INSTRUCTION MANUAL

Thermostatic cabinets

models: ST BASIC, ST COMF, ST COMF/S, ST PREM, ST PREM/S

Laboratory Refrigerators

models: CHL BASIC, CHL COMF, CHL COMF/S, CHL PREM, CHL PREM/S

Laboratory Freezers

models: ZLN COMF, ZLN COMF/S, ZLN PREM, ZLN PREM/S,
ZLW COMF, ZLW COMF/S, ZLW PREM, ZLW PREM/S,
ZLN-UT COMF, ZLN-UT COMF/S, ZLN-UT PREM, ZLN-UT PREM/S

Caution:
Before using the device first read carefully this manual!

Manufacturer:
POL-EKO-APARATURA
version 5.09
Date 18.05.2018

Contents

1 SCOPE OF DELIVERY FOR UNITS IN STANDARD VERSION

Table 1 Scope of delivery for ST cooled incubator and CHL refrigerators.

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.]	2	2	2	2	2	2	2	2	2	2
Key lock [pcs.]	2	2	2	2	2	2	2	2	2	2
Calibration certificate [pcs.]	1	1	1	1	1	1	1	1	1	1

Table 2 Scope of delivery for ZLN, ZLN-T, ZLW-T freezer.

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

Anchoring kit for devices ST and CHL:

- 1/1/1
- 2/2
- 2/3
- 2/4
- 3/3

2 SAFETY PRECAUTIONS

	**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!** **The manufacturer does not take any responsibility for any damage which results from disobeying the instruction manual and misuse!**

	This symbol indicates helpful tips.

2.1 Safety Precautions

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

1.	**<u>The unit cannot be installed:</u>** - outside, - in damp places or places which can be easily flooded, - near flammable or volatile substances, - near acids or in corrosive environments.
2.	**<u>It is forbidden to:</u>** - store inflammable or volatile substances inside the unit, - touch live parts of the unit, - operate the unit with wet hands, - put water vessels on the unit, - climb or put any objects on the unit, - touch the compressor and condenser while the unit is connected to the mains, - do not overload the shelves (the maximum load is described in technical data), - do unauthorized repair work, - touch the condenser as it heats up during operation and can cause burns.
3.	**<u>You should:</u>** • place samples in such a way to provide proper air circulation in the chamber • open the door for the shortest period of time to reduce temperature fluctuations • defrost the chamber more often if you open the door a lot or store humid samples • if possible, do not store warm samples • secure powdery samples from being blown out by the chamber fan • always check that the doors are closed • use only mains with earth to avoid electric shocks, • unplug the power cable holding the protective cover and not the cable itself, • disconnect the unit from the mains before undertaking any repairs or maintenance works, • protect the power cable and the plug from any damage and do not use the plug if it is improperly plugged in or if the cable is laid incorrectly, • disconnect the power plug before moving the unit, • disconnect the unit and protect it from reconnecting if it has any visual faults, • use suitable protective gloves depending on the temperature inside the chamber, • connect the device directly to the power supply (not recommended to use extension).

2.2 Personal protective equipment

Concerns ZLN-UT range:

	**Inside the chamber there is extremely low temperature. Do not touch the samples and interior of the chamber without appropriate protective gloves!**

Concerns ST range:

	**Inside the chamber there is high temperature (up to 70°C). Do not touch the samples and interior of the chamber without suitable protective gloves!**

3 ENVIRONMENTAL PROTECTION AND DISPOSAL OF THE UNIT

The packaging protects the unit from any damage during transportation. The packaging is harmless to the environment and can be recycled. Please handle it according to the environmental protection regulations or dispose it. The unit itself can be recycled in order to save the resources. The unit is marked according to European Union directives on waste electrical and electronic equipment (WEEE2). This directives determine the return and recycling conditions and are valid in all European Union member states.

PLEASE HELP US PROTECT THE ENVIRONMENT!

We would like to inform you that we have taken all the necessary steps to make sure that the unit will meet your requirements and will work reliably. Due to the fact that we constantly improve our products and extend their range, we invite you to provide us with any feedback. All opinions are welcome! Visit us at: www.polekolab.com

4 GENERAL CHARACTERISTICS

The ST - thermostatic cabinets and CHL – laboratory refrigerators are used to store a variety of samples in constant temperature. The devices ST – thermostatic cabinets can work in temperatures ranging from +3°C to +40°C or +70°C (option) there are various versions with photoperiodic system available for night/day simulation, refrigerators CHL from 0°C (option -10°C) to +15°C . ZLN/ZLW freezer can work in temperature ranging from -40^{o}C to 0^{o}C (not applicable for ZLN85 in which temperature range is from -25^{o}C to 0^{o}C). ZLN-UT freezer can work in temperature ranging from -86^{o}C to -40^{o}C.

CHL and ST devices are available in the following configurations:

Model:	**Material of housing**	**Material of interior**	**Class of standard temperature protection**	
			CHL	**ST**
BASIC	Powder coated sheet	aluminum	kl. 1.0	kl. 1.0
COMF	Powder coated sheet	Stainless steel DIN 1.4016	kl. 1.0	kl. 1.0
COMF/S	Polished stainless steel	Stainless steel DIN 1.4016	kl. 1.0	kl. 1.0
PREM	Powder coated sheet	Stainless steel DIN 1.4301	kl. 1.0	kl. 2.0
PREM/S	Polished stainless steel	Stainless steel DIN 1.4301	kl. 1.0	kl. 2.0

Optional class 3.2.

ZLN/ZLW/ZLN-UT devices are available in the following configurations:

Model:	**Material of housing**	**Material of interior**	**Class of temperature protection**
COMF	Powder coated sheet	Stainless steel DIN 1.4016	kl. 1.0
COMF/S*	Polished stainless steel	Stainless steel DIN 1.4016	kl. 1.0
PREM	Powder coated sheet	Stainless steel DIN 1.4301	kl. 1.0
PREM/S*	Polished stainless steel	Stainless steel DIN 1.4301	kl. 1.0

* not applicable to ZLN-UT

The insulation layer is made of polyurethane foam. Shelves inside the cabinet, made of polyethylene-coated steel wire or or stainless steel (for INOX version), have adjusted height (not applicable to ZLN-UT).

The thermostatic cabinet can be ordered with glass door (A version), solid door (B version) or double door (C version), refrigerator with glass or solid door and freezer with solid door. At the top of the device on the front there is the control panel, on the back there is the main switch (ZLN-UT double door).

Control Panel which control the unit is located in the front, upper part above the doors (ST, CHL, ZLN85) or in the front, lower part below the door (ZLN/ZLW 125, ZLN/ZLW 200, ZLN/ZLW 300, ZLN-UT200, ZLN-UT300).

You can record temperature data (and relative humidity if featured) in the memory. After you have connected your unit to a PC, you can view all stored data.

Door can be locked with a key (except ZLN 75, ZLN 145 and ZLN 180).

5 BEFORE THE FIRST USE

The default device is protected with foamed polystyrene profiles and foil, packed in a cardboard box or crate.

It is necessary to transport it in the upright position and prevent it from any unintended movements.

On the surface of unit 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.

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.

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.

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

- Ambient temperature +10°C...+28°C, for cabinets with glass door (A version) +10°C...+25°C,
- Low relative humidity of the ambient air to 60%*
- The unit has not been designed to work in highly dusty environments
- The unit should be put on a hard and stable substrate
- The unit should be placed at least 100mm away from the wall
- The height of the room must be at least 300mm greater than the height of the unit
- This unit may not be exposed to direct sunlight
- The unit should be kept away from any heat sources*
- The unit is not designed to be built-in
- The place of installation of the unit should contain a mains socket.

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

If you don't comply with the above recommendations, the unit may get broken.

Multi-chamber devices should be anchored to the wall with appropriate fixings (supplied with the device),

If you don't comply with the recommendations of place of installation, you may lose your 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 equal or higher than 45°C, the compressor will not start working. It will not be possible to cool the chamber.
- 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.
- in highly humid environments, control the frosting of evaporator and walls more often than recommended. If necessary, perform the defrosting operation.

Sudden temperature changes related to e.g. opening of the door does not pose a threat to stored products (vaccines in particular) - the temperature variation is short-lived.

The electric installation should meet the following conditions:

	The unit is an alternating current device - 230V/50Hz. Please connect it to a socket with ground in order to avoid electric shocks in case of the unit's failure.

The electric installation should be secured by a 16 A antisurge fuse.

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

	Only for 500, 700, 1200, 1450 models: There is a pipe at the rear of the units to remove condensation. You should install a container at the end of the pipe (not supplied with the unit).

	The castors should not be used for transporting the unit. Use them only to place the unit in its destination.

	During operation: door units must be tightly closed, the access ports for the introduction of an external sensors must be sealed plugs supplied. Failure to follow these guidelines may cause unstable operation, excessive deposition of ice, in extreme cases, can lead to damage of unit.

Applies to ZLN-UT unit:

-86°C working temperature is the temperature limit. The stability of the unit with the filled workload is better than with empty working chamber. The optimal freezer operation temperature is -80 ° C (the unit then obtains the best stability).

5.1 Wear parts

During normal work the following parts could be worn:

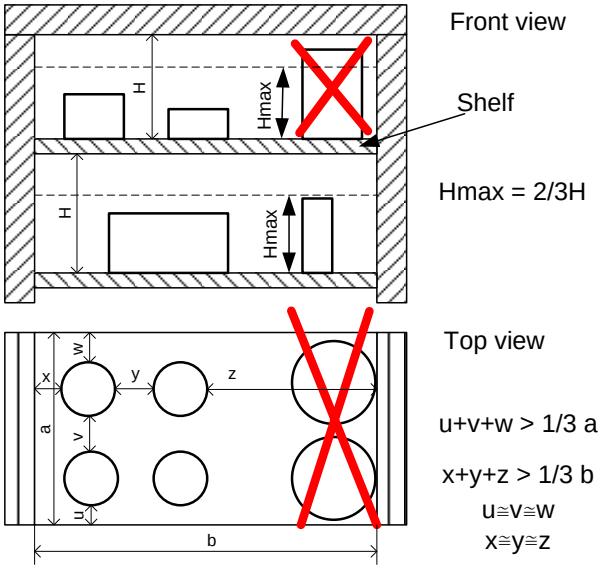
- halogen bulb of interior lighting (not applicable ZLN/ZLN/UT and device with option FOT)
- device with option FOT - fluorescent lamp

5.2 Placement of the 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 2/3 of the space below the shelves
- the samples should be placed in such a way that so that the horizontal surface between the containers does not exceed 1/3 of the width and height of the empty shelf
- the space between the samples and between the samples and the wall should be more or less equal

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



Following the above rules will provide best temperature stability.

5.3 Information on the stored samples

Water may gather on the inside of the chamber. It is a result of condensation of the water vapour located in air if the set temperature is considerably lower than the ambient temperature. It is forbidden to store moist or wet workload, it may freeze to the chamber surface.

The amount of water depends on the following factors:

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

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

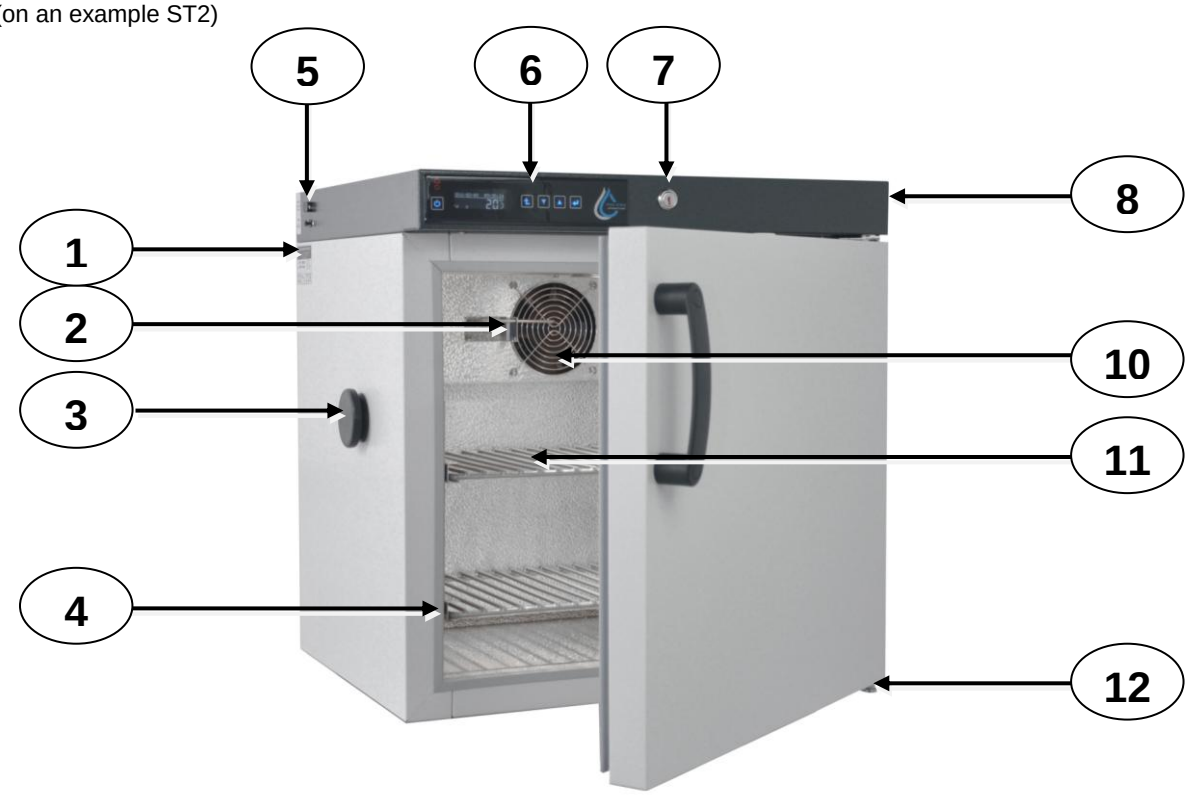
Do not use any cardboard boxes, sponges and other hygroscopic materials for storing the samples since they may increase the relative humidity in the chamber.

