

# Instruction Manual

## SMART



*Drying Oven (SL)*

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

*Incubator (CL)*

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

*Cooled Incubator (IL)*

ILW 53, 115, 240, 400, 750  
ILP 53, 115, 240, 750

*Sterilizer (SR)*

SRW 53, 115, 240, 400, 750, 1000  
SRN 53, 115, 240  
SRWP 115, 240

*Thermostatic Cabinet (ST)*

ST 1, ST 2, ST 3, ST 4, ST 5, ST 6, ST 500, ST 700,  
ST 1200, ST 1450, ST 1/1, ST 1/1/1, ST 2/2, ST 2/3,  
ST 2/4, ST 3/3, ST2/ZLN85, ST3/ZLN85

*Laboratory Refrigerators (CHL)*

CHL 1; CHL 2; CHL 3; CHL 4; CHL 5; CHL 6; CHL 500;  
CHL 700; CHL 1200; CHL 1450; CHL 1/1; CHL 1/1/1;  
CHL 2/2; CHL 2/3; CHL 2/4; CHL 3/3, CHL2/ZLN85;  
CHL3/ZLN85

*Laboratory Freezer (ZL)*

ZLN 85; ZLN-T 125; ZLN-T 200; ZLN-T 300  
ZLW-T 200; ZLW-T 300  
ZLN-UT 200; ZLN-UT 300; ZLN-UT 500;

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



Manufacturer:  
**POL-EKO-APARATURA**  
Version 1.11



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## 1. IMPORTANT INFORMATION FOR THE USER

	<p>All warnings included in this instruction manual, especially these which appear next to the warning or informative symbols, should be obeyed at all times to ensure the safety of the user and to maintain the proper operation of the unit!</p> <p>The manufacturer does not take any responsibility for any damage which results from disobeying the instruction manual and misuse!</p>
	<p><b>For SL:</b> When the device is working on 200°C or higher temperature, the housing and door can be hot.</p>
	<p><b>For the freezers ZL:</b> Inside the chamber there are extremely low temperatures, so do not touch the samples and the interior of the chamber without suitable protective gloves.</p>
	<p><b>For CHL, ST, IL, ZL:</b> A flammable coolant is used in the cooling system. If the cooling system is damaged, ventilate the room carefully and remove any open sources of fire nearby to the device.</p>
	<p><b>For units equipped with UV lamps:</b> take necessary safety precautions. Do not expose your hands, skin and eyes to UV radiation as it may cause eyes diseases (conjunctivitis) or skin diseases (red spots or cancer). It is recommended not to open the unit while the UV lamps are on. The user should be equipped with protective gloves and glasses.</p>
	<p>This symbol indicates helpful tips.</p>

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

1.	<p><b><u>The unit cannot be installed:</u></b></p> <ul style="list-style-type: none"> <li>• outside,</li> <li>• in damp places or places which can be easily flooded,</li> <li>• near flammable or volatile substances,</li> <li>• near acids or in corrosive environments.</li> </ul>
2.	<p><b><u>It is forbidden to:</u></b></p> <ul style="list-style-type: none"> <li>• store inflammable or volatile substances inside the unit,</li> <li>• touch live parts of the unit,</li> <li>• operate the unit with wet hands,</li> <li>• load the outer casing of the unit</li> <li>• overload the shelves (the maximum load is described in technical data).</li> </ul>
3.	<p><b><u>You should:</u></b></p> <ul style="list-style-type: none"> <li>• place samples in such a way to provide proper air circulation in the chamber,</li> <li>• open the door for the shortest period of time to reduce temperature fluctuations,</li> <li>• defrost the chamber if you open the door or store humid samples,</li> <li>• if possible, do not store warm samples,</li> <li>• secure samples from being blown out by the chamber fan e.g. powdery samples,</li> <li>• always check that the doors are closed,</li> <li>• use only earthed mains to avoid electric shocks,</li> <li>• unplug the power cable holding the protective cover and not the cable itself,</li> <li>• disconnect the unit from the mains before undertaking any repairs or maintenance works,</li> <li>• protect the power cable and the plug from any damage,</li> <li>• disconnect the power plug before moving the unit,</li> <li>• disconnect the power plug if the device will not be used for a long period of time,</li> <li>• disconnect the unit if it has any visual faults.</li> </ul>

## 2. PACKAGE CONTENTS

Scope of delivery for CL laboratory incubator and SL drying oven in SMART version.

Unit	SL /CL									
Type	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 for access port [pcs.]	x	x	1	1	1	1	1	1	1	1
Key for lock [pcs.]	2	2	2	2	2	2	2	2	2	2
Wrench (13mm) for wheels adjustment (where applicable) [pcs.]	x	x	x	x	x	x	x	1	1	1
Calibration certificate [pcs.]	1	1	1	1	1	1	1	1	1	1

Scope of delivery for SR sterilizers in SMART version.

Unit	SR					
Type	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 for access port [pcs.]	1	1	1	1	1	1
Key for lock [pcs.]	2	2	2	2	2	2
Wrench (13mm) for wheels adjustment (where applicable) [pcs.]	x	x	x	1	1	1
Calibration certificate [pcs.]	1	1	1	1	1	1

Scope of delivery for ILW cooled incubators in SMART version.

Unit	ILW				
Type	53	115	240	400	750
Shelves [pcs.]	2	2	3	3	5
Slides [pcs.]	4	4	6	6	10
Power cord [ pcs ]	1	1	1	1	1
Rubber cap for access port [pcs.]	1	1	1	1	1
Key for lock [pcs.]	2	2	2	2	2
Wrench (13mm) for wheels adjustment (where applicable) [pcs.]	x	x	x	x	1
Calibration certificate [pcs.]	1	1	1	1	1



Scope of delivery for ST cooled incubator and CHL refrigerators in SMART version.

Unit	ST /CHL									
Type	1	2	3	4	5	6	500	700	1200	1450
Shelves [pcs.]	2	2	2	3	3	3	3	3	6	6
Slides [pcs.]	4	4	4	6	6	6	6	6	12	12
Shelves 'bottom', 'small' [pcs.]	x	1	1	1	1	1	x	x	x	x
Slides 'short' [ pcs.]	x	2	2	2	2	2	x	x	x	x
Power cord [pcs.]	1	1	1	1	1	1	INTEGRATED			
Rubber cap for access port [pcs.]	1	1	1	1	1	1	1	1	1	1
Key lock [ pcs.]	2	2	2	2	2	2	2	2	4	4
Calibration certificate [pcs.]	1	1	1	1	1	1	1	1	1	1

Scope of delivery for ZLN, ZLN-T, ZLW-T, ZLW-UT freezer in SMART version.




Unit	ZLN	ZLN-T			ZLW -T		ZLN-UT		
Type	85	125	200	300	200	300	200	300	500
Shelves [pcs.]	2	2	2	3	2	3	x	x	x
Slides [pcs.]	4	4	4	6	4	6	x	x	x
Power cord [ pcs ]	1	1	1	1	1	1	1	1	1
Silicone cap for access port [pcs.]	2	2	2	2	2	2	2	2	2
Key for lock [pcs.]	2	2	2	2	2	2	2	2	2
Wrench (13mm) for wheels adjustment (where applicable) [pcs.]	x	x	x	1	x	1	1	1	1
Calibration certificate [pcs.]	1	1	1	1	1	1	1	1	1

Scope of delivery for Peltier-cooled incubator (ILP) in SMART version.

Unit	ILP			
Type	53	115	240	750
Shelves [pcs.]	2	2	3	5
Slides [pcs.]	4	4	6	10
Power cord [ pcs ]	1	1	1	1
Rubber cap for access port [pcs.]	1	1	1	1
Key for lock [pcs.]	2	2	2	2
Wrench (13mm) for wheels adjustment (where applicable) [pcs.]	x	x	x	1
Calibration certificate [pcs.]	1	1	1	1

### 3. BEFORE THE FIRST USE

By default, the unit is sent in a cardboard box. It is necessary **to transport it in the upright position** and prevent it from any unintended movements.

	<p><b>Once you receive the unit, please check its the technical condition and all accessories. Any claims regarding latent defects should be reported to the manufacturer, while any damage during transport or incomplete accessories need to be passed to the entities who are responsible for the transport and unloading.</b></p>
	<p><b>Only for ILW, ST, CHL: While carrying the unit, please do not tilt it to one side more than 45° from the upright position, as there is a high probability of the damaging the compressor. If it is necessary to tilt it to one side more than 45°, then after placing it, please wait at least 2 hours before connecting the unit to the mains.</b></p>
	<p><b>After transporting the device at a temperature below 10°C, the device should be put aside for at least 2 hours before connecting to a power socket.</b></p>

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

#### 3.1. Installation place

The unit should be placed at a minimum distance of 100mm from the wall of the room. The height of the room must be higher than the height of the unit by min 300mm.

In drying ovens (SL) and in incubators (CL) on the back of the unit, there is an air-flap located, through which the hot air is extracted. 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, to a fire.

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

- Ambient temperature between +10°C...+26°C \*
- Ambient relative humidity of 60%\*
- Low dust environment
- Appropriately ventilated according to its size
- Placed on a hard and stable surface
- Placed at least 100 mm away from the wall
- Height of the room must be at least 300 mm greater than the height of the unit
- Keep away from direct sunlight
- The unit should be kept far from heat sources, air conditioning vents and drafts
- Kept away from any heat sources\*
- Not designed to be built-in e.g. within a wall cavity
- The place of installation of the unit should contain a mains socket 230V/50Hz or 400V/50Hz (

(see » [page 77](#))

Failure to do so may result damage to the unit and losing the warranty rights.

\*) If it is not possible to locate the unit in a place that fully complies with the above requirements, make sure that the following points are obeyed:

- if the room temperature is higher than recommended, monitor the temperature in the chamber using an additional independent temperature sensor.
- if the room temperature is lower than recommended, under no circumstances should you turn the cooling system on, as this may damage the compressor; At room temperatures between 0° to 10°C it is only possible to heat up the chambers (only for: CHL, ST, IL, ZL).
- in highly humid environments, control the frosting of evaporator and walls more often than recommended. If necessary, perform the defrosting operation (only for: CHL, ST, IL, ZL).

The waste water is discharged by gravity. The drain hose cannot be higher at any point than the drain outlet, otherwise, this may cause leakage from the bottom of chamber and may damage the humidifier.

If you don't comply with the recommendations of place of installation, you may lose your warranty rights.

If you don't comply with the above recommendations, it may deteriorate the following technical parameters:

- temperature stability
- temperature homogeneity
- power consumption
- frosting of evaporator

Non-compliance with the above recommendations may result in damage to the unit or impair technical parameters.

**The electric installation** should meet the following conditions:



**Connect device to a socket with ground. The power specifications are listed in the technical data section and on the rating plate of the unit.**

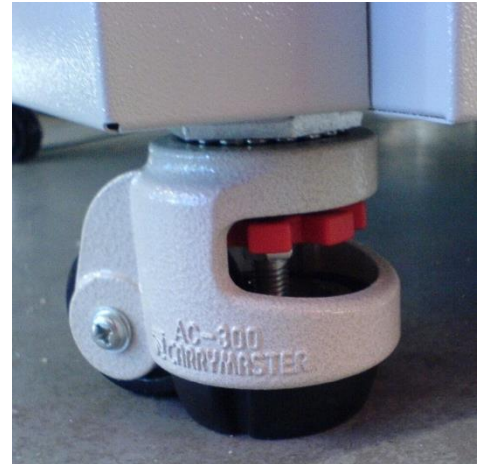
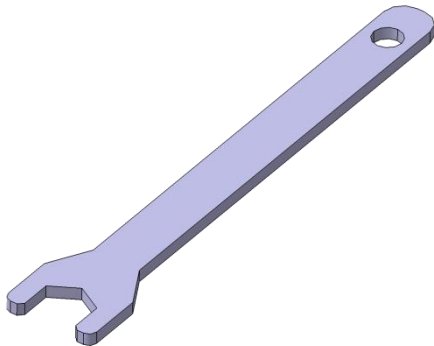
The electric installation should be secured by a 16A antisurge fuse. It is recommended that the installation is equipped with a residual current circuit breaker.

**Castors**



After placing the unit, please secure it by blocking the wheels (if they are provided along with it).

The unit can be equipped with leveling castors. After the unit has been placed in its destination, lock the castors and level the unit using the red screw located inside the castor's casing. You can adjust the level using fingers or a flat wrench size 13.



Wheels with capability of leveling are only for positioning the device at the destination place. They cannot be used to transport the device!

If the unit, table or base is fitted with lockable castors, the wheels must be locked when the device is placed in proper position.



### 3.2. HEPA filter

The HEPA filter is an optional accessory for the CL/SL range. This option is factory preinstalled. The filter has H13 class to PN-EN1822-1:2009 norm. It should be located at the rear of the unit. The filter itself is delivered separately. You should place it in the 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.



### 3.3. To install internal glass door

Internal glass door are available as an option in CHL and ST units and not available in ZL and SL units. In IL and CL units internal glass door are standard equipment.

The internal glass door comes as an option. To open or close the door use the plastic latch. If the unit is working at high temperatures, do not touch the inner chamber or the glass door to avoid burning your skin. Use protective gloves to protect yourself.



The manufacturer does not recommend to install and disassemble of internal glass doors. Incorrect assembly or dismantling may damage the glass and cause injury to the user.

### **3.4. Condensation in the chamber**

If the given temperature is much lower than the ambient temperature, as a result of condensation, water may accumulate at the bottom of the chamber.

The amount of water depends on the following factors:

- Differences between ambient and set temperatures
- Frequency of door openings
- Temperature of samples



If water gathers, use a dry cloth to wipe the bottom of the chamber.

Do not use any cardboard boxes, sponges and other hygroscopic materials for storing the samples since they may increase the humidity in the chamber.



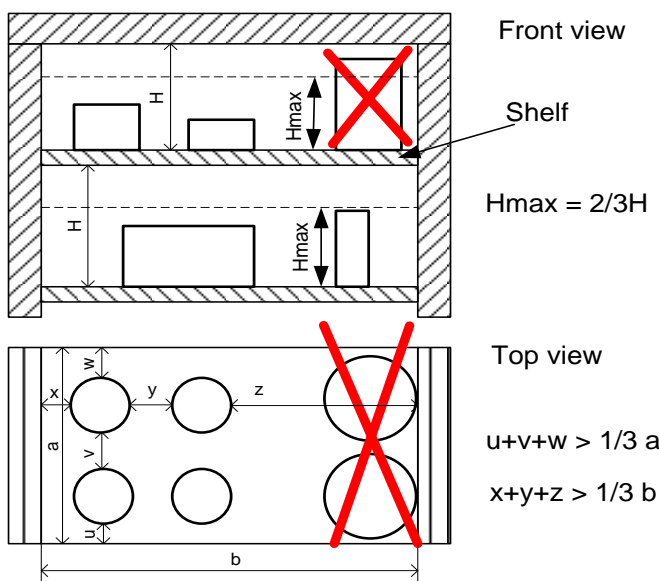
Too high relative humidity in the chamber may frost the refrigerant and lower the performance of the cooling system. It may lead to higher energy consumption.

### 3.5. Placement of samples

To provide proper air circulation and stable conditions within the chamber, it is necessary to adhere to the following rules:

- the max height of the samples should not exceed  $2/3$  of the shelf space
- the samples should be placed so that the space between the containers does not exceed  $1/3$  of the width and height of the shelf
- samples should be placed with equal spacing between each other and the chamber walls

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



Following the above rules will provide optimal parameters of temperature stability and uniformity.

### 3.6. Closing the chamber door

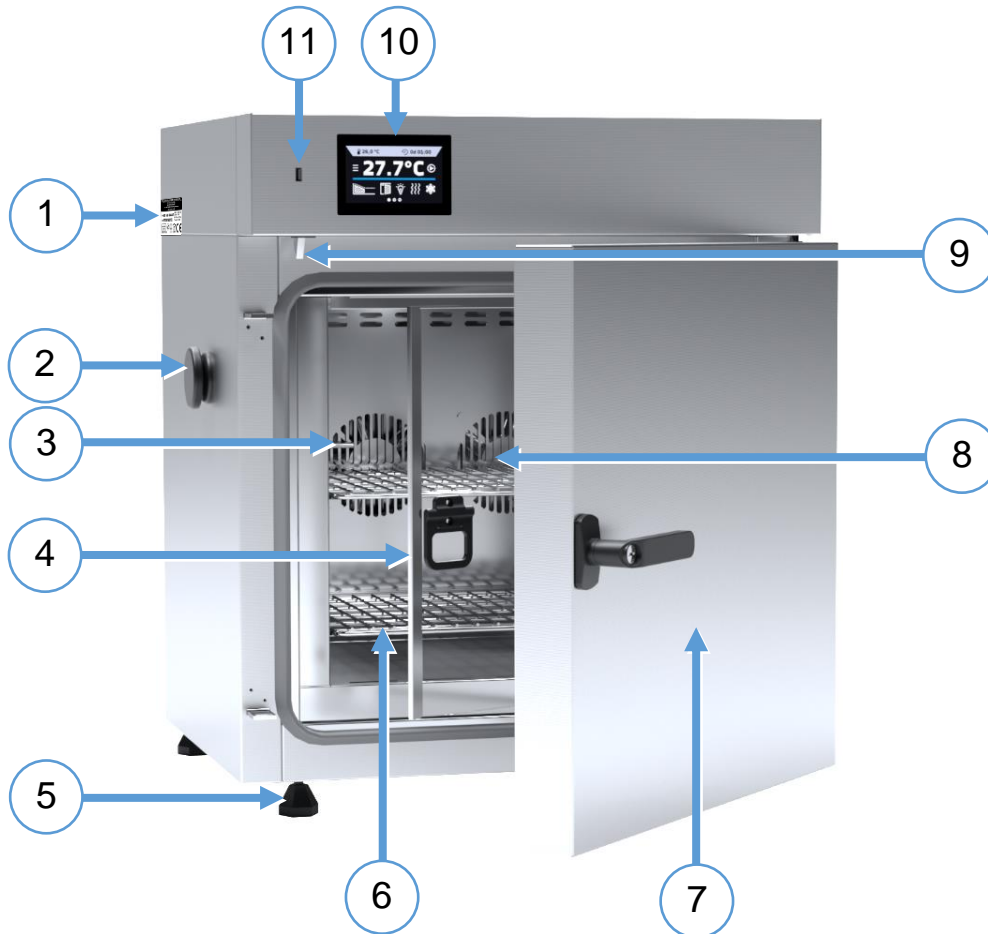
To close the door, turn the handle to the vertical position, push the door gently then turn the handle to the horizontal position. If the door has not been closed properly, an alarm will sound. Closing the door correctly reduces energy consumption and ensures consistent temperature stability and uniformity.

## 4. DESCRIPTION OF THE UNIT

SMART PRO models were equipped with PID microprocessor temperature controller and full color touch screen (7 inch, resolution 800x480).

### 4.1. Appearance of the devices ILP

Below is a picture of the ILP 53 device with a description of the important components of the device.

