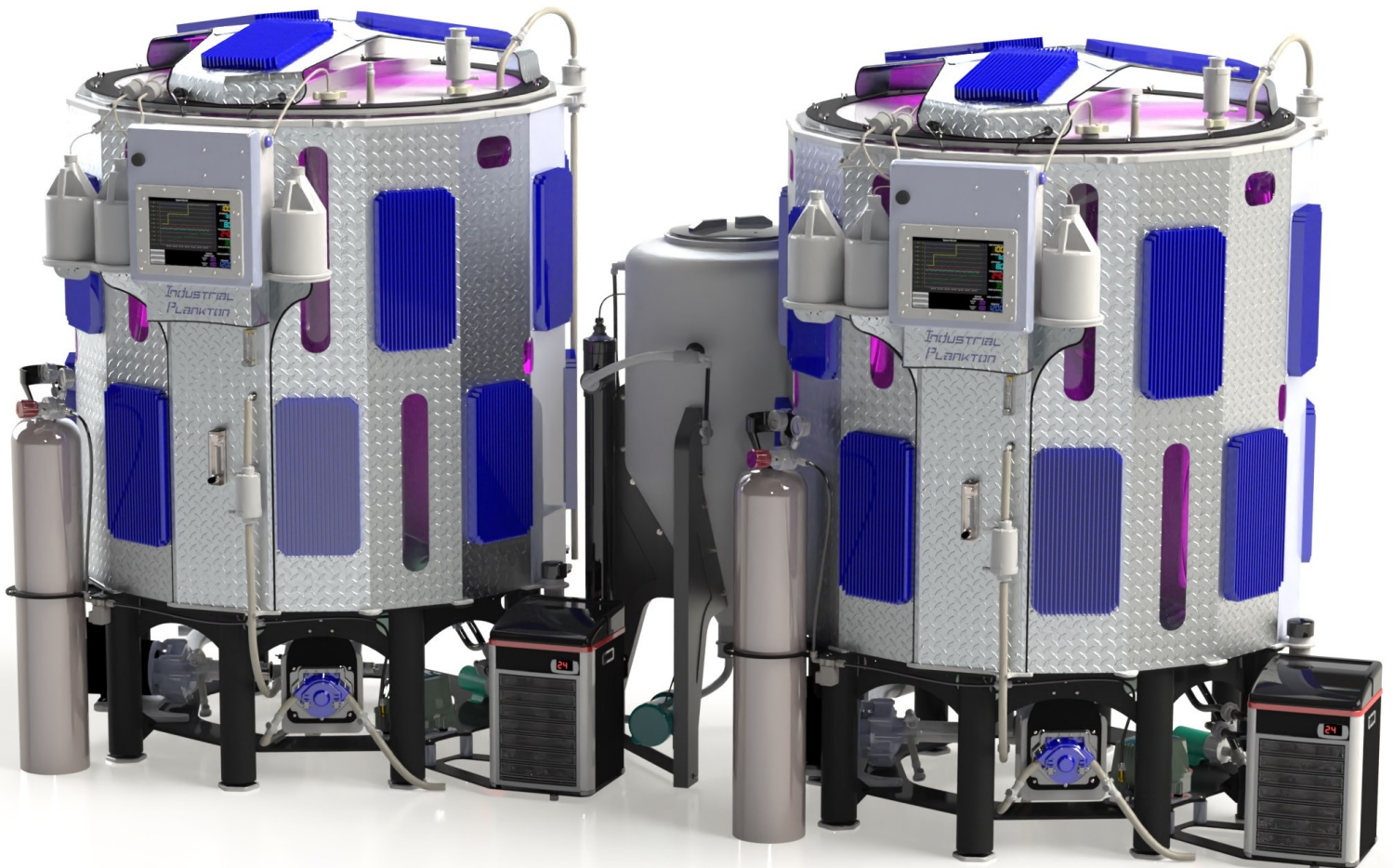


Industrial™ **PLANKTON**

PBR 1250L / 2500L INSTALLATION MANUAL



Warnings

1. **Never** use **Windex, acetone, ammonia**, or other solvent based cleaners on or near the PBR. The chemicals will weaken the acrylic and can cause catastrophic failure.
2. **Never** run Spray Pump without water in the PBR.
3. **Never** connect LED panels when the lights are powered. This damages the LEDs.
4. **Never** run Harvest Pump in reverse after inoculation.
5. **Never mix** cleaning fluids, it can result in serious injury or death.
6. **Never** drain the PBR without allowing air to replace draining fluid.
7. **Never** run the Chiller without water motion.
8. **Do not** drop the PBR when transporting it with a pallet jack or forklift.
9. **Do not** use sponges or paper towel to clean the tank. Only use soft cotton cloths to avoid scratching the acrylic.
10. **Do not** install PBR on soft ground or with uneven support.
11. **Do not** use the top port to add dangerous chemical without appropriate personal protection.



CONTENTS

PBR 1250L / 2500L Installation Manual..... 1

 Warnings2

 Contents of Crates.....4

 Spare Parts Kit7

 Abbreviations Used.....7

 Tools Required8

 PBR Uncrating8

 Header Tank Uncrating.....9

 Header Tank.....9

 PBR 1250 Components (Front)10

 PBR 1250 Components (Back).....11

 Water Flow.....13

 Water Connections13

 Drainage.....17

 Harvest Lines18

 Temperature Control.....19

 CO₂.....21

 Top Reassembly.....22

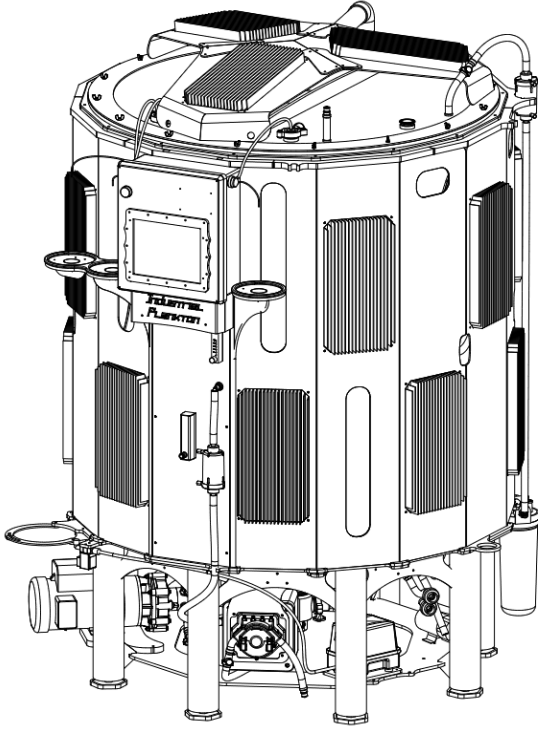
 Power.....22

 Wi-Fi.....23

 Advanced WiFi Setup24

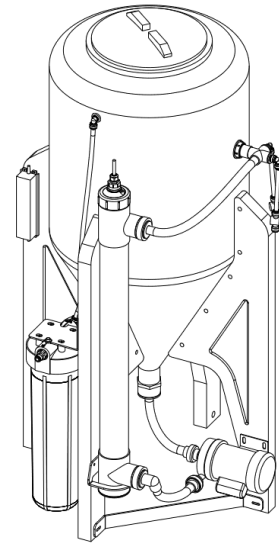
Contents of Crates

S1050 x 1



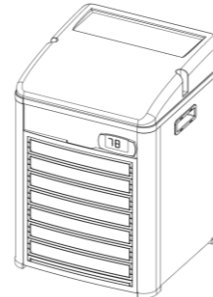
PBR 1250L

S1051 x 1



Header Tank

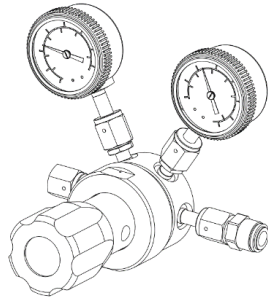
P1026 x 1



Chiller

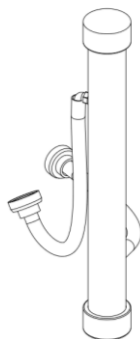
(with fittings & remote probe)

P1099 x 1



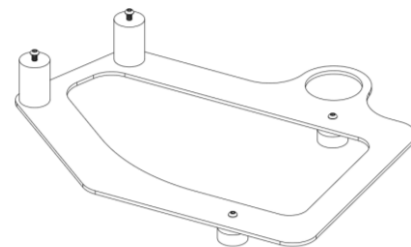
CO₂ Regulator (with 3/8" JG fitting)

S1047 x 1

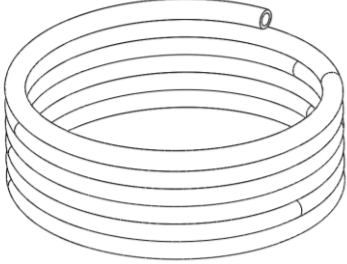
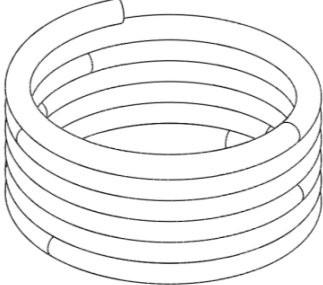


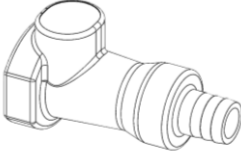

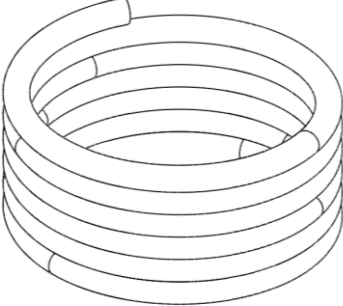
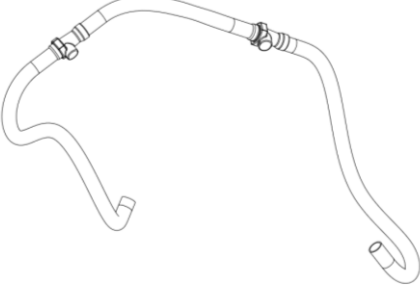
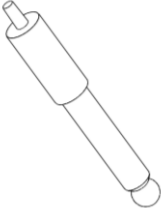
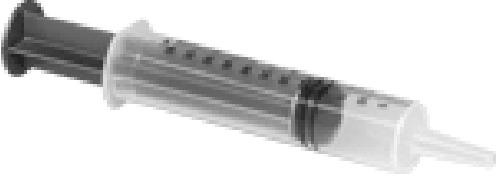






