DiUse© Owner's Manual

Installation and Operation

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Contents

1 DiUse Owner's Manual

This manual:

- Familiarizes the user with the equipment.
- Explains installation and setup procedures.
- Provides basic programming information.
- Explains the sequential steps of operation.
- Gives specification information.

Read this manual First: Before you operate the DiUse, read this manual to become familiar with the device

Through this manual, special symbols will appear:

NOTE	Is used to emphasize information related with installation, operation and maintenance without highlighting any hazard.
 **WARNING!**	Warning is used to indicate a hazard which could cause injury or death if ignored.
 **CAUTION!**	Caution is used when failure to follow directions could result in damage to equipment or property.

The CapDI system meets the essential safety and health requirements of the European Union. This means that the system can be operated and maintained safely if all safety precautions are observed. However, dangerous situations can occur due to injudicious or negligent use of the CapDI system. If a UL mark is attached to the system, then it has performed to UL standards and is certified.

1.1 General Safety Precautions

The installation, service and maintenance of this equipment should be rendered by a qualified and trained technician. This manual is written specifically for these individuals and is intended for their use. Untrained individuals who use this manual assume the risk of any resulting property damage or personal injury.

NOTE: The DiUse system is not intended for use with water of unknown quality.

NOTE: The DiUse system is to be supplied with cold water.

 **WARNING!**	**Electrical shock hazard: Located on the electrical cabinet door and inside the electrical cabinet. The electrical cabinet may never be opened when the system is producing water, unless advised to do so.**

WARNING!

If incorrectly installed, operated or maintained, this product can cause severe injury. Those who install, operate or maintain this product should be trained in its proper use, warned of its dangers, and should read the entire manual before attempting to install, operate or maintain this product.

CAUTION!

This product is not to be used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience or knowledge, unless they have been given supervision or instruction.

CAUTION!

If the power cord of the unit looks or becomes damaged, the cord should be replaced by a Voltea service engineer or similarly qualified person to avoid hazard.

Before installing be sure to check all applicable plumbing codes and ordinances. Local codes and legislation may prohibit the discharge of sanitizing or descaling solution to drain. The system and installation shall comply with applicable state and local regulation.

The WARNING and CAUTION signs are not meant to cover all possible conditions and situations that may occur during installation, maintenance and operation. Understand that common sense, caution and careful attention is always needed.

Always use protective clothing and proper face or eye protection when handling chemicals and tools.

Observe the following general safety precautions:

- Check the proper functioning of the system daily.
- Always replace damaged or defective parts before putting the system into use again.
- Do not make modifications to the system without prior approval of the manufacturer.
- Do not open the electrical cabinet when the system is powered on. unless advised to do so.
- If chemicals are supplied, the attached safety procedures should be observed.

2 LIABILITY AND WARRANTY

2.1 LIABILITY

Voltea will, under no circumstances be held liable for any consequential damages. The recipient hereby disclaims all representations and warranties, whether expressed or implied with respect to materials and/or prototypes. Including without limitation any warranties of non-infringement, merchantability or fitness for

merchantability or fitness for any particular purpose save that such shall have been prepared with reasonable skill and care. The recipient accepts all risks which may be inherent in its use of materials and/or DiUse system and shall hold harmless and indemnify each of Voltea and its affiliates officers, director, shareholders, employees and agents from and against any and all claims, damage, losses or other liabilities that may arise directly and solely from recipient's use, storage, handling or disposal of the materials and/or systems.

