

# Instruction Manual

## Laboratory Shaker



**LS 280, LS 350, LS 500, LS 700**

**Note: Before using the instrument first read carefully this instruction manual!**



Manufacturer:

**POL-EKO-APARATURA sp.j.**

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## Contents

<b>1</b>	<b>SAFETY PRECAUTIONS .....</b>	<b>5</b>
<b>2</b>	<b>ENVIRONMENTAL PROTECTION AND RECYCLING .....</b>	<b>5</b>
<b>3</b>	<b>INTENDED USE OF THE UNIT .....</b>	<b>6</b>
<b>4</b>	<b>BEFORE FIRST OPERATING.....</b>	<b>6</b>
<b>5</b>	<b>UNIT DESCRIPTION/ CONSTRUCTION.....</b>	<b>7</b>
<b>6</b>	<b>OPERATION OF THE UNIT.....</b>	<b>8</b>
6.1	Launching and stopping a program .....	8
6.2	Continuous operating .....	8
6.3	Time program.....	9
6.4	Settings mode .....	9
<b>7</b>	<b>CLEANING AND MAINTENANCE.....</b>	<b>10</b>
<b>8</b>	<b>DIFFICULTIES WITH THE UNIT.....</b>	<b>10</b>
<b>9</b>	<b>TECHNICAL DATA.....</b>	<b>11</b>
<b>10</b>	<b>RATING PLATE.....</b>	<b>12</b>
<b>11</b>	<b>ACCESSORIES AND ADDITIONAL EQUIPMENT.....</b>	<b>13</b>
<b>12</b>	<b>WARRANTY CONDITIONS.....</b>	<b>14</b>



## 1 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!

If you want the unit to serve as long as possible and your work to be safe, please obey the following rules:

<b>1.</b>	<p><b><u>The unit should not be installed:</u></b></p> <ul style="list-style-type: none"> <li>- in damp places or places which can be easily flooded,</li> <li>- near flammable or volatile substances,</li> <li>- near acids or in corrosive environment.</li> </ul>
<b>2.</b>	<p><b><u>It is forbidden to:</u></b></p> <ul style="list-style-type: none"> <li>- touch live parts of the unit,</li> <li>- operate the unit with wet hands,</li> </ul>
<b>3.</b>	<p><b><u>You should:</u></b></p> <ul style="list-style-type: none"> <li>- use only mains with earth to avoid electric shocks,</li> <li>- use inside buildings,</li> <li>- unplug the power cable holding the protective cover, not the cable itself,</li> <li>- disconnect the unit from the mains before undertaking any repairs or maintenance works,</li> <li>- protect the power cable and the plug from any damage and do not use the plug if it is improperly plugged in or if the cable is laid incorrectly,</li> <li>- disconnect the power cable before moving the unit,</li> <li>- disconnect the power plug if you are not going to use the unit for a longer period of time,</li> <li>- disconnect the unit and protect it from restarting if it has any visual faults.</li> </ul>

## 2 ENVIRONMENTAL PROTECTION AND RECYCLING



The packaging protects the unit from any damage during transportation. The packaging is environmentally friendly 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 regain precious raw materials.

The unit is marked according to European Union directives on waste electrical and electronic equipment (WEEE). These directives determine the return and recycling conditions and are valid in all European Union.

**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 suggestions are welcome!

Visit our website: [www.polekolab.com](http://www.polekolab.com)

### 3 INTENDED USE OF THE UNIT

Laboratory shaker is destined for stirring biological or chemical materials contained in beakers, flasks, probes, plates, micro cover glasses and cuvettes.

The unit can be used whenever continuous stirring of the probes is required:

- WR tests
- latex agglutination
- yeast and bacteria culture tests
- immunological and biochemical reactions tests
- etc.

Electronic control system provides thorough rotational speed regulation of the shaker's plate with constant amplitude. It enables to specify work parameters adequate to carried out test.

### 4 BEFORE FIRST OPERATING

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.