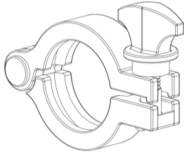
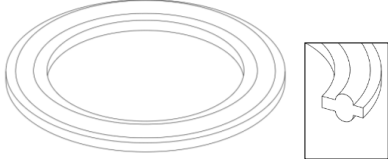
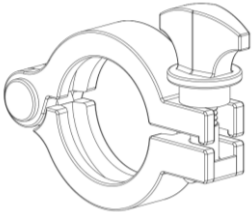
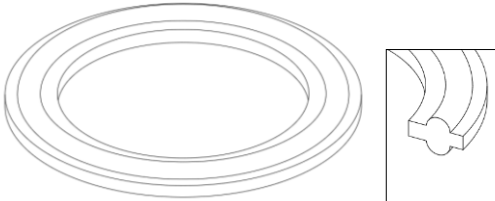
Chiller Cistern

S1046 x 1



Chiller Plate (with mounting fasteners)

<p>R1006 x 5ft</p>  <p>CO₂ Tubing: 3/8" Black Poly Tubing</p>	<p>R1082 x 7.6m (25ft)</p>  <p>Water Inlet Tubing: 1/2" Black Poly Tubing</p>
<p>B1191 x 1</p>  <p>Hose Clamp Pliers (for constant tension hose clamps)</p>	<p>B1235 x 1</p>  <p>1/2" mNPT x 1/2" JG Fitting (attached to R1082)</p>
<p>B1195 x 2</p>  <p>Female 3/8" Quick Disconnects (3/8" fQDC) (For inoculant carboys)</p>	<p>B1034 x 3</p>  <p>Stir Bars S1052, S1053</p>
<p>R1001 x 25ft</p>  <p>Drain tubing: 3/4" ID vinyl hose</p>	 <p>Automated Harvest Line, Automated Harvest Line Extension</p>
<p>B1289 x 1</p>  <p>pH Probe (Ensure fluid is in cap)</p>	<p>B1429 x 1</p>  <p>140 mL Syringe</p>

<p>P1037 x 1</p>  <p>Pleated 0.2 µm Filter</p>	<p>P1122 x 1</p>  <p>20" 0.5 µm Filter</p>
<p>P1042 x 1</p>  <p>Air Vent Filter</p>	<p>B1293 x 1</p>  <p>UV Sterilizer Bulb</p>
<p>B1163 x 1</p>  <p>1.5" Triclamp</p>	<p>B1037 x 1</p>  <p>1.5" EPDM Triclamp Gasket</p>
<p>B1164 x 1</p>  <p>2" Triclamp</p>	<p>B1206 x 1</p>  <p>2" EPDM Triclamp Gasket</p>

Spare Parts Kit

PN	Description	QTY
B1364	Silicone Lubricant	10 mL
B1037	EPDM Sanitary Flange Gasket 1.5"	1
B1206	EPDM Sanitary Flange Gasket 2"	1
B1094	1/4"-20 wingnuts for lid	4
B1089	Neoprene roofing washers 5/16" ID	4
B1103	#10-32, 3/4" button head screw	2
B1030	Constant tension tube clamp for 1/2" ID crush resistant silicone	3
B1217	Spring clamps for harvest pump hose (3/8" ID)	3
B1311	Constant tension spring clamp for nutrient tubing (3/16" ID)	3
B1011	Locking clip for 3/8" OD push-to-connect tubing	3
B1313	Locking clip for 1/2" OD push-to-connect line	3

Abbreviations Used

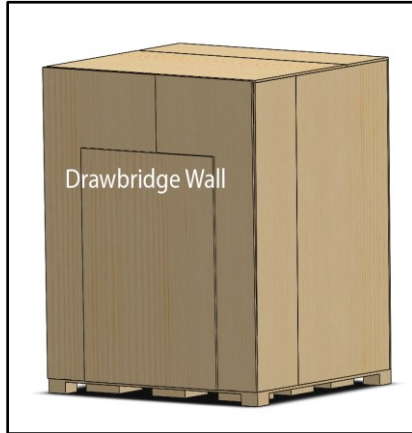
Abbreviation	Description
PBR	PhotoBioReactor
PLC	Programing Logic Controller
QDC	Autoclavable Quick DisConnect fitting
mQDC	Male autoclavable Quick DisConnect fitting
FQDC	Female autoclavable Quick DisConnect fitting
NPT	National Pipe Thread
F/2	Guillard's F/2 algae growth media
CIP	Clean-in-place
GFI	Ground Fault Interrupter
thio	Sodium thio sulphate

Tools Required

- ½" Socket wrench or crescent wrench
- Pallet jack or equivalent
- Compressed gas CO₂ cylinder
- Drill or changeable bit screwdriver

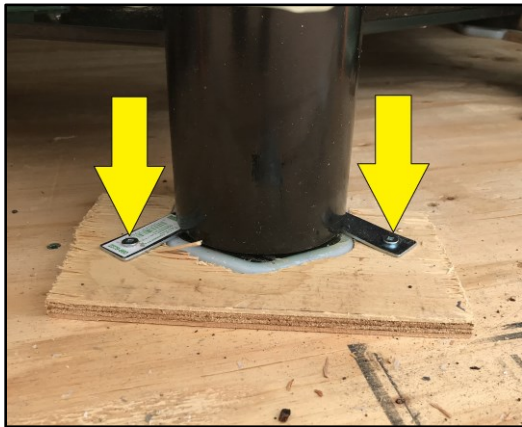
PBR Uncrating

1. Unscrew Drawbridge Wall of the crate.

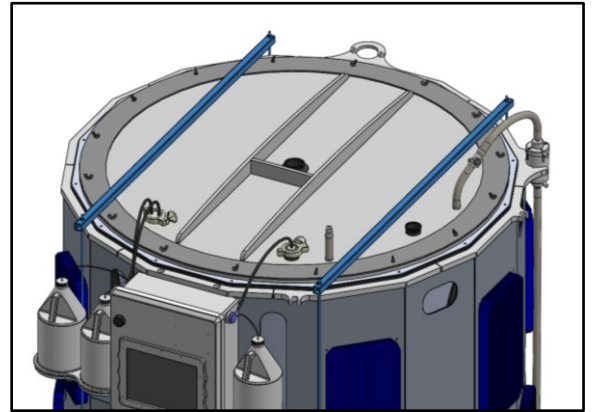


2. Remove top light, chiller and loose packages from beside PBR and locate #2 Robertson head (square) driver.

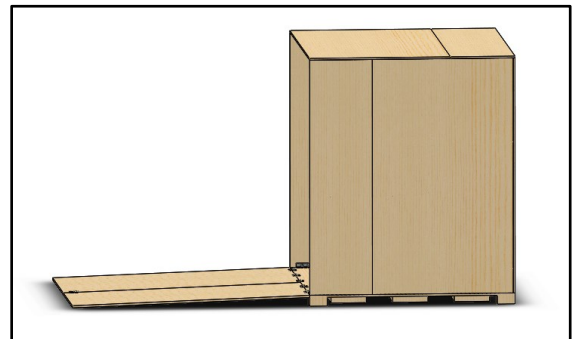
3. Unscrew hardware securing the PBR feet to the crate floor



4. Remove threaded rods and steel bars from the PBR (½" socket wrench). Ensure to loosen both sides evenly and **never** tighten. This is easier with the crate's top removed.



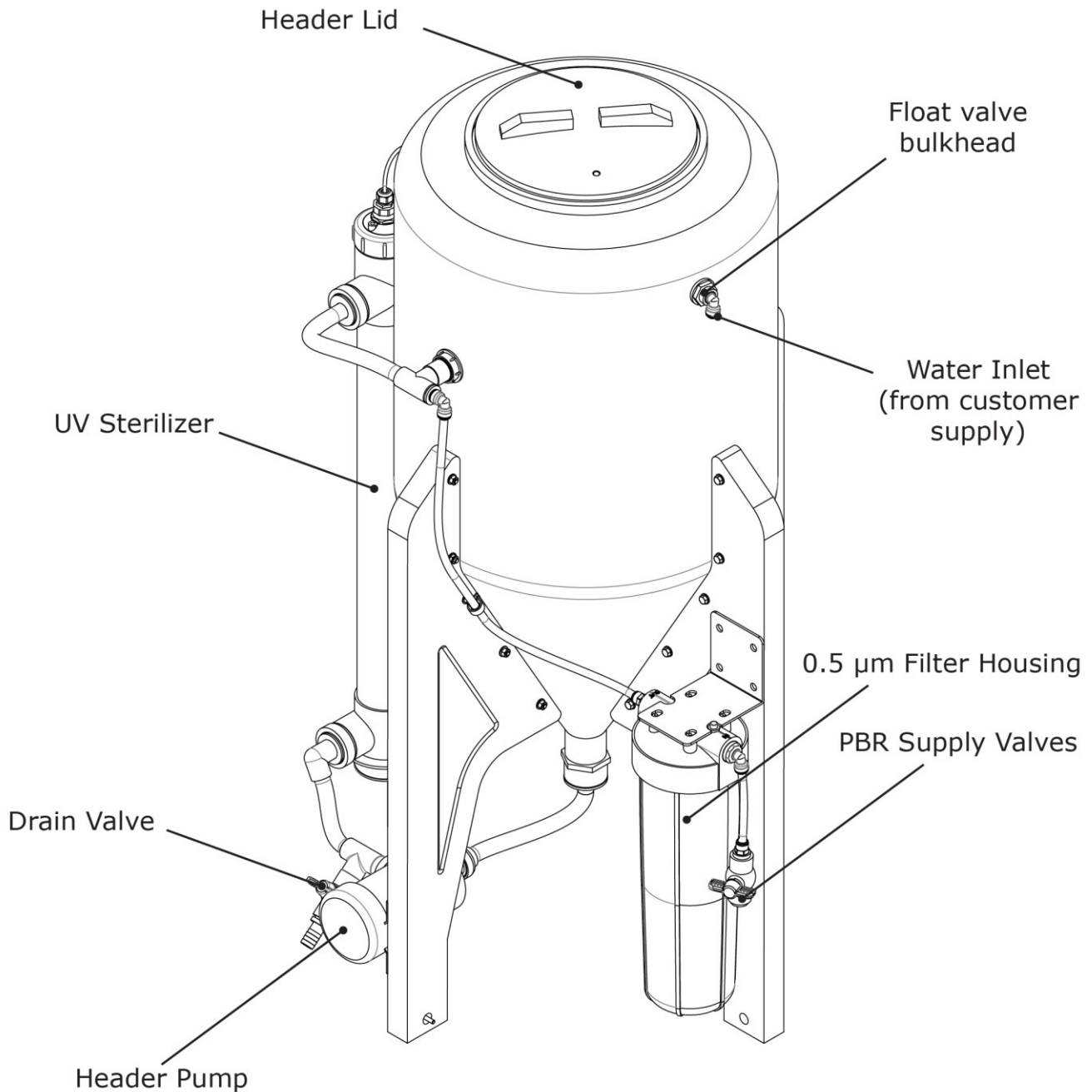
5. Use a pallet jack or forklift the PBR from the crate. **Ensure not** to scratch the powder coated base, to avoid corrosion.



