



# Thermo Scientific Barnstead Smart2Pure Pro Ultrapure water system

## Installation and Operation

50157544 • Revision A • October 2018

**IMPORTANT** Read this instruction manual. Failure to follow the instructions in this manual can result in damage to the unit, injury to operating personnel, and poor equipment performance.

**CAUTION** All internal adjustments and maintenance must be performed by qualified service personnel.

Material in this manual is for informational purposes only. The contents and the product it describes are subject to change without notice. Thermo Fisher Scientific makes no representations or warranties with respect to this manual. In no event shall Thermo be held liable for any damages, direct or incidental, arising from or related to the use of this manual.

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# Preface

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Read through the information given in these operating instructions on installing and operating the system before you begin installation and use of your water purification system. This is of particular importance, as we, the manufacturer, do not assume any liability for damage due to incorrect operation or use of the system other than the intended use.

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## Legal Information

**Note:** Specifications, terms and pricing are subject to change. Not all products are available in all countries. consult your local sales representative for details.

## Warranty


Thermo Fisher Scientific warrants the operational safety and functions of the Thermo Scientific Barnstead Ultrapure Water Systems only under the condition that:


- The system is installed and operated as per the operation manual. Do not use this product for anything other than its intended use.
- The system feed-water is not modified.
- Only original spare parts and accessories that have been approved by Thermo Fisher Scientific are used (third-party spares without Thermo Fisher Scientific approval will void the limited warranty).
- Inspections and maintenance are performed at the specified intervals.
- An installation verification test is performed on commissioning the system for the first time and repeated after each preventative maintenance and repair activity. The warranty is valid from the date of delivery of the system to the customer.
- The above mentioned warranty conditions are subject to the general terms and conditions of sale, in effect at the time of purchase, which apply as well.

## Explanatory Notes on the Operating Instructions

 EU Mark of Conformity

 CSA - admission

 **CAUTION:** This symbol, in the context of a CAUTION, indicates a potentially hazardous situation which if not avoided could result in minor to moderate injury or damage to the equipment.

 **WARNING:** This symbol, in the context of a WARNING, indicates potentially hazardous situations which, if not avoided, could result in serious injury or death.



**DANGER:** This symbol, in the context of a DANGER, indicates potentially hazardous situations which, if not avoided, could result in serious injury or death.



This symbol indicates situations where dangerous voltages exist and potential for electrical shock is present. Electrical work on the system is only to be carried out by qualified personnel.



This symbol represents protective conductor connection. Connect the power supply to an electrical socket with a protective connection.



This symbol indicates a need to use gloves during the indicated procedures.



This symbol indicates a need to wear protective goggles during the indicated procedures.



This symbol indicates a situation in which breathing protection must be used.

**Note:** Is used for application hints and useful information.

This information is valid for the system that is received. For quick and correct service, include the following information on all inquiries and replacement parts orders which relate to your system:

- The serial number (located on the right side of the system on the nameplate)
- The catalog number

## Standards and Directives

The Thermo Scientific Barnstead Ultrapure Water Systems complies with the following standards and directives:

- Low Voltage Directive 2014/35/EC
- EMC Directive 2014/30/EU
- ASTM D1193-6
- RoHs 2011/65/EU

Additionally, the ultrapure water system is in compliance with many other international standards, regulations and directives not listed here. Should you have any questions regarding compliance with national standards, regulations and directives applicable for your country, contact your Thermo Fisher Scientific sales organization.

# Transport and Packaging



**DANGER:** Do not pull the plastic foil over your head. Risk of suffocation. Use the plastic foil only for packaging.

Ultrapure water systems are carefully inspected and packed prior to shipping, but damage could still possibly occur during transport. Lifting and carrying the Thermo Scientific Barnstead Smart2Pure Pro ultrapure water system, e.g. to the installation location, should be carried out by two people.

## Examination on Receipt

1. Ensure all components for complete system was ordered and received. This should include:
  - Smart2Pure Pro water system
  - Pretreatment
  - Storage tank 30 L or 60 L
  - Wall bracket for Smart2Pure Pro water system (if wall mounting)
  - Wall bracket for 30 L or 60 L tank (if wall mounting)
2. Carefully unpack system and inspect system for damage.

**Note:** If the packaging show signs of damage, inspect the system for damage.



Figure 1. Unpacking

## Complaints

If there has been any damage occurred to the goods during transportation:

- Immediately contact your delivery transport agency.
- Save the complete packaging, including the cardboard box, for a possible inspection of them and/or return shipment of the system.

## Packaging for Return Shipment

If possible, use the original box and packaging material. When these are no longer available, then:

- Protect the system from shock by packing it in bubble wrap and/or packaging foam and a strong cardboard box.

**Note:** The time limit for claims is 6 days from the time of receipt of the goods. The right to claim for damages ceases when this time has elapsed.

### **Note:**

- Only a trained person should take the system out of operation.
- Prior to sending back an operated device, empty the water, dry the system and take out the cartridges.
- Pack the ultrapure cartridges into a bubble wrap and/or packaging foam and put it into the package of the Smart2Pure Pro ultrapure water system.



# Safety Precautions

Observe these safety precautions for your own safety!



**CAUTION:** The Thermo Scientific Barnstead Ultrapure Water Systems are modern water purification systems intended solely for the treatment of potable water. The water it produces is not fit for drinking.



**DANGER:** Work may only be performed on the system electronics when the system has been switched OFF and when ESD protection is in place. Only specially trained personnel may work on the system's electronics.

- Do not install or operate the system until you have carefully read through these operating instructions and the notes and notices contained therein.
- Lifting and carrying the ultrapure water system, e.g. to the installation location, should be carried out by two people. To do this, lift the system in tandem at the two corner points beneath the bottom plate.
- The CE mark is nullified if you make any structural changes to the system or install products from other manufacturers in/on the system.
- Protect the system from frost. The temperature at the installation area must be between +2°C and +40°C.
- Always observe the applicable, pertinent codes and regulations valid at the installation location of the system and follow all applicable accident prevention regulations.
- The feed-water pressure must be at least 2 bar and at max. 6 bar or 29 to 87 PSI. When the feed-water pressure is higher, install an external pressure reducer.
- A low pressure check valve is recommended to prevent back flow of feed-water from water system.
- A grounded 100 - 240 V, 50/60 Hz electrical outlet must be available (refer to Electrical Connections table in the section **Technical Specifications**).
- Access to the power supply cord and plug may never be restricted or obstructed.
- Unplug the system from the power outlet for all maintenance work on the system.
- An atmospherically vented floor drain with a nominal diameter of at least 63 mm (2.48 inch) (DN50 tube) must be present at the installation location. If no drain is provided it is recommended that a water detector be installed for safety reasons (for European specifications only). Failure to provide this will release the manufacturer

from liability for any water-induced damage that may result.

- Proceed as follows if the system is not to be operated for an extended period, e.g., over extended weekend, or during a vacation period:
  - Switch the system OFF or unplug the mains plug
  - Close the feed-water inlet (close the feed-water tap)

The pump will be damaged if the system runs without any supply of feed-water. The manufacturer will not accept any liability if this occurs.

- The system must be disinfected or rinsed after an extended down time. The disinfection procedure is described under section **Disinfection**.
- The surface or wall on which the system is to be installed or mounted must have an adequate load-carrying capacity (check the maximum capacity of load the wall can sustain and stability of the wall). The dry and wet weight of the system is given under section **Technical Specifications**.
- The surface on which the system is installed must be level and stable not to exceed a maximum of 2% deviation from evenness is recommended.
- When installing the water purification system, always ensure that there is adequate space all around the system (refer to the section **Technical Specifications**) to ensure that ease of use or easy replacement of materials (e.g., filter change, connection) is possible at all times.
- Visually inspect the system at regular intervals. Clean up any water or spills found around the system immediately.



**WARNING:** Never look directly into a switched ON UV-lamp, as UV-light endangers eyesight and exposure to body may cause skin irritation.



**CAUTION:** To avoid the risk of pinching, crushing, cutting or electrical shock, never perform maintenance on the system without its protective housing, or while it is in operation. Maintenance work on the system may only be performed by trained, authorized specialists.





- Wear safety gloves when working with disinfection solutions.
- If your skin should come into contact with a chlorine product, rinse it immediately with ample, fresh water.
- The system, or system components, may heat up as a result of a defect. It is recommended to always wear appropriate safety gloves to prevent skin damage or burns.
- Wear safety gloves when changing the UV lamp, in order to prevent that your skin comes in contact with the UV lamp glass.



- Wear safety glasses when working with disinfection solutions.
- If your eyes come into contact with a chlorine product, rinse them immediately with ample, fresh water and contact a physician at once.



- Check the UV-lamp before initial start.
- If the UV-lamp is broken
  - Wear a breathing protector, filter category FFP3 and replace the UV lamp. For disposal the UV lamp refer to the section **Waste Disposal**.
  - Ventilate the room well.

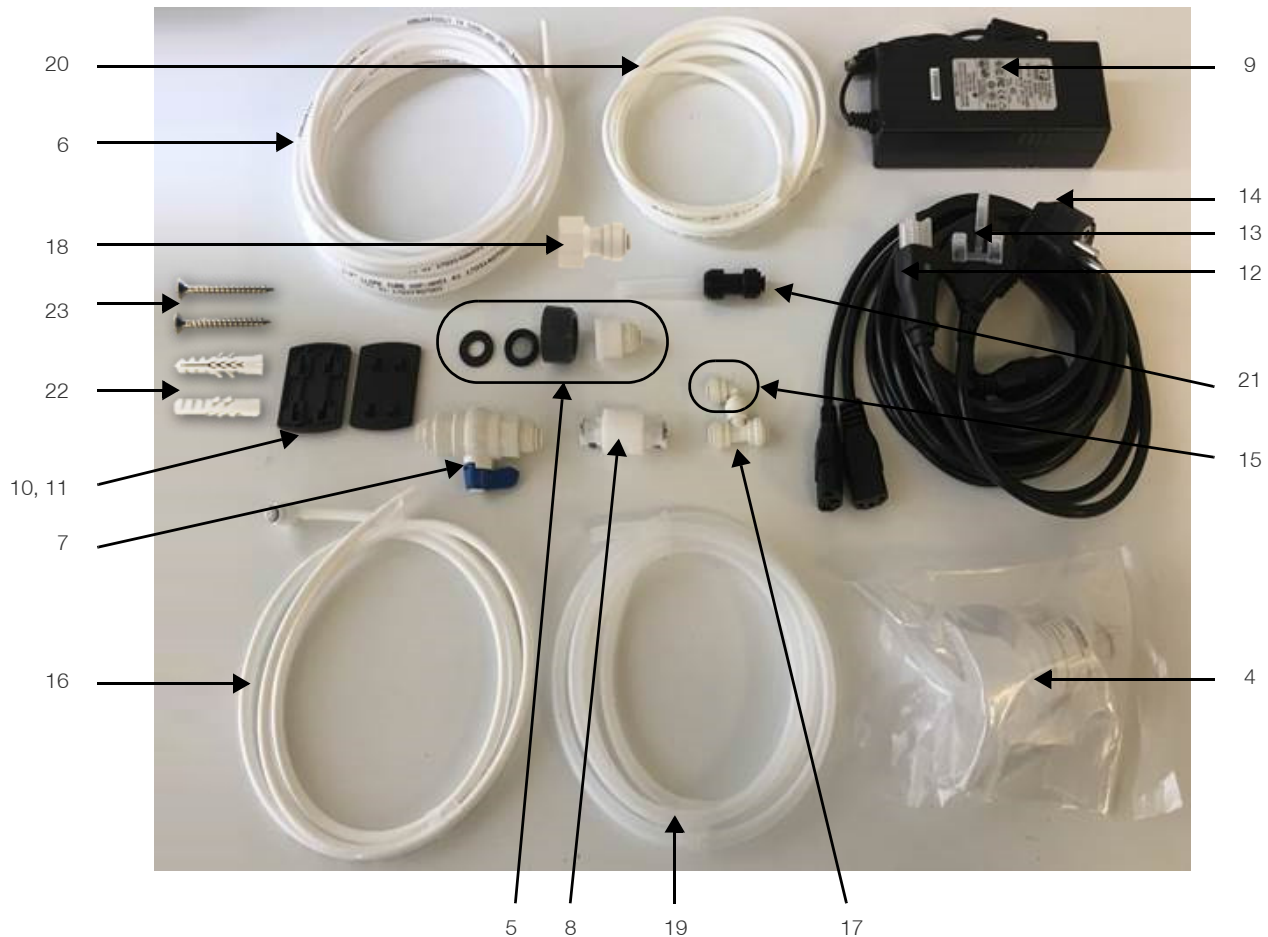
**Note:** The Hg content in the UV lamp is so low so that no damage to the environment can arise.

- To avoid tripping, ensure that the tubing do not lay over the floor.
- Apply the general rules of hygiene for laboratories when working with the system.
- Proceed as follows when the system has a defect:
  - Switch the system OFF and unplug the system from power outlet.
  - Shut off the feed-water supply.
  - Contact your local service organization.

# Contents

## Contents of Smart2Pure Pro

The following items are included with the Smart2Pure Pro water system:



**Table 1. Content List of Smart2Pure Pro**

Sr No.	Item	Item Number
1	1 x Smart2Pure Pro ultrapure water system	50157573
2	1 x Ultrapure cartridge	09.1020
3	1 x RO cartridge	50157608
<b>Including 1 x Assembly kit consisting of:</b>		
4	1 x Final filter (sterile filter 0.1 µm)	50157375
5	1 x Feed-water connecting kit	25.0071
6	1 x Connecting tube outer diameter ¼" 6 m / 8.22 inch	18.0137

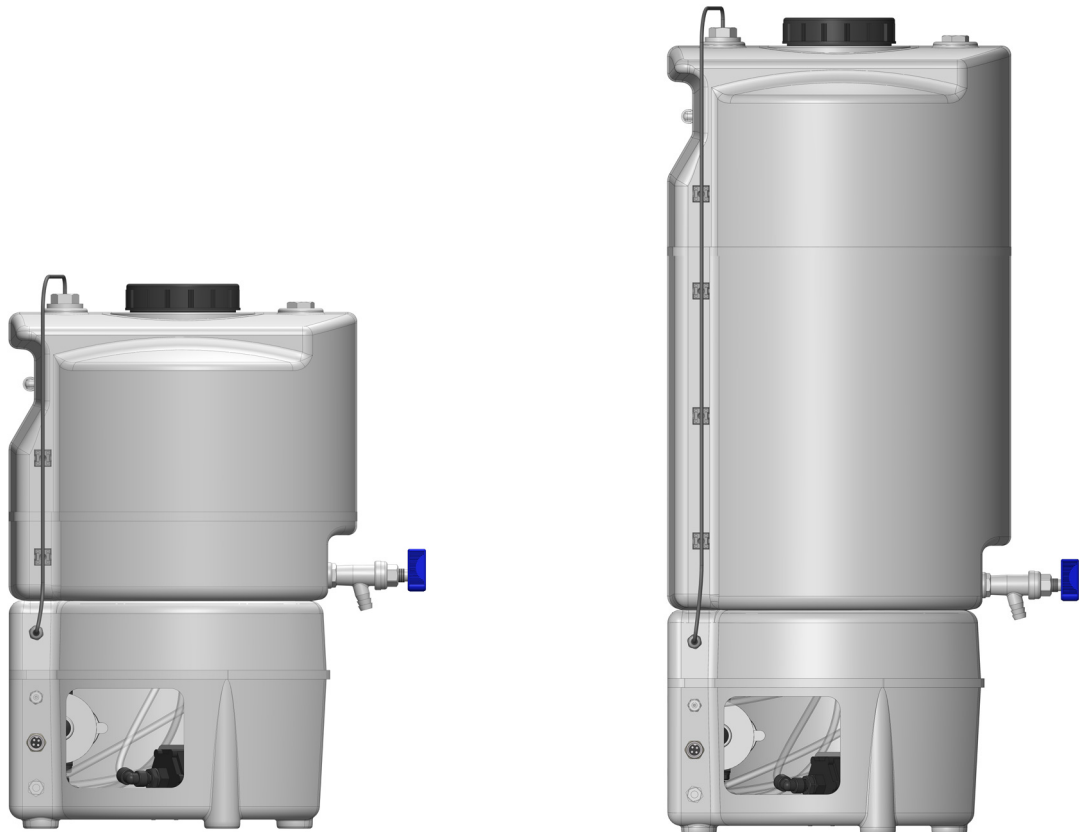
**Table 1. Content List of Smart2Pure Pro**

<b>Sr No.</b>	<b>Item</b>	<b>Item Number</b>
7	1 x External Dispenser Valve ¼"	50158317
8	1 x Disinfection Adapter	50133431
9	1 x Table Top Power Pack	50149597
10	1 x Universal Adapter	21.1006
11	1 x Universal Holder	21.1007
12	1 x Rubber connector to nema plug connector	50132200
13	1 x Rubber connector to British ST plug connector	50132203
14	1 x Rubber connector to Euro plug connector	50132215
15	1 x Plug Angle Connector ¼"	50157605
16	1 x RO Flush assembly	50157605
17	1 x T-Connector ¼"	14.0362
18	1 x Female Adaptor ½" BSP Thread x ¼" Tube OD	50157861
19	1 x PE Tubing 8 mm	18.0036
20	1 x PE Tubing 6 mm	50148369
21	1 x Straight Reduction Connector, D8 mm - D6 mm	14.0318
22	2 x Nylon Dowel Plug S6 6 x 30 mm	21.0002
23	2 x Screw DIN 7997 4 x 35 ZNPL	21.0069
<b>Additional Required Accessories:</b>		
24	1 x Ultrapure water tank:	
	- 30 L storage tank	50155494
	Or	
	- 60 L storage tank	50155499
25	1 x Pretreatment Assembly	50157886

# Smart2Pure Pro System



## Smart2Pure Pro System 30 L and 60 L Tanks



**Note:** Smart2Pure Pro will not operate with Smart2Pure 12 storage tanks.

# Intended Use of the Device

The Thermo Scientific Barnstead Ultrapure Water Systems are laboratory systems used for the treatment of water. The system allows the purification of water into the water categories mentioned in the standards of ASTM 11.01 and ASTM 11.02.

The Thermo Scientific Barnstead Ultrapure Water system are designed to be installed and used in the following application areas:

- Laboratories for cell biological and biotechnological work with the safety levels L1, L2 and L3.
- Medical and microbiological laboratories according to DIN EN 12128.
- Laboratories in the central area of clinics and hospitals.

The system must not be operated outside of the specifications as described in the operating manual. In particular, the system should not be used for production of drinking water and drugs manufacturing. The system must not be used as a medical device and outside of laboratories.

# Technical Specifications

**Note:** Check at regular intervals the quality of your feed-water.

Feed-water requirements	
Source	Potable tap water pretreated with Barnstead Pretreatment System (50157886)
Silt density index (SDI)	<3
Turbidity	<1 NTU
Conductivity (reference temperature +25 °C)	1500 µS/cm (670 Ω·cm)
Hardness	Hardness stabilized
Chlorine	Max. 0.1 ppm
pH range	4 - 11
Temperature	+2°C - +35°C
Pressure	2 - 6 bar / 29 - 87 PSI (at a pressure >6 bar / 87 PSI a pressure reducer must be installed upstream of the system.)