**Once you receive the unit, please check its 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 unit should be used in a place that fulfils following conditions:

- ambient temperature 10°C do +40°
- relative humidity: to 70% (or up to 95% under conditions which do not allow to condensation)
- the unit should not be exposed to direct contact with sunrays/solar radiation and should be placed far from a source of heat
- the unit should not be used in the environment where a great dustiness occurs
- the unit should be installed in a tough and stable surface
- the unit should be put in a position that guarantees easy flow of air around the unit, i.e. the walls of the unit are 50 mm away from the wall.

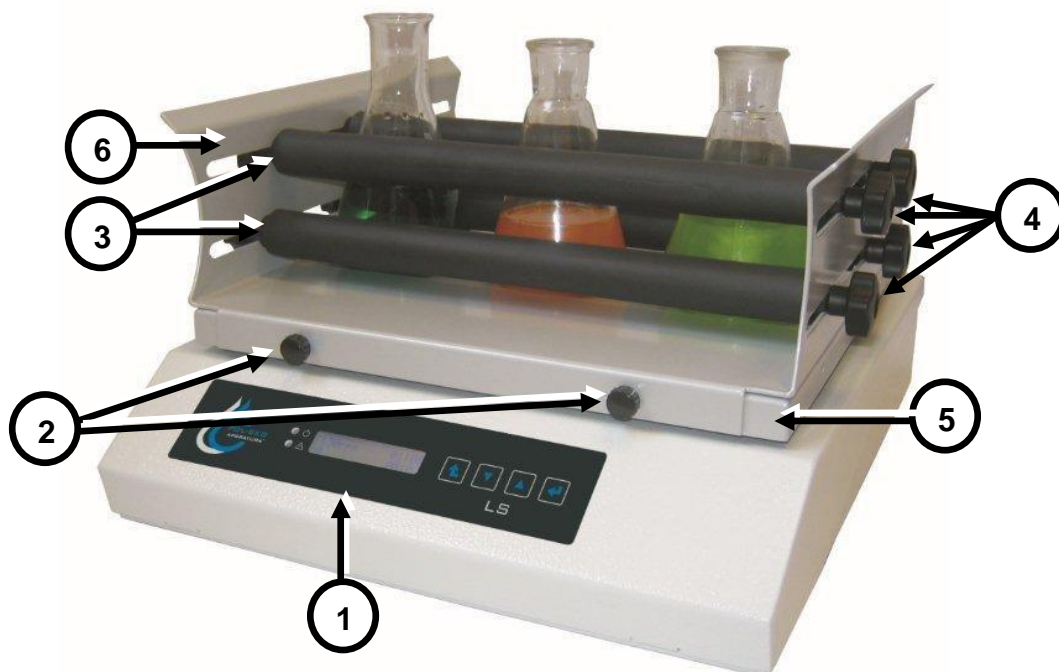


**The unit uses alternating current 220-240V/50Hz. It should be connected to a wall socket equipped in grounding to avoid electric shock in the case of the possible shaker damage.**

## 5 UNIT DESCRIPTION/ CONSTRUCTION

Significant elements of shaker:

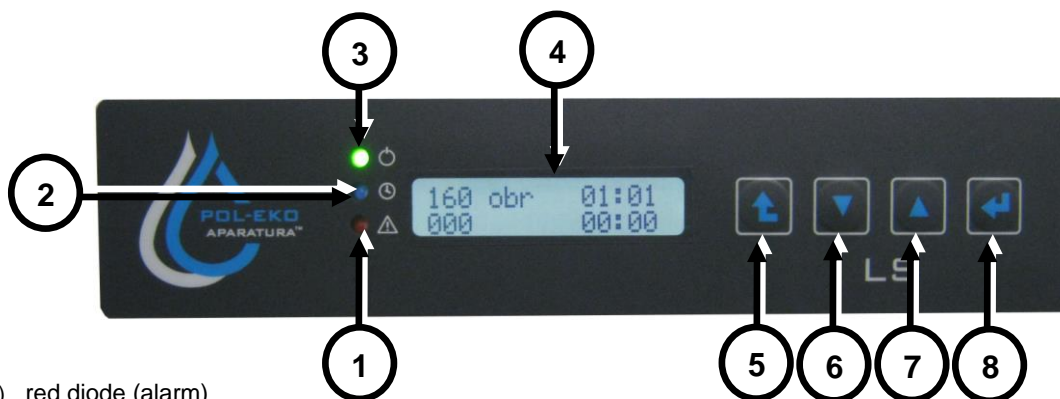
**Laboratory shaker (with optional platform Plxx1):**  
**Front**



- (1) control panel with display
- (2) screws mounting the platform,
- (3) platform rollers ( included in the platform),
- (4) roller hand wheel
- (5) shaking table,
- (6) platform of the shaker Plxx.1 (optionally).