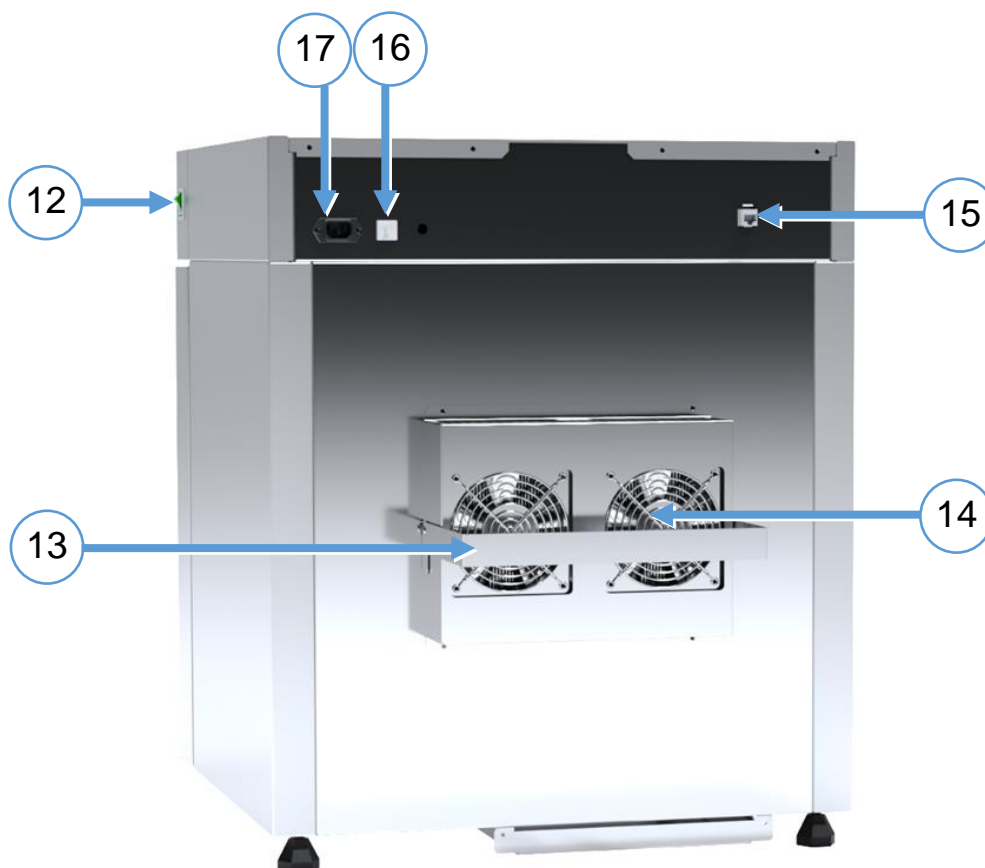


#### Front view

- 1) Rating plate
- 2) Access port (30 mm) for external sensor
- 3) Temperature sensor
- 4) Internal glass door
- 5) Height adjustable feet
- 6) Shelf
- 7) External solid door
- 8) Chamber fans - Peltier module
- 9) Open door sensor
- 10) Electronic controller with touch panel
- 11) USB port



Rear view

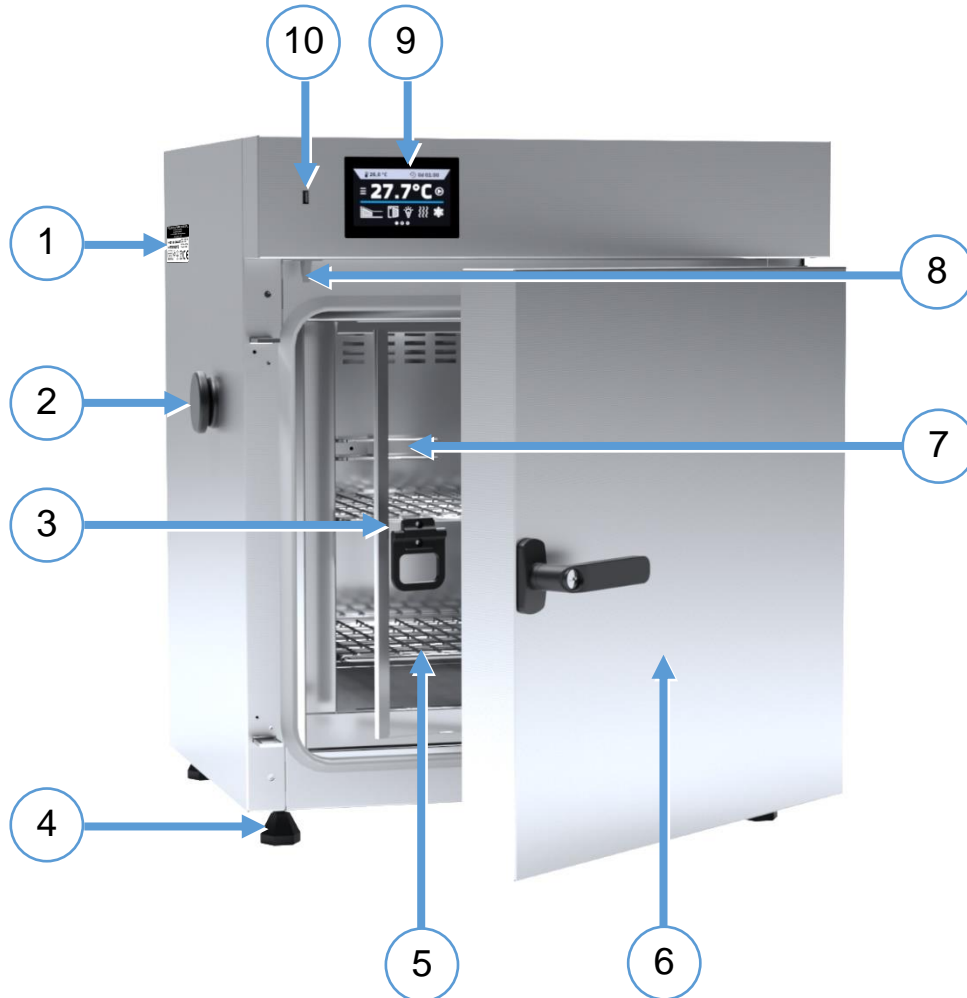


- 12) Main power switch
- 13) Spacer arm
- 14) External fans of the Peltier module
- 15) Interface LAN
- 16) Fuse
- 17) Main power socket C20

#### 4.2. Appearance of the devices SL/CL

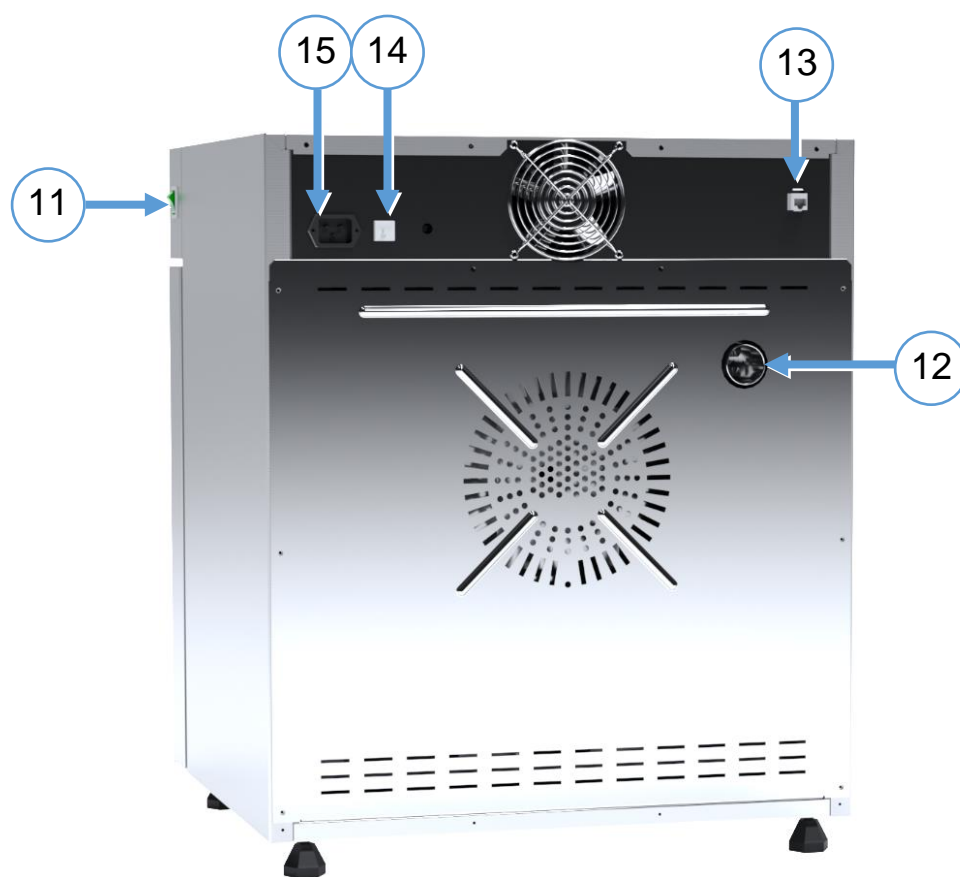
Below is a picture of the CLN 53 device with a description of the important components of the device.

Front view



- 1) Rating plate
- 2) Access port Ø30mm for external sensor
- 3) Internal glass door
- 4) Height adjustable feet
- 5) Shelf
- 6) External solid door
- 7) Temperature sensor
- 8) Door sensor
- 9) Electronic controller with touch panel
- 10) USB port

Rear view

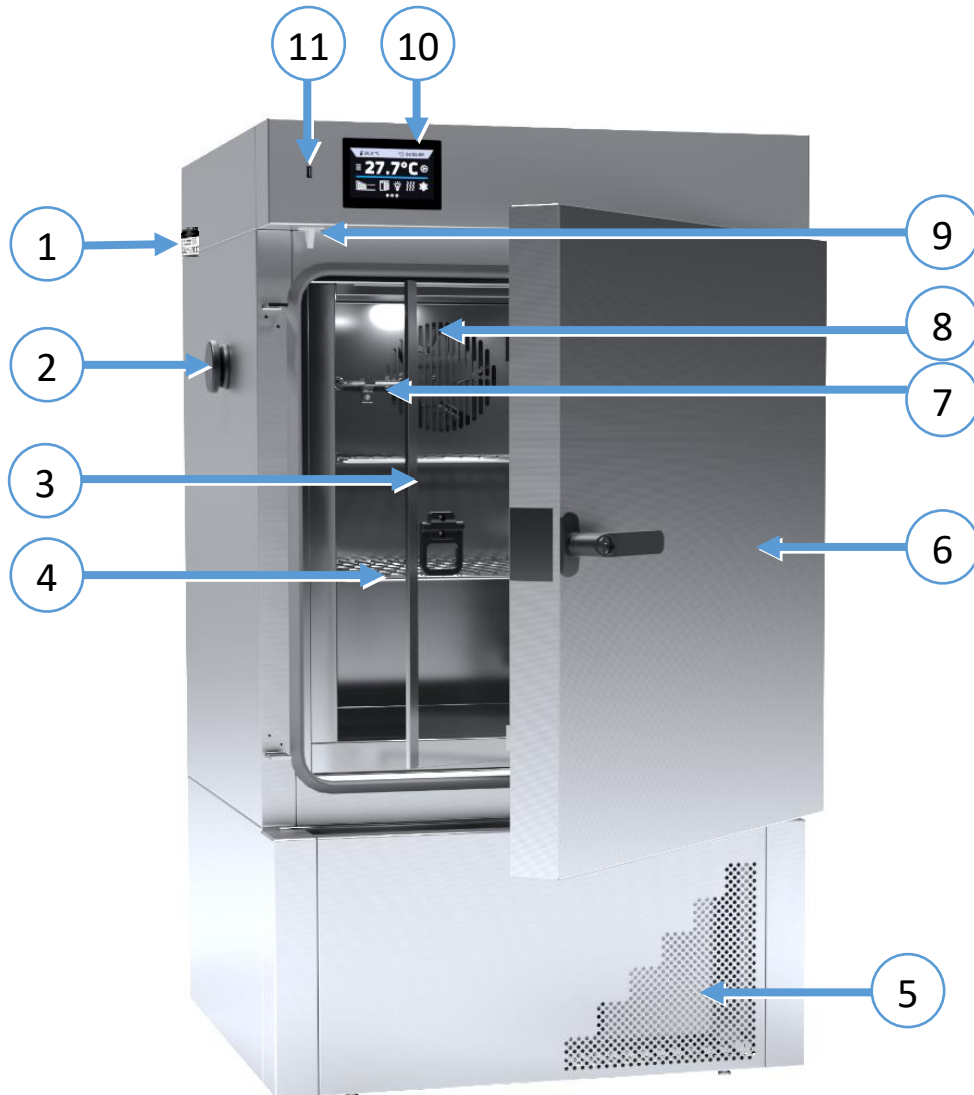


- 11) Main switch
- 12) Air-flap
- 13) LAN socket
- 14) Fuse
- 15) Main power socket C20

### 4.3. Appearance of the device IL

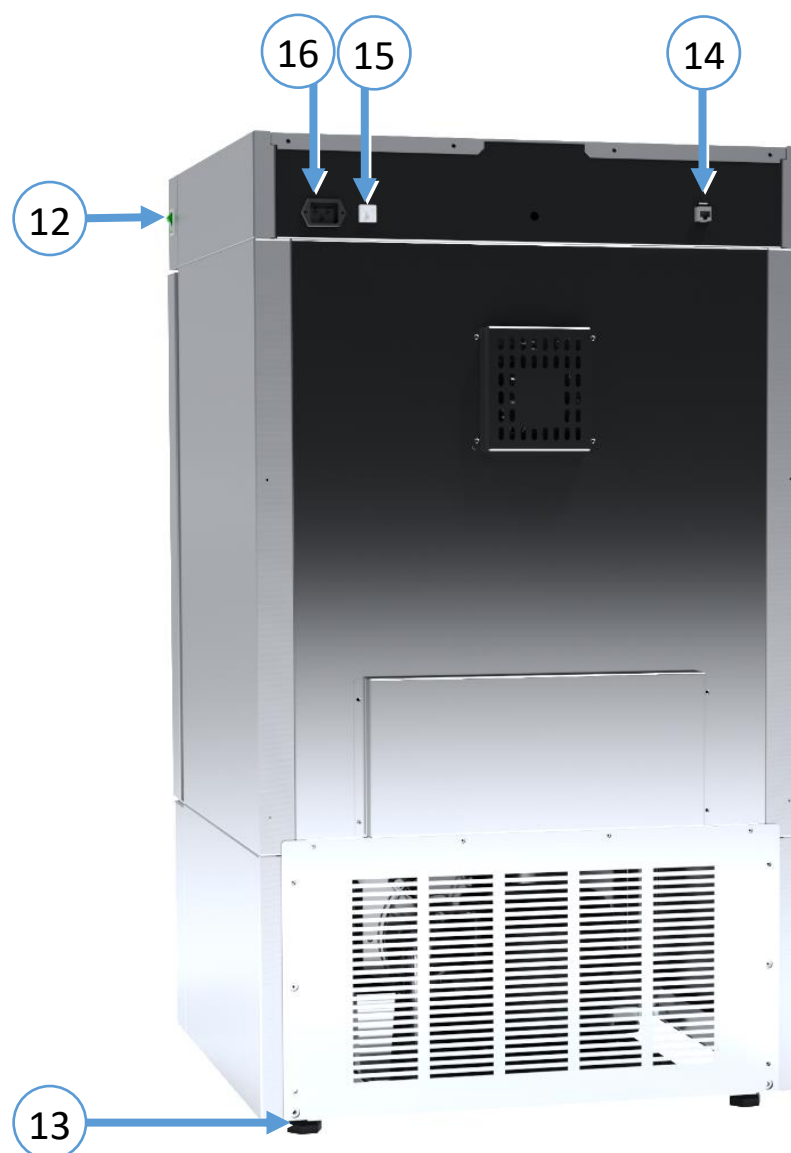
Below is a picture of the IL 115 device with a description of the important components of the device.

