



# VWR Purity TU 12

## INSTRUCTION MANUAL



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### **Germany**



## Purity TU 12



## Preface

Dear Sir or Madam,

With your decision for this ultrapure water system from the **Puranity TU** series, you have selected a high-quality product.

Before you start to install and operate this ultrapure water system, please carefully read the information on how it is to be properly installed and operated that is given in these operating instructions.

This is particularly important, as we, the manufacturer, cannot accept liability for any damage occurring as a result of improper operation of the system, or from use of it for other than the intended purpose.

Thank you for the confidence you have placed in us.

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## 1. Explanatory notes on the operating instructions



**EU Mark of Conformity**



**This symbol indicates the presence of high voltage and warns the user to proceed with caution.**



**Important operating and/or maintenance instructions! Read the operating instructions with due care.**

**Risk of electric shock! Electrical work on the system is only to be carried out by qualified personnel.**



**General information! Particularly important notes are marked with this information sign.**



**Protective conductor connection**

**Connect the power supply to an electrical socket with a protective connection.**

The information provided in these operating instructions is only valid for the system which has the serial number which is to be entered on the front page.



**Please enter the serial number\* of your Purity TU system in the space provided on the front page.**

\* Read the serial number of your ultrapure water system from the type plate.

For quick and correct service, please include the following information on all inquiries and replacement parts orders which relate to your system:

**- The serial number**

**- The article number**

## 2. Package contents

Ultrapure water systems are carefully controlled and packed prior to dispatch, but damage could nevertheless still occur during transport.

### 2.1 Examination on receipt

- Check the completeness of delivery against the delivery note.



#### Is the packaging damaged?

- Inspect the system for damage.

### 2.2 Complaints

If damage has occurred to the system during transport:

- Immediately contact the post, railway or forwarding agent\*.
- Keep the packaging and outer cardboard box for possible examinations and return shipment.

### 2.3 Packaging of return

Whenever possible, use the original cardboard box and packaging material.

Should these no longer be available:

- Pack the system in packing film and a strong cardboard box
- Protect the system against damage from shock.



**\* The time limit for complaints is 6 days (after receipt of the goods).  
The right to claim for damages expires when this time has elapsed.**



### 3. Safety informations



**For your own safety, please observe the above safety precautions!**

- The Purity TU version that you have selected is a state-of-the-art ultrapure water system, the intended purpose of which is to purify tap water of drinking water quality.
- Please do not start to install and operate the system until you have read through the information that is given in these operating instructions.
- Please note that the use of the system for other than the intended purpose and/or improper operation of it release the manufacturer from all liability.
- Lifting and carrying the ultrapure water system, e.g. to the installation location, should be carried out by two people. To lift it, each takes hold of it under the base plate at two corners.
- The CE-mark is invalidated when constructional changes are made to the system or foreign products are installed in it.
- Protect the system from frost. The temperature at the installation area must be at least + 2°C.
- Observe all general rules and regulations that are valid at the installation location, including the relevant current accident prevention regulations.
- Feedwater pressure min. 1 bar and max. 6 bar. Should it be higher, then an additional pressure reducer must be installed.
- According to DIN EN 1717(for German and Europe), water purification systems must be equipped with a device that safeguards the tap water against contamination.
- A suitable electric socket must be made available for the system (see Technical specifications).
- The installation area must have a gravity at floor level with at least DN (nominal diameter) 50 pipe and which allows free run off.
- When the system is to be wall-mounted please check that the wall has sufficient load bearing capacity (see Technical specifications for the weight).



- The maximum operating temperature is 40°C.
  
- Proceed as follows during longer system standstills (e.g. long holidays) when neither a floor drain nor a water watcher is available, :
  - **Switch the system off (unplug the mains plug).**
  - **Close off the supply of water to the ultrapure water system.**Do not start the system up again with the water supply closed off, as the pump would then suffer damage. The manufacturer accepts no liability should this occur. When restarting your system, please open the feedwater to the ultrapure system and follow our sanitization instructions to put your system into operation.
  
- When installing the ultrapure water system, ensure that there is sufficient working room around it for problem-free usage (e.g. filter replacement, connections etc.).
  
- The guarantee is valid for a period of 2 years!
  
- Never look directly at a switched-on UV-lamp, as the UV light would endanger your eyesight! The UV-lamp is only to be replaced by personnel from a authorised company.

### 3.1 Warning

- Installing the appliance incorrectly, making incorrect settings on it or modifying it can lead to damage, injury or even death.
- Do not put your fingers in socket of electrical connector because a electrical shock you can have.
- Do not swap any electrical parts of the unit when it is on and works, because there is a danger of electrical shock exist.

## 4. Intended use

### 4.1 Intended use

The continually increasing requirements that ultrapure water quality must fulfil, the ever stricter demands resulting from technological advances and increasingly lower detection limits in laboratories, together with the need for user-friendly systems and complete solutions, were the basis for the development of the novel Purity TU ultrapure water systems.

Purity TU systems have been specifically designed to produce sterile filtered ultrapure water that is free of particles, salts and organic compounds.

### Application areas

#### - Analytical techniques in laboratories:

- HPLC ( **H**igh **P**erformance **L**iquid **C**hromatography )
- IC ( **I**on **C**hromatography )
- ICP ( **I**nductive **C**oupled Argon **P**lasma )
- AAS ( **A**tomically **A**bsorption **S**pectrophotometry )
- TOC-Analyse ( **T**otal **O**rganic **C**arbon )
- etc.

#### - Reagent and solution preparation:

- Cell culture media
- Tissue culture media
- Make up water for reagents used in on-line analytical systems

#### Ultraclean washing and rinsing processes in laboratories

### 4.2 Unintended use

It must be stated according to standard din en iso 12100.

## 5. Accessories & spares

The following Puranity TU ultrapure water system versions, each with a performance of 12 L/h, are available:

Article no.: 171-1162	Purity TU 12	Standard system)
Article no.: 171-1163	Purity TU 12 UV	(Standard system + UV-Photooxidation)
Article no.: 171-1164	Purity TU 12 UV/UF	(Standard system + UV-Photooxidation + Ultrafiltration module)

(Please compare the article number of your wanted version with the article number given on the delivery note.)

1x Purity TU 12 (acc. to version)	Article no. 171-xxxx
1x Pure water tank 30 or 60 litres	Article no. 171-1170
	Article no. 171-1171
and an assembly kit consisting of:	
Pretreatment cartridge	Article no. 171-1165
Filter cartridge	Article no. 171-1141
Sterile filter capsule, 0.2 µm	Article no. 171-1105
Feedwater connecting kit, R 3/4"	Article no. 171-1145
Connecting hose, o.d. 1/4", 6 m	Article no. 171-1146
Ball valve, dia. 1/4"	Article no. 171-1147
Tabletop power pack, 24 VDC	Article no. 171-1121
Universal adapter	Article no. 171-1129
Universal holder	Article no. 171-1130
Connecting cord (rubber connector to nema plug connector)	Article no. 171-1131
Connecting cord (rubber connector to british ST plug connector)	Article no. 171-1132
Connecting cord (rubber connector to euro plug connector)	Article no. 171-1133
Connecting piece/ disinfection	Article no. 171-1148

## 5.1 Spares

Designation	Article no.
Pure water tank, 30 litres	171-1170
Pure water tank, 60 litres	171-1171
Pretreatment cartridge consisting of prefilter / hardness stabilizer and RO-membrane:	171-1165
Filter cartridge	171-1141
Sterile filter	171-1105
Sterile vent filter (option)	171-1166
Ultrafiltration module	171-1106
Float switch	171-1167
Pressure booster pump	171-1107
Recirculation pump	171-1107
Pressure switch	171-1151
Ultrapure water conductivity measuring cell	171-1152
Temperature sensor	171-1111
Replacement UV-lamp	171-1108
UV-Booster	171-1153
Replacement UV-lamp (option)	171-1168
UV-booster	171-1153
Raw water solenoid valve	171-1154
Pressure hold valve	171-1155
Check valve	171-1156
Rinsing solenoid valve	171-1154
Ultrapure water dispensing valve	171-1114
Recirculation solenoid valve	171-1154
Sterile overflow (option)	171-1170
Dispensing valve	171-1169
Check valve	171-1156
Cut-off valve	171-1157
Check valve	171-1157
Board with display	171-1158
System control board	171-1159
Fuse holder for glas tube fuse 5 x 20mm	171-1118
Glas tube fuse 5 x 20mm, 3,15 A, slow fuse	171-1119
Table top power pack (not showns)	171-1121

## 5.2 Accessories

Designation	Article no.
Disinfection agent, MICRO-Chlor (pack of 12 cans, Europe only)	171-1123
Cleaning Solution, 1 syringe (US-market only)	171-1124
Printer	171-1160
Wall holder	171-1125
Accessorie Dispenser	171-1180

## 6. Specifications

Demands made on the feedwater	
Source	Drinking water acc. to DIN 2000.
Blocking index (SDI)	max. < 3 for all versions. With higher values, a prefilter must be installed upstream.
Free chlorine concentration	< 0.1 mg/L
Manganese content	< 0.05 mg/L
Iron content	< 0.05 mg/L
pH-Range	4 - 11
Temperature	2 - 35 °C
Pressure	1 - 6 bar

Product water of quality ASTM I (dispensing valve)			
	Standard	UV	UV/UF
Conductivity $\mu\text{S/cm}$	0.055	0.055	0.055
Resistance $\text{M}\Omega\text{cm}$ at 25°C	18.2	18.2	18.2
TOC $\text{ppb}$	5 - 10	1 - 5	1 - 5
RNase $\text{ng/ml}$	--	--	<0.003
DNase $\text{pg/ml}$	--	--	<0.4
Bacteria $\text{CFU/ml}$	< 1	< 1	< 1
Bacterial endotoxines $\text{EU/ml}$	--	--	< 0.005*
Particles $> 0,2 \mu\text{m}$	< 1/ml	< 1/ml	< 1/ml
Flow rate $\text{l/min}$	1.0	1.0	0.6
Typical amount withdrawn	up to 30 litres per day		

\* Dependent on feedwater and disinfection

Product water of quality ASTM II			
	Standard	UV	UV/UF
Conductivity $\mu\text{S/cm}$	0.067 - 0.1	0.067 - 0.1	0.067 - 0.1
Resistance $\text{M}\Omega\text{cm}$ at 25°C	10 - 15	10 - 15	10 - 15
Retention quota for bacteria and particles	$\emptyset$ 99 %	$\emptyset$ 99 %	$\emptyset$ 99 %
Permeate performance $\text{L/h}$	12	12	12

Dimensions	
Height:	545 mm
Width:	305 mm
Depth:	300 mm
Weight:	
Purity TU 12 Standard	20 kg
Purity TU 12 UV	21 kg
Purity TU 12 UV/UF	21 kg

Airborne sound emission	
Sound-pressure level	49 db(A)

Water connections	
Feedwater	Hose, 1/4" o.d.
Concentrate	Hose, 1/4" o.d.
Tank water supply	Hose, 1/4" o.d.
Tank water return	Hose, 1/4" o.d.
Pure water	Hose, 1/4" o.d.
Dispensing valve outlet	Hose, 8 - 10 mm o.d.

