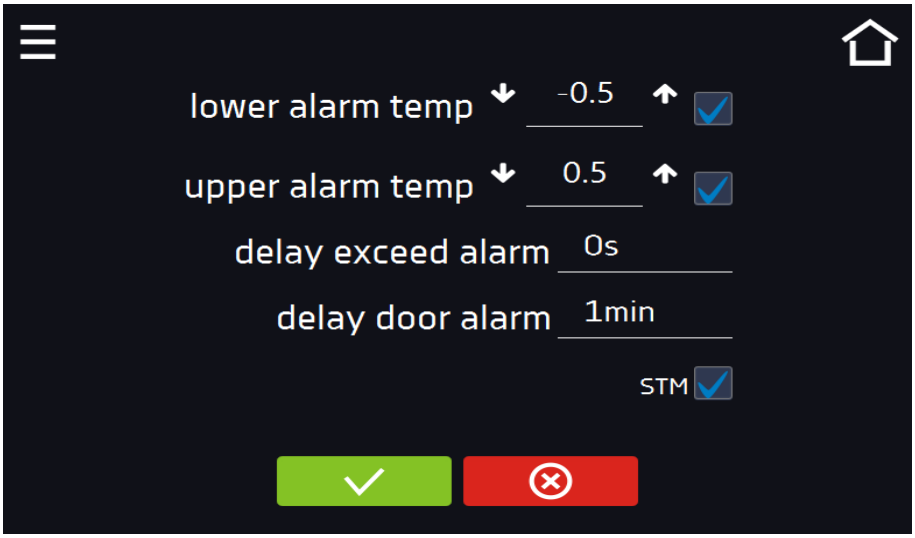
- **delay temp alarm:**

the alarm will be activated with a delay (1 min, 2 min, 5 min, 10 min, 15 min) after exceeding the permitted temperature.

- **delay door alarm:**

  the door alarm will be activated when the door is open for the time selected by the user (30 s, 1 min, 2 min, 5 min, 10 min).
- **turning on/off the STM function** (to read the description of the function go to the section *16.14.1*)

Figure 46 Alarms



 Confirms changes

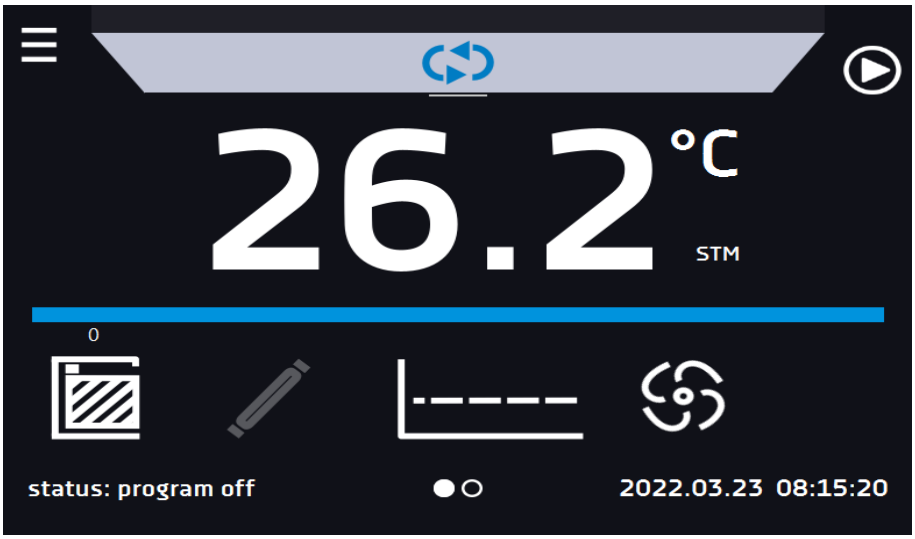
 Cancels the entered changes

In the field "lower alarm temp" you can set a value of -0,5°C to - 5°C and in the field "upper alarm temp" you can set a value of +0,5°C to +5°C.

6.14.1. STM function

The STM function (Smart Temperature Monitor) informs the user about the problem of reaching or maintaining the set temperature. The user can enable / disable the function *(Figure 46)*. If the STM function is on, the STM symbol will appear on the screen next to the temperature of the main sensor.

Figure 47 Option enabled, the program is stopped



The function status is signaled with the following colors:

- no STM on the display - option disabled,
- white color - option enabled, the program is stopped,
- blue color - option enabled (temperature monitoring), the program is running,
- red color - option enabled, warning about problems with reaching / maintaining the temperature.

Figure 48 Option enabled (temperature monitoring), the program is running

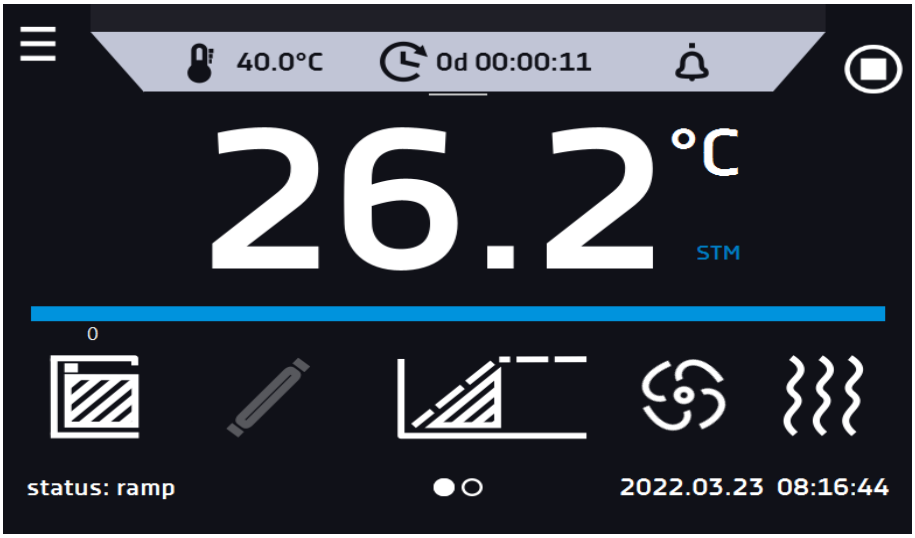
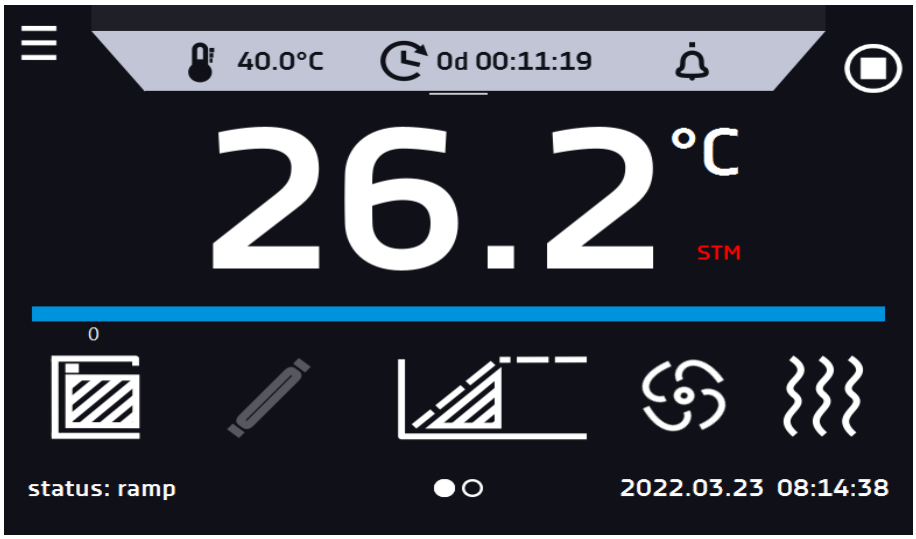


Figure 49 Option enabled, warning about problems with reaching / maintaining the temperature



Possible causes:

1. damaged heater,
2. the sample inserted into the chamber absorbs / dissipates too much energy.

If the color was red before opening the door, the color changes to blue after opening the door.

In case of activation of the function (detection of problems with reaching / maintaining the temperature):

- the warning 4.00.0.1.009… appears in the event log
- the color of the STM inscription changes to red and remains as long as the failure occurs, the segment is changed or the program is turned off
- when the status changes from red to blue, an entry about the end of the function 4.00.0.1.010 appears in the event log

6.14.2. Mute option

The icon  in the main screen in the upper menu allows temporary switching off of the alarms sound (open door alarm, exceeding temperature range), e.g. to avoid door alarm during planned loading of the samples into the chamber. There are options to turn off the sound for 5, 10 and 15 minutes *(Figure 50),* however, the sounds of critical alarms (e.g. damage to the temperature sensor, over- and under-temperature protection) will be still emitted.

Figure 50 Setting the time of mute function

6.15. Network

Go to the main menu and press the icon . In this panel *(Figure 51)* you can change LAN settings:

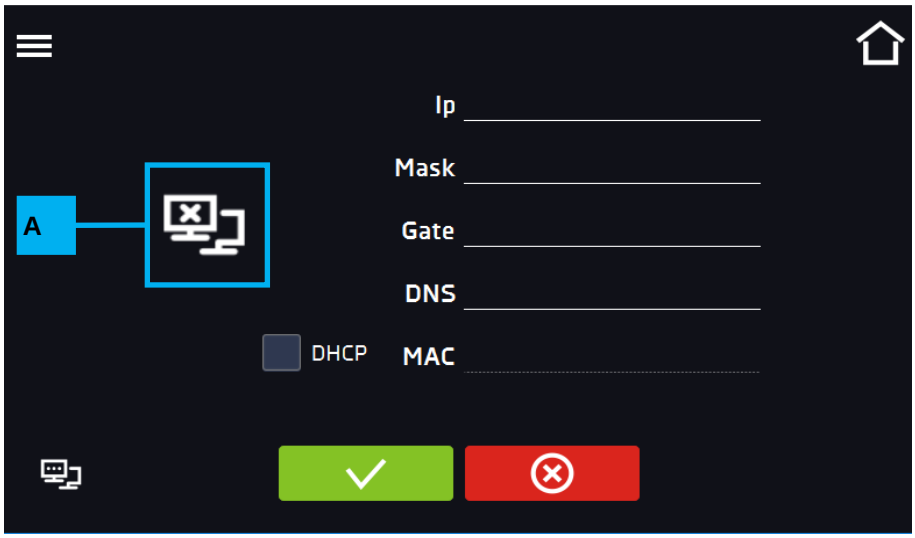
- **IP** – the device's IP address
- **Mask** – an Ethernet network mask to which the device is connected
- **Gate** – Server's IP address or router's that manages the Ethernet network
- **DNS** – IP address of the domain name system
- **MAC** – the address of the network card, read-only
- **DHCP** – you can select if the server that allocates IP addresses is running on the local network. You can then skip setting IP, Masks, Gates

