



Operating Instructions

Puridest Glass Distillation Apparatus

PD 2 G, PD 4 G, PD 8 G, PD 2 DG, PD 4 DG



LAUDA Puridest Glass Distillation Apparatus models PD 2 G, PD 4 G, PD 8 G, PD 2 DG and PD 4 DG produce ultra-pure, bacteria and pyrogen-free distillate with a very low conductivity (approx 2.2 $\mu\text{S}/\text{cm}$ at 25 °C for mono distillate and 1.6 $\mu\text{S}/\text{cm}$ at 25 °C for bi distillate). The distillate is in conformity with DAB regulations and the regulations of international pharmacopoeia.



Before installation, please check whether contents of package are in good order and complete. Should you note any damages or have any reasons for complaint, please contact your supplier or directly.

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Translation of the original operating instructions

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1 Using of the Glass Distillation Apparatus

1.1 Intended Use

In LAUDA Puridest Glass Distillation Apparatus models PD 2 G, PD 4 G, PD 8 G, PD 2 DG and PD 4 DG, quartz-sheathed heating elements serve to boil water and evaporate it. The steam is led from the glass boiler to a condenser with splash guard and condenses on a water-cooled cooling coil. In Glass Mono Distillation Apparatus (models PD 2 G, PD 4 G and PD 8 G) the produced mono distillate can directly be withdrawn from the distillate outlet. In Glass Bi Distillation Apparatus (models PD 2 DG and PD 4 DG) the produced mono distillate is evaporated again in a second, following distilling stage. The bi distillate, condensed on the cooling coil of the second-stage condenser, can be withdrawn from the distillate outlet. All assembled glass construction parts are made of Duran® / borosilicate glass 3.3, the heating elements are quartz-sheathed. The inside tubing consists of high-temperature resistant silicon hose. After switching the Distillation Apparatus on, operation is controlled automatically.

Depending on the quality of tap water, the produced mono distillate of models PD 2 G, PD 4 G and PD 8 G has a conductivity of approx. 2.2 µS/cm at 25 °C. In models PD 2 DG and PD 4 DG, the mono distillate is used to produce bi distillate in a consecutive distillation stage. The produced bi distillate is dependent on the quality of the evaporated mono distillate and has a conductivity of approx. 1.6 µS/cm at 25 °C.

The quality of the distilled water is, among other things, dependent on the composition of tap water as well as on the cleanliness of the distillation stages. The distillate quality should be controlled in regular intervals and be compared with the requirements of the relative application.

To feed the Distillation Apparatus, preferably use tap water of drinking quality. Please also observe the information in chapters 6 and 14 of these instructions on the possible use of filters and cartridges to pretreat the tap water.

The Bi Distillation Apparatus must be operated within the user's field of vision.



The information contained in these operating instructions must by all means be read and observed. Only then a perfect operation of the Bi Distillation Apparatus can be guaranteed. The units may only be installed and operated by persons who have made themselves familiar with these operating instructions.



Caution:

The accessible inner parts of the housing that can be reached after removing the front screen get strongly heated up during operation. These parts must only be touched after they have cooled down, or when wearing suitable safety gloves.

1.2 Improper Use

LAUDA Puridest Glass Distillation Apparatus, operated in a laboratory, are no Medical Devices. They fall neither under national nor international Medical Device Directives and have to be used and applied accordingly. The Distillation Apparatus must not be used in potentially explosive surroundings, e. g. during anaesthesia with inflammable gas or steam types. The Distillation Apparatus must neither be set up nor operated in laboratory areas with aggressive or corrosive ambient conditions.

2 Warranty conditions

LAUDA offers a standard 12 month manufacturer's warranty from the date of purchase.

3 Before Initiation

Important information are marked in bold letters in these instructions, safety indications are additionally marked by the following warning symbols and mandatory signs.



Read and observe the operating instructions



Warning of hot liquids and vapour



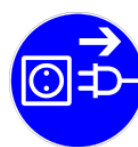
Warning of hot surfaces



Warning of dangerous electrical voltage



General warning



Before maintenance and repair disconnect the unit all-pole from the electrical mains (pull the plug from the socket).

4 Transport, Set-up and Location of the Distillation Apparatus



Protect yourself and the Distillation Apparatus during transport and setup by working carefully and avoid danger of e. g. shifting or tilting the unit as well as risk of injury by lifting heavy loads. Caution, Distillation Apparatus PD 8 G, PD 2 DG and PD 4 DG with a net weight of 26 kg must be lifted, carried and transported to the location by at least two persons. The Distillation Apparatus can be held between the four stands of the unit and lifted for setup. The unit is suitable for both bench and wall mounting. It is only suitable for indoor use. Table-top setting-up on solid, even and level surfaces only. Make sure to place the unit only on a watertight, temperature-resistant, non-flammable surface. The location must provide sufficient space as well as the necessary carrying capacity for the total weight of the Distillation Apparatus (unit weight as per Technical Data of this manual, plus weight of the filling). For setting-up on the wall check the carrying capacity of the wall in connection with the total weight of the unit (appliance plus water filling, see Technical Data). Make sure to check the on-site fixing elements in order to guarantee safe hold of the Distillation Apparatus. The fixing material must be suitable for the substrate. Use only tested and proven fixing material. There are two keyholes for wall mounting at the back of the Distillation Apparatus. Place two fixing screws (not included in the scope of supply) in the wall, 40 cm apart, and nest the still on the keyholes. The Distillation Apparatus is delivered without fixing material. To protect the glass parts during transport, the inside of the Distillation Apparatus is filled with packing material, and all free openings are taped. These transport protections must be removed before initiation. When installing the glass condenser and the glass fittings, pay special attention due to danger of glass breakage.

5 Operating Voltage

The Distillation Apparatus Models PD 2 G, PD 4 G and PD 2 DG must be connected to the mains supply through a correctly installed shock-proof socket. The models PD 8 G and PD 4DG must be connected to the mains supply through a correctly installed on-site main switch, or, permanently connected, through a CEE plug in conformity with IEC standard 60309-2.



The unit is a protection class I electrical appliance, a connection to the protective earth is to be ensured. For information on the value of the required mains fuse see Technical Data of these instructions.



The electrical connection must ensure an all-pole separation from the mains at any time. Shock-proof sockets or main switches to separate the Distillation Apparatus from the mains must be installed in such a way as to ensure clear identifiability and easy accessibility at any time.

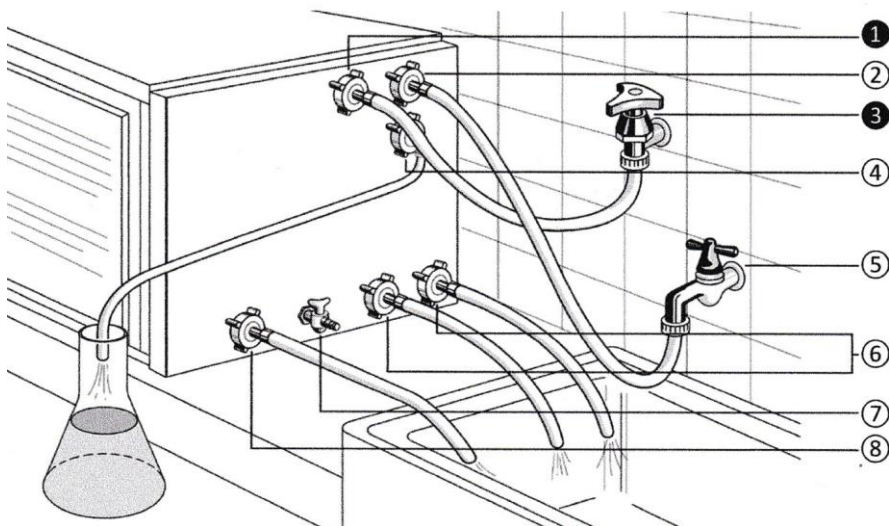


The mains connection cable must not touch any hot surfaces of the unit. It may not lead underneath the unit. The main switch of the Distillation Apparatus must be off (position O). The voltage on the nameplate (at the left-hand side of the unit) must be identical to the mains voltage. If they are identical, connect the unit to the mains.