Electrical connections / external switched mode power supply	
Input voltage	AC 100 – 240 V, 50 – 60 Hz, 5 – 3.8 A
Output voltage	DC 24 V, 3.8 A
System connection	DC 24 V, 80 W
Serial interface	RS 232
Potential-free contact	max. 30V, 2A
Protection Class	Class II (external SMPS certified as Class I)

Ambient conditions (DIN EN 61010-1 (VDE 0411-1):2011-02)	
Usage	Indoor rooms
Height	Up to 2000 m
Temperature range	From 5° C to 40° C
Relative humidity	Maximum relative humidity 80 % at temperatures of up to 31° C, linearly decreasing to 50 % relative humidity at 40° C
Line-voltage variation	Not more than $\pm 10$ % of the line voltage
Transient overvoltages	As usually occur in the supply network (overvoltage category II acc. to IEC 60364-4-443). <u>Note:</u> The rated level of transient overvoltage is the withstand impulse voltage acc. to overvoltage category II of IEC 60364-4-443
Ventilation requirements	There are no special requirements with regard to ventilation.
Degree of pollution	2

Materials of parts that contact water	
Pump head	Nylon with glass fibre
UV-Lamp	High-purity quartz
UV Housing	Stainless steel
Filter cartridge	PP
UF Housing	Polycarbonate
Raw water Solenoid valve	PA
Recirculation Solenoid valve	PA
Rinsing solenoid valve	PA
Pressure hold valve	Brass, chemically nickel-plated
Dispensing valve	POM
Conductivity measuring cell	PVC, stainless steel
Connectors	POM
Hoses	PE
Gaskets	EPDM
RO-Membrane	PA

## 7. Description of how the system functions

Raw water solenoid valve V1 is closed during Stand-by and standstills. This prevents raw water from flowing into the system when it is not in operation and so protects the external tank B1 from overflowing.

In normal operation, tap water having a maximum pressure of 6 bar flows into the system and is pumped by pressure booster pump P1 through the subsequent pretreatment F1 and reverse osmosis membrane F2. The latter retains all salts dissolved in the incoming water to the extent of the given retention quota and, because of the molecular size of the membrane pores, also bacteria, pyrogens and particles to Ø 99%.

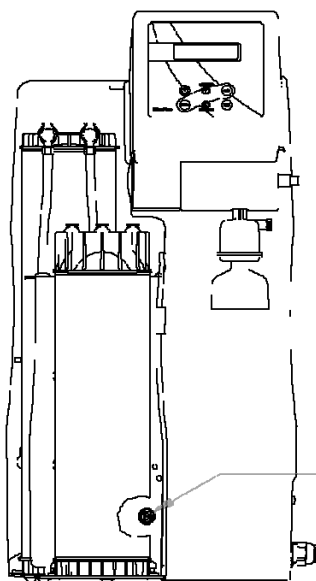
The permeate flows through the downstream purification stages, such as UV-photooxidation UV1, the 185 nm and 254 nm wavelengths of which reduce organic compounds (only with Puranility TU versions UV and UV/UF), filter cartridge F3 and ultrafilter F6 with automatic rinsing (only with Puranility TU versions UF and UV/UF) to the tank.

The retained water constituents are led away in the remaining concentrate. The special conductivity measuring probe QISA 300 (with temperature compensation) and temperature probe TIA 500 permanently monitor the conductivity and temperature of the ultrapure water and the values of these are shown in the display.

To ensure a constantly high water quality, the water in the storage tank is recirculated at regular intervals by recirculation pump P2. Float switch LS 100 monitors the water level inside the tank..



**Pressure hold valve V2 is factory adjusted. A change in this adjustment could lead to damage to the reverse osmosis membrane. Fluctuations in the temperature and pressure of the feedwater make it necessary for the adjustment of the pressure hold valve, and of the concentrate flow that is linked to it, to be checked and re-adjusted at regular intervals by Service or service personnel from a authorised company.**

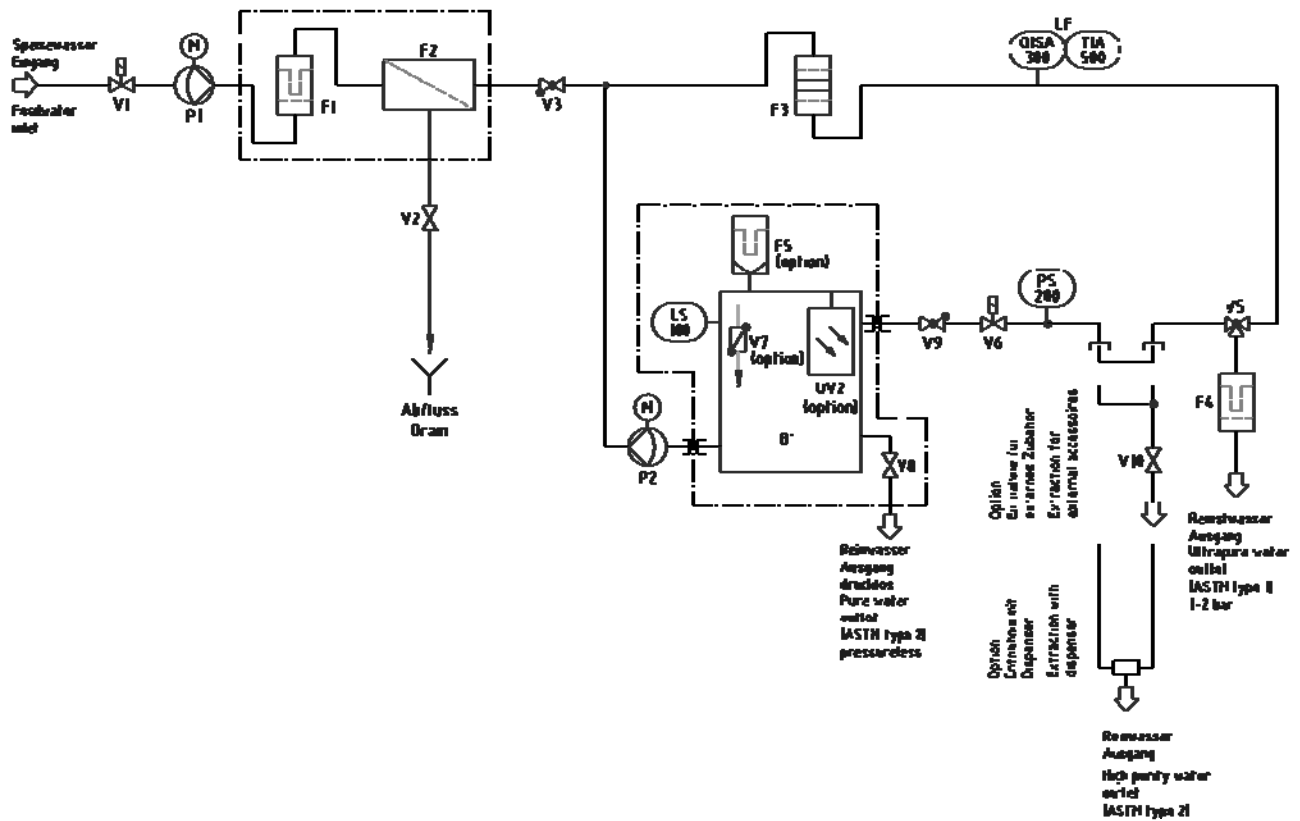


Druckhalteventil  
Pressure hold valve

Concentrate flows for Puranility TU 12 to be checked/adjusted every 3 months	
Permeate flow [L/h]	Concentrate flow [L/h]
12	60