The user can purchase platforms used to mounting different types of laboratory containers. More information can be found in point: "Accessories and additional equipment"

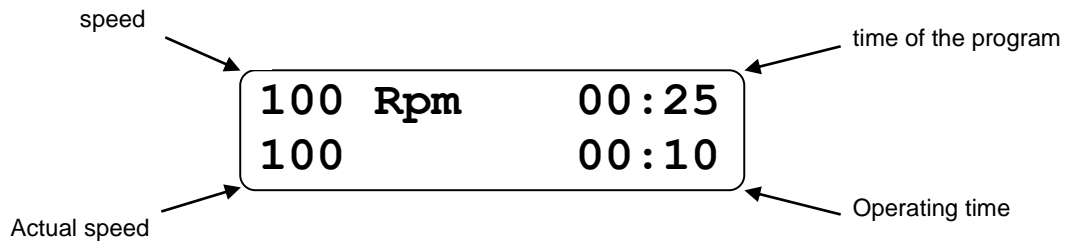
### **Panel**



- (1) red diode (alarm)
- (2) blue diode (active program)
- (3) green diode (power supply)
- (4) LCD display
- (5) EXIT button
- (6) DOWN button
- (7) UP button
- (8) ENTER button

## 6 OPERATION OF THE UNIT

### Display




In the top left-hand corner of the display the desired speed is given. Below is actual speed. In the lower right-hand corner work time of the shaker is given. Both desired and actual speed is given in rpm.


If there is no 'time of the program' message, it means that the shaker will work continuously till it's stopped by the user.

### 6.1 Launching and stopping a program

All settings are saved in the memory in case of power failure. If a program was running while the power failure occurred, it is possible to resume it with the same settings once the power is back. See point 6.4 for more information. If you chose **starting** the unit after the power is back, the shaker will continue to work.







You will see the following message: „**Power failure ...**” and a red alarm LED will be on. Press the ENTER  button to confirm the Messenger.

A blue LED informs that the shaker is working.

To launch and stop a program, press down the ENTER  button.



### 6.2 Continuous operating

Continuous program involves uninterrupted work of the unit at a certain speed. To set the stirring speed, the user needs to:

- 1) Stop the program if it is running using the ENTER  button.
- 2) Go to settings using the ESC  button.
- 3) Rpm field will be pulsing. Select the required speed using the  and  buttons.
- 4) Once you have selected the speed, please confirm it using the ENTER button . If you intend to use the shaker in the continuous mode, set the time to 00:00 and confirm it with the ENTER button.
- 5) Press the ENTER  button to start the program. The shaker will start working and the blue LED will be on.
- 6) After some time, the real speed will get stable and reach the set point.

120 Rpm      00:00  
000            00:10

120 Rpm  
120            00:00


You can adjust the speed while the shaker is working using the  and  buttons.





### 6.3 Time program

Shaker has a function of time program, which allows to work in certain time and at a certain speed.


To set the time program, the user should act as follows:

- 1) press  in inactive mode

120	Rpm	00:00
000		00:10

- 2) using  and  set the desired value. Displayed speed pulses.

150	Rpm	00:00
000		00:10

- 3) using  confirm desired speed value and proceed to time settings. Box of the timework pulses.

150	Rpm	00:00
000		00:10

- 4) Use the  and  buttons to set the operating hours.


150	Rpm	00:12
000		00:10

- 5) Use the  and  buttons to set the operating minutes.




150	Rpm	00:12
000		00:10

- 6) confirm program parameters by pressing 


150	Rpm	00:12
120		00:10





- 7) to start the program, press 

When blue diode blinks, the shaker starts working. The unit automatically turns off after certain time, informing the user by acoustic signal.