2.2 WARRANTY

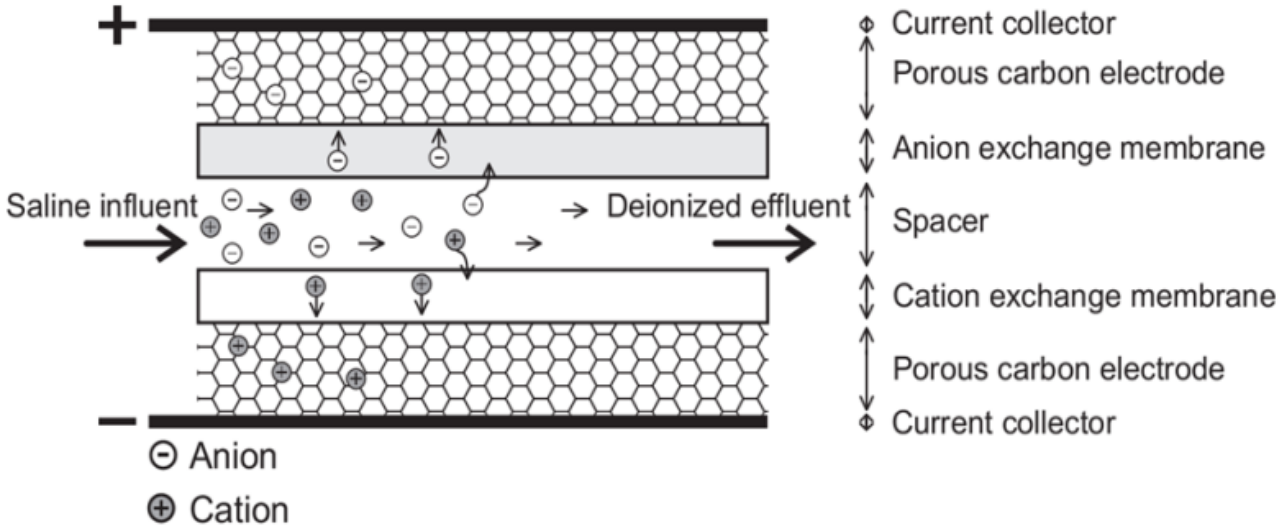
CapDI modules supplied with DiUse have been tested and have a guaranteed performance as they have passed Voltea's quality control test (a certificate of analysis will be supplied with each module upon request). Voltea does warrant workmanship (leakage, connections) of the CapDI module for a period of 1 year from shipment provided that the CapDI module is operated within the recommended operational limits as provided in the section 4.2 and 4.3. Voltea does not warrant desalination and other performance aspects of the CapDI modules within the customer application. Voltea warrants the DiUse for a period of 1 year from shipment provided that the system is operated in accordance with this manual.

3 VOLTEA CAPDI - MEMBRANE CAPACITIVE DEIONIZATION

The CapDI system uses Capacitive Deionization technology and its function is the removal of ions from the water.

NOTE: The CapDI system does not disinfect water.

CapDI: A tunable water deionization technology that is designed to remove dissolved salts from a variety of water sources ranging from tap water and brackish groundwater to industrial process water. CapDI achieves this at a lower economic cost and reduced environmental impact than any other available technology.



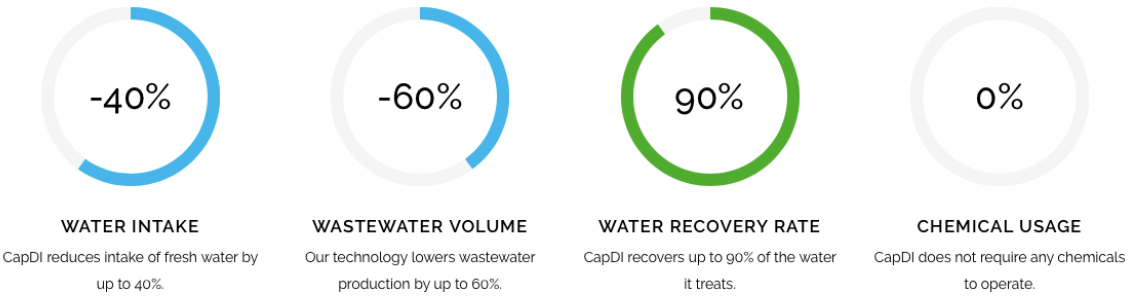
A CapDI module consists of a housing which contains multiple stacks of parallel unit cells. Each unit cell consists of two porous carbon electrodes separated from each other by a spacer. On top of the electrodes, ion exchange membranes are placed. The spacer between the membranes acts as a flow channel to transport the water to be desalinated.