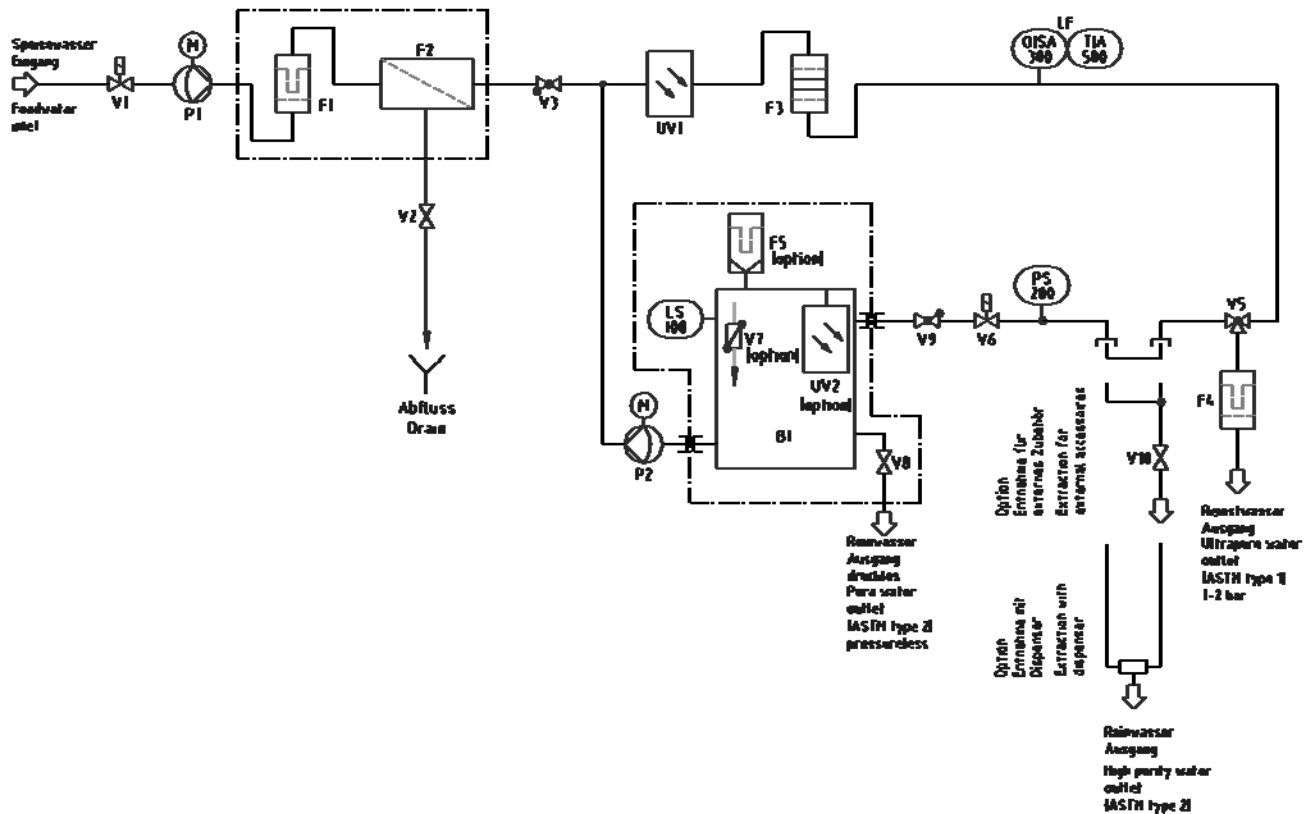


## 7.1 Flow chart, Purity TU 12



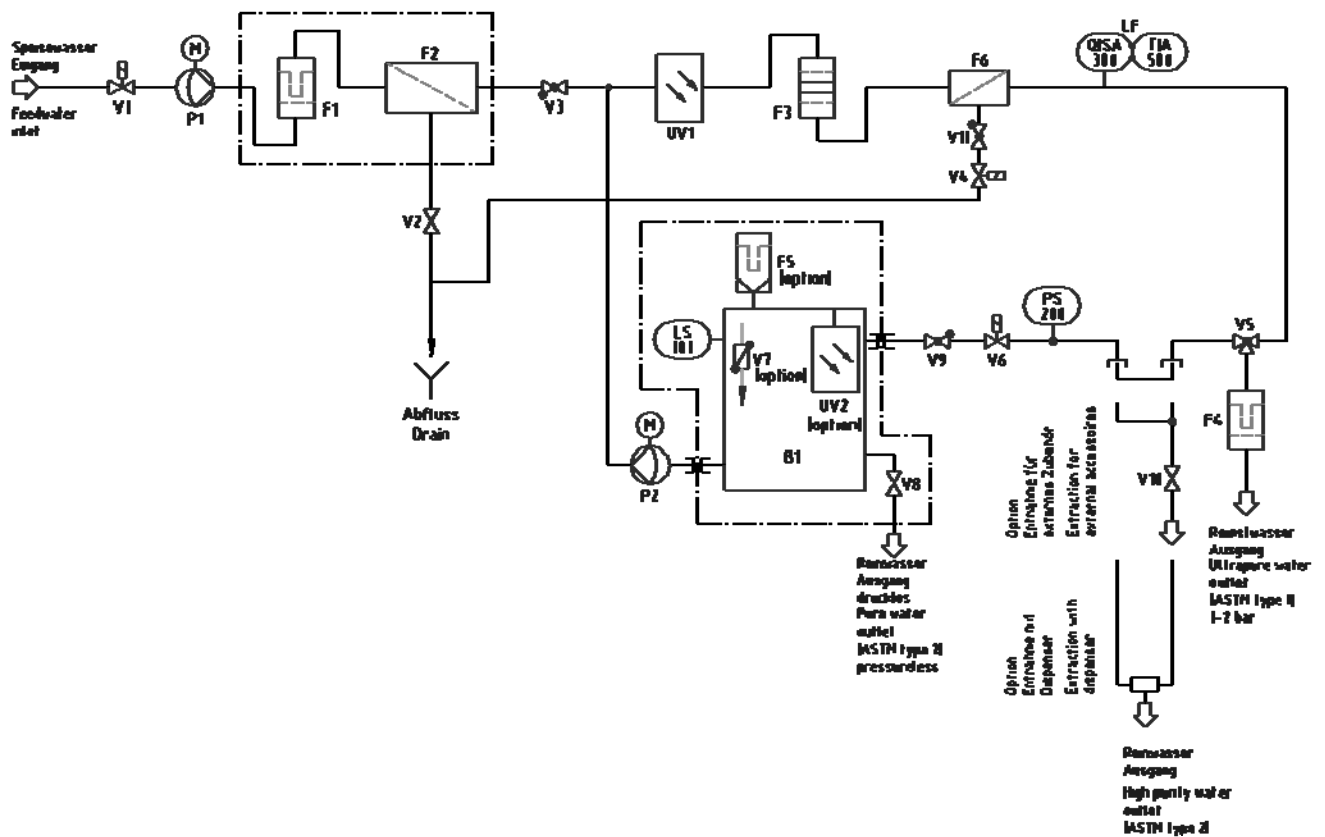
B1	Pure water tank
F1	Pretreatment cartridge
F2	Reverse osmosis membrane
F3	Filter cartridge
F4	Sterile filter
F5	Sterile vent filter (option)
LS 100	Float switch
P1	Pressure booster pump
P2	Recirculation pump
PS 200	Pressure switch
QISA 300	Ultrapure water conductivity measuring cell
TIA 500	Temperature probe
UV2	UV-Disinfection (option)
V1	Raw water solenoid valve
V2	Pressure hold valve
V3	Check valve
V5	Ultrapure water dispensing valve
V6	Recirculation solenoid valve
V7	Sterile overflow (option)
V8	Pure water dispensing valve
V9	Check valve
V10	Stop cock

## 7.2 Flow chart, Purity TU 12 UV



B1	Pure water tank
F1	Pretreatment cartridge
F2	Reverse osmosis membrane
F3	Filter cartridge
F4	Sterile filter
F5	Sterile vent filter (option)
LS 100	Float switch
P1	Pressure booster pump
P2	Recirculation pump
PS 200	Pressure switch
QISA 300	Ultrapure water conductivity measuring cell
TIA 500	Temperature probe
UV1	UV-Photooxidation
UV2	UV-Disinfection (option)
V1	Raw water solenoid valve
V2	Pressure hold valve
V3	Check valve
V5	Ultrapure water dispensing valve
V6	Recirculation solenoid valve
V7	Sterile overflow (option)
V8	Pure water dispensing valve
V9	Check valve
V10	Stop cock

### 7.3 Flow chart, Purity TU 12 UV/UF



- B1 Pure water tank
- F1 Pretreatment cartridge
- F2 Reverse osmosis membrane
- F3 Filter cartridge
- F4 Sterile filter
- F5 Sterile vent filter (Option)
- F6 Ultrafiltration module
- LS 100 Float switch
- P1 Pressure booster pump
- P2 Recirculation pump
- PS 200 Pressure switch
- QISA 300 Ultrapure water conductivity measuring cell
- TIA 500 Temperature probe
- UV1 UV-Photooxidation
- UV2 UV-Disinfection (option)
- V1 Raw water solenoid valve
- V2 Pressure hold valve
- V3 Check valve
- V4 Rinsing solenoid valve
- V5 Ultrapure water dispensing valve
- V6 Recirculation solenoid valve
- V7 Sterile overflow (option)
- V8 Pure water dispensing valve
- V9 Check valve
- V10 Stop cock
- V11 Check valve

## 8. Installation

### 8.1 Installation area

Take the following requirements into consideration when choosing the installation area:

- Feedwater pressure at least 1 bar, at most 6 bar.



**The feedwater pressure is not to exceed 6 bar. A pressure reducer must be installed if the pressure is higher.**

- Minimum temperature + 2°C.
- Level standing surface.
- If the system is to be wall-mounted, the wall must be smooth. Please check the bearing capacity of the wall, it must be sufficiently loadable (see Technical specifications for the weight).
- DN (nominal diameter) 50 gravity drain.
- Free gravity flow to drain.



**Free gravity fall to drain must be ensured!**

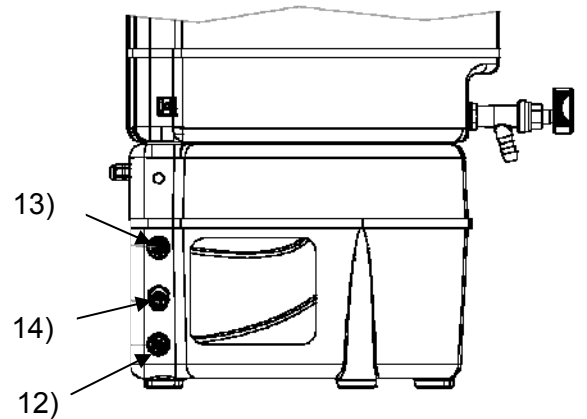
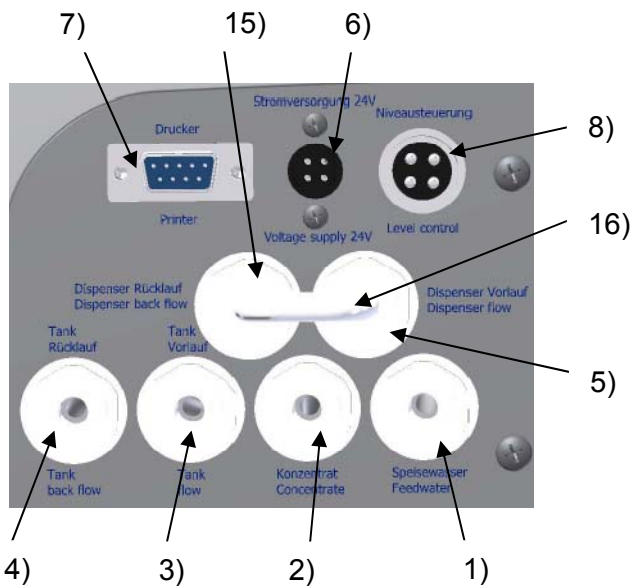
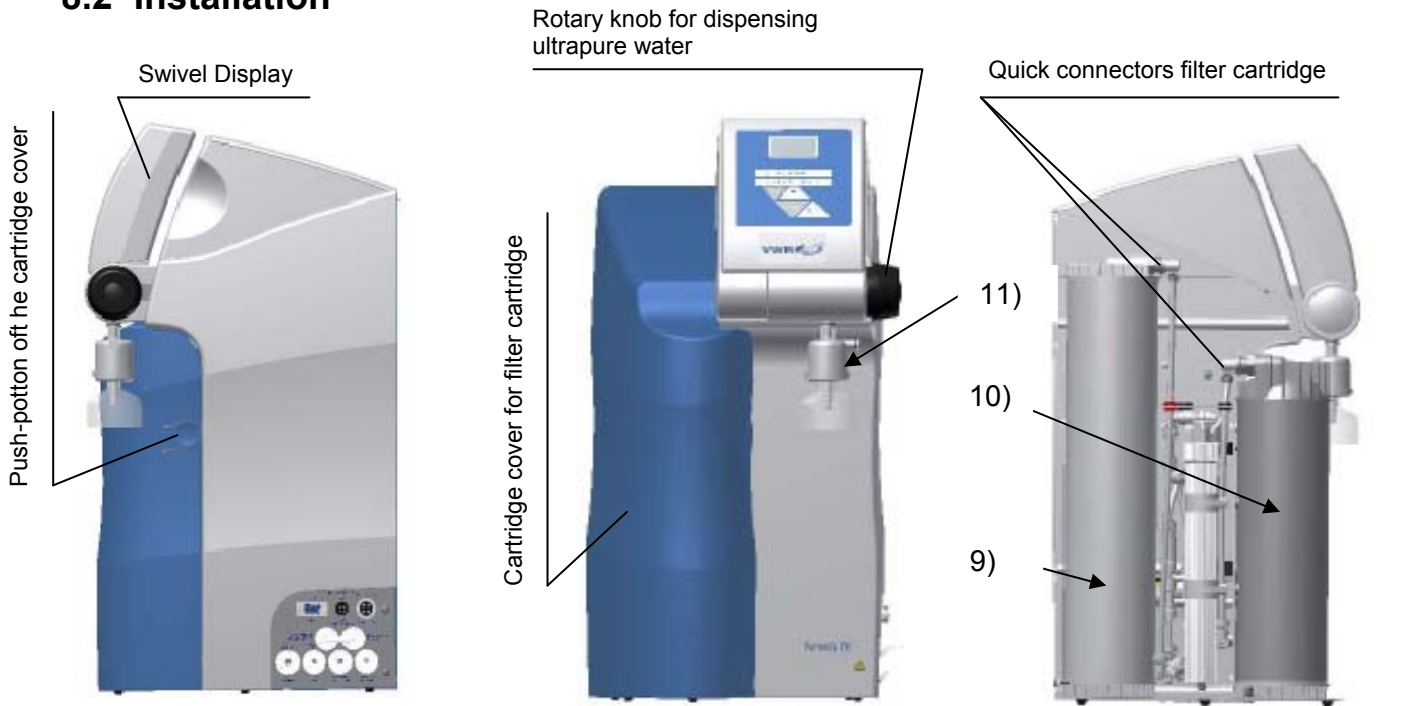
- An electric socket with protective conductor must be available for connection of the system to the voltage supply (see Technical specifications).



**Position the system so that there is no difficulty in separating the device from the electric mains.**

- There must be sufficient working space around the system (filter replacement etc.).
- The system must be easy to operate and check.
- R 3/4" pre-treated-water connection.