Please also refer to chapter 13 of these operating instructions "Connection to the Mains"..

6 Water Connections

All water connections of the Distillation Apparatus, except the distillate withdrawals, are situated on the right-hand side of the unit. Hoses for water inlet and outlet are not included in the standard scope of supply.



6.1 Inlet separate water supply

① Part of an Option. Only fitted if a „separate water supply“ was ordered.

The water inlet for the separate water supply feeds softened or desalinated water to boiler of the Distillation Apparatus through a solenoid valve. The hose connection must be connected to the domestic water connection ③ for pretreated water with a ½" pressure hose with lockable water connection (cut-off valve). Both hose connections must by all means be secured with hose clips.

6.2 Tap water inlet

② The tap water inlet provides the Distillation Apparatus with water through a solenoid valve. The hose connection must be connected to the water mains supply with a ½" (inch, Ø inside 12.7 mm) pressure hose and a lockable water connection (⑤, „manual cut-off valve“). Both hose connections must by all means be secured with hose clips!

6.3 Distillate outlet

④ Connect a heat-resistant laboratory hose to the hose connector marked distillate outlet and lead it into a vessel to collect the distillate.



Caution:
Distilled water leaves the Distillation Apparatus with temperatures up to 100 °C.
Danger of scaldings!

6.4 Cooling water outlet

⑥ Depending on the model, cooling water drains through one or two hose connections from the unit. The hoses for cooling water outlet must lead into a drain on a lower level. The hoses must have a slope on their complete length, cooling water must flow off without causing backwater. The cooling water hose must be ½", should not exceed a maximum length of approx. 1 m and must be temperature-resistant.



Caution:

The cooling water leaves the Distillation Apparatus with temperatures up to 70 °C.
Danger of scaldings!

6.5 Drain Bi-stage boiler

⑦ Only fitted in Glass Distillation Apparatus models PD 2DG and PD 4 DG.

By opening the drain cock, mono distillate can be withdrawn from the bi distillate boiler. During normal operation, the drain cock must be closed. Only then the bi distillate boiler will be filled and switched on. A ½" hose to drain the boiler for cleaning or maintenance can be connected.



Caution:

Distilled water leaves the boiler of the Distillation Apparatus with temperatures up to 100 °C.
Danger of scaldings!

6.6 Waste water drain

⑧ When the function Clean (water exchange) is activated, impure water drains from the boiler through the connection waste water drain. Connect a ½" hose with a maximum length of approx. 1 m. The hose for waste water outlet must by all means lead into a drain on a lower level, it must have a slope on its complete length and must not be obstructed. Make certain that the hose can draw air at the end of the cleaning cycle in order to cut off the water contact between two electrodes inside the Distillation Apparatus.



Water connections pos. ① and ③ are parts of an accessory. They are only fitted if a separate water supply was specifically ordered with the unit.

Drain cock pos. ⑦ is only fitted in Bi Distillation Apparatus Models PD 2 DG and PD 4 DG.

7 Initiation

After assembly of all power and water connections, the cut-off valves of the main water supply (pos. ③ only for units, equipped with separate water supply and pos. ⑤) must be opened and the main switch has to be switched on. The distillate produced during the first 5 to 8 operating hours (mono and bi distillate) should not be used.

During down-times of the Distillation Apparatus, all cut-off valves of the water supply must always be closed.

8 Functional Description

8.1 Puridest Glass Distillation Apparatus

LAUDA Puridest Glass Distillation Apparatus models PD 2 G, PD 4 G, PD 8 G, PD 2 DG and PD 4 DG work fully automatically. After switching on the Distillation Apparatus on the main switch, both the green pilot lamp in the main switch and the pilot lamp "Low water" will light up. The built-in solenoid valve opens and water flows through the cooling coil of the condenser into the boiler. Water fills the boiler until the heating element is below water level. The water level is controlled by a float switch that starts the heating element. At the same time, the pilot lamp "Low water" is switched off. After a short time, the water in the boiler comes to the boil, steam rises into the glass condenser and condenses on the cooling coil.

In Mono Glass Distillation Apparatus (models PD 2 G, PD 4 G and PD 8 G) distilled water can now be withdrawn from the distillate outlet.

In Bi Glass Distillation Apparatus (models PD 2 DG and PD 4 DG) the distillate produced in the mono stage is used to fill the boiler of the bi stage until the heating element in this stage is below water level, too. In the second distillation stage, another float switch controls the water level in the boiler and starts the heating elements. Once the water boils in the second stage, and steam condenses on the cooling coil, bi distillate can be withdrawn from the distillate outlet of Bi Glass Distillation Apparatus.

8.2 Protection against over-heating in case of low water

Float switches control the water level in the boilers. Power to the heating elements is cut off before the heating elements are not below water level any more. The pilot lamp "Low water" will light up. In the event that the float switches do not cut off power in case of low water, the temperature in the boilers is additionally controlled by thermostatic low water cut-offs. The low water cut-offs switch off power once the temperature in the boiler exceeds 135 °C. Only the pilot lamp in the main switch will remain on.

8.3 Glass Distillation Apparatus with separate water supply

Only factory installation is possible.

The accessory "separate water supply" serves to feed the boiler with softened or desalinated water, and the cooling coil with phosphatized or normal tap water. The quantity of inflowing process water is controlled by a float switch and a solenoid valve. The amount of inflowing water is limited to the amount of water evaporated

Owing to the separation of cooling and tap water, the water fed to the boiler is not pre-heated, the efficiency of the still is therefore reduced by approx. 10-15 %.

8.4 Glass Distillation Apparatus with level control switch for external storage tank

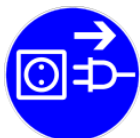
A float switch, mounted to a plastic tube, is to be led into a storage vessel (to be provided by the users, not available from us). When the storage vessel is full, power and water supply to the Distillation Apparatus are cut off by the level control switch through the unit's electronic control.

9 Maintenance, Service and Trouble Shooting



Caution:

Before service and maintenance always let the Glass Distillation Apparatus cool down!
Danger of scaldings!



Caution:

Before opening the Distillation Apparatus and before cleaning always cut off power (pull the plug or switch the main switch off).

Danger of electrical shocks!

9.1 Descaling

During the rinsing process contaminated water is merely exchanged against clean water. Scale deposits in the boiler are not removed. First press key "cleaning" to start the rinsing process. When, at the end of this process, the boiler is drained, switch off the Distillation Apparatus on the main switch.

Remove the front screen (lift by the grip holes, tilt to the front and pull down) and pour approx. 100 ml commercial descaling agent (e. g. "rea-calc®" by M/s CHEMOTEC GmbH, 63486 Bruchköbel, Germany) into the front glass funnel which is on the right-hand side next to the boiler.

After that switch on the Distillation Apparatus and wait until the boiler is filled with water and the heating element is switched on. When the solution has reached a temperature of maximum 70 °C, switch the Distillation Apparatus off.

Make absolutely sure not to bring the solution to a boil. Allow to react for approx. 1 to 2 hours with the scale deposits. After the reaction time of the descaling solution, switch on the Distillation Apparatus again and press key "Clean" to start the rinsing process. The solution is rinsed and exchanged against clean water, and the Distillation Apparatus will restart normal operation. Descaling and rinsing processes can be repeated at any time, if required. After descaling, the first few litres of distillate should not be used as it might contain traces of the evaporated descaling agent.