The water flows through a small electrical field of approximately 1.5 volts that is created over a pair of electrodes. Dissolved ions are pulled out of the water stream, toward the electrodes. The electrodes are separated from the water by the membranes that selectively allow only positive or negative ions to pass. CapDI is effective at removing all type of ions from water (e.g. calcium, sodium, chloride, carbonate).

Uniquely: Our technology is environmentally friendly by its low energy consumption and minimal to no chemical usage. Thus, allowing any unrecovered water to flow back into the ecosystem safely.

Scalable: Voltea's technology treats water types ranging from residential consumer appliances to large-scale industrial plants. Our systems are modular, allowing easy expansion to meet any increased water demands.

Tunable: CapDI is tunable, allowing adjustable TDS reduction between 25% - 95% depending on customer needs. Eliminating the requirements for blending to achieve a specific water quality. The customer sets their desired reduction rate and the CapDI maintains this level, continually adjusting itself to account for any fluctuations in feed water characteristics.



4 DiUse

Voltea's miniaturized version of the CapDI systems, specifically made for the point-of-use applications. DiUse softens and desalinates brackish water for homes and businesses at an advantage to traditional desalination technologies due to it being a salt-free, chemical-free alternative. DiUse is ideal for the HoReCa industry alongside small households.

4.1 Features

- Automated system CIP (Clean-In-Place)
- Voltea's remote monitoring and control (option)
- Pure outlet conductivity meter (0 – 5 mS/cm)
- Total flow meter (0 – 10 L/min or 0 – 2.6 gpm)
- Built in display

4.2 SPECIFICATIONS

Performance	Produced flow rate*	0.3 – 2.2 L/min (0.08 - 0.58 gpm)
	Instant flow rate*	0.5 - 4 L/min (0.13 - 1.06 gpm)
	Salt removal	25 - 90 %
	Water recovery	40 - 90 %
System Specifications	Average power requirements	0.13 kW, Single Phase (110 - 240 V AC / 50 - 60 Hz)
	System dimensions (L x W x H)	0.32 x 0.43 x 0. 64 m (1'10'' x 1'5'' x 2'1'')
	Power output to modules	0 - 65 A / 0 - 2 V DC
	Weight**	17kg (37 lbs.)
	Feed inlet coupling	3/8'' push fit
	Product outlet coupling	3/8'' push fit
	Concentrate/Waste outlet coupling	3/8'' push fit
Operational Requirements	Water feed pressure	3 - 20 bar (45 - 300 psi) System is equipped with a pressure reducer.
	Water pressure produced***	≤3.5 bar (51 psi)
	Operating ambient air temperature	Max < 35 °C (95 °F)
In/Outputs	Start/Stop	Pressure switch (standard) or external signal (24 V DC)
Operational Pressure Setpoints	Start****	≤ 2.0 bar (28 psi)
	End****	≤ 3.5 bar (51 psi)
Cleaning	Procedure	Automated cleaning with citric acid
	Control (auto/manual)	Automatic: on cycles of operation
	Storage	1L chemical container

Controls	Remote control / Data monitoring	Total flow, average conductivity, average voltage, cycle counts and alarms (2G SIM /GSM bit internet or local)
	Parameter change	Locally

*Depends on TDS reduction and water recovery
**Weight without module
***Depends on flow target
****Pressure may vary