	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.

6 DEVICE DESCRIPTION

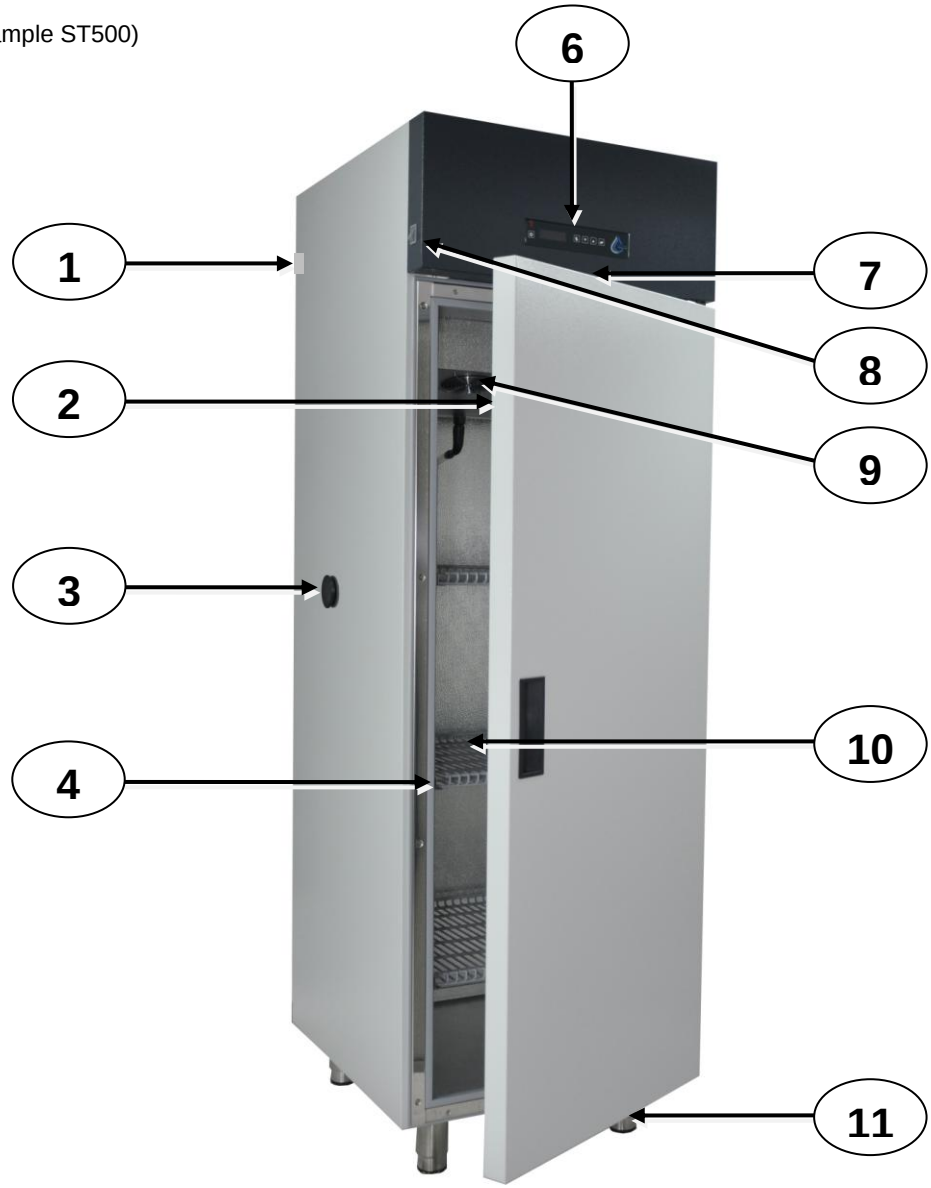
6.1 ST and CHL

(on an example ST2)



(1) Nameplate
(2) Temperature sensor \ fan
(3) Access port Ø30mm for external sensor
(4) Slides
(5) RS-232C (or RS-485/RS422-option) and USB socket
(6) Control panel
(7) Key lock
(8) Main switch
(9) Chamber fan
(10) Shelves
(11) Adjustable legs

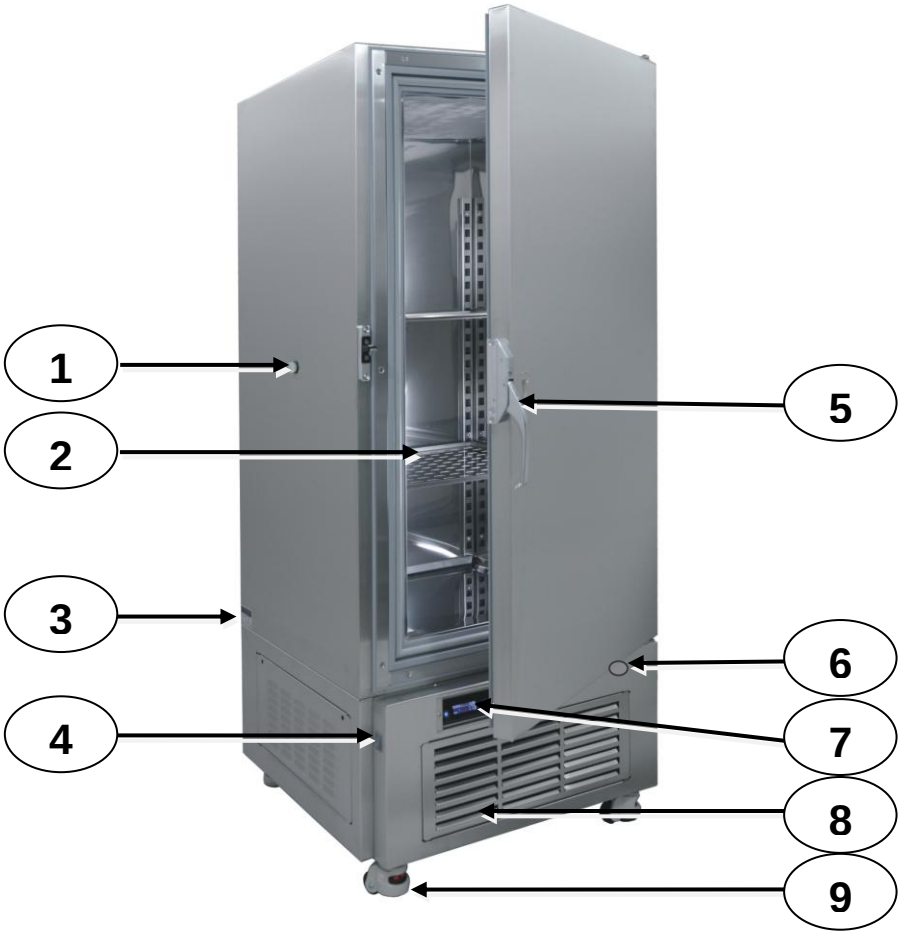
(on an example ST500)



(1) Nameplate
(2) Temperature sensor \ fan
(3) Access port Ø30mm for external sensor
(4) Slides
(5) RS-232C (or RS-485/RS422-option) and USB socket (the back of the device)
(6) Control panel
(7) Key lock
(8) Main switch
(9) Chamber fan
(10) Shelves
(11) Adjustable legs/Wheels

6.2 ZLN, ZLW and ZLN-UT

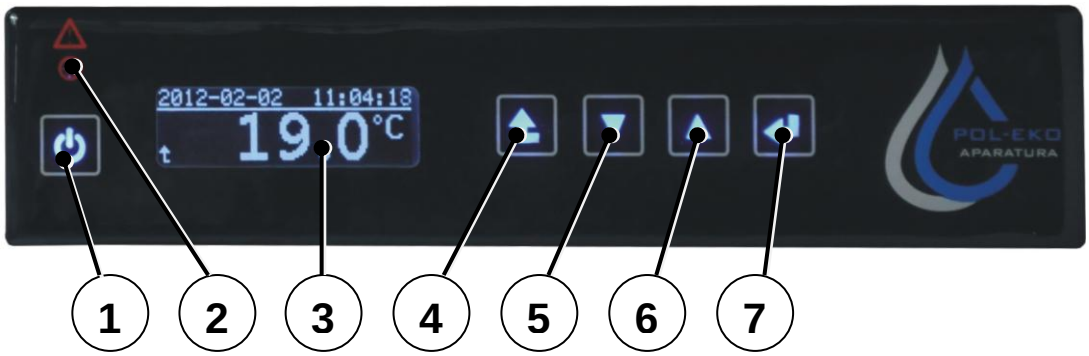
(on an example ZLN 300)



(1) Acess port
(2) Shelves \ Internal chambers (only for ZLN-UT)
(3) Nameplate
(4) Main switch
(5) Door handle
(6) Battery backup switch (only for ZLN-UT)
(7) Control panel
(8) Condenser
(9) Adjustable legs with blockade (only for ZLN-T 300, ZLW-T 300, ZLN-UT 300)

6.3 Control panel

The control panel is used to check the current temperature inside the chamber as well as to program and set up the parameters of the device.



(1) Standby button
(2) Alarm signalization (red LED).
(3) LCD graphical display.
(4) Escape/exit button.
(5) Down button.
(6) Up button
(7) Enter/accept button.

The value may be changed by the following buttons: / *up/down* (selection keys) . Confirm using the enter button. The program continues to set the next parameter. If the parameter value is incorrect, using the selection keys / *up/down* select the parameter again and set the correct value. To exit the current window, please press down the ESC button.

For units with internal lighting (OWW):

Interior lighting is switch on automatically after door opening and it switch off after door closing. Please press down the enter button and hold it for about 1 sec to switch on the light. Once the light has been switch on, a bulb icon will appear on the display.

When buttons are illuminated and the display is blank, the touch keyboard is locked. To unlock, press and hold the button

6.4 Programming possibilities

There are two temperature program modes of the device: simple and complex. In the simple mode the stress is on maximum simplification of the programming procedure. The only parameter needed to start the program is setting up the desired temperature.

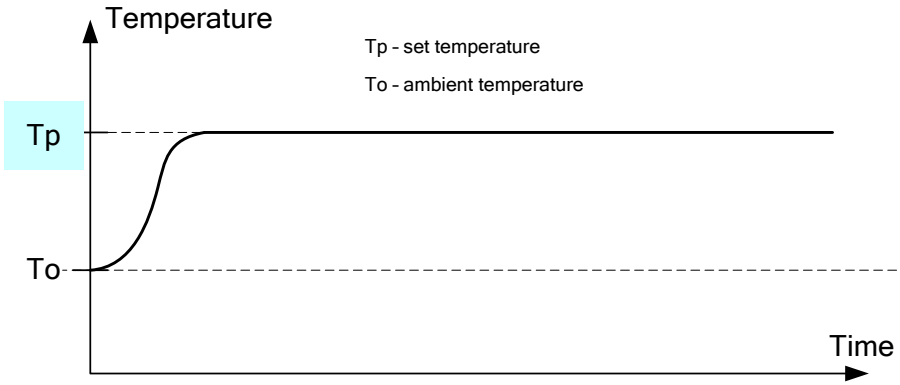
The complex mode (in ST devices) offers more possibilities in terms of programming the temperature, it is also possible to set up a six-segment time-temperature program.

Programming mode is defined in the menu settings (parameter **Prog.mode**)

The possibilities of the program controlling the operation of the device depend on the type of the device. The most advanced software allows storing up to 3 six-segment programs. The software controlling the operation of the cooling cabinet, the low-temperature cooling cabinet and the freezer allows storing only one single-segment program.

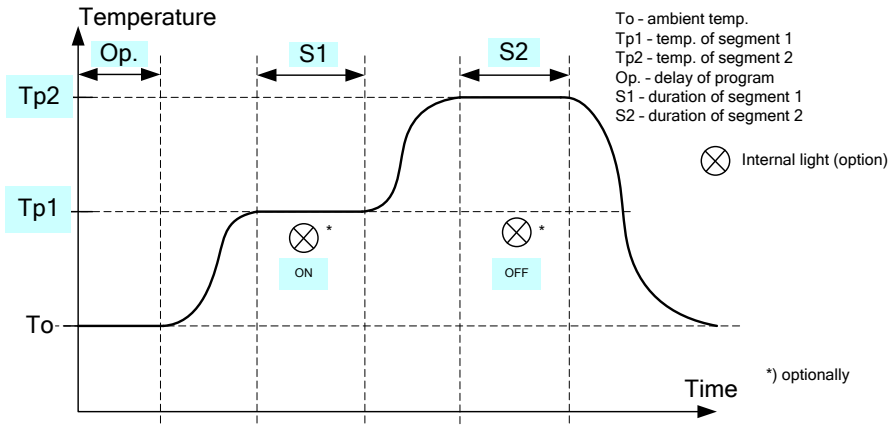
Device series	ST,	CHL,	CHL-T,	ZLN, ZLN-T	ZLN-UT	ZLW
Number of programs	3	1	1	1	1	1
Number of segments in each program	6	1	1	1	1	1

Simple mode



Operating the device in this mode is extremely simple, with temperature being the only parameter needed to set up.