Icon **A** indicates the connection status:

Device connected to the network

Device disconnected from the network

Figure 51 – LAN settings



Confirms changes

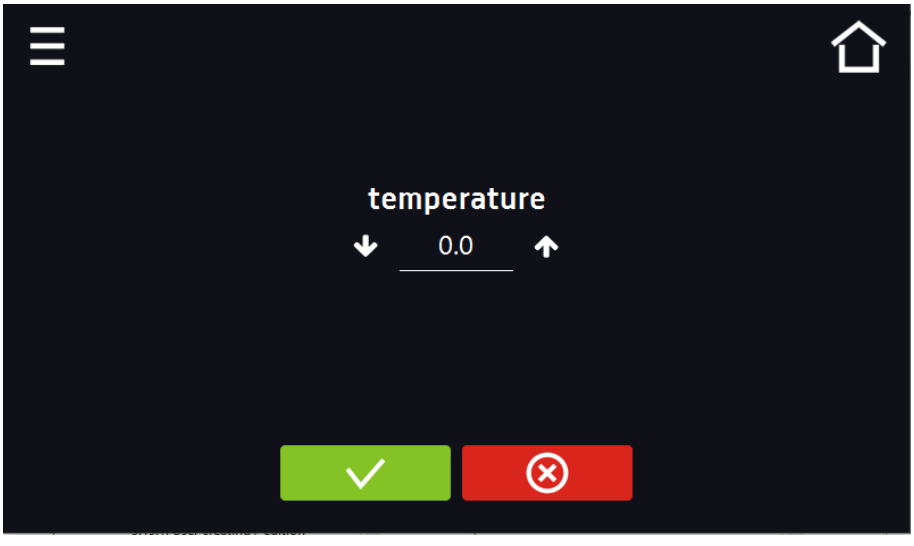
Cancels the entered changes

6.16. +/- Corrections

Go to the main menu and press the icon +/-. In this window *(Figure 52)* you can correct temperature value indicated on the display by adding the correction value. The set correction value applies to the whole temperature range of the device. For example, if the average temperature displayed by the device indicates 40,0°C and the average temperature measured by independent, external sensor indicates 40,5°C, the correction should be set on +0,5°C. The average temperature should be calculated from chosen period of time e.g. 30 min. The correction available range is between -5°C to +5°C.

	The device has been calibrated by the manufacturer in accordance with applicable norms. The temperature shown on the display corresponds with a great accuracy to the temperature near chamber's sensor. For the correct operation of the device it is not necessary to use user's calibration. The user is performing temperature correction **on his own responsibility** and must be aware of consequences of changing manufacturer's settings. If the equipment was calibrated, calibration certificate **loses its validity**.

Figure 52 User's correction



Confirms changes

Cancels the entered changes

7. INTERFACE

7.1. MODBUS TCP

The device allows status monitoring using the MODBUS TCP communication interface.
Connection parameters:

- IP address: same as device's (set in the panel *Section 6.15.*)
- port: 502

register INPUT REGISTERS function READ_INPUT_REGISTERS (0x30001)			
Address	Type	Multiplier	Description
0	int	10	temperature from the main sensor
3	bool	-	Open door
4	bit	-	b0 – door alarm b1 – upper temperature alarm b2 – lower temperature alarm b3 – over Protection b5 – main sensor error b7 – protection sensor error b8 – temperature sensors error b10 – hardware error b11 – MRW error

8. TEMPERATURE PROTECTION

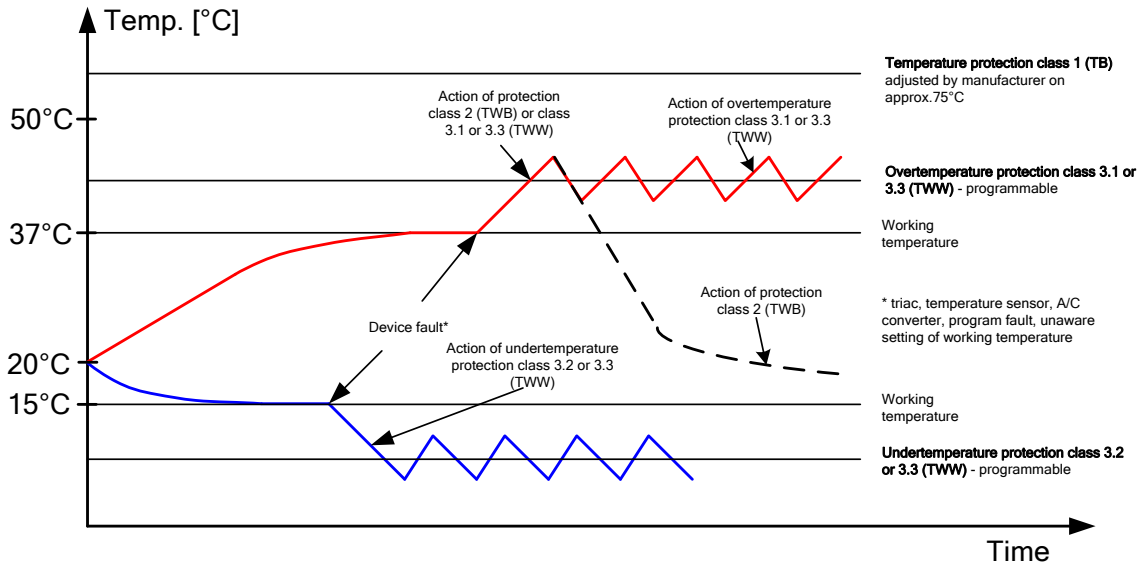
The device is factory fitted with sample protection - temperature protection. If any of the elements responsible for maintaining the set temperature is damaged or the user sets the temperature unconsciously, the set protection will work.

8.1. Temperature protection class in CL, SL, SR, SRWP models

Standard equipment in the CL, SL, SR and SRWP devices is protection class 2.0 according to DIN 12880.

Optionally, the devices can be equipped with protection class 3.1 according to DIN 12880. Then the user can program the temperature value of the upper protection. When the set temperature is exceeded, the heating system power will be turned off. When the temperature returns to the allowed range, the device will resume operation.

The figure below shows how this works.



9. SLWN DRYING OVENS WITH NITROGEN BLOW

According to the requirements of the **PN-ISO 589:2006** norm which refers to the determination of total moisture in hard coal requires that coal, the samples susceptible to oxidation should be dried at a temperature of + 105°C in a drying oven with a nitrogen flow. Requirements for the use of the equipment are given in point 6 of the norm. A drying oven with nitrogen flow should be used to control the temperature in the range of + 105°C to + 110°C with the additional possibility of blowing with a stream of dry nitrogen at a flow rate of about 15 volumes of the drying oven per hour.

Drying ovens with nitrogen blow are available in two versions:

1. **SLWN1** – laboratory oven with dry nitrogen blow system of the chamber; the kit includes connections, valves and a laboratory rotameter which can be calibrated
2. **SLWN2** – laboratory oven with dry nitrogen blow system of the chamber; the kit includes connections, valves and a tech rotameter which can't be calibrated

The nitrogen cylinder is not included in the kit.

	**SLWN drying ovens can work only in well ventilated rooms.**

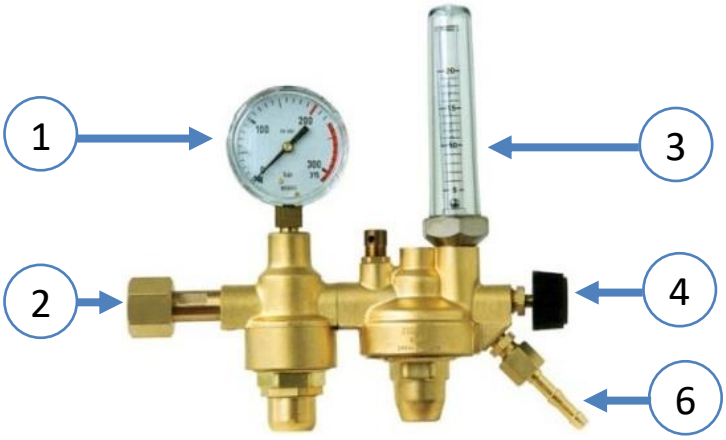
9.1. Description of the kit

Depending on the model, the drying ovrn may be equipped with one of the following nitrogen connection kits:

Kit A for SLWN2 (with tech rotameter which can't be calibrated)

The kit includes:

1. two-stage cylinder reducer with a rotameter for technical gases
2. connection hose 2 m long
3. inox hose clamps 2 pcs.

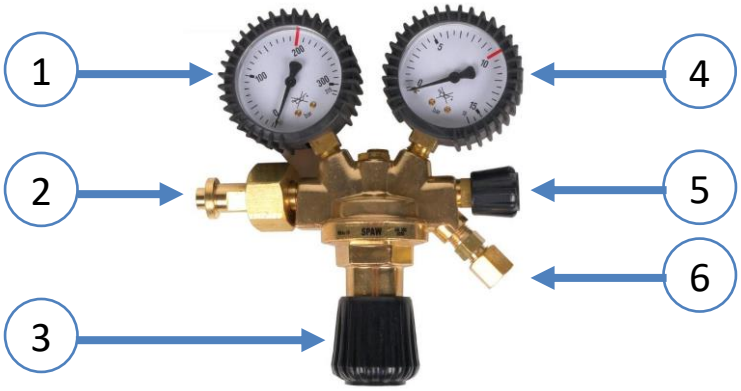


1. inlet pressure gauge (high pressure)
2. connector to connect to the cylinder
3. technical rotameter
4. shut-off valve knob
5. end for the hose connection

Kit B for SLWN1 (with laboratory rotameter which can be calibrated)

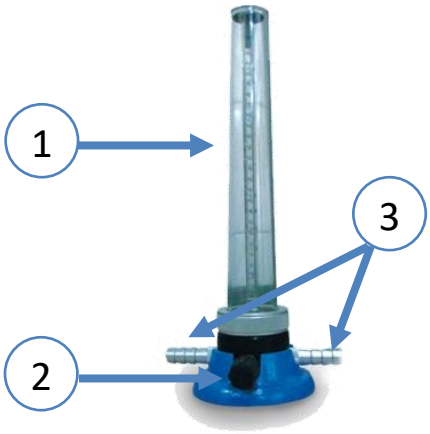
The kit includes:

1. one-stage cylinder reducer
2. laboratory rotameter
3. connection hose 4 m long
4. inox hose clamps 4 pcs.