Product water quality ASTM Type I (from dispensing valve)		UV/UF
Conductivity (reference temperature +25°C)	µS/cm	0.055
Resistance (reference temperature +25°C)	MΩ·cm	18.2
TOC value	ppb	1 - 5
RNase	ng/ml	<0.003
DNase	pg/ul	<0.4
Bacteria	CFU/ml	<0.01
Bacterial endotoxins	EU/ml	<0.001
Particle >0.2µm, #/ml	µm/ml	<1
Dispense rate	L/min	up to 1

Product water quality ASTM Type II (tank quality)		UV/UF
Conductivity (reference temperature +25°C)	µS/cm	0.1 – 1.0
Resistance (reference temperature +25°C)	MΩ·cm	1 - 10
Retention rate for bacteria and particles	%	99
External tank capacity Smart2Pure Pro	Liter	30 or 60
Smart2Pure Pro RO cartridge permeate flow*	L/hr	16lph +/-15%
Smart2Pure Pro RO cartridge concentrate flow*	L/hr	60

\*RO flows at 15°C

## Dimensions and weight of Smart2Pure Pro

Height	545 mm / 21.46 inch
Width	305 mm / 12.01 inch
Depth	300 mm / 11.81 inch
Base Area	277 x 372 mm / 10.91 x 14.65 inch
Weight including ultrapure cartridge and RO cartridge	28 kg / 61.74 lbs

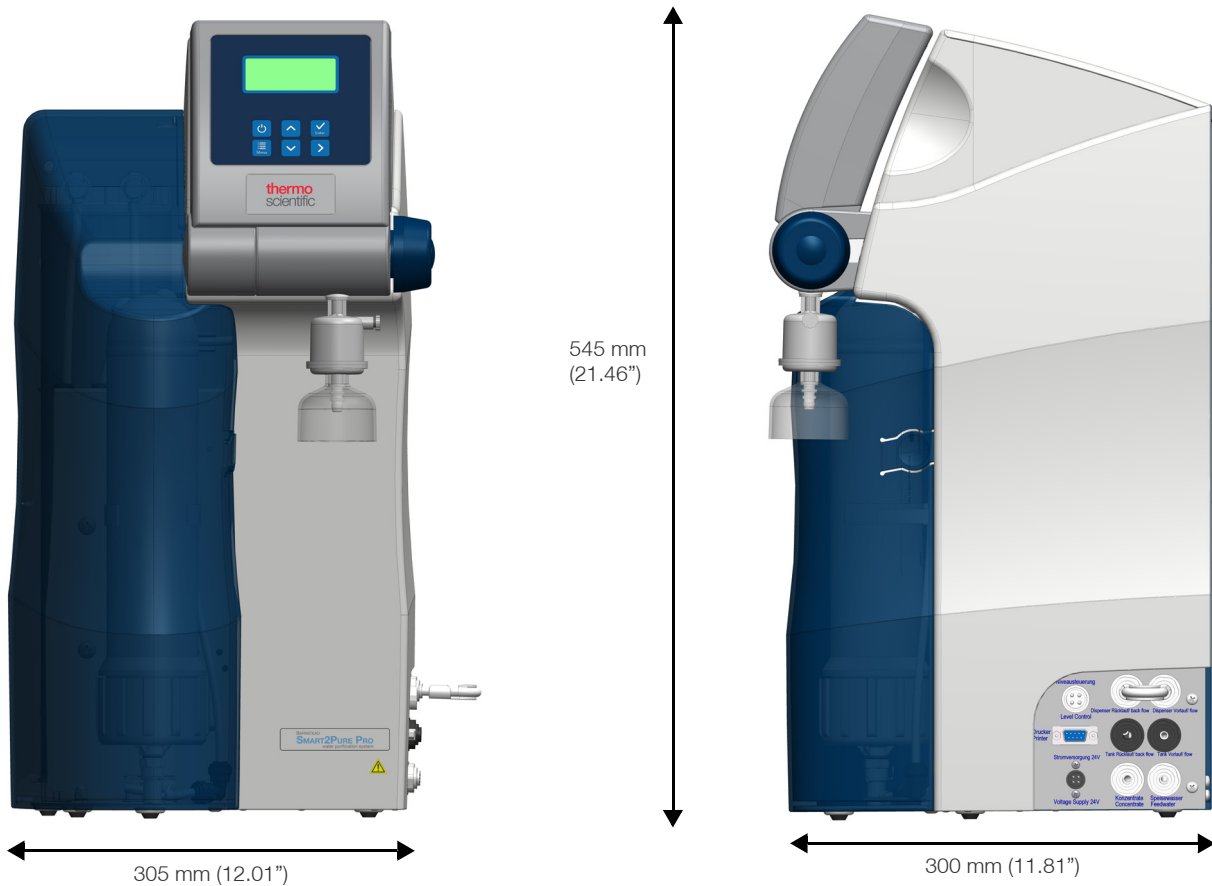


Figure 2. Smart2Pure Pro Dimensions

### Clearance around Smart2Pure Pro systems and pure water tank

Clearance on left and right from the side of the system	At least 300 mm / 11.81 inch
Top space	At least 400 mm / 15.75 inch

### Materials in contact with water

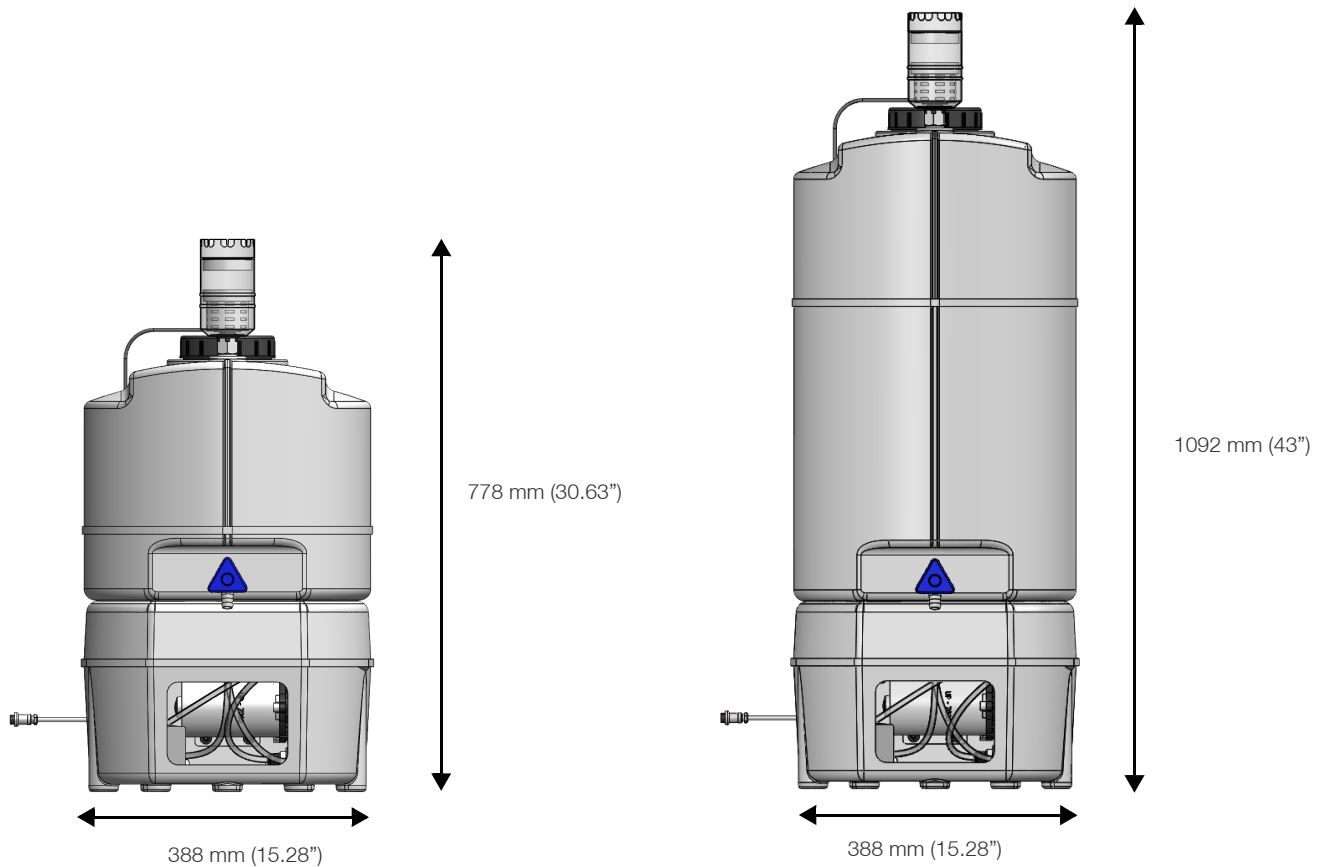
Adjustable pressure retaining valve	NBR = Acrylnitril Butadien Rubber
Pump head	Nylon with glass fibre
UV lamp	High-purity synthetic quartz
UV housing	Stainless steel
Ultrapure cartridge	PP = Polypropylene
UF housing	PC = Polycarbonate



Materials in contact with water	
Rinsing solenoid valve	PA = Polyamide
Dispensing valve	PET = Polyethyleneterephthalate
Conductivity measuring cell	POM = Polyoxymethylen, stainless steel
Distributor block	POM = Polyoxymethylen

Materials in contact with water	
Connections	POM = Polyoxymethylen
Tubing	PE = Polyethylene
O-Rings	EPDM = Ethylene propylene diene rubber

Dimensions and weight 30 L and 60 L pure water tank		
System	30 L pure water tank	60 L pure water tank
Height	606 mm / 23.86 inch	920 mm / 36.22 inch
Width	Ø 388 / 15.28 inch	Ø 388 / 15.28 inch
Depth	Ø 384 / 15.12 inch	Ø 384 / 15.12 inch
Weight with full capacity	37,5 kg / 82.57 lbs	71,5 kg / 157.66 lbs
Height with CO2 Filter	778 mm / 30.63 inch	1092 mm / 43 inch



**Figure 3. 30 L and 60 L pure water tank dimensions**

**Note:** A minimum of 250 mm (10") clearance is needed above the tank.

## Water connections

Feed-water tubing	Tube ¼" outer diameter
Concentrate tubing	Tube ¼" outer diameter
Tank Flow tubing (Smart2Pure Pro)	Tube 6 mm outer diameter
Tank back flow tubing (Smart2Pure Pro)	Tube 6 mm outer diameter
Remote dispenser tube jumper	Tube ¼" outer diameter
External dispensing valve	Tube ¼" outer diameter

## Electrical connections

Input voltage	AC 100 – 240 VAC, 50 – 60 Hz, 2.0 A Max
Output voltage	DC 24 V, 5.0 A Max
System connection	DC 24 V, 120 W
Serial Interface	RS232
Potential free contact	Maximum 30 V, 2 A
Protection class	Class II (external SMPS certified as Class I)

Ambient conditions	During Operation	Storage
Operation area	Indoor rooms	Indoor rooms
Maximum altitude above sea level	up to 2000 m	up to 2000 m
Temperature range	Min. +2°C, Max +40°C, 80% rel. rH, non-condensing	Min. +2°C, Max. +60°C, 90% rel. rH, non condensing
Line-voltage variation	Not more than +/- 10% of the line voltage	-- (not applicable)
Transient over voltages	As usually occur in the supply network (overvoltage category II acc. to IEC 60364-4-443) <b>Note:</b> The rated level of transient overvoltage is the withstand impulse voltage acc. to overvoltage category II of IEC 60364-4-443.	-- (not applicable)
Ventilation requirements	no special requirements	no special requirements
Degree of pollution	2	2

## Airborne sound emission

Sound pressure level	49 dB (A)
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# The Installation Area

**Note:** The operator is obliged to ensure, that the installation of the water purification unit and its operation are carried out in compliance with all national and international guidelines, applicable and valid for the place of installation.

**Note:** If necessary, measures to protect the drinking water have to be taken by installing appropriate components.

Take the following criteria into consideration when selecting the installation area:

- Feed-water pressure (potable tap water) not be less than 2 bar (29 PSI) and not greater than 6 bar (87 PSI).
- There must be a feed-water shut off valve installed ahead of the Smart2Pure Pro system, with a male ¾" NPT fitting for connection.
- Minimum air temperature +2°C, Maximum air temperature +40°C.
- The surface on which the system is installed must be level and stable. It should not exceed a maximum of 2% deviation from evenness is recommended.
- A smooth wall is required when the system is to be wall mounted. The bench or wall surface must be strong enough to hold the system (for system weight, refer to the section **Technical Specifications**).



**CAUTION:** Free gravity flow to drain must be ensured.

- An atmospherically floor drain with an outside diameter of 63 mm or 2.48 inch (DN 50 tube) shall be provided.
- Unobstructed draining of the rinsing water to the drain must be ensured. When no floor drain is available, install a water watcher to protect against water damage (available only for Europe).
- A check valve is recommended in the feed-water line to prevent back flow of feed-water from the water system.
- An electric socket with protective connection must be available for connection of the system to the voltage supply (refer to Electrical Connection table in the section **Technical Specifications**). The electric socket must be within 2 meters (6 feet) of the intended installation location.
- Ample working space must be provided around the system for easy and pleasant replacement of parts and for ease of operation (refer to the section **Technical Specifications**).
- Easy access for operation and control of the system.

Determine best layout of system to fit lab space. Place the Smart2Pure Pro system, pretreatment and storage tank at the desired location (on the workbench, under the workbench, or wall mount).

**Note:** Refer **Figure 9**, **Figure 13** and **Figure 14** for system layout setup.

**Note:** Pretreatment system, Smart2Pure Pro and storage tank can be installed at different heights or under counter as long as requirements as listed in "Installation Area" are followed.

**Note:** The maximum tube distance between system and storage tank should be 2 m / 78.7 inch. The minimum tube distance between system and storage tank should be 0.5 m / 20 inch.

Mount Pretreatment to wall (refer to Pretreatment System manual for mounting instructions). If not wall mounting pretreatment, skip to next section.

## Wall Mounting the Smart2Pure Pro



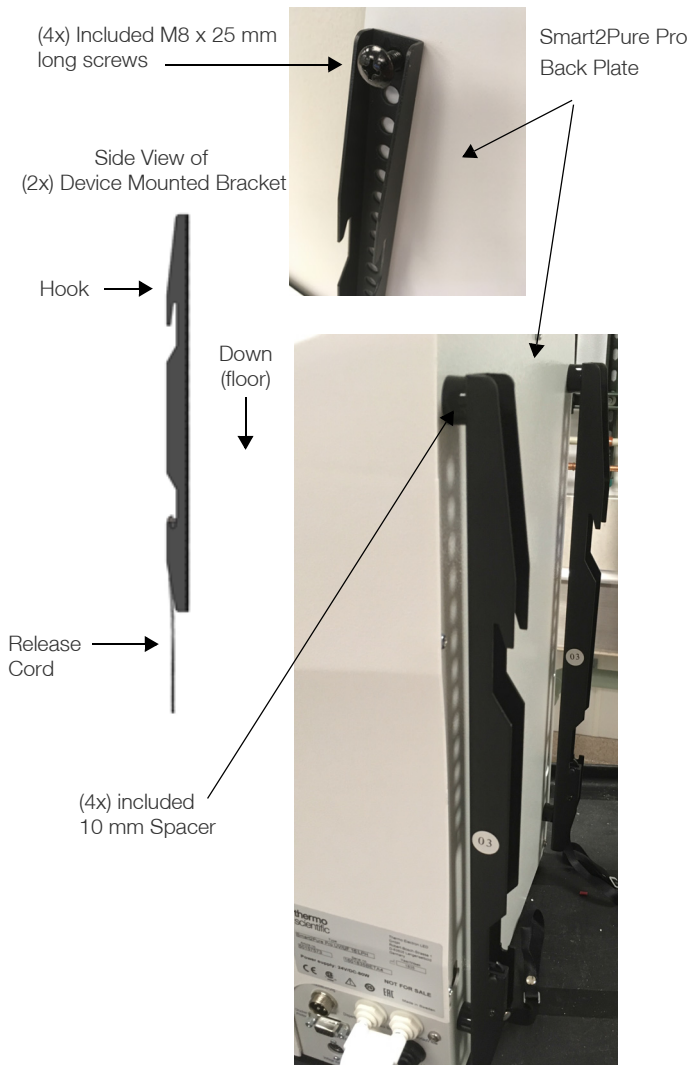
**CAUTION:** The wall mounting fixture (Item No. 50157885) supplied with the complete system or purchased separately as an accessory. Before mounting the system on the wall, verify the strength of the wall to ensure that it is suitable for supporting the system (refer to the section **Technical Specifications**).



**CAUTION:** The screws and anchors supplied with the wall mounting brackets are only suitable for attaching the wall mounted bracket to a 16 inch wooden stud construction, concrete, or solid masonry wall.

Detailed instructions and needed hardware for mounting the bracket on the wall are provided with the Wall Mounting Kit. The kit adapts to the typical stud spacing of 16 inch.

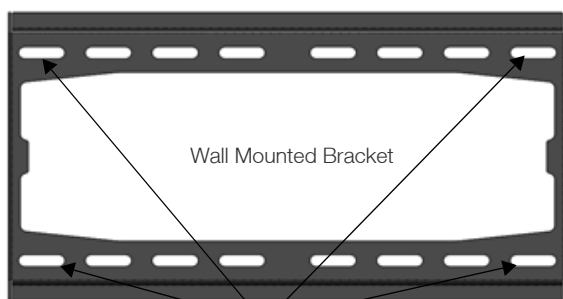
1. Attach the 2 mounting BRACKETS to the back plate of the Smart2Pure Pro system, using the (4x) M8 x 25 mm long screws and 10 mm tall spacers (included in the kit). Attach as shown in the **Figure 4**).



**Figure 4. Smart2Pure Pro wall mount bars**

2. Using (4x) included 5/16" lag bolts and washers, attach the wall mount bracket on the wall where you want to mount your Smart2Pure Pro system.
3. Lift the system (2 people recommended) and hang it on the wall mounting bracket.

The spring loaded pin locks itself on the bottom lip of mounting bracket to prevent tipping.



**Figure 5. Smart2Pure Pro wall mount bracket**

4. To remove the unit from the wall, pull on both cords at the bottom of the mounting brackets (refer to **Figure 4**), and lift (2 people recommended) the unit slightly and pull away from wall bracket.



**CAUTION:** Always lift and carry the system in tandem (two people), never alone, to avoid any risk of injury.

Lift the system at the two bottom corners.

## Attaching the Wall Mounting Bracket for 30 L or 60 L Pure Water Tank

**Note:**

- Wall mounting hardware for the 30 L or 60 L pure water tanks (purchased separately).
- 30 L pure water tank wall mounting bracket, Item No.: 06.5015
- 60 L pure water tank wall mounting bracket, Item No.: 06.5016
- The wall on which the pure water tank is to be installed or mounted must have an adequate load-carrying capacity (check the capacity and stability of the wall. Refer to the section **Technical Specifications** for weight and dimensions for pure water tanks).



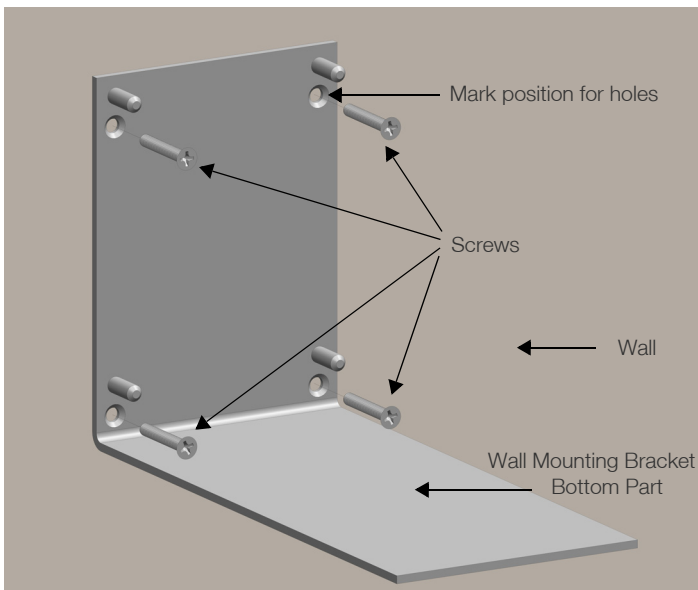
**DANGER:** Lifting of the 30 L or 60 L tank should be carried out with two person.