When the program is active, the speed value can be changed by pressing  and . The user can also stop the program pressing .

### 6.4 Settings mode

You can change the settings of the shaker. To enter the settings mode, turn the unit off using the power switch, press down the ENTER  button and turn the unit on again

Use the  and  buttons to switch between the options. Press the ENTER  button to confirm. You can cancel the settings using the ESC  button.

The following options can be edited by the user:

- **Language** [polish, english] – determines the menu language
- **Direction** [CW, CCW] – determines the rotation direction
- **Max revs.** – determines the max limit of settings of oscilation
- **Power failure**[STOP, START UP] – determines if the unit should automatically resume operating after power failure
- **Minute step** – determines the minutes step while setting the shaking time
- **Time** – setting the clock

## 7 CLEANING AND MAINTENANCE



**Before cleaning the unit, it must be unplugged as it might cause an electric shock.**

To preserve aesthetic exterior of the unit, it must be cleaned from time to time. Enamel elements and a panel should be cleaned with a cloth damped in warm water. The user should secure the unit from getting the water to the interior of the unit, power switch and socket in the unit. To remove stubborn dirt the user can use water with detergent.


To assure failure-free and long-lasting work the user should maintain the unit periodically. The maintenance is carried out by POL-EKO-APARATURA service. If you want the maintenance work to be performed, call +48 32 453 91 70, +48 32 453 91 96 or mail to us.

### If the unit is not used for a long period of time

In the case of longer shut-down, the unit should be switched off by using power switch which is located at the back part of the unit. The unit should also be unplugged.

## 8 DIFFICULTIES WITH THE UNIT

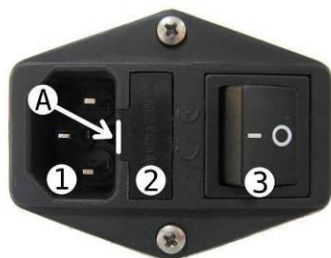
The list of faults and description of the activities before calling the service is given below.

Fault	Cause	Remedy
The unit does not turn on	Mains cable is bent or damaged	Change the mains cable
	The unit is not connected to any power supply	Plug the unit into wall socket ( 230V)
	The button switch at the back of the unit is not activated	Activate the button switch to the "I" position.
	Defective fuse	Change the fuse
Active program (blue LED is blinking), unit is not working	-	Switch off and on the unit . If the plate/table does not work, call the service.
unit has stopped	Time program is active	Set the continuous program so that the unit works continuously
unit has stopped, red LED is blinking	Overloaded plate/ table	Remove the excess overload from the plate/table
	The plate/ table cannot rotate easily	Remove objects that are around the unit and can disturb the work of the plate/table.
	The plate/table is not overloaded	Switch off and on the unit . If the unit does not work, call the service.
„Power failure...” message, red LED on	Power failure encountered	Press down  . The shaker Works correctly.

If the unit does not work properly, contact us +48 32 453 91 70, +48 32 453 91 96, or mail to us [serwis@pol-eko.com.pl](mailto:serwis@pol-eko.com.pl). An application form should contain information about the unit (model, type, purchase date, installation place) and possibly the most precise description of the defect. This information enables to solve the problem quickly and efficiently.

### Changing the fuse

At the back of the unit there is an integral socket with a switch and fuse socket.



- (1) socket
- (2) fuse socket
- (3) power switch

The unit is secured by two fuses 20x5mm 500mA / 230V.



**Before changing the fuse, the unit must be unplugged as it might cause an electric shock.**

To change the fuse, the user should:

- Power switch (3) put in „O” position (switched off).
- Unplug the mains cable (from the socket (1))
- Using the screwdriver (width about 3mm) prise the socket (2) in the place that is marked in the picture with the letter and pull out the socket with the fuses.
- Change the burnt fuses into new ones.
- Insert the socket with the fuses (2) pushing as far as possible.
- Insert mains cable into the socket (1)
- Turn the unit in using the switch button.

If the unit does not switch on after changing the fuses, call the service.