1. inlet pressure gauge (high pressure)
2. connector to connect to the cylinder
3. pressure adjustment screw
4. outlet pressure gauge (low working pressure)
5. shut-off valve
6. end for the hose connection

Reducer



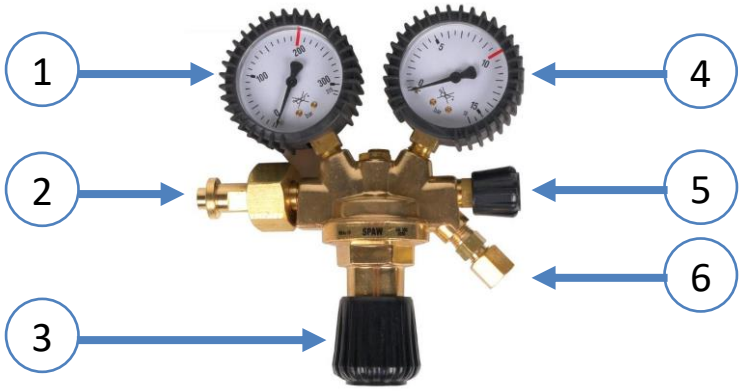
1. scale of the pressure gauge
2. flow control valve knob
3. end for the hose connection

Laboratory rotameter

Kit C for SLWN2 (with tech rotameter which can't be calibrated)

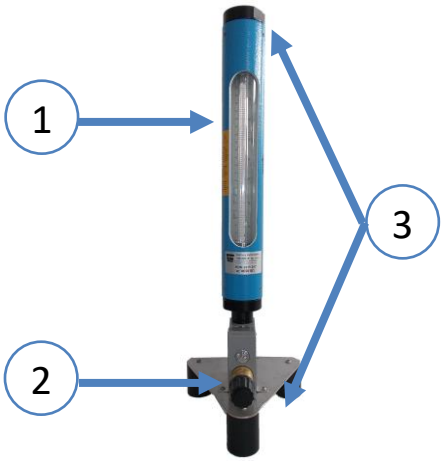
The kit includes:

1. one stage cylinder reducer
2. technical rotameter
3. connection hose 4 m long
4. inox hose clamps 4 pcs.



Reducer

1. inlet pressure gauge (high pressure)
2. connector to connect to the cylinder
3. pressure adjustment screw
4. outlet pressure gauge (low working pressure)
5. shut-off valve
6. end for the hose connection



Technical rotameter

1. scale of the pressure gauge
2. flow control valve knob
3. end for the hose connection

9.2. Connection

Before using:

- check carefully the condition of the reducer, especially the inlet fitting, connecting nut, pressure gauge, rotameter and safety valves,
- check the condition of the valve on the cylinder and then, standing on the side of the outlet nozzle, blow the valve by opening it temporarily,
- in the event of impurities of the valve, reducer or connector in the equipment, clean and degrease these places, and replace damaged gaskets with a new ones.

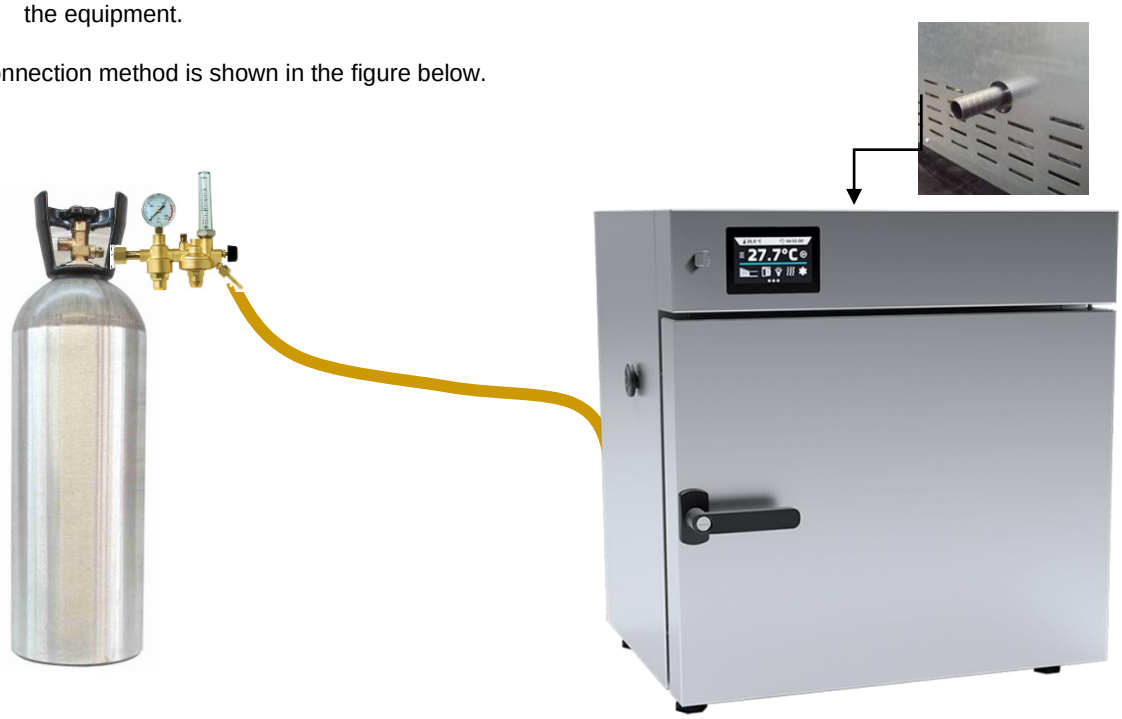
9.2.1. Connection of the Kit A

In order to connect the Kit A you have to:

1. Connect the reducer with the rotameter to the cylinder valve.

2. After connecting the reducer to the cylinder valve, slowly open the valve and with the closed shut-off valve at the reducer outlet, check the tightness of the cylinder valve, its connection with the reducer, sealing of the 1st and 2nd stage reduction systems, safety valves and shut-off valve by lubricating with soapy water. A sign of leakage of the 1st stage reduction system may be an increase in the intermediate pressure above the allowable pressure, causing the opening of the safety valve for this pressure. Similarly: a symptom of leakage of the 2nd stage reduction system may be a pressure increase causing the opening of the pressure safety valve at the outlet.
3. Attach a rubber hose to the end and put the hose clamp on and tighten it. To facilitate insertion, you can temporarily put the hose in hot water or lubricate the end with soapy water. The rubber hose should have an internal diameter in accordance with the technical data of the reducer and should be able to withstand the maximum outlet pressure. Hoses should be in good condition and can't be contaminated. New hoses should be blown out.
4. Put the other end of the hose onto the connector of the equipment (located at the bottom back of the drying oven). Put the hose clamp on and tighten it.
5. After connecting the hose to the ends of the reducer and the equipment, open the shut-off valve on the reducer and check by lubricating with soapy water the tightness of the hose, its connections to the reducer and to the equipment.

The connection method is shown in the figure below.



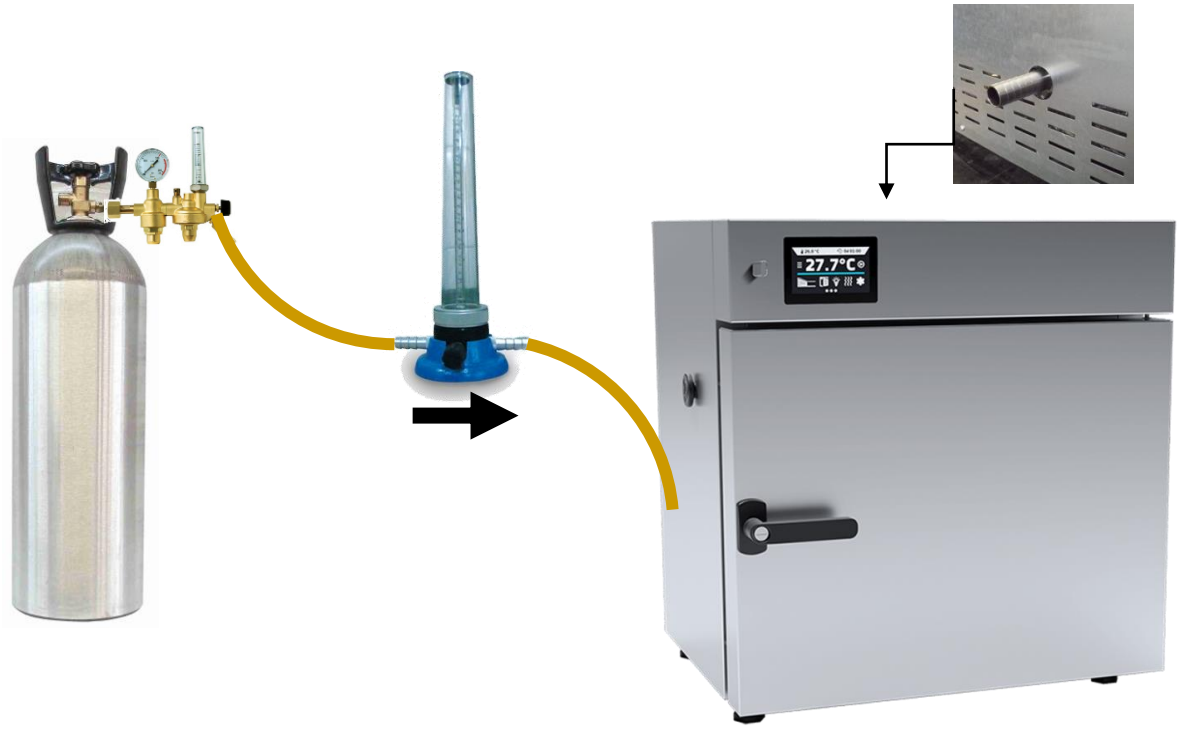
9.2.2. Connection of the Kit B

In order to connect the Kit B you have to:

1. The supplied hose cut into two parts, the length should be chosen so it will be possible to connect the cylinder with the rotameter and the rotameter with the equipment.
2. Connect the reducer to the cylinder valve. Attach a rubber hose to the end and put the hose clamp on and tighten it. To facilitate insertion, you can temporarily put the hose in hot water or lubricate the end with soapy water. The rubber hose should have an internal diameter in accordance with the technical data of the reducer and should be able to withstand the maximum outlet pressure. Hoses should be in good condition and can't be contaminated. New hoses should be blown out.
3. Put the other end of the hose onto the connector of the rotameter (pay the attention to the flow direction marked on the basis of a rotameter). Put the hose clamp on and tighten it.
4. Place the end of the second part of the hose on the connector in the rotameter. Put the hose clamp on and tighten it.
5. Insert the other end of the second part of the hose onto the connector of the equipment (located at the bottom back of the drying oven). Put the hose clamp on and tighten it.