4.3 FEED WATER QUALITY

Parameter	UNIT	RANGE
Removal limit	Δppm	≤1300
Total dissolved solids (TDS)	ppm	≤2000
Total organic carbon	ppm	< 10
Chemical oxygen demand	ppm	< 20
Turbidity	NTU	< 4
Fats, Oils, Greases	ppm	< 0.5
Total suspended solids (TSS)	ppm	< 4
Free Chlorine	ppm	< 2
pH		2 – 10
Iron total	ppm	< 0.5
Total hardness ($CaCO_3$) *	ppm	< 1000
M Alkalinity ($CaCO_3$) *	ppm	< 1000
Pre – filtration	μm	Supplied separately
Temperature	°C / °F	1 - 35 / 34 – 95
Chemicals	Contact Voltea	

*Limit depends on set TDS reduction and water recovery

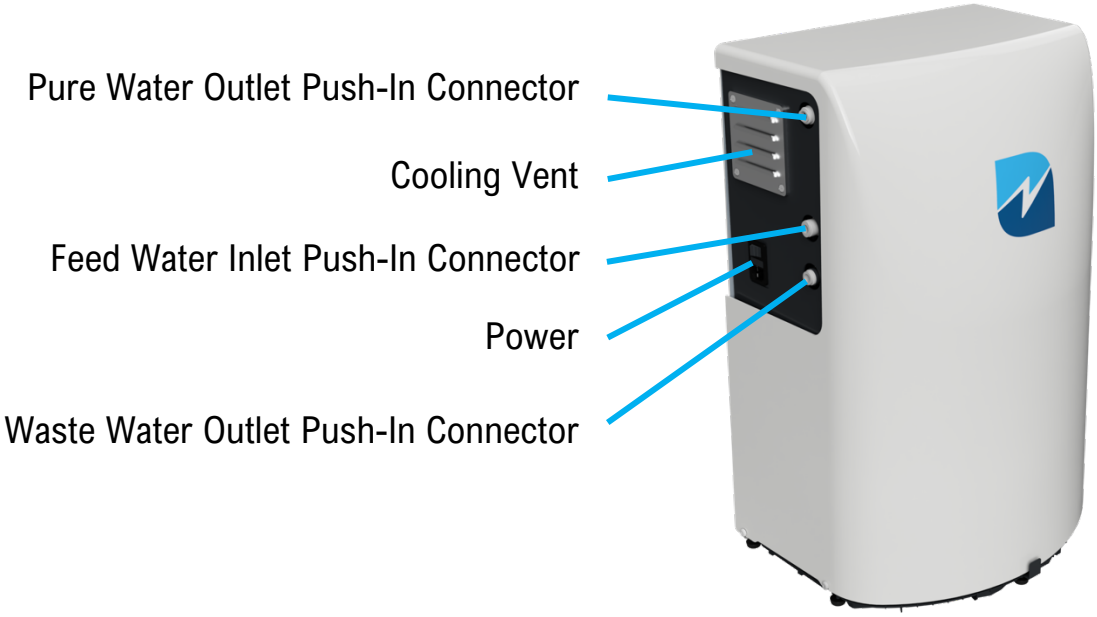
CAUTION!

5-micron filter is the minimum required pretreatment for the feed water.

5 System Overview

Control View

Connection View



6 SYSTEM INSTALLATION

NOTE: Read this section entirely before starting the installation. Follow all applicable plumbing and electrical instructions.

6.1 PACKING

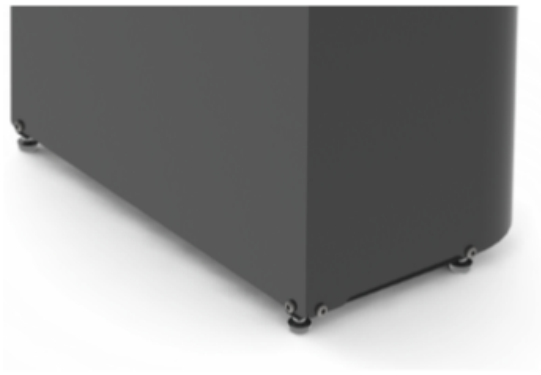
- The DiUse system is shipped in two boxes.
- One box contains the module and module T-junction (left picture).
- The other box contains the DiUse system, power cable and spare flow restrictors.