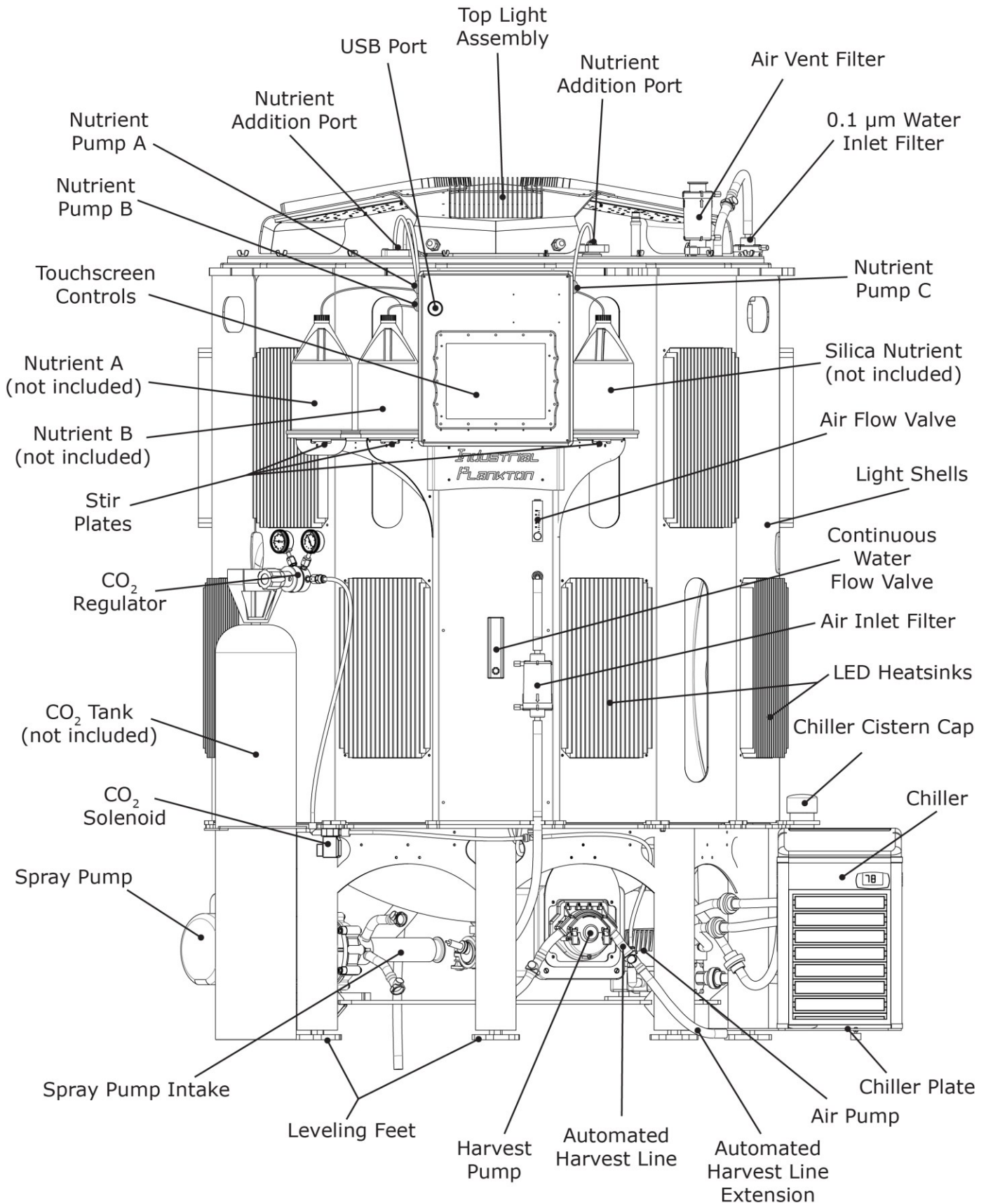
Header Tank Uncrating

1. Unscrew lid and sidewalls of the crate
2. Remove loose packages
3. Unfasten header tank from shipping pallet

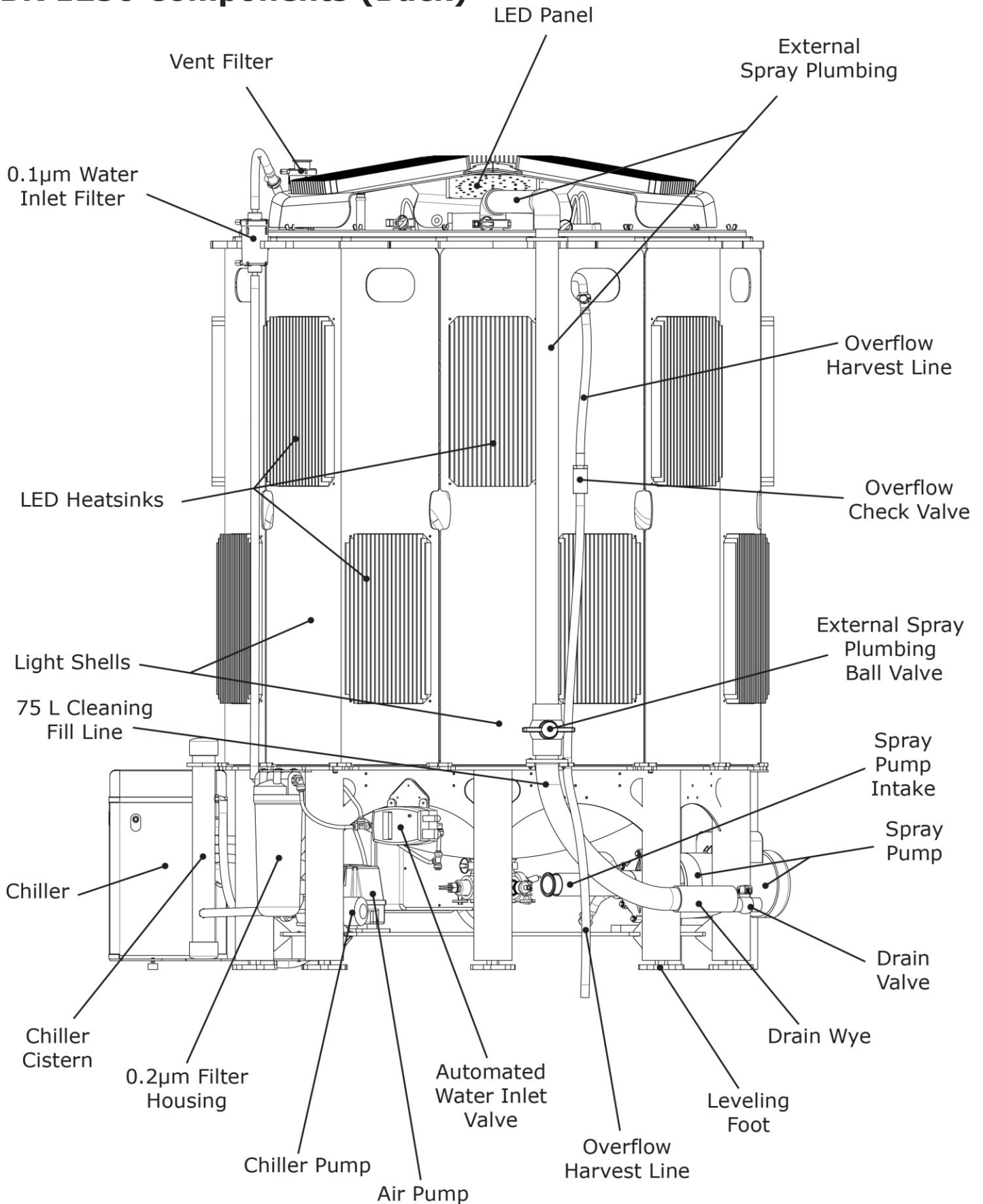
Header Tank



PBR 1250 Components (Front)



PBR 1250 Components (Back)



INDUSTRIAL™ PLANKTON

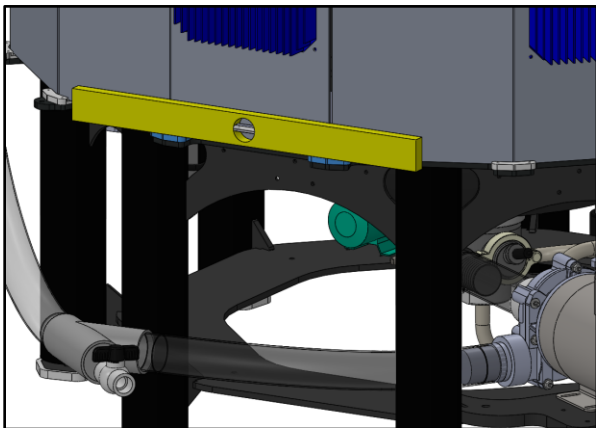
Place the PBR

Leveling and evenly supporting the PBR is critical for spray system functionality and lifetime of the tank.

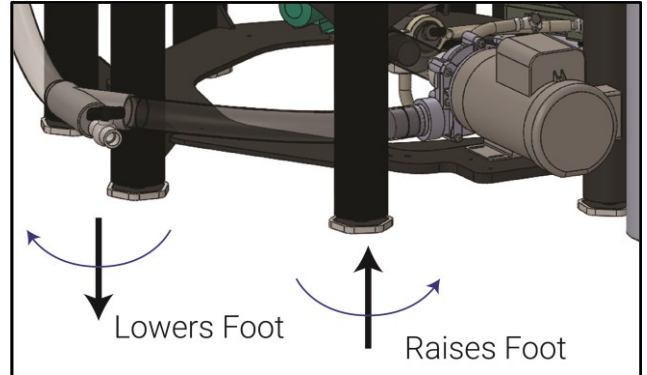
Required tools:

- Pallet jack or similar
- Spirit/bubble level
- Paper
- IP Leveling Foot Wrench

1. Use spirit level to span the bumpers that secure the bottom of the Light Shells around the PBR or use the lower steel plate. Ensure to check level in several different orientations.