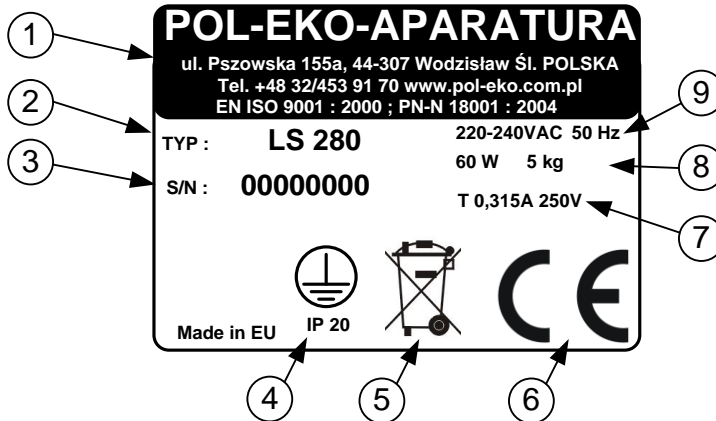
## 9 TECHNICAL DATA

Parameter	LS 280	LS 350	LS 500	LS 700	
movement	orbital				
controller	microprocessor				
display	LCD display				
speed range [rpm]	30 ... 500	30 ... 500	30 ... 300	30 ... 300	
accuracy [rpm]	10				
amplitude [mm]	5	5 or 10			
max load capacity [kg]	10				
shaking mode	1 min. ... 99 h or continuous operation				
dimensions without / with shaking table [mm]	width	320	390	550	700
	height	120 / 220	120 / 220	120 / 220	120 / 220
	depth	330	400	440	420
weight with shaking table [kg]	10	15	22	25	
fits to cooled incubator	ILW 53	ILW 115	ILW 240	ILW 400	
nominal power [W]	60				
ambient temperature [°C]	+10 ... +40				
humidity [%]	up to +70				
voltage 50/60Hz [V]	230				
warranty	24 months				
manufacturer	POL-EKO-APARATURA				

## 10 RATING PLATE

On the housing of the unit there is an identification label. It contains a lot of information about the unit.

- (1) Name of the manufacturer
- (2) Type of the unit
- (3) Serial number of the unit
- (4) Fire protection I class : protection from indirect contact
- (5) Proceedings with worn out units according to directive 2002/96/EC
- (6) Certificate of conformity (CE) according to the directives
- (7) Fuse value
- (8) Nominal power and load capacity of the table
- (9) Power supply parameters