## 8.2 Installation



- |                                    |               |
|------------------------------------|---------------|
| 1) Feedwater connector             | hose, 1/4" od |
| 2) Concentrate connector           | hose, 1/4" od |
| 3) Tank water flow connector       | hose, 1/4" od |
| 4) Tank water back flow connector  | hose, 1/4" od |
| 5) Connector dispenser flow        | hose, 1/4" od |
| 6) Connector for power supply,     | 4-pin, 24V DC |
| 7) Connector for optional printer  |               |
| 8) Connector for level control,    | 4-pin         |
| 9) Filter cartridge                |               |
| 10) Pretreatment cartridge         |               |
| 11) Sterile filter                 |               |
| 12) Tank water flow connector      |               |
| 13) Tank water back flow connector |               |
| 14) Level control cable            |               |
| 15) Connector dispenser back flow, | hose, 1/4" od |

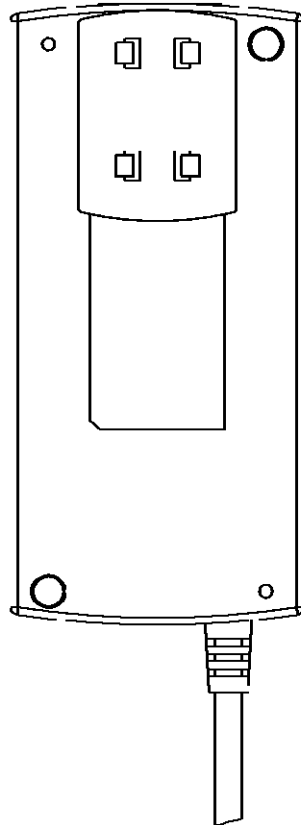


**Proceed as follows to set up your Purity TU ultrapure water system and put it into operation:**

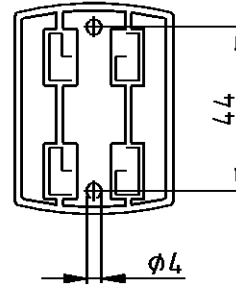
- Stand the system at the installation location or, for wall mounting, hang it to the wall using the wall holder that is available as accessory.
- Unlock the cartridge cover by pressing the push-button and take the cover off.
- Remove the stoppers from the standard supplied filter cartridge and pretreatment cartridge and keep the stoppers for return shipment.
- Fit the filter cartridge (9) in the free space at the back of the compartment and plug the 2 quick-connect couplings on the cartridge connectors so that they snap audibly into position.
- Now fit the pretreatment cartridge (10) in free place at the front of the compartment and plug the 3 quick-connect couplings on the cartridge connectors so that they snap audibly into position.
- 
- Make connection now to the feedwater connector (1) using the R 3/4" feedwater connector kit that is standardly supplied. There is also a dirt sieve in the connector kit. Fit this in the threaded feedwater hose connector, then fit this connector to a water tap thread can be shut off.
- Use a 1/4" o.d. hose to make connection of the "Tank water supply" connector of the system (3) to the "Tank water supply" connector of the tank (12), then make a similar connection from the "Tank water return" connector of the system (4) to the "Tank water return" connector (13) of the tank.  
**CAUTION: Do not mix up the connectors!**
- Plug the cable of the level control of the tank (14) in the corresponding 4-pin connector (8) of the system.
- If required, a 1/4" o.d. hose can be connected to the pure water connector (5) with the stop cock standardly supplied for withdrawal of ASTM Type 2 pure water.
- Use the 1/4" o.d. hose to make a free gravity fall connection from the "Concentrate" (2) connector of the system to a waste water drain.
- Connect the connecting cord of the standardly supplied tabletop power pack to the 4-pin socket (6) of the system.
- The system is now ready to use.
- Open the feedwater tap and check that all connections are leak-proof.
- Take the cartridge cover and put it back on, making sure that the lock on the right side of the cover locks in place.

### 8.3 Mounting the power pack (voltage supply)

Back view power supply



Universal adapter



Wall mount  
with screws

- Whenever possible, mount the power pack on the wall to the left or right of the ultrapure water system where it is freely accessible.
- Stick the universal holder which is supplied in the assembly kit to the back of the power pack as shown in the above Figure.
- Stick the universal adapter to a smooth wall surface or screw it to the wall using the dowels and screws supplied in the assembly kit.
- When the universal holder and universal adapter have been fitted, hang the power pack in.
- Plug the connecting cable (appliance cable) in the power pack socket.
- Connect the power pack to the ultrapure water system (4-pin power supply connector, pos. 6).

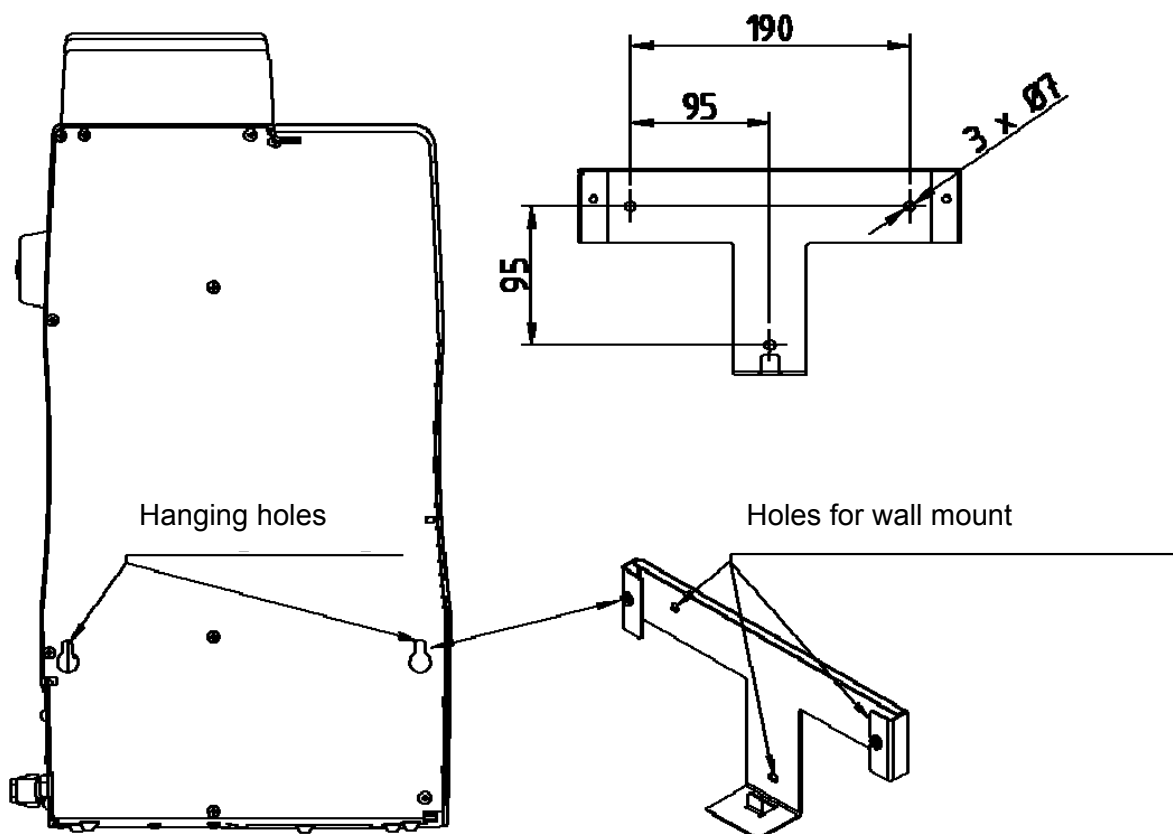
## 8.4 Wall mounting (option)

Please use the wall-mount (article number 171-1125) to mount the system on a wall. Fasten it to the wall by means of three screws.



The screws and dowels are supplied with the wall mount, are exclusively to fix the wall mount to a concrete wall or a solid masonry!

- Use the twist drill (8 mm or 5/16 inch) to make the three holes in the wall that required as shown in the diagram,
- Plug the nylon S8 dowels that are with supplied in the holes. Screw the 6 x 40 mm screws that are also with supplied in the dowels.
- Lift the Purity TU system (2 people are required for this) and hang the back side of it on the wall bracket.





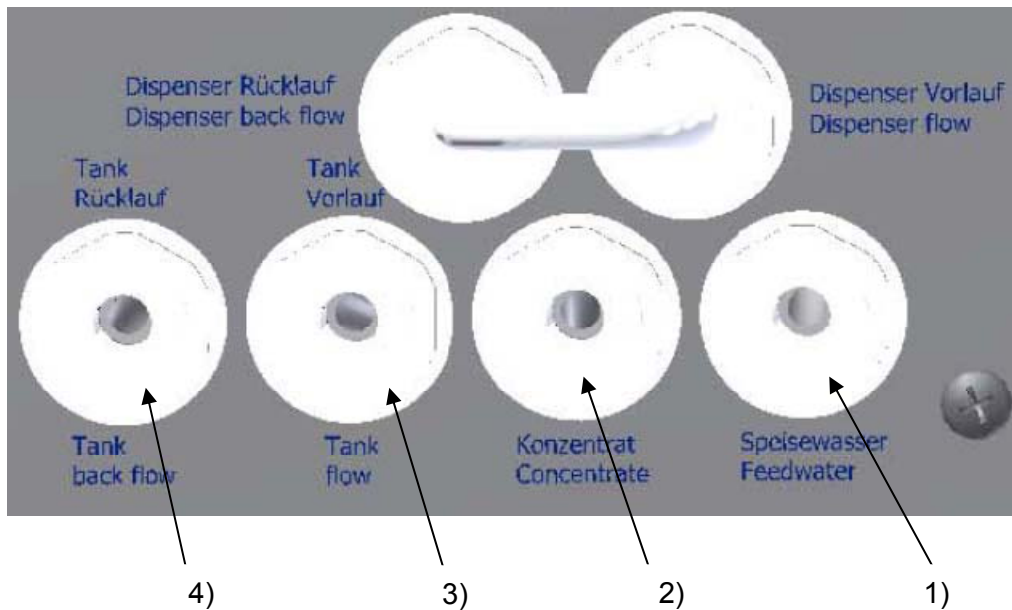
## 9. Putting the system into operation



The system must have warmed up, or cooled down, to room temperature before start-up can be begun.



Check that all hose connections have been correctly made as described in the "Setting up" section.



- |    |                           |              |
|----|---------------------------|--------------|
| 1) | Feedwater connector,      | hose 1/4" od |
| 2) | Concentrate connector,    | hose 1/4" od |
| 3) | Tank flow connector,      | hose 1/4" od |
| 4) | Tank back flow connector, | hose 1/4" od |

Switch the system on by plugging the mains plug in a suitable electric socket.

After a brief self test the system begins the production of ultrapure water.

Wait until the first tank filling has been completed and discard the water that is in the tank. Subsequently check the concentrate flow and adjust this as described in the "How Purity TU functions" section.

Withdraw at least 1 litre of water before you screw the sterile filter (10) that is standardly supplied in the outlet of the dispensing valve.

Now set the wanted display mode, the limiting value for the conductivity as well as the limiting value for the temperature as described in the "System control" section.

## 9.1. Brief operating instructions

The purity of the water produced is shown at the front of the system, either in  $\mu\text{S}/\text{cm}$  or in  $\text{M}\Omega\text{cm}$ . Ultrapure water can be withdrawn from the dispensing valve at the front of the system.

### Menu:

With one press on the menu-key you reach the first submenu, where you can select from the following choice:

1. Display of the water quality only in  $\mu\text{S}/\text{cm}$
2. Alternatively, the display can show the water quality in  $\mu\text{S}/\text{cm}$  and the temperature alternately at 2 second intervals (dual measuring mode)
3. Display of the water quality in  $\text{M}\Omega\text{cm}$  (mono measuring mode)
4. Alternatively, the display can show the water quality and the temperature alternately at 2 second intervals (dual measuring mode)

With two presses on the menu-key you reach the second menu, where you can set the limiting value for the conductivity of the ultrapure water (only in  $\mu\text{S}/\text{cm}$ )

With three presses on the menu-key you reach the third menu, where you can set the limiting value for the temperature.

