

INSTRUCTION MANUAL



Drying oven (SIMPLE version)

SLW 53, 115

SLN 53, 115

Caution:

Before using the device first read carefully this manual!



Manufacturer:

POL-EKO-APARATURA


version 1.08


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1 SAFETY PRECAUTIONS

	<p>All warnings included in this instruction manual, especially these which appear next to the warning or informative symbols, should be obeyed at all times to ensure the safety of the user and to maintain the proper operation of the unit!</p> <p>The manufacturer does not take any responsibility for any damage which results from disobeying the instruction manual and misuse!</p>
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	<p>When the device is working on 200 °C or higher temperature, the housing and door can be hot.</p>
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	<p>This symbol indicates helpful tips.</p>
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To guarantee your security and the longest efficiency of the unit, please comply with the following rules:

1.	<p><u>The unit cannot be installed:</u></p> <ul style="list-style-type: none">- outside,- in damp places or places which can be easily flooded,- near flammable or volatile substances,- near acids or in corrosive environments.
2.	<p><u>It is forbidden to:</u></p> <ul style="list-style-type: none">- store inflammable or volatile substances inside the unit,- touch live parts of the unit- operate the unit with wet hands,- put vessels containing water on the device,- climb or put any objects on the unit,- touch the compressor and condenser while the unit is connected to the mains

3. You should:

- 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 power plug if you are not going to use the unit for a longer period of time,
- disconnect the unit and protect it from reconnecting if it has any visual faults.

1.1 Personal protective equipment

Danger of: risk of burns



Inside the chamber there is high temperature up to 250°C. Do not touch the samples, interior of the chamber, door and casing without suitable protective gloves!

In the event of a failure or incorrect operation of the device immediately contact your service POL-EKO-APARATURA sp.j.

2 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

3 PRODUCT DESCRIPTION

The device is designed to work in laboratory environment and to use in laboratory process. The device are designated to test samples in constant temperature. Interior and chamber are made of stainless steel (type H17). The housing of device be made of galvanized steel powdered coated. The temperature inside chamber is controlled by multi function microprocessor which is connected to 4-digit LED display.

4 BEFORE THE FIRST USE

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

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.

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

- Ambient temperature +10°C...+28°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


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

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;

The electric installation should meet the following conditions:

	<p>Connect device to a socket with ground in order to avoid electric shocks in case of the unit's failure.</p>
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The electric installation should be secured by a 16 A antisurge fuse.

4.1 Wear parts

During normal work the following parts could be worn:

- silicone gasket door,
- chamber airfan – only in devices with forced air circulation.

4.2 Placement of the samples

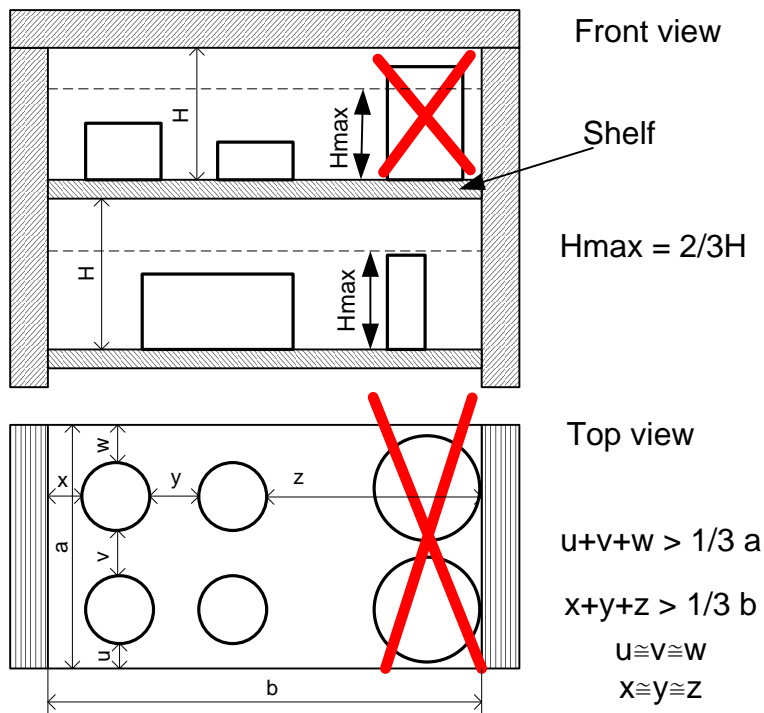
To provide proper air circulation and stable conditions in which the samples are stored in the chamber, it is necessary to keep the following rules:

the max height of the samples should not exceed 1/3 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