**DANGER:** Do not lift up the 30 L or 60 L tank with full water capacity. Risk of ergonomic postural deformities.

## Attaching Wall Mounting Bracket for 30 L Pure Water Tank

The wall holder for 30 L pure water tanks includes two holder parts:

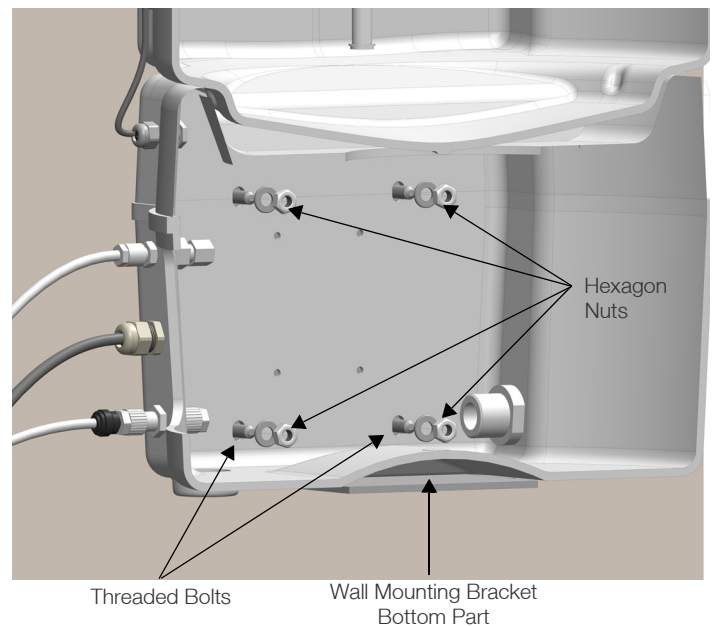
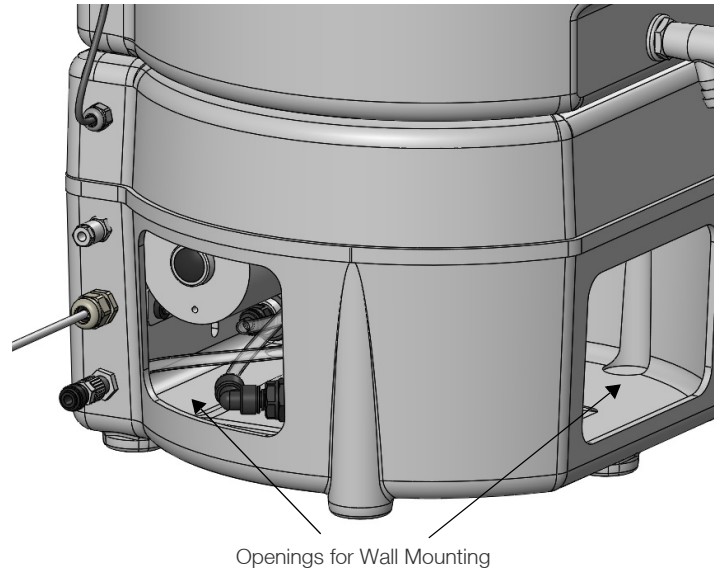
- One bottom part wall mounting bracket with mounting screws
  - One upper part wall mounting bracket with mounting screws.
1. Hold the wall mounting bracket's bottom part at the desired position on the wall and ensure levelness. Then mark the four holes for fixing the bracket. Use an 8 mm or 0.31 inch twist drill to make the holes and put in the four S8 plugs which are supplied with the wall mounting bracket (refer to **Figure 6**).
  2. Attach the wall mounting bracket bottom part to the wall by screwing in the four supplied screws with a Phillips screw driver into the wall where you put in the plugs before (refer to **Figure 6**).



**Figure 6. Mounting bracket to wall**

3. Place the 30 L pure water tank onto the mounted wall mounting bracket bottom part (2 people recommended) and then screw in the four supplied M8 hexagon nuts

onto the threaded bolts from the wall mounting bracket bottom part.

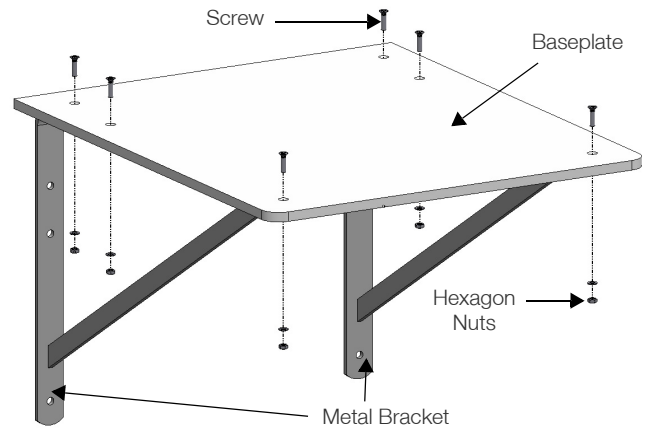


**Figure 7. Mounting wall bracket to 30 L tank**

4. a Unscrew the lid off the 30 L pure water tank.  
b. Hold the wall mounting bracket upper part at the desired position on the wall and mark the two boreholes for fixing the wall mounting bracket upper part. Use an 8 mm or 0.31 inch twist drill to make the holes and put in the two S8 plugs which are supplied with the wall mounting bracket.

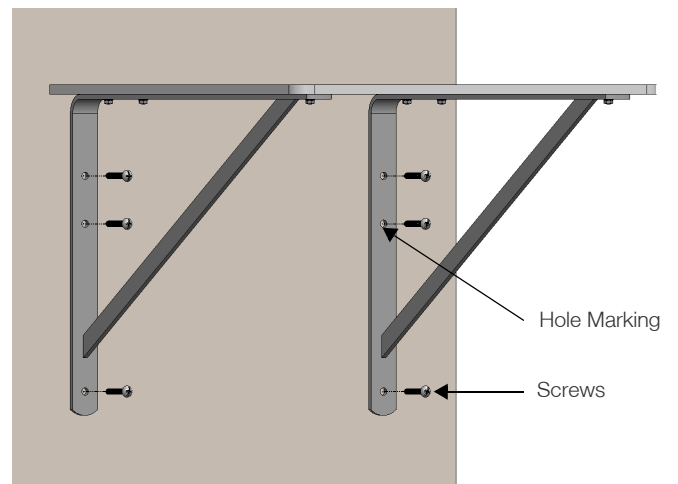
## Attaching Wall Mounting Bracket for 60 L Pure Water Tank

1. Locate the two metal brackets and the baseplate. Screw in the six screws and hexagon nuts supplied with the brackets as shown in the diagram.



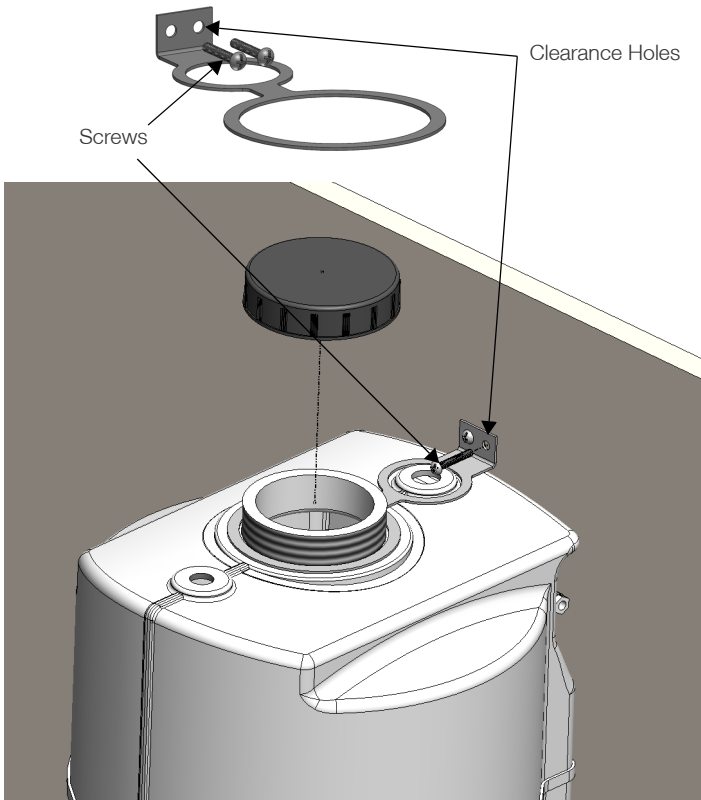
**Figure 10. Assembling 60 L mounting bracket**

2. Hold the wall mounting bracket at the desired position on the wall and mark the six boreholes for fixing the wall mounting bracket. Use an 8 mm or 0.31 inch twist drill to make the holes and put in the six S8 plugs which are supplied with the wall mounting bracket (refer to **Figure 11**).
3. Attach the wall mounting bracket to the wall by screwing in the six supplied screws with a Phillips screw driver.



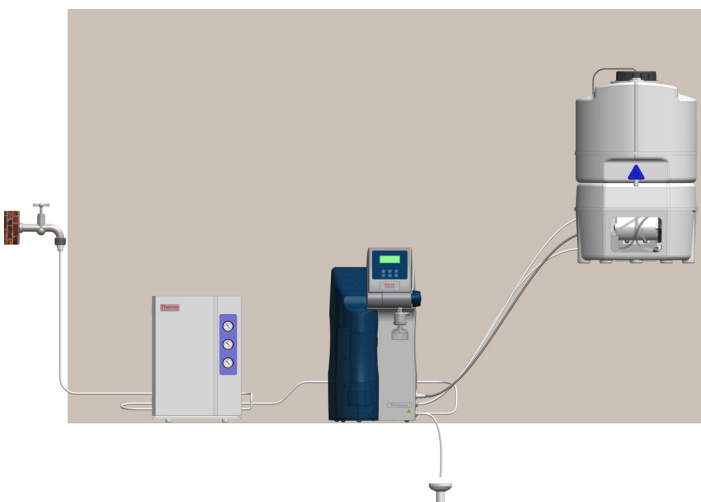
**Figure 11. Mounting bracket to wall**

4. Place the 60 L pure water tank with two people on the wall mounting bracket.



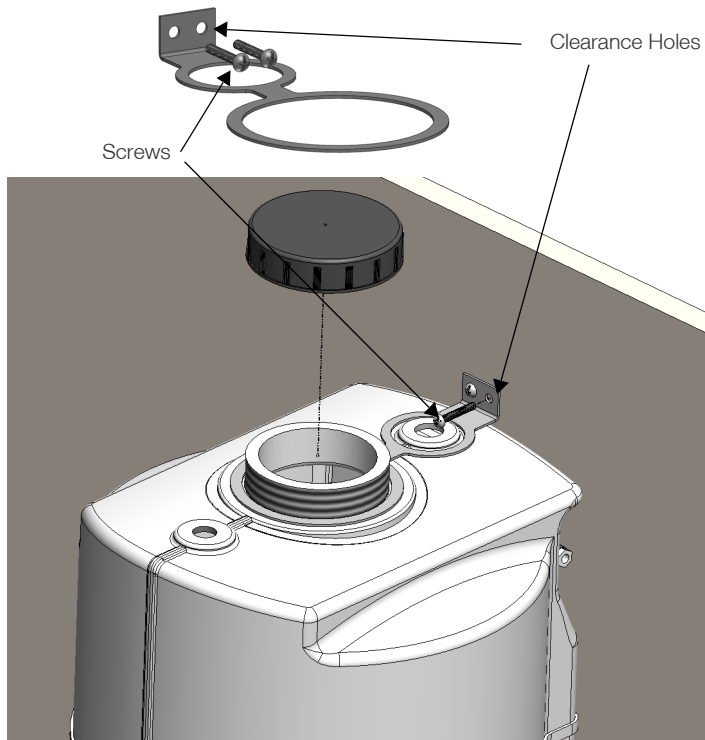
**Figure 8. Upper mount bracket**

5. Screw the lid on top of the tank.
6. Screw in the two screws with a Phillips screw driver into the wall where you have put in the plugs before (refer to **Figure 8**).
7. After mounting the complete wall mounting bracket, connect the tubing and level control cable as described in the section **Connections of the Smart2Pure Pro Pure Water Storage Tank**.



**Figure 9. Wall mounted 30 L tank**

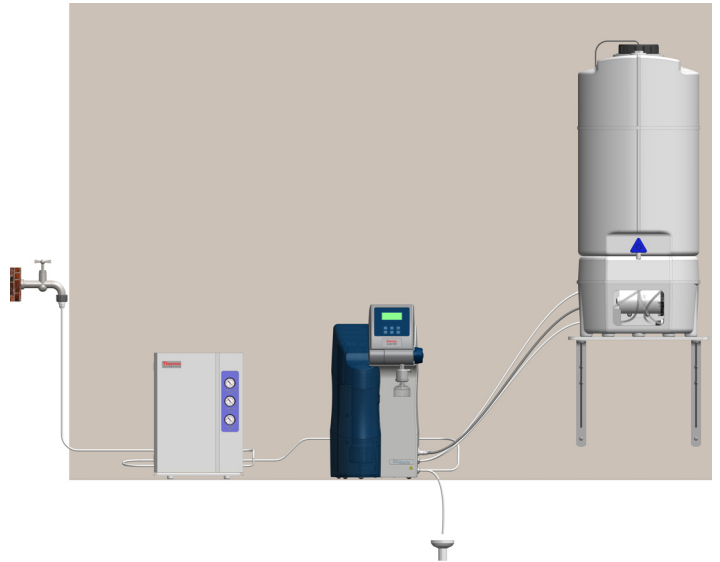
5. Hold the wall mounting bracket upper part at the desired position on the wall and mark the two boreholes for fixing the wall mounting bracket upper part. Use an 8 mm or 0.31 inch twist drill to make the holes and put in the two S8 plugs.



**Figure 12. Upper mount bracket**

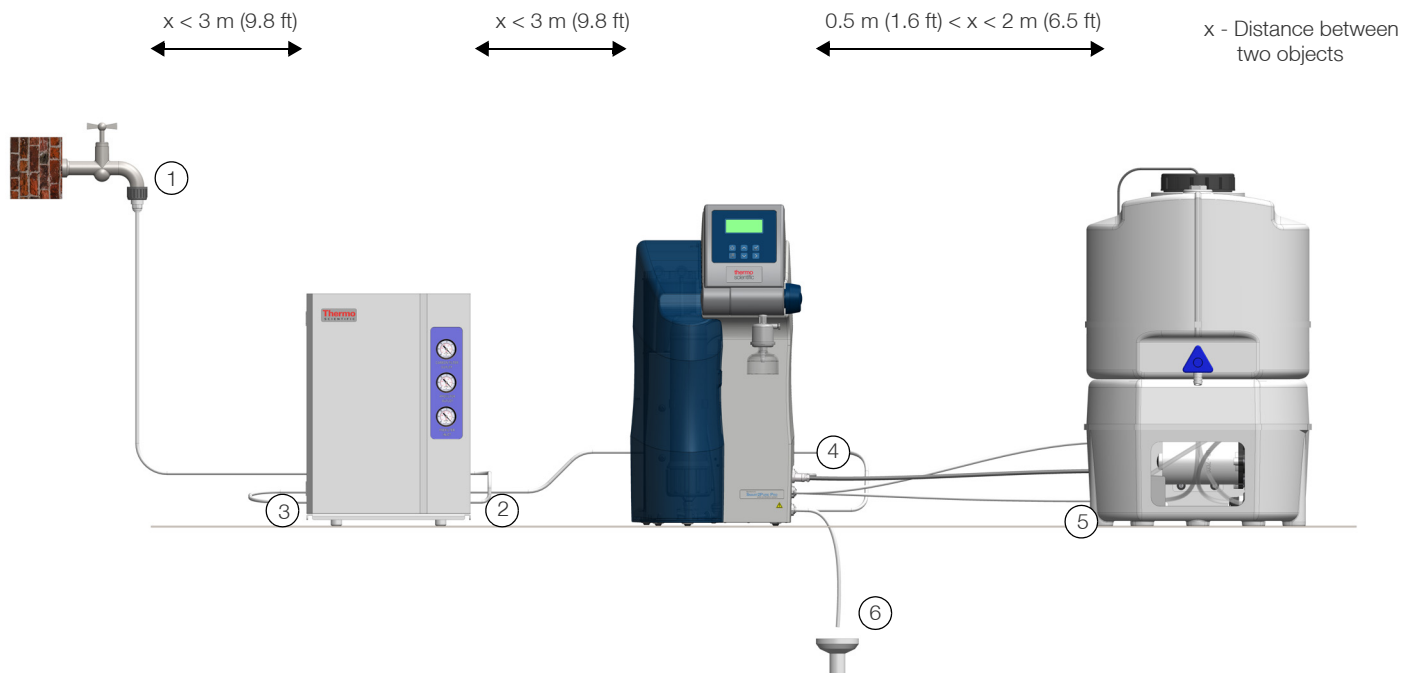
**Note:** The 2 screws and S8 plugs are not included in the kit.

6. Screw the lid on top of the tank.
7. Connect all tubing and wires as described in the section **Connections of the Smart2Pure Pro Pure Water Storage Tank.**



**Figure 13. Wall mounted 60 L tank**

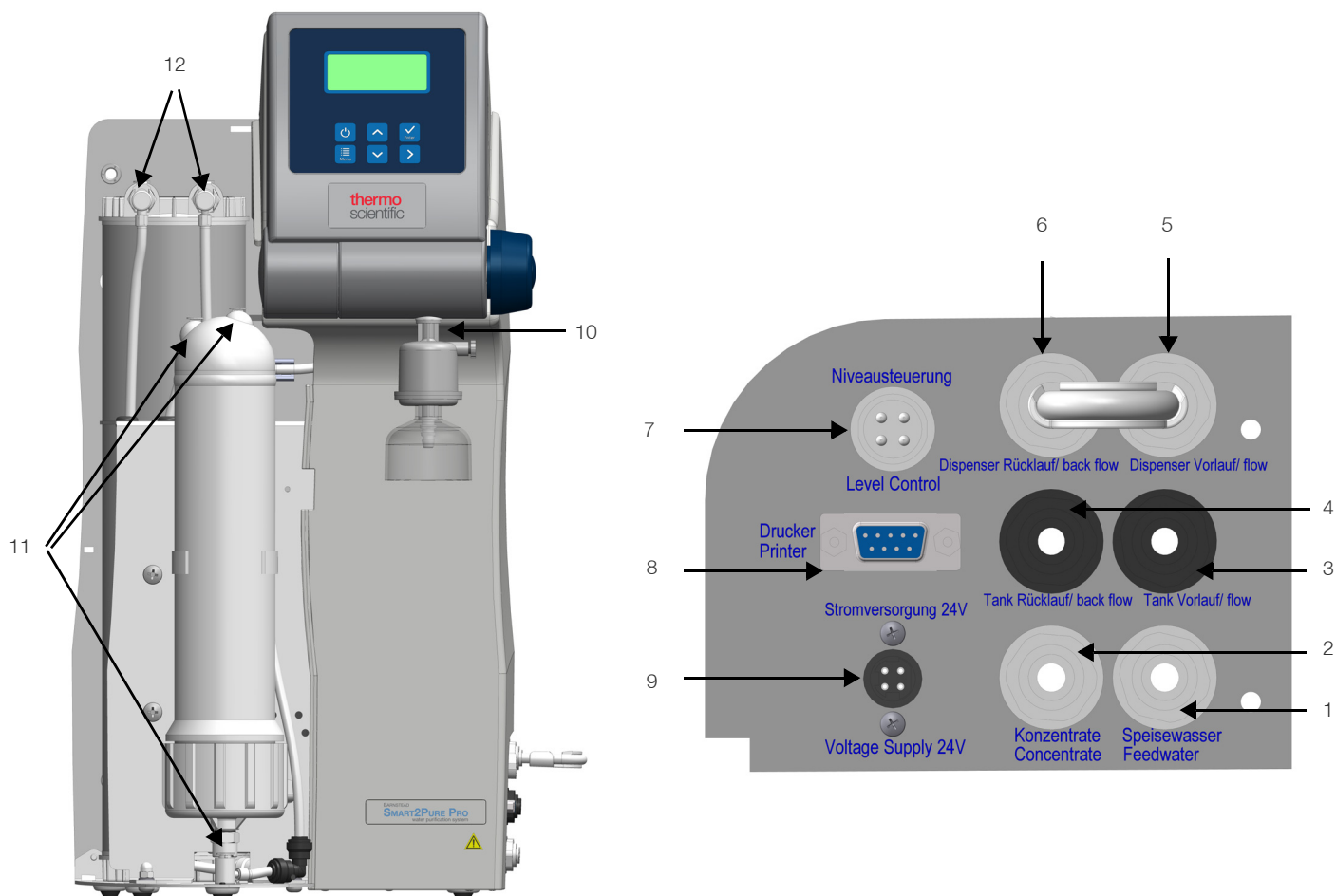
If you are not wall mounting, skip to the section, **Water Connections of Smart2Pure Pro System.**



**Figure 14. System Connections**

# Installation

## Connections of the Smart2Pure Pro System



**Figure 15. Smart2Pure Pro Connection**

Identify the location of the plumbing connections for the Smart2Pure Pro and storage tank before cutting any tubing for installation.