Complex mode (only ST)



The complex mode is used when there is a need to conduct research requiring varied temperature with specific duration. In this mode you can also store programs consisting of a maximum of six segments. For each segment you can set up temperature and its duration. For units with photoperiodic system you may also switch on/off the light inside the chamber. For devices with the "WENT" option, the fan control is additionally set (50-100%).

7 OPERATING THE DEVICE

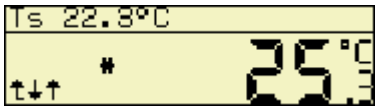
7.1 Start-up

To start-up the unit, please use the on/off switch that is located either in the upper front, upper left or upper rear part of the equipment (depending on the model).

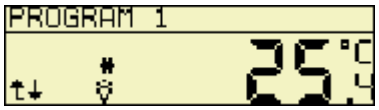
To enter the parameters, please use the control panel which is located in the upper front part of the unit.

After the unit has been switched on, there is a self test of the following parts performed: EEPROM memory, Data Flash memory, real time clock RTC, and a temperature sensor. After a successful auto-test, you will see the main screen on the display:

After switching the power, automatic buttons are locked. To start the work, hold the button.

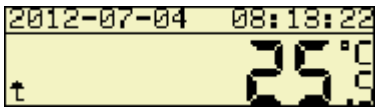


- unit working in simple mode (see point 8.1)



- unit working in complex mode (see point 8.2 I 8.3), program 1 is active.

	If the device has been switched off during an active program, it will automatically resume once the device has been switched on again.



- no program is being carried out.

Equipment with a power failure alarm battery suspension option:

	In case of power failure, the unit sends a text message with the information. The control panel will remain switched on, but the unit will not maintain any parameters, as heating/cooling systems will be inactive.

	If you don't follow the sequence below, the unit may send text messages about power failure.

Start-up

To start-up the unit, please perform the following sequence:

- ⇒ after connecting the unit to the mains, please switch it on using the on/off switch that is located in the front part of the equipment
- ⇒ after a successful start-up operating the unit is the same as in case of a standard version

Switching off the unit

- ⇒ please press down the button which is located below the control panel
- ⇒ after a successful shut down, there is no illumination of the display
- ⇒ the user may switch off the unit completely using the on/off switch located in the front panel

	Use the main switch to turn off the unit only if you are not going to use it for a longer period of time (e.g. a couple of days) or for maintenance.

7.2 Temperature control

The device has been adjusted and calibrated by the manufacturer. The calibration is carried out in accordance with the manufacturer's procedures and instructions, using instruments which are inspected regularly.

Temperature is measured by a sensor (sensors for class 3.2.) built inside the chamber and its value shows on the display of the control panel. The device has been calibrated in such a way that the display shows the temperature in the middle of the chamber.

7.3 Fan chamber

(Not applicable devices ZLN and ZLN-UT)

Inside the chamber of the device ventilator is installed which is to provide appropriate air circulation. The air intake and exhaust of blower cannot be blocked out. In devices with WENT option, you can adjust the fan speed in percents (50-100%).To avoid air exchange between air in the chamber and air outside, after open the door fan is automatically shut down.

	If you adjust fan chamber below 100%, the stability and uniformity of temperature inside chamber could be worst than declared into catalogue parameters.

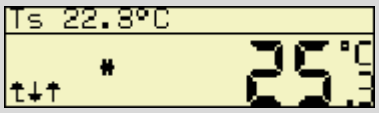
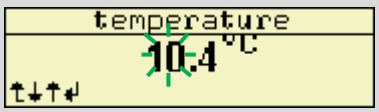
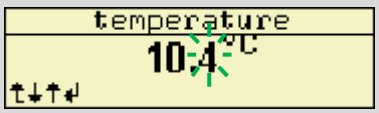
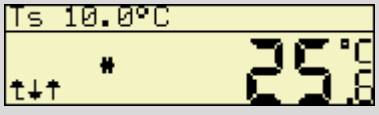
8 HOW TO OPERATE THE CONTROLLER

8.1 Simple mode

This mode arised to simplify the operation of the unit. The unit turned on in this mode will work constantly (non-stop), with possibility to change set temperature anytime.

After the unit has been turned on, you can see the set temperature on the display. You can change the value using the UP/DOWN / buttons. Press ENTER to confirm.

Example:

	Press UP or DOWN to edit the temperature.
	The temperature will flicker. Use UP or DOWN to set a new temperature. Press ENTER to confirm.
	Use UP or DOWN to set the decimal value and confirm with ENTER.
You can press ESC at any time to cancel.	
	A new temperature has been set.

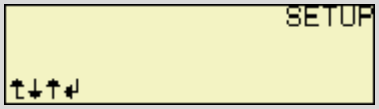
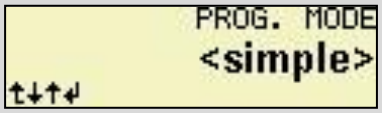
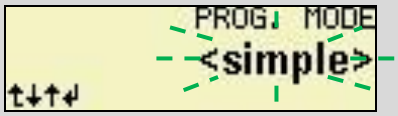
Pushing button will cause the stop of program and switch the unit to standby. When you quit standby mode the device will not continue to maintain the temperature. Pushing the main switch will cause switching off the device, after turning it on again, the device will continue to maintain the set temperature.

8.2 Switching between simple and complex modes

Concerning only ST devices

The complex mode is used when there is a need to conduct research requiring varied temperature with specific duration. In this mode you can also store programs consisting of a maximum of six segments. For each segment you can set up temperature and its duration. For units with photoperiodic system you may also switch on/off the light inside the chamber.

To switch from simple to normal mode, perform the following steps:

	In the main window press ESC to enter the MENU.
	Enter SETUP using ENTER. Press down and choose PROG.MODE.
	Press ENTER. The setting will flicker.
	Press and choose **>complex<**. Confirm with ENTER.

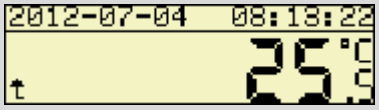
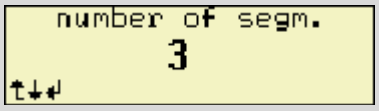
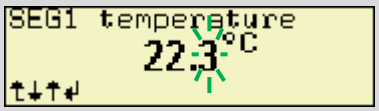
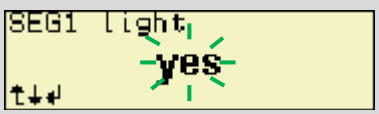
To switch from complex to simple mode, perform the above steps analogically.

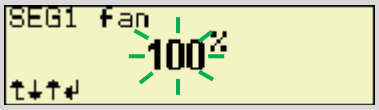
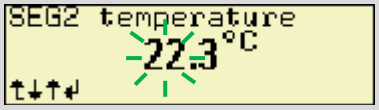
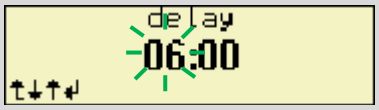
8.3 Complex mode

8.3.1 Editing program parameters

	It is impossible to make changes to a currently running program – it needs to be terminated first.

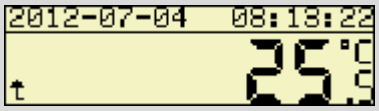
	You can press ESC ⬆ at any time to cancel.

	In the main window press ESC ⬆ twice.
	Enter PROGRAMMING using ENTER ↵.
	Choose the program you want to edit using ▲ and ▼.
	Press ENTER ↵, then use ▲ and ▼ to set the number of segments. Confirm with ENTER ↵.
 	Then you can choose the set temperature for segment 1. Use ▲ and ▼ to set a new value, then confirm with ENTER ↵. Set the decimal value in the same way.
  	Now you can set the segment time in dd:hh:mm format.
	If the unit has been equipped with photoperiodic system, you can switch it on for the segment.

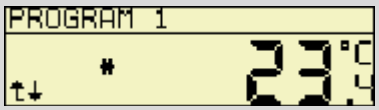
	Here you can set the fan speed.
 …	If the program has more than one segment, you can set its parameters here.
	Here you can set start delay in hh:mm format if required.
  	Here you can set if the program should run in cycles: - it can be OFF, the program will stop after finishing - infinite cycles – the program will continue to run till it is stopped by the user - you can define the number of cycles between 2 and 99

	After all parameters have been set, you can start the program. Use ENTER ↵ to confirm.

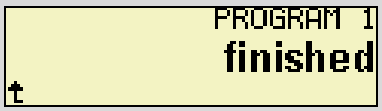
8.3.2 To start a saved program

	In the main window, press ESC ↑.
	Using ▲ and ▼ choose the program you would like to start and press ENTER ↵.

8.3.3 To stop a program

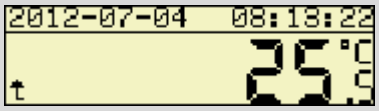
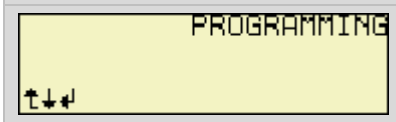
	In the main window press ESC twice.
	Confirm with ENTER.

8.3.4 Ending the program

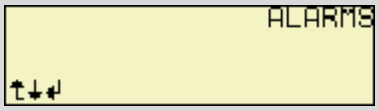
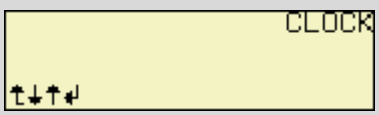
	After finishing program, the device will emit a sound alarm and show information on the display.

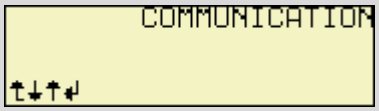
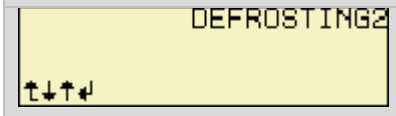
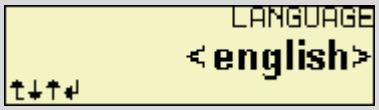
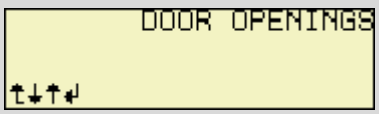
9 SETTINGS OF DEVICE

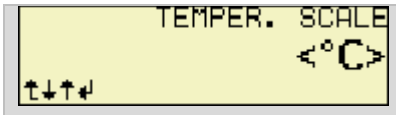
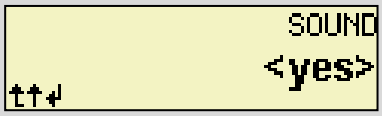
To set up working parameters of the device go to the 'SETUP' menu. Using /the UP/DOWN and then ACCEPT buttons you can change the relevant options.

	In the main window press ESC twice to enter MENU.
	Choose SETUP using.
	Press ENTER to enter the menu.

Description of options available in the 'SETUP' menu:

	CLOCK ALARM TEMP. ALARM POWER ALARM	see point. 11.1.
	[hh:mm], first you set up the hour, then the minutes. You change the value using /the up/down buttons and confirm with the accept button. The program automatically moves to setting the next value.	

	After selecting a sub-menu the user is able to choose a protocol for each socket separately – Please press the ↵ button. Available protocols: **- none** (interface off) **- EasyLabPro** (protocol complies with EasyLab Professional, EasyLab Basic), - **text** (protocol for printers with serial port, EasyTemp, terminal), **- service** (service and text protocol). - **modbus RTU** (for units equipped with RS-485) After selecting a protocol with ▲/▼ buttons, the user is able to determine its settings (for more information see point 13.7) - **Print interval**: [mm:ss] determines the interval after which data is sent to the serial port (available in service and text protocols), - **address** [1-255] – determines the address of the instrument connected to the network which is using the EasyLab protocol
	For ST, CHL, ZLW: To start defrosting you have to select **on** using ▲/▼ the UP/DOWN buttons. To confirm the choice press ↵ the ACCEPT button. Defrosting consists of keeping the temperature of +30°C inside the chamber for 30 minutes, which allows melting any ice in the evaporator. During defrosting the display shows '**defrosting**'. Pressing ▲/▼ the UP button displays the defrosting remaining time (in seconds). Having finished defrosting the program will carry on with the selected profile. (for ZLN see point 14)
	option for devices in PLUS version (ZLW, ST, CHL), for more information see point 13.6
	selecting the type of programming the device, there are two options available 'simple'– simple mode and 'complex ' – complex mode of programming the device. See point 8.2. Concerning only ST devices
	language versions. Pressing ▲/▼ the UP/DOWN button language can be choosing and accept by pressing ↵ ACCEPT button.
	option, see point. 13.2.
	This option allows to choose between Celsius (**°C**) or Fahrenheit (**°F**)

	temperature scale. It affects also the RS232 communication in text mode.
	There is a possibility to choose controller backlight mode. "**Fixed**" mode means constant backlight. "**Temporary**" mode means that the backlight will go off in approximately one minute from the last bottom touch.
	It allows you to 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.
	Allows you to completely turn off all the acoustic alarms. NOTE: Alarm signals are also disabled.

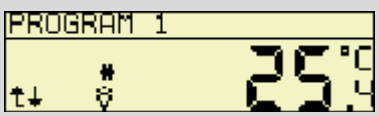
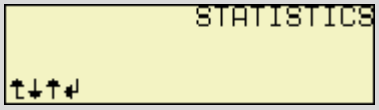
10 STATISTICS

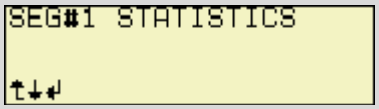
While a program is operating it is possible to check the average, minimum and maximum temperature value for all time-temperature segments. Temperature values are recorded from the moment the chamber reaches the set temperature (or to be more precise when the temperature inside the chamber is different by 0,2°C from the programmed temperature) at a ten-second interval.