Modules weigh 23 kg (50.7 lbs.)

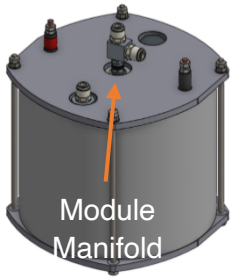
6.2 TOOLS AND MATERIALS

- Safety shoes
- 2x size 13 wrenches
- Hex key number 4
- Flathead screwdriver

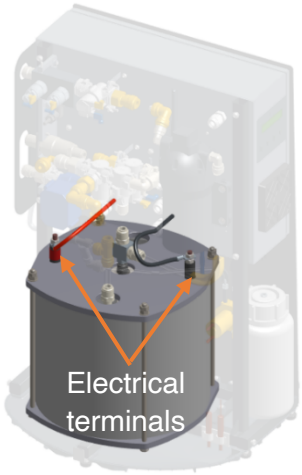
6.3 MODULE INSTALLATION



- Loosen the connections holding the curved cover in place.
- Lift off the curved cover being careful of protruding parts (e.g. air filter).



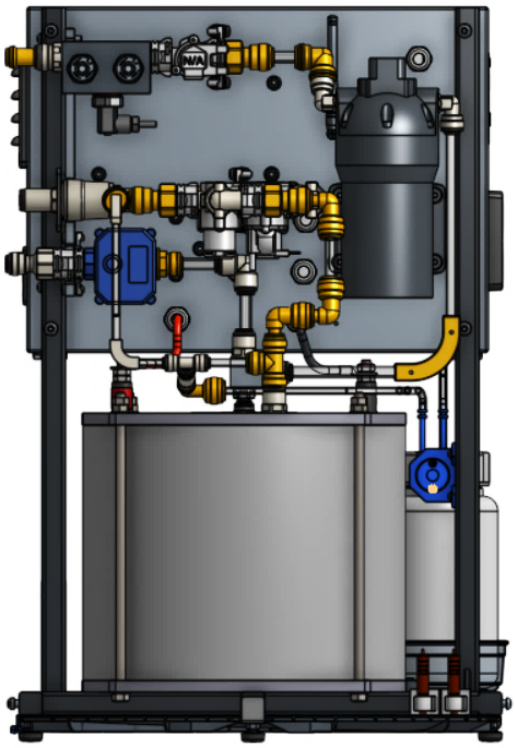
- Remove orange stoppers from module. Add manifold/T-junction to center of module using stem adapter.



- Rotate the module so the red terminal is on the left and the black terminal is on the right, when facing the water side of the electrical cabinet.
- Push the module on the frame up against the stoppers.

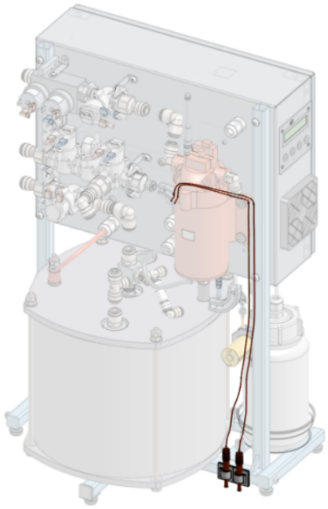
Modules weigh 23 kg (50.7 lbs.) and the system 17 kg (37 lbs.). It is recommended to wear safety shoes during installation.

- If done correctly, the module inlet (the connection that is NOT in the middle of the module top) will be facing outward from the system, and the edge of the module will be in line with the edge of the frame.
- The vertical tube that is attached to a T-junction should be pushed into the module outlet. If placed correctly, pulling on the tube firmly should not disconnect it from the module.
- The tubing that comes from the waste line (above the center of the module) should be pushed into the vertical connection coming from this point.