## 11 ACCESSORIES AND ADDITIONAL EQUIPMENT

Model	Catalogue no
<b>Equipment to WL 280</b>	
PL 28.1 universal platform to different types of containers with 4 rollers, dimensions (width x depth x height) 280 x 210 x 100 [mm]	WL280/PL 28.1
PL 28.2 platform for mounting the handles of the flask, possibility of inserting the handles of the flasks with capacity 25 ml, 50 ml, 100 ml, 250 ml, 500 ml (the handles should be ordered separately, dimensions (width x depth x height) 280 x 210 x 24 [mm])	WL280/PL 28.2
PL 28.3 platform for shaking e.g. Petri plate, bottles for bacterial culture and other containers with low centre of gravity, dimensions (width x depth x height) 280 x 210 x 32 [mm]	WL280/PL 28.3
PL 28.4 platform for distributors with 3 mounting rollers; used for shaking, salting, extraction, concentration, dimensions (width x depth x height) 280 x 210 x 150 [mm]	WL280/PL 28.4
<b>Equipment to WL 350</b>	
PL 35.1 universal platform to different types of containers with 4 rollers, dimensions (width x depth x height) 350 x 300 x 100 [mm]	WL350/PL 35.1
PL 35.2 platform for mounting the handles of the flask, possibility of inserting the handles of the flasks with capacity 25 ml, 50 ml, 100 ml, 250 ml, 500 ml (the handles should be ordered separately, dimensions (width x depth x height) 350 x 300 x 24 [mm])	WL350/PL 35.2
PL 35.3 platform for shaking e.g. Petri plate, bottles for bacterial culture and other containers with low centre of gravity, dimensions (width x depth x height) 350 x 300 x 32 [mm], for WL 280 shaker	WL350/PL 35.3
PL 35.4 platform for distributors with 3 mounting rollers; used for shaking, salting, extraction, concentration, dimensions (width x depth x height) 350 x 300 x 150 [mm]	WL350/PL 35.4
<b>Equipment to WL 500</b>	
PL 50.1 universal platform to different types of containers with 4 rollers, dimensions (width x depth x height) 545 x 360 x 100 [mm]	WL500/PL 50.1
PL 50.2 platform for mounting the handles of the flask, possibility of inserting the handles of the flasks with capacity 25 ml, 50 ml, 100 ml, 250 ml, 500 ml (the handles should be ordered separately, dimensions (width x depth x height) 545 x 360 x 24 [mm])	WL500/PL 50.2
PL 50.3 platform for shaking e.g. Petri plate, bottles for bacterial culture and other containers with low centre of gravity, dimensions (width x depth x height) 545 x 360 x 32 [mm]	WL500/PL 50.3
PL 50.4 platform for distributors with 3 mounting rollers; used for shaking, salting, extraction, concentration, dimensions (width x depth x height) 545 x 360 x 150 [mm]	WL500/PL 50.4
<b>Equipment to WL 700</b>	
PL 70.1 universal platform to different types of containers with 4 rollers, dimensions (width x depth x height) 710 x 360 x 100 [mm]	WL700/PL 70.1
PL 70.2 platform for mounting the handles of the flask, possibility of inserting the handles of the flasks with capacity 25 ml, 50 ml, 100 ml, 250 ml, 500 ml (the handles should be ordered separately, dimensions (width x depth x height) 710 x 360 x 24 [mm])	WL700/PL 70.2
PL 70.3 platform for shaking e.g. Petri plate, bottles for bacterial culture and other containers with low centre of gravity, dimensions (width x depth x height) 710 x 360 x 32 [mm]	WL700/PL 70.3
PL 70.4 platform for distributors with 3 mounting rollers; used for shaking, salting, extraction, concentration, dimensions (width x depth x height) 710 x 360 x 150 [mm]	WL700/PL 70.4
<b>Additional equipment</b>	
Handle U1 for Erlenmayer flask ( 25 ml)	WL/U1
Handle U2 for Erlenmayer flask (50 ml)	WL/U2
Handle U3 for Erlenmayer flask ( 100 ml)	WL/U3
Handle U4 for Erlenmayer flask (250 ml)	WL/U4
Handle U5 for Erlenmayer flask (500 ml)	WL/U5
Handle U6 for Erlenmayer flask (1000 ml)	WL/U6
Handle U1 for Erlenmayer flask (2000 ml)	WL/U7
SP.1 stand for probes, the hole diameter is adjusted to needs of Clients	WL/SP.1

## 12 WARRANTY CONDITIONS

1. The warranty period for the user/buyer is 24 months on from the date of invoice issue.
2. The warranty does not cover any damage resulting from inappropriate transport.
3. In case of a justified warranty repair, the user/buyer covers the cost of transporting the unit to the service, and the warrantor covers the cost of transporting the unit to the user/buyer. In case of an unjustified claim the user/buyer covers the cost of transporting the unit in both ways.
4. Justified faults and damage of the unit will be repaired free of charge within 20 days of delivering the unit to the service.
5. The warranty period for the user/buyer is extended for the time the unit has spent at the service.
6. Warranty covers data carriers delivered along with the equipment; warranty does not cover data saved on any additional data carriers plugged to the equipment by the User, like e.g. memory card or pendrive. Manufacturer recommends to make additional copy of significant data.
7. Warranty does not cover parts that are being exploited during equipment normal use, e.g. battery.
8. The term "repair" does not cover the installation and conservation of the unit, or improving the mechanical-electrical connections.
9. The only entity approved to carry out all warranty repairs is the POL-EKO-APARATURA service or other party authorized by POL-EKO-APARATURA to provide service.
10. Warranty does not cover any damage to the glass parts and any mechanical damage.
11. The user loses the warranty rights if during the warranty period:
  - they use the unit contrary to the instruction manual,
  - **does not perform the maintenance and inspection works, or does not comply to the recommendations (see point "Maintenance...")**,
  - they carry out the repairs or modifications of the unit on their own or have them made by others, not authorized by POL-EKO-APARATURA
  - the warranty seal is torn,
  - they use their guarantee rights in the first year of using the device (counting from the date of sale),
  - there are no anti-surge protections in the building which may result in a damage to the unit (e.g. due to an atmospheric discharge),