Once the program reaches the end of a segment, the recording stops and the device moves to the next temperature – defined for the next segment. Once the device reaches the next set temperature – the recording starts again. For multi-segment programs (ST) there are available statistics for each segment. If the program has not reached a segment yet, the display shows 'none data ' (there is no data available using which the average, minimum and maximum values are calculated).

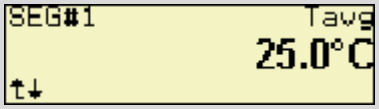
	If the simple mode is active the statistics selection step for the segment is omitted.

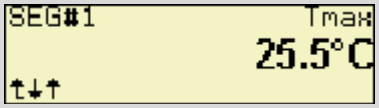
You can RESET the statistics data.

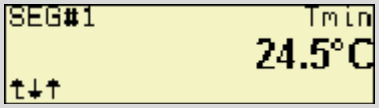
	In the main window press ESC.
	Enter STATISTICS using ENTER.



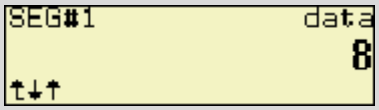
Using ▲ and ▼ choose the segment which you want to see the statistics of, then press ENTER ↵.



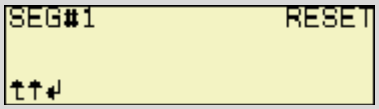




Using ▲ and ▼ you can see the average, max and min temperature recordings.

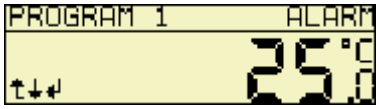


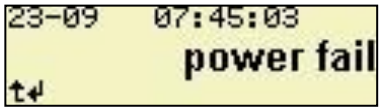
You can also see how many recordings are available.



Choose RESET and confirm with ENTER ↵ to zero the recordings.

11 ALARMS





Every alarm is signaled by red diode placed on front panel, sound and 'ALARM' text shows on display.

Pressing ↵ the accept button you can see date and time of alarm event and kind of alarm.

When the cause of the alarm stops, the alarm may be cancelled. To cancel the information of the event, press down the enter button ↵ for a while.

Type of alarms:

Sort of event	**Red diode**	**Audible signal**	**Displayed command**	**Terminate of event**
Temperature sensor fault.	Yes	Yes*	**T#1 ERR - basic sensor** **T#2 ERR- protection sensor**	Replacing of temperature sensor.
Temperature of sensor over range.	Yes	Yes*	**T#1 OVF - basic sensor** **T#2 OVF - protection sensor**	Temperature decrease/increase till work range.
Over temperature alarm.	Yes	Yes*	**HI temp** **LO temp**	Temperature decrease till hysteresis Range. Too short period or delay is set (see point 11.1.2).

Power alarm.	No	No	**power fail**	Pressing EXIT button
Open door alarm.	Yes	Yes*	**door open**	Closing door.
Temperature protection LO	Yes	Yes*	**LO prot.**	Remove from the chamber any objects which are too cold and might cause a fall of temperature. Restart the device. If the problem recurs, call the service. (see point 13.1)
Temperature protection HI	Yes	Yes*	**HI prot.**	Remove from the chamber any objects which are too hot and might cause a rise of temperature. Restart the device. If the problem recurs, call the service. (see point 13.1)
Time alarm.	No	Yes*	**Clock al.**	Pressing ↵ button.

* If the sound signal is not disabled

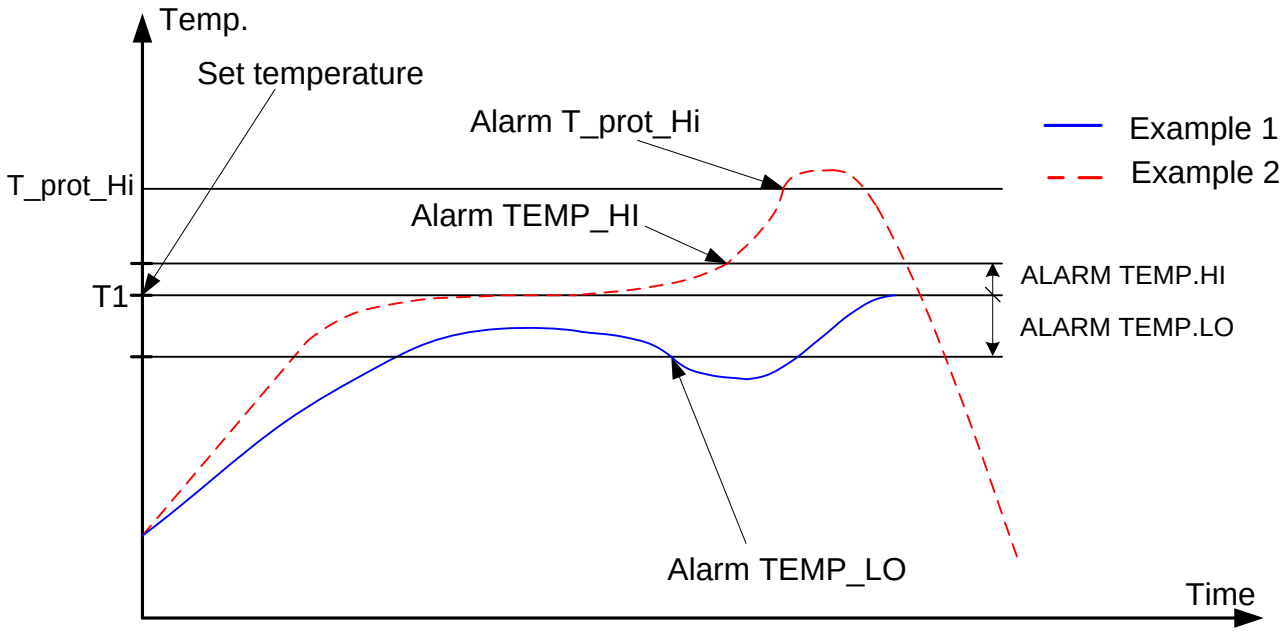
11.1 Settings alarms

11.1.1 Clock alarm

An audible signal is emitted at a specified time, setting up the alarm [hh:mm] – is done similarly to setting up real time. The alarm can be activated selecting **(on)** and deactivated selecting **(off)**.

11.1.2 Over and under temperature alarm

The function allows to define the variation from the set temperature. Once the temperature exceeds the set variation the device (**TEMP. ALARM LO** and **TEMP.ALARM HI** parameters) activates an audible alarm signal. The variation can be set up ±10.0°C and with a 0.1°C leap or deactivated by selecting off. To set up the parameter value in the SETUP menu, select the 'ALARM TEMP.' option and then the threshold of acceptable variation. Exceeding the allowed variation is signaled by short audible signals once every five seconds, even after the device goes back to the desired temperature, until ↵ the ACCEPT button is pressed.



The alarm activates once the set temperature has been reached (it's inactive while reaching the set temperature) (example 1). You can also set the alarm delay from 0 to 30min using the **ALARM TEMP. DELAY** parameter.

For example, if you set the alarm delay at 3 minutes, the alarm will go off 3 minutes after the set temperature has been beyond the set point. If the temperature goes back to the set point within 3 minutes, the alarm will not sound.

11.1.3 Alarm door

Determines, in how many minutes after opening the door, the alarm should be activated (adjustment in the range of 1-10min or disabled).

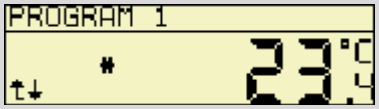
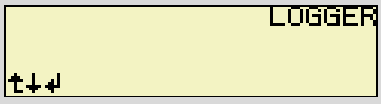
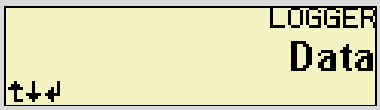
11.1.4 Power alarm

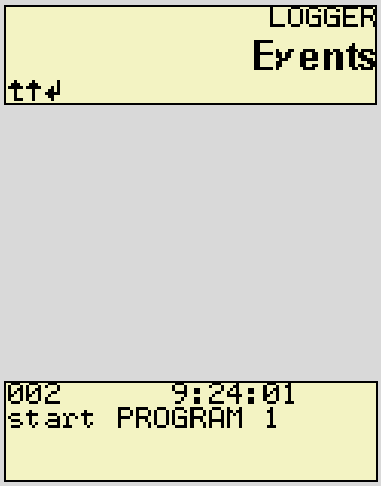
If this function is turned ON and the program is running, after the power shortage over 1 minute and after switching on again a message pops up in the display saying at what time did the power shortage occur.

When you turn the alarm on **(on)** you can adjust the following parameters:
- **pause** – from 1 min up to 24h with 1min resolution or **(off) –** setting max length of power shortage after which the program will be resumed
- **decrease temp** – from 0,5°C to 25°C or **(off)** – max drop below set temperature after which the program will continue
- **increase temp** – from 0,5°C to 25°C or **(off)** – max increase over set temperature after which the program will continue

12 LOGGER

The unit is equipped with internal memory which save information about events and sample temperature. Registered event consists of date and description. Maximum save 110 events and 2046 sample.

	In the main window press twice button ↑ to enter MENU. The symbol * - indicates a compressor work
	By pressing ↓, choose submenu LOGGER and confirm by pressing ↵. Use ↑ and ↓ buttons to choose DATA or EVENTS. Press ↵ to confirm.
	In submenu DATA, the following options are available: use ↑ and ↓ buttons to choose: - send – sending by RS232/USB port to connected computer all logged data(or printer, e.g. Kafka). To receive data on the computer use type program like 'terminal' (not supplied). - interval – determines the interval after which data is store in the internal memory. - erase – remove all stored data.



In submenu EVENTS, the following options are available: use ▲ and ▼ buttons to choose:

- send – sending by RS232/USB port to connected computer all logged data. To receive data on the computer use type program like 'terminal' (not supplied).
- show – enable to view stored events.
- erase – remove all stored data.

Sample event. To view the event press ↵

Recommended maximum length of USB cable is 4 meters and of RS232 is 15 meters. Longer cable can cause errors in operation.

Sample temperatures stored in the internal memory can be downloaded to your computer using free program EasyLab Basic. Downloaded data can be saved in .txt or .csv format. The program is not supplied with the device, it can be downloaded from: www.polekolab.com.

13 OPTIONAL FEATURES

13.1 Over and under temperature protection

The unit could be equipped with samples protection – over/under temperature protection, which is realized on the basis of temperature value measured on the second, independent temperature sensor (protection sensor). The purpose of samples protection is to protect from uncontrolled raise or drops of the temperature. At the time of operation, the transmitter disconnects the power supply circuit.

There is 4 classes of protection:

2.0 class – over temperature protection – no automatic switch on the circuit when the temperature go down below the set value protection – intervention of the user is required.

3.1 class – over temperature protection – automatic switch on the circuit when the temperature go down below the set value protection

3.2 class – under temperature protection - automatic switch on the circuit when the temperature raise above the set value protection

3.3 – under and over temperature protection – combination of class 3.1 and 3.2.

In class 3.x – in case of damage, the temperature will oscillate around the set temperature protection value.

During setting the value of protection, please note that when achieving the temperature and after opening the door the set temperature may exceed by 2%. If the temperature value of protection will be set to 'close' to set temperature in program, it may cause unexpected activation of the protection. It is especially important in 2.0 protection class because after activation, the intervention of the User is needed to keep the unit to maintain the set temperature.

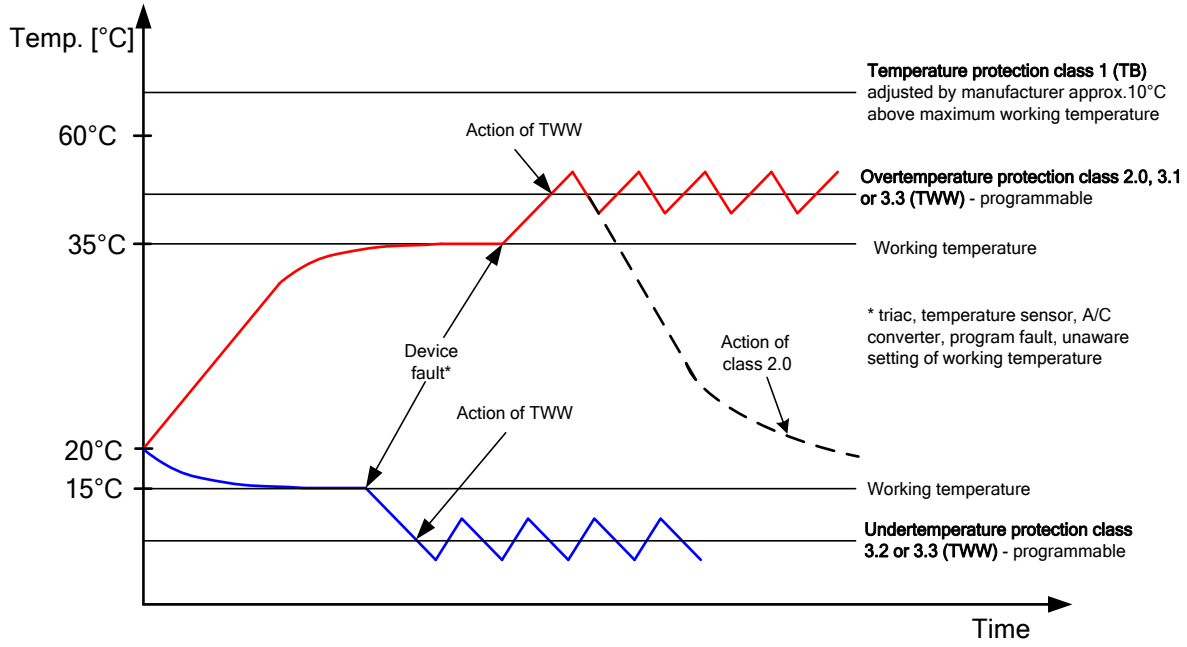
It's recommended to set the values to:

over temperature protection: 5°C above set temperature

under temperature protection 5°C below set temperature

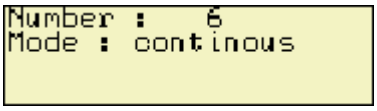
The activation of protection generates audible alarm and display the alarm icon.