#### Front view



- 1) Rating plate
- 2) Access port Ø30mm for external sensor
- 3) Internal glass door
- 4) Shelf
- 5) Condenser cover
- 6) External solid door
- 7) Temperature sensor
- 8) Chamber fan
- 9) Door sensor
- 10) Electronic controller with touch panel
- 11) USB port

Rear view

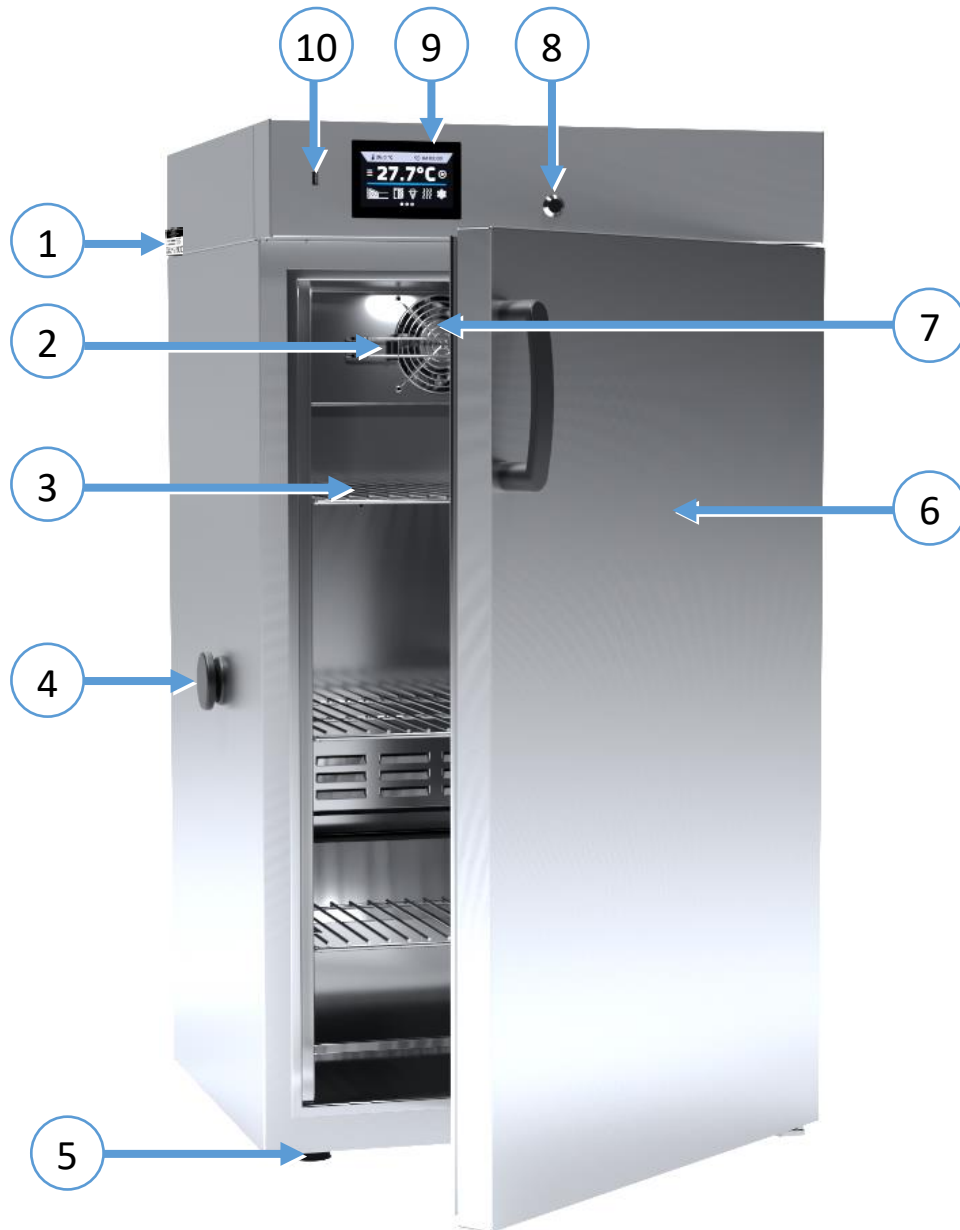


- 12) Main switch
- 13) Height adjustable feet
- 14) LAN socket
- 15) Fuse
- 16) Main power socket C20

#### 4.4. Appearance of the device ST/CHL

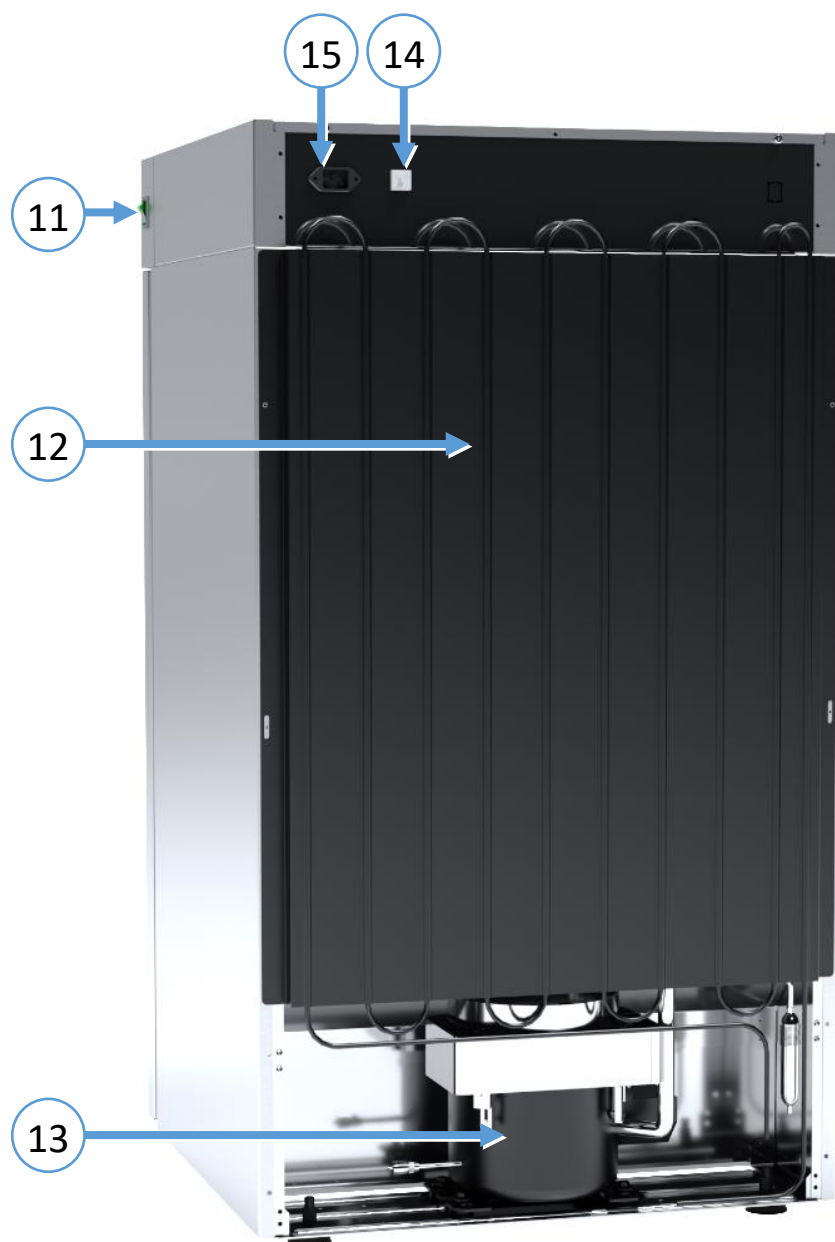
Below is a picture of the ST 3 device with a description of the important components of the device.

Front view



1. Rating plate
2. Temperature sensor
3. Shelf
4. Access port Ø30mm for external sensor
5. Height adjustable feet
6. External solid door
7. Fan chamber
8. Door lock
9. Electronic controller with touch panel
10. USB port

Rear view



- 11. Main switch
- 12. Condenser
- 13. Cooling system
- 14. Fuse
- 15. Power socket C14

#### 4.5. Appearance of the device ZLN 85

Below is a picture of the ZLN 85 device with a description of the important components of the device.

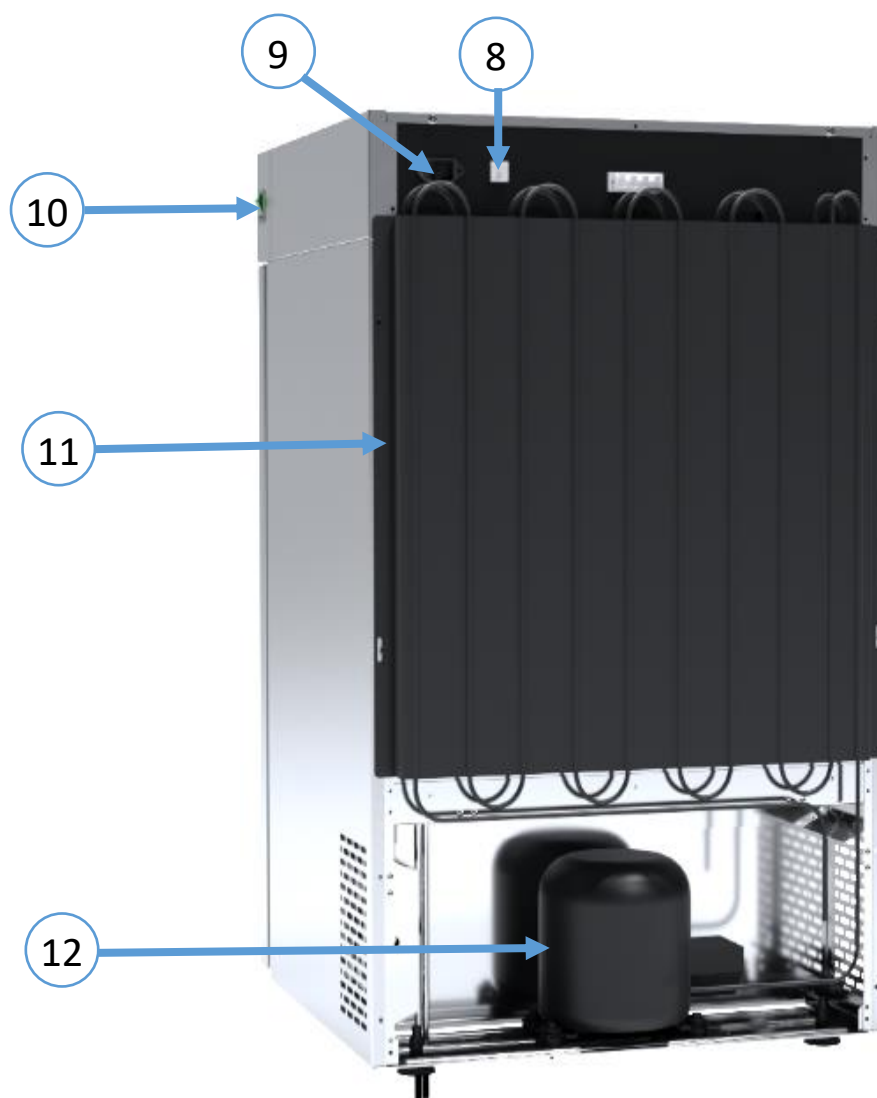
Front view



- 1) Rating plate
- 2) Door handle
- 3) Access port for external sensor
- 4) Door
- 5) Door lock
- 6) Electronic controller with touch panel
- 7) USB port



Rear view



- 8) Fuse
- 9) Power socket C14
- 10) Main switch
- 11) Condenser
- 12) Cooling system

#### 4.6. Appearance of the device ZLN-T 125, ZLN-T 200, ZLN-T 300, ZLW 200, ZLW 300

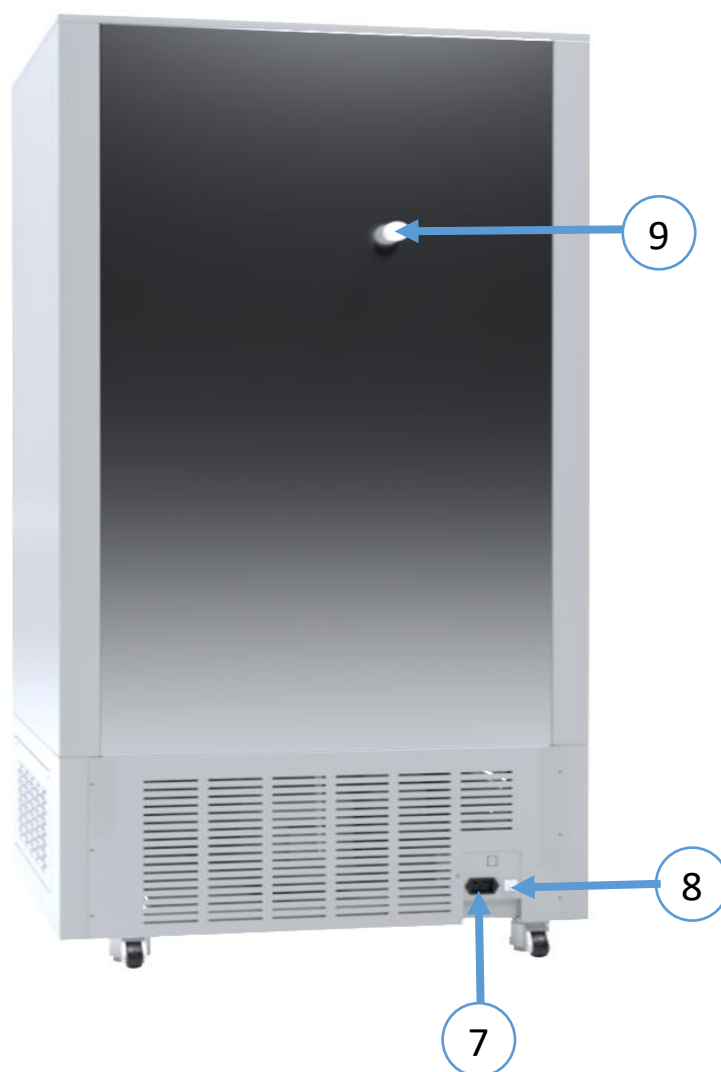
Below is a picture of the ZLN-T 200 device with a description of the important components of the device.

Front view



- 1) Rating plate
- 2) Door handle
- 3) Main switch
- 4) Adjustable feet (option)
- 5) Condenser cover
- 6) Door
- 7) Electronic controller with touch panel

Rear view



- 8) Power socket C20
- 9) Fuse
- 10) Compensation valve

#### 4.7. Appearance of the device ZLN-UT 200, ZLN-UT 300, ZLN-UT 500

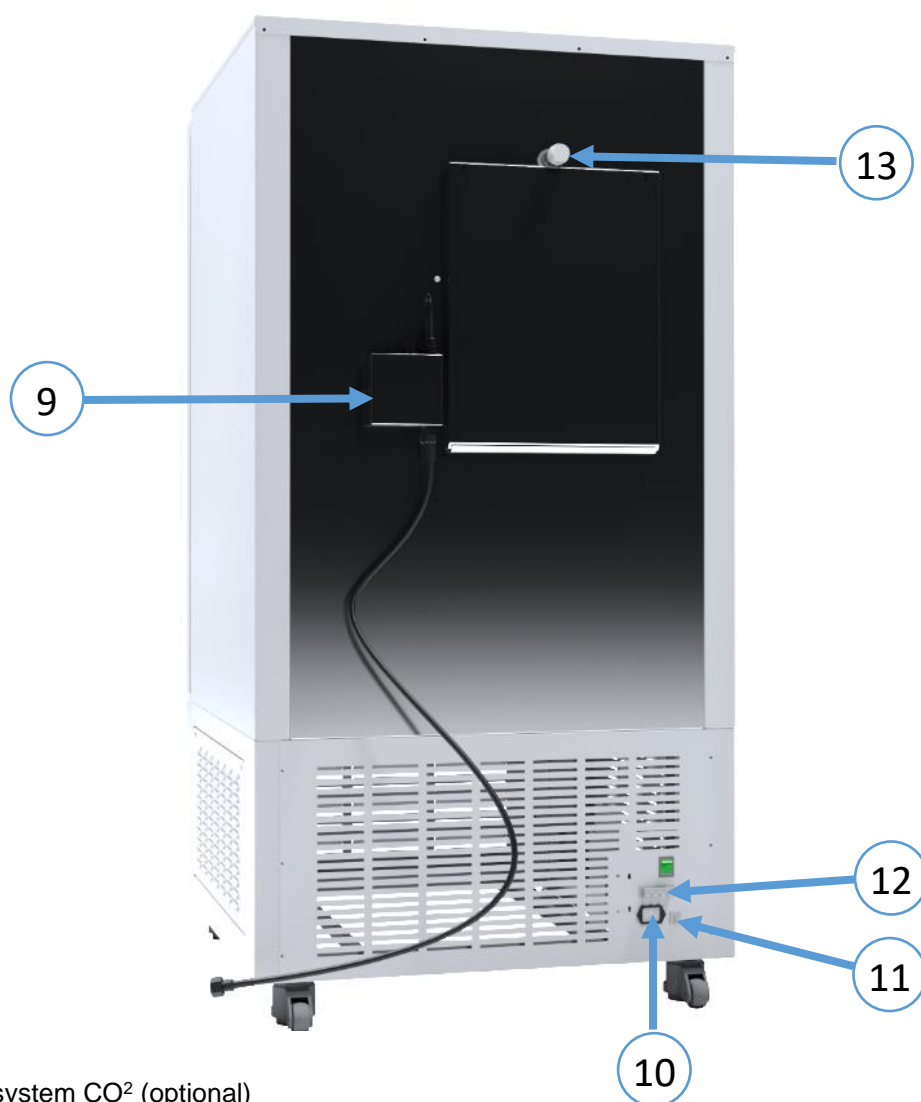
Below is a picture of the ZLN-UT 200 device with a description of the important components of the device.

Rear view



- 1) Rating plate
- 2) Door handle
- 3) Main switch
- 4) Adjustable feet
- 5) Condenser cover
- 6) Switch of the emergency power support
- 7) Door
- 8) Electronic controller with touch panel

Widok z tyłu



- 9) Back up system CO<sup>2</sup> (optional)
- 10) Power socket C20
- 11) Fuse
- 12) Potential-free alarm exit
- 13) Compensation valve

## 5. DEVICE OPERATION



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

### 5.1. Internal memory

During using the unit, it may be necessary to write or read the data from the external memory – a USB flash-drive. The USB flashdrive should be formatted the FAT 32 file system. The unit should be placed in USB slot located on the front the device, near to the display. Wait a few seconds, the corret reading is indicated by the message „USB flashdrive connected” at the bottom of the screen.

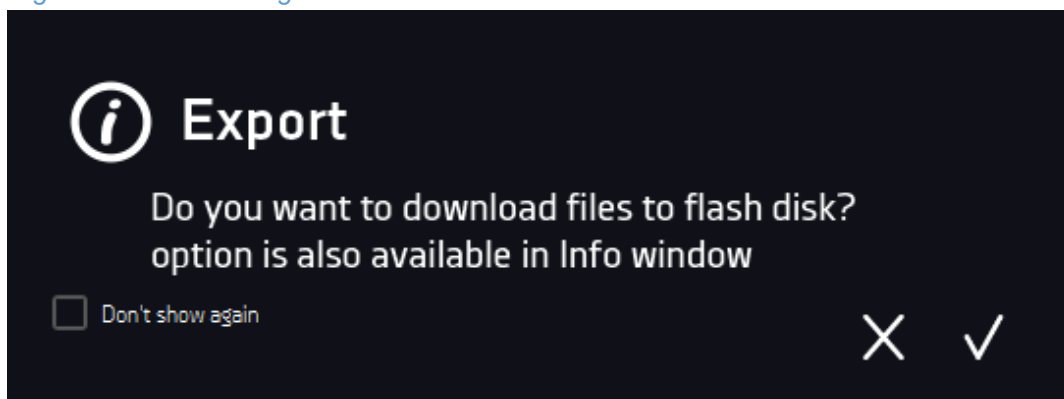


USB slot is used to connect a flash memory – a pendrive. Connecting other devices (external hard drives) or any other is not authorized by the manufacturer and may damage the USB slot.

### 5.2. First boot

During the first boot, the screen ([Figure 1](#)) will display proposing to save the "Download" folder (among others with instruction manual) on the USB flashdrive. Insert the USB flashdrive and wait a second to detect the hardware, then press . By pressing  you quit downloading the folder, the window will appear again during the next start. You can tick „Don't show again” so that the window will not be displayed when you start. You can always download the "Download" folder in the information panel. More information, » [page 62](#)  
During the first boot you should set date/time and time zone » [page 64](#).