- The exceeding of a limiting value is signalled by a buzzer. The alarm signal can be switched off by a press on the quit/up button.

Leave your Purity TU ultrapure water system in operation even at weekends and during holiday times. Only then can the automatic recirculation effectively protect against increasing conductivity values in the storage tank.



Should your Purity TU ultrapure water system be out of operation for longer than 72 hours, then the ultrapure water inside the system will take up carbon dioxide and so cannot be immediately produce ultrapure water of  $18.2 \text{ M}\Omega\text{cm}$  quality. To prevent this, the filter cartridge should be prematurely replaced, whereby the emptying of the storage tank is necessary so that fresh ultrapure water flows through the system.

## 10. Instruction for use

### Display

Indicates that the displayed value is conductivity ( $\mu\text{S}/\text{cm}$ ), resistance ( $\text{M}\Omega\text{cm}$ ) or temperature ( $^{\circ}\text{C}$ )

### Limit Value

Illuminates when alarm is triggered.

- Cond. Illuminates when limiting value of conductivity is exceeded.
- Temp.
- Status Sensor signals that an interruption has occurred between the system and the sensor

### Down

Enables a lower value to be set. Also triggers value output with optional printer.



### .060

Resistance in  $\text{M}\Omega\text{cm}$ . The display can also display conductivity.

### Up/Quit

Allows a higher value to be set. Deactivates the acoustic alarm.

### Enter

Confirms changes in settings and shifts the cursor.

### Menu

- Measurement mode – use up/down to select either: purity by itself (c) or flashing purity then temperature in 2 sec intervals (ct).
  - ct /  $\text{M}\Omega\text{cm}$  is resistivity and temperature
  - c /  $\text{M}\Omega\text{cm}$  is resistivity alone
  - ct /  $\mu\text{S}/\text{cm}$  is conductivity and temperature
  - c /  $\mu\text{S}/\text{cm}$  is conductivity alone
- Enables limiting value for conductivity to be set (red “Cond.” LED lights up). Use up/down keys to set value between 0.055 to 30  $\mu\text{S}/\text{cm}$ . Use Enter key to confirm. If value exceeds 30, then OFF appears in display and measurement is off.
- Set limiting value for temperature (red “Temp LED lights up). Choose from 10 to 40 $^{\circ}\text{C}$ .

## 11. The system control

### 11.1 Menu

The menu consists of three sub-points: Switching to the dual mode together with selection of the measurement unit for the conductivity measurement, setting the limiting value for the conductivity and setting the limiting value for the temperature.

#### Mono / dual measurement mode:

Mono measurement mode: In this mode only the conductivity is displayed. The temperature can be read as long as the Enter-key is pressed .

Dual measurement mode: In this mode, temperature and conductivity are shown in 2-second alternation. The LED for the unit switches with the display.

A single press on the menu-key brings the measurement mode that has last been set to display. Use the up- or down-key to switch the permanent display of the conductivity and the alternating display of conductivity/temperature. The display shows "c" for conductivity or "ct" for conductivity/temperature.

Switching between the measurement units  $\mu\text{S}/\text{cm}$  or  $\text{M}\Omega\text{xcm}$  can also now be made here. The unit selected must be confirmed with Enter. The corresponding LED indicates which unit is operative.

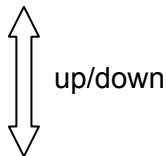
The following combinations are hereby possible:

ct /  $\text{M}\Omega\text{xcm}$

c /  $\text{M}\Omega\text{xcm}$

ct /  $\mu\text{S}/\text{cm}$

c /  $\mu\text{S}/\text{cm}$



### 11.2 Setting the limiting value for the conductivity

Setting range: 0.055 - 30  $\mu\text{S}/\text{cm}$

Basic setting: off

**Important note: The limiting value can only be entered in  $\mu\text{S}/\text{cm}$ .**

Two presses on the menu-key (the red "Cond." LED lights up) enable the limiting value for the conductivity to be set. Use the up- and down-keys to make the setting. The particular position that is to be changed can be selected with the Enter-key and is shown flashing in the display.

When the wanted value has been reached, be sure to confirm it with Enter.

Should a value of 30.1  $\mu\text{S}/\text{cm}$  be set, then the word OFF appears in the display and limiting value evaluation is switched off.

When the limiting value of the conductivity is exceeded (Limit value Conductivity), then the red "Cond." LED lights up and the exceeding is additionally signalled by a buzzer. The fault message can be given out via the optional printer.

## 11.3 Setting the limiting value for temperature

Setting range: 10 - 40°C

Basic setting: 35°C

Three presses on the menu-key (the red "Temp" LED lights up) enables the limiting value for the temperature to be set. Use the up- and down-keys to make the setting. The particular position that is to be changed can be selected with the Enter-key and is shown flashing in the display.

When the wanted value has been reached, be sure to confirm it with Enter.

Should a value of 41°C be set, then the word OFF appears in the display and limiting value evaluation is switched off.

When the limiting value of the temperature is exceeded (Limit value Temperature), then the red "Temp" LED lights up and the exceeding is additionally signalled by a buzzer. The fault message can be given out via the optional printer.

## 11.4 Communication

A printer can be connected to the RS 232 interface for the print out of measured values. The interface works at a transmission rate of 9600 bits/sec., 8 data bits, 1 stop bit and no parity.

The resistance in MΩxcm and the temperature in °C are given out at the serial interface separated by a comma. The conductivity is automatically scaled to three significant places.

Output is made 1x per hour.

When the system is in operation, a press on the down-key triggers a measured value output at the serial interface.

### Print out:

e.g.: 18.2 MΩxcm, 23.4 °C

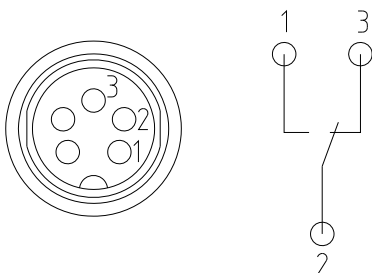
The SUB-D socket has the following pin assignment: PIN 2: RXD  
PIN 3: TXD  
PIN 5: GND

## 11.5 Potential-free contact

The system is equipped with a potential-free contact for the control of external equipment.

Max. connected load: 30V, 2A.

The PIN assignment of the 5-pin socket is as follows:



## 12. General maintenance

Regular maintenance of your system ensures that the value of it is maintained. We recommend that you close a service contract with a Service company that is expressly authorized to carry out service. You then have the certainty of a high operational safety and reliability.

### NOTE!

To ensure your system will work reliably for a long time, it must be checked, serviced and cared for at regular time intervals in accordance with these operating instructions! For this reason, the operating instructions must be readily available to operating and maintenance staff at all times, and be carefully followed!

Any maintenance work which should become necessary during the validity of the guarantee is only to be carried out by a service professional which is expressly authorized to do such work.

The operating-staff assigned is committed to carry out the weekly checks. During the agreed term of validity of the guarantee, the maintenance record sheet supplied in the operating instructions should be kept by entry of the weekly check results.

### IMPORTANT!

The ultrafiltration membrane should be replaced every 2 years, or when a drop in performance is determined, for perfect functioning to be ensured.

Cleaning and disinfection of your system is performed for reasons of hygiene and has no effect on the technical condition of the system. The system must be cleaned and disinfected at least once yearly.



**Control and maintenance work on electrical systems is only to be carried out when the system has been switched to a currentless condition at the mains and the switching has been secured against inadvertent switching back on. Such work is only to be performed by an appropriately trained, skilled electrician.**

## 12.1 Maintenance intervals

Consumable materials are to be replaced at the intervals given in the following Table or when there is a drop in performance:

Material	Flow chart no.	Article no.	Interval*
Pretreatment cartridge	F1,F2	171-1142	12 Months <sup>1</sup>
Filter cartridge	F3	171-1141	12 Months <sup>1</sup>
0.2µm sterile filter	F4	171-1105	12 Months <sup>2</sup>
Ultrafiltration membrane	F6	171-1106	24 Months <sup>1</sup>
UV lamp	UV1	171-1108	24 Months <sup>3</sup>

\*Please keep in mind that the life of your consumables is directly dependent on the quality of the feed water and the amount of water used daily. The interval is contingent on the feedwater quality so that a shorter one may be necessary.

<sup>1</sup> Or when the ultrapure water limiting value is exceeded, whichever is shorter. Longer usage can be result in bacterial growth on the resin.

<sup>2</sup> Or flow rate is noticeably slow.

<sup>3</sup> Or unless system indicates the lamp needs to be replaced.

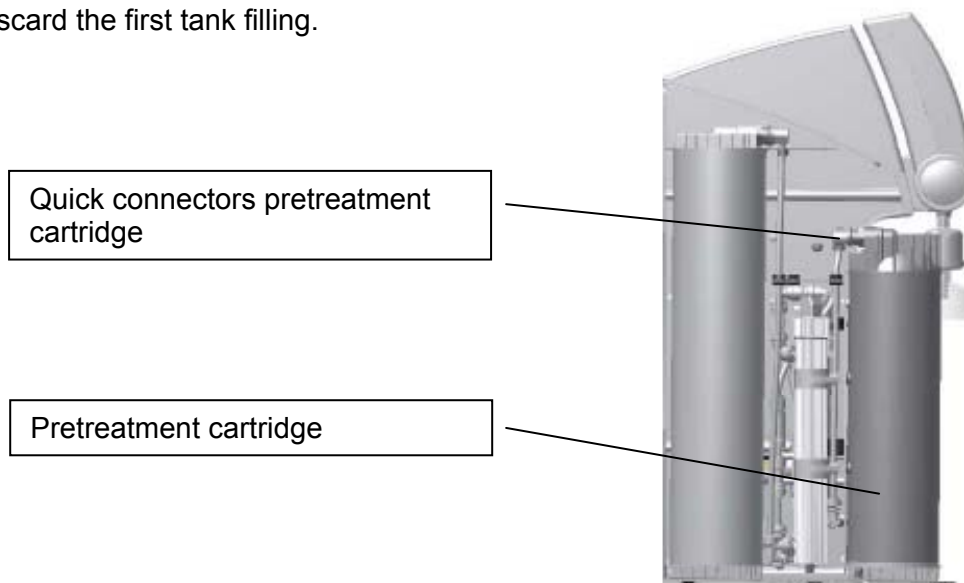
## 12.2 Replacing the pretreatment cartridge



**If a drop in the stated capacity is given because module blockage has resulted from operating the system with insufficient preconditioning, then the pretreatment cartridge must be replaced.**

**Proceed as follows to replace the pretreatment cartridge:**

1. Empty the storage tank.
2. Separate the system from the mains by unplugging the mains plug.
3. Turn the supply of feedwater off.
4. Open the dispensing valve until water no longer flows out, then close it again.
5. Take off the cartridge cover.
6. Remove the three quick-connects from the pretreatment cartridge and close the connectors with the stoppers that have been saved.
7. Draw the spent pretreatment cartridge out from the guide and replace it with the new pretreatment cartridge.
8. Remove the stoppers from the new pretreatment cartridge and save them.
9. Fit the quick-connects on the pretreatment cartridge so that they audibly click into position.
10. Re-open the supply of feedwater.
11. Connect the system to the mains and check the connections for leakage.
12. Replace the cartridge cover.
13. Discard the first tank filling.