The chart below exemplifies the way the protections work.



13.2 Open door counter

In sub menu “Settings” please choose “door count”. The following window will appear on the display:



where:

- „**State**” - shows how many times the door has been open.
- „**Mode**” – shows the counting / cancelling mode. The user is able to choose one of 3 modes: *continuous*, *program*, *segment*.

Counting the door openings depending on different modes:

- ***continuous*** – all door openings are counted,
- ***program*** – counting only when a program is running (after the program has been finished / interrupted the door openings are not counted)
- ***segment*** - counting the door openings only when the program is running and when it has reached the set temperature for a segment, so the door openings are not counted when the program is reaching the set temperature, or when the start delay is set, or it is switching to another segment, or it has been finished / interrupted / stopped

Cancelling the open door counter depending on the mode :

- **continuous** – cancelling the counter after the unit has been restarted
- **Program** and **Segment** – cancelling when the program has started

Additionally, for each mode it is possible to cancel the open door counter by pressing down for 2 seconds the ↵ button in the door counter window

13.3 Power failure alarm battery suspension

It is possible to equip the unit with power failure alarm battery suspension option. This option alarms the user when there is a power failure. Moreover, it allows the user to monitor the temperature inside the chamber and change the parameters.
In case there is a power failure, the program is stopped. The alarm is signalized by a red LED light in the control panel and short sound signals. After the power is back, the program is resumed.

13.4 Photoperiodic system

It is possible to equip the unit with the photoperiodic system, which allows the user to turn of the interior lighting during each segment. Therefore, it is possible to simulate day and night time. While programming each segment, it is possible to turn on/off this feature.

13.5 Additional temperature sensor

It is possible to equip the unit with additional temperature sensor. In this case, during the unit's operation, there are 2 temperature values displayed on the screen and marked 1 (basic temperature sensor) and 2 (additional temperature sensor). Additionally, it is possible to record the temperature simultaneously from 2 sensors, or separately.

13.6 Defrosting for low temperature refrigerator

This option is available for ST, CHL (option Plus).

The defrosting of the evaporator is carried out by raising the temperature inside the chamber by a few degrees and then going back to the previously defined temperature. There are 2 options available:

1. 'Auto' – automatic mode (AUTO ON/OFF) in which the controller of the device decides about turning on the defrosting option as frequent as it needs. The defrosting is carried out by following scheme: is activated always after first reach of temperature or it is activated when the device has to work very hard to keep set temperature.
2. "defr2. Freq." Programmable mode – user can set frequency of defrosting with following scheme:
   '0' – defrosting is off;
   '1' – defrosting activates once a day – at midnight (00:00);
   '2' – defrosting activates twice a day – at noon (12:00) and midnight (00:00);
   '3' – defrosting activates three times a day – at midnight (00:00), 8 am (08:00) and 4 pm (16:00);
   '4' – defrosting activates four times a day – at midnight (00:00), 6 am (06:00), at noon (12.00) and 6 pm (18:00);

Defrosting time can be programmable between 60 to 240 seconds.
Automatic mode and programmable mode can be set both.

Notice:
Defrosting time should be match individually and its depends of chamber's charge.
If defrosting time is to short the ice will be not melt down. It can be cause more ice.
If defrosting time is to long it will cause undesirable increase of chamber temperature.

This option is available for ZLW .

The User set the temperature (at evaporator) of defrosting to stop T off in the range of 0 to 20°C. Next choose the frequency of defrosting:

‘0’ – defrosting is off;

‘1’ – defrosting activates once a day – at midnight (00:00);

‘2’ – defrosting activates twice a day – at noon (12:00) and midnight (00:00);

‘3’ – defrosting activates three times a day – at midnight (00:00), 8 am (08:00) and 4 pm (16:00);

‘4’ – defrosting activates four times a day – at midnight (00:00), 6 am (06:00), at noon (12.00) and 6 pm (18:00);

or do the defrosting manually. After approval, display will show DEFROSTING ACTIVE and the main display will show icon {*}.

13.7 MODBUS Protocol

Operation of the device equipped with RS-485 interface can be monitored using MODBUS protocol.

To do this, connect the device to the existing RS-485 network and identify them by selecting the address in the range of 1-255. The device address is determined in **SETUP** -> **Communications** -> **RS232**. In the same menu, select the MODBUS RTU protocol.

MODBUS network parameters:

- speed: 9600 bauds
- number of data bits: 8
- number of stop bits: 1
- no parity check

To communication is used the following command:

Code 0x04 **Read Input Register -** used to read couple of registry value in one command

Registry 0 contains Information on appeared alarms or events.

The individual bits of the register contains information about:

0 temperature sensor error
1 temperature outside the measurement range of the sensor
2 low temperature alarm
3 high temperaturę alarm
4 open door alarm
5 reserve
6 active low temperature protection
7 active high temperature protection
8 reserve
9 reserve
10 reserve
11 no power /power failure
12 modem error
13 Temperature protection sensor error
14 reserve
15 reserve

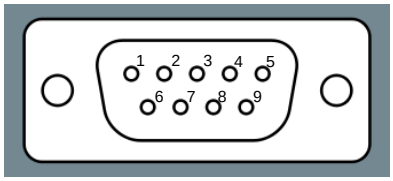
Registry 1 contains Information on program status. It can be shown as:

1 temperature profile delay
2 set parameters
3 reaching to the set temperature
4 time of segment (keeping the set temperature)
5 end of program
6 continuous program

Value saved in **Registry 2** is equal to value of set temperature multiply by 10.

Value saved in **Registry 3** is equal to value of measured temperature in the chamber divided by 10.

13.8 Description of RS-485 interface



RS485
1 - NC
2 - NC
3 – COM
4 – NC
5 - NC
6 – A Rx/Tx
7 – NC
8 - NC
9 - B Rx/Tx

or

RS422 (option)
1 – B Tx
2 - NC
3 – COM
4 - NC
5 - A Tx
6 – A Rx/Tx
7 – NC
8 - NC
9 - B Rx/Tx

14 OPERATION OF THE COOLING SYSTEM

If the device is operating in low temperatures the evaporator may get covered with ice. One symptom of too much ice on the evaporator is lower cooling efficiency of the device. To ensure proper operation of the device you should obey these principles:

1.	In temperatures above +8ºC the air automatically defrosts the ice cover, defrosting is self-operating.
2.	In temperatures below +8ºC the evaporator may be covered in ice and the device should be defrosted manually. In order to do that you need to open the door and turn on the defrost function on the controller. After the defrosting has finished, please wait ca. 30 min, then wipe the chamber precisely. Disobeying this precaution will make the evaporator freeze again quickly. If the unit works in a temperature below +8°C and the user does not defrost it periodically, it may make the compressor overheat and break down the unit.
3.	(Concerns ZLN 85, ZLN-T 125, 200, 300, ZLN-UT 300 devices): Operation of the equipment can be associated with formation of layers of ice inside the chamber. The rate of formation of ice or frost layer depends on few factors: environmental conditions (temperature, humidity), the frequency of door opening and the type of samples, therefore periodic defrosting is necessary once the layer of ice or frost covers the entire chamber. Defrosting is performed manually in the following order: 1. Switch off the device (unplug it from the mains), 2. Open the door of the unit and leave it to defrost (do not speed up the defrosting time), 3. Wipe out the water gathering on the bottom of the unit (it is recommended to wipe it till

	dry), 4. Switch on the device (plug it to the mains).
4.	The device is equipped with a protection mechanism against damaging the cooling system. The mechanism makes it impossible to turn on cooling when the temperature exceeds 45ºC. As a result if the device has been programmed to go down with temperature (e.g. from 60ºC to 20ºC) it may take longer for the program to operate until it reaches 50ºC. The temperature inside the device is lowered naturally by emitting the heat to the surrounding environment.
5.	**Always make sure that the door has been closed properly!**

	**Do not try to speed up the defrosting process by any of electrical or chemical agents.**

15 CLEANING AND MAINTENANCE OF THE DEVICE

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

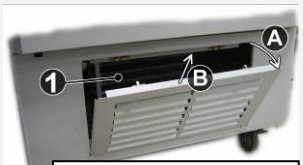
To clean products made of stainless steel (INOX) we recommend using cleaning solution dedicated particularly to stainless steel material. It preserves the steel surface from permanent stains and at the same time retains aesthetic appearance of the product. Recommended cleaning solution is in POL-EKO-APARATURA offer.

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 user manual (or in the safety data sheet) of the cleaning solution.**

15.1 Housing 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.	At least once a month condenser have to be cleaned by using vacuum cleaner, dry cloth or brush. Placement of condenser as per units: in the upper part of the unit (models 500, 700, 1200, 1450), in the back (models 1, 2, 3, 4, 5, 85), in the front lower part (ZLN/ZLW 125, ZLN/ZLW 200, ZLN/ZLW 300, ZLN-UT). To get acces to condenser (when it's placed in front lower part) pull ventilation cover towards you (A), then pull up (B). After cleaning condenser (1) install the cover.  ZL: 125, 200, 300

15.2 Interior cleaning

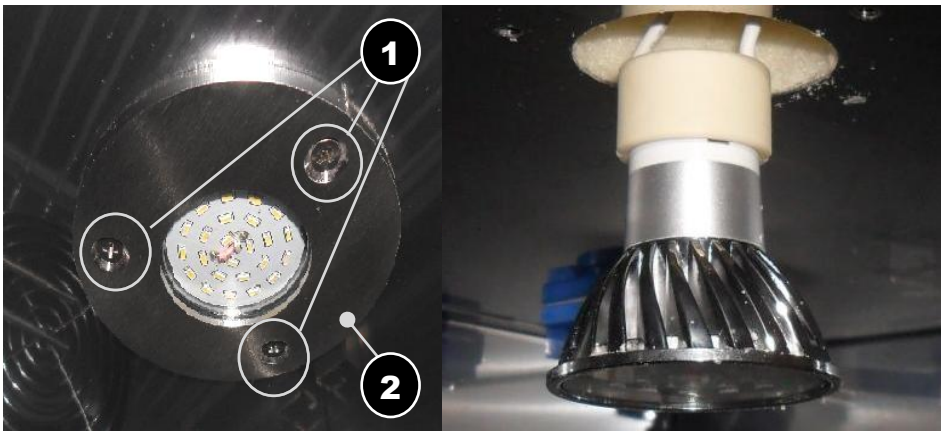
1.	The chamber should be emptied of any samples before cleaning.
2.	Open the door of the device and wait for the frost to melt (in case of working in low temperatures), take out the shelves and start cleaning the device,
3.	Only water or water with mild detergent should be used.
4.	Having finished cleaning, you should allow the device to dry fully and fit all parts removed before cleaning.
5.	During cleaning you should make sure not to damage the temperature sensor built in on the top of the chamber.

15.3 Internal LED lighting replacement

Halogen light is consumable part

Type of halogen bulb: GU10 230V 50Hz 3,7W LED

1.	Disconnect the unit from the power supply and the computer.
2.	Unscrew light fixing (1) screws and remove the light support (2).(Pic. 1.)
3.	Pull out the halogen bulb and replace it with a new one. (Pic. 1.)
4.	Insert the light socket and mount the support.
5.	Reconnect the unit to the power supply and check if it works properly.



Pic. 1.

16 RESUMING OPERATION AFTER A LONGER PERIOD OF TIME

1.	Remove all objects from the chamber.
2.	Disconnect the device from the mains.
3.	If the instrument has worked in low temperatures, please wait until the frost melts.
4.	Clean and dry the chamber.
5.	Leave the door open to avoid nasty smells.
6.	Store in temperature between 0°C and 50°C and relative humidity maximum 70%.

17 PROBLEMATIC SITUATIONS

If the device is not working. You should check if:

1.	There is not an electrical supply failure?
2.	The power cord is plugged in the mains socket properly?
3.	The fuse has not been blown?
4.	The power cord has not been damaged?
5.	When you turn on the device with main switch and the display is unreadable (works only the backlight) turn off the device, wait for about 1 minute and turn on the unit again.

Inefficient cooling. You should check if:

1.	What is the temperature outside the device?
2.	Is the door shut tight? Is access ports for external sensors is sealed?
3.	Is the condenser clean?
4.	Is the device placed in direct sunlight?
5.	Is there any heat source near the device?
6.	Are there too many objects inside the device that are not cool enough?

Water is condensing inside the chamber. You should check if:

1.	Is the defrosted water outlet not blocked?

Frost occurs on walls. You should check if:

1.	Usual condition while working in low temperatures.
2.	If necessary, set a new defrosting parameters (see point 11.6).
3	Is the door shut tight? Is access ports for external sensors is sealed?

The device is operating too loud. You should check if:

1.	Is the device not leaning against furniture or other objects?

2.	Are the pipes at the back in direct contact or are they vibrating?
3.	Is the device leveled properly?
	CAUTION: Buzz, vibes and noise from decompression coming from the cooling circuit are normal noises.

