# Instruction manual SMART

## Laboratory incubators

with a cooling system based on Peltier effect

**models:** **ILP 53, ILP 115, ILP 240, ILP 750**

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

Version 1.41

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Manufacturer's address:

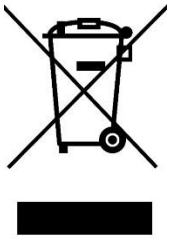
POL-EKO A.Polok-Kowalska sp.k.
ul. Kokoszycka 172 C
44-300 Wodzisław Śląski
Country of origin: Polska

**As the manufacturer of this device, we want to assure you that we have taken every step to ensure it meets your expectations and provides reliable performance over a long period of use. We are constantly improving our products and expanding our offerings, so we welcome any suggestions you may have regarding additional features or operational enhancements. Please feel free to visit our website at www.pol-eko.com.pl for more information.**

**The manufacturer takes every possible measure to eliminate post-production contamination. However, small oily residues from material processing, such as contact between tools and the processed parts, may still be present. To remove these residues, use a soft cloth or paper towel dampened with warm water and a degreasing solution.**

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!**

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# 1. INTENDED USE AND IMPORTANT INFORMATION FOR THE USER

ILP incubators are laboratory devices designed for incubation and storage of samples at temperature range from 0°C to +70°C (maximum 20°C below ambient temperature). Incubators have both heating and cooling system based on Peltier modules and forced air convection.

**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.** |
|  | 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:**<br>• outside,<br>• in damp places or places which can be easily flooded,<br>• near flammable or volatile substances,<br>• near acids or in corrosive environments. |
| **2.** | **It is forbidden to:**<br>• store inflammable or volatile substances inside the unit,<br>• touch live parts of the unit,<br>• operate the unit with wet hands,<br>• put water vessels on the unit,<br>• climb on the unit,<br>• overload the shelves (the maximum load is described in technical data),<br>• place objects on the bottom of the chamber. |
| **3.** | **You should:**<br>• place samples in such a way to provide proper air circulation in the chamber,<br>• open the door for the shortest period of time to reduce temperature fluctuations,<br>• secure samples from being blown out by the chamber fan e.g powdery samples,<br>• always check that the doors are closed correctly,<br>• use only mains with earth to avoid electric shocks,<br>• unplug the power cable holding the protective cover and not the cable itself,<br>• 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),<br>• protect the power cable and the plug from any damage,<br>• disconnect the power plug before moving the unit,<br>• disconnect the power plug if the device will not be used for a long period of time,<br>• disconnect the unit and protect it from reconnecting if it has any visual fault. |

**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

**Incubators with Peltier modules (ILP) in SMART version are delivered with:**

| **Device** | **ILP** | | | |
|---|---|---|---|---|
| **Capacity** | **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 [pcs.]** | 1 | 1 | 1 | 1 |
| **Key for door lock [pcs.]** | 2 | 2 | 2 | 2 |
| **Wrench (13mm) for wheels adjustment [pcs.]** | x | x | x | 1 |
| **Quality Control Certificate [pcs.]** | 1 | 1 | 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.

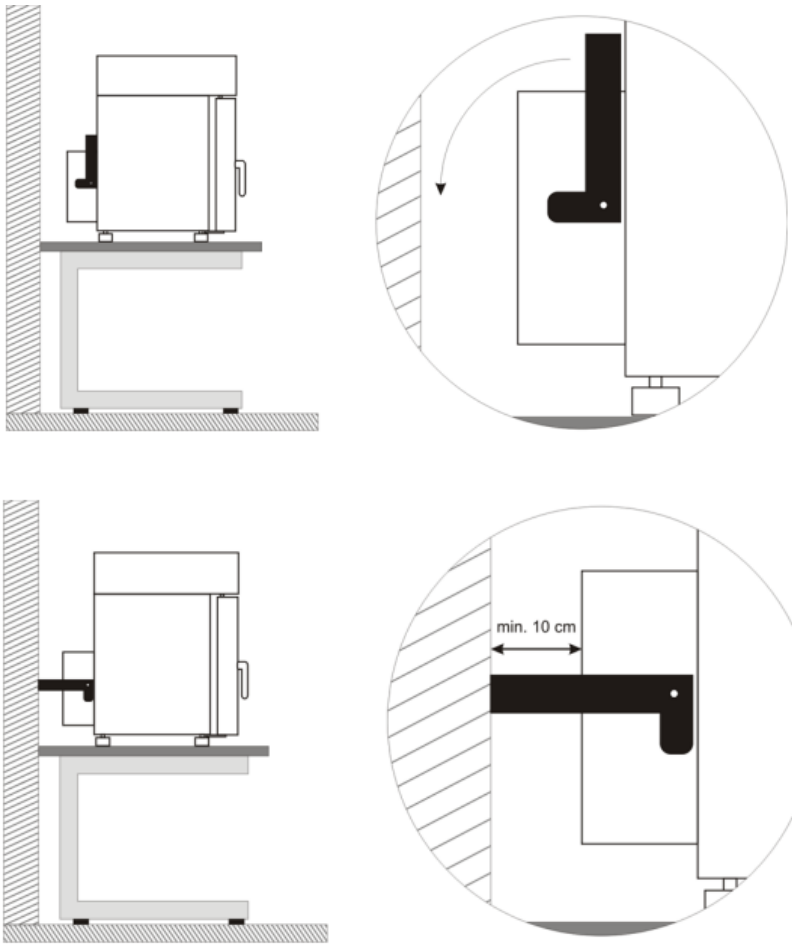
| | |
|---|---|
|  | **After receiving the device, visually assess its condition and equipment in the presence of the person delivering the goods. A courier company is responsible for any damage caused during transport.** |

| | |
|---|---|
|  | **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.

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

- ambient temperature +18°C...+28°C, for models with glass door +18°C...+25°C,
- 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 and a spacer bracket should be used:




- 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,
- the device **MUST** be placed only on a stable and properly levelled floor. An uneven surface may lead to changes in the device's geometry, including door misalignment or improper door closing. Correct levelling is essential for the safe and proper operation of 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**:

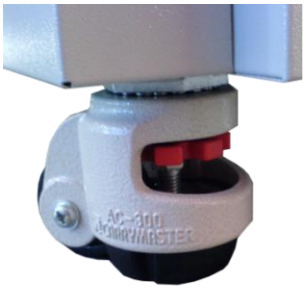
- **temperature fluctuation,**
- **temperature variation,**
- **power consumption,**

**and may result in loss of warranty.**

**Wheels / leveling feet**

| | |
|---|---|
| | **The device has been equipped with wheels or leveling feet. 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 unit is equipped with reinforced wheels, they must be locked and leveled. For this purpose use the red knob mounted in the wheel housing. Initially, the knob can be turned by hand, but if resistance is encountered, use a 13 size wrench.



For reinforced wheels with leveling feet (see the image), once the unit is in the desired position, the leveling feet must be unscrewed from all wheels – the unit CAN'T stand on the wheels.



| | |
|---|---|
| | **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*

In the ILP models

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. Condensation in the chamber

If the set temperature is much lower than the ambient temperature, condensation may occur, which will cause accumulation of the water at the bottom of the chamber. The amount of accumulated water depends on the following factors:

- the difference between the ambient temperature and the temperature in the chamber,
- frequency of door openings,
- temperature of the samples.

| | |
|---|---|
|  | If water accumulates at the bottom of the chamber, wipe the bottom of the chamber with a dry cloth. |

| | |
|---|---|
|  | Too high relative humidity in the chamber can cause icing of the cooling element, and thus reduce the cooling efficiency and increase power consumption. |

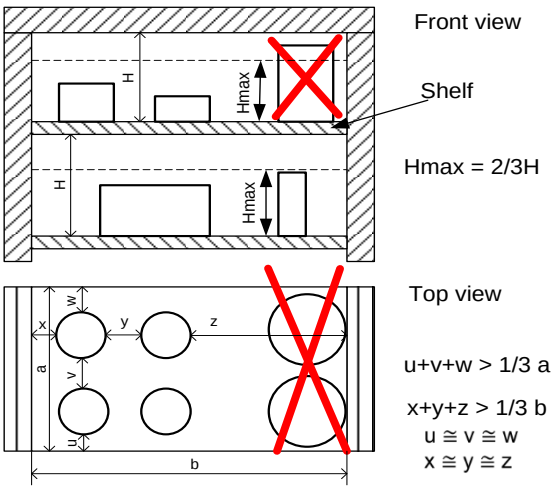
Cartons, sponges and other hygroscopic materials should not be used to store samples, as they may increase the humidity in the chamber.

## 3.3. 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.




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

## 3.4. Closing chamber door

All ILP incubators have been equipped with a gasket and open door sensor. If the door has not been closed properly, an audible and visual alarm will start. You can set delay door alarm by: 30s, 1 min, 2 min, 5 min or 10 min (see Section 6.14).