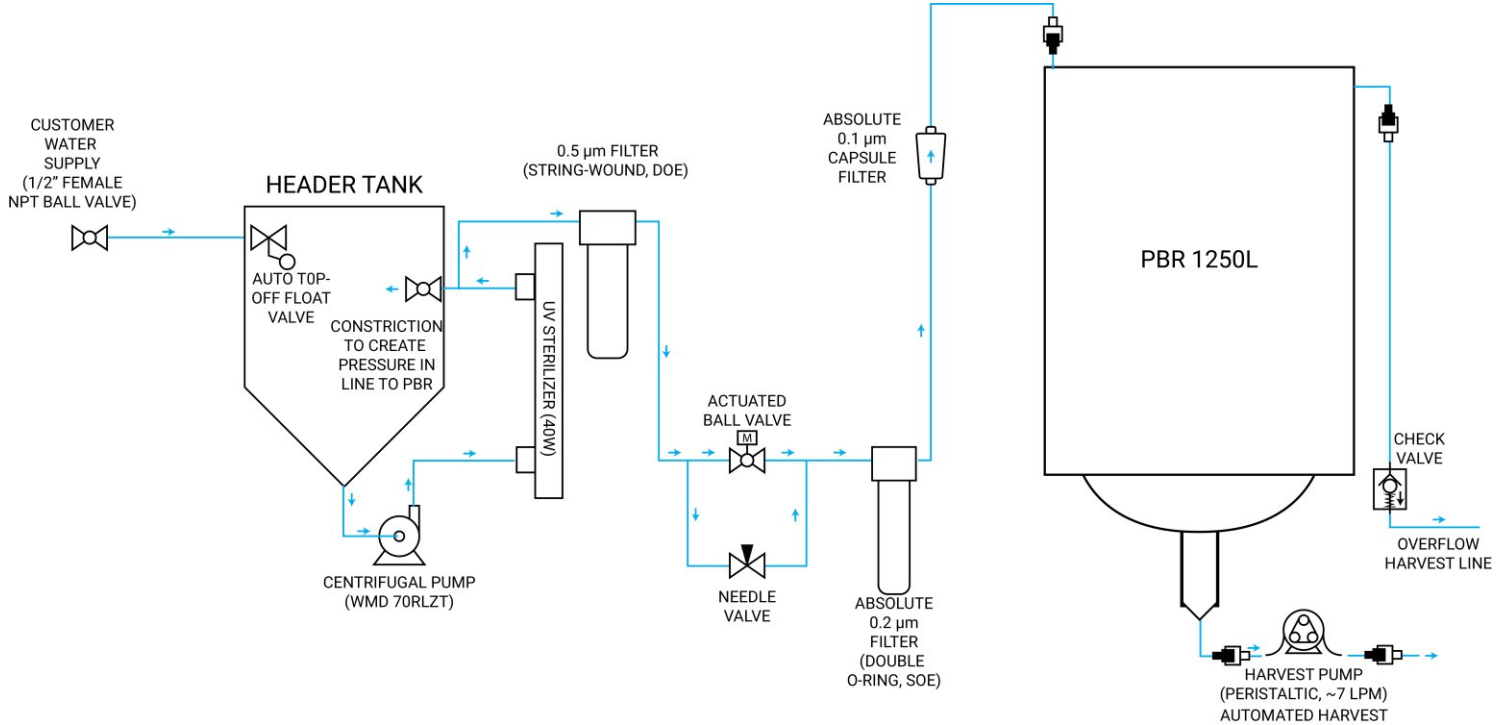


2. Rotate the leveling feet to adjust to the PBR to level.



3. Once level, ensure each foot is supporting the PBR evenly. Slide a thin sheet of paper under each foot to ensure it is tight to the ground – paper should not slide between the foot and the floor.
4. Place Header Tank between water supply and PBR(s)

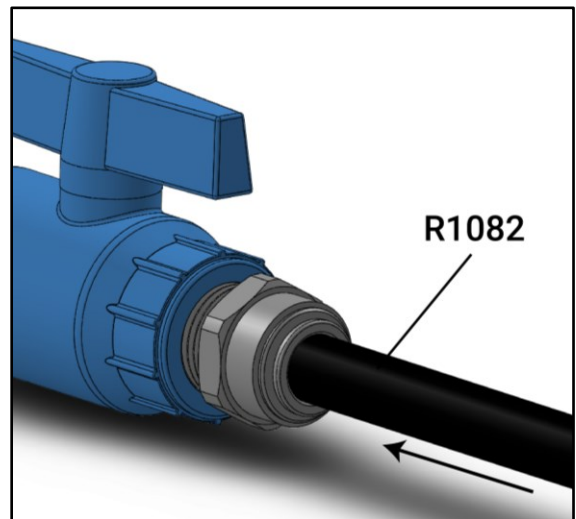
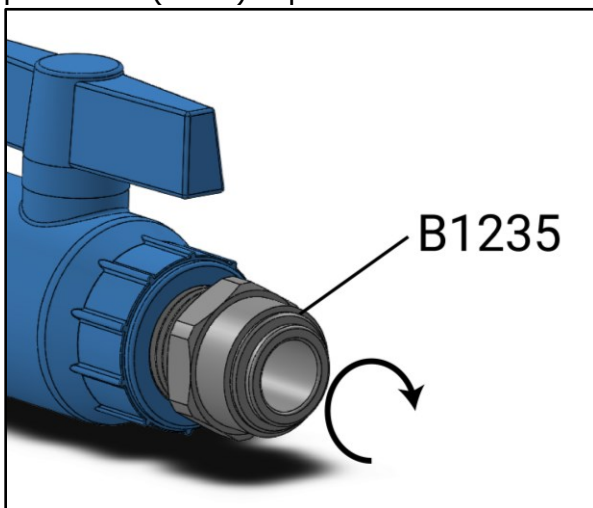
Water Flow



Water Connections

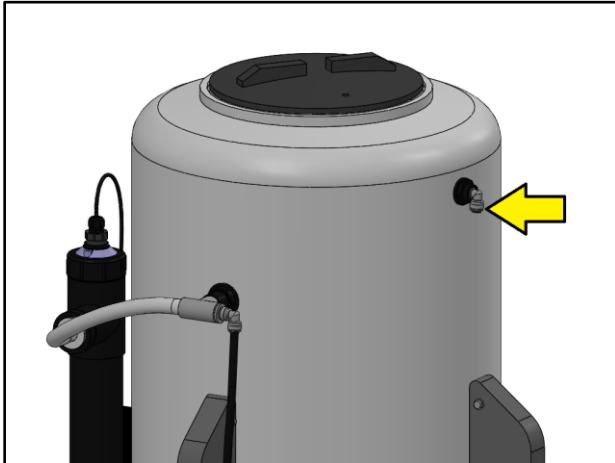
Ensure that push-to-connect tubing is fully inserted into fittings to create a proper seal. If there is a leak, push tube in further. To remove a tube, depress the dark grey ring toward fitting body and pull on tube.

1. Tighten supplied 1/2" mNPT by 1/2" OD push to connect adapter (B1235) into the **facility's** water supply connection. Use plumbers (PTFE) tape to seal threads.
2. Ensure end of supplied 1/2" OD black poly tubing (R1082) is round and cut square, then insert into **B1235**.

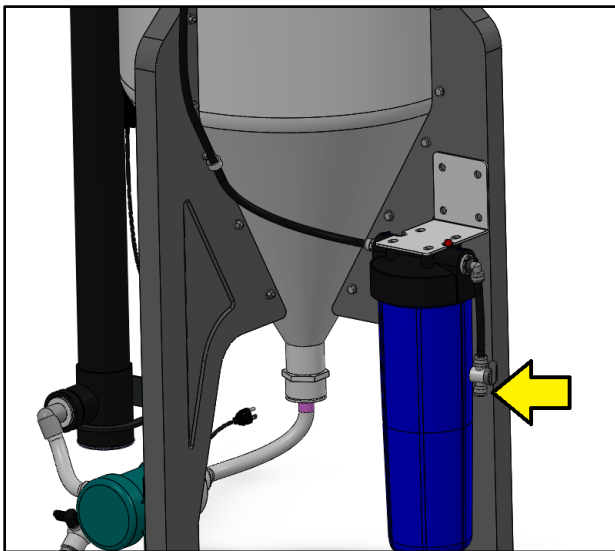


Industrial[™] Plankton

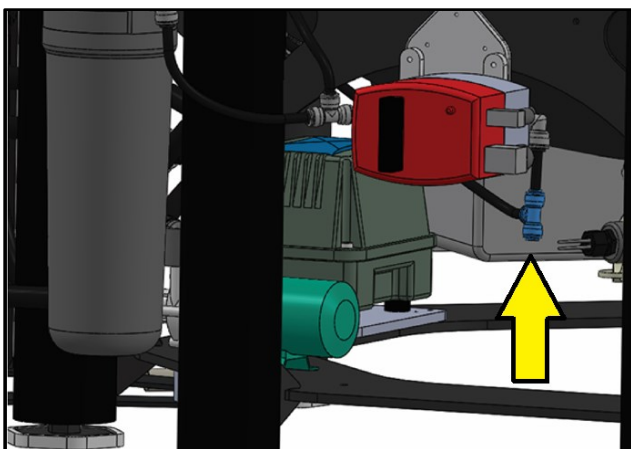
3. Unroll and route **R1082** connected to water supply (from step 1) to the float valve bulkhead on the Header Tank.