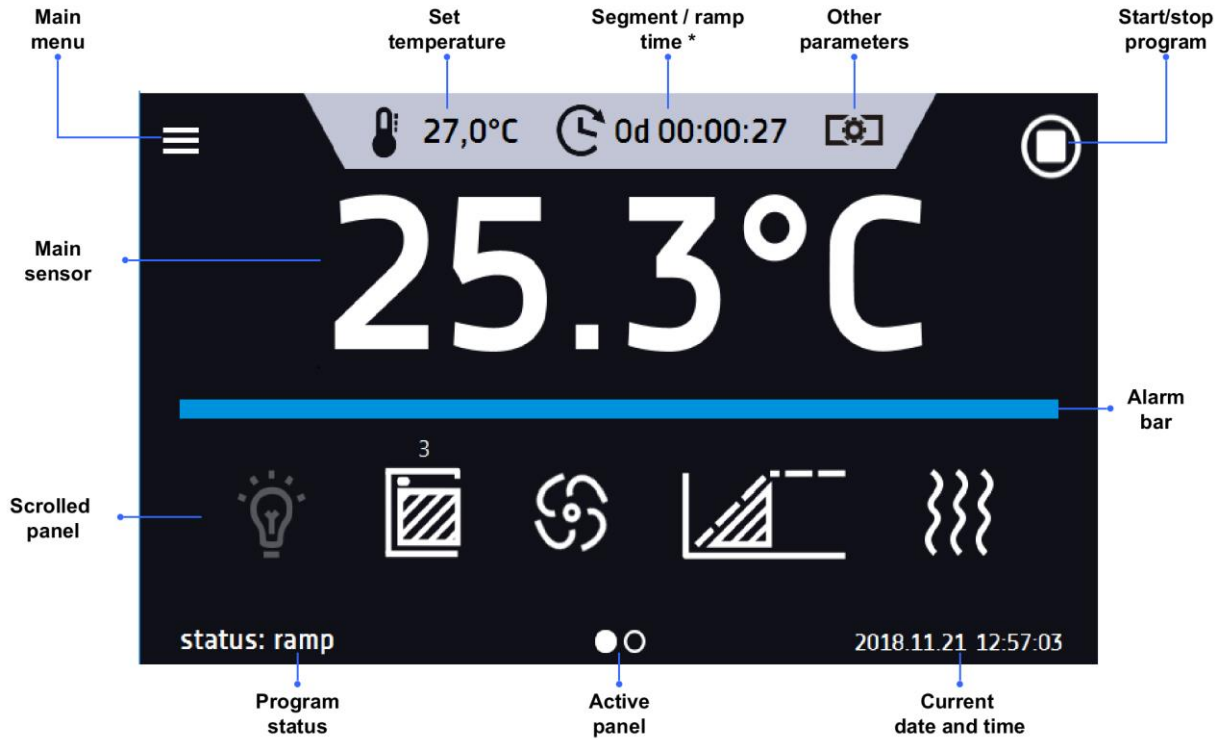
[Figure 1 – Downloading files](#)



### 5.3. Main Screen

After switching on the device, the Main Screen (*Figure 2*) appears. It contains the information about the device status.

*Figure 2 - Main Screen*



\* - elapsed / remaining time » [page 54](#)

### 5.3.1. Upper menu expandable

After swiping your finger down (*Figure 3*) you will see options (*Figure 4*) that you can quickly change by dragging and changing the icons (*Figure 5*). Among the options available in the bar we will find:

- mute function (more information » [page 38](#)),
- Quick Change (more information » [page 53](#)):
  - segment time elapsed or remained
  - set temperature,
  - others parameters (fan, flap) available in selected models.

*Figure 3 - expanding the menu bar*



*Figure 4 – expand the menu bar*







Positions available on the top bar can be personalized. Just drag the selected button to a new place.

Figure 5 – change positions



### 5.3.2. Alarm bar

The colour of the bar indicates the status of the device:

	– blue – the device is working properly
	– red – alarm

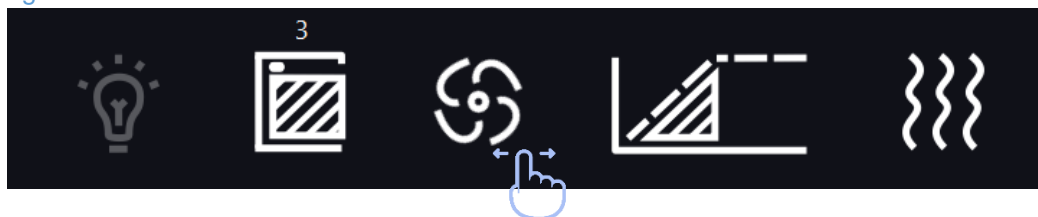
### 5.3.3. Information panel


You can view two different windows. Switching between them is done by swiping your finger left or right

Information about which window is active indicates .

#### Status

Figure 6 - Status - icons



Internal light is switched on. It is automatically switched on when the door is opened and switched off after closing. By pressing the icon  on the status panel you can manually switch on/off the light.



Light icon FOT – symbolizes the active photoperiodic lighting, controlled from the program.



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 during turning on the device



Icon for the fan. Rotating icon shows that the fan is running. Icon does not move at status program off or when the fan is defect\*



Ramp status: Chamber is currently cooling down or heating up to reach set temperature



Set temperature is reached



Active schedule or start delay. The program will start at the given date/time



Icon is visible only when the chamber lowering the temperature. Only in CHL, ST, ILW series devices



Icon is visible only when the chamber increases the temperature



Icon is visible only when the defrosting function is on, or defrosting program is running

## Information

Figure 7



### 5.3.4. Alarms panel

In this place appears the list of alarms. With active alarm, the control bar is red. The alarm event is displayed in the list, with the status alarm active.

When an alarm event stops, the alarm remains in the list as inactive.

- “**delete**” button – confirms and removes the alarm from the list (only inactive alarms can be deleted),
- “**confirm**” button – confirms the class 2.0 alarm,
- “**details**” button – displays a preview of all instances of selected alarm (*Figure 9*).

Figure 8 – Alarms panel

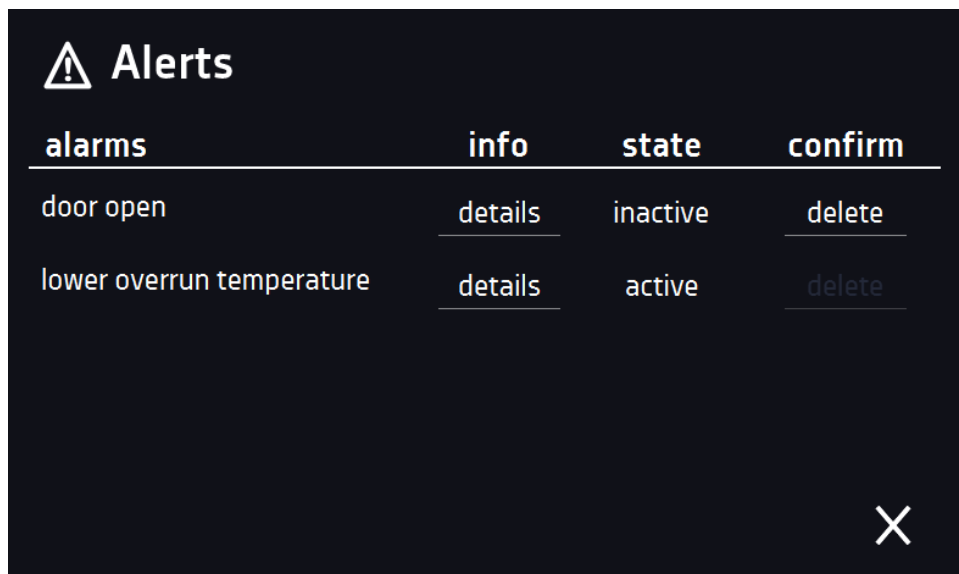
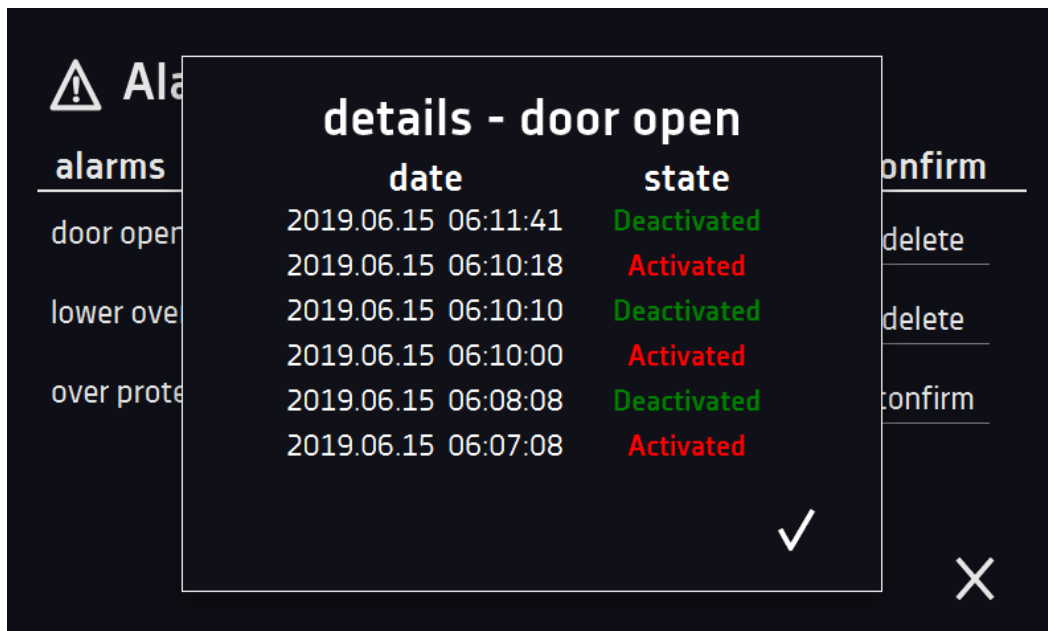


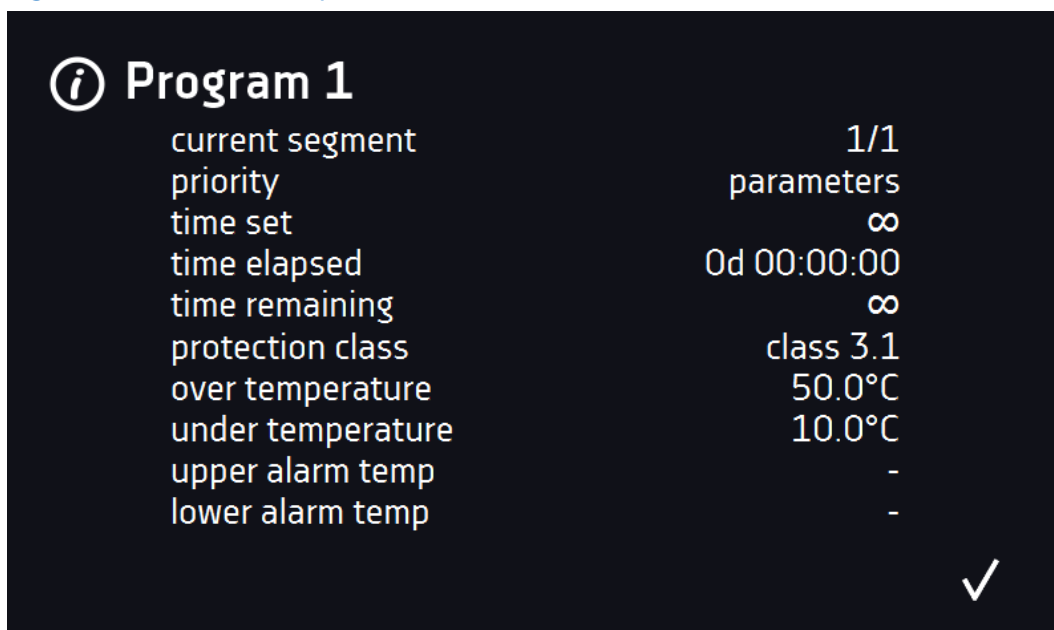
Figure 9 – Alarm details



### 5.3.5. Status panel

The status of the device is indicated by description

Figure 10 – Status - description



program name	The name of program
current segment	Currently performing segment / total number of segments in the program
priority	In regard of time or parameters, more information can be found on » <a href="#">page 46</a>
time set	Set time of performing segment
time elapsed	Elapsed time after reaching the segment
time remaining	Remaining time until the end of the segment
current loop	Currently performing cycle/ total number of cycles to perform » <a href="#">page 46</a>
protection class over temperature under temperature	Information about the protection temperature associated with a running or completed program. The protection parameters can be set in the program parameters » <a href="#">page 42</a> . Information about protection classes » <a href="#">page 47</a> .
upper alarm temp lower alarm temp	information about the set alarms, separately for overrunning up and down. Alarms set » <a href="#">page 66</a> .

### 5.3.6. Mute function

Temporary switching off of sound alarms e. g. to avoid an open door alarm when the load is scheduled to be loaded into the chamber. Mute is available for 5, 10 and 15 minutes.


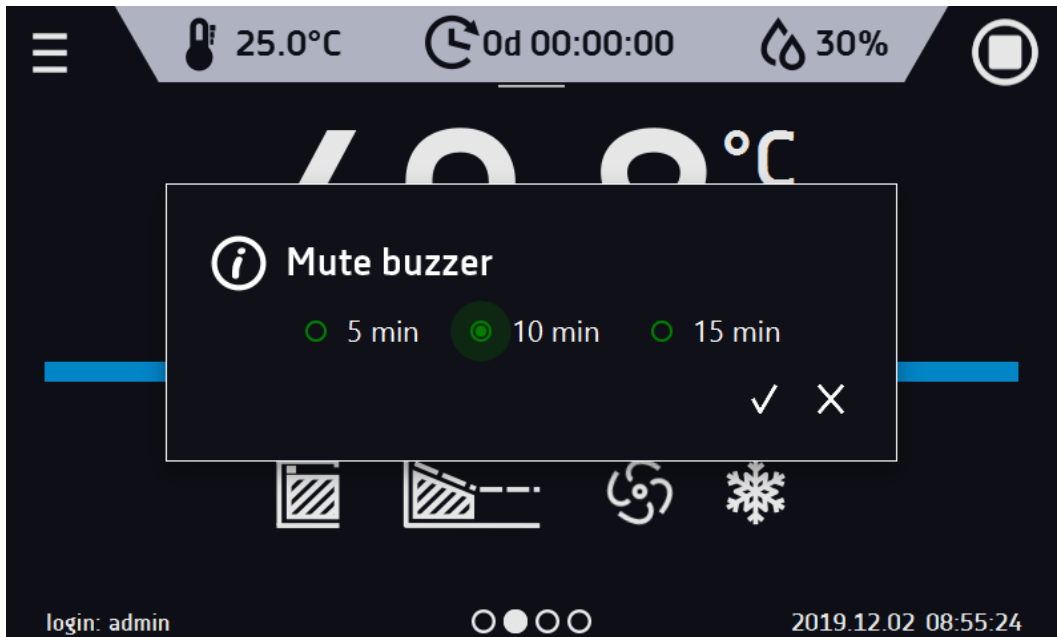

Press the icon  in the main window on the upper menu, in the new window select the time (*Figure 11*).

Figure 11 – mute function



## 5.4. Quick Program

Quick Program allows you to quickly start the program from the home screen position without having to enter and create a menu (Figure 12). After switching on the device, a symbol  will be available on the main screen, which will enable you to switch on the program after setting the temperature (optional fan, flap depending on your model of device). The program is started in continuous. The Quick Change option is available during the program. During program performing it is possible to change parameters (temperature, humidity, flap, fan). Just press the appropriate button on the top beam. The next time you start SMART, the previous settings are remembered.

### Temperature protection:

The highest available protection class is set. The protection values depend on the set temperature:

set temperature  $\leq 15^{\circ}\text{C}$ : under temperature protection = set temperature  $- 2^{\circ}\text{C}$ , over temperature protection =  $30^{\circ}\text{C}$

set temperature  $> 15^{\circ}\text{C}$ : under temperature protection = set temperature  $- 5^{\circ}\text{C}$  (max  $20^{\circ}\text{C}$ ), over temperature protection set temperature  $+ 5^{\circ}\text{C}$  (min.  $30^{\circ}\text{C}$ )

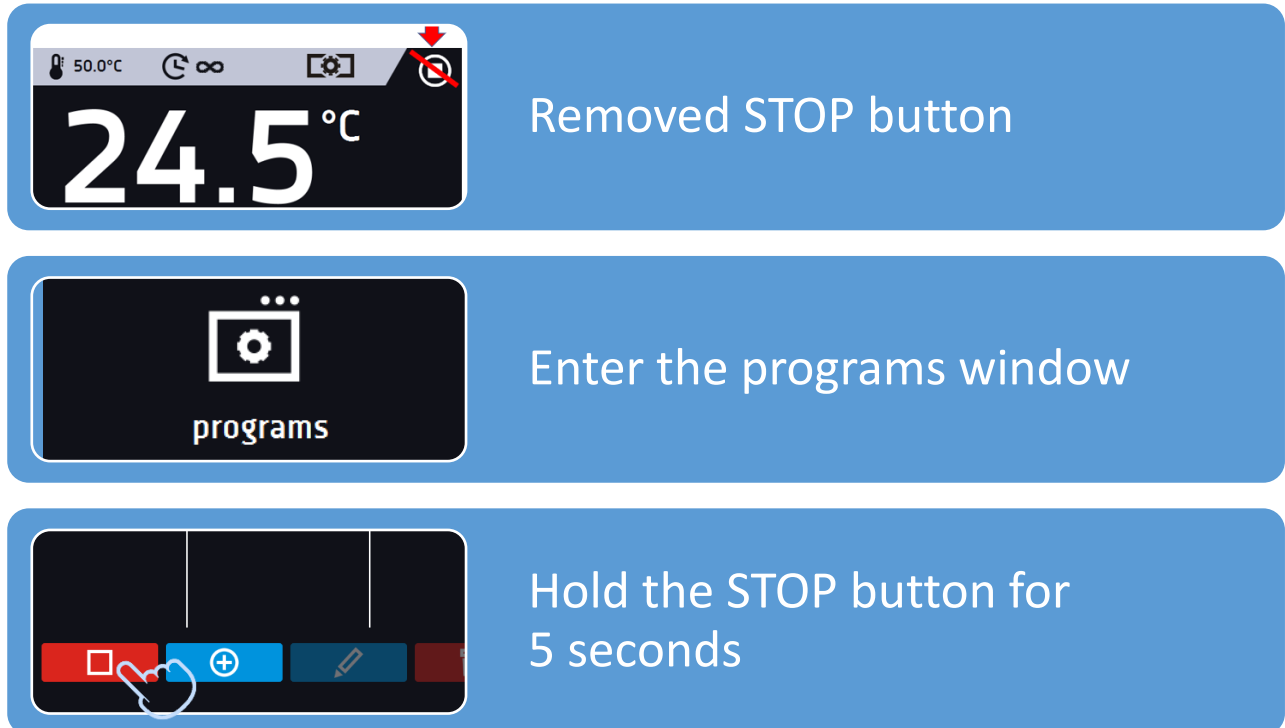
Figure 12 – Quick Program - running



The SMART program has several features that guarantee its uninterrupted performance

- the program is always set to infinity;
- If the display fails, the program continues;
- After the power supply is resumed (after its loss), the program continues;
- To prevent the program from stopping accidentally, the STOP button was removed from the main window (stopping the program was intentionally made difficult. It is necessary to enter the device menu, then the programs window and hold the STOP button for 5 seconds [Figure 13](#)).