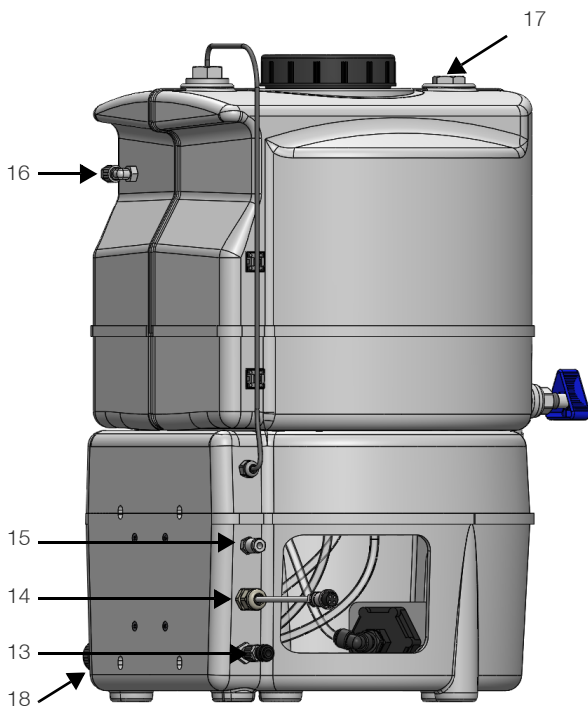
1. Feed-water connector for outer diameter ¼” tube
2. Concentrate connector for outer diameter ¼” tube which is ran to an atmospherically vented drain
3. Tank flow connector for outer diameter 6 mm tube which is connected to the bottom connector on the tank (refer to #13 in the section **Connections of the Smart2Pure Pro Pure Water Storage Tank**)
4. Tank back flow connector for outer diameter 6 mm tube which is connected to the top tubing connector on the tank (refer to #15 in the section **Connections of the Smart2Pure Pro Pure Water Storage Tank**)
5. Dispenser flow connector outer diameter ¼” tube. Used for optional remote dispenser accessory
6. Dispenser back flow connector outer diameter ¼” tube for additional hand dispenser
7. Level & Pump (4 Pin) control connection, max.: 24 V/ 1 A, for external pure water tank (refer to #14 in the section **Connections of the Smart2Pure Pro Pure Water Storage Tank**)
8. Optional printer connector, max.:24 V/ 1A  
**Note:** For RS232 connection to printer, parameters are: Baud rate 9600 bps, 8 Data bits, 1 Stop bit, no parity.
9. Power supply connection, max.: 24 V/ 5.0 A
10. ¼” thread connector for 0.1µm final filter



- 11. Quick connectors for RO cartridge
- 12. Quick connectors for ultrapure cartridge

**Note:** The external terminals of the equipment are only required to be connected with external circuits with the voltages below the limits of 6.3.1 of 61010-1 or 30 V r.m.s. and 42.4 V peak or 60 VDC and are electrically separated from hazardous live voltages by reinforced or double insulation.

## Connections of the Smart2Pure Pro Pure Water Storage Tank



**Figure 16. Water storage tank connection**

- 13. Tank flow connector for outer diameter 6 mm tube
- 14. Level & Pump control cable with connector
- 15. Tank back flow connector for outer diameter 6 mm tube
- 16. Connector for required sterile overflow, outer diameter 8 mm tube which connects to the atmospherically vented drain
- 17. Plug to be removed for required CO<sub>2</sub> Absorber +0.2 micron Vent Filter
- 18. 3/4" NPT outlet connector for pressurized flow to remote hand gun or equipment feed

## Water Connections of Smart2Pure Pro System

Make sure that you have installed upstream, the Smart2Pure Pro system and the required pretreatment accessory 50157886 (triple cartridge pretreatment system).

Refer to the section **Installation** for feed-water fitting installation tips. To ensure a leak free connection, push the tubing into the fitting 12 - 13 mm (1/2") until the tubing locks in place.

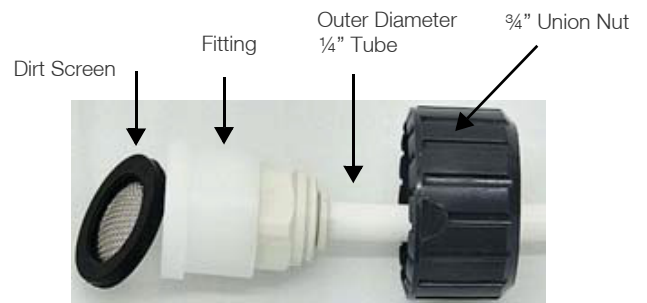
**Note:** Use tube cutter to ensure ends of tubing are flat and free of burrs (prickles).

Refer to **Figure 14** for assistance in making the connections on the Smart2Pure Pro. If installing alternative pretreatment, refer to the section **Alternative Feed Water Connections**.

Install system tubing in the following order:

### Pretreatment connections:

Connect 3/4" to 1/4" feed-water connector from the assembly kit, to the feed-water source.



**Figure 17. Feed-water fitting**

1. Connection to feed water supply requires Barnstead Pretreatment system, 50157886 (refer to **Pretreatment System User manual** for installation instruction),

Connect 1/4" tube to feed-water connector and to pretreatment "Feed-water Inlet"

2. Connect 1/4" tube to pretreatment "Water Outlet"

**Note:** Maximum distance between pretreatment and Smart2Pure Pro should be 3 meters.

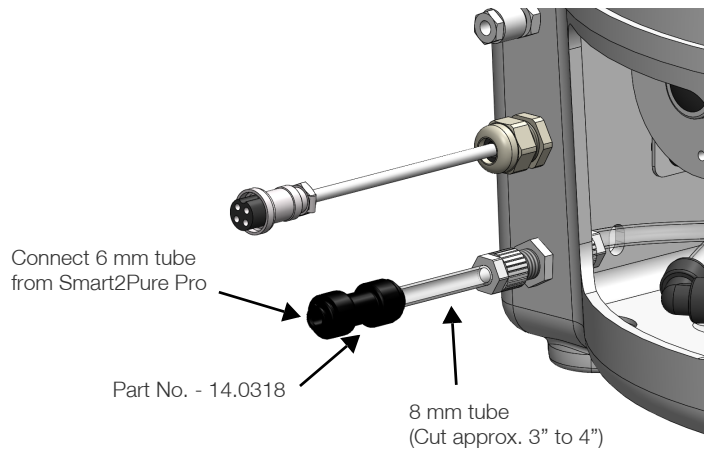
3. Connect 1/4" tubing from pretreatment "Water Outlet" to the feed-water connector on the Smart2Pure Pro

Connect 1/4" tubing from assembly kit to the concentrate connector (for drain)

### Smart2Pure Pro and Tank Connections:

- Connect 6 mm tubing from assembly kit to the Tank Flow connector on Smart2Pure Pro (to be connected to tank)

- Connect 6 mm tubing from assembly kit to the Tank Back Flow connector on Smart2Pure Pro (to be connected to tank)
- Connect tank level and pump control cable (from tank) to the Level Control connector on the Smart2Pure Pro



**Figure 18. Tank Flow connection**

4. Connect 6 mm tubing from Tank Flow connector on Smart2Pure Pro, to the Tank Flow connector on Tank using straight reduction connector (part no. - 14.0318) and 8 mm tube from kit (refer **Figure 18**).  
Connect 6 mm tubing from Tank Back Flow connector on Smart2Pure Pro, to the Tank Back Flow connector on Tank
5. Connect 1/4" tubing from concentrate connector on Smart2Pure Pro to atmospherically vented drain
6. Connect optional remote hand dispenser to the Dispenser Flow and Dispenser Back Flow connector on Smart2Pure Pro
7. Connect optional remote hand dispenser to the 3/4" NPT pressurized outlet connector on bottom right of pure water tank

## Alternative Feed Water Connections

If pretreatment other than the part no. 50157886 is used, then use the R3/4" feed-water connecting kit (refer **Figure 17**) or Female Adaptor "BSP Thread x" Tube OD #50157861, supplied with the system to connect to alternative pretreated feed water supply. Assemble feed water connector kit as shown in **Figure 17**. Insert Smart2pure Pro 1/4" feed water tubing into the fitting and then connect the union nut to the supply.

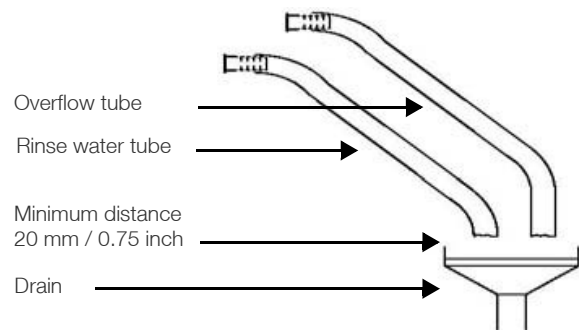


**Figure 19. Feed-water Smart2Pure Pro connector**

## Routing Tubes to Drain

**Note:** Shorten the rinse water and concentrate outlet tube to the required length and route it to an atmospherically vented drain. The tubes that run from the Water Purification system and the external tank to the drain must be routed with a downward slope and without any kinks or restrictions, as this would result in backing up of the draining water.

If a standard drain siphon is in place, the ends of the tubes must be located at least 20 mm / 0.75 inch above the drain. Attach the tubes in such a manner that they remain in their position.

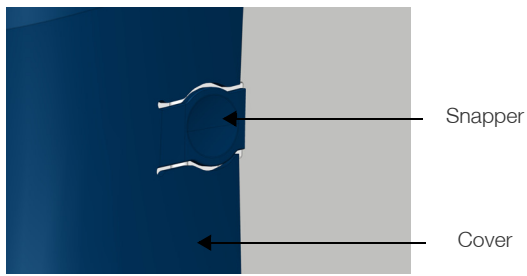


**Figure 20. Routing drain pipes.**

## Installation of Ultrapure Cartridge and RO Cartridge

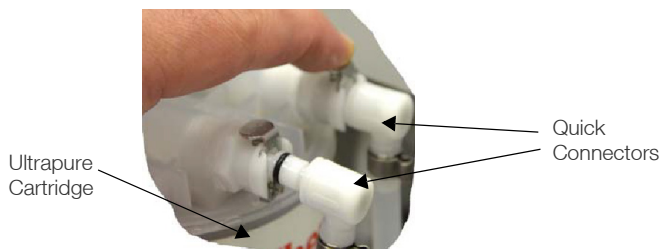
**Note:**

- After Installation all tubing must be checked for their correct position on the systems panel and their is no leakage or blockage occurs after opening the feed-water supply.
  - To avoid tripping, ensure that the tubing and wires do not lay over the floor.
1. Remove the cover from the Smart2Pure Pro by pressing the snapper and pull the cover off towards the front.



**Figure 21. Remove the cover**

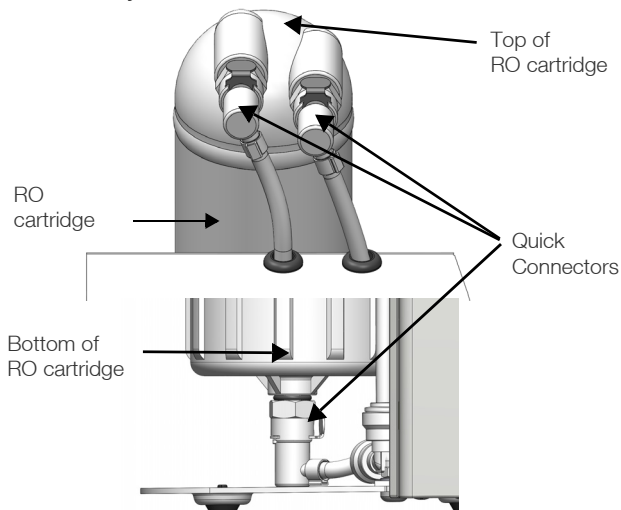
2. a. Locate the ultrapure cartridge.
- b. Place the ultrapure cartridge in the rear section of the system and insert the two quick connectors into the ultrapure cartridge. When you hear an audible click you can be sure that the quick connectors have been inserted correctly.



**Figure 22. Quick Connectors**

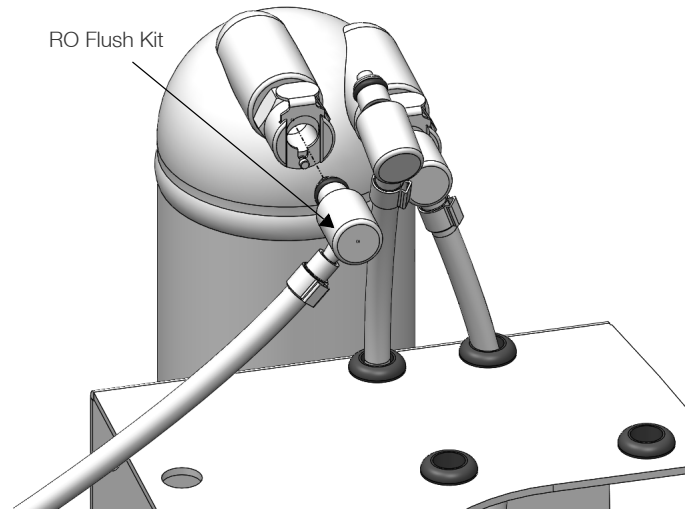
**Note:** The quick connectors are attached to the system in such a manner so as to prevent installing the ultrapure cartridge incorrectly.

3. a. Locate the RO cartridge
- b. Place the RO cartridge in the front part of the system and insert the three quick connectors into the RO cartridge. When you hear an audible click you can be sure that the quick connectors have been inserted correctly.



**Figure 23. Quick connectors**

When changing the RO cartridge, connect the RO flush kit (50157605) as shown in **Figure 24** and run water to drain for 30 minutes.



**Figure 24. RO Flush kit**

**Note:** Repeat the process of flushing water when replacing the RO cartridge.

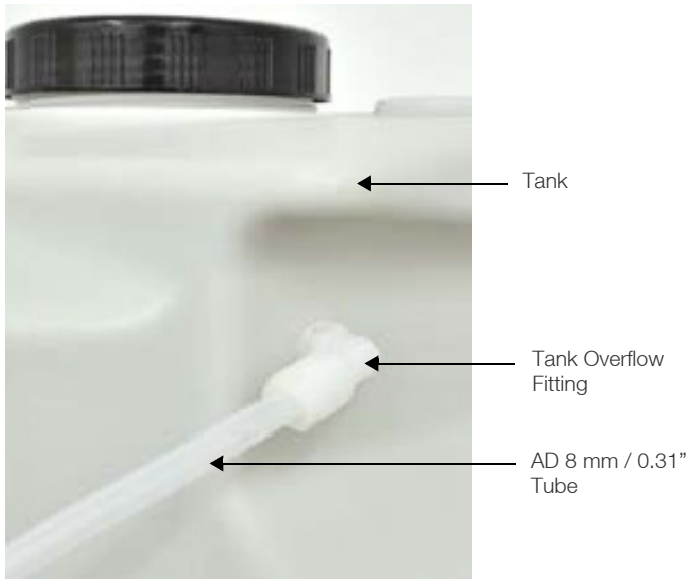
4. Connect the power to the system (refer to the section **Mounting the External Dispensing Valve to the Smart2Pure Pro System (Optional)**).
5. Turn the system ON by pressing ON/OFF key on the display.
6. Perform RO flush.
7. While RO is flushing, install sterile overflow and CO<sub>2</sub> vent filter on storage tank. See next section **Pure Water Tank Setup**.
8. After RO flush, remove RO Flush kit and reconnect tubing.
9. Mount the front cover back (removed in **Step 1**)

## Pure Water Tank Setup

### Install Sterile Overflow

**Note:** If you have ordered additional sterile tank overflow, mount the tank overflow as described in its installation guide provided with it.

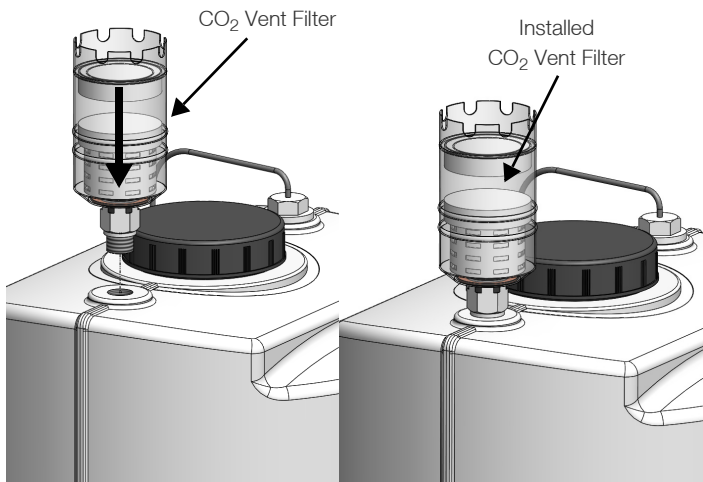
If you have not ordered additional sterile tank flow, use a AD 8 mm / 0.31 inch tube to connect the tank overflow fitting connector with the drain. Route the AD 8 mm / 0.31 inch tube with a free gravity fall to the drain. (refer to the section **Routing Tubes to Drain**).



**Figure 25. Sterile overflow tube**

## Install CO<sub>2</sub> Vent Filter

Remove plug at top of tank and thread CO<sub>2</sub> vent filter in its place.



**Figure 26. CO<sub>2</sub> Vent Filter installation**

## Mounting the External Dispensing Valve to the Smart2Pure Pro System (Optional)

**Note:** An external dispensing valve with a t-connector is provided with the assembly kit to dispensed pure water ASTM Type II quality from the internal or external tank from the Smart2Pure system.

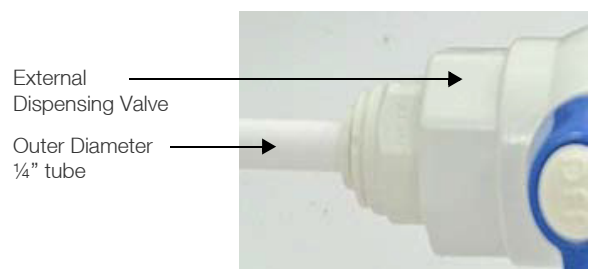
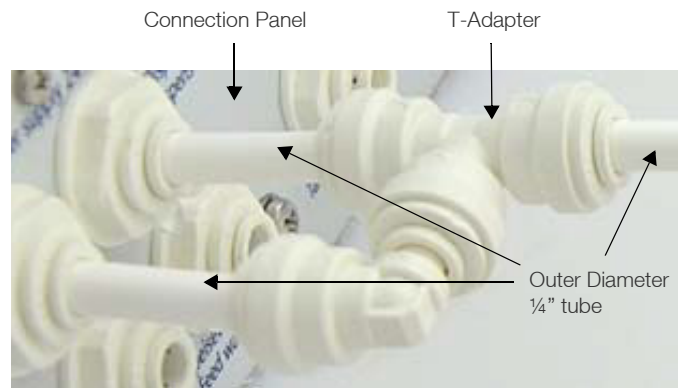
Follow the steps below to mount the external dispensing valve:

1. Switch the system OFF. (unplug the main power supply)
2. a. Locate the external dispensing valve, the t-adapter and the outer diameter 1/4" tube.
  - b. Remove the tube jumper from the connection panel of the system.