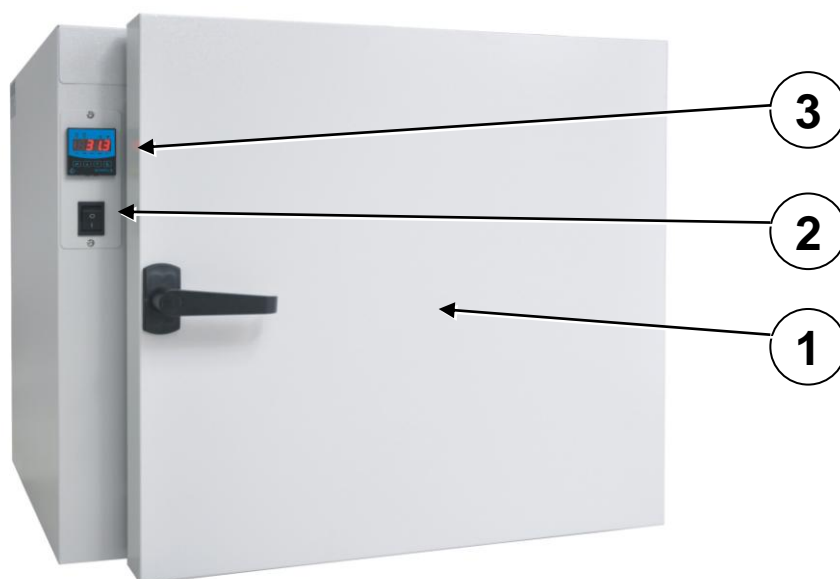
4.3 Closing the door

The door has been equipped with a handle and locking mechanism. To close, put the handle in a horizontal position, gently push the door wing and turn the handle into a vertical position.



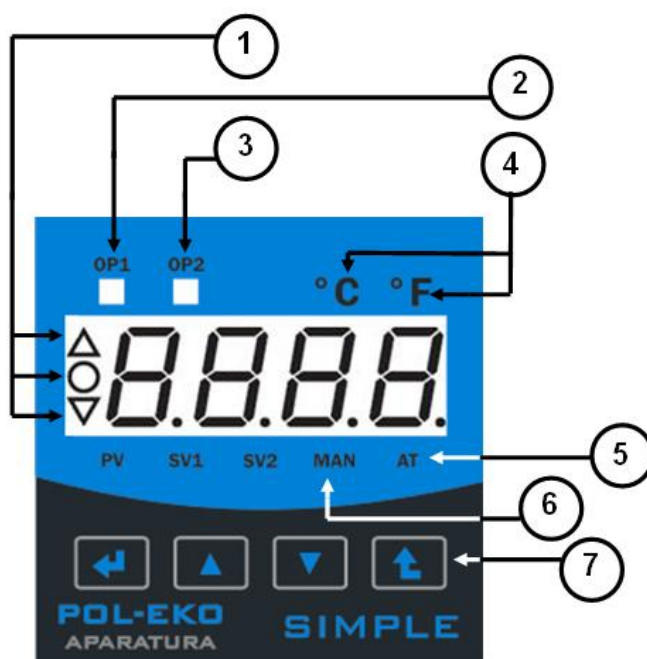
Proper door closing reduces energy consumption and assures correct temperature uniformity and stability.