Figure 13 – Stop Quick Program





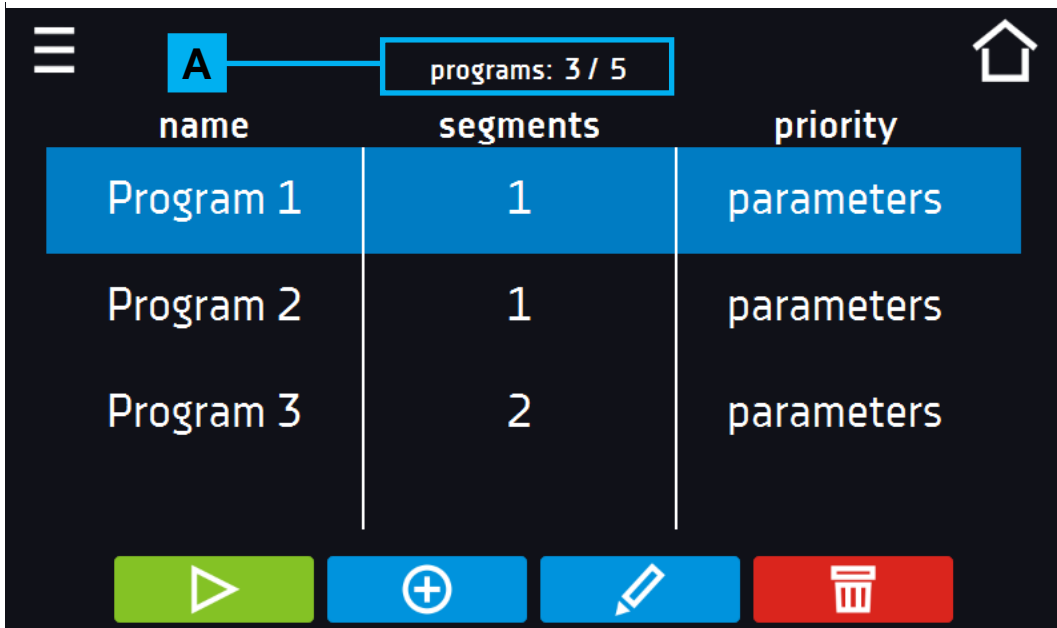
## 5.5. Programs

In this panel (*Figure 14*) you can run the selected program, add a new one, edit the program, delete it, make it. You can create 5 independent programs (ZL series – 1 program). SR series devices have 3 predefined programs preset (Program 1, Program 2, Program 3) for more information [page 49](#).

Menu push buttons:

-  Run the selected program
-  Stop the program
-  Add a new program
-  Edit the selected program
-  Delete the selected program



*Figure 14 - List of programs*



name	segments	priority
Program 1	1	parameters
Program 2	1	parameters
Program 3	2	parameters

Information about the number of created programs and the programs to be created is presented at the top **A**

### 5.5.1. Program making / edition

Press the button  or , and a panel with program parameters will appear (*Figure 15*).

The name of the program is completed automatically.

You can set the panel:

- **Segments number** – the number of segments
- **Interval** – frequency of saving to data logging
- **Protection class** – more information » [page 47](#)
- **Protection temperature** – temperature range for the protection class
- **Priority** – the priority of time or parameters, more information » [page 46](#)
- **Loop** – the number of program repetitions, more information » [page 46](#)
- **Bolt** – door opening lock (only in SR model).

*Figure 15 - Program parameters*



Cancels adding or editing of the program




Switching to the edition of program segments



With more parameters you can scroll the panel up and down

### 5.5.2. Segments edition

Press the button , and the first program segment will appear (*Figure 16*). You can set 1-6 segments (ZL series 1 segment).

In this window you can set:


- **temperature** – target temperature which the device is to achieve in this segment, (can't be lower than under temperature protection +2°C and higher than over temperature protection -2°C).
- **time** – the time of maintaining the set temperature ([d hh:mm]) (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]) (days, hours, minutes)


The following parameters are available in selected models or as options available on request:

- **fan** – fan efficiency in percent,
- **flap** – the level of air-flap opening,
- **ramp fan** – fan efficiency during reaching the set temperature,
- **ramp flap** – the level of air-flap opening during reaching the set temperature,
- **light** – settings FOT light in this segment.

The active value is highlighted in blue.

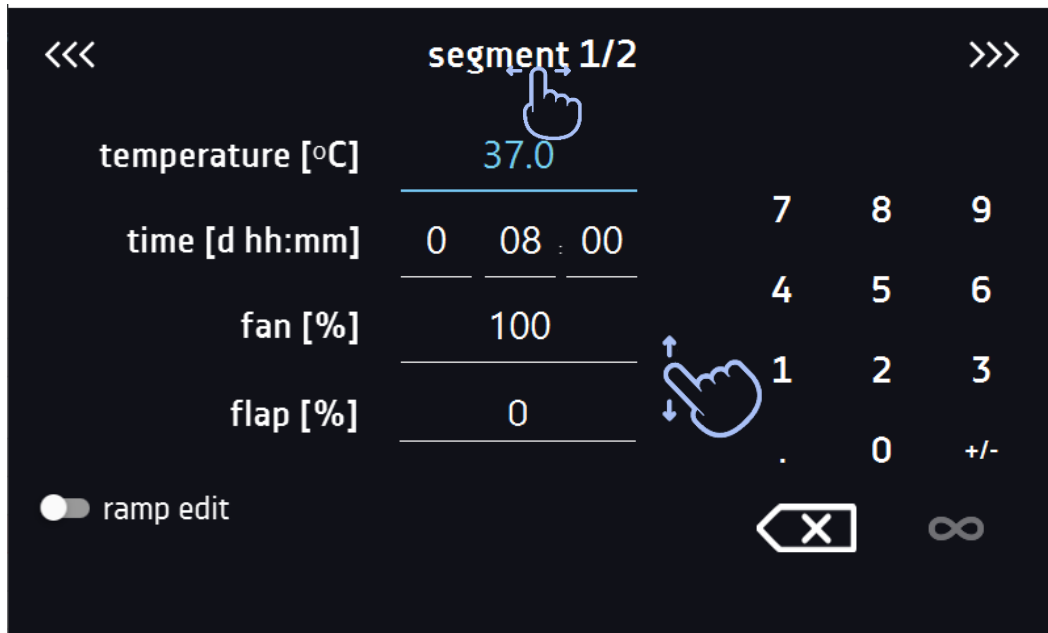
The item highlighted in red means that the value is out of range and you should enter another one, eg the temperature is above / below the operating range of the device or the protection temperature.

	It is strongly recommended that you leave the fan speed at 100% as set by default. If you decrease the fan speed, the chamber may frost, temperature/humidity stability and uniformity will be affected and condensation may occur as a result.
---	---

	It is used to achieve temperature. Setting a short period of time for gaining given temperature won't speed up the process, it's going to be achieved in the shortest possible time depending on the given temperature, environmental conditions and prospect of cooling or heating system in the device.
---	---

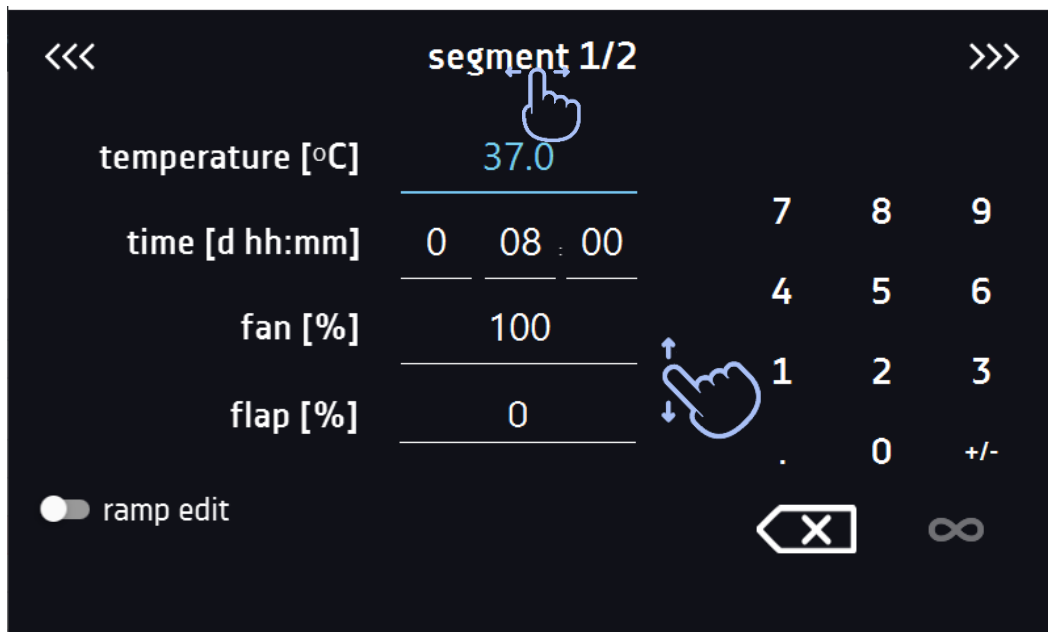
	With more parameters you can scroll the panel up and down.
---	--

Figure 16 - Program segment edition



The ramp parameters are set to the values recommended by the manufacturer. If it is necessary to set individual parameters, activate the edit ramp field and set your own values

Figure 17 - Program segment edition



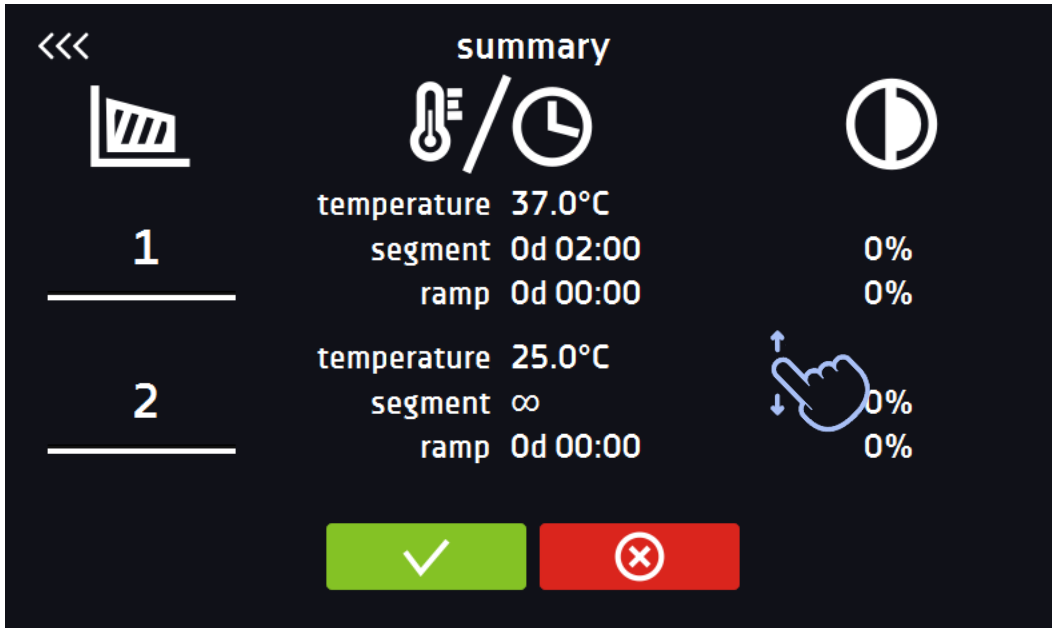
The navigation between: segments, program parameters and summary is done by swiping up the segment with the finger or touch the icon **<<<** **>>>**.

### 5.5.3. Summary of segments

In the summary in the figure all segments (*Figure 18*) are visible along with the entered settings:

- segment number,
- Temperature, duration time, target time of reaching temperature of a given segment
- Fan efficiency, (available on selected models)
- The percentage of air-flop opening (available on selected models).

Figure 18 - The summary of the program



Confirms and saves the program



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

»Page 42



With more parameters you can scroll the panel up and down

### 5.5.4. 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.

The selected number determines the amount of the program repetitions. If the time of the last segment is set to infinity, it will be treated as infinite in the last cycle. In the remaining cycles it will be treated as 0.

### 5.5.5. Priority

Can be set in terms of:

#### **Parameters:**

The program without a ramp – the device starts the countdown of the segment time when the set temperature is reached.

The program with a 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 couldn't reach the set temperature within the set time because the reaching time was too short. In such situation the reaching time will be exceeded and the segment's time countdown will start when the set temperature is reached.

#### **Time:**

The program without a ramp – the device starts counting down the segment time when the program is started. Regardless of whether the temperature has been reached.

The program with a ramp – the device first 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 stay in the set temperature will be shortened.

### 5.5.6. Protection class

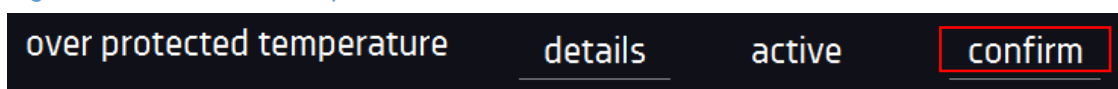
Some devices are equipped with cartridge protection – temperature protection, which is realized on the basis of the temperature value measured by an independent temperature sensor, the so-called security sensor. The main aim of the cartridge protection is to protect against uncontrolled rise or fall in temperature. At the moment of activation, the relay disconnects the heating / cooling power supply.

There are five classes of cartridge protection:

**Class 1** – there is no under and over temperature protection

**Class 2** – over temperature protection – when the temperature drops below the set protection value, the power does not turn on automatically - the user must do it by pressing „confirm” on the alarm panel. (*Figure 19*)

*Figure 19 - Confirmation of protection alarm class 2.0*



**Class 3.1** – over temperature protection – when the temperature drops below the set protection value, the power turns on automatically.


**Class 3.2** – under temperature protection – after rising the temperature above the set protection value, the power turns on automatically.

**Class 3.3** – over and under temperature protection – combination of classes 3.1 and 3.2


The temperature set in the segment can not be higher than the upper protection temperature less 2 ° C, e.g. the upper protection temperature: 50°C the maximum temperature set in the segment that can be given is 48°C.


More information see » [page 76](#).


### 5.5.7. Defrosting program

Some of the units that come with a cooling system feature a special defrosting program (*Figure 20*). It appears on the list of programs available in the main screen after pressing the  button.

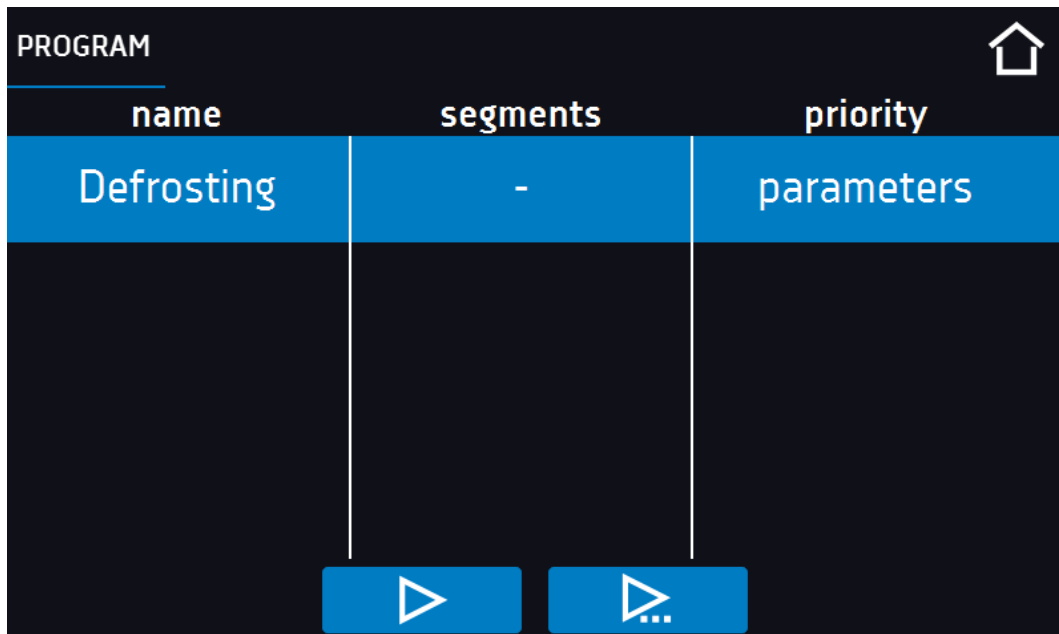
Defrosting consists in temporarily turning on the heaters, whose aim is to defrost the coating of ice or frost on the chamber walls during normal use. Then the chamber is heated to about 30 ° C and maintained for 30 minutes.

If the defrosting function is active, you will see the following icon  on the main screen.

Defrosting can be cancelled by pressing the  button.

	After defrosting has finished, you need to wipe out the chamber. This will reduce the risk of quick frosting of the chamber.
---	--

*Figure 20 – Defrosting program*





### **5.5.8. SR series devices - predefined sterilizing programs**

The SR series (sterilizers) have three pre-defined sterilization programs (Program 1, Program 2, Program 3) that have the following features:

- programs cannot be deleted,
- you cannot change the settings of the ventilation pipe - it is always closed during sterilization,
- the locking settings cannot be changed - the door is always locked during sterilization,
- at the start of the program, the door must be closed and automatically locked,
- in the event of a locking or door failure during the program, it is stopped in an emergency (a message appears and saved in the event log),
- at the start of the program, the ventilation pipe is automatically closed, without the possibility of controlling it during program operation.

In addition to the predefined sterilization programs, 5 regular programs are available to the user. They can be freely configured along with setting the fireplace and locking. They do not have the above features.

## 5.6. Starting the program

You can start the program in two ways:

### The first way



- Press the icon  „programs” in main menu (*Figure 21*).
- Then select the program you want to activate and press „Start” button.  (*Figure 22*).