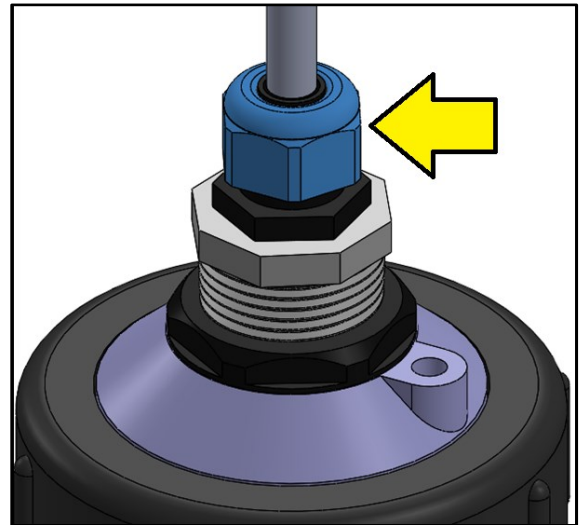
4. Connect excess **R1082** to PBR supply ball valve on the PBR Distribution Manifold.



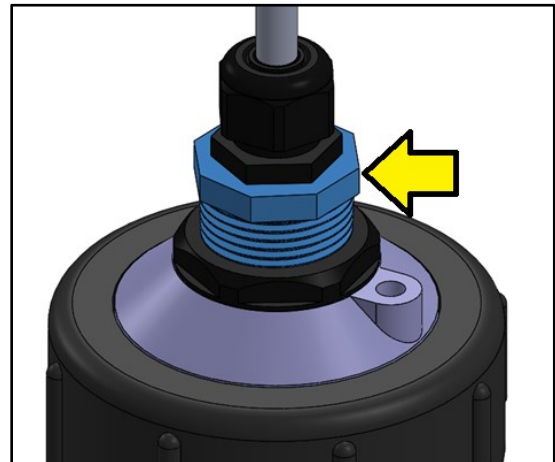
5. Route **R1082** from header to Automated Water Inlet Valve on PBR.



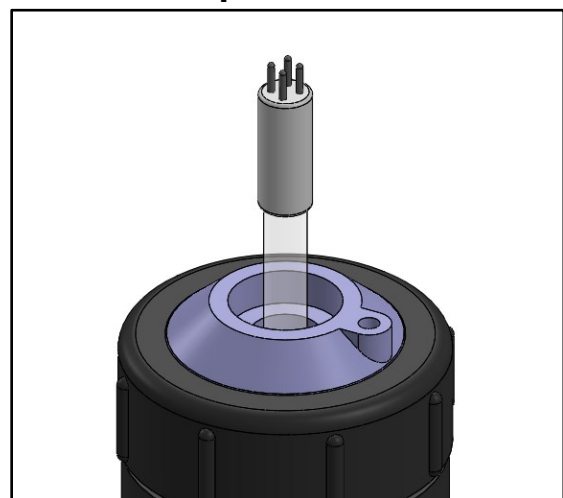
6. Loosen UV cord grip on Header Tank.



7. Unscrew UV cord fitting and remove plug from UV sterilizer.

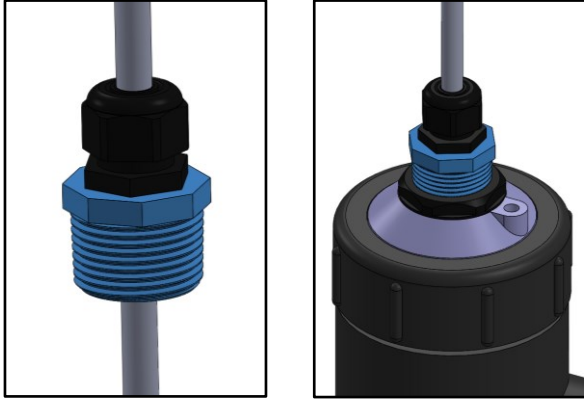


8. Insert UV bulb into Quartz sleeve and connect the 4-pin connector to the bulb. **Do not touch bulb's glass with bare hands or drop the bulb.**

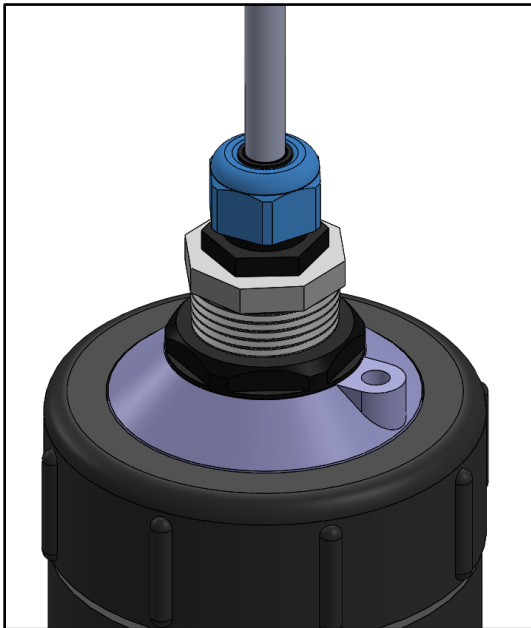


Industrial[™] Plankton

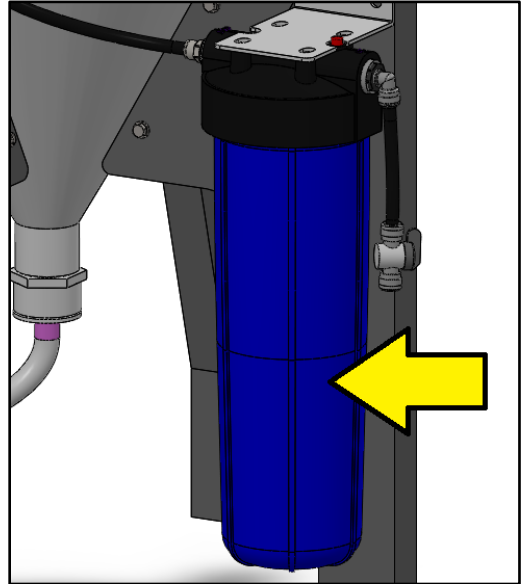
9. Apply plumbers tape to UV cord fitting and tighten into UV Sterilizer. If water enters the quartz sleeve it will damage the bulb and ballast.



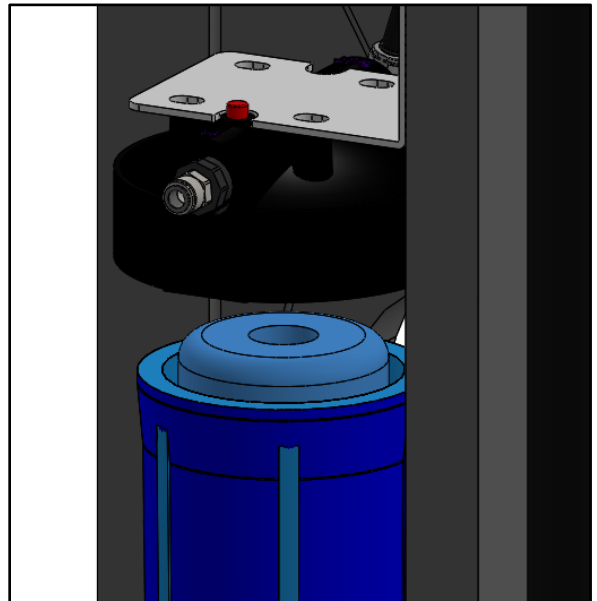
10. Tighten cord grip.



11. Loosen canister on 0.5 µm water filter housing.



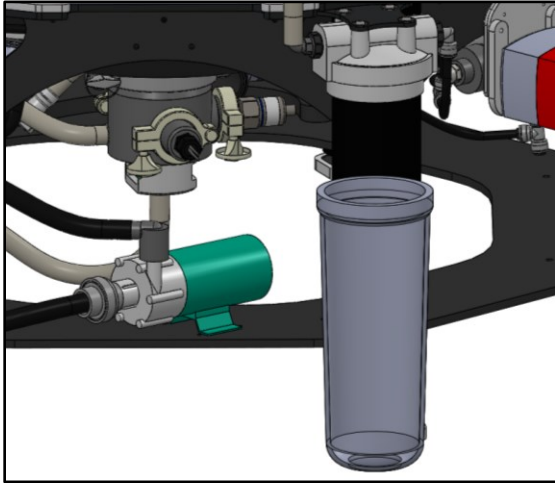
12. Place 0.5 µm water filter into bottom of filter housing ensuring it is centred.



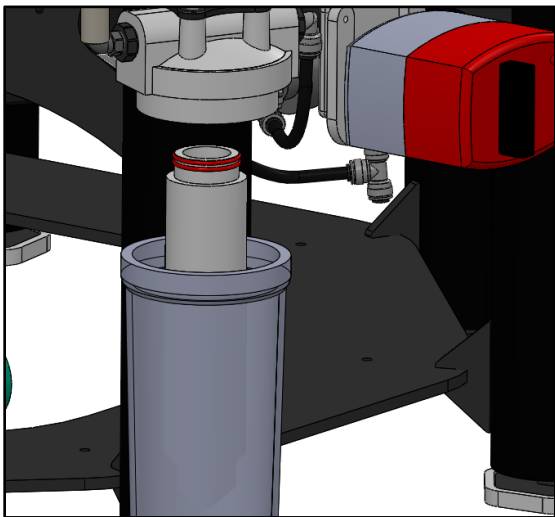
13. Keep filter centred and screw canister back into top.

INDUSTRIAL™ PLANKTON

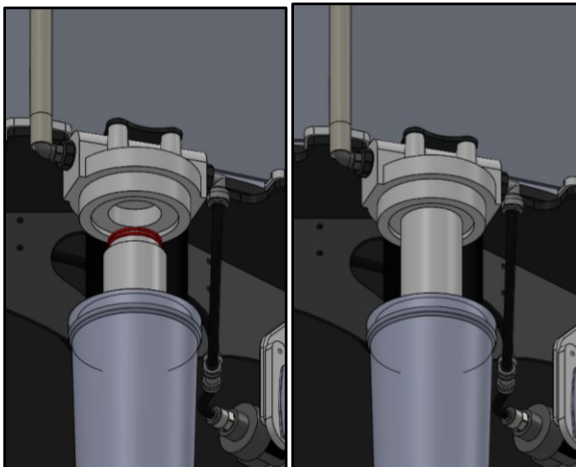
14. Unscrew 0.2 µm filter housing canister on PBR and check O-ring.