***Warranty conditions shall be subject to Polish law***

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Warranty repairs have to be reported to:

**Address:** POL-EKO-APARATURA Sp.j.  
ul. Kokoszycka 172 C  
44-300 Wodzisław Śląski  
POLAND

**Phone:** +48 32 453 91 70  
**Fax:** +48 32 453 91 86  
**e-mail:** [info@pol-eko.com.pl](mailto:info@pol-eko.com.pl)

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### **Before you contact the service:**

- Make sure you cannot remove the failure by yourself.
- Turn the unit off and on again to make sure it is not working properly. If this is the case, disconnect the unit from the mains and repeat the procedure after an hour,

If the unit is still not working properly, contact the service giving the following information:

- type and serial number of the device,
- date of purchase,
- type of damage (detailed description),
- full address and place where the unit has been installed,
- time when we can contact you,



**DEKLARACJA ZGODNOŚCI UE**  
**DECLARATION OF CONFORMITY UE**



<b>Produkt:</b> Wytrząsarka laboratoryjna	<b>Product:</b> <i>Laboratory shaker</i>
<b>Model:</b>  LS 280; LS 350; LS 500; LS 700	<b>Model:</b>  
<b>w wersjach:</b>	<b>in version:</b>  -
<b>Nazwa i adres producenta:</b>	<b>Name and address of the manufacturer:</b> POL-EKO-APARATURA sp.j. A. Polok-Kowalska, S. Kowalski ul. Kokoszycka 172c 44-300 Wodzisław Śl.
<b>Niniejsza deklaracja zgodności wydana zostaje na wyłączną odpowiedzialność producenta.</b>	<b>This declaration of conformity is issued under the sole responsibility of the manufacturer.</b>
<b>Wymieniony powyżej przedmiot niniejszej deklaracji jest zgodny z odnośnymi wymaganiami unijnego prawodawstwa harmonizacyjnego:</b>	<b>The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:</b> LVD 2014/35/UE EMC 2014/30/UE RoHS 2011/65/UE WEEE 2012/19/UE
<b>Odniesienia do odnośnych norm zharmonizowanych, które zastosowano, lub do innych specyfikacji technicznych, w stosunku, do których deklarowana jest zgodność:</b>	<b>References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:</b>
LVD	PN-EN 61010-1:2011 PN-EN 61010-2-051:2015-05 PN-EN 60529:2003
EMC	PN-EN 61326-1:2013-06
RoHS	PN-EN 50581:2013-03

POL-EKO-APARATURA sp.j.  
DYREKTOR  
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Producer of basic and indispensable laboratory equipment  
as well as continuous measurement equipment.

Authorized dealer of:  
Knick, Thermo Scientific, WTW



## **POL-EKO-APARATURA sp.j.**

A. Polok-Kowalska, S. Kowalski  
ul. Kokoszycka 172 C  
44-300 Wodzisław Śląski, Poland  
Tel. +48 / 32 453 91 70, Fax. +48 / 32 453 91 85

e-mail: [info@pol-eko.com.pl](mailto:info@pol-eko.com.pl)

web: <https://www.pol-eko.com.pl> \* <https://www.cieplarki.pl>

### **We produce:**

- thermostatic cabinets
- refrigerators
- laboratory freezers
- heating ovens
- cooled incubators
- drying ovens
- colony counters
- stationary samplers
- specialized devices for controlled sewage  
and waste waters taking

### **We organize:**

- trainings
- seminars

### **We provide:**

- warranty service
- post-warranty service

### **We offer portable, laboratory and on-line equipment:**

- pH-meters
- ISE measuring
- dissolved oxygen meters
- conductivity meters
- photometers
- spectrophotometers
- thermo reactors
- turbidity meters
- heavy metals trace analyzers
- pH electrodes
- conductivity sensors
- 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 !