18 SOFTWARE

Program EasyLab Professional

EasyLab Professional program enables to register the temperature and/or humidity in thermostatic devices manufactured by POL-EKO-APARATURA.

By this program the User is able to register test results (continous, single) as well as store this data and browse in tabelar or graphic form. Registering is made through RS 232 or USB cable (cables to be ordered separately). Recommended maximum length of USB cable is 4 meters and of RS232 is 15 meters. Longer cable can cause errors in operation. In case ordering device with additional temperature Pt 100, in EasyLab Professional you can parallelly register data from both sensors. Additionally, EasyLab Professional allows to program devices in TOP+ version, thanks to integrated application TOP+ Control. This program is an additional option available for all product ranges

EasyLab Professional is equipped with quality tools for creation of charts and approximation. By the program User is able to:

- generate raports,
- import of data stored on external memory,
- 12 languages as option.

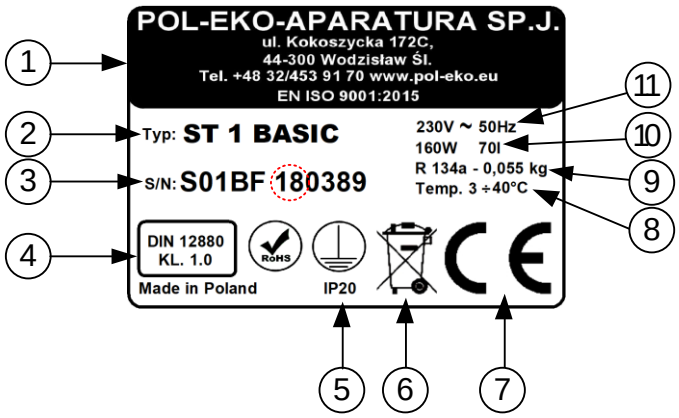
EasyLab Basic

Using EasyLab Basic software the User can easily download data saved In the unit's internal memory to the PC. Basic version of EasyLab is available free of charge (download from the website www.pol-eko.com.pl). In orede to keep constant data registration to the PC, create charts or statistical raport, EasyLab Professional version must be purchased

19 RATING PLATE

The rating plate is located on the left wall of the unit, in the upper left corner (or bottom corner in ZL devices).

Below there is a example of rating plate:



1. Name and address of manufacturer
2. Type of device
3. Serial number (2 indicated numbers state the year of production of the device)
4. Temperature safety device according with DIN12880
5. Electric shock protection: protection against indirect contact and IP code
6. Disposal of used device according with WEEE2
7. CE sign
8. Temperature range
9. Type and weight of refrigerant
10. Maximum power consumption and capacity of device
11. Voltage and Frequency of mains

20 WARRANTY

Warranty conditions shall be subject to Polish law

Support form and warranty conditions are specified on the manufacturer's website:

http://www.pol-eko.com.pl/en/service

Warranty repairs have to be reported to:

POL-EKO-APARATURA Sp.j.
ul. Kokoszycka 172 C
44-300 Wodzisław Śl.

Tel:
+48 32 453 91 96
+48 32 453 91 70
+48 32 453 90 30

E-mail:
export.service@pol-eko.com.pl

21 TECHNICAL DETAILS

Parameter \ Device			ST1 CHL1	ST2 CHL2	ST3 CHL3	ST4 CHL4	ST5 CHL5	ST6 CHL6	ST500 CHL500	ST700 CHL700	ST1200 CHL1200	ST1450 CHL1450
Air convection			forced									
Chamber capacity [l]		[l]	70	150	200	250	300	400	500	625	1365	1460
		[cu ft]	2,5	5,3	7,1	8,8	10,6	14,1	17,7	22,1	48,2	51,6
Working capacity [l]		[l]	55	122	163	203	243	324	386	450	1229	1307
		[cu ft]	1,9	4,3	5,8	7,2	8,6	11,4	13,6	15,9	43,4	46,2
Door type			solid/glass or double[1] (option)									
Temperature range	CHL	[°C]	0…+15						0…+15 / -10…+15 (option)			
		[°F]	32…+59						32…+59/14…+59 (option)			
	ST	[°C]	+3…+40/ do + 70(option) /+3...+70 w PREM TOP+									
		[°F]	+37…+104 / do +158 (option) / +37…+158 w PREM TOP+									
Temperature resolution[°C]			every 0,1									
Controreller			microprocessor with external LCD graphic display									
Interior	BASIC		aluminum									
	COMF		stainless steel to DIN 1.4016									
	COMF/S		stainless steel to DIN 1.4016									
	PREM (TOP+)		stainless steel to DIN 1.4301									
	PREM/S (TOP+)		stainless steel to DIN 1.4301									
Housing	BASIC		powder coated sheet									
	COMF		powder coated sheet									
	COMF/S		polished stainless steel									
	PREM (TOP+)		powder coated sheet									
	PREM/S (TOP+)		polished stainless steel									
Overall dims[2][mm]	A width		570	620	620	620	620	620	660	750	1480	1450
	B height		600	860	1060	1260	1460	1860	1990	1990	1990	1970
	C depth		680	650	650	650	650	650	810	860	860	950
Internal dims[3] [mm]	D width		430	480	480	480	480	480	480	480	2x480	2x480
	D' width		470	520	520	520	520	520	510	600	1310	1340
	E height		430	660	860	1060	1260	1660	1510	1510	1510	1460
	F depth		300	420	420	420	420	420	650	690	690	750
	F' depth		360	480	480	480	480	480	-	-	-	-
	G depth		-	320	320	320	320	320	-	-	-	-
	H height		-	440	640	840	1050	1440	-	-	-	-
	I height		-	-	-	-	-	-	1380	1360	1360	1300
Max shelf workload[4][kg]	-		10	10	10	10	10	10	20	30	30	30
	PW[5] version		on request						100	150	300	300
Max unit workload [kg]]	-		20	30	40	50	60	60	100	150	300	300
	W[6] version		on request									
Nominal power[7] [W]			250	250	250	250	350	350	450	450	550	950
Weight[8][kg]			32	54	59	69	75	90	105	115	185	200
Over temperature protection			class 1.0 to DIN 12880/ classa 3.3 (option) / class 3.3 in PREM TOP+									
Power supply			220-240V 50Hz / 110-120V 60Hz (on request)									
Number of shelves std/max			2/2	3/4	3/4	4/6	4/7	4/10	3/11	3/11	2x3/11[9]	2x3/11[9]
Total maximum power of electrical outlets (option)			Σ_{max} 200W									
Cooling agent			R134a									
Number of doors			1	1	1	1	1	1	1	1	2	2
Warranty			24 months									
Manufacturer			POL-KO-APARATURA									

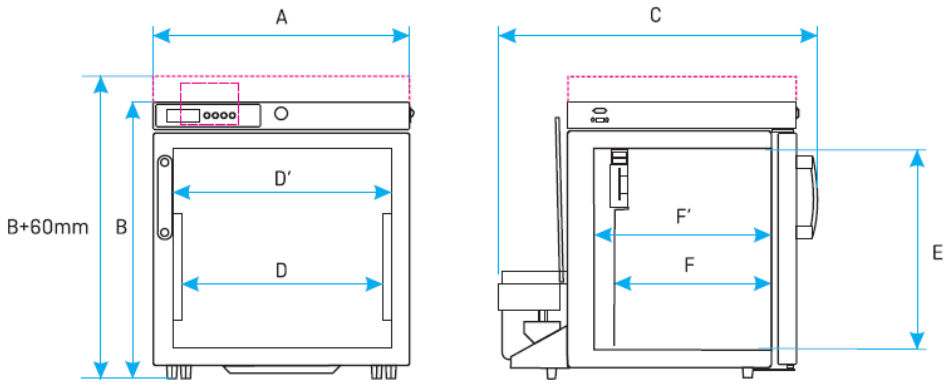
1. additional internal glass door,
2. ST1-6 in TOP+ version are 60mm higher, depth doesn't include 50mm of power cable,
3. dims of units with double door can be smaller,
4. on uniformly loaded surface,
5. reinforced shelf,
6. reinforced version,
7. see the nameplate,znamionowa,
8. for units in BASIC version with solid door,
9. two columns with 3 shelves each.

.

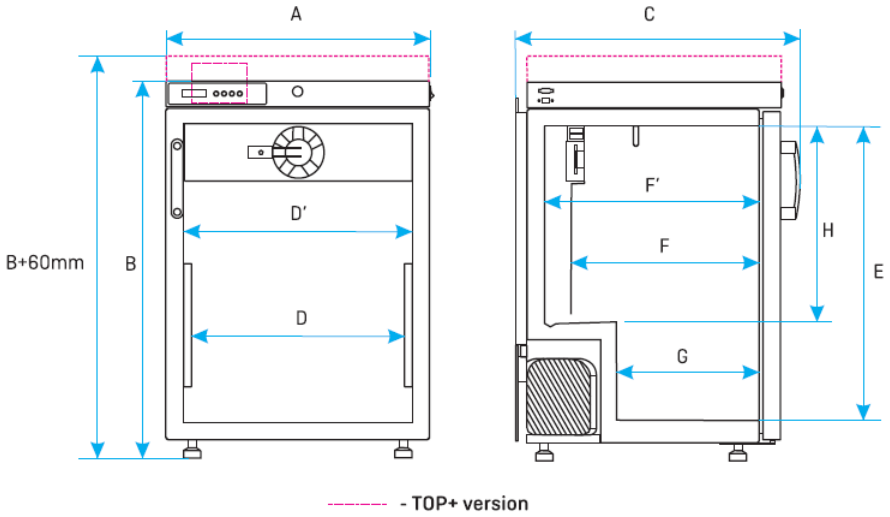
Parameter \ Device			CHL1/1 ST1/1	CHL1/1/1 ST1/1/1	CHL2/2 ST2/2	CHL2/3 ST2/3	CHL2/4 ST2/4	CHL3/3 ST3/3
Air convection			forced					
Chamber capacity [l]		[l]	70/70	70/70/70	150/150	150/200	150/250	200/200
		[cu ft]	2,5/2,5	2,5/2,5/2,5	5,3/5,3	5,3/7,1	5,3/8,8	7,1/7,1
Working capacity [l]		[l]	55/55	55/55/55	122/122	122/163	122/203	163/163
		[cu ft]	1,9/1,9	1,9/1,9/1,9	4,3/4,3	4,3/5,8	4,3/7,2	5,8/5,8
Door type			solid/glass or double[1] (option)					
Temperature range	CHL	[°C]	0…+15					
		[°F]	32…+59					
	ST	[°C]	+3…+40/ do + 70(option) /+3...+70 w PREM TOP+					
		[°F]	+37…+104 / do +158 (option) / +37…+158 w PRM TOP+					
Temperature resolution[°C]			every 0,1					
Controreller			microprocessor with external LCD graphic display					
Interior	BASIC		aluminum					
	COMF		stainless steel to DIN 1.4016					
	COMF/S		stainless steel to DIN 1.4016					
	PREM (TOP+)		stainless steel to DIN 1.4301					
	PREM/S (TOP+)		stainless steel to DIN 1.4301					
Housing	BASIC		powder coated sheet					
	COMF		powder coated sheet					
	COMF/S		polished stainless steel					
	PREM (TOP+)		powder coated sheet					
	PREM/S (TOP+)		polished stainless steel					
Overall dims[2][mm]	A width		570	570	620	620	620	620
	B height		1170	1740	1680	1880	2080	2080
	C depth		680	680	650	650	650	650
Internal dims[3] [mm]	D width		430	430	480	480	480	480
	D' width		470	470	520	520	520	520
	E height		430	430	660	660/860	660/1060	860
	F depth		300	300	420	420	420	420
	F' depth		360	360	480	480	480	480
	G depth		-	-	320	320	320	320
	H height		-	-	440	440/640	40/840	640
Max shelf workload[4][kg]	-		10	10	10	10	10	10
	PW[5] version		on request					
Max unit workload [kg]	-		20	30	40	50	60	60
	W[6] version		on request					
Nominal power[7] [W]			500	750	500	500	500	500
Weight[8][kg]			65	98	109	114	124	119
Over temperature protection			class 1.0 to DIN 12880/ classa 3.3 (option) / class 3.3 in PREM TOP+					
Power supply			220-240V 50Hz / 110-120V 60Hz (on request)					
Number of shelves std/max			2/2	3/4	3/4	4/6	4/7	4/10
Total maximum power of electrical outlets (option)			Σ_{max} 200W					
Cooling agent			R134a					
Number of doors			2	3	2	2	2	2
Warranty			24 months					
Manufacturer			POL-KO-APARATURA					

1. additional internal glass door,
2. depth doesn't include 50mm of power cable,
3. dims of units with double door can be smaller,
4. on uniformly loaded surface,
5. reinforced shelf,
6. reinforced version,
7. see the nameplate,
8. for units in BASIC version with solid door.