- Each module has one red and one black electrical terminal, with each terminal having two M8 nuts. Unscrew one of the nuts from the red terminal. Place the red cable from the system on the red electrical terminal, then screw the nut back on. Tighten using two size 13 wrenches, one on the top nut and one on bottom nut. Repeat the process with the black terminal and black cable. Be sure the bottom nut is not sitting on the plastic bushing.

6.4 PLACING LEAK SENSOR



The leak sensors are pre-installed. If the leak sensors were removed during transit:

- Take the two sensors and place them in the clamps as shown in the image. The tip of the sensor should be in contact with the leak tray.

NOTE: Leak tray should always be dry to avoid triggering the leakage alarm and stopping the system.

NOTE: You can remove the leak sensors before installing the module and re-install them right after.

6.5 PLACING THE COVERS.

Place the covers back and tighten the connections holding the covers in place.

NOTE: Every connection has a spacer attached to it. Spacers should be between the covers and frame before tightening.

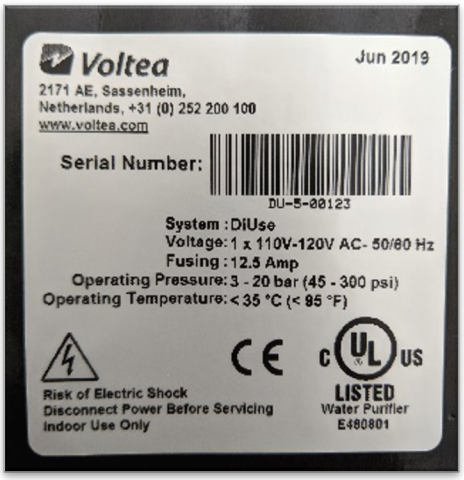
6.6 WATER CONNECTIONS

Size 3/8" tubing should be used to connect the inlet to the IN connection on the side of the unit. The purified (Out) water is discharged through the top 3/8'' connection. Concentrate (Waste) is discharged through the bottom 3/8'' connection.

Connections are indicated by stickers.

6.7 POWERING THE SYSTEM UP/DOWN

- A power cable is provided with the system.
- Connect the cable to the power connection on side of the unit.
- **I** powers ON the system and **O** powers OFF.



NOTE: DiUse systems are specific to either 110 V or 240 V. If in doubt about system specifications, please contact Voltea.