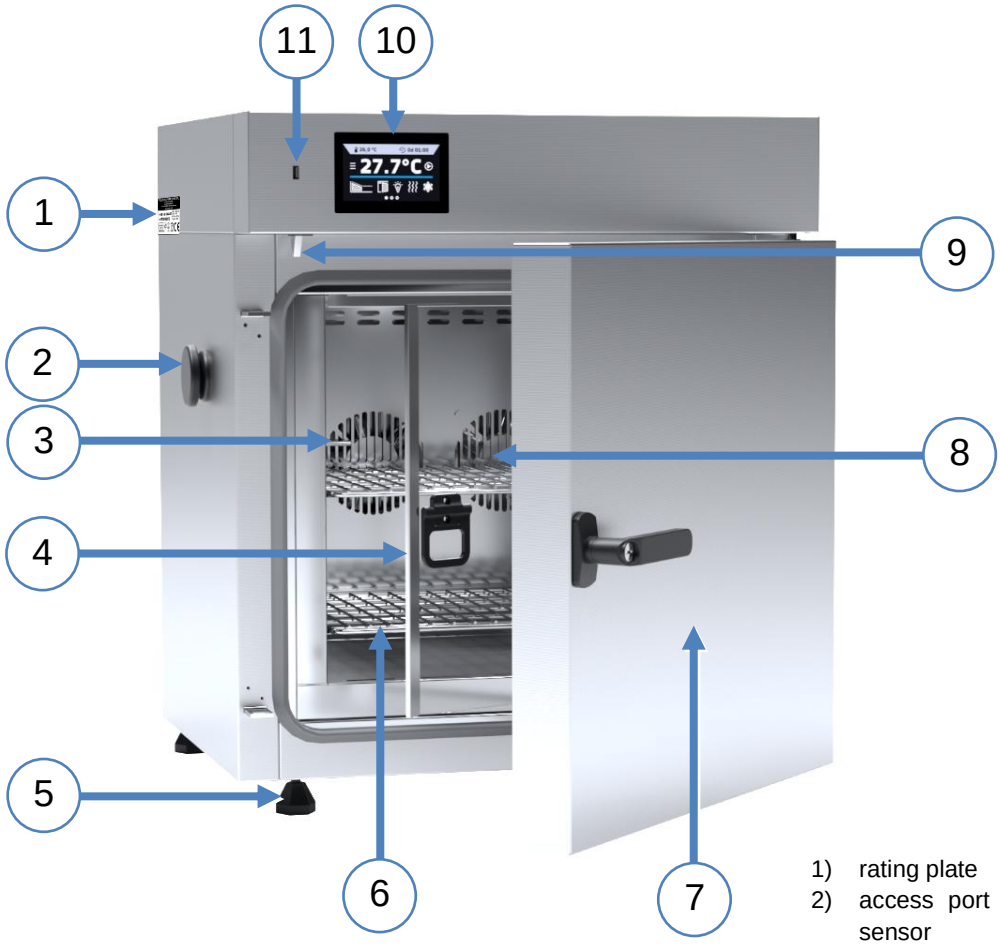
# 4. DESCRIPTION OF THE DEVICE

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

## *4.1. Design of ILP devices*

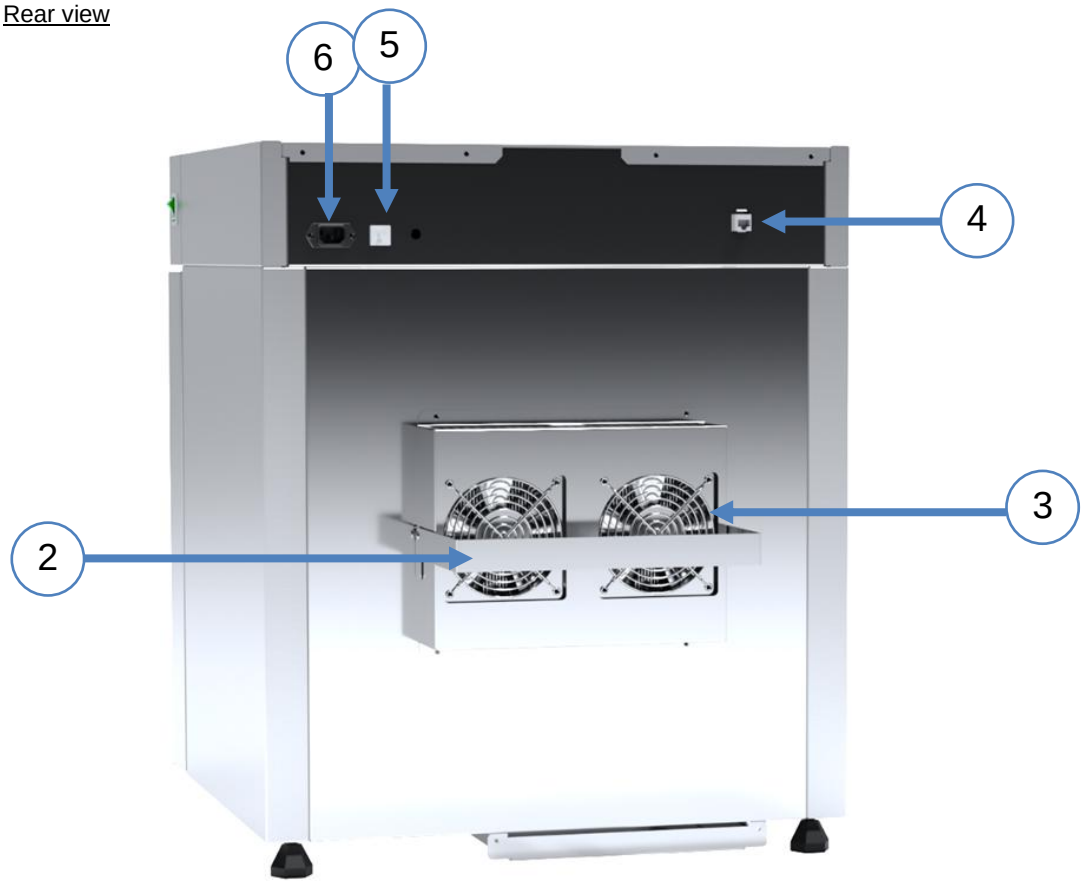
Below there's a picture of ILP 53 model (exemplary photo) with a description of the important components of the device.

Front view




1) rating plate
2) access port ø30mm for external sensor
3) temperature sensor
4) internal glass door
5) adjustable feet
6) inox wire shelf
7) external solid door
8) Peltier module chamber fan
9) open door sensor
10) touch control panel
11) USB port

Rear view




1) main switch
2) spacer frame
3) external fans of the Peltier module
4) LAN port
5) fuse
6) main power socket c20

# 5. DEVICE EQUIPMENT (STANDARD AND OPTIONAL)

## 5.1. Internal glass door (standard)

Internal glass door is a standard equipment in ILP cooled 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 doors, 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. |

## 5.2. External door with viewing window (optionally)

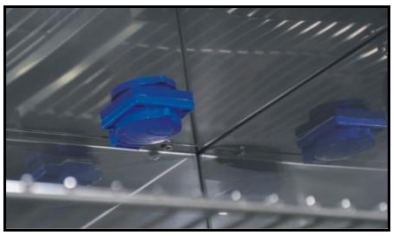
The external door with a viewing window is an optional equipment for ILP cooled incubators.



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

## 5.3. Internal socket (optionally)

An internal socket with grounding and IP44 protection is an optional equipment for ILP 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]. |

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

## 5.4. Door lock (standard)

All devices have a key lock. The key lock is situated in the door handle. Two keys are supplied with the device (hung on the back of the device).



## 5.5. Access port for external sensor (standard)

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.





## 5.6. Open door alarm (standard)

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



## 5.7. Internal LED light (optionally)

All ILP incubators can be optionally equipped with LED interior lighting integrated with an open door sensor (Philips Corepro LEDspot 3.5-35W GU10 827 36D). 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 LED light ON or OFF (the lighting is not integrated with the open door sensor).



## 5.8. USB port (standard)

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. 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. For more information see Section 6.1.

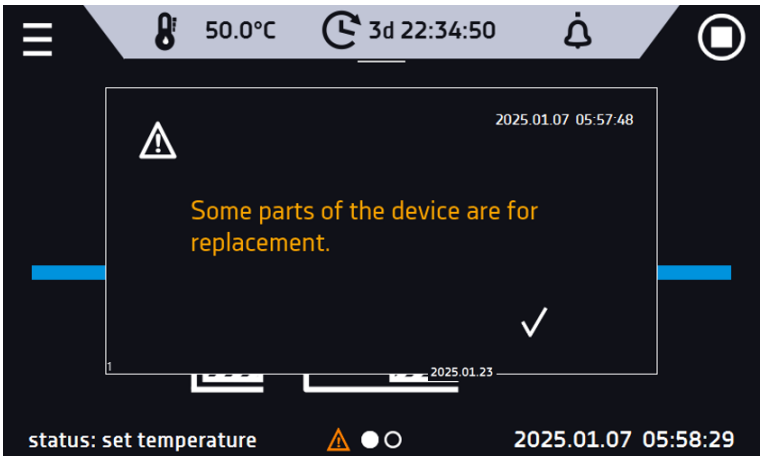
## 5.9. Display battery backup (optionally)

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 24 months. When it is time to replace the battery, a message will appear on the display, see Fig.2 |

*Figure 2 Battery replacement message*

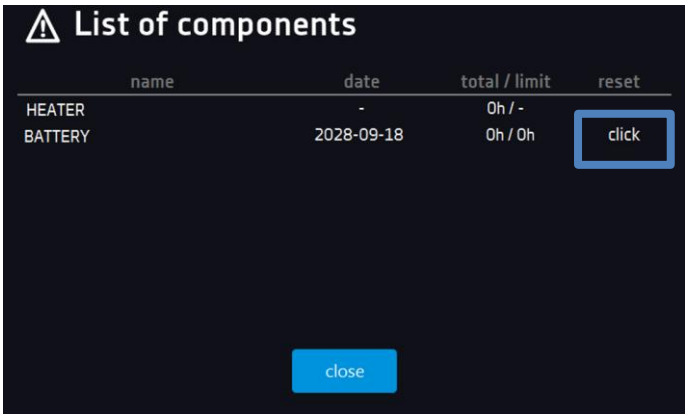



After replacing the battery, you must confirm the replacement in the device's system:

1. On the home screen, tap the orange icon with an exclamation mark, located at the bottom of the screen.
2. In the list that appears, locate the entry for the battery and tap the 'Click' button.
3. Confirm the battery replacement.
4. Once confirmed, restart the device.

A restart is required for the battery replacement reminder icon to disappear from the home screen.

Rys. 3. List of components




You can also confirm that the battery has been replaced via the INFO menu (see 6.11 Info).

## 5.10. Consumables

Consumables during normal operation are:

- silicone door seal - in all units,
- chamber fan - in units with forced air circulation.

# 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 un-mounted (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 startup, a wizard appears on the screen allowing you to configure settings such as:

- language selection
- downloading the manual
- connection to a computer network
- setting the time zone and time
- connection to the LabDesk Cloud cloud service

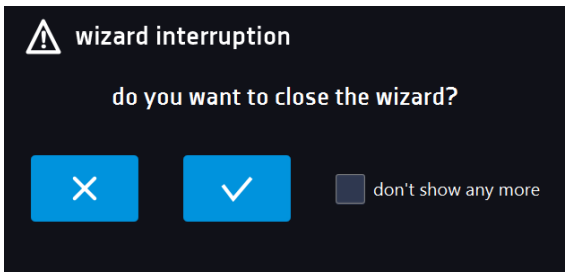
*Figure 3 Settings wizard*



It is recommended to complete the entire wizard, but you can interrupt it at any time by pressing 
You can then choose one of the options:

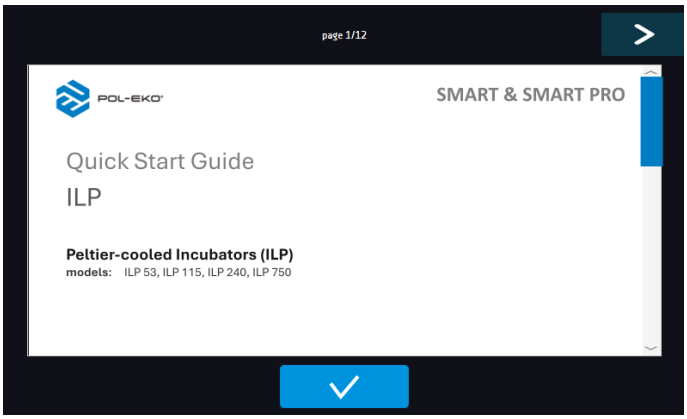
- one-time closing – the wizard will be displayed again during the next launch
- check the option so that the wizard will no longer appear the next time you run it
- return to the wizard

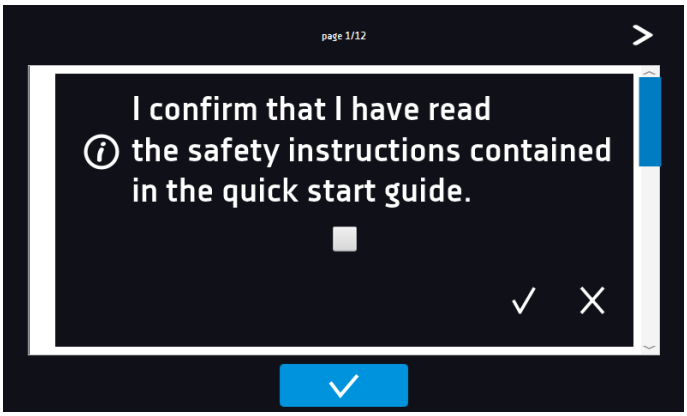
*Figure 4. Wizard interruption*




Once the wizard has finished or been closed, a safety instruction will be displayed; please read this carefully. You must confirm that you have read the instructions before closing the window. Until you have confirmed this, the safety instruction will be displayed every time the device is started.

Fig. 4. Safety instructions



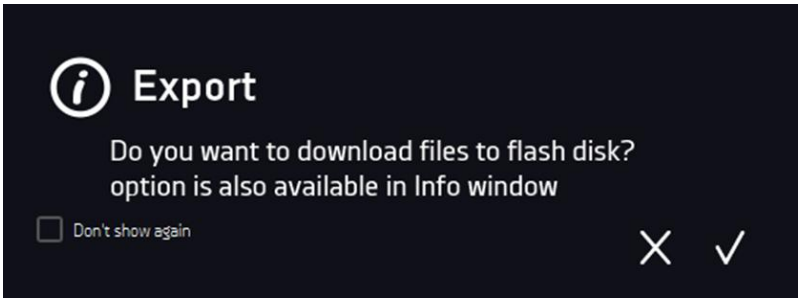






The safety instructions are also available in the ‘Info’ menu and are stored on a USB stick together with the basic user manual. The ‘Download’ folder can be downloaded at any time from the ‘Info / Registration’ submenu (for further information, see Section 8.11).

After completing the wizard, a question will appear on the screen regarding downloading the "Download" folder containing the operating instructions in PDF format to the pendrive. To do this, insert the pendrive into the USB port and wait a moment for the hardware to be detected, 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 5 Downloading files*




## 6.3. Main screen

After switching on the device, the main screen appears. It contains the information about the device status. After starting the program, additional information appears on the screen.