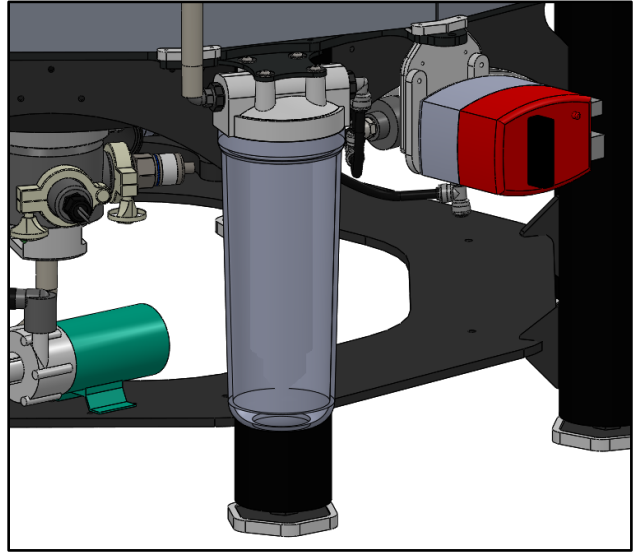
15. Place filter membrane into canister below filter top (double O-ring up)



16. Fully insert filter membrane into top



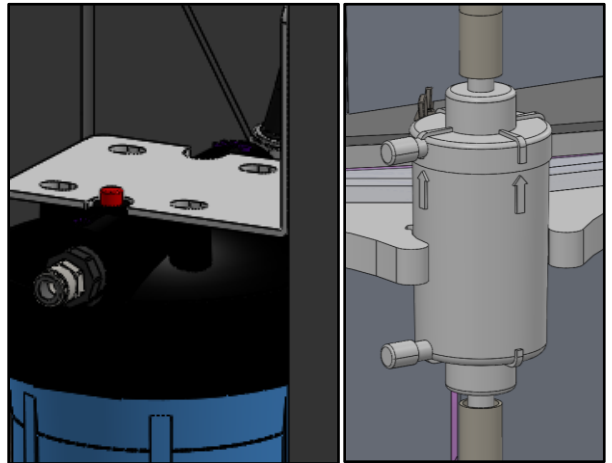
17. Ensure O-ring is seated in canister to avoid shearing, then tighten closed.



18. Turn on water supply

19. Check for leaks in all water lines

20. Bleed air from 0.5 µm (red button) and 0.1 µm filters (top side-barb).

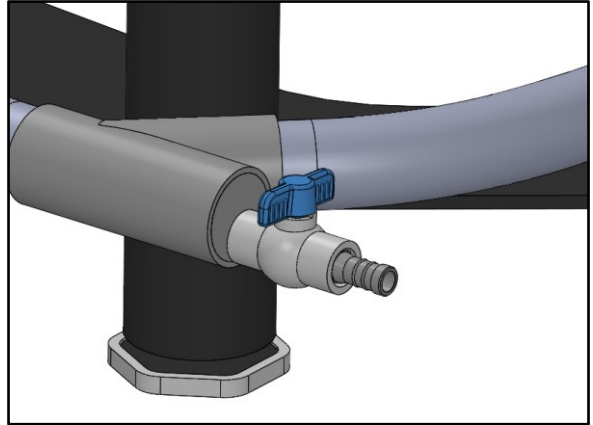


INDUSTRIAL™ PLANKTON

Drainage

The PBR is designed to gravity drain. If a floor drain is unavailable, the harvest pump can be used to drain the PBR. Refer to tank "Harvest: Manual" description in the user manual for details.

1. Attach **R1001** ($\frac{3}{4}$ " ID vinyl hose) to drain valve
2. Route **R1001** to the floor drain



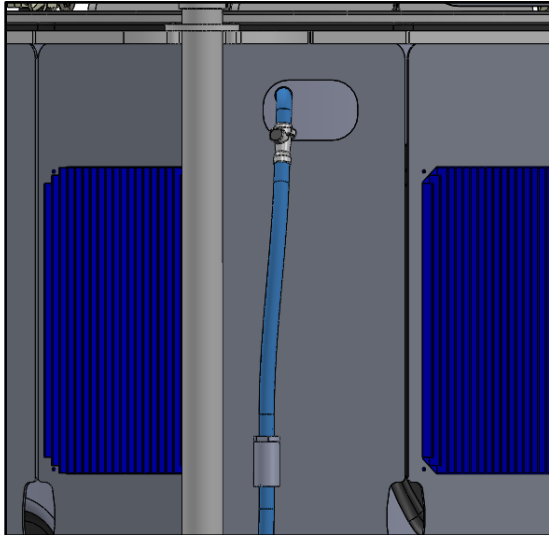
Harvest Lines

Never submerge Overflow Harvest Line or run uphill. It relieves excess air pressure inside the tank to stabilize volume readings and prevent top seal from leaking during spray cleaning.

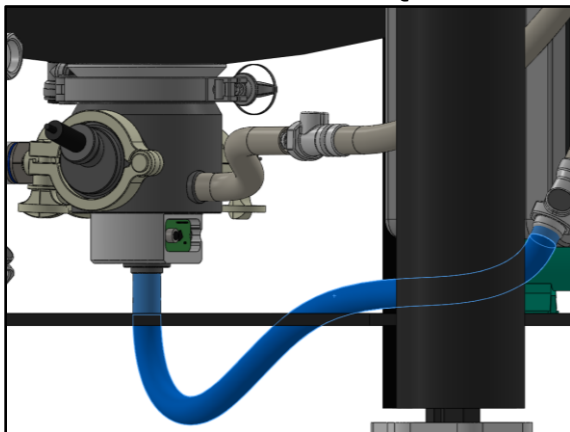
Never connect the Overflow Harvest Line to waterways with livestock when cleaning. Cleaning agents must go to waste.

The Overflow Check Valve prevents contaminated air from entering the PBR when harvesting/draining. **Ensure** air and water can flow freely out of the PBR through it.

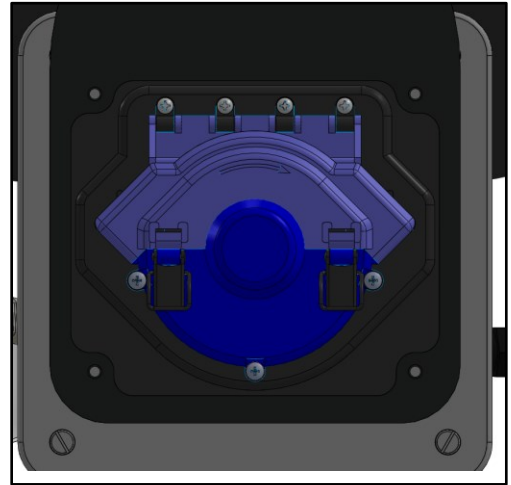
1. Route the Overflow Harvest Line to algae collection tank (or where algae is desired) when culturing in continuous mode. Or, leave directed to waste for spray cleaning. Any tubing or vessel attached to this line must be able to vent to ambient pressure.



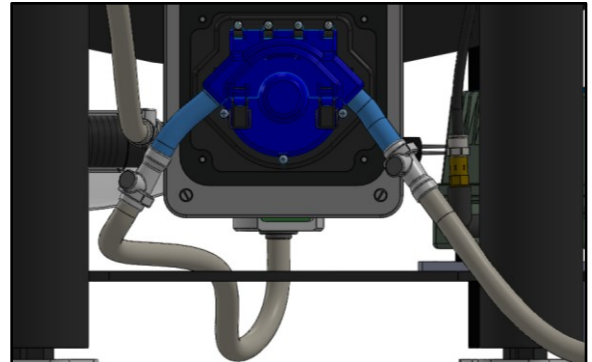
2. Attach Automated Harvest Line to bottom barb on Manifold and adjust tube clamp to secure it. Ensure mQDCs is closer to the PBR than fQDCs.



3. Unclamp and open Harvest Pump top cover.

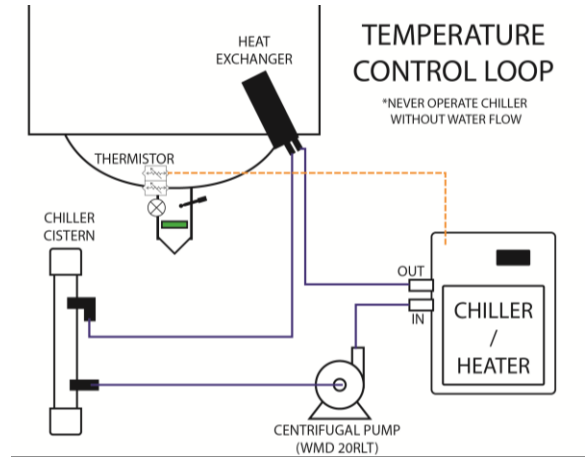


4. Apply **B1364** (silicone lubricant) to the Automated Harvest Line section between QDCs.
5. Place this section through the Harvest Pump's rollers, ensuring to press the tubing far back into the rollers, then press top cover down and clamp shut.

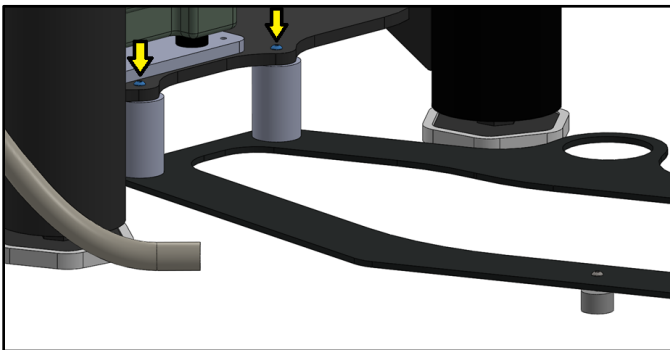


Temperature Control

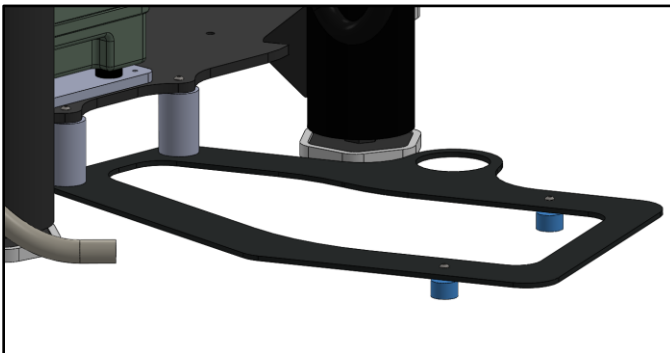
- **Tools Required:** 5/32" Allan key
- **Warnings:**
 - Never run chiller without water motion
 - Carry chiller by handles
 - Top up chiller cistern monthly or as required



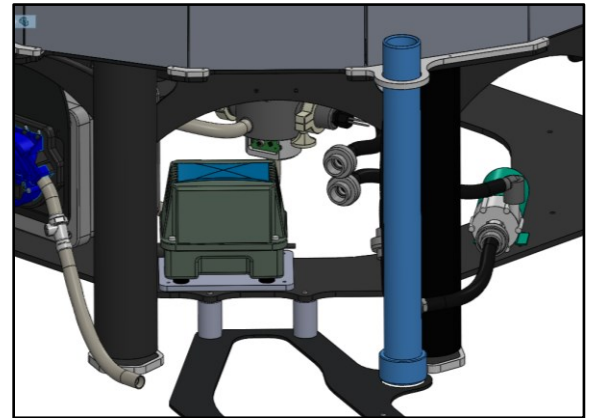
1. Install Chiller Plate using Allan key to install bolts.