6. After connecting the hose to the ends of the reducer and the equipment, open the shut-off valve on the reducer and check by lubricating with soapy water the tightness of the hose, its connections to the reducer and to the equipment.

The connection method is shown in the figure below.

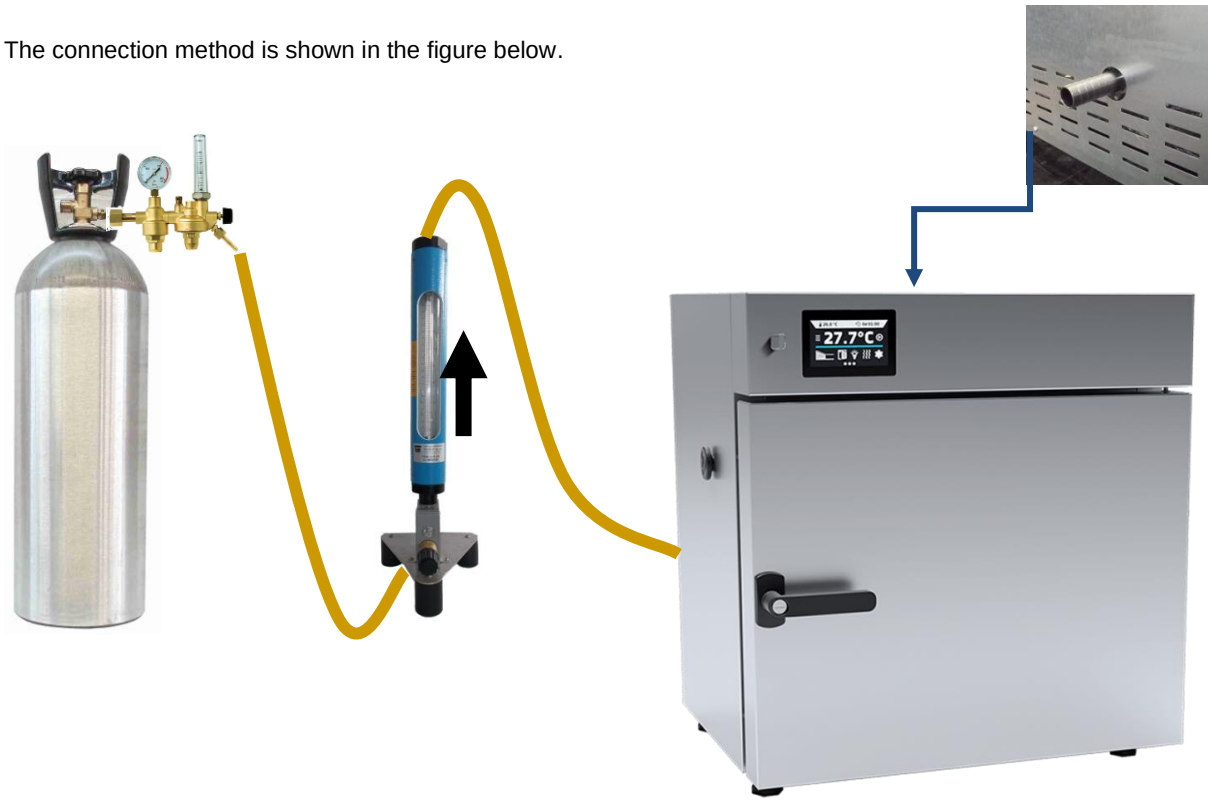


9.2.3. Connection of the Kit C

In order to connect the Kit C you have to:

1. The supplied hose cut into two parts, the length should be chosen so it will be possible to connect the cylinder with the rotameter and the rotameter with the equipment.
2. Connect the reducer to the cylinder valve. Attach a rubber hose to the end and put the hose clamp on and tighten it. To facilitate insertion, you can temporarily put the hose in hot water or lubricate the end with soapy water. The rubber hose should have an internal diameter in accordance with the technical data of the reducer and should be able to withstand the maximum outlet pressure. Hoses should be in good condition and can't be contaminated. New hoses should be blown out.
3. Put the other end of the hose onto the connector of the rotameter (pay the attention to the flow direction marked on the basis of a rotameter). Put the hose clamp on and tighten it.
4. Place the end of the second part of the hose on the connector in the rotameter. Put the hose clamp on and tighten it.
5. Insert the other end of the second part of the hose onto the connector of the equipment (located at the bottom back of the drying oven). Put the hose clamp on and tighten it.
6. After connecting the hose to the ends of the reducer and the equipment, open the shut-off valve on the reducer and check by lubricating with soapy water the tightness of the hose, its connections to the reducer and to the equipment.

The connection method is shown in the figure below.



9.3. Shut-off solenoid valve for gas supply (optionally)

The solenoid valve opens the gas supply to the equipment at the beginning of the program and closes it when the program is finished. If the program has been started with a delay, while waiting for the start of the first segment of the program, the gas supply is closed.

The connection is made through rubber hose connector with an external thread 1/4 (or 1/8 depending on the solenoid valve). The flow direction is indicated by an arrow symbol. To the output of the solenoid valve we connect the input to the equipment, and to the input-output of the rotameter.

9.4. Operation and maintenance of the dry nitrogen blow system

The nitrogen flow rate should be calculated according to the methodology given in *Section 9.5.*

Before starting to work with the drying oven with dry nitrogen blow, set the correct pressure and flow as described below.

Kit A
Open the cylinder valve slowly and constantly observing the indications on the rotameter, adjust the valve knob on the reducer until the required flow rate is achieved.

Kit B and C

	**Do not set a pressure higher than 4 bar on the low-pressure working gauge with the adjustment screw. It can damage the rotameter.**

1. Close the control valve on the rotameter (turning clockwise).
2. Set the minimum pressure on the reducer with the adjustment screw (turning left).
3. Close the shut-off valve (if applicable) on the reducer.
4. Slowly open the cylinder valve.
5. Using the adjustment screw on the reducer, set the pressure of 3 bar on the low-pressure working gauge.
6. After correctly set pressure on the reducer, unscrew the shut-off valve (if applicable).
7. Adjust the valve on the rotameter until the required flow is achieved.

During long-term breaks in use, close the cylinder valve.

During operation, check the tightness of the reducer and its connections once at month, using soapy water.

If the reducers operate at low temperatures, they can freeze from the inside. Frozen reducers should be thawed with hot water or steam. You can also use electric or water heaters on permanent basis.

9.5. Methodology for calculating the nitrogen flow rate in the drying oven

Calculation of nitrogen flow rate in drying ovens intended for drying oxidizing coals.

Depending on the capacity of the drying oven, calculate the flow rate (set on the rotameter). An example of how to calculate the flow rate for the SLWN 115 STD at the temperature of 105ºC is given below.

Description of variables:

V_k - **total** capacity of the chamber

SLWN 15: V_k = 28,6 l = 0.0286 [m^3]
SLWN 32: V_k = 50 l = 0.0500 [m^3]
SLWN 53: V_k = 83 l = 0.0830 [m^3]
SLWN 115: V_k = 152 l = 0.1520 [m^3]
SLWN 180: V_k = 180 l = 0.180 [m^3]
SLWN 240: V_k = 314 l = 0.3140 [m^3]
SLWN 400: V_k = 543 l = 0.5430 [m^3]
SLWN 750: V_k = 935l = 0.9350 [m^3]
SLWN 1000: V_k = 1200 l = 1.200 [m^3]

Q_h - required flow per hour [l/h]
Q_{ma} - required flow per minute for atmospheric pressure [l/min]
Q_{mr} - required flow per minute for reduced pressure [l/min]
V_r - gas volume on the rotameter [m^3]
p_r - gas pressure on the rotameter [bar]
p_k - pressure in the chamber (atmospheric) [bar]

Calculations:

required gas flow per hour:

$$Q_h = V_k * 15\ [1/h]$$

required gas flow per minute for atmospheric pressure:

$$Q_{ma} = \frac{Q_h}{60} = \frac{V_k * 15}{60}$$

For e.g. SLWN 115 V_k = 152 [l]

$$Q_{ma} = \frac{152 * 15}{60} = 38\ [l/min]$$

NOTE: (applies to RUG rotameters, which are accessories of a two-stage cylinder reducer with a rotameter type 2RBAz-0,3R):

If there are „**dm^3/min N_2 / T = 293 K / P = 392,3 kPa / T_0 = 273 K / P_0 = 101,3 kPa**" markings next to the scale on the rotameter, the result obtained in the calculations should be divided by the correction factor kv = 1.14.
The correction factor should be taken into account because the rotameter is scaled in normal liters for 3.923 [bar] working pressure, and the reducer works at a pressure of 3 [bar].

$$Q_{mr} = \frac{Q_{ma}}{1{,}14} = \frac{38}{1{,}14} = 33{,}33\ [l/min]$$

If the change in gas volume is taken into account with the increase of its temperature in the chamber, then the ideal gas equation should be used (assuming constant pressure during heating):

$$\frac{p_k * V_k}{T_k} = \frac{p_r * V_r}{T_r}$$

where:

T_r - gas temperature on the rotameter: $T_r = 273,15 + t_r = 273,15 + 25 = 298,15$ [K]

T_k - gas temperature in the chamber, in this case t_k =105ºC: $T_k = 273,15 + t_k = 273,15 + 105 = 378,15$ [K]

Calculation for the temperature in the chamber t_k = 105 [ºC] :

$$\frac{1 * V_k}{378,15} = \frac{1 * V_r}{298,15}$$

$$V_r = 0,79 * V_k$$

analogously:

$$Q_{mr} = 0,79 * Q_{ma}\ [l/min]$$

For e.g. SLW 115 the result was:

$$Q_{mr} = 0,79 * 38 = 30,02\ [l/min]$$

For reducers with inbuilt RUG rotameters taking into account correction factor:

$$Q_{mr} = 0,79 * 33,33 = \ 26,33\ [l/min]$$

Data for each equipment.