5 APPEARANCE



- (1) Doors
- (2) Main switch
- (3) Control panel

5.1 Control panel



(1) Deviation Indicator

- \triangle current temperature is higher than set temp
- \circ current temperature is $\pm 1,0^{\circ}\text{C}$ than set temp
- ∇ current temperature is lower than set temp

(2) Heating active

(3) Timer indicator (used when it is active)

(4) Temperature unit

(5) Auto-tuning Indicator

(6) Calculated heating power

(7) Buttons for ease of control setup and set point adjustment

KEYPAD OPERATION

SCROLL / ENTER KEY: 

This key is used to select a parameter to be viewed or adjusted.

UP KEY: 

This key is used to increase the value of selected parameter.

DOWN KEY: 

This key is used to decrease the value of selected parameter.

RESET KEY: 

This key is used to:

- Revert the display to display the temperature value.
- Stop the auto-tuning mode.
- Clear the message of communication error and auto-tuning error
- Restart the timer when the timer has been time out.

Display Form of Characters

A	<i>A</i>	E	<i>E</i>	I	<i>I</i>	N	<i>n</i>	S	<i>S</i>	X	
B	<i>b</i>	F	<i>F</i>	J	<i>J</i>	O	<i>o</i>	T	<i>t</i>	Y	<i>y</i>
C	<i>C</i>	G	<i>G</i>	K	<i>K</i>	P	<i>P</i>	U	<i>u</i>	Z	
c	<i>c</i>	H	<i>H</i>	L	<i>L</i>	Q		V	<i>v</i>	?	<i>?</i>
D	<i>d</i>	h	<i>h</i>	M	<i>m</i>	R	<i>r</i>	W		=	<i>=</i>

6 OPERATION AND MAINTENANCE

6.1 Turning the unit on/off



SL ovens

Before using the unit, it is recommended to heat the chamber. To do this, turn on the unit and set the temperature at 250°C. Then let the unit work for 3 hours. During the heating, the unit is likely to produce a specific smell. Before the heating process, please clean the chamber in order to avoid permanent stains.



After launching, the unit will start reaching the set temperature immediately. Make sure the set temperature is the one you require and check if there are no items inside the chamber that might get damaged due to high temperature.


Once the device is turned on with the main switch, the display will show the code of the product for 2.5 seconds.

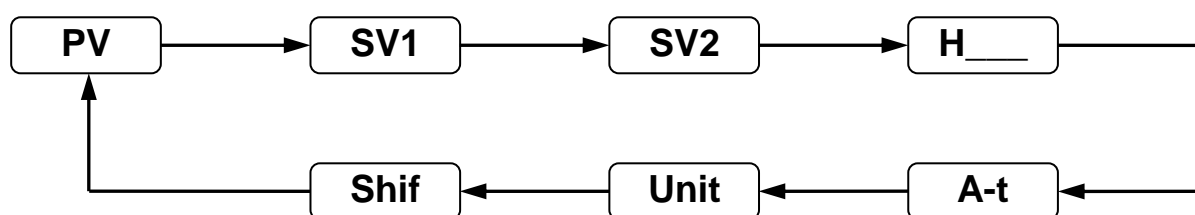
Current temperature in the chamber will appear. The unit has been calibrated, the displayed temperature corresponds to the temperature in the centre of chamber.



It is not possible to stop the program using the control panel (display). To stop heating, set the min temperature or turn of the unit using the main switch.


6.2 Navigating between screens

To navigate between the screen, please use the ENTER  button. The sequence is as follows:





- PV – current temperature
- SV1 – set temperature
- SV2 – program time left (only when timer is active)
- H___ - Calculated heating power
- A-t - AUTO-TUNING function
- UNIT – selection of temperature unit
- SHIF – temperature correction function








When you modify the settings (temperature, units) the changes are saved immediately without the need to confirm them. After that you may press the ESC  button to display current temperature.

6.2.1 To change set temperature



Keep pressing the ENTER  button until the SV1 indicator illuminates. Use the  to change the set temperature.

6.2.2 Time of holding set temp

This function is inactive by default. To activate it, perform the following steps:

When the PV indicator is illuminated, press down and hold the ENTER  button for about 7 seconds until you have seen "Set" on the display. Press the ENTER button several times until you see OUT2, then use the arrows  to set *t, nr*. Then press 2x ENTER , on the display you will see 02TY, then use the arrows  to set *reLy*. Press RESET . The function is now active. The deactivation procedure is the same, but in the OUT2 position you have to set *none*.