For Bi Glass Distillation Apparatus (models PD 2 DG and PD 4 DG), the contents of the back boiler (second stage) should also be discarded after descaling by opening valve ⑦ because here, too, the distillate quality might be reduced by traces of descaling agent

9.2 Sterilising

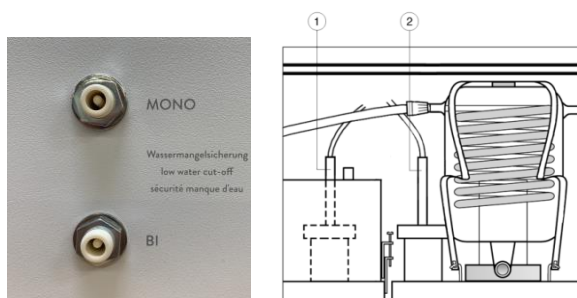
By pressing key "Sterilise" the tap water inflow (cooling water) is cut-off for a five-minute sterilising period. The steam, produced by the heating element is used to sterilise the pure water area (condenser) and is allowed to escape through a vent in the lid of the Distillation Apparatus. After the sterilising period the unit restarts automatically.



Caution:

Heavy steam formation.
Danger of scaldings!

9.3 Water shortage in mono or bi stage



① Float switch mono stage

② Float switch bi stage

LAUDA Puridest Glass Distillation Apparatus are protected from overheating in case of low water by two separate safety devices. Before restarting the unit, a thorough analysis of the malfunction must be carried out by a trained electrician.

After the unit being switched off in case of low water, the water flow through the unit has to be checked, starting from the cut-off valve of the water mains, through the solenoid valves Y1, Y3 and Y4 (according to model and version) and the cooling coils of the glass condensers, to the boiler. Furthermore, check the function of float switches S4 and S5 in the rear part of the water overflow to the right of the boiler. The float switches can be checked by a resistance measurement after pulling off contact strip X1.

Triggered low water cut-offs of the Distillation Apparatus must be resetted. For this, loosen the black cap nuts at the left-hand housing wall. Inside the thread a small white plastic pin can be seen that has gently to be pressed inside (e. g. with a pen) until a clicking sound can be heard. The Glass Distillation Apparatus being switched off during operation is presumably always due to a defect of the unit. Models PD 2 G and PD 4 G have only one low water cut-off

9.4 Pilot lamp "Clean"

Depending on the degree of impurities in the tap and the increasing contamination of the water in the boiler, caused by the distillation process in the mono stage boiler, a fully automatic rinsing process should be started by pressing key "Clean". The function "Clean" is also triggered when boiling contaminated water foams up in the boiler and comes into contact with the electrode in the mono stage boiler.

During the rinsing process, the boiler is filled with water to its upper rim and then drained completely. The contaminated water flows off through the hose connection marked "contaminated water drain". The boiler is automatically refilled with water until the heating element is below water level. The distillation process then restarts. The purpose of the function "Clean" is to exchange contaminated water in the mono stage boiler against clean water.



Caution:

If the separate water supply is installed, the function "Clean" will only work partially as the low conductivity of the industrial water (e. g. desalinated water) will prevent the water exchange being switched off. In these cases, the Distillation Apparatus must be switched off (main switch) after the mono stage boiler is filled with water. The unit must not be switched on again before the boiler has been completely drained through the contaminated water drain.

The LAUDA Puridest Glass Distillation Apparatus are produced of first class materials. Nevertheless, the unit should only be subjected to mechanical strain within sensible limits. The powder-coated surfaces and the front screen of the unit may be cleaned with mild detergents, if necessary.

9.5 Technical support

You can call our customer service at any time for technical support relating to LAUDA Puridest Glass Distillation Apparatus appliances.

Phone : +49 (0) 9343 / 503-350

Fax : +49 (0)9343 503-283

Email : service@lauda.de

Maintenance, repairs and modifications must be carried out by a qualified electrician (section 2 (3) DGUV Regulation 3) according to the General Rules of Technology (section 2 (2) DGUV Regulation 3). Only original spare parts may be used. Request that the person performing the work provides written confirmation of the type and scope of the work carried out (company, date, signature).

10 Disposal of Old Units

LAUDA will take responsibility, within the scope of the legal directives, for an environmentally sound handling and disposal of all used LAUDA units as of the production year 1995 that are returned to us free of charge and will have it materially recycled. Before the unit is returned, a legally binding declaration must be provided from the sender confirming that the unit is free from harmful and/or hazardous contaminations as well as from hazardous substances caused by the previous use of the unit.

LAUDA laboratory apparatus are exclusively designed for industrial use and may not be disposed of through public waste disposal authorities.

EAR Registration Number WEEE-ID.NO.DE 67770231

11 Technical Data

11.1 Puridest Glass Distillation Apparatus models PD 2 G, PD 4 G and PD 8 G

	PD 2 G	PD 4 G
Exterior dimensions (W x D x H)	680 mm x 200 mm x 410 mm	680 mm x 200 mm x 410 mm
Distillation capacity	2 l / h mono distillate	4 l / h mono distillate
Distillate quality	Mono distillate approx. 2.2 µS / cm at 25 °C in conformity with DAB, bacteria and pyrogen free, low gas content.	Mono distillate approx. 2.2 µS / cm at 25 °C in conformity with DAB, bacteria and pyrogen free, low gas content.

The conductivity of the distilled water is directly related to the chemical composition of the raw water. Components of the raw water having the same or a lower evaporation point than water may deteriorate the conductivity.

Cooling water required	48 l / h	72 l / h
Low water cut-off	Electromechanical temperature limiter, with capillary tube sensor. Switch-off temperature 135 °C / -15 K	Electromechanical temperature limiter, with capillary tube sensor. Switch-off temperature 135 °C / -15 K
Water pressure min. / max.	> 3 bar / 7 bar > 43.5 psi / 101.5 psi	> 3 bar / 7 bar > 43.5 psi / 101.5 psi
Electrical connection	230 V +/- 10 %, 50 / 60 Hz, 1.5 kW	230 V +/- 10 %, 50 / 60 Hz, 3.0 kW
Mains supply	Mains connection cable with Schuko plug,	Mains connection cable with Schuko plug,
Internal fuse	internal 2 x 8 A inert, on-site 10 A inert	internal 2 x 15 A inert, on-site 16 A inert
On-site fuse		
Caution! Mains voltage deviations, even with the mentioned limits, influence the quantity of distillate produced.		
Protection class / - type	I / IP20	I / IP20

Surrounding conditions	Use only inside buildings (not in potentially explosive areas).	Use only inside buildings (not in potentially explosive areas).
Height above MSL	up to 2000 m MSL	up to 2000 m MSL
Ambient temperature	+10 °C to +40 °C	+10 °C to +40 °C
Humidity	max. 80 % rel. humidity to 31 °C, decreasing to 40 % rel. humidity at 40 °C	max. 80 % rel. humidity to 31 °C, decreasing to 40 % rel. humidity at 40 °C

Net Weight	16.2 kg	16.2 kg
Weight with water filling	20.2 kg	20.2 kg

PD 8 G

Exterior dimensions (W x D x H)	685 mm x 360 mm x 410 mm
Distillation capacity	8 l / h mono distillate
Distillate quality	Mono distillate approx. 2.2 $\mu\text{S} / \text{cm}$ at 25 °C in conformity with DAB, bacteria and pyrogen free, low gas content.

The conductivity of the distilled water is directly related to the chemical composition of the raw water. Components of the raw water having the same or a lower evaporation point than water may deteriorate the conductivity.