Required flows for the temperature in the chamber t_k = 105 [ºC]:

Equipment	Q_h [l/h]	Q_{mr} [l/min]
SLWN 15	338,91	5,65
SLWN 32	592,50	9,88
SLWN 53	983,55	16,39
SLWN 115	1801,20	30,02
SLWN 180	2891,40	48,19
SLWN 240	3720,90	62,02
SLWN 400	6434,55	107,24
SLWN 750	11079,75	184,66
SLWN 1000	14220,00	237,00

Required flows for the temperature in the chamber t_k = 105 [ºC] and for reducers with inbuilt RUG rotameters taking into account correction factor k_v = 1,14:

Equipment	Q_{mr} [l/min]
SLWN 15	4,95
SLWN 32	8,66
SLWN 53	14,38
SLWN 115	26,33
SLWN 180	42,27
SLWN 240	54,40
SLWN 400	94,07
SLWN 750	161,98
SLWN 1000	207,89

NOTE: the above calculations refer to the empty chamber of the drying oven. In laboratory conditions, the total volume of the chamber Vk should be corrected by the volume of dried material. Depending on the capacity of a drying oven, the calculations should be modified accordingly.

10. SRWP PASS-THROUGH STERILIZERS

10.1. Precautions

When installing the device, follow the health and safety rules. Two people are needed to assemble the device.

10.2. Package contents

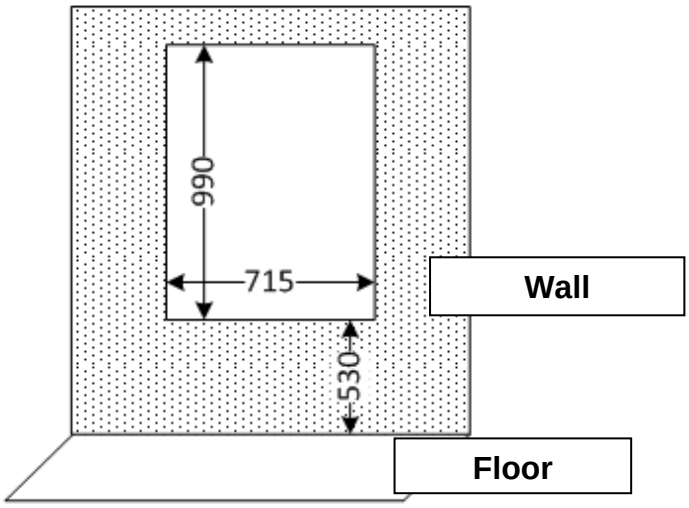
- pass-through sterilizer
- stand
- fastening bolts
- frame consisting of 4 elements
- frame installed in the device

10.3. Preparing the aperture in the wall

Before mounting, prepare the aperture with the dimensions given below:

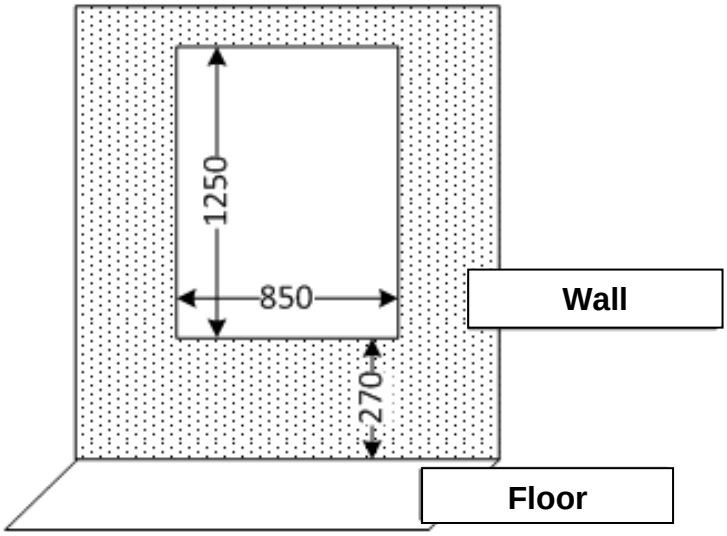
For SRWP 115

Partition wall thickness:	50-100 mm
Aperture width:	715 mm
Aperture height:	990 mm
Height of the bottom edge of the aperture relative to the ground:	530 mm



For SRWP 240

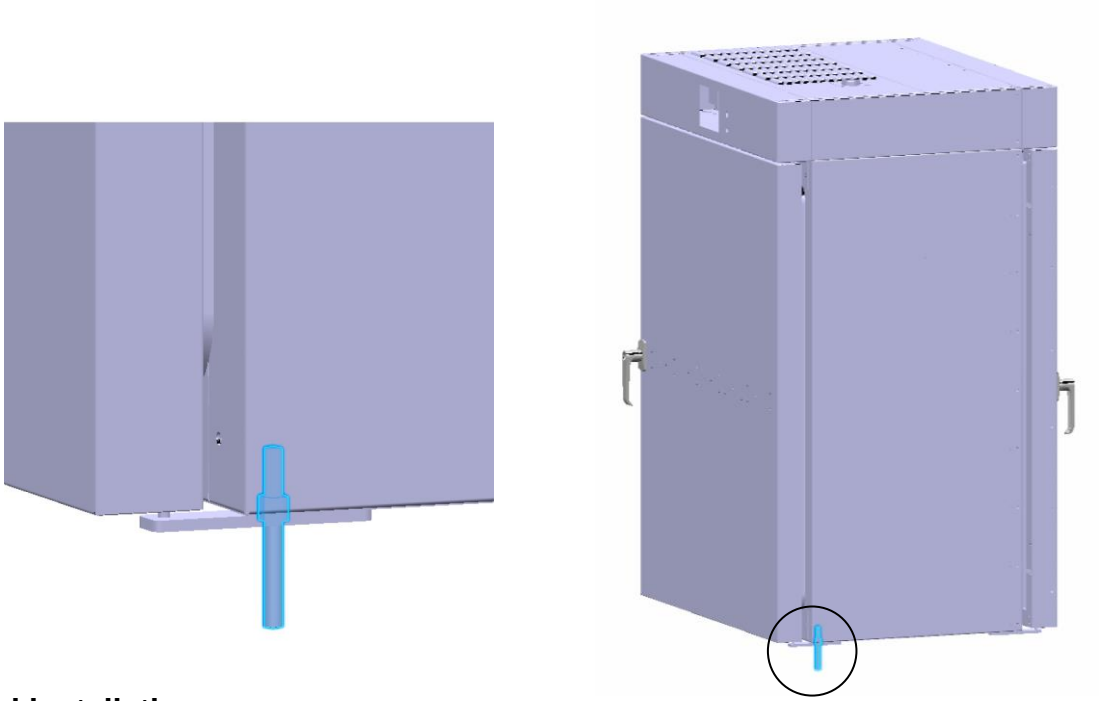
Partition wall thickness:	50-100 mm
Aperture width:	850 mm
Aperture height:	1250 mm
Height of the bottom edge of the aperture relative to the ground:	270 mm



10.4. Installation of SRWP sterilizer

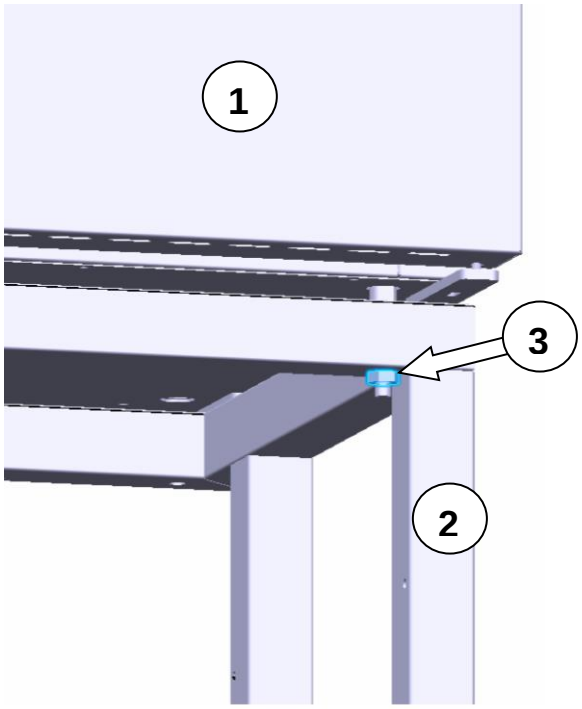
Fastening bolts

Screw in the 4 fixing bolts - tilt the device in such a way that you will be able to screw the fixing bolts into the special holes in the four corners of the bottom of the device. The device can be placed on screwed bolts.



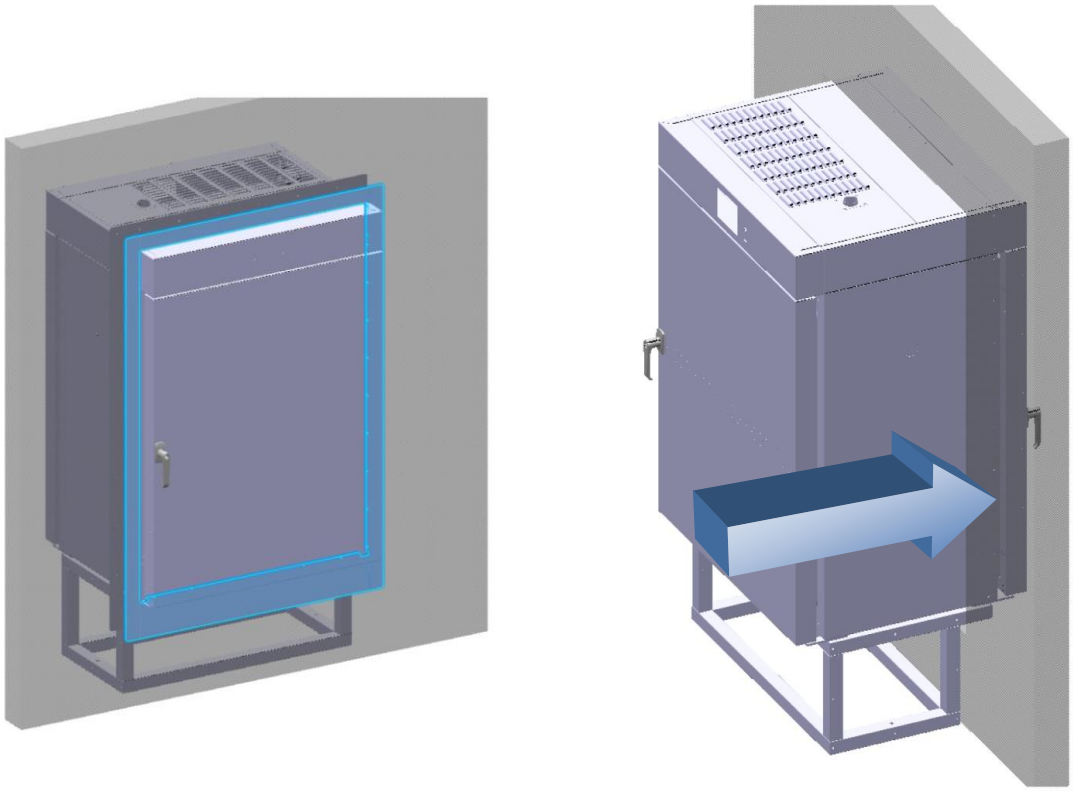
Stand installation

The device (1) should be placed on the stand (2) so that the fastening bolts hit the holes in the stand. After placing the device on the stand, tighten it with the nuts (3).