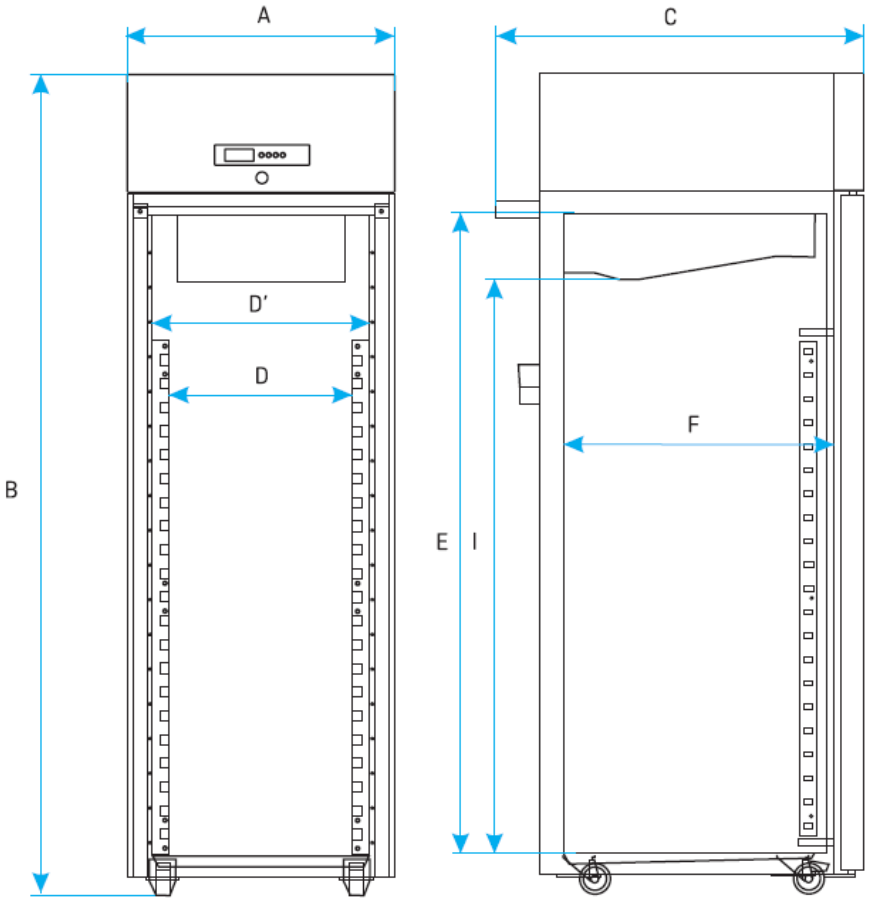
ST, CHL 1



ST, CHL 2, 3, 4, 5, 6



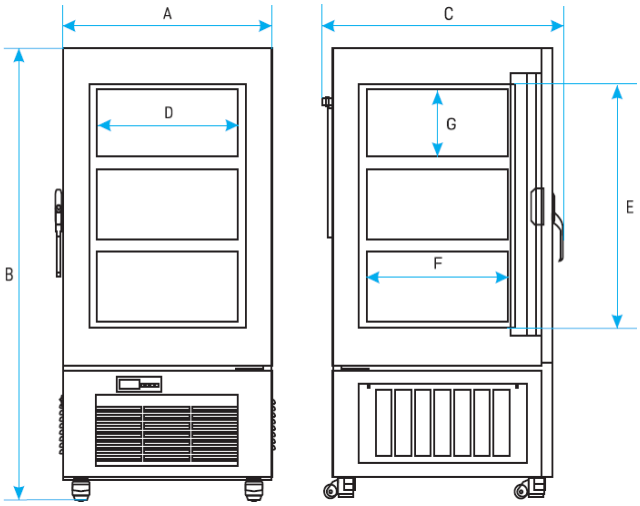
ST, CHL 500, 700, 1200, 1450



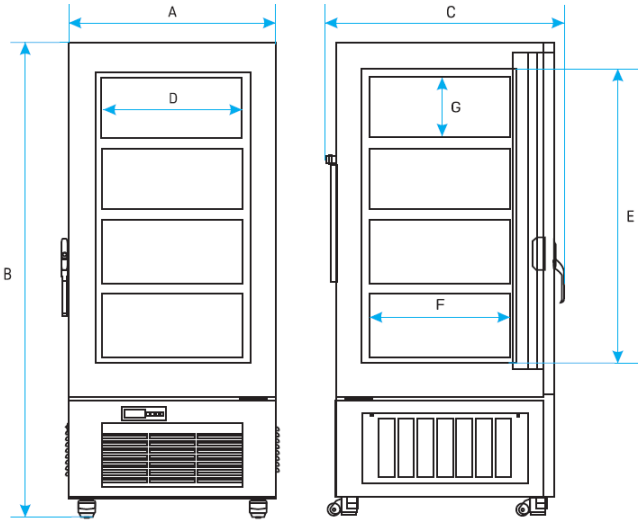
Parameter \ Device		ZLN-UT 200	ZLN- UT 300
Air convection		natural	
Chamber capacity[I]		237	326
Number of boxes 133x133x50mm [pcs.]		108	144
Door type		solid	
Temperature range[°C]		-86 …-40	
Temperature range[°F]		-122,8 …-40	
Temperature resolution[°C]		every 0,1	
Cooling time from z +25°C to -86°C [h]		3,5	3,5
Heating time in case of power failure – 80°C to – 60°C [h]		1,5	1,5
Controreller		microprocessor with external LCD graphic display	
Interior	COMF	stainless steel to DIN 1.4016	
	PREM	stainless steel to DIN 1.4301	
Housing		powder coated sheet	
Overall dims[1][mm]	A width	850	850
	B height	1620	1910
	C depth	950	950
Internal dims [mm]	D width	520	520
	E height	830	1140
	F depth	550	550
	G height	240	240
Max unit workload[kg]		65	80
Max shelf workload[2][kg]		10	10
Nominal power [W]		2100	2100
Energy 24h [kWh]w- 80°C		16	18
Weight[kg]		180	200
Power supply		230 V 50Hz	
Number of internal chambers		3	4
Cooling agent		R507, R170	
Warranty		24 months	
Manufacturer		POL – EKO – APARATURA	

1. depth doesn't include 50mm of power cable.

ZLN-UT 200



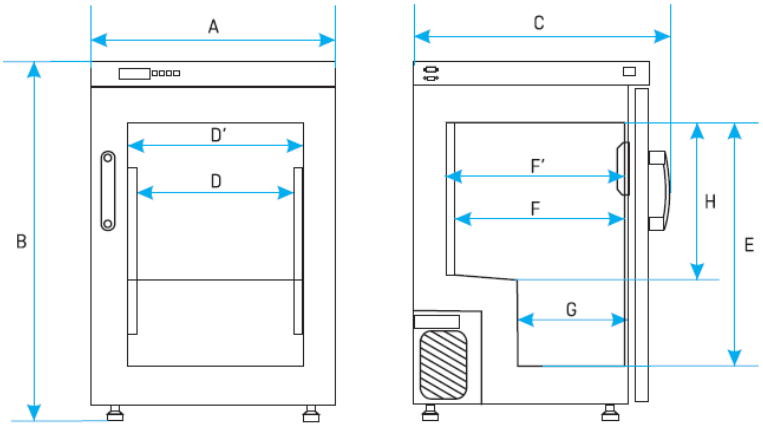
ZLN-UT 300



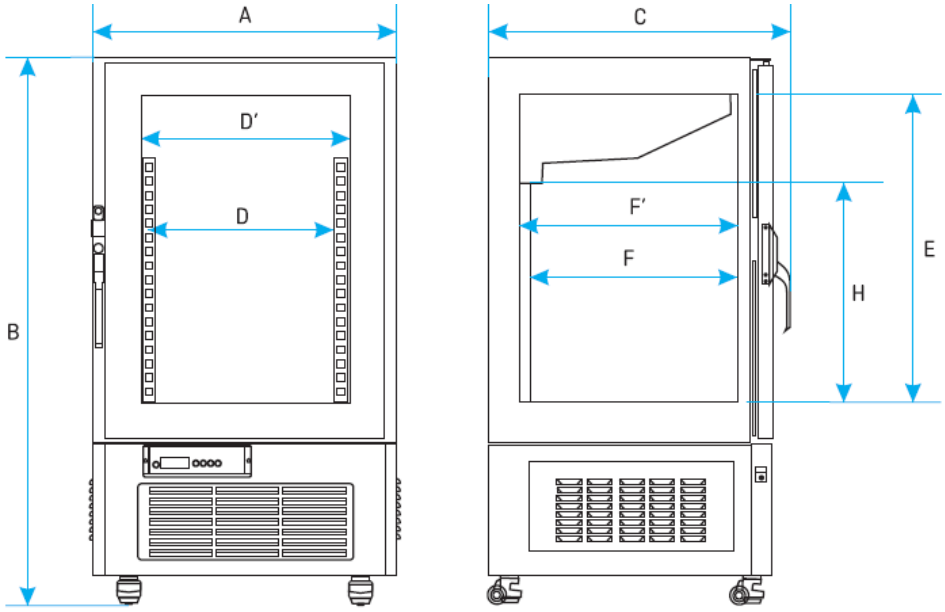
Parameter \ Device		ZLN 85	ZLN-T 125	ZLN –T 200	ZLN- T 300	ZLW- T 200	ZLW-T 300
Air convection		natural				forced	
Chamber capacity[I]		95	130	210	310	210	310
Working capacity[I]		76	109	180	262	140	213
Door type		solid					
Temperature range[°C]		- 25…0	-40…0				
Temperature range[°F]		-13…32	-25,6…32				
Temperature resolution[°C]		every 0,1					
Controreller		microprocessor with external LCD graphic display					
Interior	COMF	stainless steel to DIN 1.406					
	COMF/S	stainless steel to DIN 1.406					
	PREM	stainless steel to DIN 1.4301					
	PREM/S	stainless steel to DIN 1.4301					
Housing	COMF	powder coated sheet					
	COMF/S	polished stainless steel					
	PREM	powder coated sheet					
	PREM/S	polished stainless steel					
Overall dims[1][mm]	A width	610	660	760	760	760	760
	B height	880	1190	1380	1730	1380	1730
	C depth	650	800	800	800	800	800
Internal dims [mm]	D width	380	370	450	450	450	450
	D´ width	420	420	520	520	520	520
	E height	590	600	770	1120	770	1120
	F depth	440	520	520	520	520	520
	F´ depth	440	530	530	530	530	530
	G depth	230	-	-	-	-	-
	H height	380	-	-	-	600	600
Max shelf workload[2][kg]	-	10	10	10	10	10	10
	PW[3] version	-	50	50	50	50	50
Max unit workload[kg	-	30	50	65	80	65	80
	W[4] version	-	100	130	160	160	160
Nominal power [W]		200	450	470	470	500	500
Weight[kg]		60	90	120	185	120	185
Power supply		230 V 50 Hz					
Shelves fitted/max		2/4	2/3	2/4	3/6	2/4	3/6
Cooling agent		R 404a	R507				
Warranty		24 months					
Manufacturer		POL - EKO - APARTURA					

1. depth doesn't include 50mm of power cable,
2. on uniformaly loaded surface,
3. reinforced shelf,
4. reinforced version.

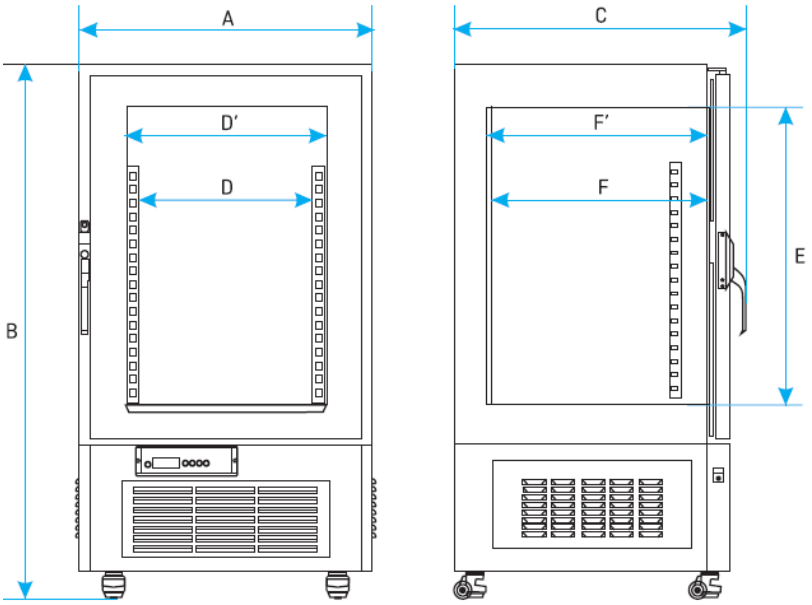
ZLN 85



ZLW 200, 300



ZLN-T 125, 200, 300



22 REGISTER MAINTENANCE AND INSPECTION

Type of the unit:…….…… Serial no: ……..…….