Using timer:


Keep pressing the ENTER  button until the SV2 indicator illuminates. Use the  to change the set time. When the unit has reached the set temp, timer will start counting down to zero. The time can be set between 0.1 to 4553.6, when 1.0 refers to 1 minute, and 0.1 to 6 seconds.

When the time has been count down to 0, the unit will stop maintaining the set temperature. To start counting down the time again, press down RESET.



It is not possible to use Timer when AUTO-TUNING function is active.

6.2.3 Overview of the heating power

Keep pressing the ENTER  button until the MAN indicator illuminates. The current heating power calculated by the controller will be displayed. The range is 0 to 100 where 0 stands for no heating and 100 for max power. It is not possible to change those values.



6.2.4 AUTO-TUNING function



After the AUTO-TUNING function has been carried out successfully, new settings will be saved in the controller. Returning to previous settings is not possible.
Set a set point to a lower value if overshooting beyond the normal process value is likely to cause damage

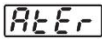


The unit has been factory configured and calibrated, so in most cases using the AUTO-TUNING function is not necessary. However, it still can be used if reaching the set temperature and temperature stability are not satisfactory.

This function consists in reaching the set point and oscillating around it. This function can last up to several hours depending on the set temperature and type of unit. You need to set the temperature at which you want to perform the AUTO-TUNING function according to point 6.2.1. Then keep pressing the ENTER  button until the PV and AT indicators have illuminated at the same time. Press and hold the ENTER  button for 5 seconds, the function will start when the AT indicator starts blinking.

After the auto-tuning procedures are completed, the AT indicator will cease to flash and the unit revert to PID control by using its new PID values. The PID values obtained are stored in the nonvolatile memory




Auto-Tuning Error

If auto-tuning fails an  message will appear on the display in case of set point is changed during auto-tuning procedure.

Solutions to :




- Try auto-tuning once again.
- Don't change set point value during auto-tuning procedure.
- Touch RESET key to reset message.

6.2.5 Temperature unit



To change the temperature unit, keep pressing the ENTER  button until you have seen the  sign on the display. Use the  buttons to change the temperature unit.

6.2.6 Temperature correction


In certain applications it is desirable to shift the controller display value from its actual value. This can be easily accomplished by using the PV shift function. Example: if the set temperature is 100°C, it has been reached and is stable, and, the temperature measured in the centre of chamber with an independent sensor is 99°C, you should set the correction value of -1°C.

To change the correction value, keep pressing the ENTER  button until you have seen the  sign on the display. Use the  to change the temperature correction.

7 CLEANING AND MAINTENANCE OF THE DEVICE

	Before cleaning the device, it needs to be disconnected from the electrical supply!
	Use rubber gloves while cleaning to protect yourself from injuries.

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

	When cleaning stainless steel surface 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.
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7.1 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.	On a regular basis clean with a vacuum cleaner or a duster the cooling unit and condenser (exchanger) which is placed in the rear (or upper) part of the device. If you fail to do so you might damage the compressor and subsequently lose your rights for warranty-covered repair.

7.2 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.
6.	In drying oven could happened the internal bottom metal part becomes discoloured. It is caused by very high heaters temperature which are placed just under bottom metal part.

8 TAKING CARE OF THE DEVICE IN CASE OF LONGER ABSENCE

1.	Remove all objects from the chamber.
2.	Disconnect the device from the mains
3.	Clean and dry the chamber.
4.	Leave the door open to avoid nasty smells.
5.	Store in temperature between 0°C and 50°C and relative humidity maximum 70%.

9 TROUBLESHOOTING

9.1 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?