*Figure 5 Main screen*

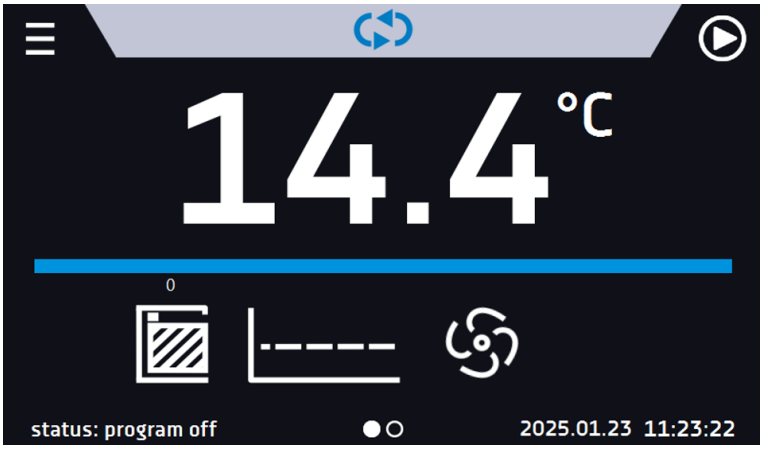
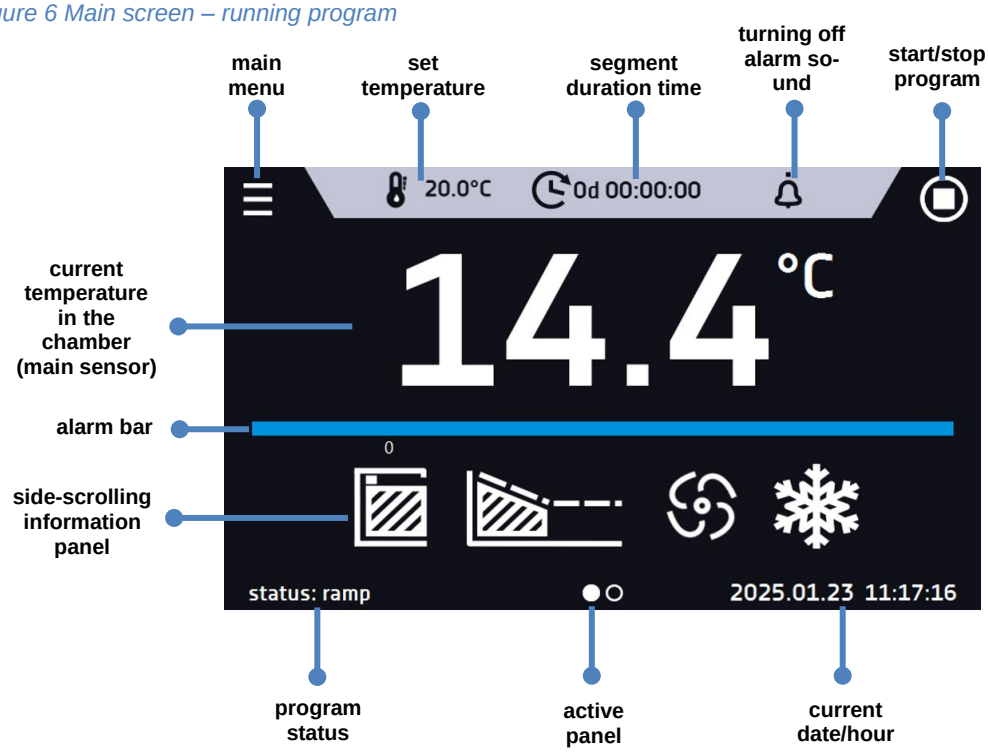


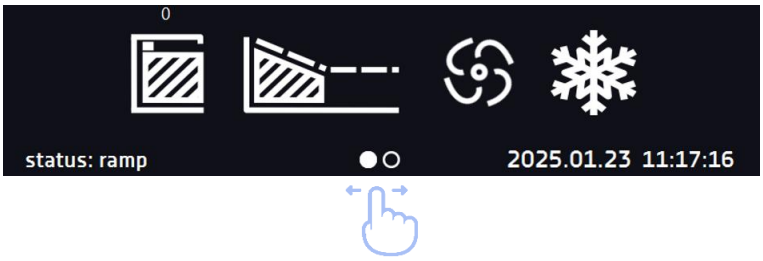
*Figure 6 Main screen – running program*




### 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 7 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 8 Icon: Alarms panel*



In the alarms panel 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 Alarms panel*

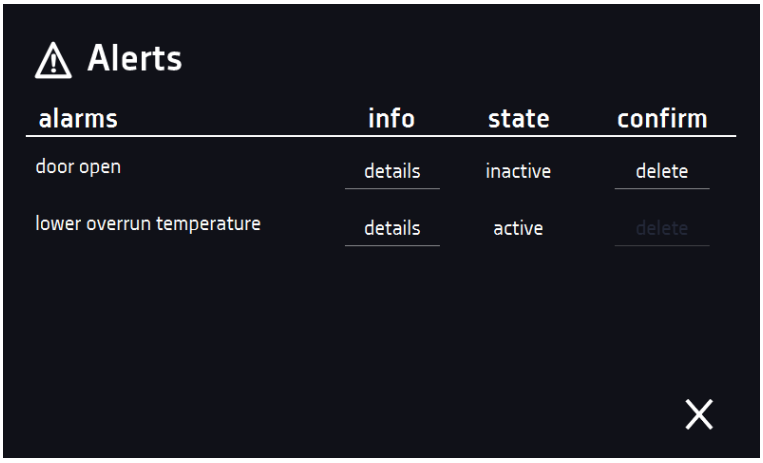



*Figure 10 Alarm details*



### 6.3.1.2. Status panel

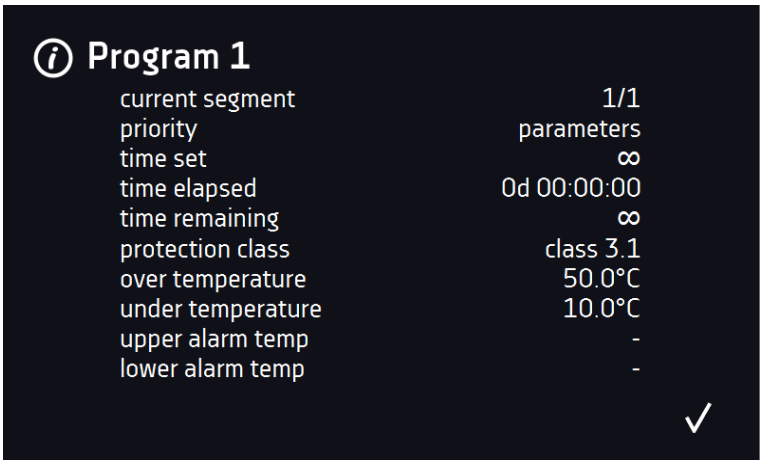
The icon which is on the second page of the information panel, allows you to go to the status panel.

*Figure 11 Icon: Status panel*



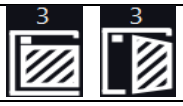
The status of the device is indicated also by description.

*Figure 12 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<br>over temperature<br>under temperature | information about the protection temperature of a running or completed program. The protection parameters can be set in the program parameters. Information about protection classes |
| upper alarm temp<br>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

| icon | function |
|---|---|
|  | 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. |
|  | Quick Start Guide. |
|  | Internal light is switched on. The icon appears when the incubator is optionally equipped with internal light (OWW). Light switched off – icon is 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). |
|  | Icon is visible only when the chamber is cooling down. |
|  | Fan icon. Rotating icon means that the program is active. If it is not rotating – the program is inactive. |
|  | 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).<br>Indicates the time that has elapsed from the program start. |
|  | Countdown of the time remaining to the end of the program. |
|  | 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. |
|  | Turning off of the alarm sound (open door alarm, exceeding temperature range). Critical alarms (i.e. damage to the temperature sensor, temperature protection, etc.) continue emitting a sound. |
|   | 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. |

| | |
|---|---|
|  | The arrow icon allows navigation between: segments, program parameters and summary. |
|  | Ramp status: Chamber is currently heating up or cooling down. |
|  | Set temperature is reached. |
|   | The program will start on the given date / time.<br>Start delay activated. |
|  | 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. |
|  | 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). |
|   | Active STM function (Smart Temperature Monitor) informs the user about the problem of reaching or maintaining the set temperature.<br>• white color - option enabled, the program is stopped<br>• blue color - option enabled, the program is running<br>• red color - warning about problems with reaching / maintaining the temperature |

### 6.3.3. Upper menu

When the program is running, in the upper part of the main screen there's a bar menu with parameter icons (temperature, time and mute function). These parameters can be quickly changed (Quick Change).

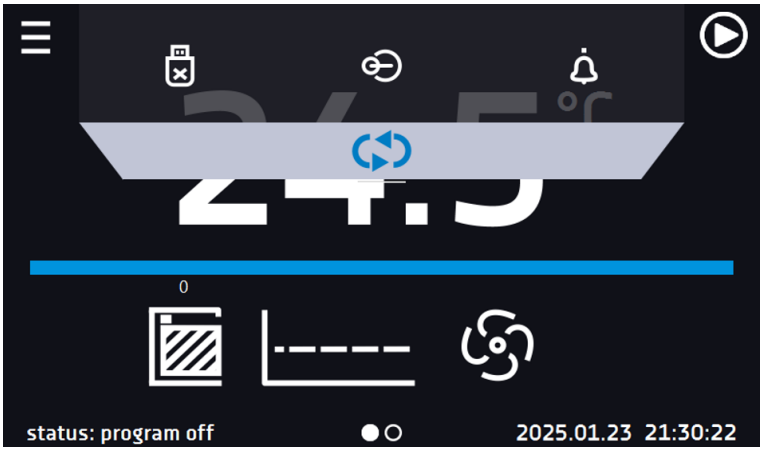
There are the following icons:

-  USB flash drive unmounting – more information *Section 5.8.*
-  mute option. Critical alarms (i.e. damage to the temperature sensor, temperature protection – if available, etc.) continue emitting a sound. See the Section 6.14.1.
- Quick Change (more information Section 6.7.) of:
  -  program duration time
  -  set temperature

*Figure 13 Upper menu when the program is running*

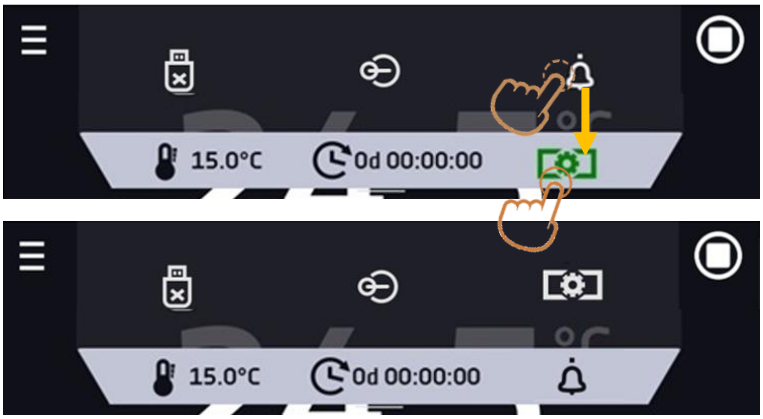



*Figure 14 Upper menu when the program is stopped*




Positions available on the upper bar can be personalized. Just drag the selected icon to a new location.

*Figure 15 Changing icon´s position*




### 6.3.4. Alarm bar

The alarm 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

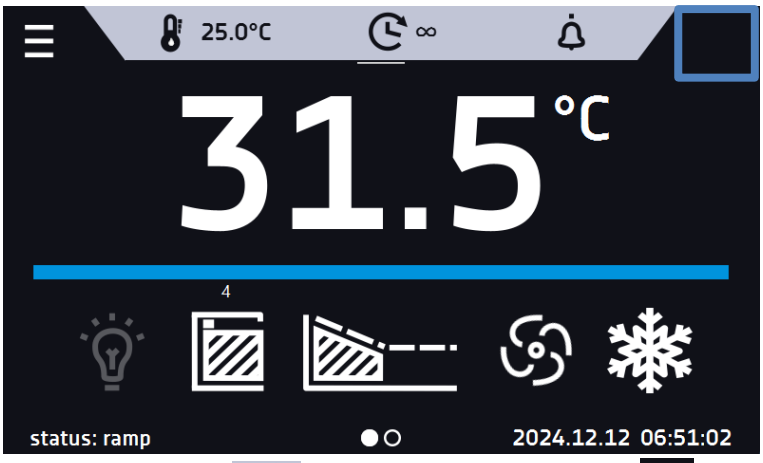
## 6.4. Quick Program

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 16 SMART program*




In order to go to Quick program click the icon in the main screen. By clicking set the temperature

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

*Figure 17 Starting the Quick Program*



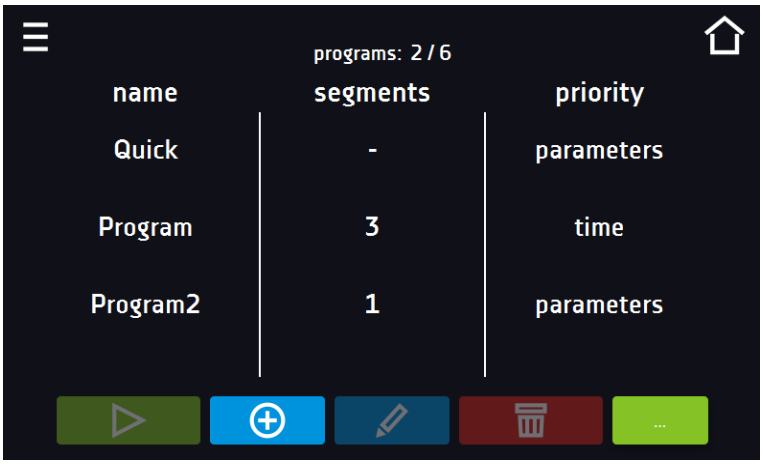

Stopping a Quick program has been made difficult on purpose (this prevents the program from being stopped accidentally) – to stop a program, you have to:

1. go to the menu ☰,
2. click the program window ⚙,
3. keep pressing STOP button ☐ for 5 seconds.

The over and under temperature protections are set automatically: the over temperature protection is the set temperature + 10°C, the under temperature protection is the set temperature -10°C.

After configuriation of the Quick Program, it appears in the programs list. Quick Program is displayed at the top of the list by default.

*Figure 18 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 Quick program is running you can change the temperature by pressing the icon . During next launch of the Quick program, your previous settings will be remembered.

## 6.5. Programs

Press the icon of main menu , and then press . In this panel 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.