22.1 Maintenance

No.	Date	Defrosting*	Cleaning condenser**	Signature
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

* Depending on the set temperature
** Every month, (high air pollution - every week)

22.2 Inspection

Technical inspection performed by POL-EKO-APARATURA's service:

No.	Date	Description	Performer	Signature
1				
2				

DEKLARACJA ZGODNOŚCI UE

EU DECLARATION OF CONFORMITY

Produkt:	***Product:***
Chłodziarka laboratoryjna	*Laboratory refrigerators*
Model:	***Model:***
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	
w wersjach:	***in version:***
BASIC, COMF, COMF/S, PREM, PREM/S, PREM TOP+, PREM/S TOP+	
Nazwa i adres producenta:	***Name and address of the manufacturer:***
POL-EKO-APARATURA sp.j. A. Polok-Kowalska, S. Kowalski ul. Kokoszycka 172c 44-300 Wodzisław Śl.	
Niniejsza deklaracja zgodności wydana zostaje na wyłączną odpowiedzialność producenta.	***This declaration of conformity is issued under the sole responsibility of the manufacturer.***
Wymieniony powyżej przedmiot niniejszej deklaracji jest zgodny z odnośnymi wymaganiami unijnego prawodawstwa harmonizacyjnego:	***The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:***
LVD 2014/35/UE EMC 2014/30/UE RoHS 2011/65/UE WEEE 2012/19/UE	LVD 2014/35/EU EMC 2014/30/EU RoHS 2011/65/EU WEEE 2012/19/EU
Odniesienia do odnośnych norm zharmonizowanych, które zastosowano, lub do innych specyfikacji technicznych, w stosunku, do których deklarowana jest zgodność:	***References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:***
LVD	PN-EN 61010-1:2011 PN-EN 61010-2-010:2015-01 PN-EN 60519-1:2015-10 PN-EN 60529:2003
EMC	PN-EN 61326-1:2013-06
RoHS	PN-EN 50581:2013-03

POL-EKO-APARATURA sp.j.
DYREKTOR
Sebastian Kowalski

Wodzisław Śl. 19.04.2016 (Director)

DEKLARACJA ZGODNOŚCI UE

EU DECLARATION OF CONFORMITY

Produkt:	***Product:***
Szafa termostatyczna	*Cooled incubator (ST)*
Model:	***Model:***
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	
w wersjach:	***in version:***
BASIC; COMF; COMF/S; PREM; PREM/S; PREM TOP+; PREM/S TOP+ *z opcją (*with option*) FOT, FIT	
Nazwa i adres producenta:	***Name and address of the manufacturer:***
POL-EKO-APARATURA sp.j. A. Polok-Kowalska, S. Kowalski ul. Kokoszycka 172c 44-300 Wodzisław Śl.	
Niniejsza deklaracja zgodności wydana zostaje na wyłączną odpowiedzialność producenta.	***This declaration of conformity is issued under the sole responsibility of the manufacturer.***
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LVD 2014/35/UE EMC 2014/30/UE RoHS 2011/65/UE WEEE 2012/19/UE	LVD 2014/35/EU EMC 2014/30/EU RoHS 2011/65/EU WEEE 2012/19/EU
Odniesienia do odnośnych norm zharmonizowanych, które zastosowano, lub do innych specyfikacji technicznych, w stosunku, do których deklarowana jest zgodność:	***References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:***
LVD	PN-EN 61010-1:2011 PN-EN 61010-2-010:2015-01 PN-EN 60519-1:2015-10 PN-EN 60529:2003/A2:2014-07
EMC	PN-EN 61326-1:2013-06
RoHS	PN-EN 50581:2013-03

POL-EKO-APARATURA sp.j.
DYREKTOR
Sebastian Kowalski

Wodzisław Śl. 23.05.2017 (Director)

DEKLARACJA ZGODNOŚCI UE

EU DECLARATION OF CONFORMITY

Produkt:	***Product:***
Zamrażarka laboratoryjna	*Laboratory freezer*
Model:	***Model:***
ZLN 85; ZLN-T 125; ZLN-T 200; ZLN-T 300; ZLW-T 200; ZLW-T 300	
w wersjach:	***in version:***
COMF, PREM, COMF/S, PREM/S	
Nazwa i adres producenta:	***Name and address of the manufacturer:***
POL-EKO-APARATURA sp.j. A. Polok-Kowalska, S. Kowalski ul. Kokoszycka 172c 44-300 Wodzisław Śl.	
Niniejsza deklaracja zgodności wydana zostaje na wyłączną odpowiedzialność producenta.	***This declaration of conformity is issued under the sole responsibility of the manufacturer.***
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LVD 2014/35/UE EMC 2014/30/UE RoHS 2011/65/UE WEEE 2012/19/UE	LVD 2014/35/EU EMC 2014/30/EU RoHS 2011/65/EU WEEE 2012/19/EU
Odniesienia do odnośnych norm zharmonizowanych, które zastosowano, lub do innych specyfikacji technicznych, w stosunku, do których deklarowana jest zgodność:	***References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:***
LVD	PN-EN 61010-1:2011 PN-EN 60519-1:2015-10 PN-EN 60529:2003/A2:2014-07
EMC	PN-EN 61326-1:2013-06
RoHS	PN-EN 50581:2013-03

POL-EKO-APARATURA sp.j.
DYREKTOR
Sebastian Kowalski

Wodzisław Śl. 23.05.2017 (Director)

DEKLARACJA ZGODNOŚCI UE

EU DECLARATION OF CONFORMITY

Produkt:	***Product:***
Zamrażarka niskotemperaturowa	Ultra-low freezer
Model:	***Model:***
ZLN-UT 200; ZLN-UT 300	
w wersjach:	***in version:***
COMF, PREM, COMF/S, PREM/S	
Nazwa i adres producenta:	***Name and address of the manufacturer:***
POL-EKO-APARATURA sp.j. A. Polok-Kowalska, S. Kowalski ul. Kokoszycka 172c 44-300 Wodzisław Śl.	
Niniejsza deklaracja zgodności wydana zostaje na wyłączną odpowiedzialność producenta.	***This declaration of conformity is issued under the sole responsibility of the manufacturer.***
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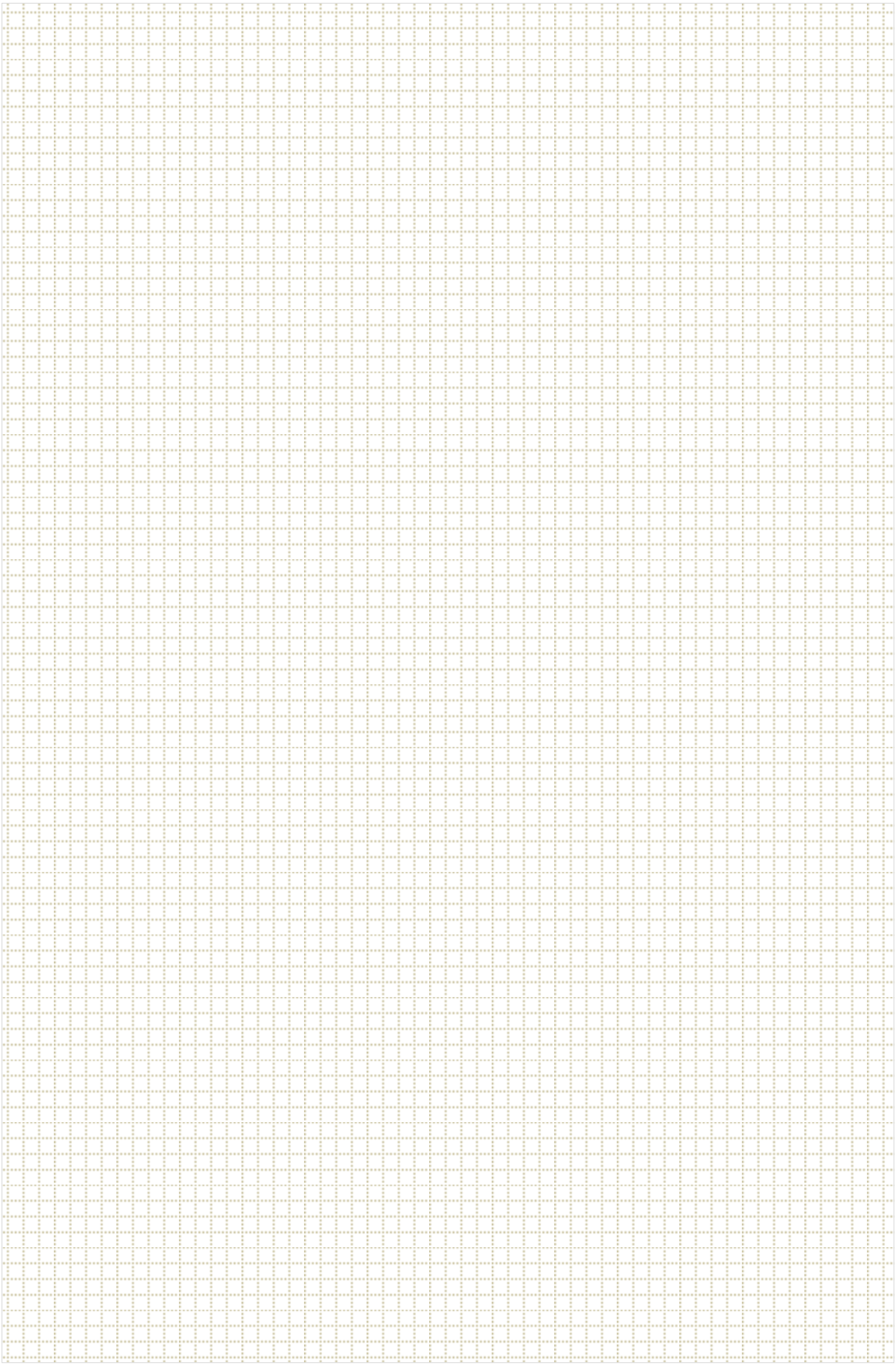
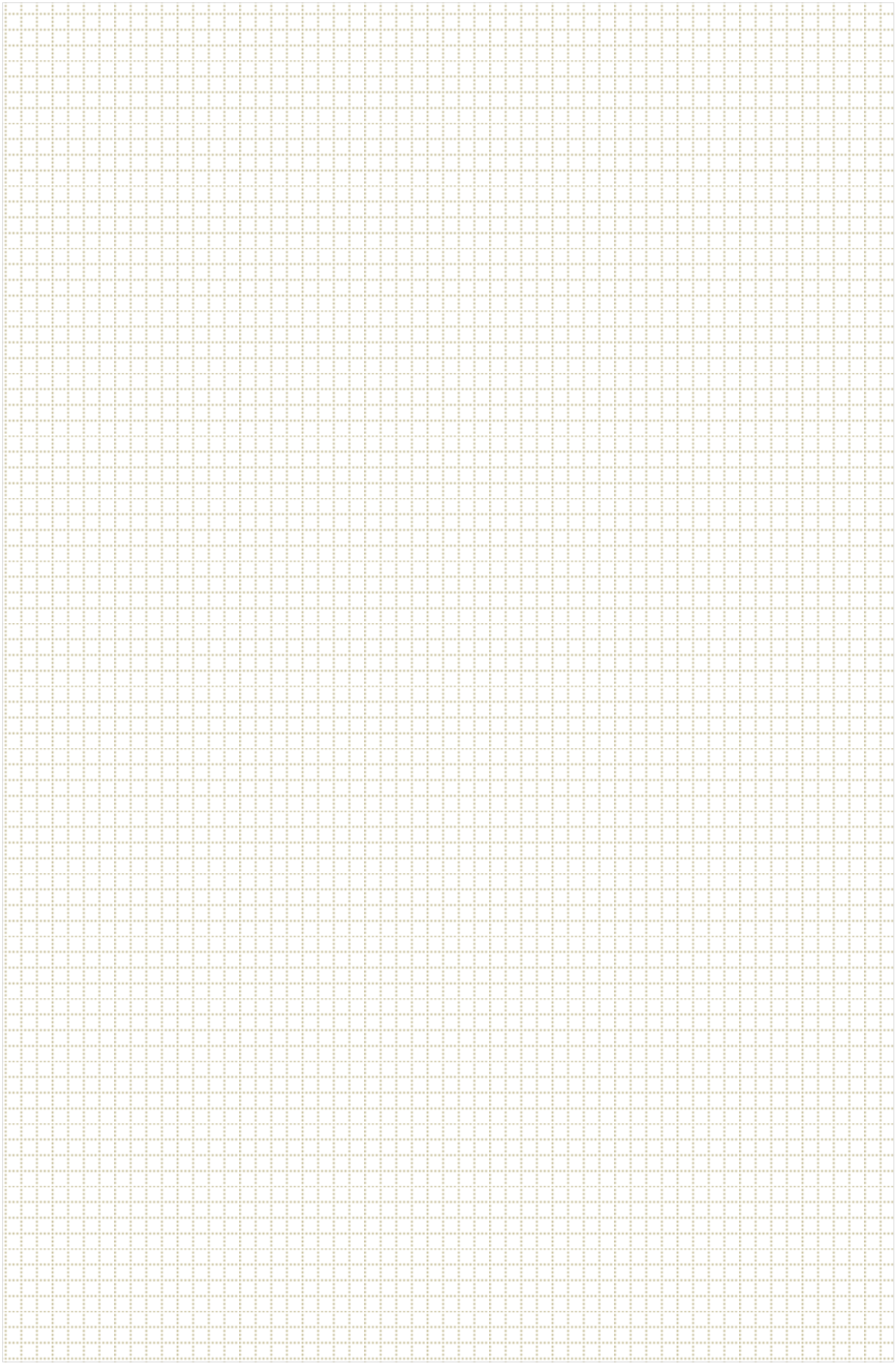
LVD 2014/35/UE EMC 2014/30/UE RoHS 2011/65/UE WEEE 2012/19/UE	LVD 2014/35/EU EMC 2014/30/EU RoHS 2011/65/EU WEEE 2012/19/EU
Odniesienia do odnośnych norm zharmonizowanych, które zastosowano, lub do innych specyfikacji technicznych, w stosunku, do których deklarowana jest zgodność:	***References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:***
LVD	PN-EN 61010-1:2011 PN-EN 60519-1:2015-10 PN-EN 60529:2003/A2:2014-07
EMC	PN-EN 61326-1:2013-06
RoHS	PN-EN 50581:2013-03

POL-EKO-APARATURA sp.j.
DYREKTOR
Sebastian Kowalski

Wodzisław Śl. 23.05.2017 (Director)

NOTES:





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POL–EKO–APARATURA sp.j.

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Tel. +48 / 32 453 91 70, Fax. +48 / 32 453 91 85

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