Figure 21 – Main menu

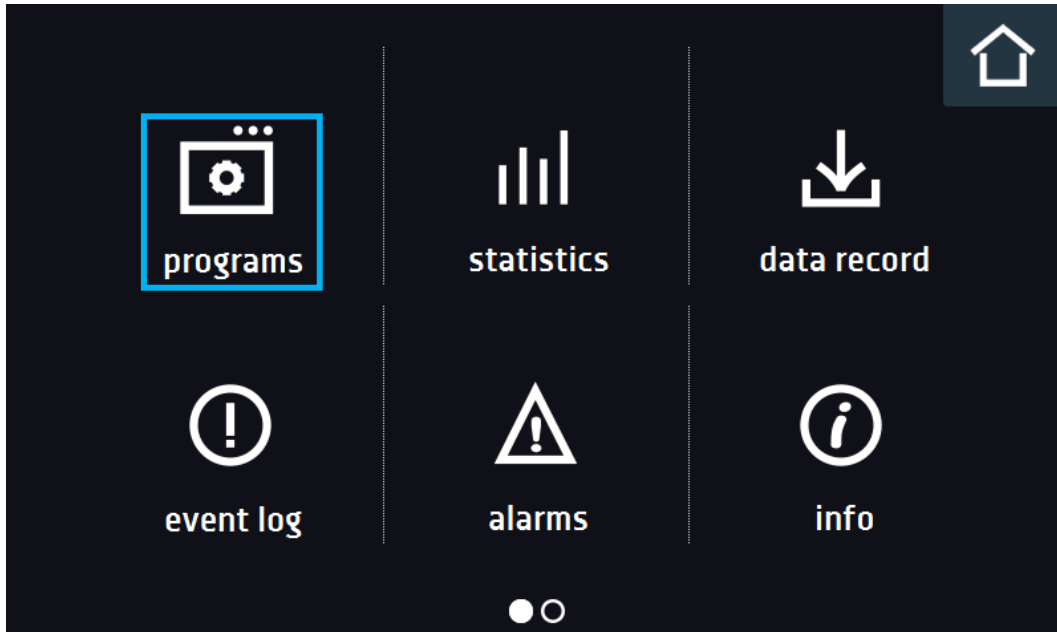
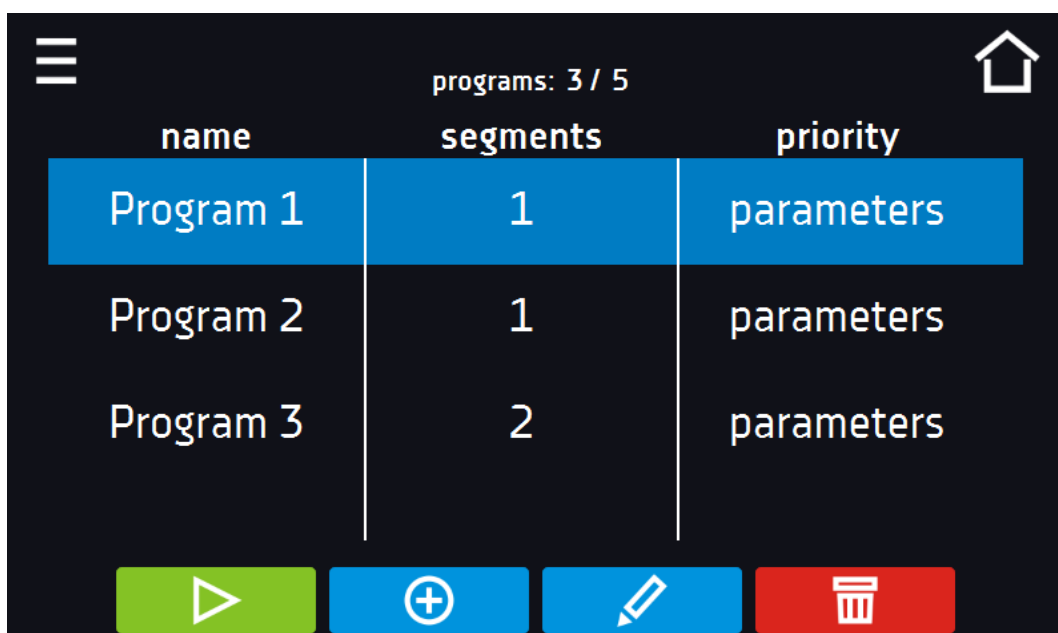



Figure 22 - List of programs



## The second way

- In the main panel (*Figure 23*) press the icon in the upper right corner. 
- Press „PROGRAM”,
- By pressing the icon you will go to the program selection window (*Figure 24*).
- Select the program you want to activate, you have got two additional options:



Immediate start of the program



Scheduled program start according to the set date and time

*Figure 23 - Main screen*

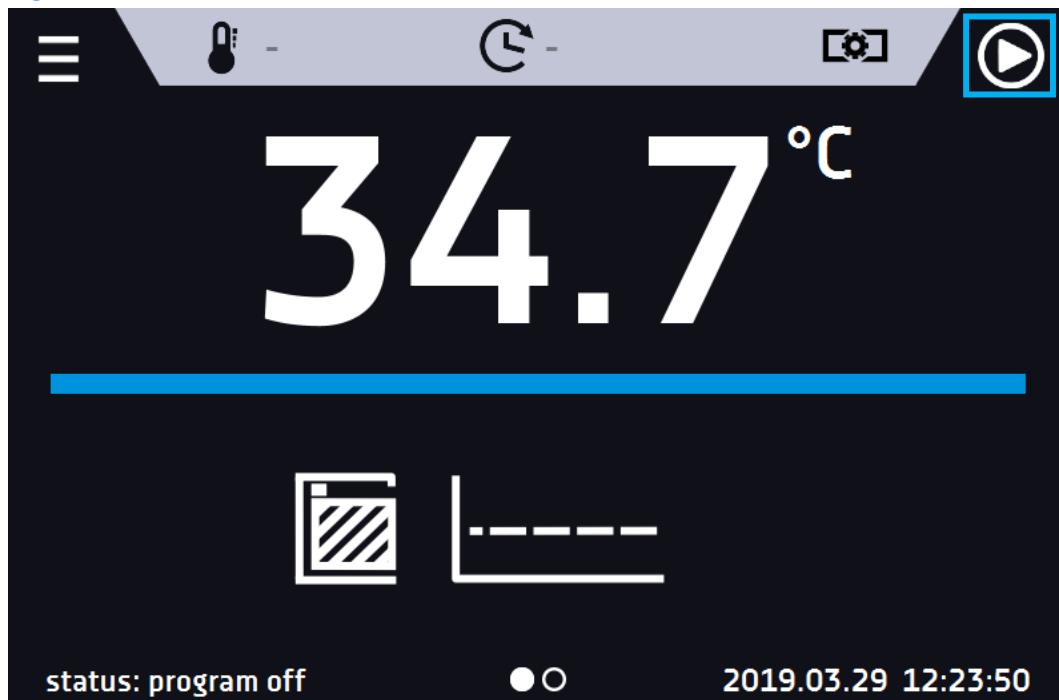





Figure 24 - Starting the program

PROGRAM 		
name	segments	priority
Program 1	2	parameters
Program 2	1	parameters



It's possible to start a backdated scheduled program but only for programs with time priority and scheduled max. 7 days back. It is possible for time priority programs.

Program segments which last for a total period from the current date to the current date will be skipped.


## 5.7. Quick change of parameters




If the ramp time is set for the program then the quick change of parameters would occur during achieving given temperature.

When the ramp time is not set in the program, then the changes would occur after achieving given temperature.

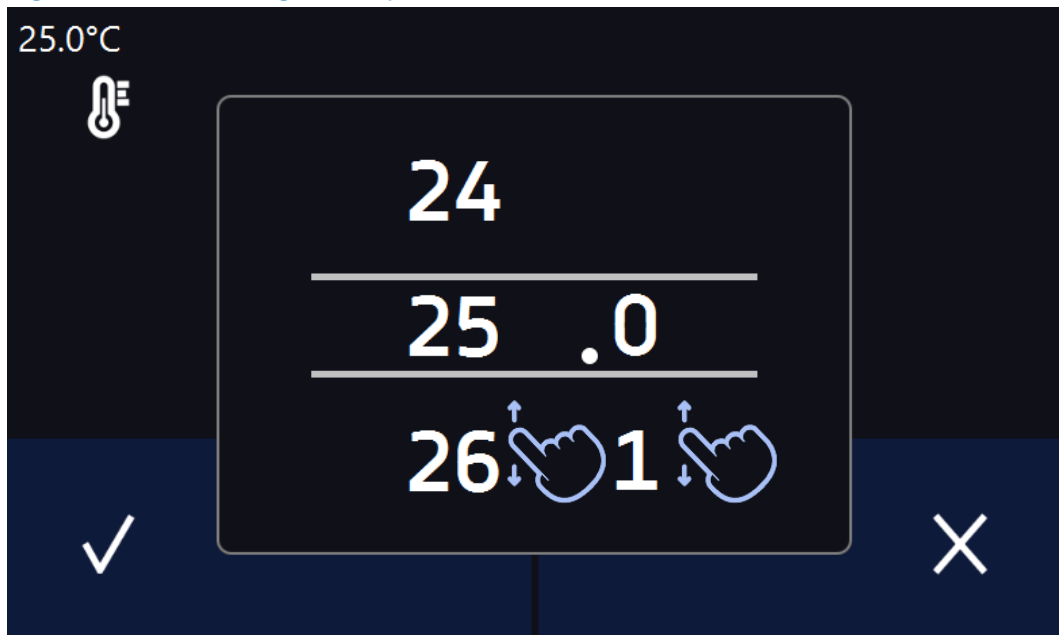
### 5.7.1. Quick change the set temperature

In order to quickly change the value of the set temperature of the program, press the icon  in main screen (*Figure 2*).




The value of the temperature should be selected by strolling the list up or down (*Figure 25*). Confirm the change by pressing .

Temperature cannot be lower than protection temperature (under temperature) +2°C and higher than protection temperature (over temperature) -2°C.

*Figure 25 - Quick change of temperature*



### 5.7.2. Quick change the set time

In order to quickly change the duration time of the program, press the icon  in main screen (*Figure 2*).  
 Select the number of days, hours and minutes by strolling the list up or down (*Figure 26*). Confirm the change by pressing . To set the continuous work press .


To change the way of displaying the time, press:



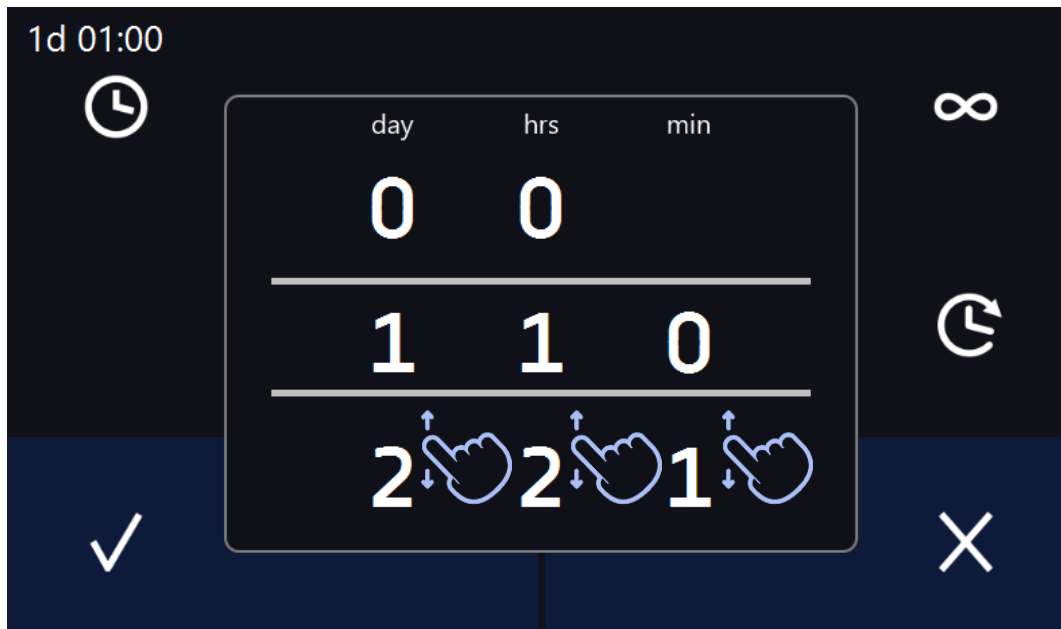
- to display the elapsed time





- to display the remaining time

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

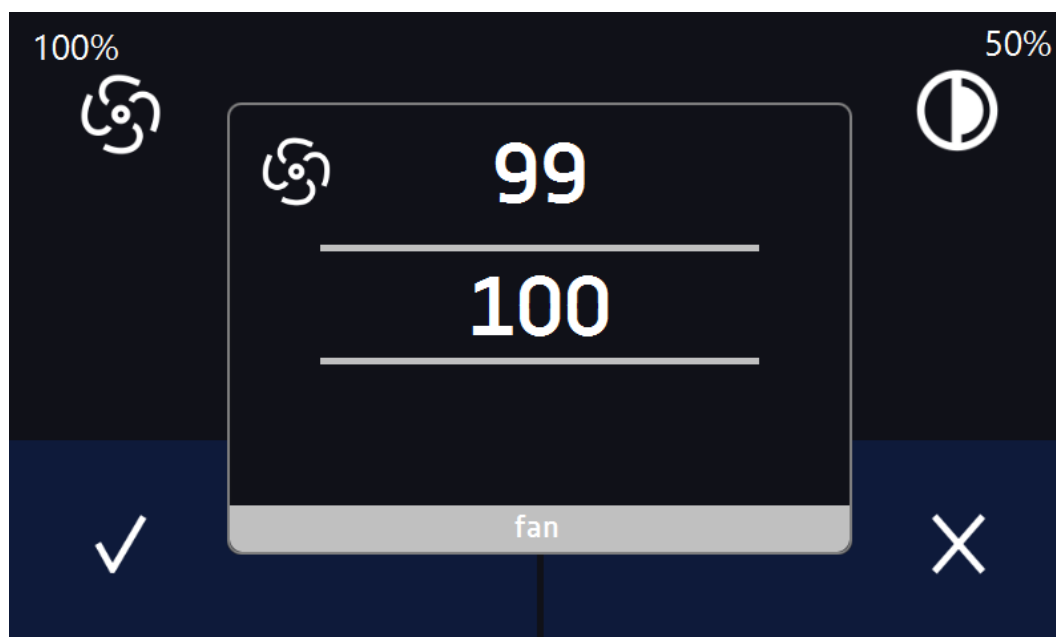
*Figure 26 - Quick change of time*



### 5.7.3. Quick change of other parameters

In order to quickly change of other parameters of the program, press the icon  in main screen (*Figure 2*). Select the parameter you want to change and make changes by strolling the list up or down (*Figure 27*). Confirm the change by pressing .

*Figure 27 - Quick change of other parameters*



## 5.8. Statistics

This panel displays statistics about the currently running program or program that has ended. Statistics are calculated separately for each segment and for a current cycle. Data logging starts for calculation after 30 seconds from reaching the set temperature in the segment. The next data is registered every 1 minute.

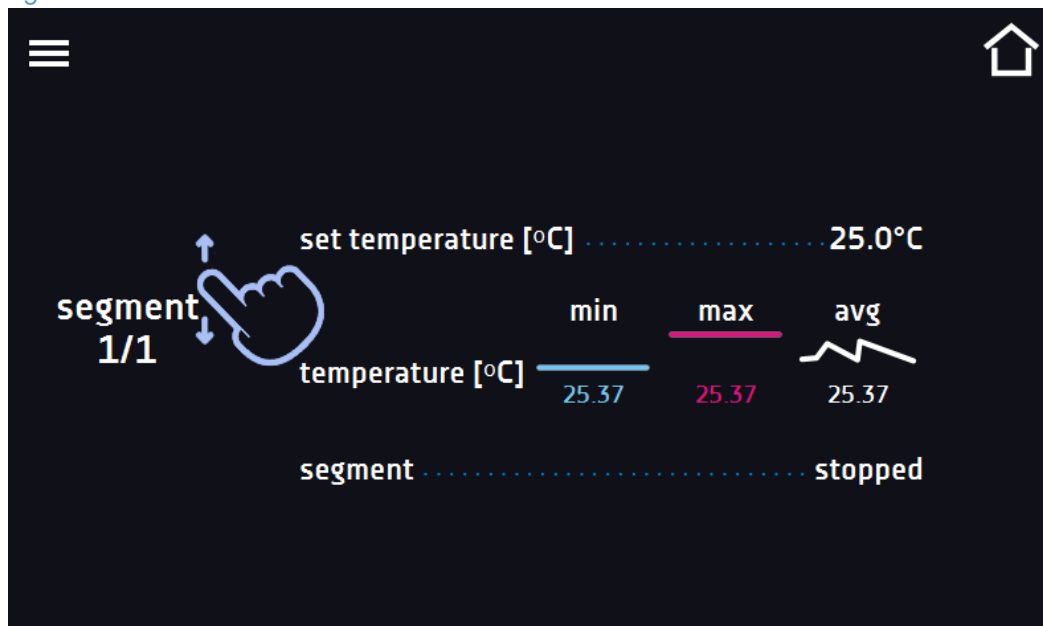
The following information is available:

- **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 performed segment (data is constantly updated)
  - finished – the segment is made,
  - interrupted – the segment was interrupted by the User before the set time expired
- **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 up your finger up or down.



You can not overview the segment / cycle data that has not yet started.

Figure 28 - Statistic






## 5.9. Data record

Register window (*Figure 30*) contains the following information:

- Time of sample registration [date],
- Temperature value from the main sensor in the chamber [temp.].

Each User can have 10 000 data records to use for the max period of 6 months. If all the memory cells are full, the oldest ones are overwritten. Data is displayed in the chronological order from the oldest to the latest record. It is possible to segregate data according to the selected column. To do so, click the column heading. The samples are only registered when the program is running. The frequency of registration depends on the program parameters settings, see » [page 42](#) .



The time of opening the Data Register depends on the number of saved samples. The larger number of stored cells increases the opening time of the window. Then, a progress window will appear (*Figure 29*), indicating what date range has been displayed. By clicking on  you can stop loading and overview only some part of the data. By pressing the progress bar, you can minimize it (it will appear at the top of the screen) and overview the previously loaded data.

*Figure 29 - Progress bar*

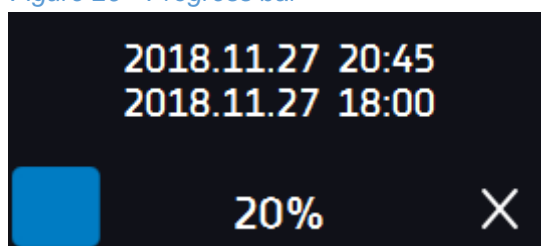


Figure 30 - Data Register

date	temp.	status
2019.03.29 12:22	34.61	ramp
2019.03.29 12:16	34.76	set temp.
2019.03.29 12:06	34.98	set temp.
2019.03.29 11:54	35.03	set temp.
2019.03.29 11:44	35.00	set temp.
2019.03.29 11:34	35.00	set temp.
2019.03.29 11:24	35.02	set temp.
2019.03.29 11:14	35.01	set temp.
2019.03.29 11:04	34.98	set temp.



Data recording onto the USB flash drive. .csv files are available - semicolon separated by opening eg with a spreadsheet, .plx - opening with the LabDesk application

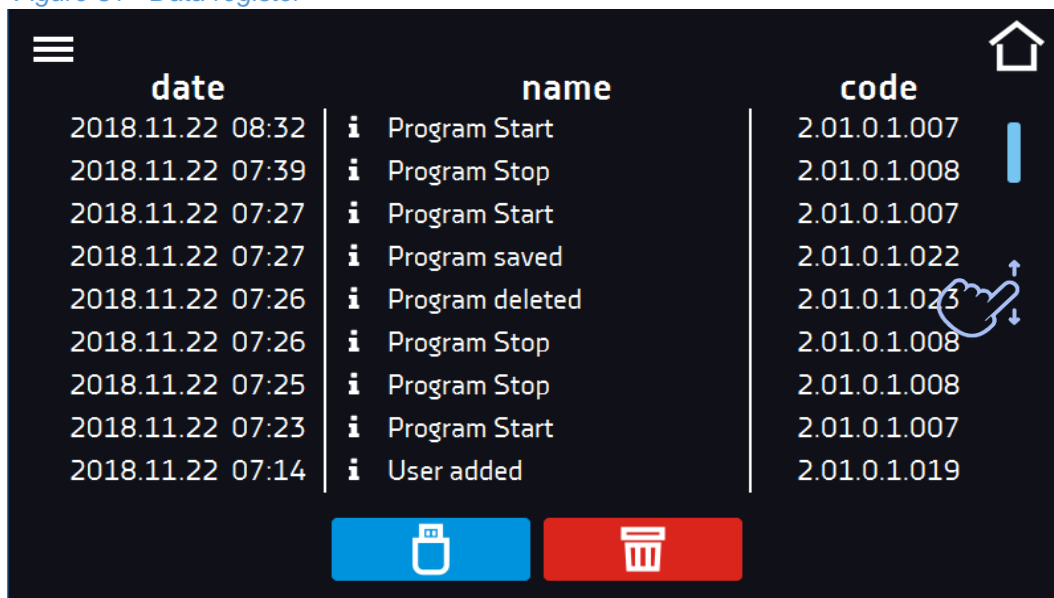


Deleting data.