## 12.3 Replacing the filter cartridge



**The filter cartridge must be replaced as soon as the maximum limiting value for the ultrapure water that you have set is exceeded, The filter cartridge must also be replaced after disinfection of the system.**

**Proceed as follows to replace the filter cartridge:**

1. Empty the storage tank.
2. Separate the system from the mains by unplugging the mains plug.
3. Turn the supply of feedwater off.
4. Open the dispensing valve until water no longer flows out, then close it again.
5. Take the cartridge cover off.
6. Remove the two quick-connects from the feedwater side and the ultrapure water side of the filter cartridge and close the connectors with the stoppers that have been saved.
7. Draw the spent filter cartridge out from the guide and replace it with the new filter cartridge.
8. Remove the stoppers from the new filter cartridge and save them.
9. Fit the quick-connects on the filter cartridge so that they audibly click into position.
10. Re-open the supply of feedwater.
11. Connect the system to the mains and check the connections for leakage.
12. Replace the cartridge cover.
13. Discard the first tank filling.



**Only a filter cartridge of article number 171-1141 is to be used in this system, as this cartridge is specifically designed for this system. Use of any other cartridge invalidates the guarantee.**

Quick connectors filter cartridge

Filter cartridge



## 12.4 Disinfection



**Your system should be cleaned and disinfected at least once a year to eliminate any bacteria that are possibly in the system. We recommend that you carry out cleaning and disinfection shortly before the time that the filter cartridge is to be replaced.**

Use cleaning solutions as follows:

MICRO-Chlor Granulate, 1 box, article no. 171-1123 (Europe only)

Cleaning Solution, 1 syringe, article no. 171-1124 (US-market only).



**Please observe the information given in the safety data sheet supplied with Micro-Chlor disinfectant to avoid possible health hazards!**

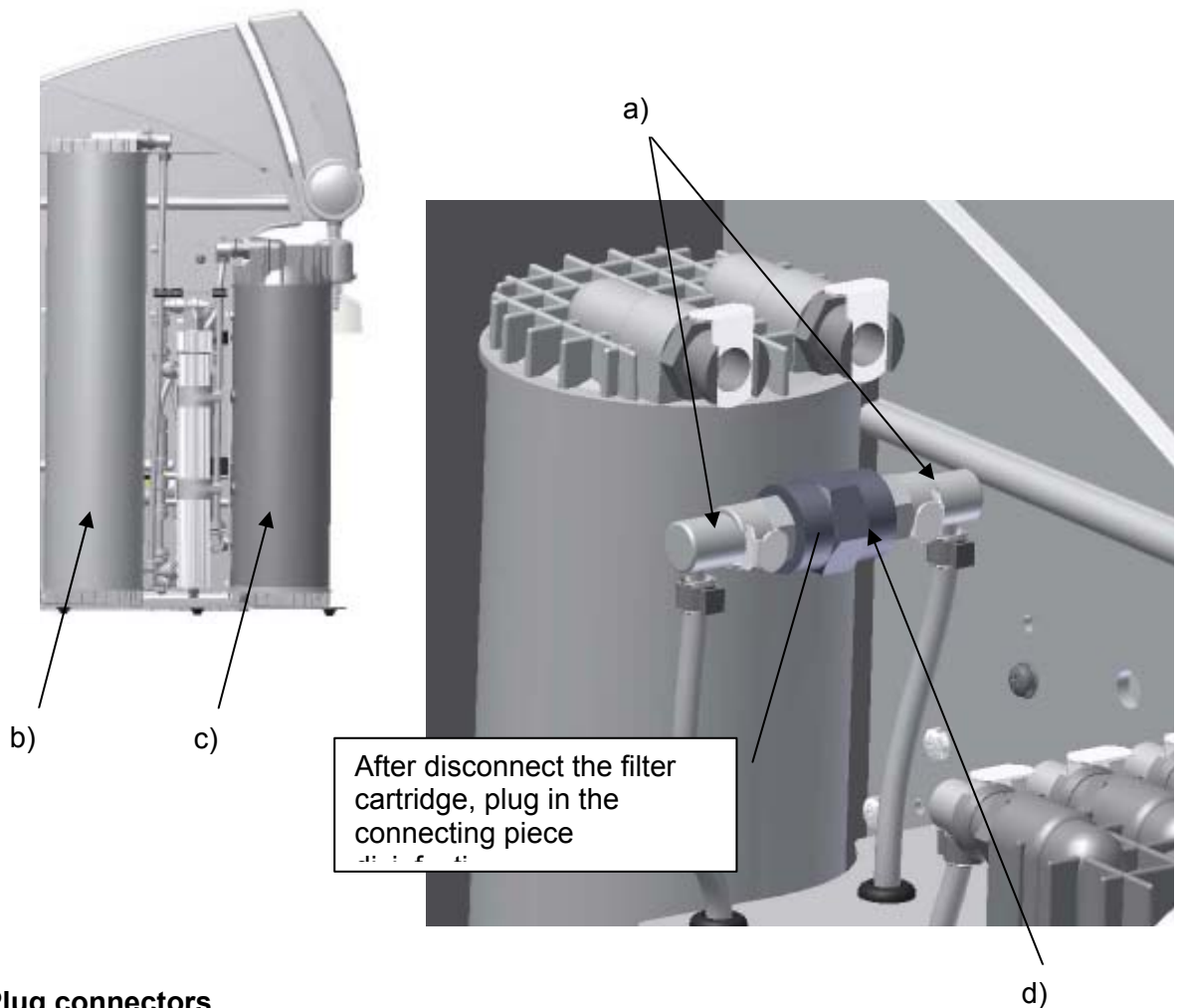
**Proceed as follows to disinfect your system:**

1. Disconnect the Purity TU from mains supply.
2. Replace the pretreatment cartridge (c) as is described in chapter 12.2 “Replacing the pretreatment cartridge.”
3. Undo and remove the plug connectors (a) of the filter cartridge (b). Briefly close the plug connections with the connecting piece / disinfection (d) from the assembly kit (article no. 171-1148).
4. Open the lid of the storage tank, pour the contents of a box respectively a syringe of cleaning solution into the water-filled tank and then close the lid.
5. Connect the system with mains supply and let it run for 1 hour in normal operation to effective bacteria killing.
6. Discard two tank fillings of water.
7. Close the dispensing valve, disconnect the system from mains supply.

8. Change the filter cartridge as described in the Operating Instructions supplied with the system and if necessary the pre-treatment filter and the sterile filter.
9. Connect the system with mains supply.
10. Fill the tank completely once and discard the water produced from this tank filling.



**Before dispensing water from the system, let water run out for approx. 15 minutes. The system is then ready for use.**

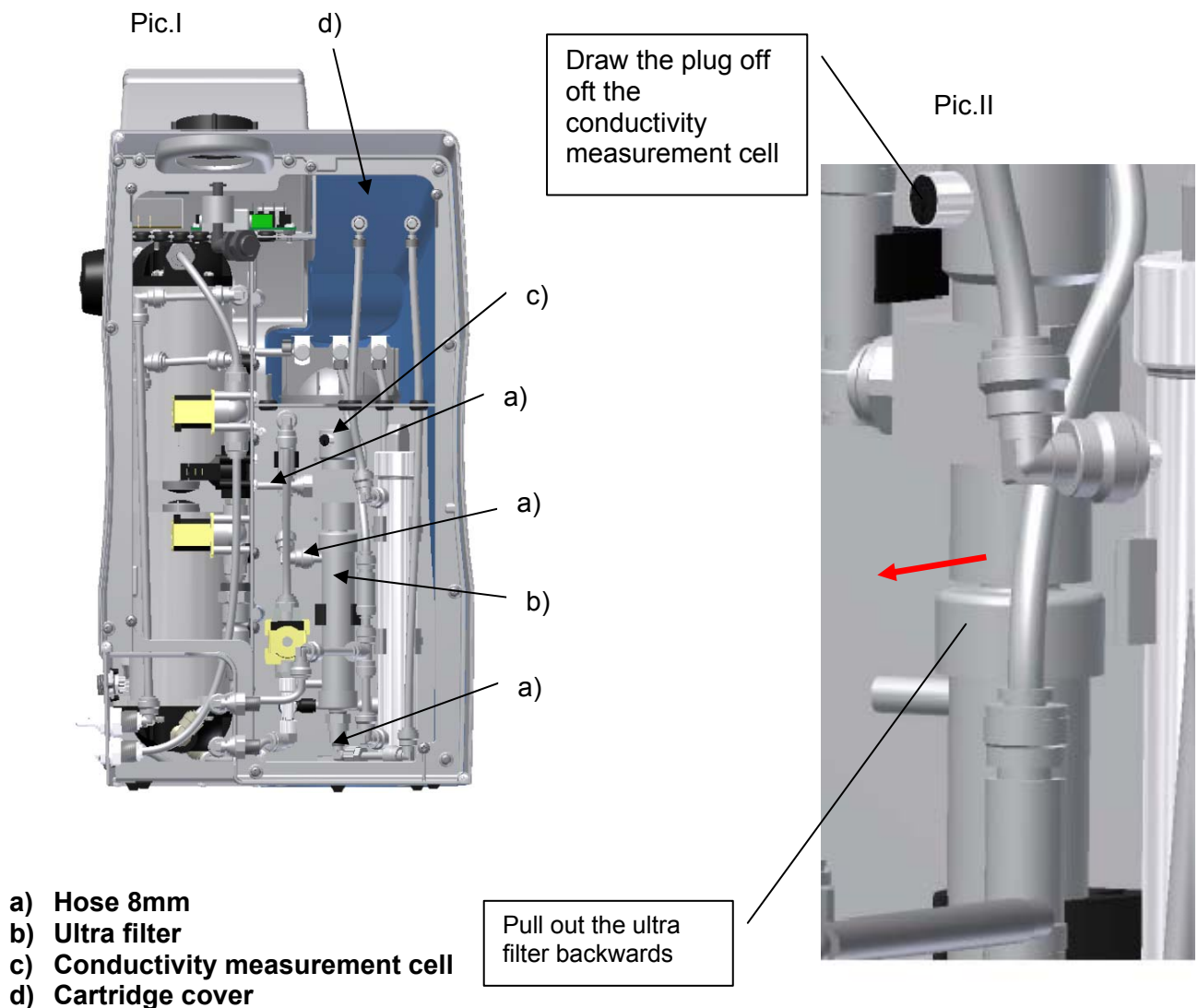


- a) Plug connectors
- b) Filter cartridge
- c) Pretreatment cartridge
- d) Connecting piece disinfection (included in assembly kit)