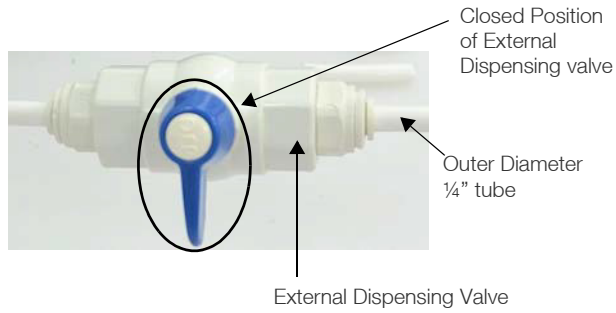
**Figure 27. Tube jumper**

- c. Cut from the outer diameter 1/4" tube two tubes with a length of 80 mm/ 3.2 inch and attach the tubes into the t-adapter and the connection panel. Attach the external dispensing valve with a third outer diameter 1/4" tube to the t-adapter.



**Figure 28. T-Connection and external dispensing valve**

- d. Additionally attach a fourth outer diameter 1/4" tube to the other connection of the external dispensing valve.

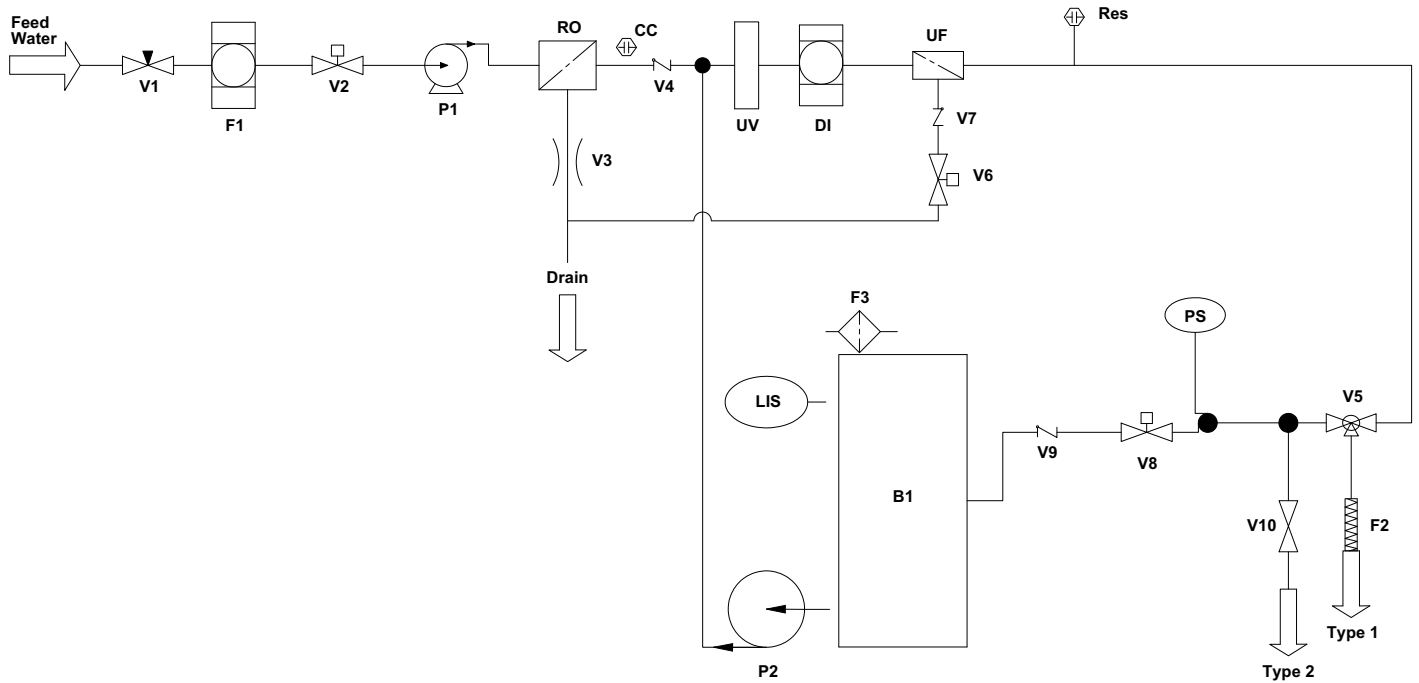


**Figure 29. External dispensing valve connection**

**Note:** You can choose the length of the outer diameter 1/4" tubes beginning from the t-adapter for the external dispensing valve by yourself.

3. Switch the system ON (Connect main power supply).

# Smart2Pure Pro Flow Chart



- V1 Pressure Regulator
- V2 Inlet Solenoid Valve
- V3 Flow Restrictor
- V4 Check Valve
- V5 Dispensing Valve
- V6 Rinse Solenoid Valve
- V7 Check Valve
- V8 Recirculation Solenoid Valve
- V9 Check Valve
- V10 Type 2 Dispense Valve
- P1 RO Booster Pump Aquatec
- P2 Recirculation Pump

- RO Reverse Osmosis
- DI DI Resin Cartridge
- UV UV Photo Oxidation
- F1 Pretreatment
- F2 Sterile Filter
- F3 Sterile Filter
- Res Resistivity Cell
- CC RO Conductivity Cell
- PS Pressure Switch
- LIS Level Sensor
- B1 Tank

# How the Smart2Pure Pro System Functions

When the system is in operation, pretreated water (2 - 6 bar / 29 - 87 psi) flows into the system and is pumped by pressure booster pump P1 through the RO cartridge. The RO cartridge purifies the feed-water by reverse osmosis technology. The “concentrate” water with impurities flows to drain. The purified “permeate” water from the reverse osmosis cartridge flows into the deionization section (UV, Polishing cartridge, UF, dispenser) and then into the external pure water tank. A level switch monitors the water level inside the tank. If the external pure water tank is filled with maximum capacity with water, the feed-water solenoid valve is closed. When the water level in the storage drops below a certain level, the Smart2pure Pro system will turn on feed-water solenoid valve to refill storage tank. Water quality in storage tank is ASTM Type II.

The pure water from the tank flows through the UV bulb, ultrapure cartridge and the ultrafilter. ASTM Type I water can be dispensed through the 0.1 µm final filter on dispensing valve and ASTM Type II water when you have connected the accessory external dispensing valve on the connection panel of the system. If using the optional remote hand dispenser, ASTM Type I water can be dispensed when connected to the side outlets of the connection panel of the system.

The water in the external tank is recirculated at regular intervals through the recirculation pump P2 to ensure the constant quality of pure water ASTM Type II.

ASTM Type II water can be dispensed from the right side outlet of external tank valve or from the front valve of the external tank.

# Initial Start Up

## Putting the System into Operation



**CAUTION:** Check that all connections have been made as described in the section **Installation**.

## Mounting the Power Pack (voltage supply)

Do not plug system into power supply until all cartridges and filters are installed and system is ready for start up.

**Note:** Whenever possible, mount the power pack on the wall to the left or right of the water purification systems where it is freely accessible and not come in contact with water.



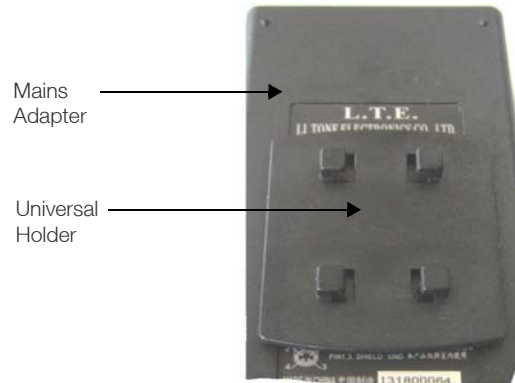
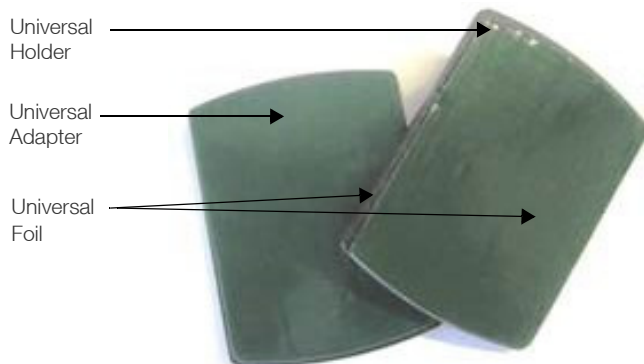
**DANGER:** Take caution to ensure that the suitable plug and the power cable do not get wet. Mount the power pack with dry hands. Risk of an electrical shock.



**DANGER:** Take caution to ensure that only the original equipment from the power supply pack with sufficient capability is being used.

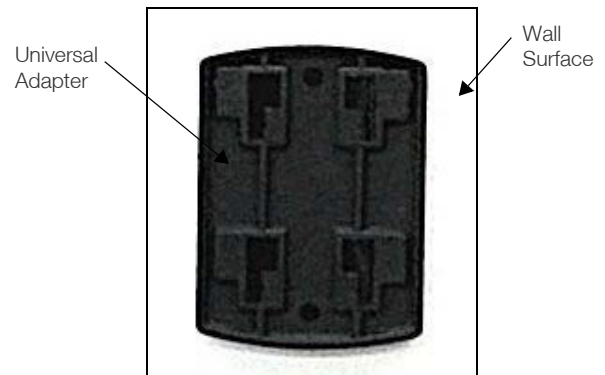
**Note:** The removable power cable must always face downward when the power supply unit has been mounted.

1. Remove the protective foil on the back of the universal holder and from the universal adapter. Attach the universal holder to the center of the back of the mains adapter.



**Figure 30. Attaching universal holder to universal adapter**

2. Stick the universal adapter to a smooth wall surface or screw it to the wall (screws are not provided).



**Figure 31. Universal adapter back view**

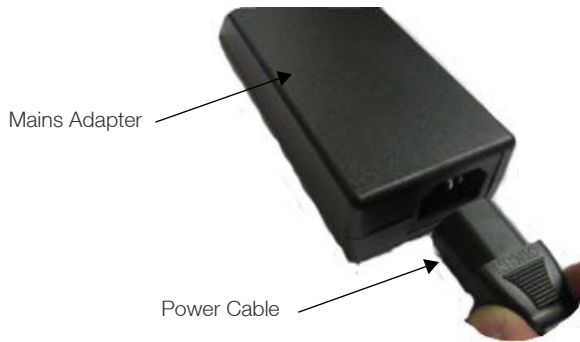
3. a Take the power supply unit and press it with the attached universal holder onto the wall and then slide it down (thick black arrows in **Figure 32**).



**Figure 32. Installing power supply on universal adapter**



- b. Plug the appropriate power cable into the power supply unit.

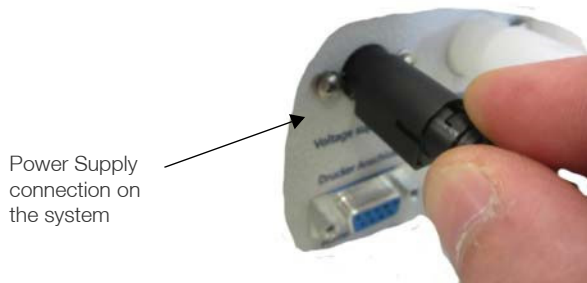


**Figure 33. Plug power supply cable**



**DANGER:** Do not bring the power pack in contact with water. Risk of an electrical shock.

- 4. Connect the power supply unit to the “Power supply” connection on the right side of the Smart2Pure Pro system. Next plug the power supply to a grounded 100 - 240 V, 50/60 Hz power outlet.



**Figure 34. Plugging power supply cable to system**

**Note:** The system does not turn on when the power supply is plugged in. Press ON/OFF switch to power the system and turn on the display.

- 5. The system is now ready for work and will operate based on the programmed system parameters according to the system control logic described in the section **Flow Chart of Menu System Control**



**CAUTION:**

**Note:** If the tank’s water level is below 25% and tank filling is in progress, all function keys on the display are **DISABLED**. To turn system off, unplug power supply.

When the system is powered again, the system reverts to normal operation mode for 40 seconds.

- Check the production of pure water immediately after the RO-pump starts to operate by checking the concentrate water flow into the drain. If there is no concentrate water

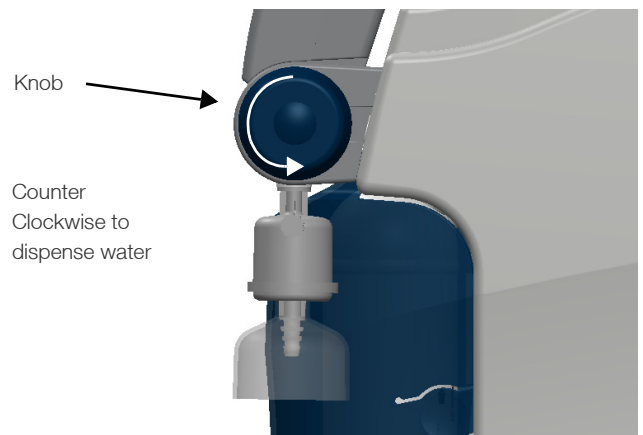
flow, reconnect the RO cartridge (refer to the section **Maintenance**).

- Turn the system ON by pressing ON/OFF key on the display. System will display “Tank Filling”. During this time, function keys do not operate until storage tank is 25% full.
- Check the production of ultrapure water. If the tank is full, dispense water from the tap. Otherwise wait until the RO pump fills the tank to 25% with water from the RO/ pretreatment and then dispense water from the tap. If there is no ultrapure water flow, reconnect the ultrapure cartridge and check the connections of the RO cartridge (refer to the section **Maintenance**).

## Dispensing Water from the Dispensing Valve

- 1. Turn knob counter clock wise to dispense water.

Water flow out of unit can be adjusted with turning the knob. Turn the knob clockwise to slow down or stop water flow.



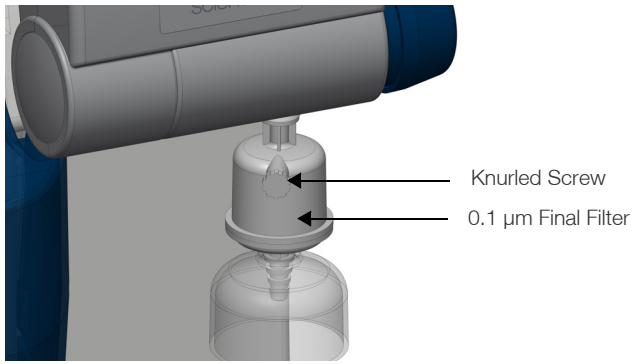
**Figure 35. Adjusting the knob**



**CAUTION:** Do not over tighten knob once flow stops, doing so could damage dispensing valve.

## Install and Vent the 0.1 µm Final Filter

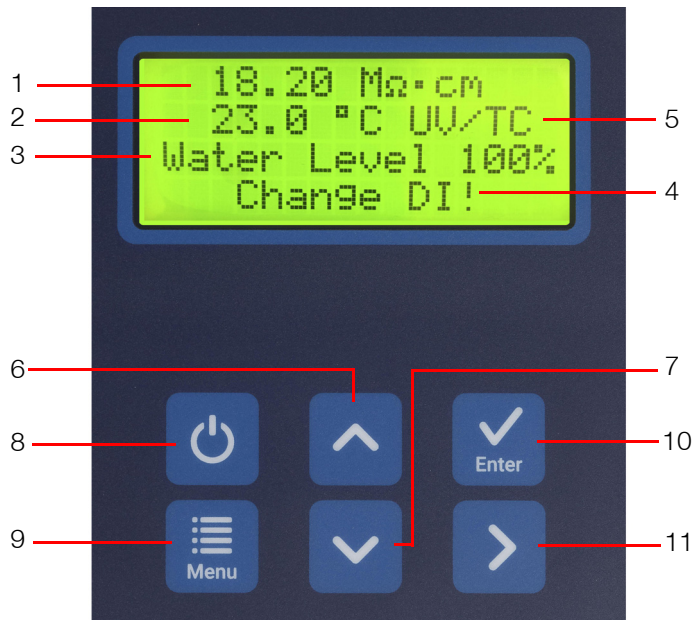
- 1. Install final filter at dispenser. The first time you dispense pure water at the main dispenser through the 0.1 µm final filter, open the white knurled screw.



**Figure 36. Venting the Final Filter**

2. Do not close the knurled screw until pure water runs out of the opening at the knurled screw continuously. Rinse about 500 ml of water through the final filter.

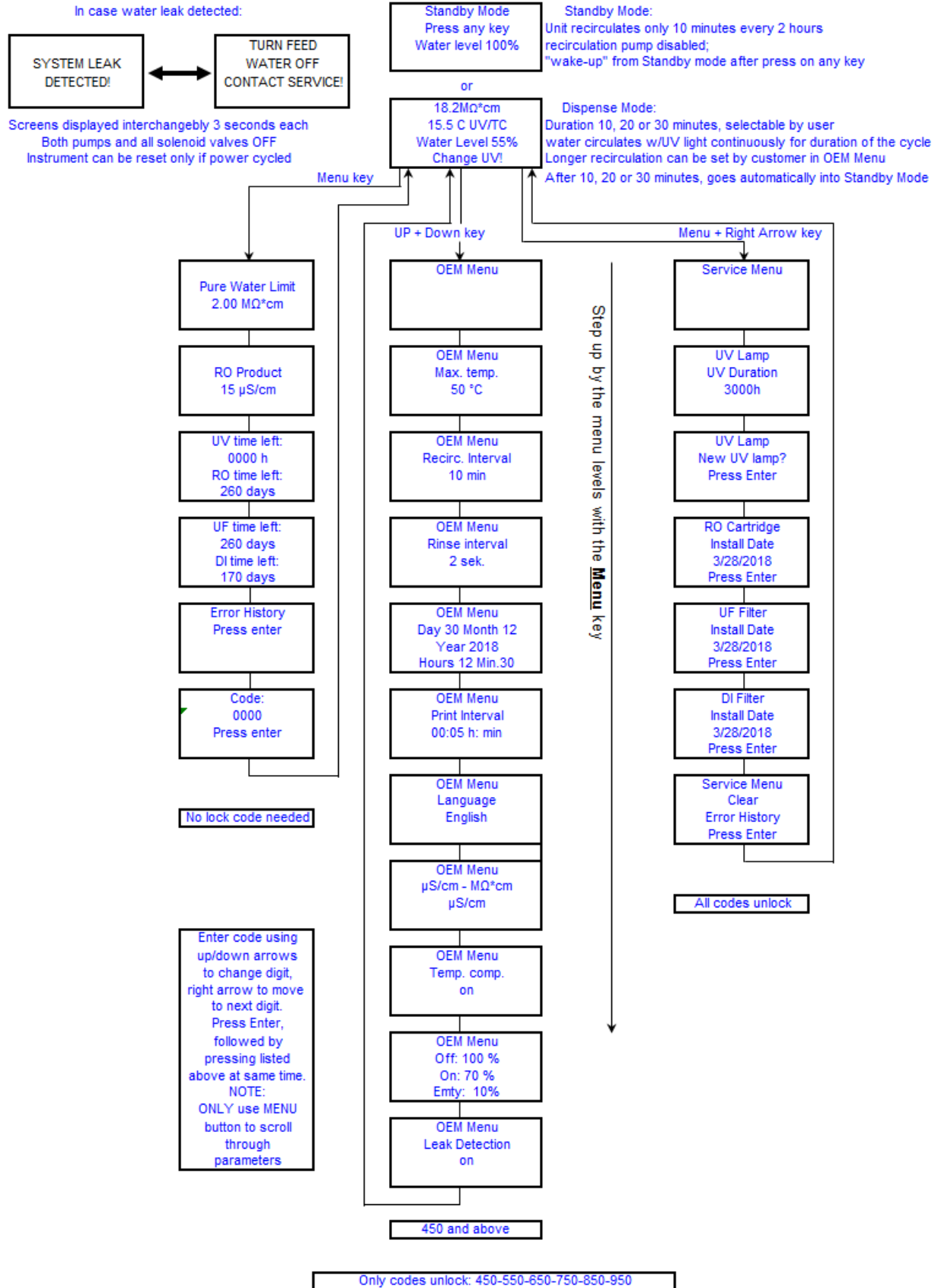
# Operating Elements



**Figure 37. Control Panel**

1. In dispense mode, shows the pure water conductivity/resistivity. In standby mode, press any key activate dispense mode
2. Temperature (°C) of pure water
3. Water Tank level indication
4. System Alert - Should a fault occur, message is displayed. Should several faults occur at once, they are alternately displayed.
5. UV Light option is active/Temperature Compensation is turned ON.
6. Increases a value on the Display
7. Decreases a value on the Display
8. ON/OFF Key
9. Menu key scrolls through menu parameters
10. Confirms and saves selections
11. Moves cursor to the right when changing values

# Flow Chart of Menu System Control



Part No. - 50158040

# System Control

## General Information

When the ON/OFF key is pressed, the system starts in the Standby Mode, recirculating pump is off, the booster pump comes on based on the tank level and level set points.