## 5.10. Event log

The window displays information about registered events, alarms and errors.

Figure 31 - Data register



date	name	code
2018.11.22 08:32	<i>i</i> Program Start	2.01.0.1.007
2018.11.22 07:39	<i>i</i> Program Stop	2.01.0.1.008
2018.11.22 07:27	<i>i</i> Program Start	2.01.0.1.007
2018.11.22 07:27	<i>i</i> Program saved	2.01.0.1.022
2018.11.22 07:26	<i>i</i> Program deleted	2.01.0.1.023
2018.11.22 07:26	<i>i</i> Program Stop	2.01.0.1.008
2018.11.22 07:25	<i>i</i> Program Stop	2.01.0.1.008
2018.11.22 07:23	<i>i</i> Program Start	2.01.0.1.007
2018.11.22 07:14	<i>i</i> User added	2.01.0.1.019



Saving the data onto USB flash drive. .csv files are available - semicolon separated by opening eg with a spreadsheet, .plx - opening with the LabDesk application



Deleting data



Information event



Alarm event



Error

**Possible events:**

<b>Date/time change</b>	data/time were changed
<b>DeviceOn</b>	the device is switched on (on the main switch)
<b>DeviceOff</b>	the device is switched off (on the main switch)
<b>Door closed</b>	the door is closed
<b>Door opened</b>	the door is opened
<b>Open door alarm start</b>	open door alarm has been activated
<b>Open door alarm stop</b>	open door alarm has been deactivated
<b>Over Protection Start</b>	over-temperature protection has been activated
<b>Over Protection Stop</b>	over-temperature protection has been finished
<b>Program Edit</b>	changing the program parameters
<b>Program End</b>	program is finished
<b>Program Restarted</b>	program has been restarted after power failure
<b>Program Start</b>	starting the program
<b>Program Stop</b>	stopping the program
<b>Under Protection Start</b>	sub-temperature protection has been activated
<b>Under Protection Stop</b>	sub-temperature protection has been finished
<b>Lower temp. alarm Start</b>	lower temperature alarm has been activated
<b>Lower temp. alarm End</b>	lower temperature alarm has been finished
<b>Upper temp. alarm Start</b>	upper temperature alarm has been activated
<b>Upper temp. alarm End</b>	upper temperature alarm has been finished
<b>Deleted Measurement</b>	user measurements have been deleted
<b>Deleted All Measurement</b>	all measurements have been deleted
<b>Program saved</b>	new program has been saved
<b>Program deleted</b>	program has been deleted
<b>Program updated</b>	program has been updated
<b>Time Zone Changed</b>	in the time settings the time zone has been changed
<b>Temperature Correction Changed</b>	main sensor temperature correction changed
<b>Emergency stop of the program</b>	the program has been automatically stopped – the was a situation that didn't allow the program to be continued. PLEASE CONTACT THE SERVICE
<b>Defrosting Start</b>	starting the defrosting process
<b>Defrosting Stop</b>	stopping the defrosting process
<b>Start program cancelled, door is open</b>	program was not started due to the door open, it only applies to the launch of predefined programs in SR series devices
<b>Program aborted, door was opened</b>	program stopped due to door opening, applies only to running predefined programs in SR series devices
<b>Power Fail Start</b>	power supply failure / device fuse blown. Maintaining display operation, preset program parameters are not being maintained

<b>Power Fail Stop</b>	power return, return to maintaining program parameters
------------------------	--


## 5.11. Info


The panel contains the following information:

- Software versions,
- name of device,
- manufacturer's address,
- manufacturer's website.

Figure 32 - Info window






Press icon  to save the “Download” folder (among others with manual instruction) on the USB memory stick.

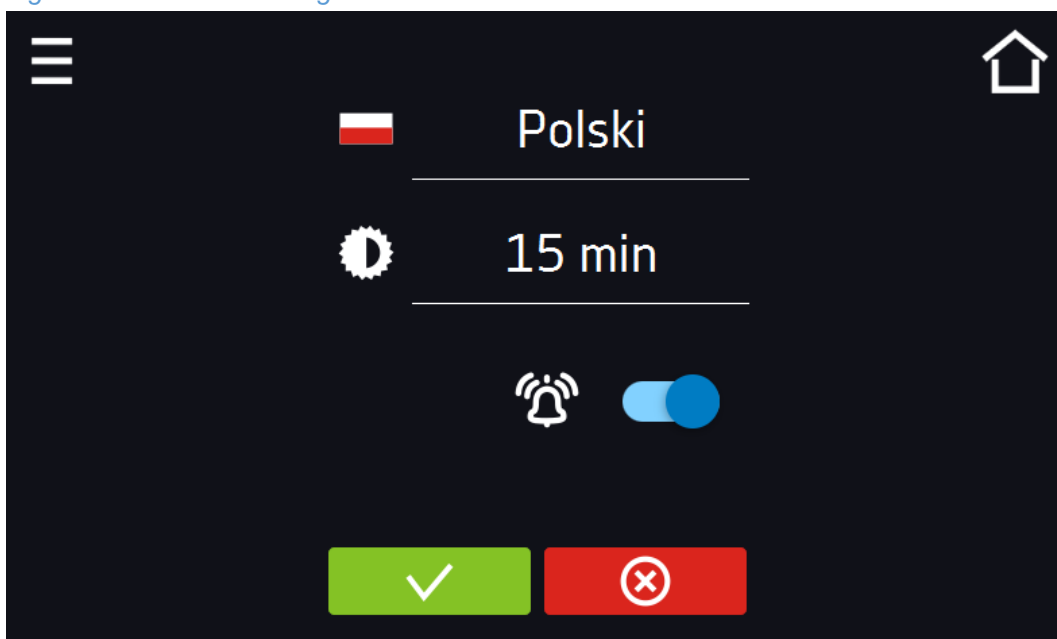
 - write the service data on the pendrive – contact the service for more information.



## 5.12. Interface

In this panel (*Figure 33*) you can:

-  **English** Change the language of device
-  Set the time after which the screen will be dimmed
-   Turn on/off the sound, alarm sounds will be still emitted

*Figure 33 - Interface settings*



-  Confirms and saves changes
-  Cancels the entered changes

### 5.13. Time

In this panel you can:

- change date / system time,
- change time zone

#### Change date / system time

Date and time cannot be changed while the program is running.

When reversing the date/time, the data and event log is transferred to the archive. Data and event files (only in the plx format) can be downloaded from the Archive menu more information » [page 71](#).

When changing the date/time forward, will not change the date/time in the data and events previously stored.

To change the system date or time, press the button  [Figure 34](#). In the next window ([Figure 35](#)) you can change settings.

Approving the date / time change restarts the device.

*Figure 34 - Time*

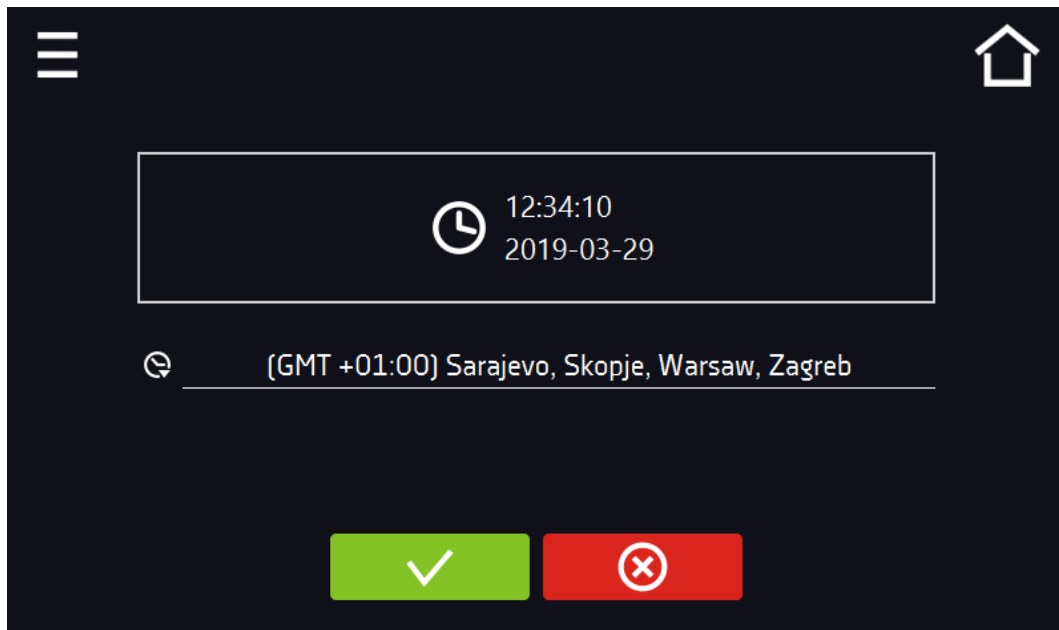





Figure 35 – Time settings



Change time zone

Changing the time zone will not change the date/time in the data and events previously stored.

To change the time zone, press the button  Figure 34. Select a time zone from the drop-down list. After changing only the time zone, the device is not restarted.



Confirms the time changes and restart device.



Cancels the entered time changes



The same time zones are required for correct operation of programs on the device and computer.

## 5.14. Alarms

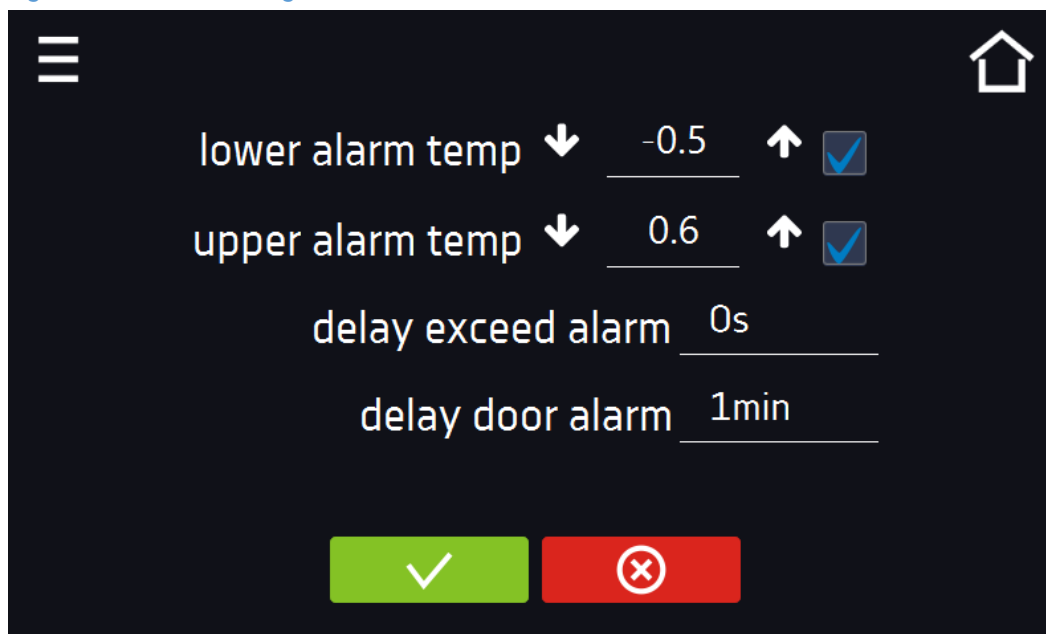
You can set parameters related to alarms.

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

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

- **delay temp alarm:**  
the alarm will be activated with a delay (1 min, 2 min, 5 min, 15 min) after exceeding the permitted temperature.
- **delay door alarm:**  
the door alarm will be activated when the door is opened for the time selected by the user (5 s, 30 s, 1 min, 5 min, 10 min).

Figure 36 - Alarm settings



lower alarm temp ↓ -0.5 ↑

upper alarm temp ↓ 0.6 ↑

delay exceed alarm 0s

delay door alarm 1min



Confirms changes



Cancel the entered changes



The value in the fields:

"Lower alarm" must be between -0,5 and -5°C

"Upper alarm" must be between 0,5 and 5°C

## 5.15. Network

In this panel (*Figure 37*) you can change the settings for the LAN:

- **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 connect



Device disconnect

*Figure 37 - LAN settings*



Confirms changes



Cancel the entered changes

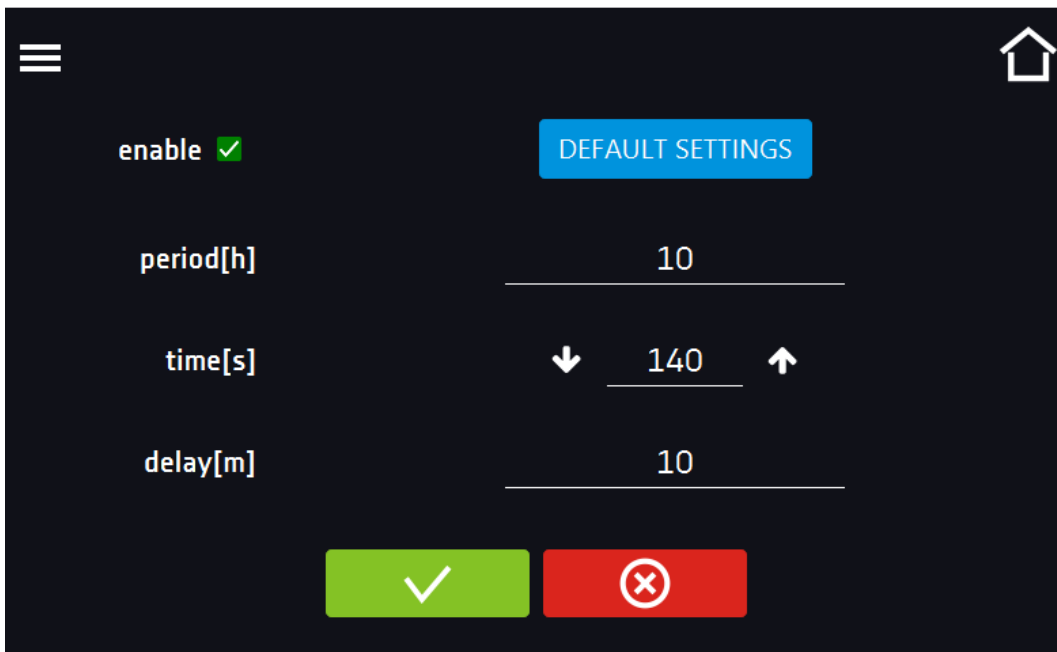
## 5.16. Defrosting

The panel ([Figure 38](#)) allows to control the defrosting of interior of the device. (Available on selected devices)  
You can set:

- **Period [h]** – is counted when the temperature is:
  - In devices:
    - **CHL / ST / IL / ZLW**– lower or equal to 5°C for the set temperature and lower than or equal to 7°C for the current temperature.
- **Time[s]** – the time of defrosting
- **Delay[min]** – time after the completion of defrosting in which temperature alarms are not generated, determined in minutes,

**DEFAULT SETTINGS** – restores factory settings

*Figure 38- Defrosting settings*



Confirms changes



Cancel the entered changes

### 5.16.1. **Defrosting for ZLW devices**

ZLW units are additionally equipped with evaporator temperature measurement and heating of the condensate drain system. In “Defrost” window there are additional parameters to be set:

- **preheat time [s]** – time before defrosting is to start during which the condensate drain system is to be heated,
- **evaporator temp [°C]** – defrost stop temperature (on the evaporator). Defrosting ends when the evaporator reaches the set temperature or the time set in the Time parameter has expired. Depending on what happens sooner.



Parameters: Time, Time to preheat the tray, Evaporator temperature.


Lower values may cause that the accumulated ice will not melt in the defrost cycle and cause increased icing.

Higher values may cause an unnecessary increase in the temperature in the chamber.

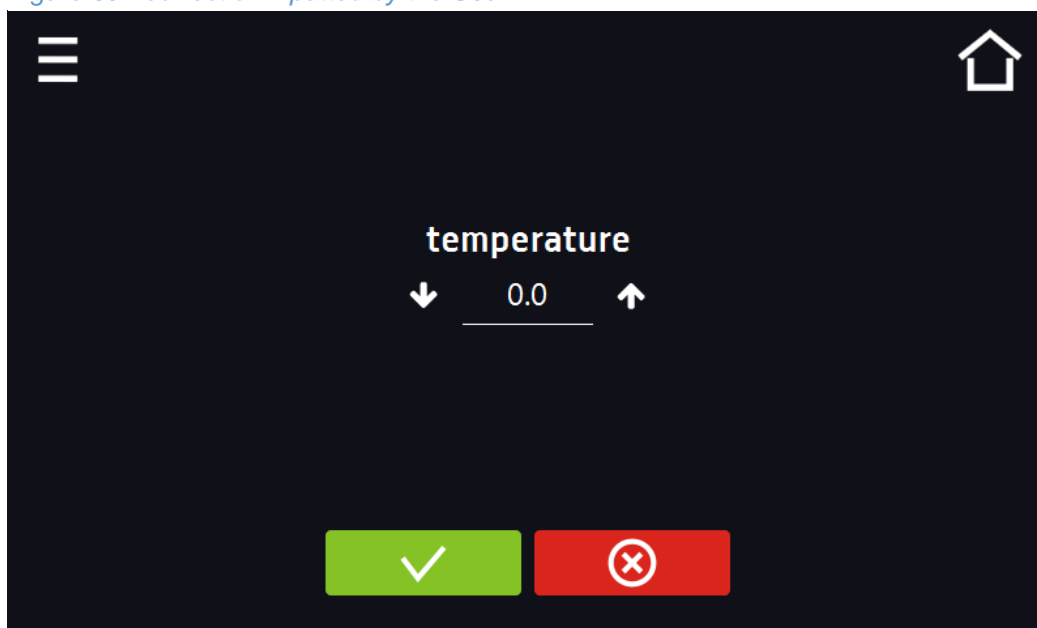
 Corrections

In this window (*Figure 39*) you can set correct:

- The temperature indicated on the display by adding the correction value. The set correction value is taken in the whole temperature range operation of the device. For example, if the average temperature displayed by the device indicates 100°C and the average temperature measured by independent, external sensor indicates 100,5°C, the correction should be set on +0,5°C. The average temperature should be calculated from chosen period of time e.g 30min. The correction range of -5°C to +5°C.