Cooling water required	144 l / h
Low water cut-off	Electromechanical temperature limiter, with capillary tube sensor. Switch-off temperature 135 °C / -15 K
Water pressure min. / max.	> 3 bar / 7 bar > 43.5 psi / 101.5 psi
Electrical connection	220 V / 3 ~ / PE, +/- 10 %, 50 / 60 Hz, 6.0 kW
Mains supply	Mains connection cable for permanent connection to the mains, on-site 3 x 25 A inert
Internal fuse	or
On-site fuse	400 V / 3 ~ / N / PE, +/- 10 %, 50 / 60 Hz, 6.0 kW Mains connection cable for permanent connection to the mains, on-site 3 x 16 A inert

Caution! Mains voltage deviations, even with the mentioned limits, influence the quantity of distillate produced.

Protection class / - type	I / IP20
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Surrounding conditions	Use only inside buildings (not in potentially explosive areas).
Height above MSL	up to 2000 m MSL
Ambient temperature	+10 °C to +40 °C
Humidity	max. 80 % rel. humidity to 31 °C, decreasing to 40 % rel. humidity at 40 °C

Net Weight	26.0 kg
Weight with water filling	34.0 kg

11.2 Puridest Glass Bi Distillation Apparatus models PD 2 DG and PD 4 DG

	PD 2 DG	PD 4 DG
Exterior dimensions (W x D x H)	685 mm x 360 mm x 410 mm	685 mm x 360 mm x 410 mm
Distillation capacity	2 l / h bi distillate	4 l / h bi distillate
Distillate quality	Bi distillate approx. 1.6 $\mu\text{S} / \text{cm}$ at 25 °C in conformity with DAB, bacteria and pyrogen free, low gas content.	Bi distillate approx. 1.6 $\mu\text{S} / \text{cm}$ at 25 °C in conformity with DAB, bacteria and pyrogen free, low gas content.

The conductivity of the distilled water is directly related to the chemical composition of the raw water. Components of the raw water having the same or a lower evaporation point than water may deteriorate the conductivity.

Cooling water required	72 l / h	144 l / h
Low water cut-off	Electromechanical temperature limiter, with capillary tube sensor. Switch-off temperature 135 °C / -15 K	Electromechanical temperature limiter, with capillary tube sensor. Switch-off temperature 135 °C / -15 K
Water pressure min. / max.	> 3 bar / 7 bar > 43.5 psi / 101.5 psi	> 3 bar / 7 bar > 43.5 psi / 101.5 psi
Electrical connection	230 V +/- 10 %, 50 / 60 Hz, 2.9 kW	220 V / 3 ~ / PE, +/- 10 %, 50 / 60 Hz, 5.8 kW
Mains supply / On-site fuse	Mains connection cable with Schuko plug, internal 2 x 15 A inert, on-site 16 A inert	Mains connection cable for permanent connection to the mains, on-site 3 x 25 A inert or 400 V / 3 ~ / N / PE, +/- 10 %, 50 / 60 Hz, 5.8 kW Mains connection cable for permanent connection to the mains, on-site 3 x 16 A inert

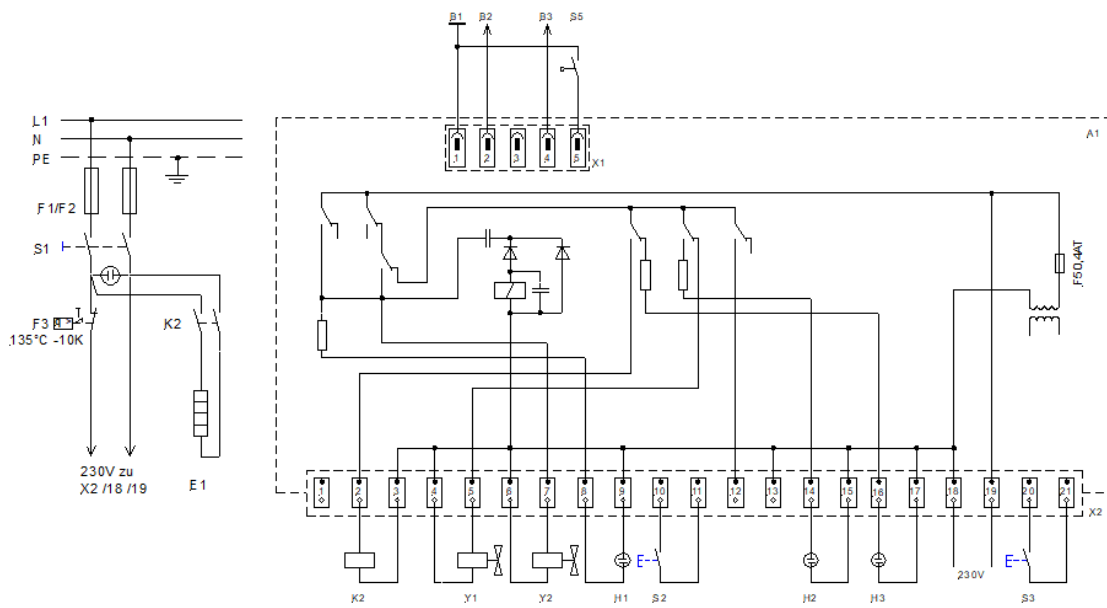
Caution! Mains voltage deviations, even with the mentioned limits, influence the quantity of distillate produced.

Protection class / - type	I / IP20	I / IP20
Surrounding conditions	Use only inside buildings (not in potentially explosive areas).	Use only inside buildings (not in potentially explosive areas).
Height above MSL	up to 2000 m MSL	up to 2000 m MSL
Ambient temperature	+10 °C to +40 °C	+10 °C to +40 °C
Humidity	max. 80 % rel. humidity to 31 °C, decreasing to 40 % rel. humidity at 40 °C	max. 80 % rel. humidity to 31 °C, decreasing to 40 % rel. humidity at 40 °C
Net Weight	43.0 kg	43.0 kg
Weight with water filling	68.4 kg	68.4 kg