## User Menu

User menu parameters monitor the operation of the system. Use Menu button to access and scroll through User Menu parameters. **Table 2** below describes parameter, settable range if adjustable, factory default setting and appropriate action when required.

**Table 2. User menu options**

Menu	Description	Settable Range	Factory Setting	Actions
Pure Water Limit	Alarm Setpoint to alert user to replace cartridge	1 - 10 MΩ*cm	2 MΩ*cm	Change DI Cartridge
RO Product	RO permeate conductivity value (Purity is only displayed in conductivity μS/cm)	N/A	N/A	Monitor for changes in RO permeate purity. If purity drops below 70% of feed-water conductivity, replace RO cartridge.
UV Time Left	How many hours until the UV bulb needs to be replaced		3000 Hours	Change UV when UV Duration alarm appears and reset timer in Service Menu
RO time left	How many days until the RO needs to be replaced		360 Days	Change RO cartridge at 0 and reset timer in Service Menu
UF time left	How many days until the UF needs to be replaced		720 Days	Change UF at 0 and reset timer in Service Menu
DI time left	How many days until the DI needs to be replaced		360 Days	Change DI at 0 and reset timer in Service Menu
Error History	Alerts listed by date or if menus were unlocked		N/A	Press ENTER to view error history, and use the Up/Down keys to scroll through the errors
Code	Unlocking code to allow access to change values in Service or OEM Menus		N/A	Input code 0450 and press ENTER key to unlock machine.

## OEM Menu

Basic operation settings and limiting values can be changed in OEM-menu. To make changes in the OEM-menu, the system control must previously be unlocked.

1. Press Menu button until CODE is displayed.
2. Using Up/Down and over keys enter code 0450, Press ENTER.
3. Simultaneously pressing the Up/Down keys. The prompt "OEM-menu Press enter!" appears.
4. Use Menu button to scroll through parameters.

The different menu points in the OEM-Menu are listed in the **Table 3** below.

**Table 3. OEM Menu Options**

Menu	Description	Settable Range	Factory Setting	Actions
OEM MENU	OEM Menu Prompt	N/A	N/A	Press ENTER key to enter into the OEM Menu
Max Temp	Alarm set point for maximum allowable temperature.	1 - 50°C	40°C	Use Up/Down/Right Arrow keys to adjust setting and press ENTER to confirm Change
Recirculation Interval	Time setting for how long the Smart2Pure Pro will recirculate water in the Dispense Mode	10, 20, 30 minutes	10 minutes	Use Up/Down/Right Arrow keys to adjust setting and press ENTER to confirm Change
Rinse Interval	When the unit switches from standby mode into dispense mode (or tank filling) a short rinse of the RO cartridge occurs	0.1 - 10 seconds	2 seconds	Use Up/Down/Right Arrow keys to adjust setting and press ENTER to confirm Change
Date & Time	The date and time can be set in this screen.	1-12 month, 1-31 days, 0-24 hours, 0-60minutes	N/A	Use Up/Down/Right Arrow keys to adjust setting and press ENTER to confirm Change
Print Interval	If printer option is used, this menu is where to set the frequency of the data printout	5 minutes - 12 hours	5 minutes	Use Up/Down/Right Arrow keys to adjust setting and press ENTER to confirm Change
Language	Setting for different languages	English, French, German	English	Use Up/Down/Right Arrow keys to adjust setting and press ENTER to confirm Change
µS/cm - MΩ*cm	Allows for water purity to be read in conductivity (µS/cm) or resistivity (MΩ*cm)	µS/cm - MΩ*cm	MΩ*cm	Use Up/Down Arrow keys to adjust setting and press ENTER to confirm Change
Temp. comp.	Allow purity on the display to be temperature compensated to 25°C	ON - OFF	off	Use Up/Down Arrow keys to adjust setting and press ENTER to confirm Change
OFF/ON/ Empty	Tank level settings (OFF/ON) to adjust when filling of the tank stops (OFF) and when it starts again (ON). Also, sets the level at which the recirculation pump can turn on (Empty)	Off: 40 - 100% On: 10-70% Empty: 10-25%	Off: 100% On: 70% Empty: 25%	Use Up/Down/Right Arrow keys to adjust setting and press ENTER to confirm Change
Leak Detection	Turns on leak detection and threshold. If ON, if leak is detected all pumps and feed-water solenoid valves are de-energized.	ON - OFF	On	Use Up/Down Arrow keys to adjust setting and press ENTER to confirm Change

# Service Menu

Service Menu is accessed when the system consumables are replaced and their associated timers need to be reset. To make changes in the Service-menu, the system control must previously be unlocked.

1. Press Menu button until CODE is displayed.
2. Using Up/Down and over keys enter code 0450, Press ENTER.

3. Simultaneously pressing the Menu and the > keys at the same time. The prompt “Service-menu” appears. Use Menu button to scroll through parameters. Only use the Enter key to confirm a change.

The different menu points in the Service Menu are listed in the **Table 4** below.

**Table 4. Service menu option**

Menu	Description	Settable Range	Factory Setting	Actions
Service Menu	Service Menu Prompt	N/A	N/A	Press ENTER key to enter into the Service Menu
UV Duration	Timer set-point to alert user when to change UV bulb.	500-5000 hours	3000 hours	(3000 hours is optimal life of UV lamp) Use Up/Down Arrow keys to adjust setting and press ENTER to confirm Change
New UV Lamp? Press Enter	Used to reset the UV timer after UV bulb replacement.	N/A	N/A	Press ENTER key to reset the UV timer and clear the UV Duration alarm message.
RO cartridge Install Date DD/MM/YYYY Press Enter	Shows the date of the last RO cartridge replacement and used to reset the RO timer after RO cartridge replacement.	N/A	N/A	Press ENTER key to reset the RO cartridge timer and clear the RO cartridge alarm message.
UF Filter Install Date DD/MM/YYYY Press Enter	Shows the date of the last UF replacement and used to reset the RO timer after RO cartridge replacement.	N/A	N/A	Press ENTER key to reset the UF timer and clear the UF Filter alarm message.
DI Filter Install Date DD/MM/YYYY Press Enter	Shows the date of the last DI filter replacement and used to reset the DI Filter timer after DI Filter replacement.	N/A	N/A	Press ENTER key to reset the DI Filter timer and clear the DI Filter alarm message.
Clear Error History Press Enter	Used to clear all errors stored in the error history menu.	N/A	N/A	Only clear service history, if necessary, after service has been performed. Alert history is important to monitor changes in system.

# Maintenance

Regular servicing of the system ensures that the quality of the treated water will remain constant. To ensure that your system is serviced properly we recommend that you obtain a maintenance contract with Thermo Fisher Scientific or factory authorized service provider. You can then be certain that your system will have a high degree of operational reliability and dependability.

To ensure that your system functions without any errors it must be checked, maintained and serviced at regular intervals, as described in these operating instructions. The operating instructions must therefore be kept in an easily accessible location for anyone who is using or servicing the system.

Calibration of the conductivity may only be performed by a service technician authorized by the manufacturer.

Disinfection of the system should be performed annually. Disinfection must also be performed in the event of a high

bacteria content or impurities in the product water and when changing the ultrapure cartridge.



**DANGER:** Checks or maintenance work on electrical equipment are only to be carried out by qualified, factory trained and authorized service representatives.

Unplug the system from the power outlet for all maintenance work on the system.

## Maintenance Intervals

Wear parts must be replaced in accordance with the following table. The intervals have been established for the user and depend on the actual, exact water quality and the volume of water that is used daily.

Material	Flow chart no.	Item No.	Interval	Other problems
Ultrapure cartridge	DI	09.1020	12 months	Or when the pure water limit value is exceeded, whichever occurs first. Bacteria growth may occur in the resin when the system has been in use over an extended period.
Sterile filter 0.1 µm	F2	50157375	12 months	Or the flow rate is markedly slower
Ultrafiltration membrane (UF)	UF	50133980	24 months	Or if there is endotoxin breakthrough in product water or when the water flow rate is markedly slower.
UV lamp	UV	09.1002	24 months	Or when UV lamp does not light.
RO cartridge	RO	50157608	12 months	Or when the ultrapure cartridge has shorter life time than expected.

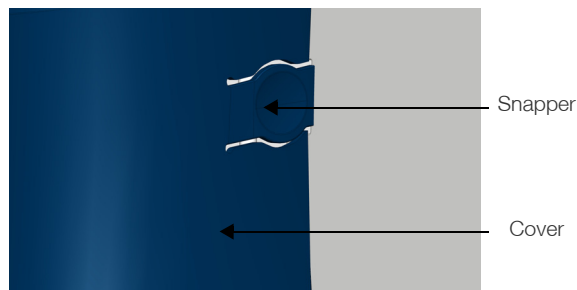
**Note:** The lifetime of the wear parts is a direct function of the quality of the feed-water and the daily volume of water that is used.

- Remove the cover from the ultrapure cartridge by pressing the snapper and pull the cover toward the front to remove it.

## Replacing the Ultrapure Cartridge

**Note:** Replace the ultrapure cartridge with a new one when the ultrapure water purity dropped below acceptable levels or the replacement interval is due.

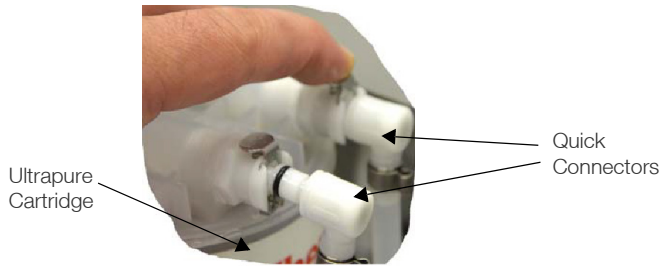
- Switch the system OFF (unplug main power supply).



**Figure 38. Removing the cover**



- Press on the two quick connectors at the inlet and outlet of the ultrapure cartridge and remove the used cartridge from the system.

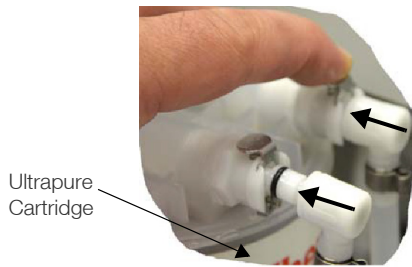


**Figure 39. Removing the ultrapure quick connectors**

- We recommend performing a disinfection when an existing ultrapure cartridge is replaced.

**Note:** Refer to section **Disinfection** for an explanation of how to perform disinfection.

- Locate the new ultrapure cartridge and insert the cartridge into the system.
- Insert the quick connectors into the connecting points on the ultrapure cartridge. When you hear an audible click you can be sure that the quick connectors have been inserted correctly.



**Figure 40. Installing the quick connectors**

**Note:** The quick-connectors are attached to the system in such a manner so it is to prevent any confusion (switching).

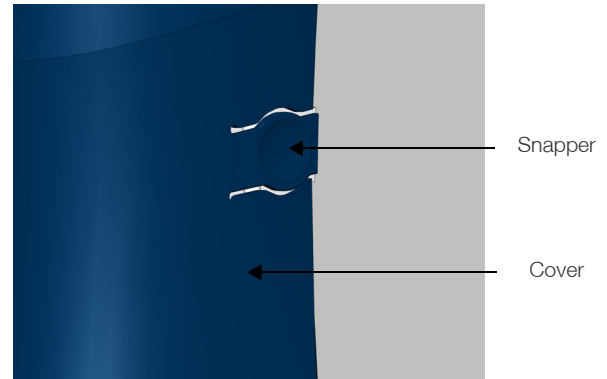
- Put the cover for the ultrapure cartridge back in place and switch the system ON (connect the main power supply).

**Note:** Discharge the first 5 liters and check the production of ultrapure water by dispensing water from the tap. If there is no ultrapure water flow, check level of water in storage tank and repeat the steps of replacing the ultrapure cartridge.

## Replacing the RO Cartridge

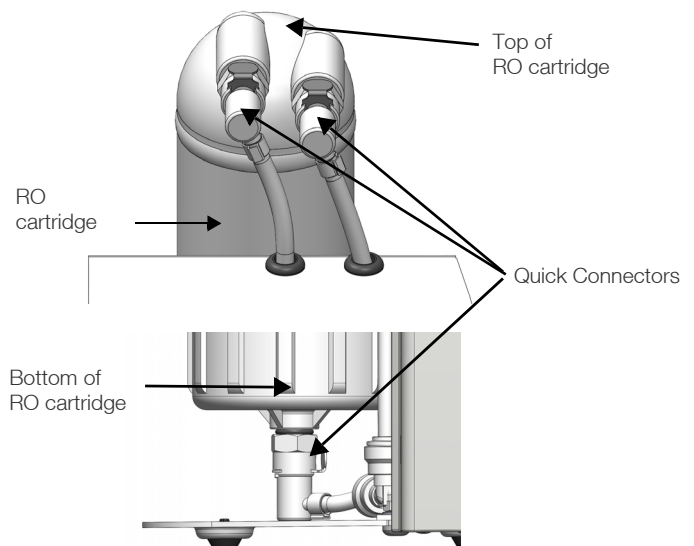
**Note:** Replace the RO cartridge when the maximum limit for the feed-water has been exceeded, when you cannot extract any water from the sampling tap or when the replacement interval is due.

- Switch the system OFF (unplug main power supply).
- Remove the cover over the RO cartridge by pressing the snapper and pull the cover forward.



**Figure 41. Remove the cover**

- Press on the three quick connectors on the cover of the RO cartridge and remove the used cartridge from the system.



**Figure 42. Removing the RO quick connectors**

- Locate the new RO cartridge and insert the cartridge into the system.
- Insert the quick connectors into the connecting points on the new RO cartridge. When you hear an audible click you can be sure that the quick-action fasteners have

been inserted correctly.

Flush RO by connecting the RO flush kit (50157605) and run the water to drain for 30 minutes. Remove flush kit and install RO connections.

**Note:** The quick connectors are attached to the system in such a manner so as to prevent any confusion (switching).

6. Replace the cover over the RO cartridge and switch the system ON (connect main power supply).
7. Check the production of pure water immediately after the RO pump starts to operate by controlling the concentrate water flow into the drain. If there is no concentrate water flow, repeat the steps of replacing the RO.

## Check the Concentrate Flow of RO

1. a After operating the system at least 10 minutes, direct the tube from the concentrate water flow (right side of the system) into a graduated cylinder (with 1000 ml volume).

### Concentrate water guidance values for Smart2Pure Pro

Smart2Pure Pro	60 L/h ± 10 L/hr
----------------	------------------

- b. Run the concentrate flow into a graduated cylinder for 36 seconds. Record the volume in milliliters. Divide this value by 10. This is the concentrate flow rate in L/hr.
- c. Note the value



**CAUTION:** The Concentrate flow is controlled by a non-adjustable flow restrictor. Only specially trained personnel may replace this part. The restrictor has a flow arrow. Correct direction is pointing to drain, refer to the section **Replacement Parts**.

## Disinfection

**Note:** Your system should be disinfected before replacing the ultrapure cartridge, or if bacteria is present in system.

Use bleach disinfection solutions as follows:

Required for disinfection:

- 50133431 Disinfection adapter (Supplied with Smart2Pure Pro)
- Bleach solution (obtained locally, concentrations and amounts listed below)
- Optional, chlorine test strips (obtained locally)

Table of Volume (mL) of bleach concentrate (**Table 5**) to use for disinfection based on storage tank volume.

**Table 5. Table of volume (mL) of bleach concentration**

Bleach Concentrations (%)	30 L Tank	60 L Tank
5.25	120 mL	240 mL
6	105 mL	215 mL
8.25	80 mL	155 mL

**Note:** After the Disinfection process, install new DI cartridges and final filter. Replace pretreatment cartridges if necessary.



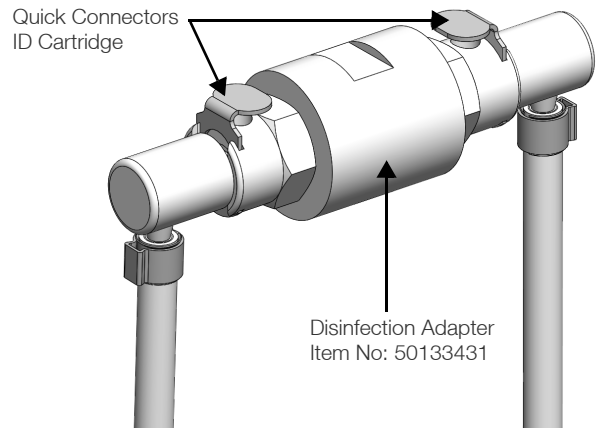
Wear protective gloves for handling bleach disinfection solution.



Wear safety goggles when working with bleach disinfection solution.

**Note:** During the disinfection process, the room should be well ventilated to prevent concentration of chlorine vapors.

1. Install disinfection adapter, 50133431 in place of DI cartridge. When you hear an audible click you can be sure that the quick connectors have been inserted correctly. Discard used DI cartridge (refer **Figure 43**).



**Figure 43. Installing the DI quick connectors**

2. Turn on the system. Program the Smart2Pure Pro to fill the tank completely by adjusting the float switch to turn

off at 100%, and on at 70%. Refer to OEM Menu Settings, **Table 3** in the section **System Control** for information on Float Switch settings (ON/OFF/EMPTY).

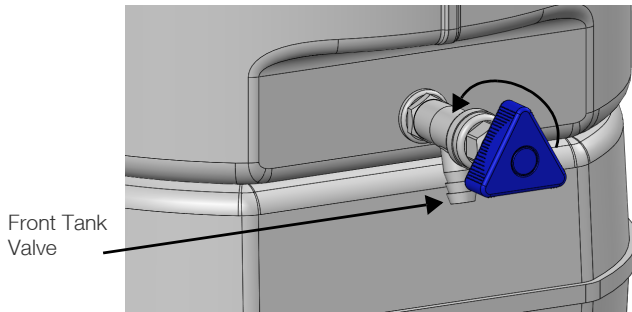
3. Pour bleach into top of tank.