	<p>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 in the geometrical centre of the chamber. For the correct operation of the device it is not necessary to use User's calibration.</p> <p>The user is performing temperature correction on his own responsibility and s/he must be aware of consequences of changing of manufacturer's settings. If the equipment was calibrated, calibration certificate loses it's validity.</p>
---	---

*Figure 39 - correction inputted by the User*



Confirms changes



Cancels the entered changes

## 5.17. Archives

Contains data and events transferred to the archive when changing time backwards.


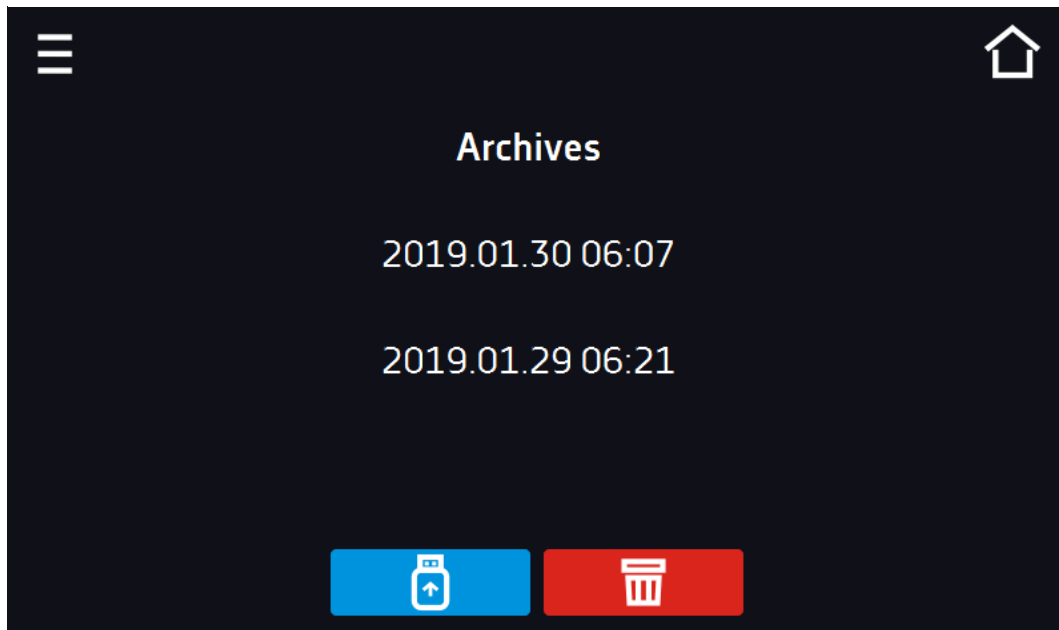
Plug in the USB drive, select the archive and press the icon . At the same time, data and event files are downloaded. All files are saved in the folder named archive.

Figure 40 – Archives



Saving the selected archive onto USB flash drive.



Delete the selected archive.

## 6. MODBUS TCP interface

Connection parameters:

IP address: the same as devices (set in the Network panel » [page 67](#))

port: 502

register INPUT REGISTERS				
function READ_INPUT_REGISTERS (0x04)				
Modbus address	Offset	Type	Multiplier	Description
30000	0	int	10	temperature from the main sensor
30001	1	int	10	temperature from the additional sensor (option)
30002	2	int	10	humidity (option)
30003	3	bool	-	door open
30004	4	bit	-	b0 – door alarm b1 - upper temperature alarm b2 - lower temperature alarm b3 - over Protection b4 - under Protection b5 – main sensor error b6 – additional sensor error b7 – protection sensor error b8 – temperature sensors error b9 – humidity sensor error b10 – hardware error b11 - MRW error
30050	50	int	-	Photoperiod light setting: 0-off, 1-on



## **7. COMPONENTS OF THE DEVICE**

### **7.1. Internal glass door**

To open or close the internal glass door use the plastic handle installed on the glass. While operating the unit at high temperatures, do not touch the glass door or inner parts of the chamber.

### **7.2. Door lock**

All units have been equipped with a door lock located in the door handle. Two keys are attached on the backside of the device.

### **7.3. Access port**

A  $\varnothing 30$  mm access port can be used to insert an external temperature sensor, which has been secured with a silicon plug. The plug should cover the access port while the unit is operating. If multiple cables have been inserted through the access port and if 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 stability and uniformity within the chamber.


Silicone cap (only for the devices ZL)



Rubber cap



## 7.4. Open door alarm

All incubators have been equipped with an open door sensor. If you open the door,  icon would appear on the display.

If you leave the door open for a limited time, an alarm will sound and the control bar will be red. The alarm event “door open” is displayed in the list, with the status alarm active.



## 7.5. Internal LED light

Internal lighting is switched on automatically when the outside door is open. Once the light has been switch

on, a bulb icon  will appear on the display.

Standard equipment of the ST / CHL series devices and optionally available for the ZL / IL / CL / SL / SR series devices (OWW / OWW LED option). This option does not allow for a day and night simulation. The maximum working temperature of the device is limited to + 70 ° C, for SL / SR to + 250 ° C.



## 7.6. USB port

To transfer data from the unit's memory to the USB memory stick, connect the memory stick to the USB slot on the device.

Go to Main Menu → Data record, press the button



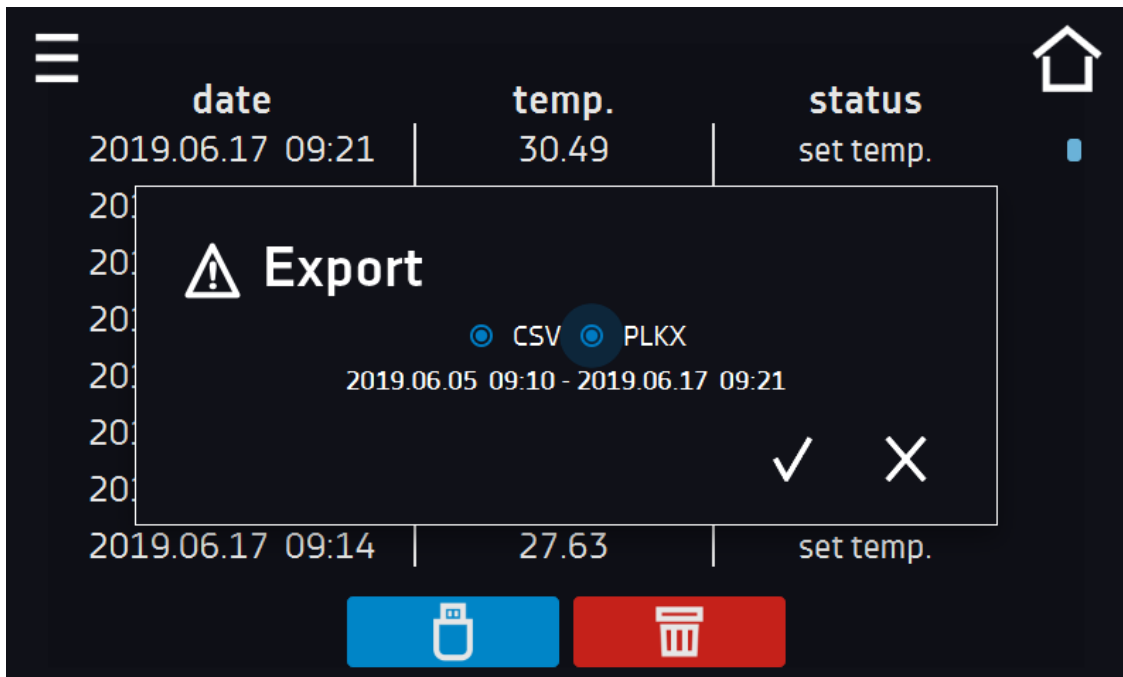
Select file type \*.csv, \*.plx.

Press:



Data is copied.

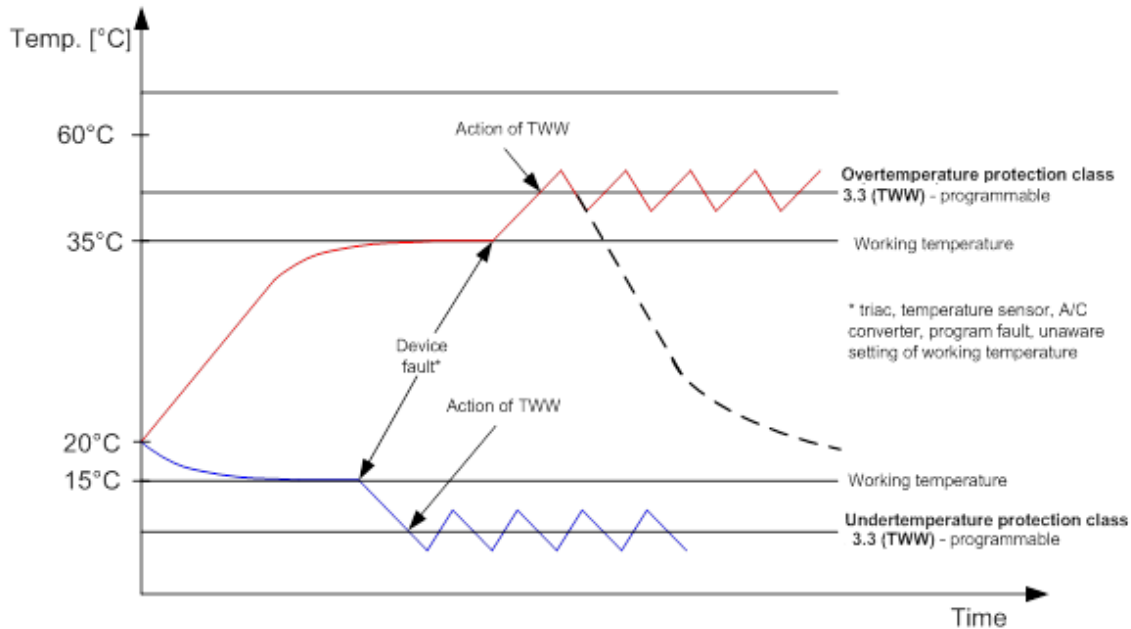
Data saved as \*.csv file can be opened in the Notepad. Data saved as \*.plx file can be opened only by LabDesk. This program allows you f. ex. to view the data in the table as a graph. It allows you to make a report of selected data range.



## 8. TEMPERATURE PROTECTION

Temperature protection is included as standard, if damage occurs to the temperature controller or the user changes the temperature settings outside of the upper and lower limits, temperature protection will activate.

The figure below shows how this works.



Protection Class 3.3. according to DIN 12880 norm is called protecting sample function. The User can set the temperature protection lower / upper by himself. When the set temperature falls outside of this range, the power of cooling system or heating system is switched off. In the ILP devices, the power supply of the peltier module responsible for heating and cooling is switched off. When the temperature returns to within normal parameters, the device continues to work normally.

## **9. OPERATION OF THE COOLING SYSTEM (only ILP and ZL devices)**

### **9.1. Operating of the cooling system of ILP series devices**

The thermoelectric incubator relies on Peltier effect. Cooling elements are Peltier Modules which act as a heat pump transporting heat / cold in the direction of the flow current. The cooling system is constructed of Peltier modules, fans and radiators. Contrary to refrigerated units, it has a long operating life, no moving parts, the ability of reverse operation i.e., the quick and easy transition from cooling to heating and vice versa, quiet operation and the absence of harmful environmental and flammable refrigerants.

### **9.2. Freezing of the chamber ZL**

Using the device involves the formation of a layer of ice inside the chamber. The rate of ice or frost formation depends on several factors: ambient conditions (temperature, humidity), the frequency of door opening and the type of samples, therefore periodic defrosting is necessary when the ice or frost layer covers the entire chamber. **Defrosting** is done manually in the following order:

- 1) Turn off the device (unplug the power cord from the socket),
- 2) Open the door of the device and leave it to defrost (do not accelerate the defrosting process),
- 3) Wipe off the water accumulating on the bottom of the chamber and the walls (it is recommended to wipe dry),
- 4) Turn on the device (insert the power plug into the socket).

## 10. CLEANING AND MAINTENANCE OF THE DEVICE



Before cleaning the device, it needs to be disconnected from the electrical supply!

Maintenance (cleaning of the housing and the chamber) should be carried out at least once a week (depending on the environmental conditions in the workplace).

To clean products made of stainless steel (INOX) we recommend using cleaning solution dedicated particularly to stainless steel material. It preserves the steel surface from permanent stains and retains aesthetic appearance of the product.

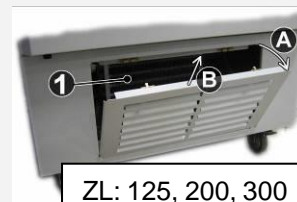
INOX products are made of stainless steel, when used in standard laboratory conditions they do not rust. However it is possible that stains (which may look like rust) form on the steel surface (e.g. due to the kind of samples that are incubated in the chamber). In such case we recommend using cleaning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



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

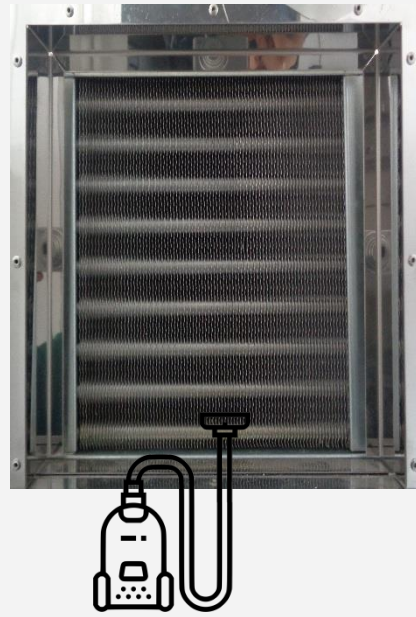
### 10.1. Exterior cleaning

1.	Clean the housing of the unit at least once a week or even more often depending on the conditions in the place the unit works.
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	<p><b>Applies to devices equipped with cooling system: laboratory refrigerators (CHL), thermostatic cabinets (ST), cooled incubators (IL), freezers (ZL).</b></p> <p>The condenser should <b>be cleaned at least once a month</b> with a vacuum cleaner, a dry cloth or brush. Placement of a condenser according to the model: at the rear in the upper part (capacities 500, 700, 1200, 1450), at the rear (capacities 1, 2, 3, 4, 5, 6, 85), in the front in the lower part (ZLN/ZLW with the capacities 125, 200, 300, ZLN-UT 200, 300, 500).</p> <p>In devices with a bottom condenser position, to access to it, pull the ventilation cover (A) towards you, and then pull it up (B). After cleaning the condenser (1), install the cover.</p>



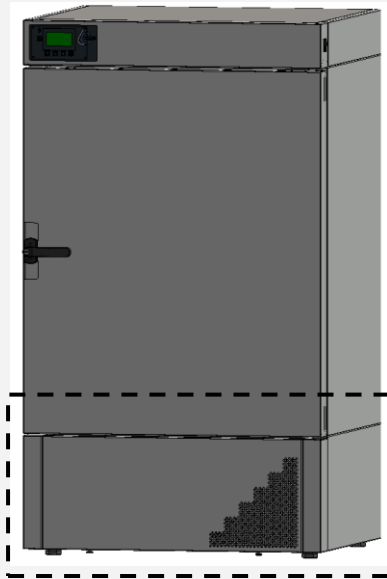


ST 1, 2, 3, 4, 5, 6,  
CHL 1, 2, 3, 4, 5, 6, ZLN 85

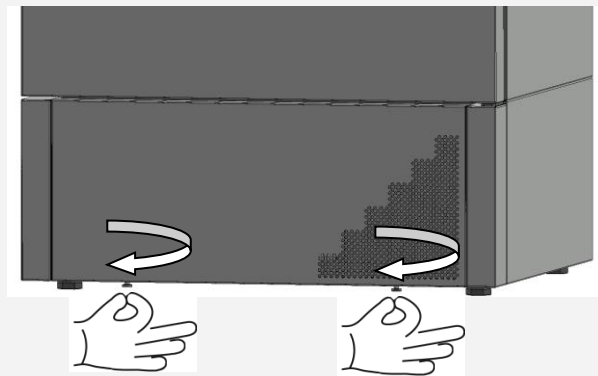


ST 500, 700, 1200, 1450  
CHL 500, 700, 1200, 1450

1.

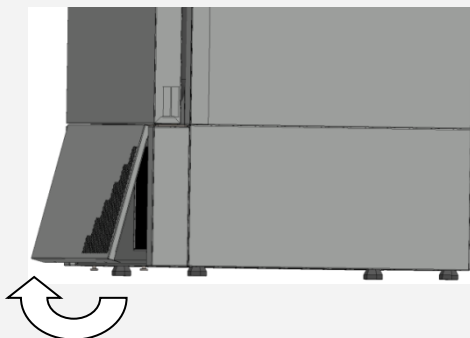


2.

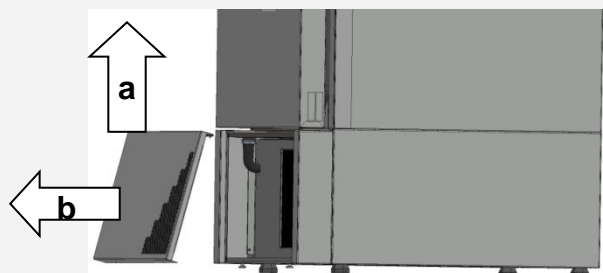


To loosen/ (1 rotation)

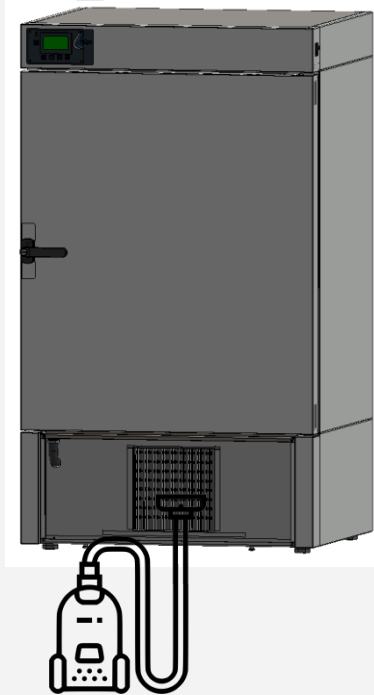
3.



4.



5.



ILW

**If you do not do this, you may break the compressor and lose the warranty rights!**

- |    |   |
|----|---|
| 5. | Electrical parts should not be in contact with water or detergent.  |
| 6. | Clean the touch screen using a soft cloth for touch screens, or it is possible to use foam for cleaning touch screens |
| 7. | <b><u>USB port</u></b> can be cleaned with a vacuum cleaner to prevent accumulation of dirt inside the socket.        |