## 12.5 Change the ultrafilter

Proceed as follows to change the ultra filter

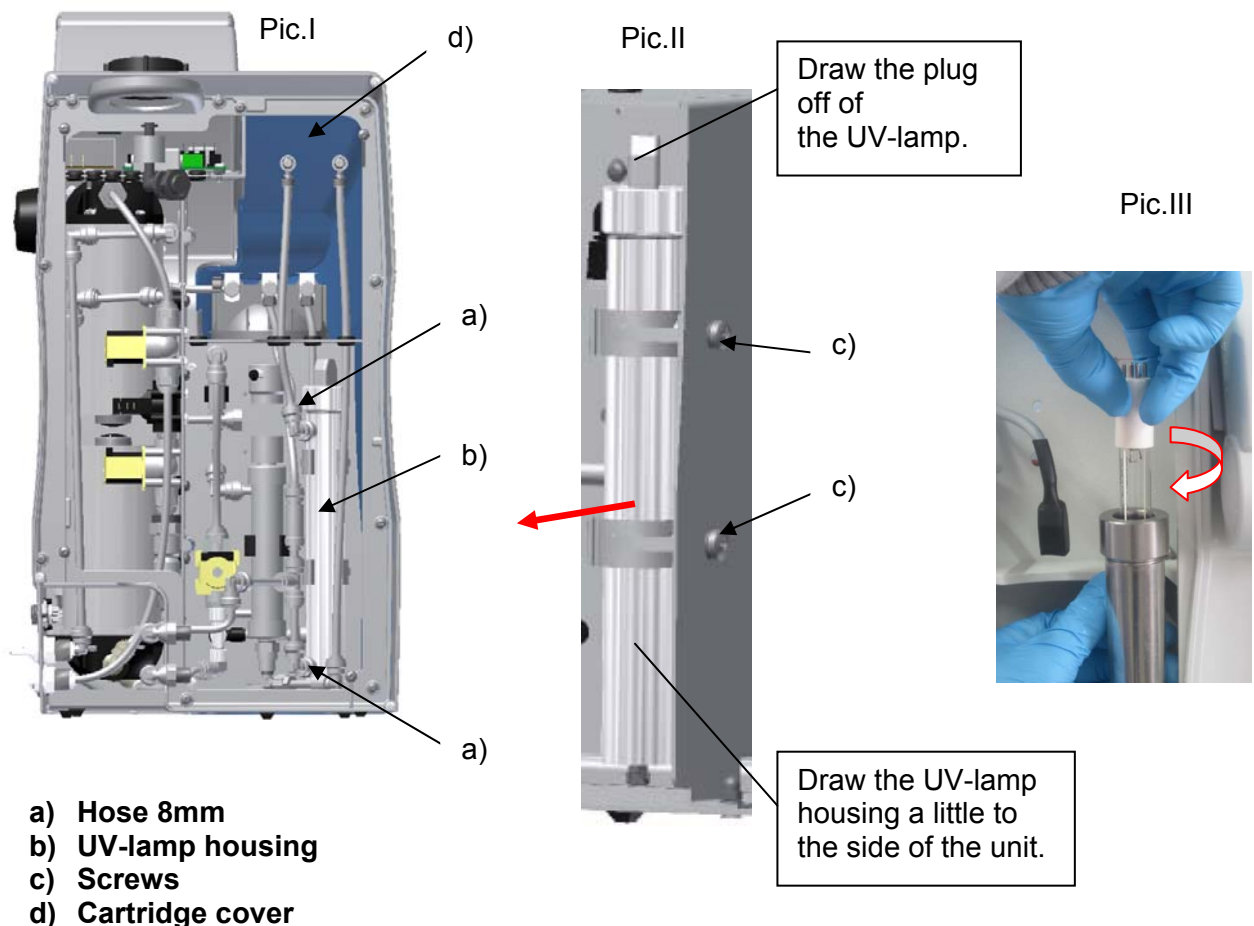
1. Switch the Purity TU system off.
2. Shut off the supply of feedwater to the system and open the dispensing valve so that pressure in the system is completely released.
3. Remove the cartridge cover (d) and the filter cartridge ( see under chapter 12.2 "Changing the filter cartridge) and draw out the hoses(a) from the ultra filter (b) (Pic.I). Then draw off the plug from the conductivity measurement cell. (c). After this procedure draw off the ultrafilter (b) backwards and change it.(Pic.II)
4. Build the hoses (a), filter cartridge, plug from conductivity measurement cell and the cartridge cover( d) back and switches the sytem on again.



## 12.6 Change the UV lamp

Proceed as follows to change the UV-lamp

1. Switch the Purity TU system off.
2. Shut off the supply of feedwater to the system and open the dispensing valve so that pressure in the system is completely released.
3. Remove the cartridge cover (d) and the filter cartridge (not shown, see under chapter 12.2 "Changing the filter cartridge) and pull out the hoses (a) (Pic.I). Then draw the plug off of the UV-lamp, unscrew the screws (c) and draw the UV-lamp housing (b) a little to the side of the unit (Pic.II).
4. Now carefully draw the UV-lamp upwards while lightly turning it clockwise (Pic.III). During the replacement of a UV-lamp, great care must be taken to avoid touching the glass of the UV-lamp with fingers, to avoid dirtying of the lamp which would impair the functioning of it. We therefore recommend that clean gloves be worn.
5. Carefully introduce the new UV-lamp under a slight turning motion as before but in the anticlockwise direction. Plug the plug on the lamp and push it back in the unit.
6. Build the screws (c), the hoses (a), the filter cartridge and the cartridge cover (d) back and switches the system on again.



### 13. Waste disposal



This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste.

Instead it's your responsibility to correctly dispose of your equipment at lifecycle -end by handling it over to an authorized facility for separate collection and recycling. It's also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect from health hazards the persons involved in the disposal and recycling of the equipment.

For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment.

By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

Thank you

## 14. Trouble shooting

Fault	Cause	Remedy
System does not start	<ul style="list-style-type: none"> <li>- No current</li> <li>- Power pack or system control defect</li> </ul>	<ul style="list-style-type: none"> <li>- Supply current</li> <li>- Replace the power pack or system control</li> </ul>
Water cannot be dispensed	<ul style="list-style-type: none"> <li>- Feedwater supply is off</li> <li>- Feedwater and rinse water connectors are mixed up</li> <li>- Feedwater pressure &lt; 1 bar</li> </ul>	<ul style="list-style-type: none"> <li>- Open the feedwater tap</li> <li>- Reverse the connections</li> <li>- Increase feedwater pressure</li> </ul>
Resistance < 18.2 MΩxcm	<ul style="list-style-type: none"> <li>- The system has a UF-module (higher conductivity possible)</li> <li>- Air in the UF-module because of empty tank</li> <li>- Spent exchanger capacity</li> </ul>	<ul style="list-style-type: none"> <li>- Wait until tank is filled again and a rinse is triggered</li> <li>- Insert new filter cartridge</li> </ul>
System control no longer reacts but LED's light up	<ul style="list-style-type: none"> <li>- Improper operation</li> <li>- Voltage fault</li> </ul>	<ul style="list-style-type: none"> <li>- Unplug the mains plug for 5 seconds</li> </ul>
Water leaks out	<ul style="list-style-type: none"> <li>- Leaky hose connection</li> <li>- Feedwater pressure &gt; 6 bar</li> <li>- Component defect (e.g. UV-quartz tube)</li> </ul>	<ul style="list-style-type: none"> <li>- Check, seal hose connection</li> <li>- Install an upstream pressure reducer</li> <li>- Replace the component</li> </ul>
Volume that can be dispensed is too small	<ul style="list-style-type: none"> <li>- UF-Module blocked</li> <li>- Sterile filter blocked</li> <li>- Air in the sterile filter</li> <li>- Tank is not yet sufficiently filled</li> </ul>	<ul style="list-style-type: none"> <li>- Replace the UF-module</li> <li>- Replace the sterile filter</li> <li>- Vent the sterile filter</li> <li>- Wait until the tank is full</li> </ul>

<p>Fault message: Red LED is lit up <i>"Limit value Cond."</i></p>	<ul style="list-style-type: none"> <li>- Spent filter cartridge</li> <li>- Limiting value set too low</li> <li>- System has a UF-module (higher conductivity is possible)</li> </ul>	<ul style="list-style-type: none"> <li>- Replace with new filter cartridge (art. no.: 09.1006)</li> <li>- Check, match the limiting value setting</li> </ul>
<p>Fault message: Red LED is lit up <i>"Limit value Temp."</i></p>	<ul style="list-style-type: none"> <li>- Temperature in the system is too high</li> <li>- Limiting value is set too low</li> <li>- Feedwater temperature too high</li> </ul>	<ul style="list-style-type: none"> <li>- Reduce temperature by letting water flow out</li> <li>- Check, match the limiting value setting</li> <li>- Reduce the feedwater temperature</li> </ul>
<p>Fault message: Red LED is lit up <i>"Status Sens."</i> The display shows "---"</p>	<ul style="list-style-type: none"> <li>- Interruption in cable to the conductivity measuring cell</li> <li>- Measuring cell defect</li> </ul>	<ul style="list-style-type: none"> <li>- Check the cable and the plug connection.</li> <li>- Replace the measuring cell</li> </ul>
<p>Fault message: Red LED is lit up <i>"Status Sens."</i> The display shows "---", simultaneous acoustic message from the buzzer</p>	<ul style="list-style-type: none"> <li>- Interruption in cable to the conductivity measuring cell.</li> <li>- Temperature sensor defect</li> </ul>	<ul style="list-style-type: none"> <li>- Check the cable and the plug connection.</li> <li>- Replace the measuring cell</li> </ul>