**Note:** For bleach concentration volume refer to **Table 5** to use for disinfection based on storage tank volume”.

4. a Let system run in Dispense Mode until display shows that the storage tank is 100% and remain on for 1 additional hour.

**Note:** The system may give a “Pure.w.lim” alert.

- b. Drain the tank by opening valve on front of tank.

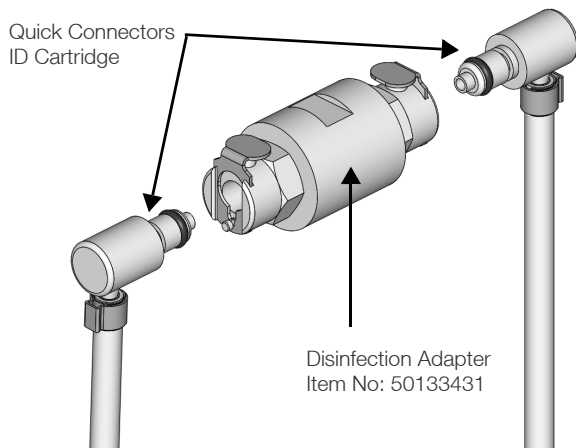


**Figure 44. Draining the tank**

5. Turn Smart2Pure Pro system off.
6. If necessary, replace RO cartridge (refer to the section **Replacing the RO Cartridge**)

**Note:** If replacing RO cartridge, keep disinfection adapter in place until RO rinsing is completed.

7. Replace the pretreatment filter elements if necessary.
8. Remove disinfection adapter if added in step 1.



**Figure 45. Uninstalling the quick connectors**

Install new ultrapure cartridge and final filter.

9. a Change float switch back to original setting if necessary. Refer to OEM Menu Settings, **Table 3** in

the section **System Control** for information on Float Switch settings (ON/OFF/EMPTY).

- b. Change “Recirc interval” time back to original settings if changed in step 2.

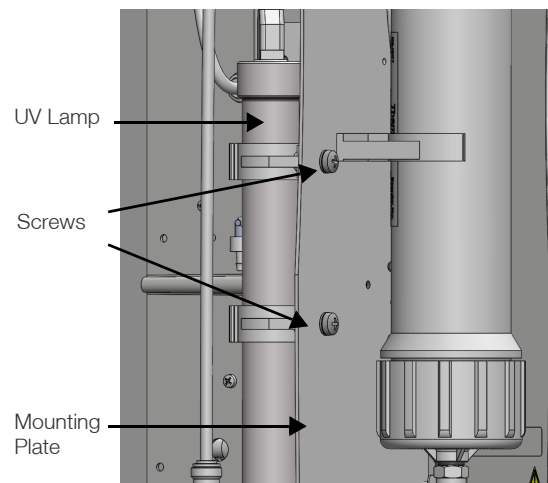
10. Turn system on and empty and refill the tank 2x to rinse storage tank.

**Note:** Chlorine test strips can be used to test water for presence of residual chlorine. Repeat tank rinsing if necessary.

## Changing the Ultrafilter

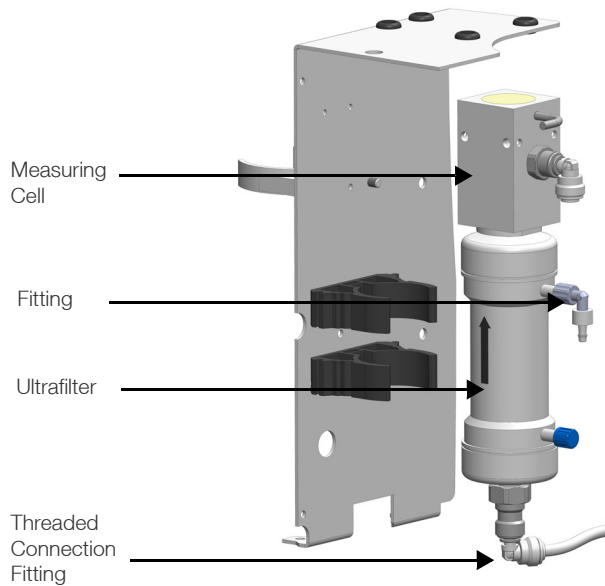
**Note:** You will need the following tools for replacing the ultra-filter: Open-end wrench, size 17, Phillips screwdriver and Teflon tape.

1. Switch the system OFF (unplug main power supply).
2. a Remove the cover from the system.
- b. Take out the ultrapure cartridge and RO cartridge (refer to the section **Replacing the Ultrapure Cartridge** and **Replacing the RO Cartridge**).
- c. Use the Phillips screwdriver to unscrew the screws from the bracket for the UV lamp and pull the UV assembly out toward the front (refer to **Figure 46**).



**Figure 46. Ultrafilter installation plate**

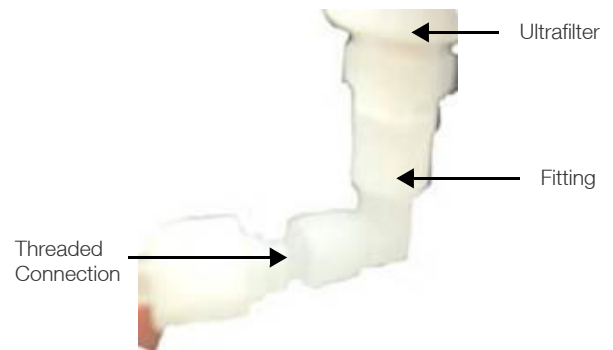
- d. Unscrew the threaded connection screws by hand on the ¼” fittings of the ultra-filter and pull the tubes out. Disconnect the fitting on the upper side from the ultra-filter. Twist the ultrafilter to turn out the measuring cell from the upper side from the ultrafilter.



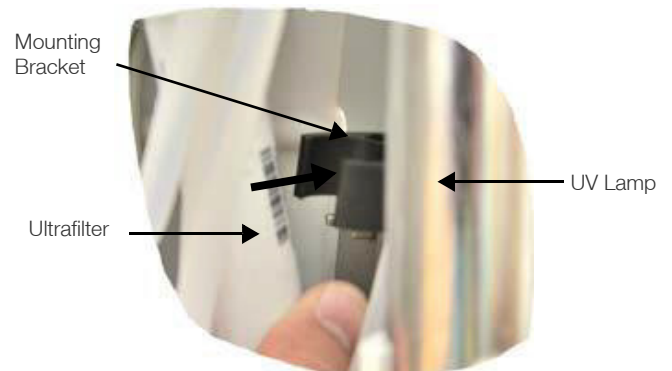
4. a Take the new ultra-filter and wrap the bottom threads in Teflon strip (roughly 3 times around).



- b. Take the fitting that you unscrewed in step 3b and screw the fitting into the same position that it was on the old ultra-filter. Use the 17 mm / 0.67 inch open-end wrench for this.



- c. Screw on the measuring cell and insert the tubes into the top and bottom connection for the ultra-filter and screw the fittings securely into place.

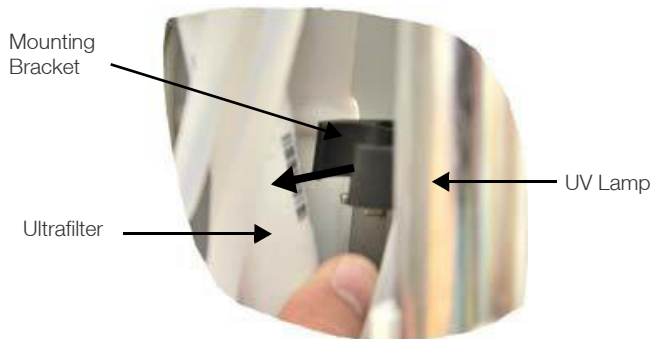


- d. Insert the ultra-filter back into the mounting bracket and screw back the UV assembly into place (see Step 2c).
- e. Replace the cover on the system, open the feed-water tap and switch the system ON (connect main power supply). Dispense the first 5 L of water.

### Figure 47. Detaching ultrafilter

**Note:** Ensure that the ferrule on the 1/4" inch tubes are not lost in the process. You will need these again for re-attaching the tube.

3. a Pull the ultra-filter out of the mounting bracket.

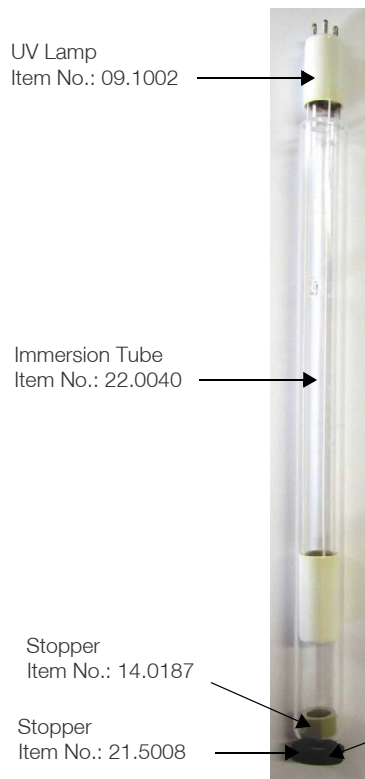
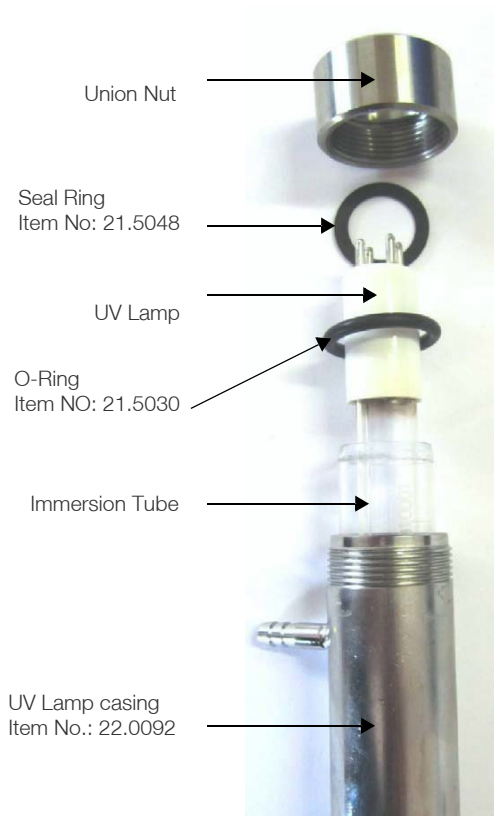


- b. Mark the position of the bottom fitting before you remove them. Use the open-end wrench size 17 mm / 0.67 inch to unscrew the bottom fitting on the ultra-filter.



**Note:** When you install a new ultra-filter ensure that the arrow on the filter corresponds to the direction of flow through the filter (it must point upward).

# UV-Reactor Assembly



# Replacing the UV Lamp



## CAUTION:

Never look directly into a UV lamp when it is on. It could damage your eye sight.



Always wear safety gloves when changing the UV-lamp, in order to prevent that your skin comes in contact with the UV-lamp glass.

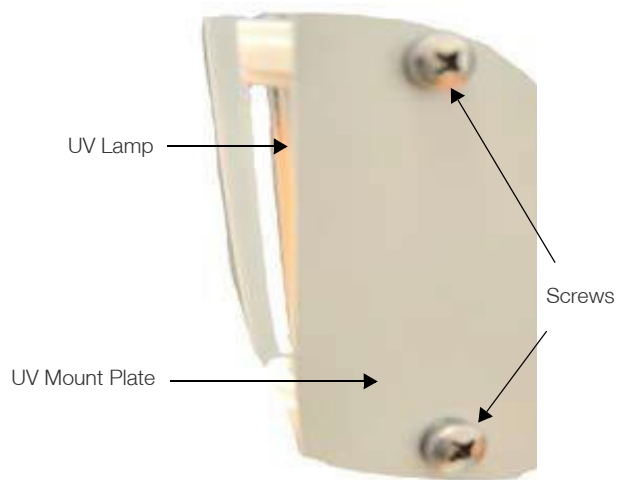


Wear directly a breathing protector if the glass of the UV-lamp is broken and ventilate the room well.

The Hg content in the UV-lamp is so low so that no damage to the environment can arise.

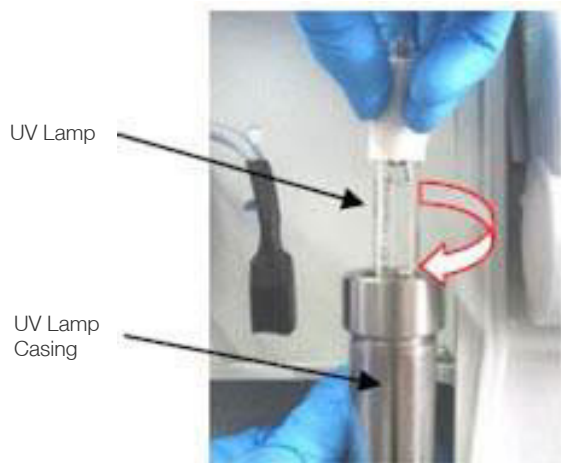
Contact your company's EHS department to proceed as the proper disposal of the used UV-lamp.

1. Switch the Smart2Pure Pro system OFF. (Unplug from main power supply).
2. Remove the cover for the ultrapure cartridge.
3.
  - a. Take the ultrapure cartridge out of the system (refer to the section **Replacing the Ultrapure Cartridge**) and the installed RO cartridge (refer to the section **Replacing the RO Cartridge**).
  - b. Use the Phillips screwdriver to unscrew the two screws from the bracket for the UV assembly.



**Figure 48. Removing the UV backplate screws**

4. **Note:** To more easily remove the UV lamp in the next step, pull the UV lamp out by about 1cm while still plugged in.
5.
  - a. Carefully unplug the plug for the UV lamp.
  - b. Now, carefully pull the UV lamp up while turning it slightly in a clockwise direction at the same time.



**Figure 49. Extracting UV lamp**

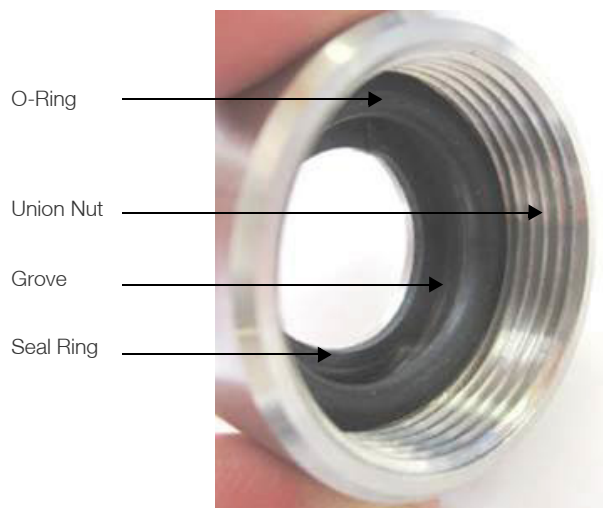


**CAUTION:** When you are removing the UV lamp you must ensure that the glass of the UV lamp is not soiled or that you do not touch it with your fingers. This could impair proper functioning of the lamp. We therefore recommend that you wear clean, disposable gloves when performing this work.



**CAUTION:** When installing a new UV lamp ensure that the flat seal ring and the O-ring are on the correct position. The flat seal ring must fit exactly in the groove provided for it on the top of the union nut (**Figure 50**). The O-ring fits in the bottom groove in the union nut (**Figure 50**). If these items do not fit exactly in the grooves and you restart the system, the UV assembly will not be leak-tight at these locations.

6. a Now, carefully rotate a new UV lamp into place by turning it in a counter-clockwise direction into the UV assembly.

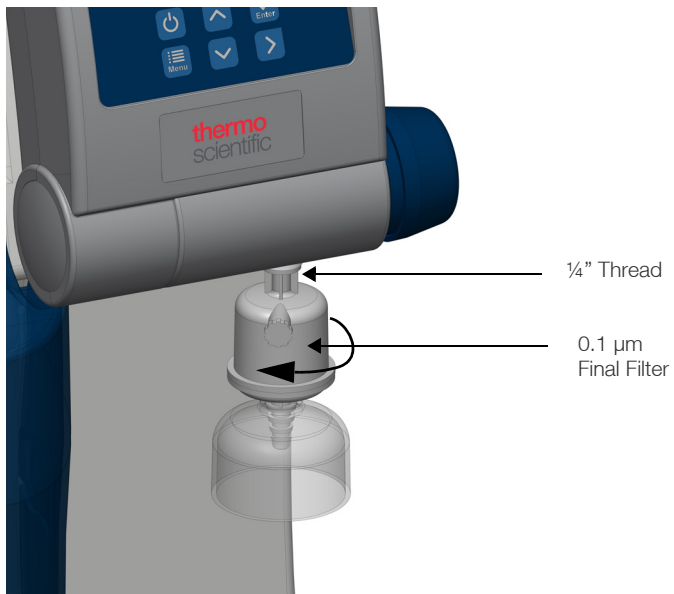


**Figure 50. Installing UV lamp**

- b. You can then re-attach the plug to the UV lamp and re-tighten the UV assembly on the mounting plate using the two retaining brackets and the two screws that you removed previously.
7. Insert the ultrapure cartridge back into the system (refer to the section **Replacing the Ultrapure Cartridge**) and the RO cartridge too (refer to the section **Replacing the RO Cartridge**).
8. Switch the system ON (connect main power supply).

## Replacing the 0.1 $\mu\text{m}$ Final Filter

1. Rotate the exhausted or clogged 0.1  $\mu\text{m}$  final filter in a clockwise direction to remove it.



**Figure 51. Removing final filter**

2. Unpack the new 0.1 µm final filter and screw it into the bottom 1/4" thread on the sampling tap. Vent final filter and rinse 500 ml through it.

# Waste Disposal

**Note:** Before returning your Thermo Scientific Barnstead Ultrapure Water Systems for waste disposal, contact your local waste disposal company for proper disposal of the system and its components. Only specially trained personnel can take the system out of operation and dispose it properly.

**Note:** If you have a used or broken UV-lamp, contact a local waste disposal company.

When the packaging is no longer needed it can be disposed of as household waste. Systems are in conformity with EEC Guideline 2011/65/EC.

The system is not to be thrown away as household waste but must be properly disposed of. It can be returned to the manufacturer for safe disposal according to EEC Guideline 2011/65/EC. We therefore request our customers in Germany and other member States in the European Economic Area to contact our local service center or our headquarters.

[wEEE.recycle@thermofisher.com](mailto:wEEE.recycle@thermofisher.com)

WEEE-Reg.-no.: DE 12471402

In countries outside of the European Economic Area, contact your local authorities or waste disposal company.