Placing the device in the aperture

Insert the device with the mounted stand into the aperture in the wall to such a depth that it will be possible to screw the frame on the opposite side.



Frame and stand installation

To install the frame and the stand you need the following equipment (not supplied by the manufacturer):

- For masking element installation:
  - screws M4x8 (SRWP 115 -20 pcs.,SRWP 240 - 30 pcs.)

- for anchoring the stand depending on the surface.
  - chemical anchor + 2x threaded rod M8 lenght 120mm + 2x hex nut M10 DIN934 2x flat washer M10 DIN125 (recommended)
  - Wedge anchor M10x120 with washer and nut

Mount the frame with the screws. Then slide the device so that the frame rests against the wall. Tighten the frame to the wall with screws. Do the same on the opposite side.

Final work

The aperture can be sealed with acrylic sealant on both sides of the frame. Connect the power cord of the device to a power socket.

11. CONNECTING THE DEVICE TO A COMPUTER

Each device in the SMART version can be connected to an Ethernet network or directly to a computer with a LAN cable (optional). To read data (stored data and event log), you need the Lab Desk software (optional equipment). If you purchase the software, a LAN cable is included together with a hardware key, which should be inserted into the USB port of the computer. The installed Lab Desk software and hardware key allow reading the data stored in the internal memory of the device. The features of the software have been described in a separate instruction manual.

12. CLEANING AND MAINTENANCE OF THE DEVICE

Disconnect the device from the power supply before carrying out any activities related to the cleaning! In the case of the battery back-up of the controller, also turn it off.

On the internal walls of the device (in particular the new one) made of stainless steel, discoloration (spots) may appear - which are not caused by factory defects, but only by the steel production process. They can be cleaned using extraction gasoline.

INOX products are manufactured with stainless steel. When used in standard laboratory conditions they do not rust. However it is possible that stains (which may look like rust) form on the steel surface (e.g. due to the kind of samples that are incubated in the chamber). In such case we recommend using cleaning solution (to clean the stains) which is dedicated to this particular application, e.g. Pelox.

When cleaning stainless steel product with dedicated cleaning solution, one should pay attention to the suggestions and recommendations given in the instruction manual (or in the safety data sheet) of the cleaning solution.

12.1. Exterior cleaning

1.	The housing of the device should be cleaned at least once a week, depending on the working conditions.
2.	The housing and door should be cleaned with caution using a soft cloth dampened with water.
3.	Only mild cleaning products should be used to clean the device.
4.	Electrical parts should not get in contact with water or detergent.
5.	Clean **the touch screen** using a soft cloth or a foam for cleaning touch screens.
6.	**USB port** can be cleaned with a vacuum cleaner to prevent accumulation of dirt inside the port.

12.2. Interior cleaning

1.	Before cleaning the interior of the device, empty the chamber.
2.	Open the door of the device, if necessary wait till the chamber has cooled down, take out the shelves and start cleaning of the device
3.	Only water or water with mild detergent should be used.
4.	Having finished cleaning, you should allow the device to dry fully and instal all parts removed before cleaning.
5.	During cleaning you should make sure not to damage the temperature sensors which are located inside the chamber.

12.3. Cleaning the touch screen

The touch screen is exposed to dirt, so it must be cleaned regularly. To clean the touch screen, use a clean and dry microfiber cloth. It is a very delicate material and collects dirt well.

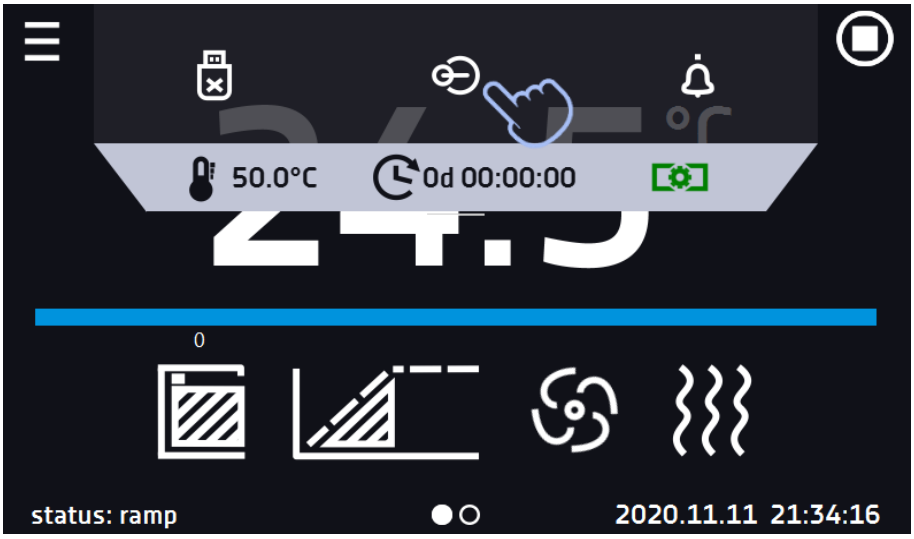
	Before using the cloth, make sure that on the surface there are no crumbs or particles. During cleaning, they can act like sandpaper and scratch the surface of the screen.

If the stains cannot be removed by dry cleaning, the cloth can be lightly dampened with water.

	Do not use paper towels to clean the screen as it may cause microdamages.

Before cleaning, lock the screen by pressing on the top drop-down list *(Figure 53)*

Figure 53 Locking the screen



The screen is ready to be cleaned.

To unlock the touch screen, slide the blue circle into the white circle

Figure 54 Unlocking the screen

13. ADVICE ON HOW TO SAFELY STORE THE DEVICE

1.	Remove all objects from the chamber.
2.	Disconnect the device from the mains. If the unit is equipped with battery back-up of the controller (optional), also turn it off.
3.	Clean and dry the chamber.
4.	Leave the door open to avoid unpleasant odors.
5.	Store in temperatures between 0°C and 50°C and relative humidity maximum 70%.

14. TROUBLESHOOTING

Before you contact Service Department:

1.	Make sure that the operation complies with the instruction manual of the device.
2.	Restart the device to make sure that the unit is not functioning properly. If it still does not work, disconnect the unit again from the mains and repeat the operation after one hour. Do the same with optional battery back-up of the controller.

Service

Visit the POL-EKO website at: www.pol-eko.com.pl in order to:
• get full contact details of technical service
• access to POL-EKO online catalogue, and information about accessories and related products
• receive additional product information and special offers
To receive information or technical assistance, contact the Service Department or visit the website: www.pol-eko.com.pl

14.1. Possible defects

Malfunction	**What to check?**	**What to do?**
The unit is not working	Check if the unit is plugged in correctly	Plug in the unit correctly
	Check if the circuit-breaker has tripped	Press the circuit breaker on the back of the device
	Check the voltage in the socket	Connect the device to a different socket, preferably from a different electrical circuit. Call a licensed electrician to check the electrical installation.
	Check if the power cable is broken	Change the cable
The unit is not heating up	Check if the door of the unit is closed properly	Clean the gasket
	Check if the fan is turned on	Set the fan operation in the program
	Check if the ambient temperature is within the permissible values given in the technical data table?	Adjust the ambient temperature to the value given in this manual
The unit is working too loud	Check if the unit is not touching other objects or furniture etc.	Remove other objects
	Check if the door is properly leveled	Level the device
The door has dropped or is skewed	Check if the door is properly leveled	Level the device. If this does not help, contact the service.

15. WARRANTY CONDITIONS

POL-EKO warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of the invoice. If a defect is present, POL-EKO will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid.

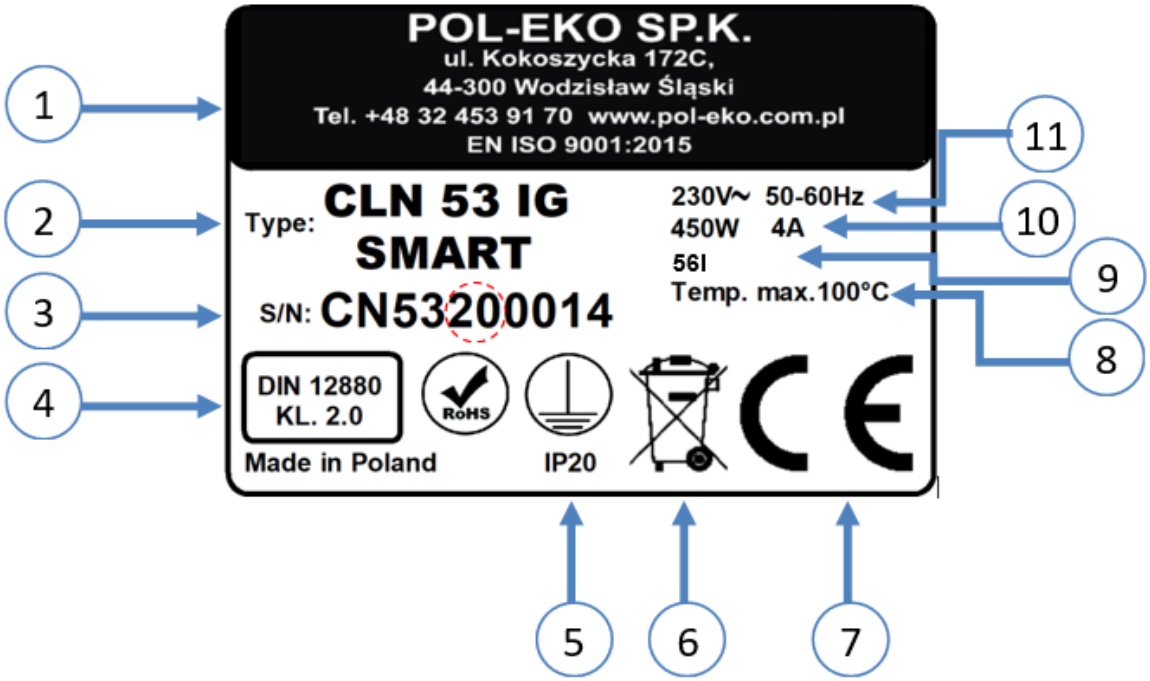
The device that is being returned must be secured by the customer in the event of any damage or loss. The warranty will be only limited to the situations listed above. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

All complaints should be reported using the form available on the website **http://www.pol-eko.com.pl/en/service**

Compliance with local laws and regulations
The user is responsible for obtaining any approvals or authorizations required to launch and use the product. POL-EKO shall not be liable for any negligence in the above matter except when the refusal to obtain authorization is caused by a product defect.