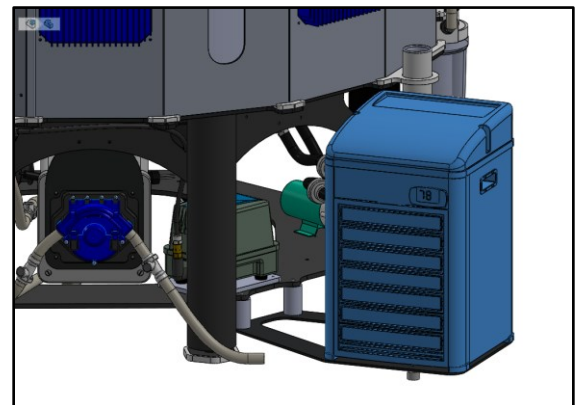
2. Rotate Chiller Plate feet to level chiller plate.



3. Remove Chiller Cistern Cap and install cistern as shown.

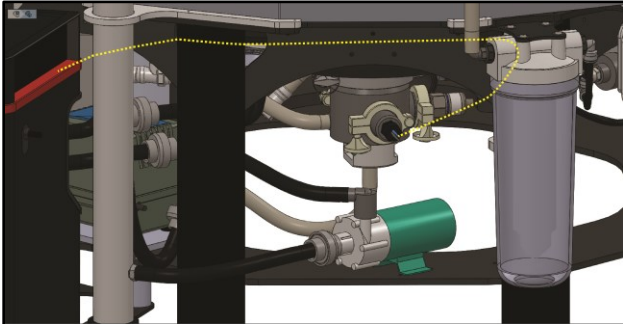


4. Align Chiller on Chiller Plate. Controller faces same direction as PBR's touchscreen

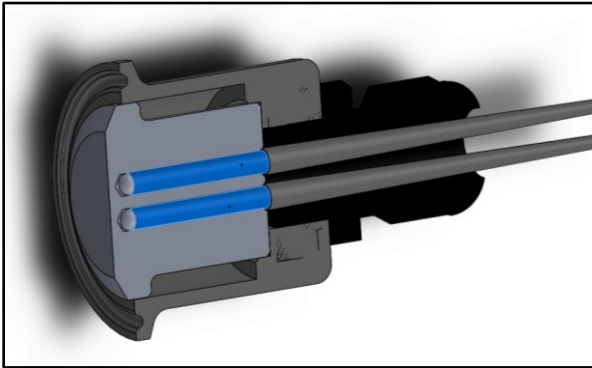


INDUSTRIAL™ PLANKTON

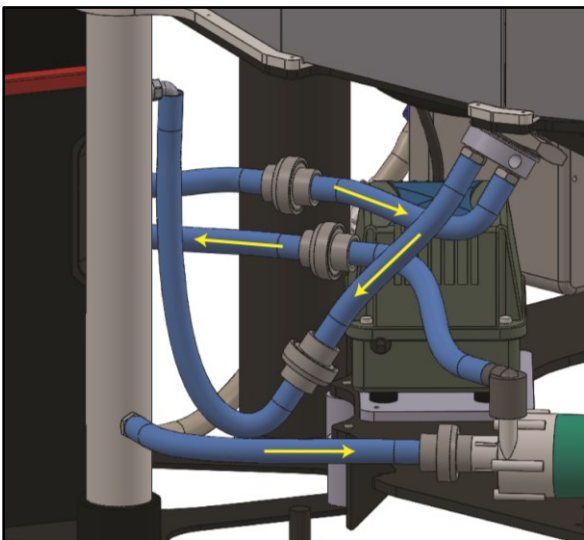
5. Run Chiller's temperature probe through PBR cord loops to temperature probe housing. Run probe wire in separate bundle from major power conductors.



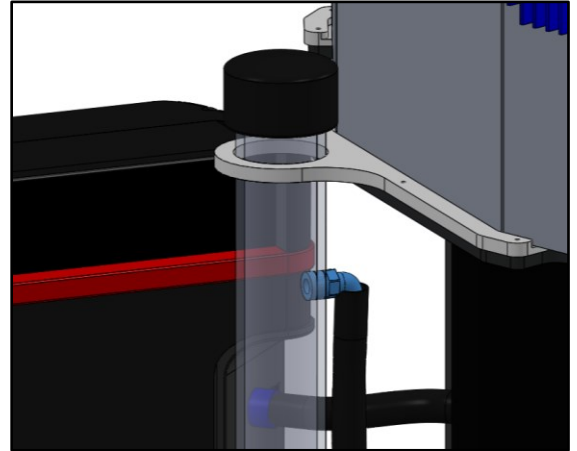
6. Fully insert temperature probe into the Temperature Probe Housing. There are two temperature probes: one for the PBR and one for the chiller. **Ensure** both probes are fully inserted.



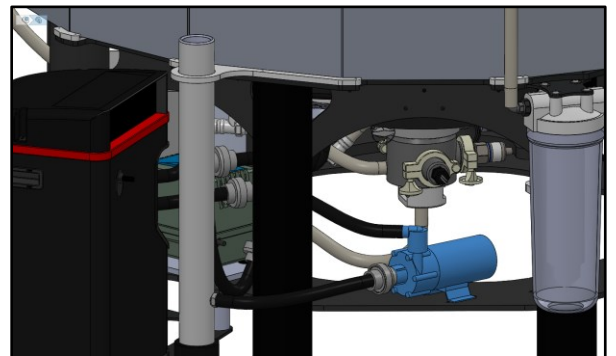
7. Connect chiller plumbing as per diagram using the PVC unions (arrows indicate flow direction).



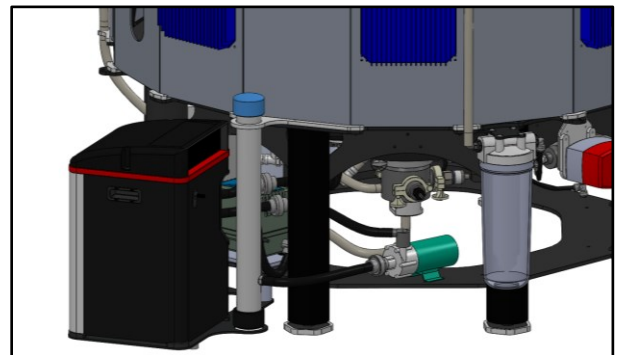
8. Fill cistern to just below the cap height, so water level is visible.



9. Plug in the Chiller Unit power cord (powers both the chiller and chiller pump) and top up cistern (air will be trapped in the lines). It may be necessary to unplug chiller unit and refill the cistern several times to clear the air.



10. Replace cistern cap to avoid evaporation and **check for leaks**

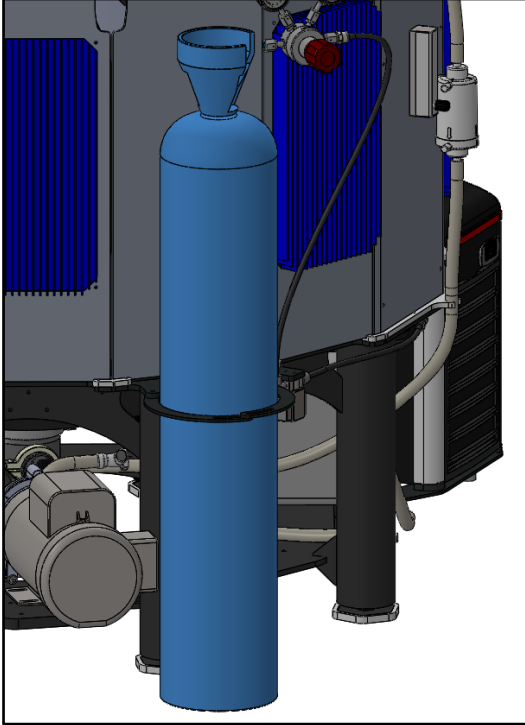


11. Turn on chiller. For instructions refer to [Teco TK 2000 manual](#) or [TK 3000 for high heat option](#)

Industrial[™] Plankton

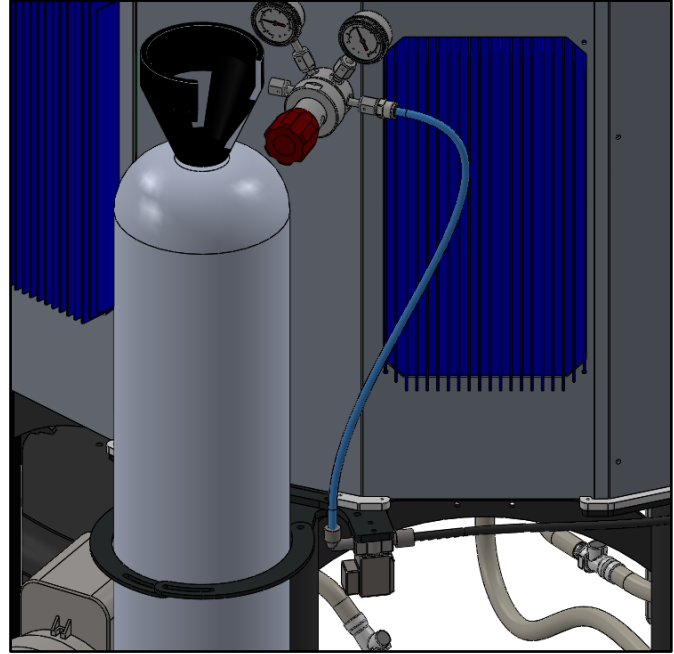
CO₂

1. Place CO₂ cylinder (**not included**) in holder and tighten bolt to secure in place.



2. Attach **P1099 (regulator)** to CO₂ cylinder (check gasket for debris)

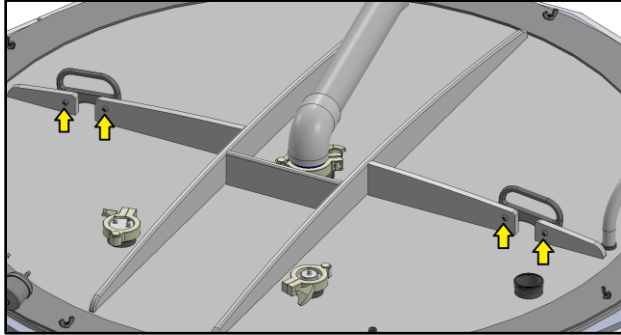
3. Connect regulator to CO₂ valve with **R1006 (3/8" black tubing)**