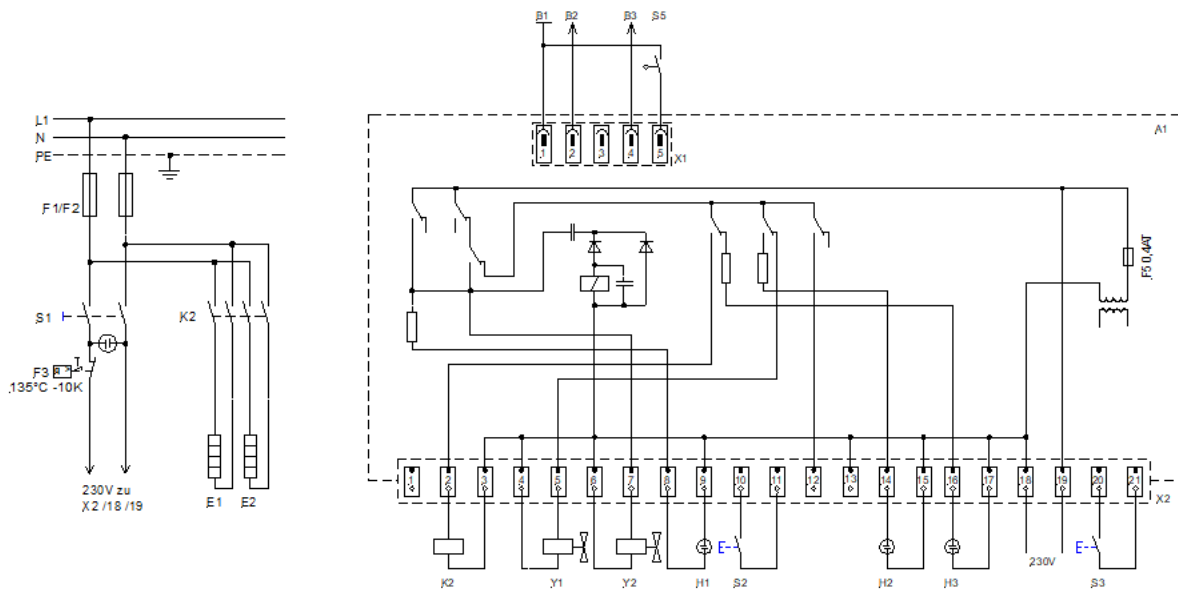
12 Circuit diagram

A1	Electronic level switch
B1	Mass (for B2 – B3 – S4 – S5)
B2	Electrode Cleaning
B3	Electrode Contaminated Water Drain
E1	Glass heating element 1.5 kW
E2	Glass heating element 1.5 kW
E3	Glass heating element 1.4 kW
E4	Glass heating element 1.4 kW
E5	Glass heating element 1.5 kW
E6	Glass heating element 1.5 kW
F1	Mains fuse 6.3 x 32 mm, 8 A inert (Model PD 2 G), 15 A inert (Models PD 4 G and PD 2 DG)
F2	Mains fuse 6.3 x 32 mm, 8 A inert (Model PD 2 G), 15 A inert (Models PD 4 G and PD 2 DG)
F3	Low water cut-off (front boiler stage)
F4	Low water cut-off (rear boiler stage)
F5	Fuse 400 mA inert on A1
H1	Pilot lamp Cleaning
H2	Pilot lamp Sterilising
H3	Pilot lamp Low Water
K1	Contactor mains voltage
K2	Contactor heating element mono stage
K2/1	Contactor heating element mono stage
K2/2	Contactor heating element mono stage
K3	Contactor heating element bi stage
S1	Main switch
S2	Switch Cleaning
S3	Switch Sterilising
S4	Float switch bi stage
S5	Float switch mono stage
S6	Float switch, for external storage tank, Option
S7	Float switch process water
X1	Supply terminal sensor
X2	Supply terminal control
Y1	Solenoid valve cooling and process water
Y2	Solenoid valve cleaning
Y3	Solenoid valve cooling water
Y4	Solenoid valve process water