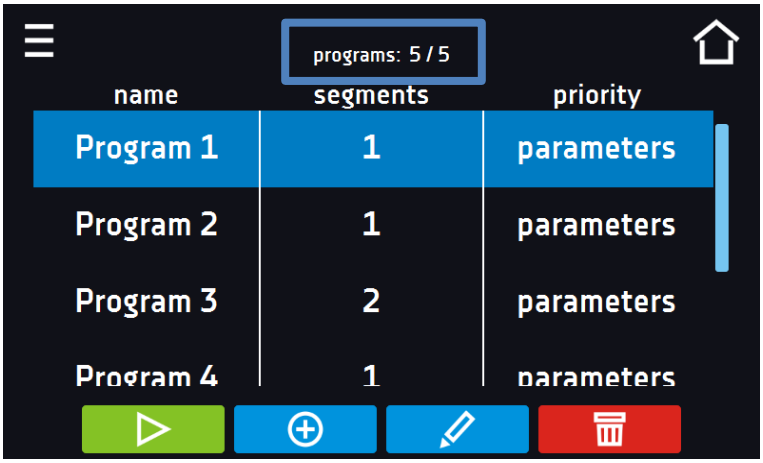
Stop the program.

Add a new program.

Edit the selected program.

Delete the selected program.

*Figure 19 List of programs*



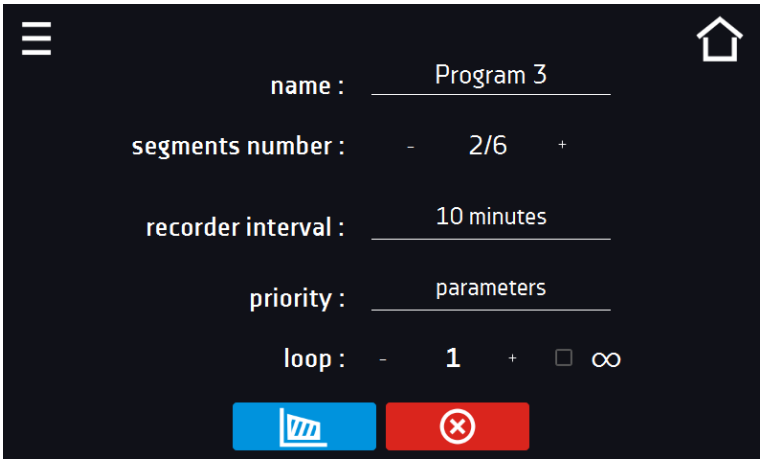

Information on the number of created programs / the maximum number of programs that can be created is at the top of the screen (programs: 5/5).

### 6.5.1. Creating / editing a program

Press the button or and a panel with program parameters will appear.
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 6.5.4.*
- **Protection temperature** – temperature range for the protection class, more information *Section 6.5.5.*
- **Priority** – the priority of time or parameters, more information *Section 6.5.6.*
- **Loop** – the number of program repetitions, more information *Section 6.5.7*.

*Figure 20 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 (parameters priority):
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. 40°C, time 2 hours (after reaching the temperature 40°C, it is maintained for 2 hours)
segment5: temp. 30°C, time 2 hours (after reaching the temperature 30°C, it is maintained for 2 hours)
segment6: temp. 20°C, time 1 hours (after reaching the temperature 20°C, it is maintained for 1 hour)

Press the buton  and the first program segment will appear.
In this window you can set:

- **temperature –** target temperature which the device is to achieve in this segment (needs to be minimum 2°C below the value for over temperature protection and minimum 2°C above the value for under temperature protection),
- **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.

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 is factory set to 100% and it cannot be changed.

| | |
|---|---|
| | **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 cooling or 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 21 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 configuring all segments, a window with the protection class is displayed. For class 2.0 and 3.3 (optional), you can set the protection temperature.

Figure 22. *Security class*

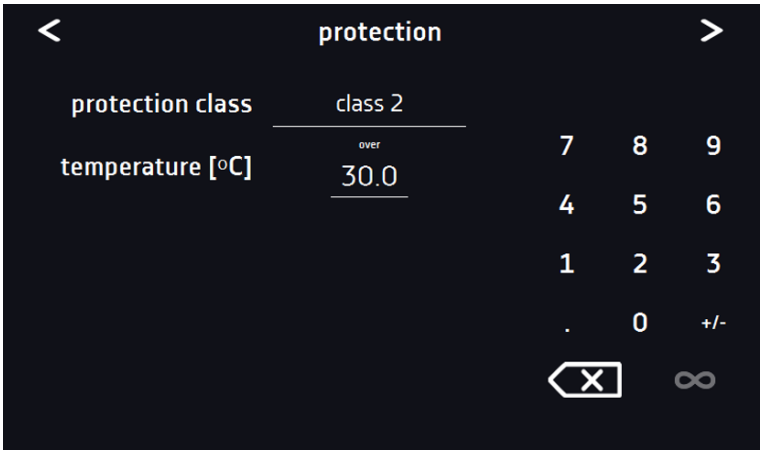
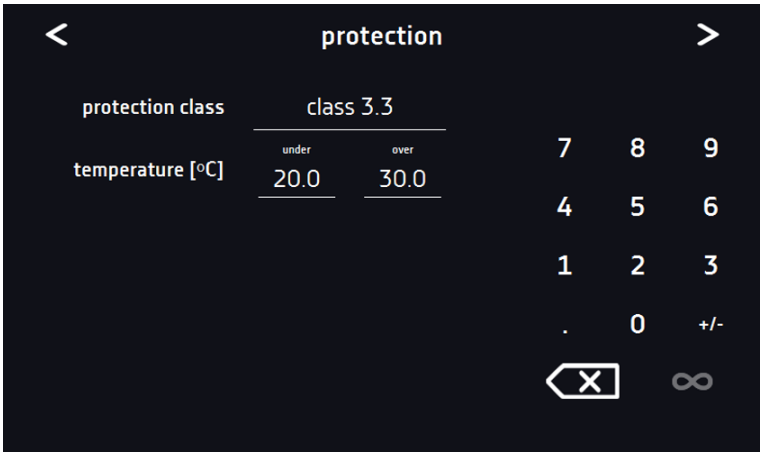
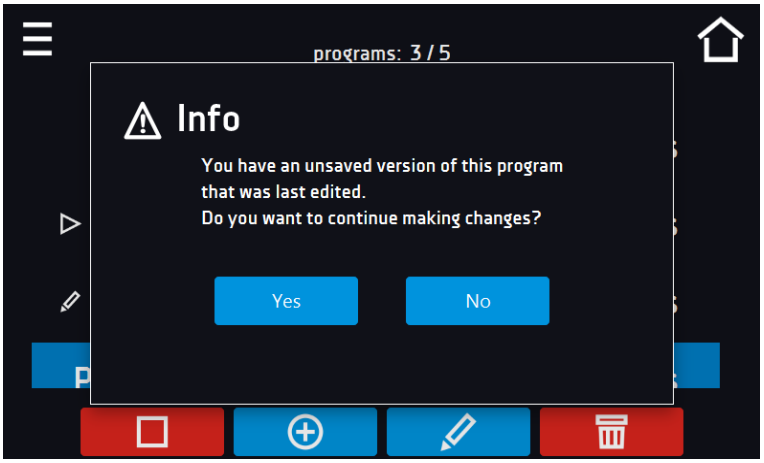



Figure 22. *Security class 3.3*




After switching to the program edition, the information about the possibility of continuing changes in the program settings appears.

*Figure 23 Info*

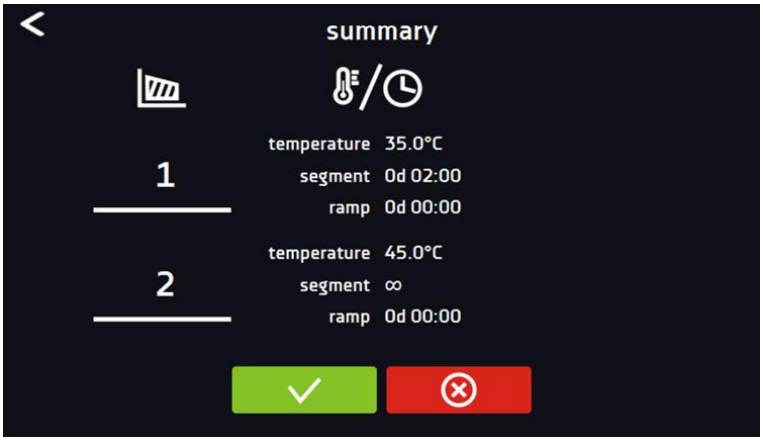


### 6.5.3. Summary of segments

In the segments summary 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 is factory set to 100% and cannot be changed.

*Figure 24 The summary of the segment*






Confirms and saves the changes.



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

### 6.5.4. Protection class

As standard the device is equipped with temperature protection class 2.0 according to DIN 12880 where the user programs the protection temperature and once it's exceeded, the heating system will be cut off. To restart the device, the user must turn the device off and on.

*Figure 25 Confirmation of protection alarm class 2.0*




**Optionally the incubator can be equipped with temperature protection class 3.3 according to DIN 12880** – over and under temperature protection – combination of classes 3.1 and 3.2. - the user programs the protection temperature (over and under) and once it's exceeded, the heating or cooling system will be 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.

### 6.5.5. Temperature protection (option)

The temperature protection value for protection class 3.3 is as follows:

- for set temperature <= + 15°C the bottom protection temperature = set temperature -2°C, upper protection = + 30°C
- for set temperature >= + 15°C the bottom protection temperature = set temperature -5°C (max. 20°C), upper protection = set temperature +5°C (max. 30°C)

### 6.5.6. 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 count-down 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.

### 6.5.7. 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. 10°C, time 2 h
segment2: temp. 30°C, time 2 h,
segment3: temp. 40°C, time „∞"

The device will run segment1 and segment2 three times and then will go to segment3 which will last indefinitely.

### 6.5.8. Defrosting program

In ILP cooled incubators in which the sample is stored at a temperature of ≤ 5°C, ice or frost on the chamber walls may appear. It can be thawed by raising the temperature in the chamber to approx. + 30°C and keeping it for 30 min (you can create a program with the given parameters, which will be visible on the program list and run it if it's necessary to defrost.



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

## 6.6. Starting the program

The created program can be started in two ways:

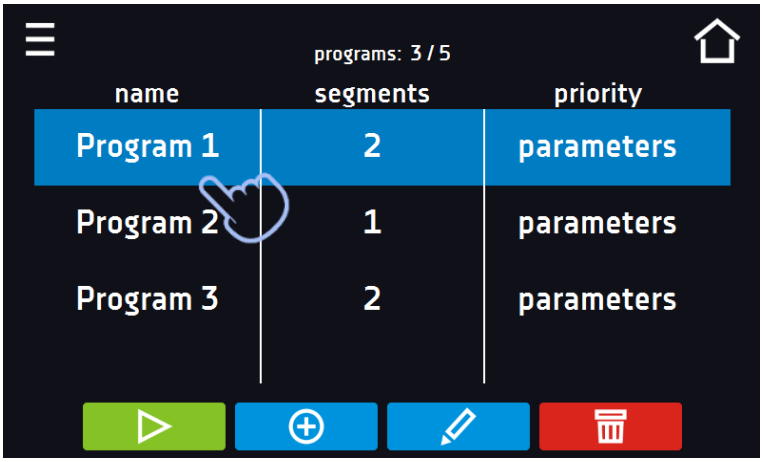
### 6.6.1. The first way

- Go to the main menu and press the icon „programs”.
- Then select the program you want to activate and press „start” button .