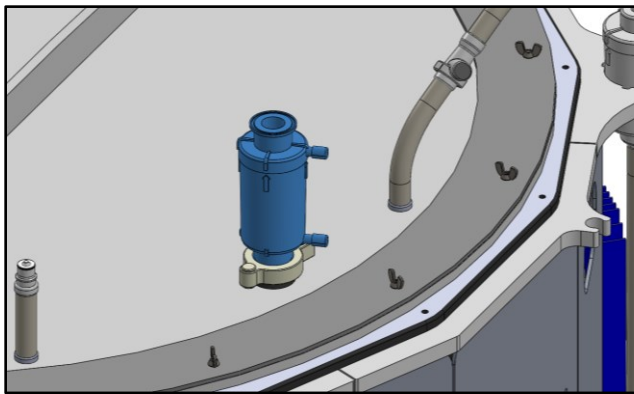
4. Open CO₂ cylinder valve fully
5. Check regulator is set to 15 psi (pull out red knob to adjust and push back in to set)

Top Reassembly

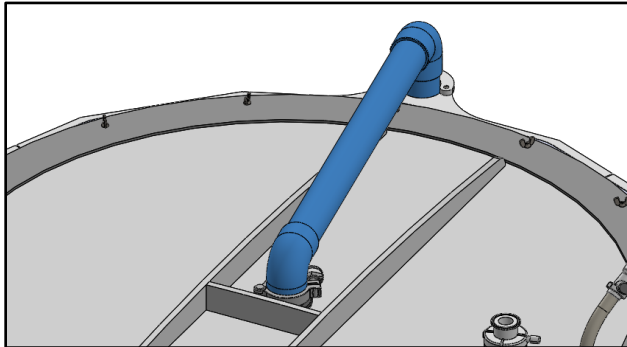
1. Attach the cross supports for the lid using the supplied hex wrench.



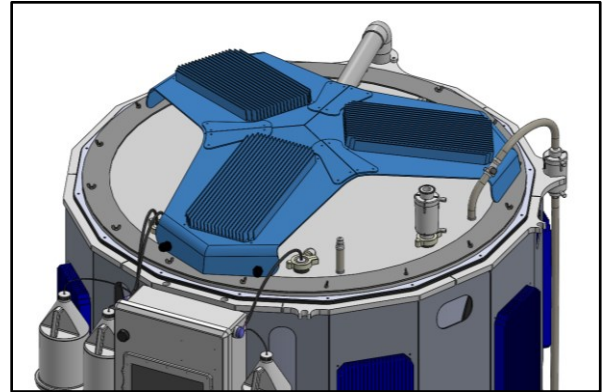
2. Connect Air Vent Filter (**P1042**, KA3PFRP1) to triclamp with gasket (**B1037**) and clamp (**B1163**) on lid with flow direction going out of the tank. Parts should be together in labelled box.



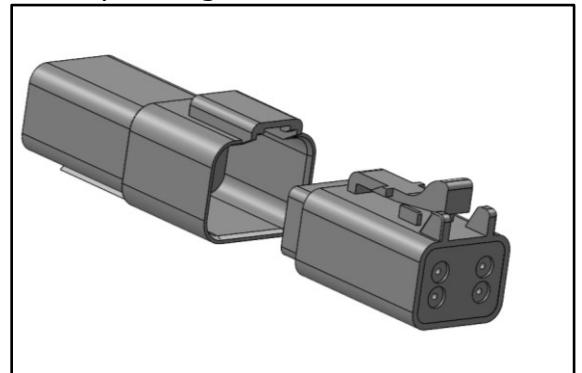
3. Connect external spray post using 2" triclamp (**B1164**) and gasket (**B1206**)



4. Place top light on top of PBR, aligned as indicated (a ladder and 2 people are required). LEDs are fragile on the top light. Ensure not to damage them – it is best to leave the protective foam on until it is installed atop the PBR.



5. Connect two plugs on the top right and left of control box with the top light's corresponding connectors.



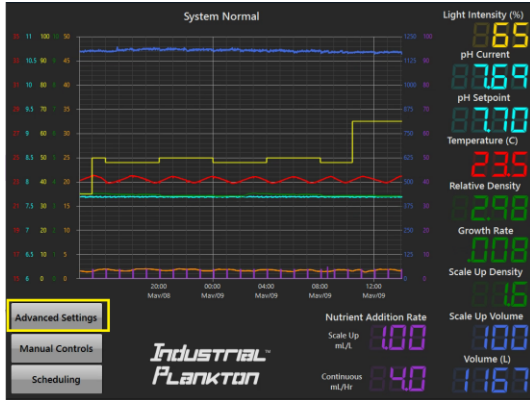
Power

Plug in the reactor, it will automatically boot into the program.

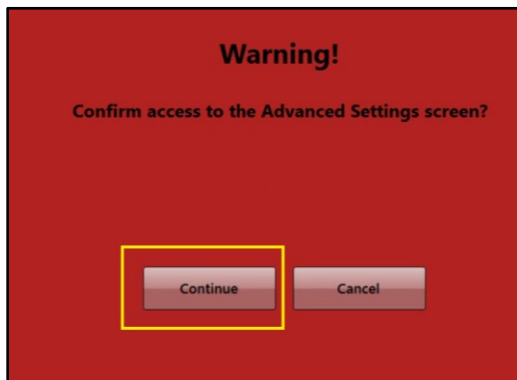
WiFi

To connect to the PBR remotely, Wi-Fi internet must be available, and your remote access subscription must be current.

1. Go to Advanced Settings.



2. Press Continue.



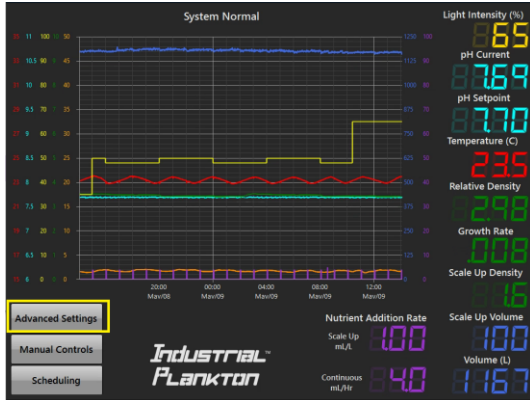
3. From Advanced Settings select Wi-Fi network from list and enter the password.



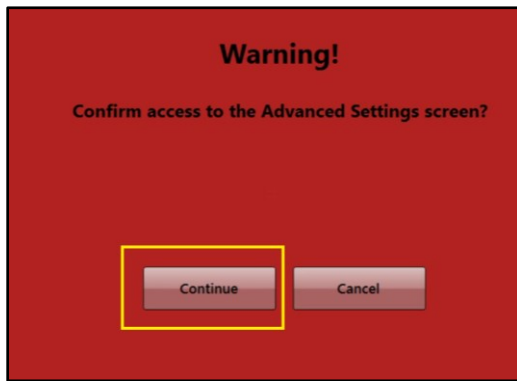
4. If step 3 doesn't connect, continue to advance WiFi setup.

Advanced WiFi Setup

1. Go to Advanced Settings



2. Press Continue.



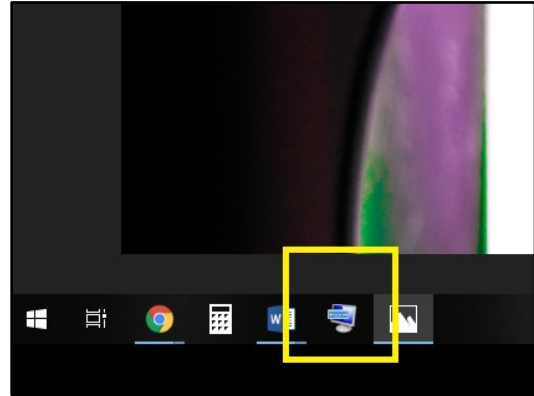
3. Press Exit Program.



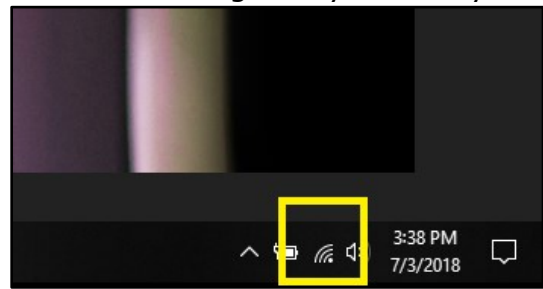
4. Open the on-screen keyboard (in lower right menu on windows login screen).
5. Log into Admin (password: dansarki).
6. Double click the Unlock computer icon on the desktop (this will restart the computer).

7. Repeat steps 1-5.

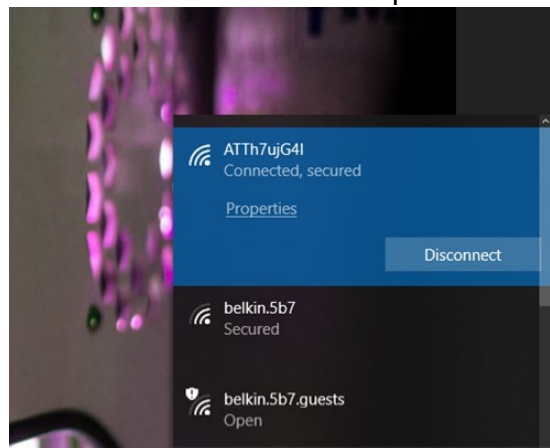
8. Open On-Screen Keyboard (only required if network is password protected).



9. Select Wi-Fi Logo in system tray.



10. Select network and enter password.



11. Double click lock computer icon on desktop.
12. The PBR will restart and launch the control system upon reboot.