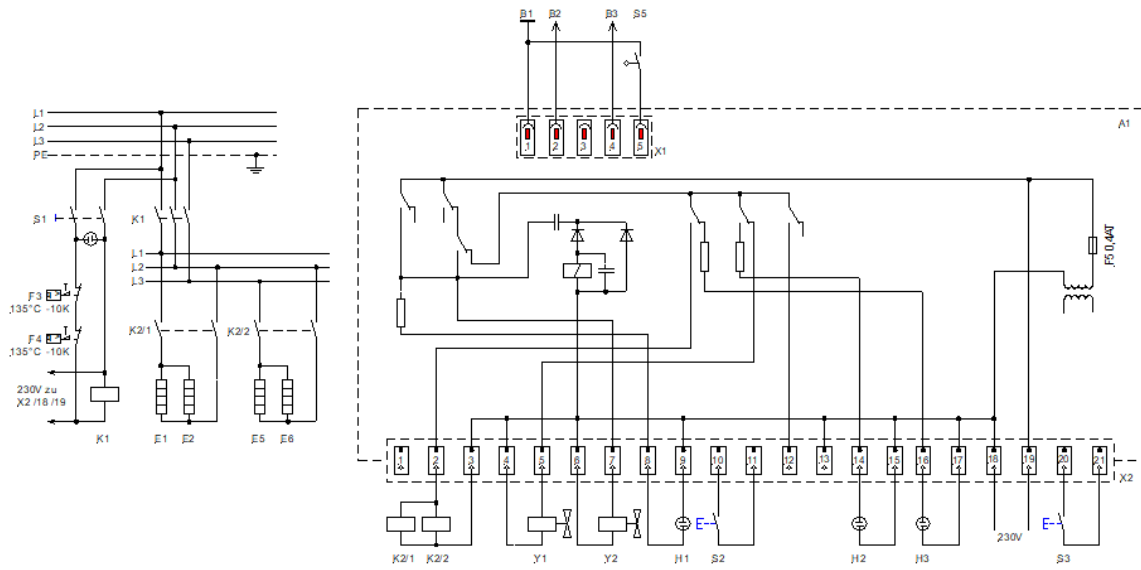
12.1 PD 2 G for 230 V 50 / 60 Hz



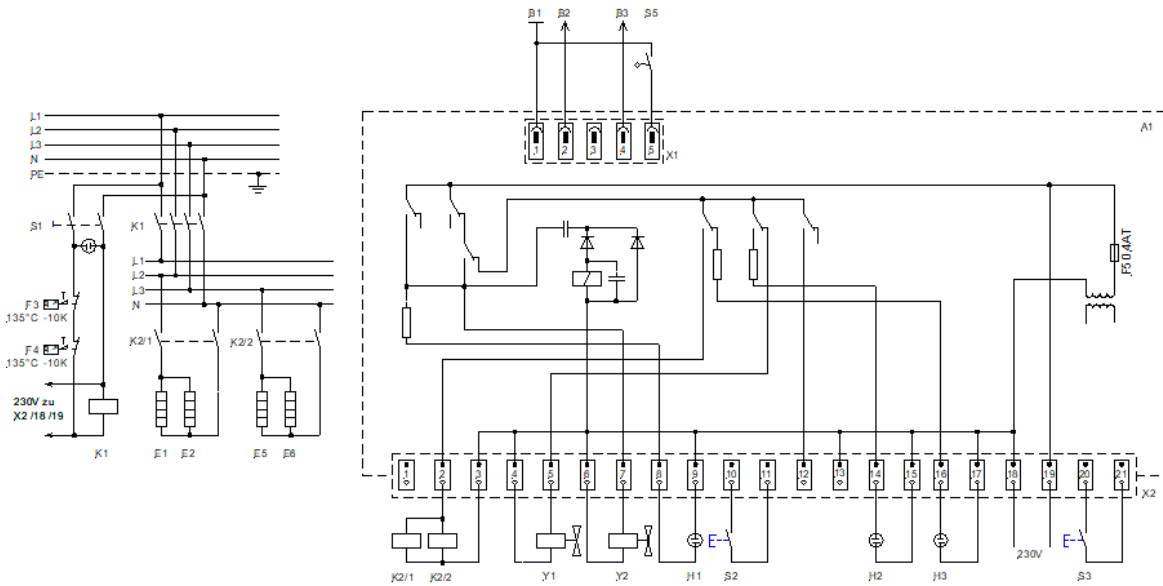
12.2 PD 4 G for 230 V 50 / 60 Hz



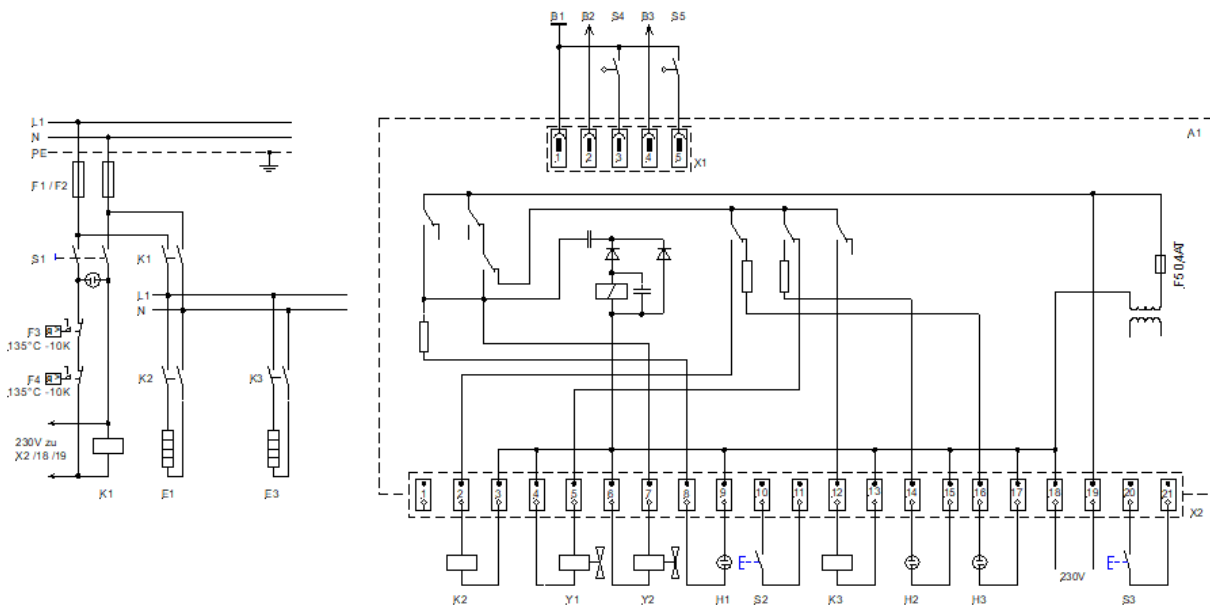
12.3 PD 8 G for 220 V / 3 ~ / PE 50 / 60 Hz



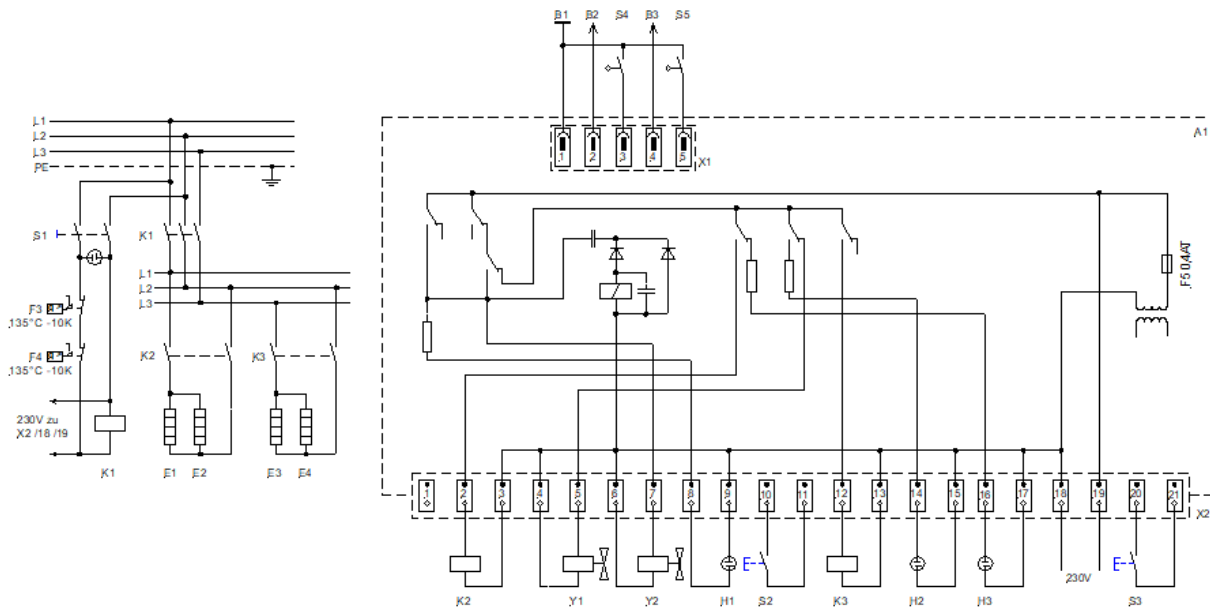
12.4 PD 8 G for 400 V / 3 ~ / N / PE 50 / 60 Hz



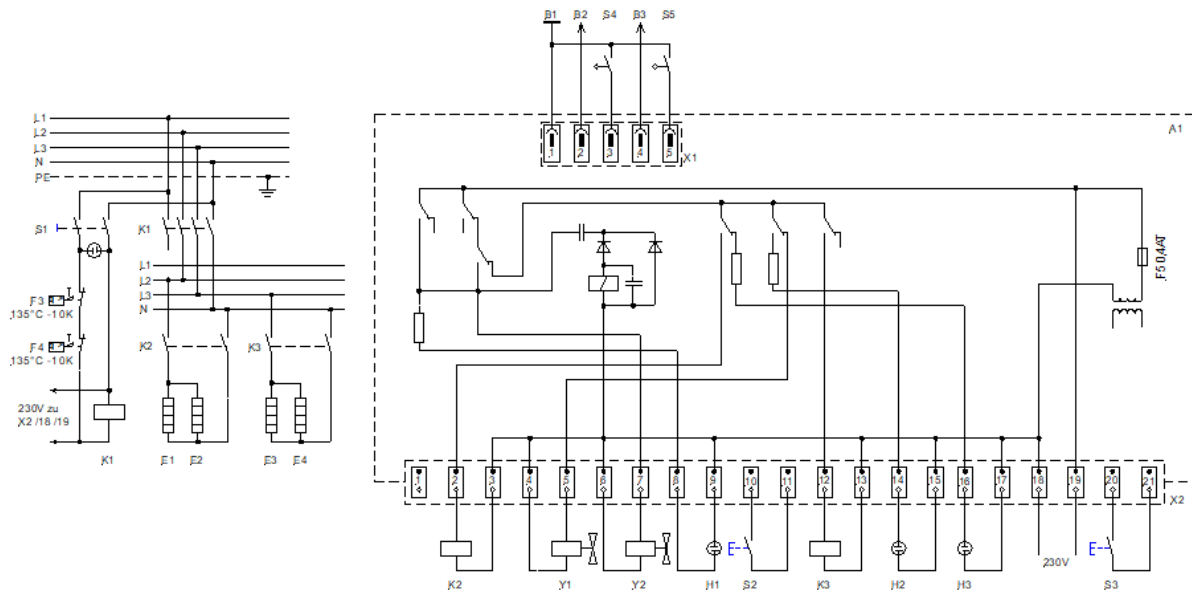
12.5 PD 2 DG for 230 V 50 / 60 Hz



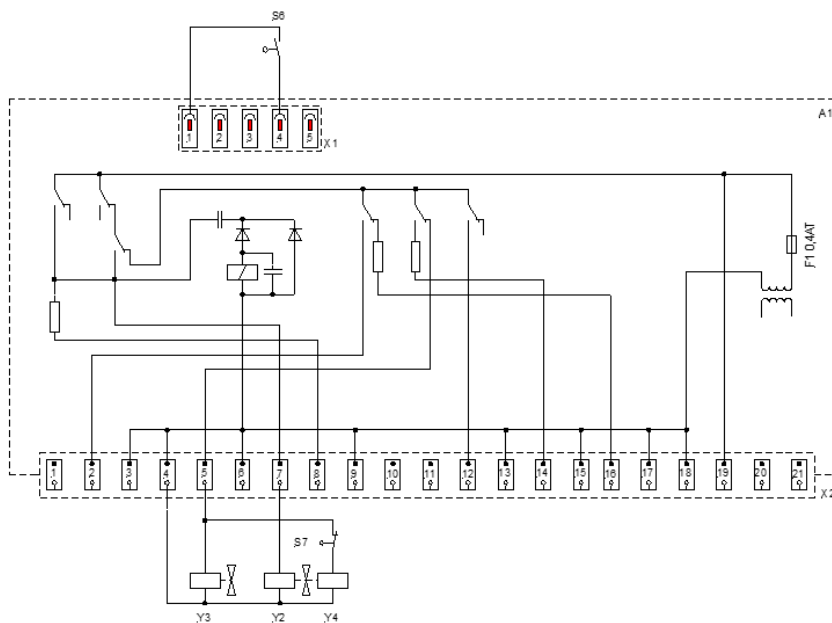
12.6 PD 4 DG for 220 V / 3 ~ / PE 50 / 60 Hz



12.7 PD 4 DG for 400 V / 3 ~ / N / PE 50 / 60 Hz



12.8 Circuit diagram for accessory „level control switch“ and option „separate water supply“



13 Connection to the mains supply

The electrical connection must ensure an all-pole separation of the Glass Distillation Apparatus from the mains supply. Installed assembly parts, such as CEE shock-proof sockets or main switches, must be installed so as to ensure clear identification and they must be within easy reach in an emergency case.