16. RATING PLATE

The rating plate is located on the left side wall in the upper left corner. Below there is an example of a rating plate:



1. Manufacturer's data
2. Type of device
3. Serial number (the two marked digits indicate the year of manufacture of the device)
4. Temperature protection class according to DIN 12880
5. Degree of protection against electric shock (class I: protection against indirect contact) and IP enclosure protection rating
6. Disposal of used device according to WEEE2
7. CE marking as confirmation of compliance with the directives
8. Maximum temperature range of the device
9. Capacity of the device
10. Maximum power consumption
11. Acceptable range of voltage and frequency of mains supply

17. TECHNICAL DATA

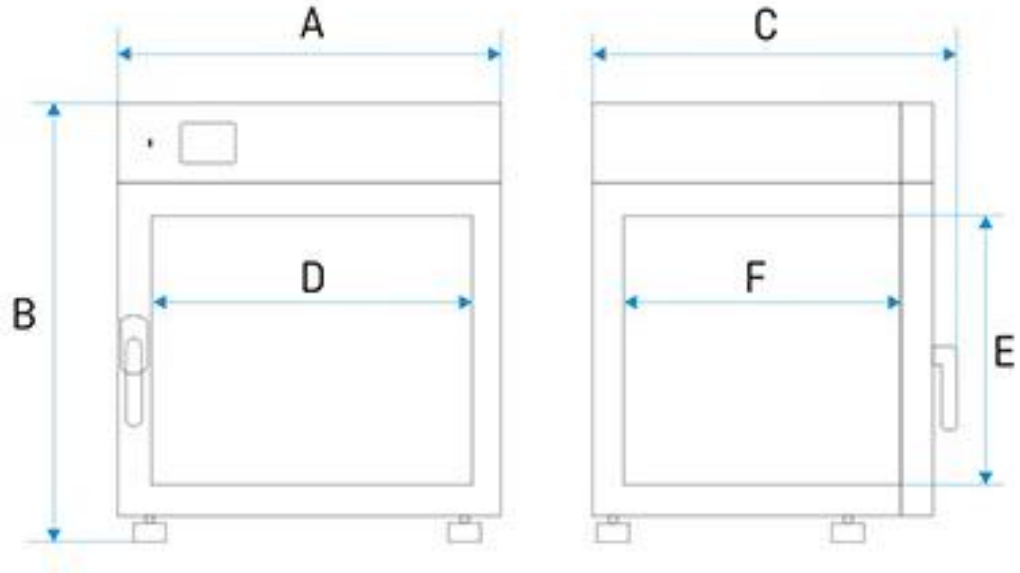
Technical data are given with a tolerance of ± 5%, the working capacity of the chamber is always smaller. All the below technical data refers to standard units (without optional accessories).

17.1. CL, SL, SLWN, SR, SRWP** devices*

*SLWN – data as for SLW, **SRWP - data as for SRW 115 and SRW 240

Parameter			**CL/SL 15**	**CL/SL 32**	**CL/SL/SR 53**	**SL75**	**CL/SL/SR 115**	**CL/SL180**	**CL/SL/SR 240**	**CL/SL/SR 400**	**CL/SL/SR 750**	**CL/SL/SR 1000**
Air convection			natural (N) / forced (W)							forced (W)		
Chamber capacity[1] [l]			15	32	56	74	112	180	245	424	749	1005
Door			solid		solid/with viewing window (option)							
Temperature range		CL	+5°C above ambient temperature…+100°C									
			+41°F above ambient temperature … 212°F									
Temperature range		SL	+5°C above ambient temperature …+300°C									
			+41°F above ambient temperature …572°F									
Temperature range		SR	+5°C above ambient temperature …+250°C									
			+41°F above ambient temperature …482°F									
Temperature resolution [°C]			every 0,1									
Controller			microprocessor with external touch screen									
Interior			acid-proof stainless steel according to DIN 1.4301									
Housing	-		powder coated sheet									
	INOX/G		stainless steel linen finish									
Overall dims[2] [mm]	A width		510	590	590	590	650	650	810	1010	1260	1260
	B height		550	630	700	850	850	1030	1200	1430	1600	2000
	C depth		470	520	620	570	710	820	770	780	870	880
Internal dims [mm]	D width		320	400	400	400	460	470	600	800	1040	1040
	E height		230	320	390	530	540	720	800	1040	1200	1610
	F depth		200	250	360	350	450	560	510	510	600	600
Max shelf workload[5] [kg]	-		10	10	25	25	25	25	25	25	-	-
	version PW[3]		-	-	50	50	50	50	100	100	100	100
Max unit workload [kg]	-		20	30	40	40	60	75	90	120	140	-
	version W[4]		-	-	80	80	120	120	300	300	300	300
Nominal power [W]			consult rating plate of the device									
Weight [kg]			27	35	50	56	65	94	126	174	260	330
Temp. protection			class 2.0 according to DIN 12880 / class 3.1 (option)									
Power supply		SL	230 [V] ±10% / 50 [Hz]							400 [V] ±10% / 50 [Hz] 3P+N+PE		
		SR	230 [V] ±10% / 50 [Hz]							400 [V] ±10% / 50 [Hz] 3P+N+PE		
		CL	230 [V] ±10% / 50 [Hz]									
Shelves fitted/max			1/2	1/3	2/5	2/5	2/7	3/9	3/10	3/14	5/16	6/22
Warranty			24 months									
Manufacturer			POL-EKO									

1. working chamber is always smaller
2. depth does not include 50mm of power cable
3. reinforced shelf
4. reinforced version
5. on uniformly loaded surface



CL, SL, SLWN, SR, SRWP

18. DECLARATIONS OF CONFORMITY

CE

DEKLARACJA ZGODNOŚCI UE

EU DECLARATION OF CONFORMITY

POL-EKO

Produkt:	***Product:***
Cieplarka laboratoryjna	*Laboratory incubator*
Model:	***Model:***
CLW 15; CLW 32; CLW 53; CLW 115; CLW 180; CLW 240; CLW 400; CLW 750; CLW 1000 CLN 15; CLN 32; CLN 53; CLN 115; CLN 180; CLN 240	
w wersjach:	***in version:***
SMART; IG SMART; SMART PRO; IG SMART PRO	
Nazwa i adres producenta:	***Name and address of the manufacturer:***
POL-EKO A.Polok-Kowalska sp.k. ul. Kokoszycka 172 C 44-300 Wodzisław Śląski Polska/Poland	
Niniejsza deklaracja zgodności wydana zostaje na wyłączną odpowiedzialność producenta.	***This declaration of conformity is issued under the sole responsibility of the manufacturer.***
Wymieniony powyżej przedmiot niniejszej deklaracji jest zgodny z odnośnymi wymaganiami unijnego prawodawstwa harmonizacyjnego:	***The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:***
LVD 2014/35/UE EMC 2014/30/UE RoHS 2015/863 WEEE 2012/19/UE	LVD 2014/35/EU EMC 2014/30/EU RoHS 2015/863 WEEE 2012/19/EU
Odniesienia do odnośnych norm zharmonizowanych, które zastosowano lub do innych specyfikacji technicznych, w stosunku, do których deklarowana jest zgodność:	***References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:***
LVD	PN-EN 61010-1:2011 PN-EN 61010-2-010:2015-01 PN-EN 60529:2003/A2:2014-07
EMC	PN-EN IEC 61326-1:2021-10
RoHS	PN-EN IEC 63000:2019-01

Wodzisław Śl. 02.01.2023

Manufacturer of control and measurement equipment
for laboratory tests and technological processes,
distributor in Poland of the following companies:
HAMILTON, NICKEL ELECTRO, RODWELL, THERMO SCIENTIFIC, WTW.

We produce:

- thermostatic cabinets
- laboratory refrigerators
- laboratory incubators
- devices with photoperiod and phytotron system
- drying ovens and sterilizers
- drying ovens with nitrogen blow
- laboratory freezers
- ultra-low freezers
- climatic chambers
- Caldera fluid and blanket warmers
- colony counters
- laboratory shakers
- stationary samplers
- Hydromat water dispensers
- Eurodrop stations
- FEKO+ waste water receipt station
- heating ovens
- cooled incubators
- fume hoods

We offer portable, laboratory and on-line equipment:

- pH-meters
- ionmeters
- dissolved oxygen meters
- conductivity meters
- photometers and spectrophotometers
- thermo reactors
- turbidity metres
- pH electrodes
- conductivity sensors
- oxygen probes
- heavy metals trace analyzers
- water baths
- autoclaves
- pH buffer solutions
- conductivity standards
- photometric tests
- laboratory accessories
- consumables

We organize:

- regional trainings
- individual trainings
- seminars

We provide:

- warranty and post-warranty service
- consultancy in the selection, maintenance and operation of laboratory equipment

POL-EKO LAB is Accredited by the Polish Centre for Accreditation (a member of ILAC) and provides accredited calibration of:

- thermostatic and climatic chambers (incubators, drying ovens, thermostatic cabinets, climatic chambers, freezers)
- water baths and thermo reactors
- autoclaves
- electric and electronic thermometers
- data loggers
- high temperature laboratory furnaces
- thermohygrometers
- laboratory sieves

Calibration is confirmed with the issue of 'Calibration Certificate'.