*Figure 26 Main menu*

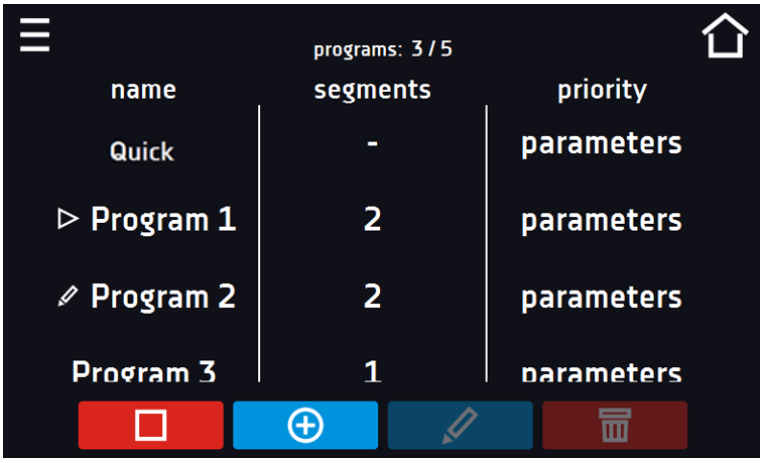



*Figure 27 Program management menu*




Start the program

*Figure 28 List of programs with the selected status*




### 6.6.2. The second way

- In the main screen press the icon in the upper right corner .
- Select the program you want to start. 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 29 Main screen*

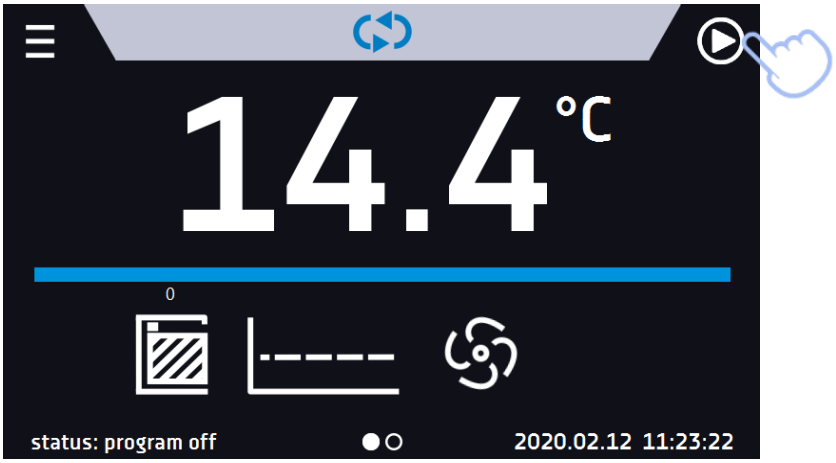
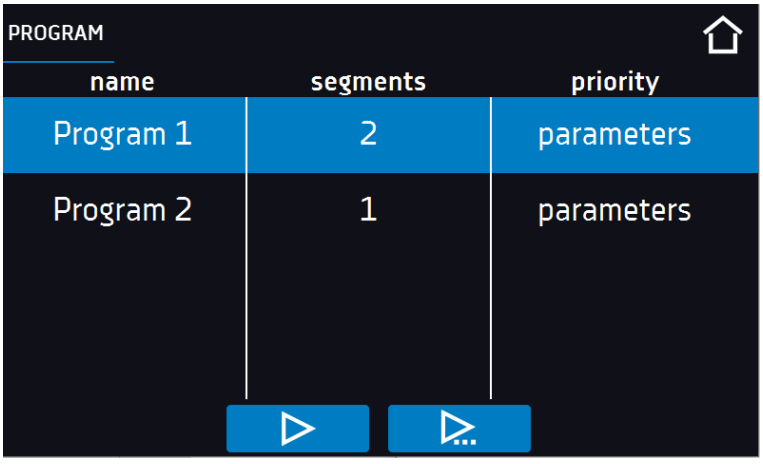
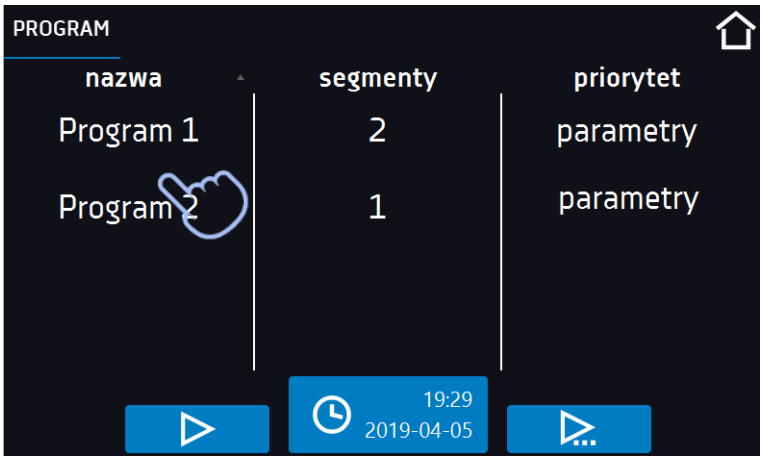



*Figure 30 Selection from the program list*






| | |
|---|---|
| | It is possible to delay the program start (up to a maximum of 7 days).. 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. The value of the temperature should be selected by scrolling the list up or down. 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 31 Quick temperature change – selection*

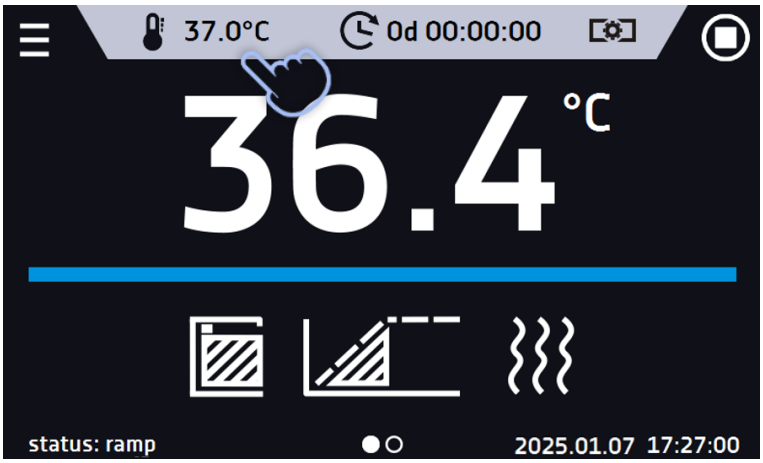
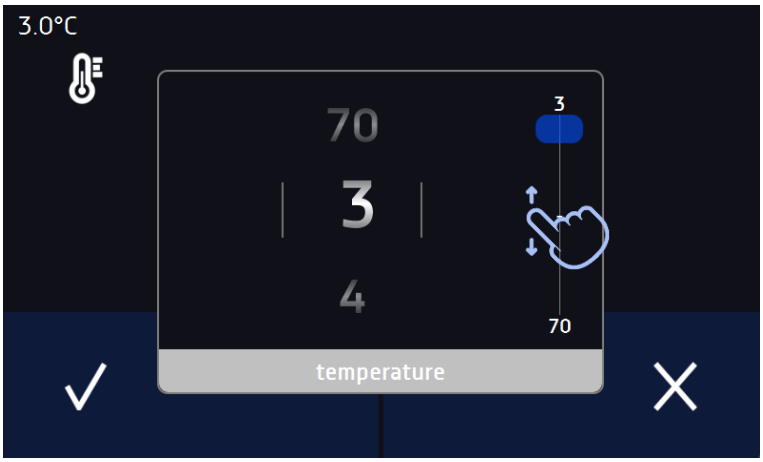


*Figure 32 Quick temperature change - setting the value*




### 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. Select the number of days, hours and minutes by scrolling the list up or down. 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 33 Quick change of the set time - selection*

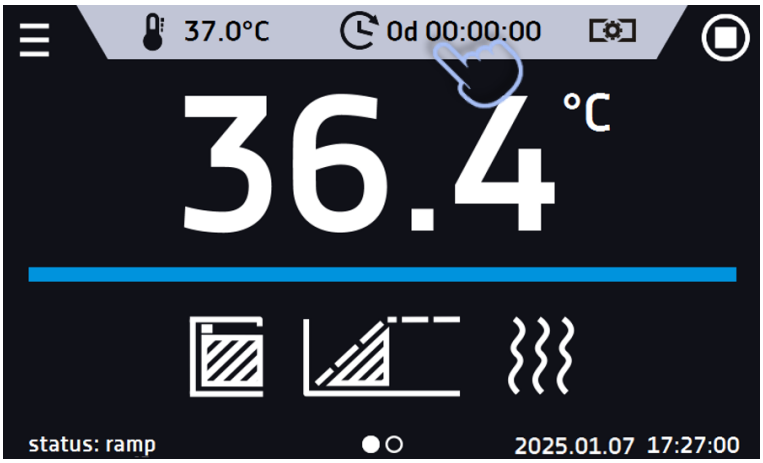
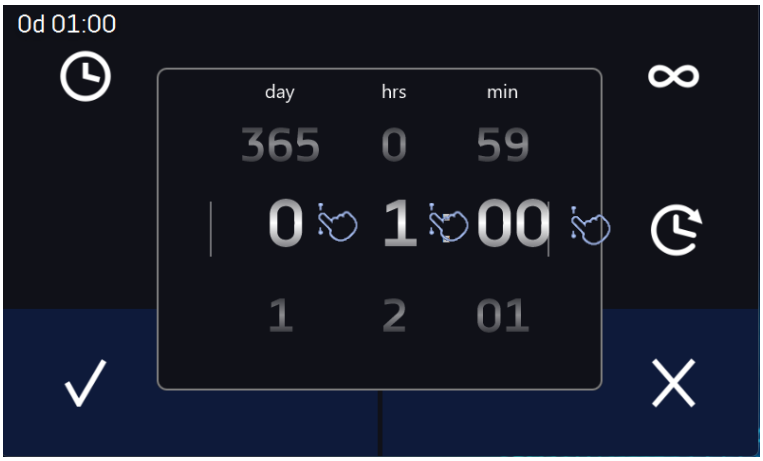


*Figure 34 Quick change of the set time - setting the value*



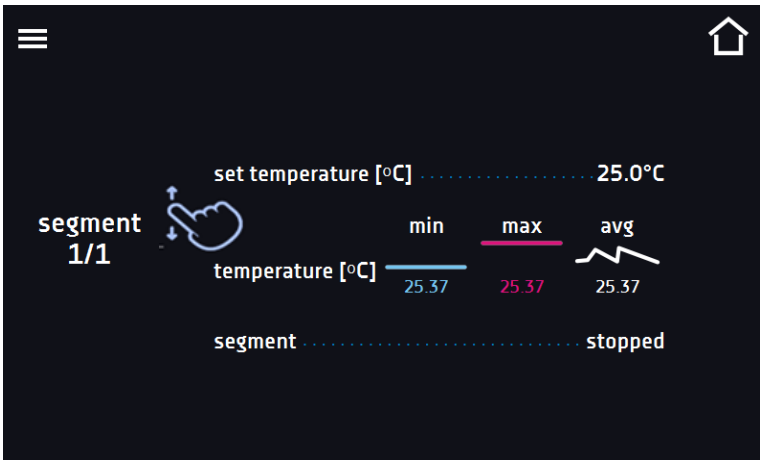

## 6.8. Statistics

Go to the main menu and press the icon . This panel 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 / cycle data that has not started yet. |

*Figure 35 Statistics*



## 6.9. Data record

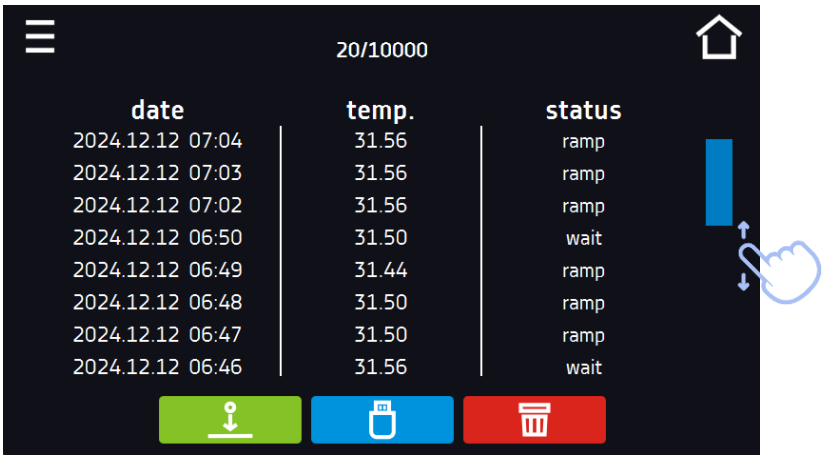
Go to the main menu and press the icon . Data record window contains the following information:

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

Each user can 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 5.8*.

Deleting data

If there is a lot of data, a progress bar appears on the display:

*Figure 37 Progress bar*

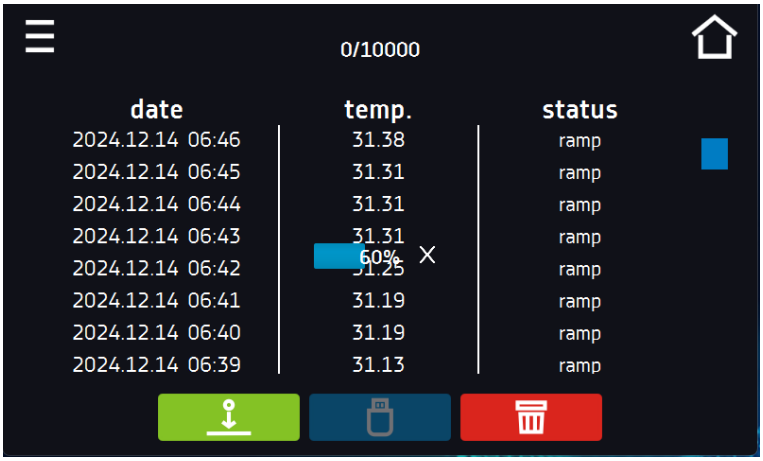
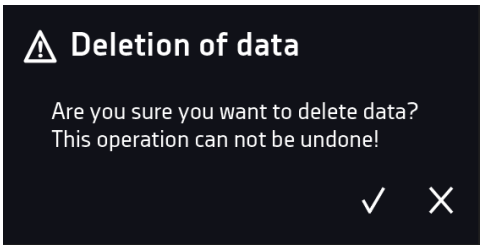



*Figure 38 Deleting data*

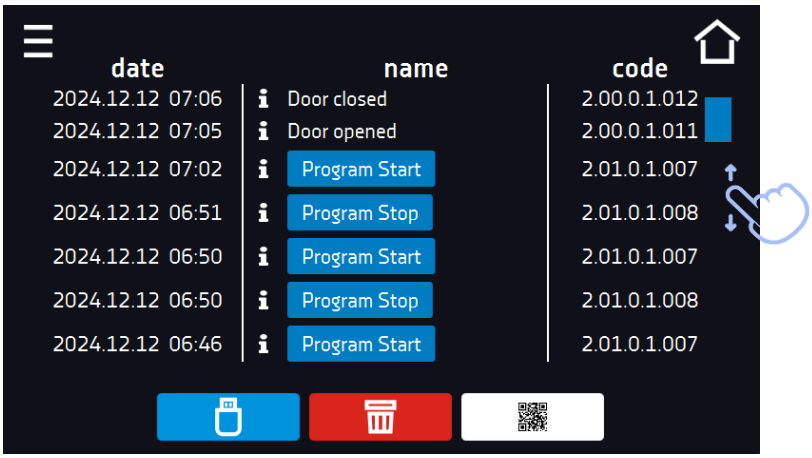



## 6.10. Event log

The log can store up to 10,000 esvents. When the memory reaches its capacity, new data automatically overwrites the oldest entries.