Distillation Apparatus models PD 8 G and PD 4 DG must have a permanent connection with the mains. This may only be implemented through an on-site main switch or through a CEE plug in conformity with IEC standard 60309-2.

Colour decoding of the individual leads of the mains connection cables for Glass Distillation Apparatus models PD 8 G and PD 4 DG.

Colour decoding	Mains supply	Mains supply
	220 V / 3 ~ / PE 50 / 60 Hz	400 V / 3 ~ / N / PE 50 / 60 Hz
ge/gr – yellow/green	PE (Protective earth)	PE (Protective earth)
bl – blue		N
sw – black	L1	L1
br – brown	L2	L2
gra – grey	L3	L3

Glass Distillation Apparatus can be supplied in different versions for connection to different mains supplies.

Models PD 2 G, PD 4 G and PD 2 DG for connection to 230 V (see nameplate) can be connected to all mains supplies with 220 V or 230 V.

Models PD 8 G and PD 4 DG for connection to 220 V / 3 ~ (see nameplate) can only be connected to mains supplies with 220 V / 3 ~ / PE.

Models PD 8 G and PD 4 DG for connection to 400 V / 3 ~ (see nameplate) can only be connected to mains supplies with 400 V / 3 ~ / N / PE.

On-site electrical fuses

Model	Power	Power consumption at mains voltage	On-site mains fuse (F2 – F4)
PD 2 G	1.5 kW	6.5 A at 230 V	10 A inert
PD 4 G	3.0 kW	13.0 A at 230 V	16 A inert
PD 2 DG	2.9 kW	12.6 A at 230 V	16 A inert
PD 8 G	6.0 kW	20.0 A at 220 V / 3 ~ / PE 13.0 A at 400 V / 3 ~ / N / PE	25 A inert 16 A inert
PD 4 DG	5.8 kW	20.0 A at 220 V / 3 ~ / PE 13.0 A at 400 V / 3 ~ / N / PE	25 A inert 16 A inert

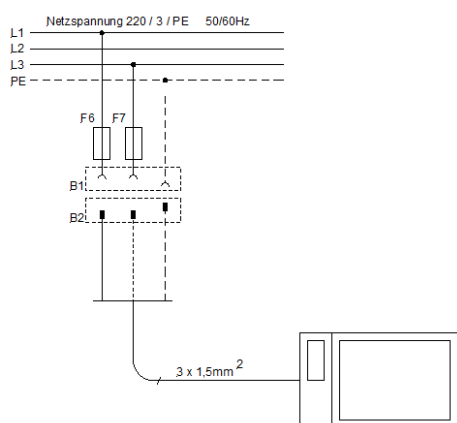
* see nameplate

13.1 Connection to the mains supply (examples)

Components

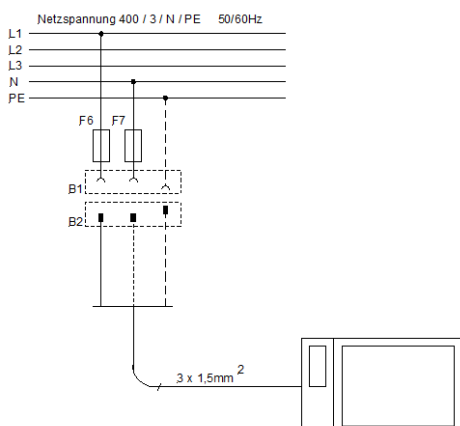
- B1 Shock-proof socket, on-site
- B2 Shock-proof plug, assembled
- B3 CEE plug, not assembled, according to IEC standard 60309-2
- F6 Mains fuse (on-site)
- F7 Mains fuse (on-site)
- F8 Mains fuse (on-site)
- S4 Main switch (on-site)

13.1.1 PD 2 G, PD 4 G and PD 2 DG for 230 V at Mains supply 220 V / 3 ~ / PE 50 / 60 Hz (see nameplate)



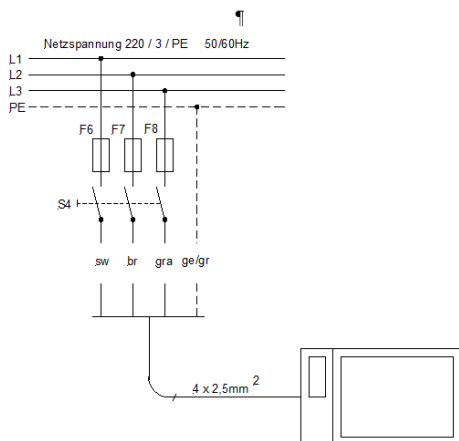
PD 2 G, PD 4 G and PD 2 DG for 230 V
Mains connection through CEE plug 7/7 (pre-assembled), all-pole separation from the mains possible.

13.1.2 PD 2 G, PD 4 G and PD 2 DG for 230 V at Mains supply 220 V / 3 ~ / PE 50 / 60 Hz (see nameplate)



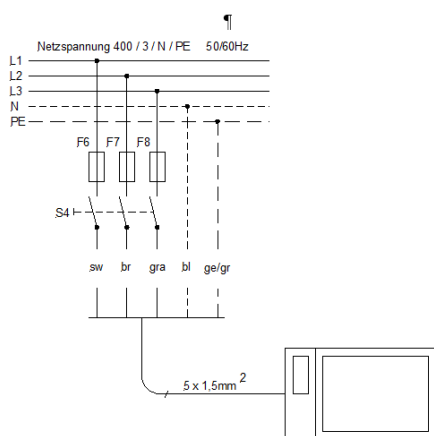
PD 2 G, PD 4 G and PD 2 DG for 230 V
Mains connection through CEE plug 7/7 (pre-assembled), all-pole separation from the mains possible.

13.1.3 PD 8 G and PD 4 DG for 220 V / 3 ~ at Mains supply 220 V / 3 ~ / PE 50 / 60 Hz
 (see nameplate)



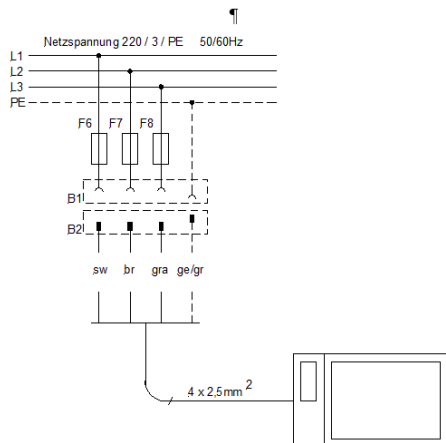
PD 8 G and PD 4 DG
 Permanent mains connection through on-site switch S4, all-pole separation from the mains possible.