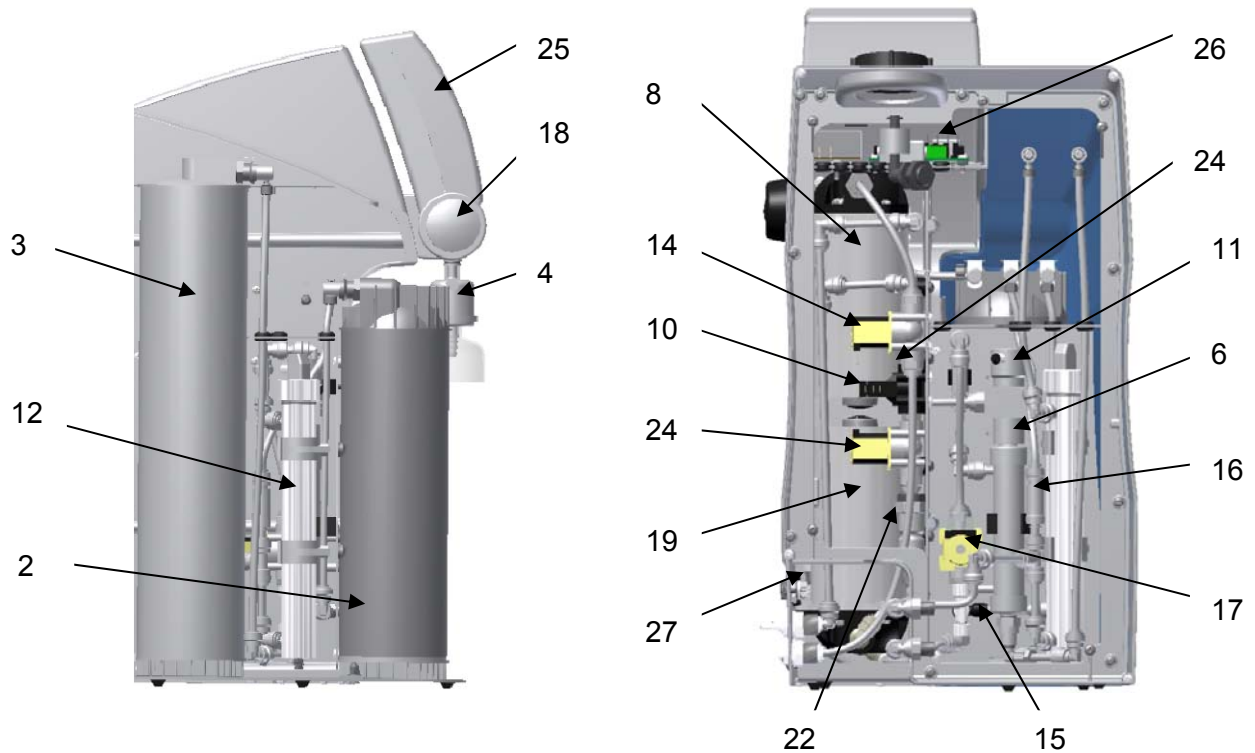


## 15. Technical service

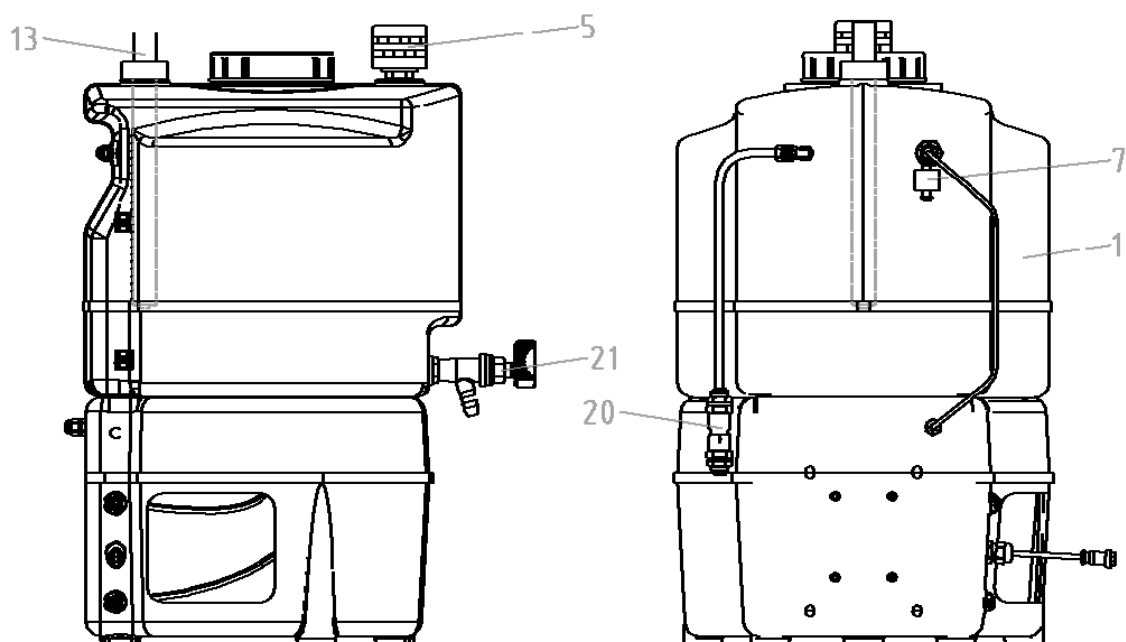
Visit the VWR's website at [www.vwr.com](http://www.vwr.com) for:

- Complete technical service contact information
- Access to VWR's Online Catalogue, and information about accessories and related products
- Additional product information and special offers

**Contact us** For information or technical assistance contact your local VWR representative or visit. [www.vwr.com](http://www.vwr.com).



Pure water tank



Pos.	Designation	Article no.
1	Pure water tank, 30 litres Pure water tank, 60 litres	171-1170 171-1171
2	Pretreatment cartridge consisting of prefilter / hardness stabilizer and RO-membrane:	171-1165
3	Filter cartridge	171-1141
4	Sterile filter	171-1105
5	Sterile vent filter (option)	171-1166
6	Ultrafiltration module	171-1106
7	Float switch	171-1167
8	Pressure booster pump	171-1107
9	Recirculation pump	171-1107
10	Pressure switch	171-1151
11	Ultrapure water conductivity measuring cell Temperature sensor	171-1152 171-1111
12	Replacement UV-lamp UV-Booster	171-1108 171-1153
13	Replacement UV-lamp (option) UV-booster	171-1168 171-1153
14	Raw water solenoid valve	171-1154
15	Pressure hold valve	171-1155
16	Check valve	171-1156
17	Rinsing solenoid valve	171-1154
18	Ultrapure water dispensing valve	171-1114
19	Recirculation solenoid valve	171-1154
20	Sterile overflow (option)	171-1170
21	Dispensing valve	171-1169
22	Check valve	171-1156
23	Cut-off valve	171-1157
24	Check valve	171-1157
25	Board with display	171-1158
26	System control board	171-1159
27	Fuse holder for glas tube fuse 5 x 20mm Glas tube fuse 5 x 20mm, 3,15 A, slow fuse	171-1118 171-1119
28	Table top power pack (not shown)	171-1121



## 16. Warranty

**VWR International** warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of delivery. If a defect is present, VWR will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, the defect of the product is not due to such non-performance.

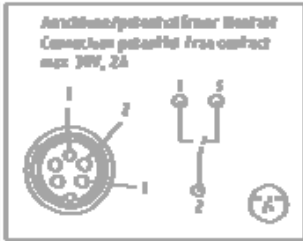
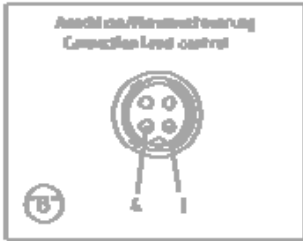
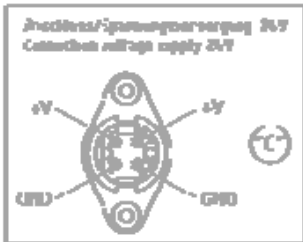
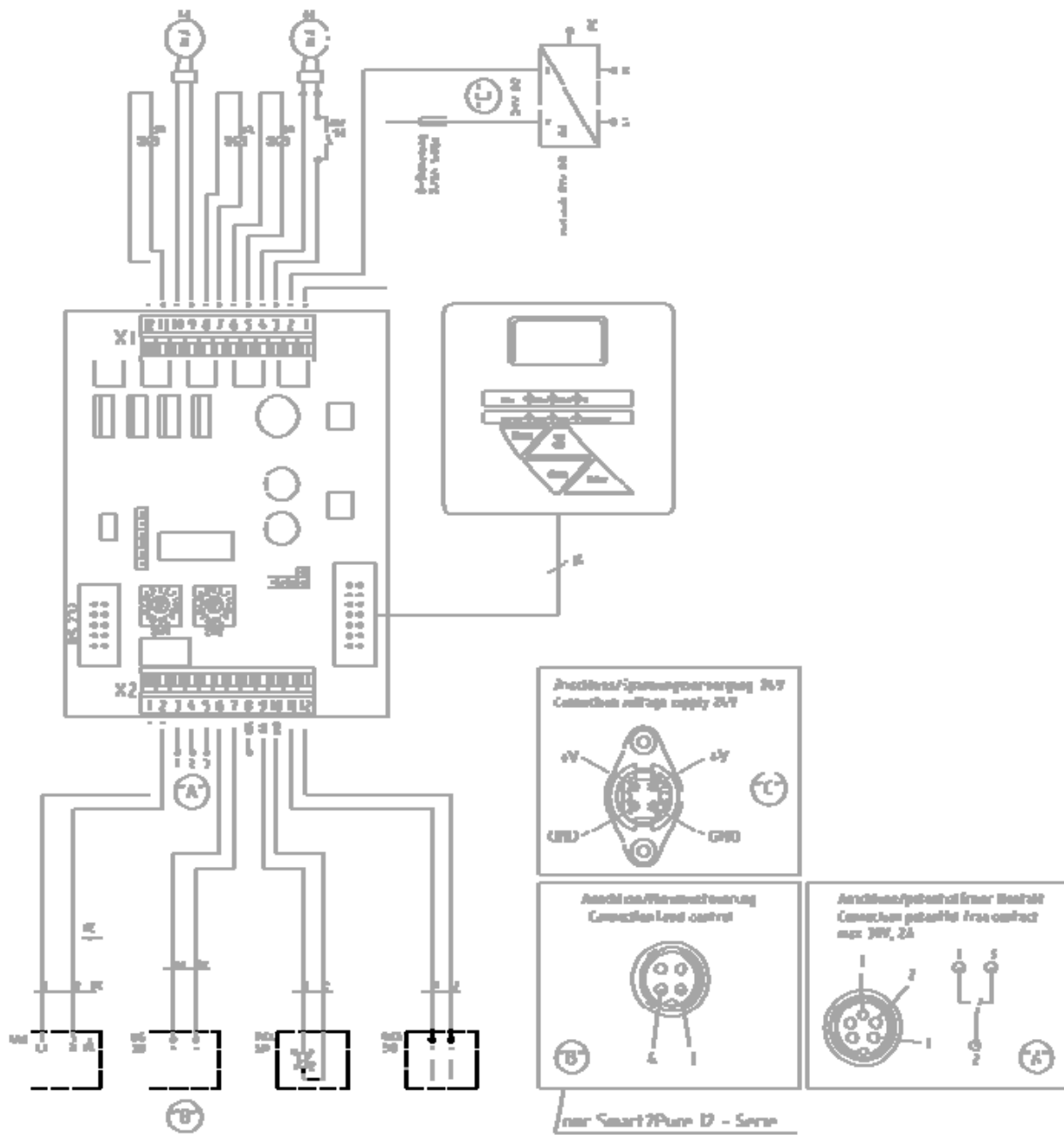
Items being returned must be insured by the customer against possible damage or loss. This warranty shall be limited to the aforementioned remedies. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

### 16.1 Compliance with local laws and regulations

The customer is responsible for applying for and obtaining the necessary regulatory approvals or other authorisations necessary to run or use the Product in its local environment. VWR will not be held liable for any related omission or for not obtaining the required approval or authorisation, unless any refusal is due to a defect of the product.

# 17. Abendix

## 17.1 Terminal assignment



for Smart2Pure D - Series  
only Smart2Pure I2 - series

X1	1,2	Spünpumpenversorgung 24V	
	3,5	Berücksichtigungspumpe (P2), Druckhalter (PC204)	
	5,6	Druckwasser-Abgabeventil (P1)	
	2,1	Spünpumpenventil (P4)	
	9,10	Druckwasserabpumpen (P3)	
	11,12	Reinwasser-Abgabeventil (P6)	
	X2	1,5	UV-Abgabehahn (UV1)
		3	Pol. freier Kontakt
		4	Pol. freier Kontakt
		5	Pol. freier Kontakt
6,7		Norm. Kontakt (LS100)	
8 (PL1)			
9 (SD)		Temperatursensor (ITS500)	
10 (SD)		Temperatursensor (ITS500)	
11,12	Leitfähigkeitssensoren für Wasser (ISA300)		

X1	1,2	Power supply 24V
	3,5	Berücksichtigungspumpe (P2), Pressure switch (PS200)
	5,6	Pressure-actuated valve (P1)
	7,8	Washing solenoid valve (P4)
	9,10	Booster pump (P3)
	11,12	Reinwater-actuated valve (P6)
X2	1,2	UV-Abgabehahn (UV1)
	3	Pol. free contact
	4	Pol. free contact
	5	Pol. free contact
	6,7	Level contact (LS100)
	8 (PL1)	
9 (SD)	Temperature sensor (ITS500)	
10 (SD)	Temperature sensor (ITS500)	
11,12	Conductivity measuring cell (ISA300)	

## 17.2. Maintenance record

(Please keep this carefully updated, as correct keeping of this maintenance record is a condition of the guarantee)

**Customer address:**

**Location:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Type of system:**

\_\_\_\_\_

**Serial no.:**

\_\_\_\_\_

**Year made:**

\_\_\_\_\_

Date	Resistance, ultrapure water [MΩxcm]	Temperature, ultrapure water [°C]	Flow rate of ultrapure water ASTM Type I [L/min]	Resistance, permeate [MΩxcm]	Flow rate of permeate [L/h]	Flow rate of concentrate [L/h]

Pretreatment cartridge replaced yes/no	Filter cartridge replaced yes/no	Cleaning, disinfection yes/no	Remarks	Signature

Each false entry is considered to be a falsification of documents.

**The following points are to be observed to assure the quality of the system:**

- 1x weekly, record measured values
- 1x yearly, replace the pretreatment cartridge
- 1x yearly, replace the filter cartridge

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