9.2 Inefficient heating

1.	Is the door shut tight?
2.	Is the air fan switched on?
3.	What is the ambient temperature?

9.3 The device is operating too loud

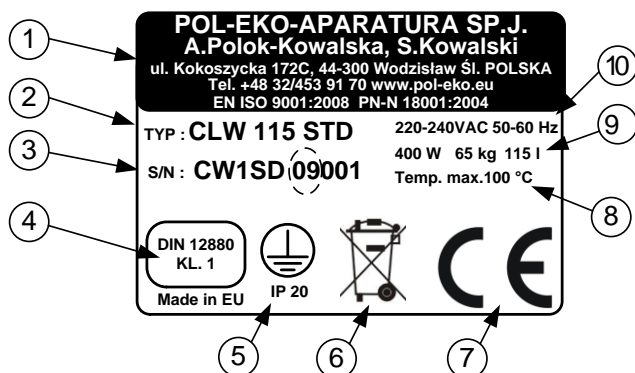
1.	Is the device not leaning against furniture or other objects?
2.	Is the device levelled properly?
	CAUTION: Buzz and noise from decompression coming from the cooling circuit are normal noises.

9.4 Error Codes and Corrective Actions

Error Code	Display Symbol	Error Description	Corrective Action
26	<i>RdEr</i>	Fail to perform auto-tuning function	1.The PID values obtained after auto-tuning procedure are out of 2.Don't change set point value during auto-tuning procedure. 3.Use manual tuning instead of auto-tuning. 5. Don't set a zero value for TI. 4. Don't set a zero value for PB. 6. Touch RESET key
29	<i>EEPE</i>	EEPROM can't be written correctly	Return to factory for repair
39	<i>SbEr</i>	Input sensor break	Replace input sensor.
40	<i>RtEr</i>	A to D converter or related component(s) malfunction	Return to factory for repair.

10 RATING PLATE

The rating plate is located on the left wall of the unit, in the upper left corner. 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) Maximum power consumption, weight and capacity of device
- 10) Voltage and Frequency of mains

11 TECHNICAL DATA

Parameter		Model	
		53	115
chamber capacity ¹	[l]	56	112
	cu ft]	2	3,9
temperature max[°C]	SL	+250	
temperature max[°F]	SL	+482	
overall dims* [mm]	width	655	655
	height	584	845
	depth	600	700
internal dims [mm]	width	395	460
	height	395	540
	depth	360	450
max shelf workload [kg]	SL	10	10
max unit workload [kg]	SL	40	60
nominal power [W]	SL	1600	2400
shelves fitted/max ²		2/5	2/7
voltage 50/60 Hz[V]	SL	Value described on rating plate	
warranty		24 months	

* - dims of door handles, power cable and leveling feet or wheels not included

1 - working capacity of chamber can be smaller

2 - "fitted" - number of shelves fitted, included in price, "max" - numbers of shelves which can be fitted

All technical data exact to $\pm 5\%$, working capacity of chamber can be smaller.

12 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

13 MAINTENANCE AND INSPECTION REGISTER

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

13.1 Inspection

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

No.	Date	Description	Performer	Signature
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				



DEKLARACJA ZGODNOŚCI UE

DECLARATION OF CONFORMITY UE



Produkt:	<i>Product:</i>
Suszarka laboratoryjna SIMPLE	Drying oven SIMPLE
Model:	<i>Model:</i>
SLW 53 SIMPLE; SLN 53 SIMPLE; SLW 115 SIMPLE; SLN 115 SIMPLE	
w wersjach:	<i>in version:</i>
-	
Nazwa i adres producenta:	<i>Name and address of the manufacturer:</i>
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.	<i>This declaration of conformity is issued under the sole responsibility of the manufacturer.</i>
Wymieniony powyżej przedmiot niniejszej deklaracji jest zgodny z odnośnymi wymaganiami unijnego prawodawstwa harmonizacyjnego:	<i>The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:</i>
LVD 2014/35/UE EMC 2014/30/UE RoHS 2011/65/UE WEEE 2012/19/UE	
Odniesienia do odnośnych norm zharmonizowanych, które zastosowano, lub do innych specyfikacji technicznych, w stosunku do których deklarowana jest zgodność:	<i>References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:</i>
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



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- D.O. sensors
- pH buffer solutions
- conductivity standards
- photometric tests
- chromatography syringes
- laboratory accessories

We advise our customers as far as the choice
and maintenance of the equipment are concerned !