13.1.4 PD 8 G and PD 4 DG for 220 V / 3 ~ at Mains supply 400 V / 3 ~ / N / PE 50 / 60Hz
 (see nameplate)



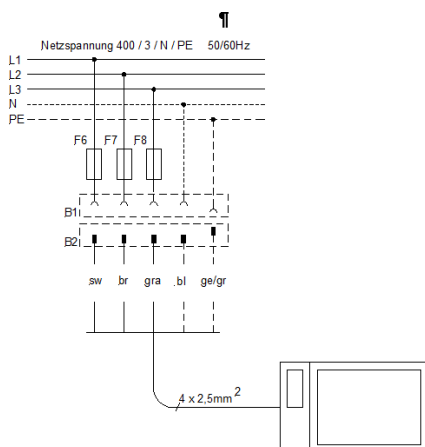
PD 8 G and PD 4 DG
 Permanent mains connection through on-site switch S4, all-pole separation from the mains possible.

13.1.5 PD 8 G and PD 4 DG for 220 V / 3 ~ at Mains supply 220 V / 3 ~ / PE 50 / 60 Hz (see nameplate)



PD 8 G and PD 4 DG
Permanent mains connection through CEE plug according to IEC standard 60309-2, all-pole separation from the mains possible.

13.1.6 PD 8 G and PD 4 DG for 220 V / 3 ~ at Mains supply 400 V / 3 ~ / N / PE 50 / 60 Hz (see nameplate)



PD 8 G and PD 4 DG
Permanent mains connection through CEE plug according to IEC standard 60309-2, all-pole separation from the mains possible.

14 Accessories and Options

Separate Water Supply, to feed the boiler with softened or desalinated water (pressure > 1 bar / 14.5 psi) and the cooling coil with phosphatised or normal tap water (pressure > 3 bar / 43.5 psi). This Option must be installed in our works. When a separate water supply is installed, the hourly capacity of distilled water is reduced by approx. 10-15 %.

Separate Water Supply

Only factory installation into all Glass Distillation Apparatus is possible.

When the storage is full, the inlet of pretreated water is not automatically switched off. Part-No. is depending on the Model of the Distillation Apparatus.

Separate Water Supply with solenoid valve

Only factory installation into all Glass Distillation Apparatus is possible.

When the storage tank is full, the solenoid valve switches off pretreated water automatically. Part-No. is depending on the Model of the Distillation Apparatus.

Dechlorite Filter, eliminates chlorine particles in tap water added by the local waterworks. Complete with connections for pressure hose ½ inch, with first filling.



Dechlorite-Filter
Part-No. A000129



Spare filling
Part-No. A000130

Phosphate cartridge, prevents scale formation in the condenser by phosphatising of tap water. Can be used from 4 to 15 °dH (German hardness), equivalent to approx. 0.7 to 2.7 mMol / l. With connection for pressure hose ½ inch, with first filling.



Phosphate cartridge
Part-No. A000131



Spare filling
Part-No. A000132

Pre-Filter 1 µm, for pre-cleaning the tap water, and to protect the unit from premature contamination. Complete with connections for pressure hose ½" (inner diameter 12.7 mm), including filter candle. The candle should be replaced at least every six months.



Pre-Filter with candle
Part-No. A000133



Spare candle
Part-No. A000134

Wall bracket, for one filter or for filter combinations of two or three filters, including sleeves to connect the filters as well as screws to fix the filters to the wall bracket.

A data sheet on possible connection variants of articles A000129, A000131 and A000133 can be supplied on request.



Wall bracket for one filter
Part-No. A000136



Set of all 3 filters, incl. wall bracket
and fillings, mounted completely
Part-No. A000135

Hose Sets, consisting of hoses for water inlet and outlet (length 1.5 m), including hose clips.



Hose Set
for models PD 2 G to PD 8 G
Part-No. A000139



Hose Set
for models PD 2 G to PD 8 G
for separate water supply
Part-No. A000143



Hose Set
for models PD 2 DG and PD 4 DG
Part-No. A000140



Hose Set
for models PD 2 DG and PD 4 DG
for separate water supply
Part-No. A000144

Level Control Switch

Only factory installation into all Glass Distillation Apparatus is possible.

When connecting an external storage tank (not included in the scope of supply) to the Distillation Apparatus, it is recommended to equip the unit with a Level Control Switch which controls the water level in the external storage tank and switches off power and water when the external storage tank is full. When using an external storage tank in connection with Level Control Switch, the internal storage tank is only usable to a limited extent due to different levels of the internal and external tanks. Part-No. is depending on the Model of the Distillation Apparatus.



Level Control Switch

16 Ordering spare parts / LAUDA Service

When ordering spare parts, please state the serial number (type plate) to avoid queries and wrong deliveries.

Your partner for maintenance and competent service support:

LAUDA Service
Phone: +49 (0)9343 503-350
Fax: +49 (0)9343 503-283
Email: service@lauda.de

We are always at your disposal for questions and suggestions!

LAUDA DR. R. WOBSER GMBH & CO. KG
Laudaplatz 1
97922 Lauda-Königshofen
Germany
Phone: +49 (0)9343 503-0
Fax: +49 (0)9343 503-222
Email: info@lauda.de
Internet: <http://www.lauda.de/>

17 Product Returns and Clearance Declaration



Product Returns and Clearance Declaration

Product Returns

Would you like to return a LAUDA product you have purchased to LAUDA? For the return of goods, e.g. for repair or due to a complaint, you will need the approval of LAUDA in the form of a *Return Material Authorization (RMA)* or *processing number*. You can obtain the RMA number from our customer service department at +49 (0) 9343 503 350 or by email service@lauda.de.

Return address

LAUDA DR. R. WOBSEER GMBH & CO. KG
Laudaplatz 1
97922 Lauda-Königshofen
Deutschland/Germany

Clearly label your shipment with the RMA number. Please also enclose this fully completed declaration.

RMA number	Product serial number
Customer/operator	Contact name
Contact email	Contact telephone
Zip code	Place
Street & house number	
Additional explanations	

Clearance Declaration

The customer/operator hereby confirms that the product returned under the above-mentioned RMA number has been carefully emptied and cleaned, that any connections have been sealed to the farthest possible extent, and that there are no explosive, flammable, environmentally hazardous, biohazardous, toxic, radioactive or other hazardous substances in or on the product.

Place, date	Name in block letters	Signature



EC DECLARATION OF CONFORMITY

Manufacturer: LAUDA DR. R. WOBSEY GMBH & CO. KG
Schulze-Delitzsch-Straße 4+5, 30938 Burgwedel, Germany

We hereby declare under our sole responsibility that the machines described below

Product Line: Puridest **Serial number:** from 220____

Types: PD 2, PD 4,
PD 2 D, PD 4 D, PD 8 D,
PD 2 G, PD 2 DG, PD 4 G, PD 4 DG, PD 8 G,
PD 2 R, PD 4 R, PD 8 R and PD 12 R

comply with all relevant provisions of the EC Directives listed below due to their design and type of construction in the version brought on the market by us:

Machinery Directive	2006/42/EC
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU in connection with (EU) 2015/863

The protective objectives of the Machinery Directive with regard to electrical safety are complied with in accordance with Annex I Paragraph 1.5.1 in conformity with the Low Voltage Directive 2014/35/EU.

Applied standards:

- EN 61326-1:2013
- EN 61010-1:2010/A1:2019/AC:2019-04
- EN IEC 61010-2-010:2020

Authorized representative for the composition of the technical documentation:

Dr. Jürgen Dirscherl, Head of Research & Development

Burgwedel, 05.06.2023



Dr. Alexander Dinger,
Head of Quality and Environmental Management

Q5WA-QA13-030-EN-01

*FAHRENHEIT. *CELSIUS. *LAUDA.

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