AP 115

Services outside the scope of accreditation:

- checking equipment for physicochemical measurements (meters and probes),
- carrying out IQ, OQ, PQ qualification procedures,
- mapping of temperature and humidity in the rooms

POL-EKO Perfect Environment
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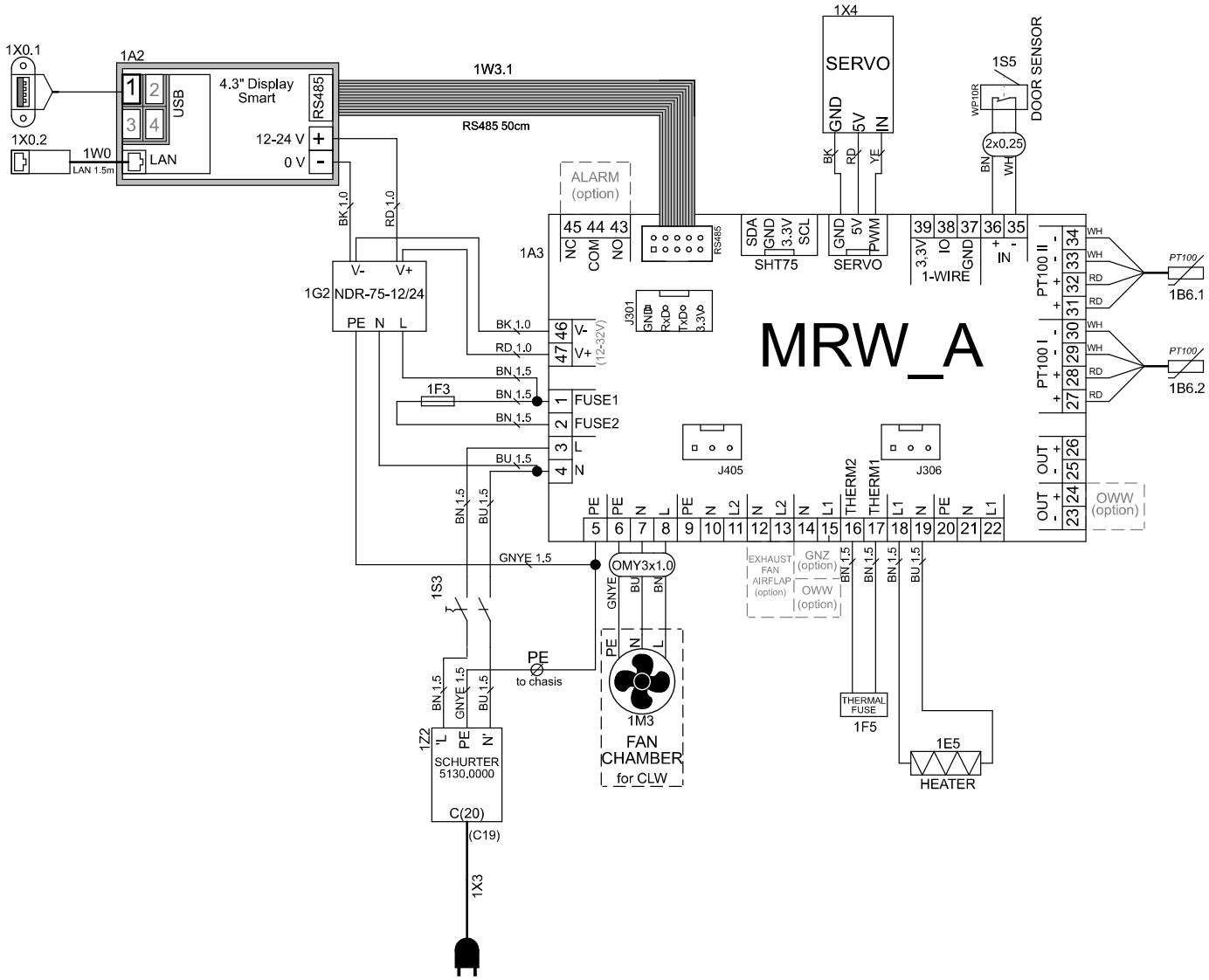
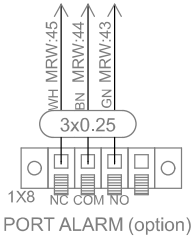
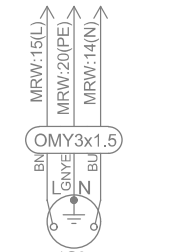
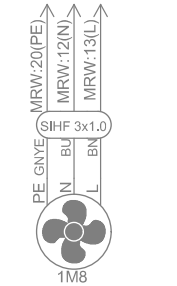


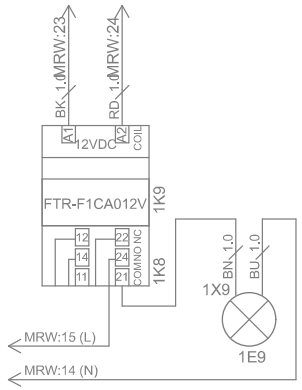
Type	Circuit breaker [A]	FAN (only CLW)	Power of heater [W/V]	Power of device [W/V]
CLN/CLW 15	4	EBM R2A150AC	300/230	350/230
CLN/CLW 32	4	EBM R2A150AC	300/230	350/230
CLN/CLW 53	4	EBM R2A150AC	400/230	500/230
CLN/CLW 115	4	EBM R2A150AC	400/240	500/230
CLN/CLW 180	6	EBM R2A150AA	600/230	650/230
CLN/CLW 240	6	EBM R2A150AA	800/230	850/230

Ground:
-all externall sheet metal and door
Uziemić:
-wszystkie blachy zewnętrzne oraz drzwi









Project:	CL CLW 15-240 Smart v1.06
	Main Scheme

Date:	Drawn by:/Checked by:	Version:	Scheme:
11.01.2023	Sz.Kiedos/P.Duda	1.06	1 /1

POL-EKO

Zestawienie aparatury

Ozn.	Kod katalogowy	Nazwa	Opis	Producent	Sch.	Kol.
1X0.2	LOG-NK4011	Łącznik RJ45 ekranowany	Łącznik RJ45	INNY	1	0
1X0.1	USBAJ-1	adapter USB A 0,5m	Gniazdo USB	BQ CABLE	1	0
1W0	U/UTP5-CCA-015	Patch cord; U/UTP; 5e; 1,5m	Przewód LAN	INNY	1	0
1G2	NDR-75-12	Zasilacz 12V/6,3A	Zasilanie elektroniki 12V lub 24V	MEAN WELL	1	2
1Z2	5130.0000	gniazdo zasilające AC; IEC 60320; C20 (I); 16A; na panel; z filtrem,	SCHURTER	SCHURTER	1	2
		SCHURTER				
1A2	STEROWANIE IGS (SMART)	Wyświetlacz; sterowanie IGS SMART	Panel z wyświetlaczem	POL-EKO	1	2
1F3			Wyłącznik naprądowy		1	3
1S3	R-210C5W-NBBA-11TNC	Przełącznik Rocker wpuszczany, czarny	Wyłacznik główny	CANAL ELECTRONIC	1	3
1A3	MRW_A	Sterownik MRW_A	Sterownik	POL-EKO	1	3
1W3.1	TAŚMA RS485 50	Taśma RS485 50cm	TAŚMA RS485 50	INNY	1	3
1X3	SN25-3/15/3BK	Kabel zasilający 3m; 1,5mm2; 16A; (NKSK250SGH)	Przewód zasilający	LIAN DUNG	1	3
1M3			Wentylator komory (CLW)		1	3
1X4	HS-311	Serwomechanizm	Serwo kominek	INNY	1	4
1E5			Grzałka		1	5
1S5	WP10R	Przełącznik drzwiowy	Czujnik drzwi	ELWAT	1	5
1F5	BT L-120	Termostat	Termostat	INNY	1	5
1B6.1	CKG-34-400-12	Czujnik temperatury PT100 1,2m	Czujnik temperatury PT100	INNY	1	6
1B6.2	CKG-34-400-12	Czujnik temperatury PT100 1,2m	Czujnik temperatury PT100	INNY	1	6
1X8	(opcja)CC-210	Gniazdo alarmu (głośnikowe)	(opcja) Alarm	INNY	1	8
1M8	(Opcja)R2A150AC	Wentylator do gorącego powietrza EBM R2A 150 AC 01-13	(Opcja)Wentylator kominka (opcja)	EBM	1	8
1K8	(Opcja)GZM80	Podstawka pod przekaźnik	(Opcja)Podstawka GZM80	RELPOL	1	8
1K9	(Opcja)FTR-F1CA012V	Przekaźnik 12VDC	(Opcja) przekaźnik oświetlenie	FUJITSU-TAKAMISAWA	1	9
1G9	(Opcja)1040-0b	Gniazdo zasilające 230VAC panelowe	(Opcja) GNZ	PCE	1	9
1X9	(Opcja)GU10	Oprawka GU10	Gniazdo LED GU10	INNY	1	9
1E9	(Opcja)75253100	Żarówka LED 3,5W	OWW LED Philips	Philips	1	9

	Data:	Projekt:	Schemat:
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Zestawienie materiałów

Ilość	Kod ERP	Opis	Kod katalogowy	Producent	Uwagi
21					
3					
1	04-0601-0001-1008655	Żarówka LED 3,5W	(Opcja)75253100	Philips	
1	04-0699-9901-1008655	Oprawka GU10	(Opcja)GU10	INNY	
1	04-0801-1208-1010065	Gniazdo zasilające 230VAC panelowe	(Opcja)1040-0b	PCE	
1	04-0801-2001-1004401	gniazdo zasilające AC; IEC 60320; C20 (I); 16A; na panel; z filtrem, SCHURTER	5130.0000	SCHURTER	
1	04-0802-0005-1003087	Gniazdo alarmu (głośnikowe)	(opcja)CC-210	INNY	
1	04-0802-0215-1012978	Łącznik RJ45 ekranowany	LOG-NK4011	INNY	
1	04-1002-0008-1031847	Przełącznik drzwiowy	WP10R	ELWAT	
1	04-1004-0013-1039769	Przełącznik Rocker wpuszczany, czarny	R-210C5W-NBBA-11TNC	CANAL ELECTRONIC	
1	04-1201-0011-0000000	Przekaźnik 12VDC	(Opcja)FTR-F1CA012V	FUJITSU-TAKAMISAWA	
1	04-1299-0002-1010176	Podstawka pod przekaźnik	(Opcja)GZM80	RELPOL	
1	04-1401-0015-1004205	Wentylator do gorącego powietrza EBM R2A 150 AC 01-13	(Opcja)R2A150AC	EBM	
1	04-1505-0045-1031229	Zasilacz 12V/6,3A	NDR-75-12	MEAN WELL	
1	04-1607-0021-0000000	Taśma RS485 50cm	TAŚMA RS485 50	INNY	
1	04-1607-0037-0000000	Patch cord; U/UTP; 5e; 1,5m	U/UTP5-CCA-015	INNY	
1	04-1607-0038-0000000	Kabel zasilający 3m; 1,5mm2; 16A; (NKSK250SGH)	SN25-3/15/3BK	LIAN DUNG	
1	04-1607-0070-1008012	adapter USB A 0,5m	USBAJ-1	BQ CABLE	
2	04-1901-0002-1004456	Czujnik temperatury PT100 1,2m	CKG-34-400-12	INNY	
1	04-1902-0007-1023089	Termostat	BT L-120	INNY	
1	04-2003-0001-1008033	Serwomechanizm	HS-311	INNY	
1	04-2503-0098-1024862	Sterownik MRW_A	MRW_A	POL-EKO	
1	04-2503-0099-1005076	Wyświetlacz; sterowanie IGS SMART	STEROWANIE IGS (SMART)	POL-EKO	

Data:	Projekt:	Schemat:
11.01.2023	CL CLW 15-240 Smart v1.06	1