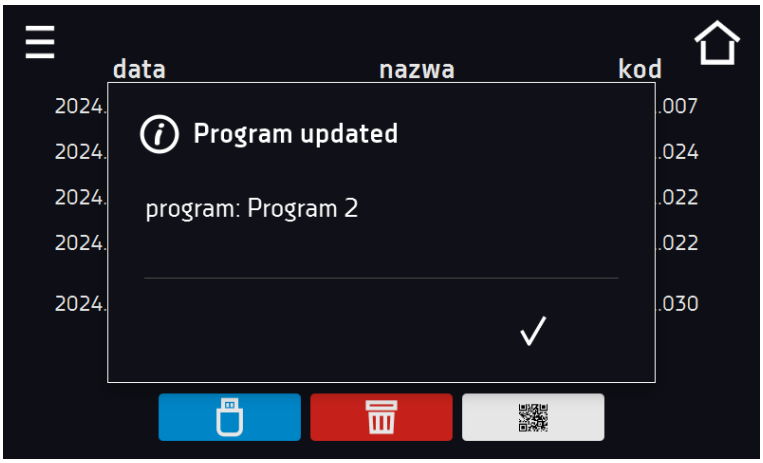
Go to the main menu and press the icon . The window displays information about registered events, alarms and errors.

*Figure 43 Event log*




For program-related events, after pressing the event name, the program name is displayed.

*Figure 44 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 5.8*.

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 5.8.*

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 deactivated |
| **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 |
| **Power Fail Start** | power failure / device fuse blown out. |
| **Power Fail Stop** | power reasumed, returned to maintain program parameters |
| **Confirmation of the quick start guide** | This appears once the user has confirmed that they have read the Quick Start Guide |

## 6.11.  *Info*

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

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

*Figure 41 Info window (example)*




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 - for more information go to the *Section 6.1*. 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.

Press the icon ... to see additional information about software version.

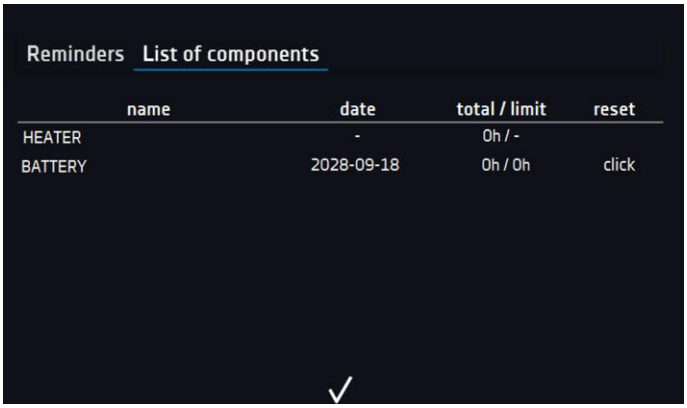
*Fig.42.* Software versions




When you press the icon A list appears showing reminders and parts that need replacing.

When you press the button info the software licence is displayed.

*Fig.42.* list of components

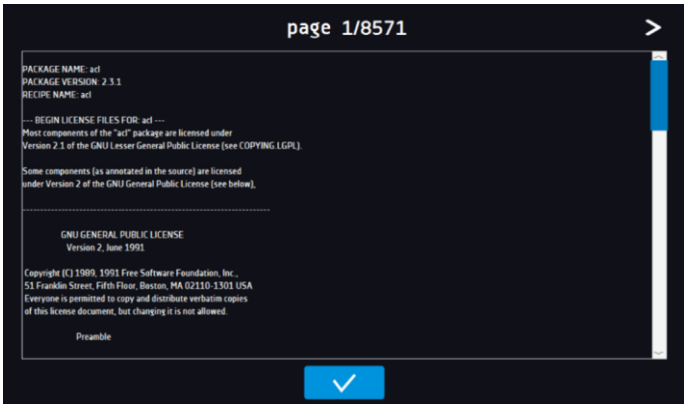


From the ‘List of components’ screen, you can confirm that the battery has been replaced in devices equipped with a battery-powered display backup option.
After replacing the battery, you should:

1. press the ... button,
2. press the icon,
3. select the List of components tab,
4. in the BATTERY row, press the click button. This button is only available for the battery,
5. after pressing the click button, the date for the next battery replacement will be automatically updated by adding 25 months to the date on which the reset was performed.

After confirming the replacement, restart the device.

*Fig.43.* Licencja oprogramowania



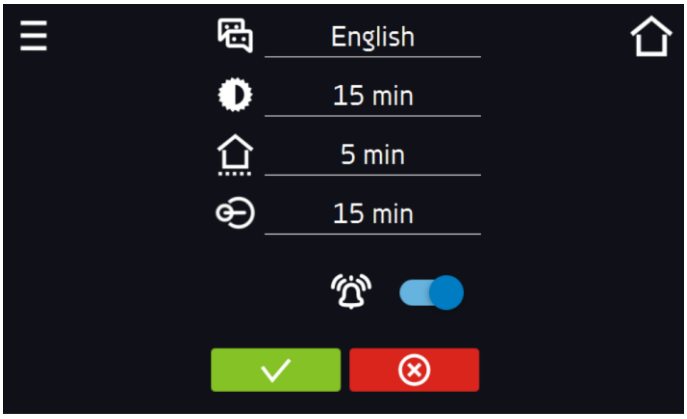

| | |
|---|---|
|  | Before removing the USB flash drive from the USB port, it must be unmounted, see *Section 5.8.* |

## 6.12. User settings panel

Go to the main menu and press the icon . In this panel 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*



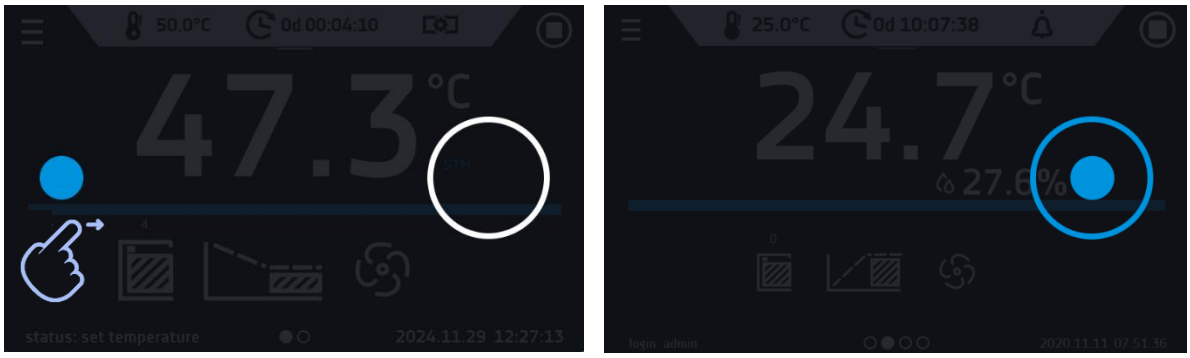

Confirms changes

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

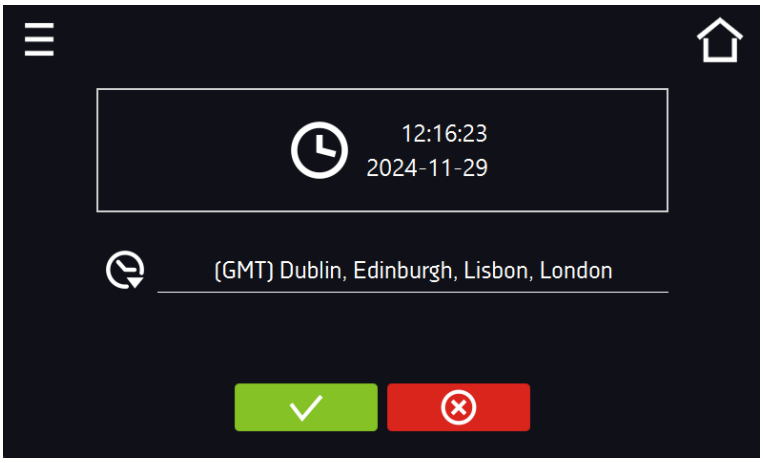
| | |
|---|---|
| | If the date / system time is changed to the later date / time comparing with the data and events which are stored in the memory, they will remain in the register. If the date / system time is changed to the earlier date than the date / time which is stored in the memory, they will 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. The window will appear and you will be able to make changes.

*Figure 44 Time zone change*




Confirms changes and restarts the device

Cancels the entered changes

*Figure 45 Date / time change*




## 6.14. Alarms

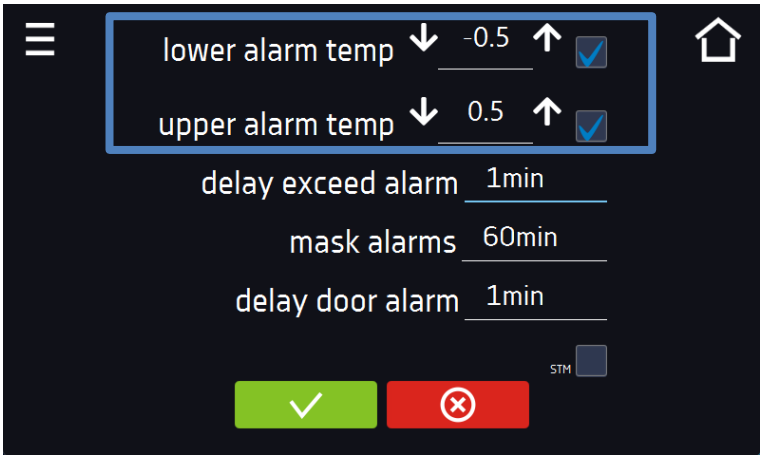
### 6.14.1. Alarms when set parameters are exceeded

Press the main menu icon , and then press . Here you can set parameters related to alarms

- **low alarm –** an alarm will be generated if the temperature drops below the set value by the value specified in this field,
- **high alarm –** an alarm will be generated if the temperature increases above the set value by the value specified in this field.

| | |
|---|---|
| | In the "lower alarm" field you can enter a value from the range of -0.5°C to -5°C, and in the "upper alarm" field from the range of 0.5°C to 5°C. |

*Figure. 46. Parameter exceedance alarms*






Confirm the changes.



Cancels the entered changes.

The upper and lower alarms can only be generated when the set temperature is reached.

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

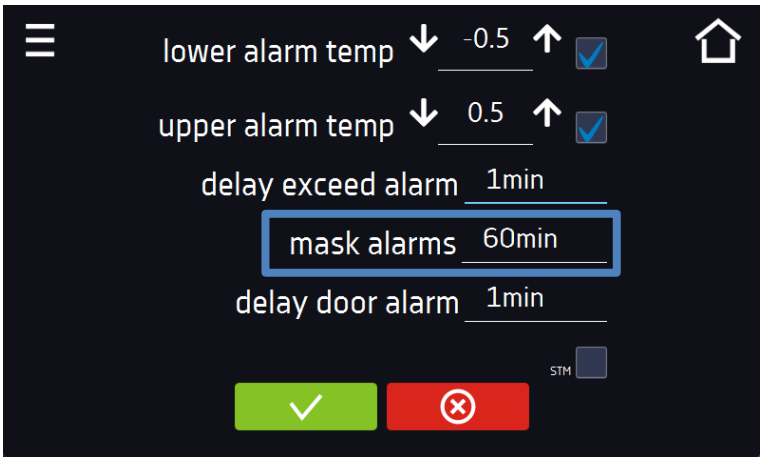
### *6.14.1.1. Masking of parameter exceedance alarms*

Masking of alarms when the set parameters are exceeded can be used when new samples are added to the chamber or samples are added to those already incubated. During these activities, the set parameters, i.e. temperature, may be exceeded and alarms may be activated - parameter exceedance alarms are set assuming that stable conditions prevail in the chamber (temperature) and the door is closed. After opening the door and placing the samples in the chamber, time is needed for the parameters to stabilize - the alarm masking function allows you to delay alarms when the parameters are exceeded.