# Troubleshooting

**Note:** Contact the service department if you cannot rectify this error.

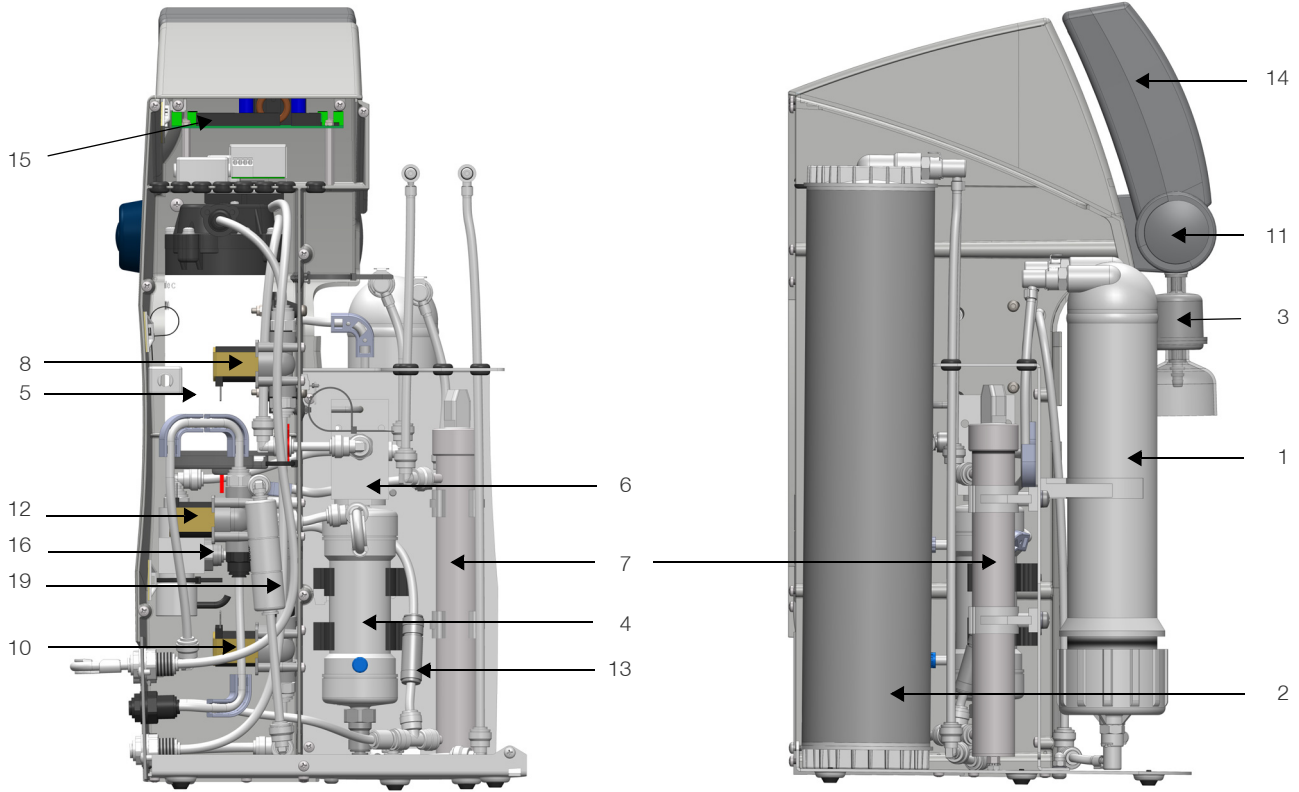
Error	Cause	Solution
The system does not start	No supply of power Power pack or system control defect Power Switched OFF	Provide power Replace the power pack or system control Press power ON switch on the display
Dispensing not possible/ storage tank is empty	Feed-water supply is closed Feed-water and concentrate water connections are mixed up Feed-water pressure <2 bar Sterile filter blocked RO cartridge blocked.	Open the feed-water supply line Replace connections Increase feed-water pressure Replace the sterile filter (refer to the section <b>Replacing the 0.1 µm Final Filter</b> ) Install new RO cartridge (refer to the section <b>Replacing the RO Cartridge</b> or check RO cartridge connections
Resistance <18.2 MΩ·cm / 0.055 µS/cm	Ultrapure cartridge is exhausted Air in the ultrafilter because of empty tank	Check feed-water quality Insert new ultrapure cartridge Wait until the tank is again filled and a rinse is triggered
Control panel non responsive	Storage tank's water level is below 25% and tank filling is in progress, Microprocessor locked up error	Normal operation. All function keys on the display are <b>DISABLED</b> while system is filling to 0 - 25%. Wait until storage tank has filled to 25% level. If control panel is non responsive and tank level is >25%, unplug the mains plug for 5 seconds. Contact the Thermo Fisher Scientific service department
System leak OR Error message: "System Leak Detected/ Turn Feed-water OFF - Contact Service"	Leak sensor in contact with water Leaky tubing connection Feed-water pressure >6 bar Component defect (e.g. UV quartz tube)	Unplug power supply. Clean and dry leak detection sensor Plug power supply and follow the control logic procedure if a leak is detected. 40 second delay in error allows time for detecting and correcting leak. Repeat as necessary to correct leak Check and seal the tubing connection Install a pressure reducer No leak detected, verify if high humidity conditions in room. Turn off leak detection in OEM menu for high humidity conditions" Contact the Thermo Fisher Scientific service department

Error	Cause	Solution
Dispensed water flow rate is too low	0.1 micron final filter is blocked Air in 0.1 micron final filter Ultrafilter is blocked	Replace the 0.1 micron final filter Vent the 0.1 micron final filter Replace ultrafilter (refer to the section <b>Changing the Ultrafilter</b> )
Error message: “Pure Water Limit”	Exhausted ultrapure cartridge Ultrapure water limit value is set to too high resistivity/low conductivity.	Replace with new ultrapure cartridge Check and reset the limiting value
Error message: “Measuring cell Temp”	Temperature in system is too high Limiting value is set too low Feed-water temperature is too high	Verify water temperature in system is exceeding limits set in “OEM Menu”. Check and reset the limiting value Reduce the feed-water temperature
Error message: “Measuring cell LF1”	Ultrapure water resistivity/ conductivity outside of measuring range Fault in measuring cell Fault in system control	Check setting for pure water limit value Replace the measuring cell Replace the system control Contact the Thermo Fisher Scientific service department

# Replacement Parts

**Note:** The use of spare parts, accessories or wear parts from other manufacturers will nullify the warranty for this unit.

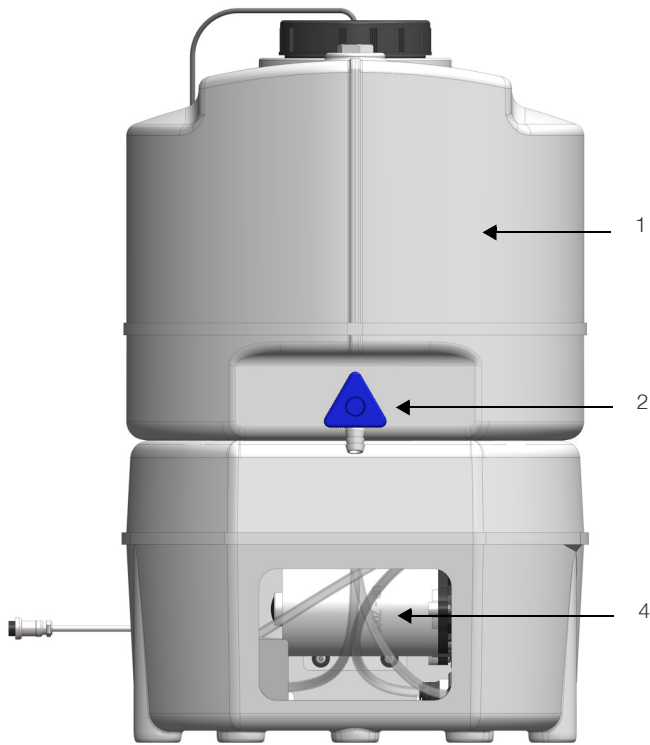
## Replacement Parts: Smart2Pure Pro



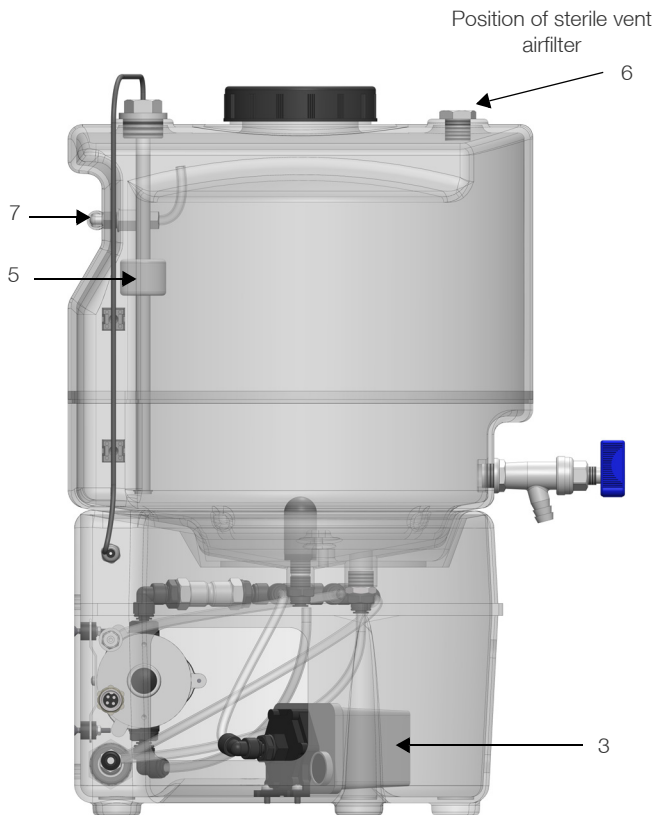
Sno.	Item	Part No.
1	RO cartridge	50157608
2	Ultrapure cartridge	09.1020
3	Final 0.1 micron filter	50157375
4	Ultrafilter	50133980
5	Pressure booster pump	50149262
6	Ultrapure water measuring cell	50133992
7	Replacement UV-lamp	09.1002
	UV booster	50143195
8	Feed-water solenoid valve	15.0062
9	Check valve (above rinsing solenoid valve; not shown)	15.0114
10	Rinsing solenoid valve	15.0062

Sno.	Item	Part No.
11	Dispensing valve	50157387
12	Recirculation solenoid valve	15.0062
13	Check valve	15.0114
14	RWS CPU mit LCD-Display	50157276
15	Interface	50131346
16	Measuring cell	50148228
17	Fuse holder for glass tube fuse	50143154
	Glass tube fuse 5x20 mm, 3,15 A, slow fuse (not shown)	50150714
18	Tabletop power pack (not shown)	50149597
19	Flow restrictor	50157567

# Replacement Parts: Pure Water Tank for Smart2Pure Pro



Sno.	Item	Part No.
1	Pure water tank 30 liters	50155494
	Pure water tank 60 liters	50155499
2	Dispensing valve	14.0250
3	Pressure switch	15.0058
4	Pressure booster pump	19.0046
5	Float Switch	50155549
6	CO <sub>2</sub> Vent Filter	06.5002
7	Sterile tank overflow (option)	06.5001



# Consumables

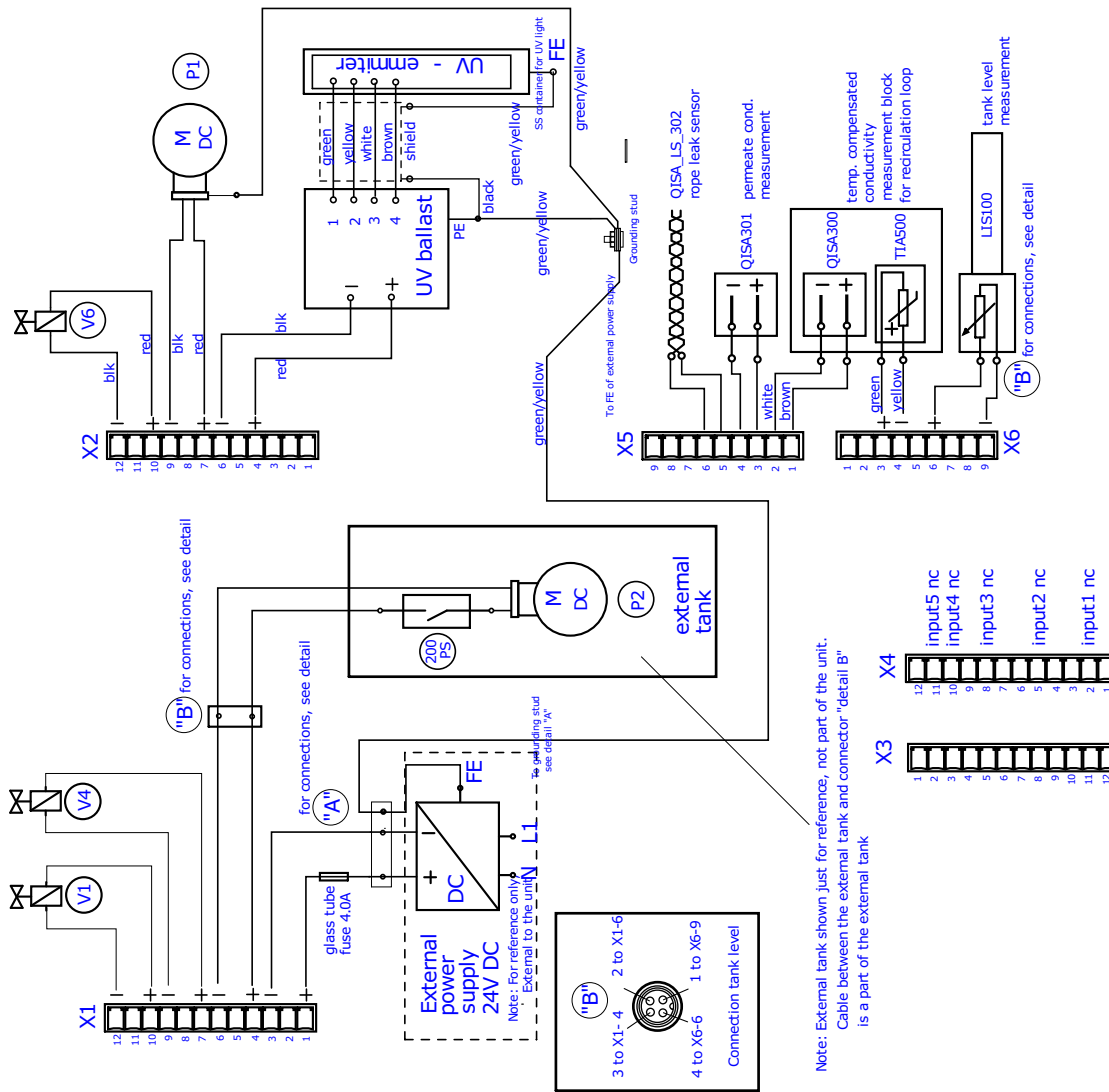
Designation	Item No.
Ultrapure cartridge	09.1020
UV lamp	09.1002
Ultrafiltration module	50133980
Sterile filter 0.1 µm	50157375
RO cartridge	50157608
CO <sub>2</sub> vent filter	06.5002

## Accessories

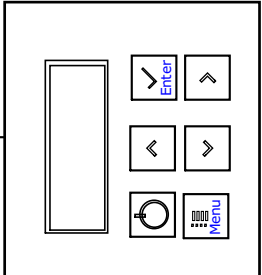
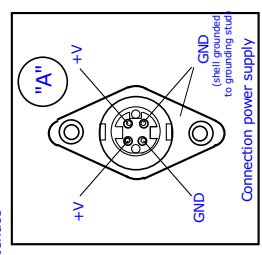
Designation	Item No.
External pretreatment	50157886
Accessory hand dispenser	50138221
Spart2Pure Pro Wall bracket	50157885
Sterile tank overflow	06.5001
CO <sub>2</sub> Vent filter	06.5002

**Note:** Printers can be connected to the device as an accessory. For the RS232 connection to printer, parameters are: Baud rate 9600 bps, 8 Data bits, 1 Stop bit, no parity.

# Terminal Assignment



Note: External tank shown just for reference, not part of the unit.  
Cable between the external tank and connector "detail B" is a part of the external tank



X1	4-6	Redirc. pump(P2), Pressure switch(PS200)(Ext. Tank)
	7-9	Rinsing solenoid valve ( V4)
X2	10,12	Raw water solenoid valve (V1)
	4-6	UV photooxidation (UV1)
X5	7-9	Booster pump (P1)
	10,12	Redirection solenoid valve (V6)
X6	1,2	Conductivity measuring cell ( QISA300)
	3,4	PT1000 temperature sensor
	9,6	ADC level inputs for analog level reading (LIS100)

# Maintenance Record

Customer address:

Location:

System type:

Serial no.:

Date installed

Date	Ultrapure water resistivity / conductivity	Temperature (°C)	Ultrapure water volume flow (L/m)	Date of RO cartridge replacement	Date of external pretreatment cartridge replacement	Date of Sterile filter 0.1 µm replacement

Date of UV lamp replacement	Date of Ultrapure cartridge replacement	Date of disinfection	Date of Ultrafiltration module replacement	Date of CO <sub>2</sub> vent filter replacement

The following points must be observed in order to ensure the quality of the system.

- 1x/Weekly, enter measured values.

# WEEE Compliance

**WEEE Compliance.** This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2012/19/EU. It is marked with the following symbol. Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State, and this product should be disposed of or recycled through them. Further information on our compliance with these Directives, the recyclers in your country, and information on Thermo Scientific products which may assist the detection of substances subject to the RoHS Directive are available at [www.thermofisher.com](http://www.thermofisher.com) under Services & Support.

## Great Britain



**WEEE Konformität.** Dieses Produkt muss die EU Waste Electrical & Electronic Equipment (WEEE) Richtlinie 2012/19/EU erfüllen. Das Produkt ist durch folgendes Symbol gekennzeichnet. Thermo Fisher Scientific hat Vereinbarungen getroffen mit Verwertungs-/Entsorgungsanlagen in allen EU-Mitgliederstaaten und dieses Produkt muss durch diese Firmen wiederverwertet oder entsorgt werden. Mehr Informationen über die Einhaltung dieser Anweisungen durch Thermo Scientific, die Verwerter und Hinweise die Ihnen nützlich sein können, die Thermo Fisher Scientific Produkte zu identifizieren, die unter diese RoHS-Anweisung fallen, finden Sie unter [www.thermofisher.com](http://www.thermofisher.com) unter Services & Support.

## Deutschland



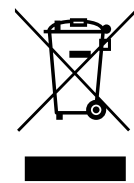
**Conformità WEEE.** Questo prodotto deve rispondere alla direttiva dell'Unione Europea 2012/19/EU in merito ai Rifiuti degli Apparecchi Elettrici ed Elettronici (WEEE). È marcato col seguente simbolo. Thermo Fisher Scientific ha stipulato contratti con una o diverse società di riciclaggio/smaltimento in ognuno degli Stati Membri Europei. Questo prodotto verrà smaltito o riciclato tramite queste medesime. Ulteriori informazioni sulla conformità di Thermo Fisher Scientific con queste Direttive, l'elenco delle ditte di riciclaggio nel Vostro paese e informazioni sui prodotti Thermo Scientific che possono essere utili alla rilevazione di sostanze soggette alla Direttiva RoHS sono disponibili sul sito [www.thermofisher.com](http://www.thermofisher.com) in Servizi e Supporto.

## Italia



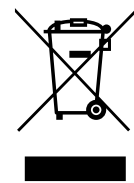
**Conformité WEEE.** Ce produit doit être conforme à la directive euro-péenne (2012/19/EU) des Déchets d'Equipements Electriques et Electroniques (DEEE). Il est marqué par le symbole suivant. Thermo Fisher Scientific s'est associé avec une ou plusieurs compagnies de recyclage dans chaque état membre de l'union européenne et ce produit devrait être collecté ou recyclé par celles-ci. Davantage d'informations sur la conformité de Thermo Fisher Scientific à ces directives, les recycleurs dans votre pays et les informations sur les produits Thermo Fisher Scientific qui peuvent aider la détection des substances sujettes à la directive RoHS sont disponibles sur [www.thermofisher.com](http://www.thermofisher.com) sous Services et Assistance.

## France



**Cumplimiento de la directiva RAEE.** Este producto está obligado a cumplir con la Directiva de la Unión Europea sobre residuos de aparatos eléctricos y electrónicos (RAEE) 2012/19/EU. Está marcado con el siguiente símbolo. Thermo Fisher Scientific ha contratado a una o varias empresas de reciclado/disposición de residuos en cada estado miembro de la UE, y este producto debe reciclarse o desecharse a través de dichas empresas. Para obtener más información sobre nuestro cumplimiento con estas directivas, las empresas de reciclaje de su país, así como información sobre los productos Thermo Scientific que pueden ayudarle a detectar sustancias sujetas a la directiva RoHS, visite [www.thermofisher.com/WEEERoHS](http://www.thermofisher.com/WEEERoHS) en la sección Servicios y Asistencia.

## España







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