The parameter exceedance alarm will be triggered with a delay (15 min, 30 min, 45 min, 60 min, 120 min, 150 min, 180 min) after inserting new samples. The time is counted from the last time the door was opened. Setting 0 s means masking is disabled.

| | |
|---|---|
| | If the door is opened during the parameter exceedance alarm, the ongoing alarm will not be "masked". Only the next alarm can be masked. |

*Figure.47. Alarm masking*






Confirm the changes.



Cancels the entered changes.

*Figure.48. Alarm masking enabled*

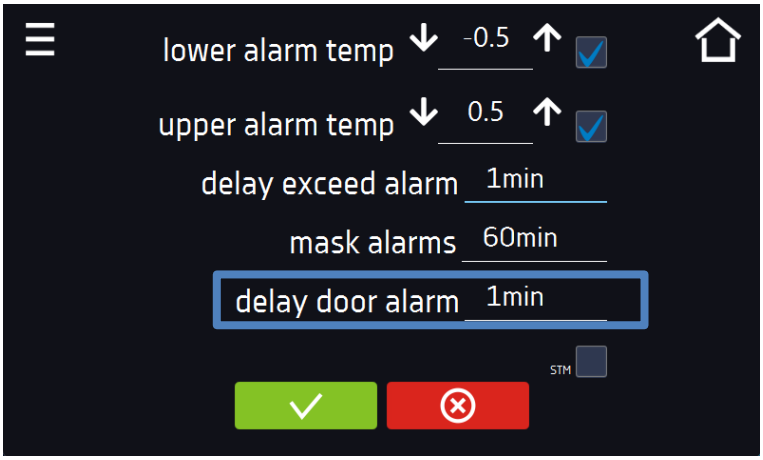



### 6.14.2. Open door alarm

All devices are equipped with an open door sensor. If the door is left open longer than the time set by the user, an acoustic signal, a red flashing alarm bar and a "door open" alarm with the status "active" will appear.

- **door open alarm delay**:
  The door alarm will sound when the door is open for the user-selected time
  (30 sec, 1 min, 2 min, 5 min, 10 min).

*Figure.49. Open door alarm delay*



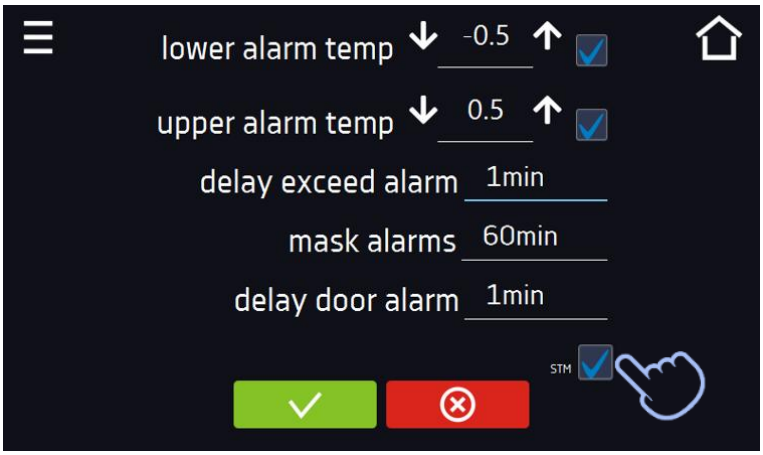

 Confirm the changes.

 Cancels the entered changes.

### 6.14.3. STM function

The STM (Smart Temperature Monitor) function informs the user if there is a problem in reaching or maintaining the set temperature. The user can enable/disable the function.
If the STM function is enabled, the STM symbol will appear on the screen next to the temperature of the main sensor.

*Figure. 50. Enable/disable STM function*




 Confirm the changes.

 Cancels the entered changes.

The function status is indicated by color:

- no inscription – option disabled,
- white color – option enabled, program is stopped,
- blue color – option enabled (temperature monitoring), program running,
- red color – option enabled, warning about problems with achieving/maintaining temperature.

*Figure. 51. STM Function - option enabled, program is stopped*

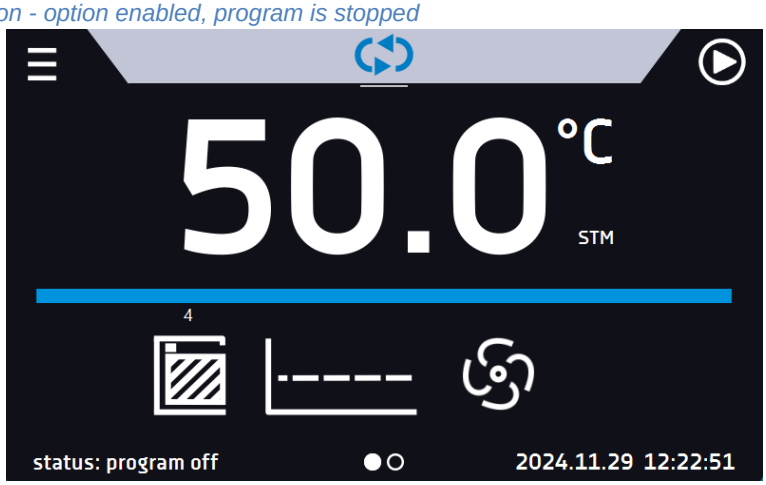



*Figure. 52. STM Function - option enabled, program running*

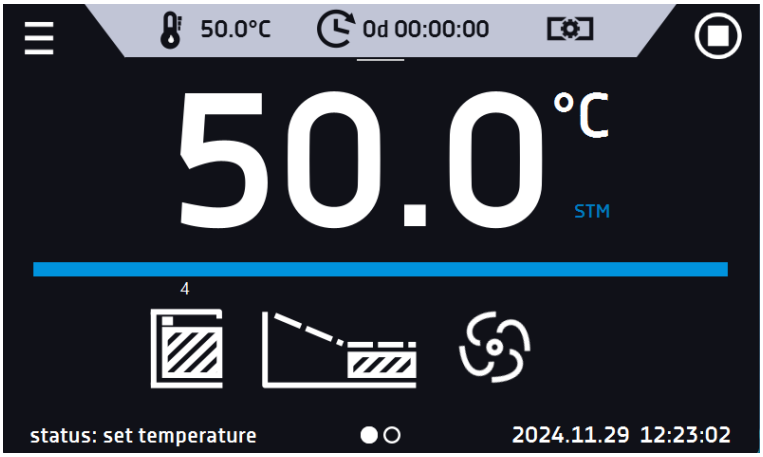
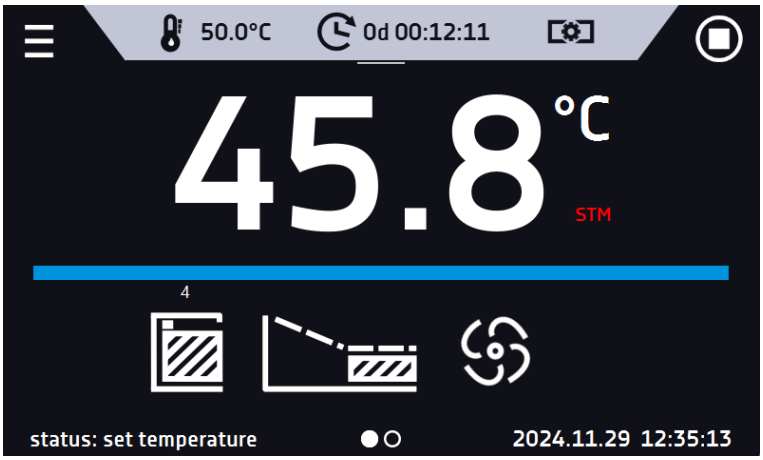



*Figure. 53. STM Function - option enabled, warning about problems with achieving/maintaining temperature*




Possible causes of operation:

1. damaged heater,
2. the cartridge inserted into the chamber absorbs / releases too much energy.

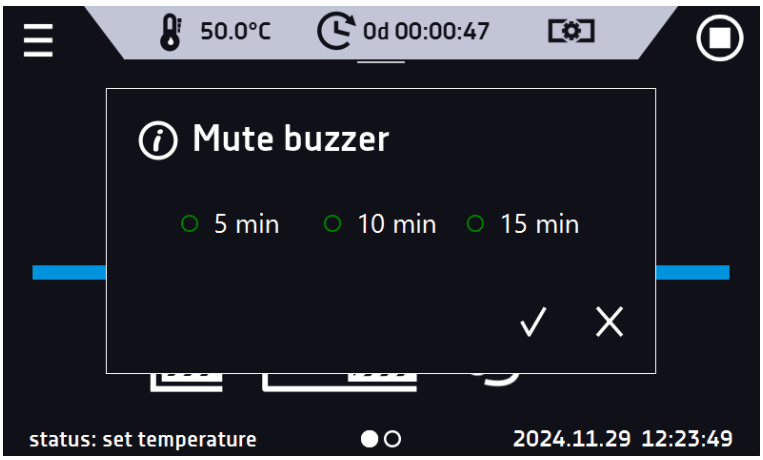
If the color was red before opening the door, then the color changes to blue after opening the door.
If the function is activated (detection of problems with achieving/maintaining temperature):

- the warning 4.00.0.1.009… appears in the event log.
- the color of the STM inscription changes to red and remains red throughout the disruption, segment change, and program shutdown.
- when the state changes from red to blue, an entry about the end of function 4.00.0.1.010 appears in the event log.

## 6.15. 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, however, the sounds of critical alarms (e.g. damage to the temperature sensor, over- and under-temperature protection) will be still emitted.

*Figure 54 Mute function*




## 6.16.  Network

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

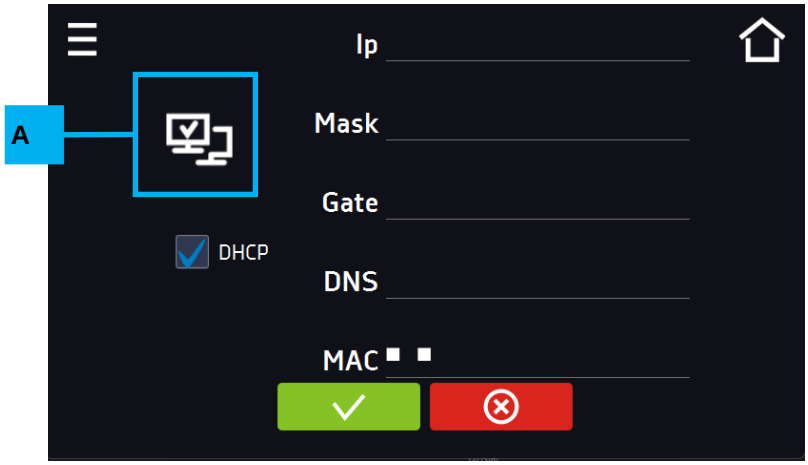
- **IP** – the device's IP address
- **Mask** – an Ethernet network mask to which the device is connected
- **Gate** – Server's IP address or router's that manages the Ethernet network
- **DNS** – IP address of the domain name system
- **MAC** – the address of the network card, read-only
- **DHCP** – 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  indicates the connection status:

 Device connected to the network

 Device disconnected from the network

*Figure 55 LAN settings*




Confirms changes

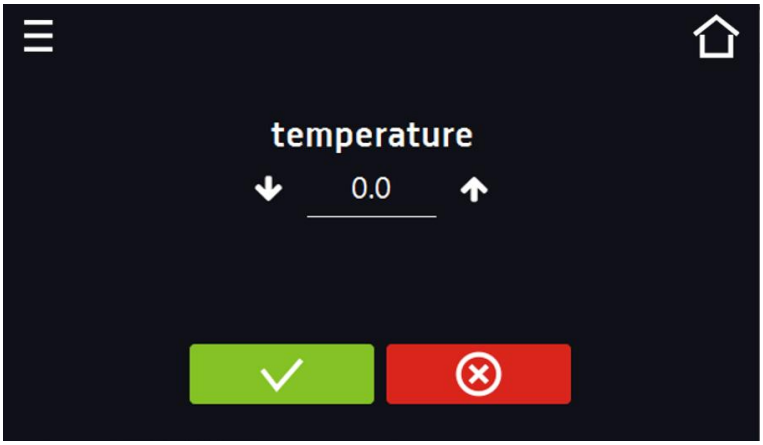
Cancels the entered changes

## 6.17. Corrections

Go to the main menu and press the icon . In this window 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 20,0°C and the average temperature measured by independent, external sensor indicates 20,5°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 56 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<br>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<br>b1 – upper temperature alarm<br>b2 – lower temperature alarm<br>b3 – over Protection<br>b5 – main sensor error<br>b7 – protection sensor error<br>b8 – temperature sensors error<br>b10 – hardware error<br>b11 – MRW error |

## 7.2. Network and Communication Requirements

To ensure proper operation of the functions listed below, the following network connections and services must be allowed.

### 7.2.1. Communication with the LabDesk Cloud Service

The device must be allowed to establish outbound connections to the host:

- mqtt.labdesk.cloud

using the following ports and protocols:

| Service | Port | Transport protocol |
|---|---|---|
| MQTT | 1883 | TCP |
| MQTTS | 8883 | TCP |

Additionally, the following must be allowed::

| Service | Address / Host | Port | Transport protocol |
|---|---|---|---|
| ICMP (ping) | **8.8.8.8** | - | ICMP |
| NTP | 0.europe.pool.ntp.org (default) | 123 | UDP |

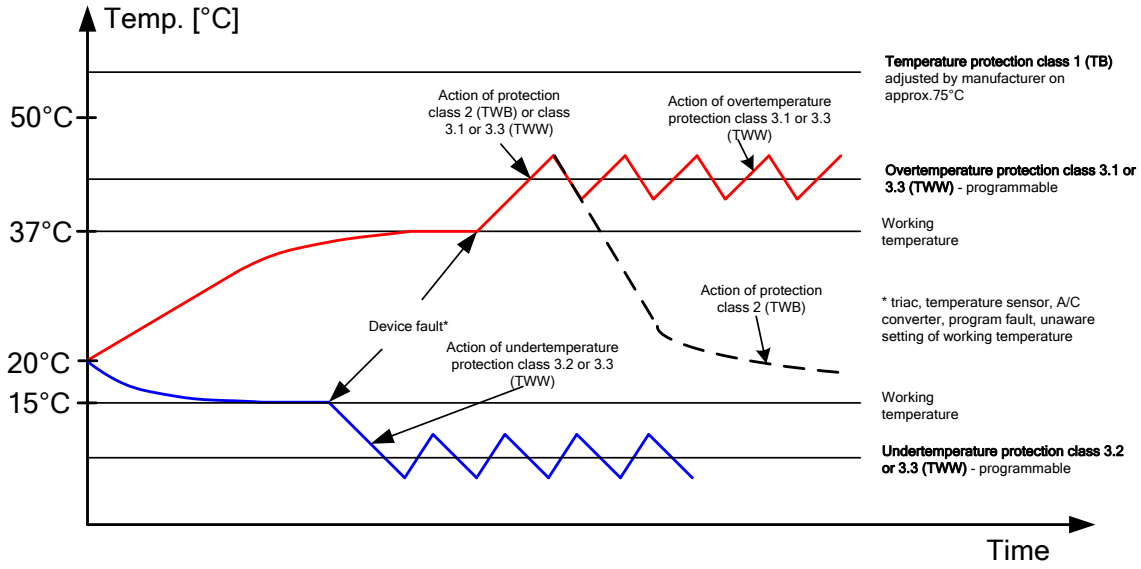
# 8. TEMPERATURE PROTECTION

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*

Standard equipment in the ILP cooled incubators with SMART controller is protection class 2.0 according to DIN 12880.

Optionally in ILP SMART cooled incubators there's a protection class 3.3 according to DIN 12880. When the set temperature is exceeded, the cooling or 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. 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.

# 10. OPERATION OF THE COOLING SYSTEM

The ILP incubators have a cooling system based on Peltier cell technology. The cooling system consists of Peltier modules that act as a heat pump which transports heat / cold in a direction dependent on the direction of current flow. The incubator's cooling system is constructed of Peltier modules, fans and heat sinks. Unlike systems with refrigeration units, it is characterized by long trouble-free operation, no moving parts, the possibility of reverse operation (quick and easy transition from cooling to heating mode and vice versa), quiet operation and lack of environmentally harmful and flammable refrigerants.

# 11. 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.** |

## *11.1. 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. |

## *11.2. Interior cleaning*

The interior of ILP incubators is made of stainless steel 0H18 acc. with DIN 1.4301. Stainless steel 0H18 also corrodes, but much less and slower than other types of steel. To slow down the corrosion process as much as possible, this type of steel requires regular maintenance and cleaning. Avoid aggressive cleaning agents and preparations based on chlorine and bleach, do not allow stainless steel to come into contact with non-alloy steel, unless you are dealing with ground steel, and avoid materials that may scratch the surface.

| | |
|---|---|
| **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.** | To clean the device, use a lint-free, lint-free, soft cloth and water or water with a mild detergent. |
| **4.** | In the case of ground steel, movements should be made in the direction of grinding on the surface. |
| **5.** | If rust occurs:<br>- slight discoloration - use household cleaners for stainless steel containing calcium carbonate or citric acid,<br>- medium discoloration - clean with a 10% phosphoric acid solution; after cleaning, neutralize the acid with diluted ammonia or a mild alkaline detergent,<br>- severe rust - use products for pickling and passivation of steel - for example Pelox FR-D |

| | |
|---|---|
| | After each cleaning, wipe the surface thoroughly with clean water. |
| **6.** | Having finished cleaning, you should allow the device to dry fully and instal all parts removed before cleaning. |
| **7.** | During cleaning you should make sure not to damage the temperature sensors which are located inside the chamber. |
| **8.** | At least one a month clean the radiator and external fans with a vacuum cleaner. The radiator and external fans are located at the back of ILP incubator.  |

## 11.3. 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 57 Locking the screen*




The screen is ready to be cleaned.

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

*Figure 58 Unlocking the screen*







## 11.4. Consumables

Consumables during normal operation are:

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

# 12. 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%. |

# 13. TROUBLESHOOTING

**Before you contact Service Department:**

| | |
|---|---|
| **1.** | Make sure that the operation complies with the instruction manual of the device. |
| **2.** | If an alarm or error message occurs, check its meaning and the recommended corrective actions at https://smart4lab.eu/smart-en/, under the SUPPORT tab. |
| **3.** | 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

## *13.1. 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 cooling down | Check if the unit is exposed to direct sunlight | Change the location of the unit |
| | Check if there is a heat emitter near the device | Change the location of the unit |
| | Check if the door is closed properly | Clean the gasket |
| 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. |

# 14. WARRANTY CONDITIONS

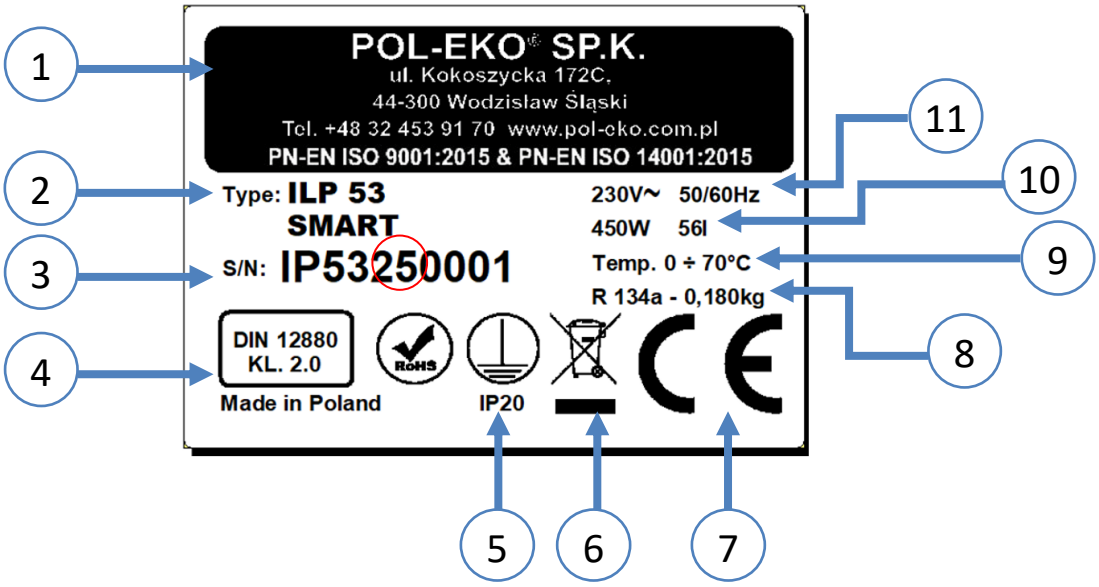
POL-EKO® warrants that this product will be free from defects in material and workmanship for a period of two (2) years from the date of the invoice. In the event of a defect, contact your dealer. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, 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.

**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.

# 15. 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. Temperature range of the device
9. Information about the device - capacity of the chamber
10. Information about the device - maximum power consumption,
11. Acceptable range of voltage and frequency of mains supply

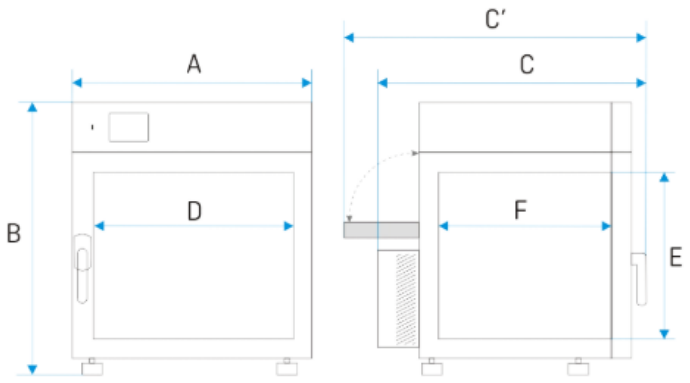
The numbers marked with a red circle indicate the year of manufacture of the device.

# 16. 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).

| Parameter | | ILP 53 | ILP 115 | ILP 240 | ILP 750 |
|---|---|---|---|---|---|
| Air convection | | forced | | | |
| Chamber capacity[1] [l] | | 84 | 153 | 315 | 923 |
| Working capacity [2] [l] | | 55 | 107 | 237 | 749 |
| Door | | solid + internal glass door | | | |
| Temperature range [°C] | | 0...+70 (max 20°C below ambient temperature) | | | |
| Controller | | microprocessor with external touch screen | | | |
| Interior | Smart | Corrosion-resistant stainless steel to DIN 1.4301 | | | |
| | IG Smart | Corrosion-resistant stainless steel to DIN 1.4301 | | | |
| Housing | | linen finish stainless steel | | | |
| Overall dims [mm] | A widith | 600 | 660 | 820 | 1270 |
| | B height | 710 | 860 | 1140 | 1580 |
| | C depth [3] | 690 | 780 | 840 | 950 |
| | C' depht | 790 | 880 | 940 | 1040 |
| Internal dims [mm] | D widith | 400 | 460 | 600 | 1040 |
| | E height | 390 | 530 | 790 | 1200 |
| | F depth | 350 | 440 | 500 | 600 |
| Weight (kg) | | 69 | 90 | 140 | 240 |
| Shelves fitted/max | | 2/5 | 2/7 | 3/10 | 5/16 |
| Max shelf workload [kg][4] | | 25 | 25 | 25 | 25 |
| Max unit wor-kload [kg] | | 50 | 50 | 90 | 140 |
| Power supply 50/60 Hz [V] | | 220-240 | | | |
| Nominal power [W] | | 500 | 650 | 800 | 1400 |
| Warranty | | 24 months | | | |

1. Chamber capacity (gross)
   The maximum theoretical internal volume of the chamber, calculated based on its internal dimensions, without taking into account equipment and structural elements. An informational value, always higher than the working (net) capacity.
2. Working capacity (net)
   The actual working space of the chamber available for loading products, excluding fixed and structural elements (e.g. fans, evaporators, air ducts, guide rails). It defines the real amount of material that can be placed inside the device.
3. depth does not include 50mm of power cable
4. on uniformly loaded surface



# 17. DECLARATION OF CONFORMITY

## DEKLARACJA ZGODNOŚCI UE

## *EU DECLARATION OF CONFORMITY*

| **Produkt:** | ***Product:*** |
|---|---|
| Inkubator z chłodzeniem Peltiera | *Peltier- cooled incubator* |
| **Model:** | ***Model:*** |
| ILP 53; ILP 115; ILP 240; ILP 750 | |
| **w wersjach:** | ***in version:*** |
| SMART; IG SMART | |
| **Nazwa i adres producenta:** | ***Name and address of the manufacturer:*** |
| POL-EKO® A.Polok-Kowalska sp.k.<br>ul. Kokoszycka 172 C, 44-300 Wodzisław Śląski<br>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<br>EMC 2014/30/UE<br>RoHS 2011/65/UE & 2015/863UE<br>WEEE 2012/19/UE | LVD 2014/35/EU<br>EMC 2014/30/EU<br>RoHS 2011/65/EU & 2015/863EU<br>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<br>PN-EN 61010-2-010:2020-10<br>PN-EN 60529:2003/A2:2014-07 |
| EMC | PN-EN IEC 61326-1:2021-10 |
| RoHS | PN-EN IEC 63000:2019-01 |

Wodzisław Śl. 10.07.2024

Podpis / Signature:

Dawid Rybarz
Dyrektor Techniczny (CTO)

**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

POL-EKO Laboratorium Pomiarowe

PCA Polskie Centrum Akredytacji >o< WZORCOWANIE

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

**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

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

PN-EN ISO 9001 ISOCERT CERTIFICATE

PN-EN ISO 14001 ISOCERT CERTIFICATE

POL-EKO®

(+48) 32 453 91 70
info@pol-eko.com.pl
www.pol-eko.com.pl

**POL-EKO® A.Polok-Kowalska sp.k.**
44-300 Wodzisław Śląski
ul. Kokoszycka 172 C