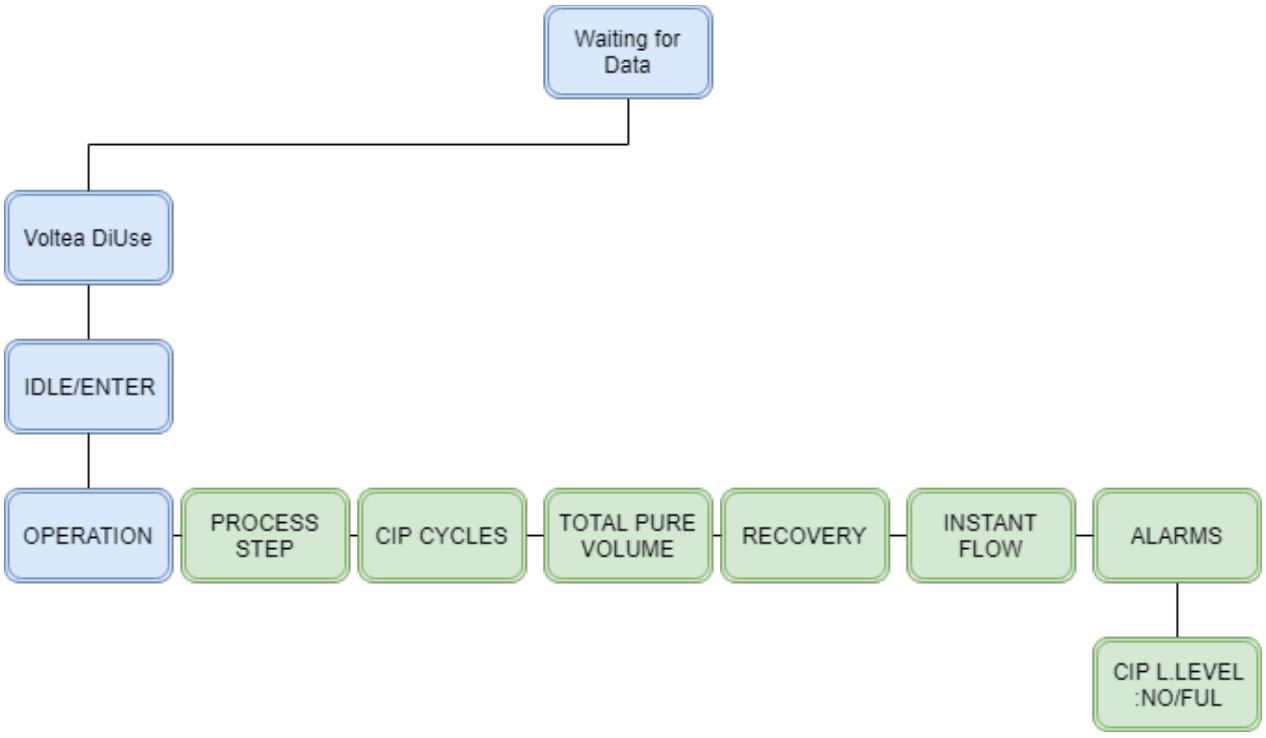
6.8 FILLING THE CLEANING IN PLACE (CIP) CONTAINER

- Unscrew the lid of the CIP container.

WARNING! Acid may splash. Avoid contact with eyes.

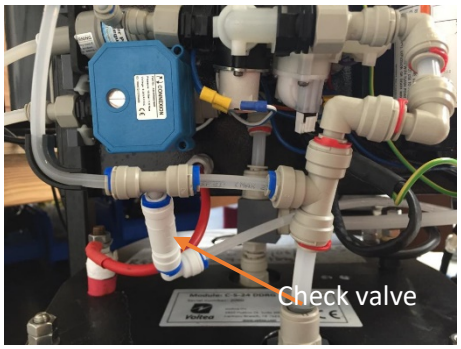
CAUTION! If using citric acid powder always use distilled or sterile water for CIP solution preparation.

- Fill container to max volume with 50% w/w citric acid solution. The maximum and minimum levels are indicated by stickers
- Screw the lid of the CIP container back on.
- Go to CIP L.LEVEL in alarms and press ENTER, the alarm now reads **CIP L.LEVEL : FUL**

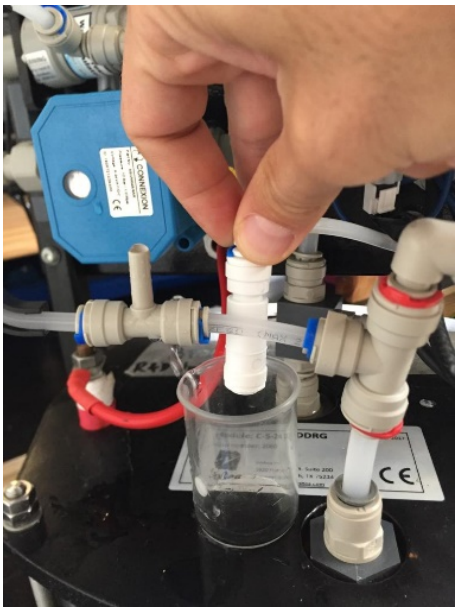


NOTE: CIP solution level is calculated based on the CIP's pump capacity to exhaust the 1L of CIP solution. For this reason, it is mandatory to reset the CIP alarm once the CIP bottle is refilled. Around 36 ml of CIP solution is used per CIP event.

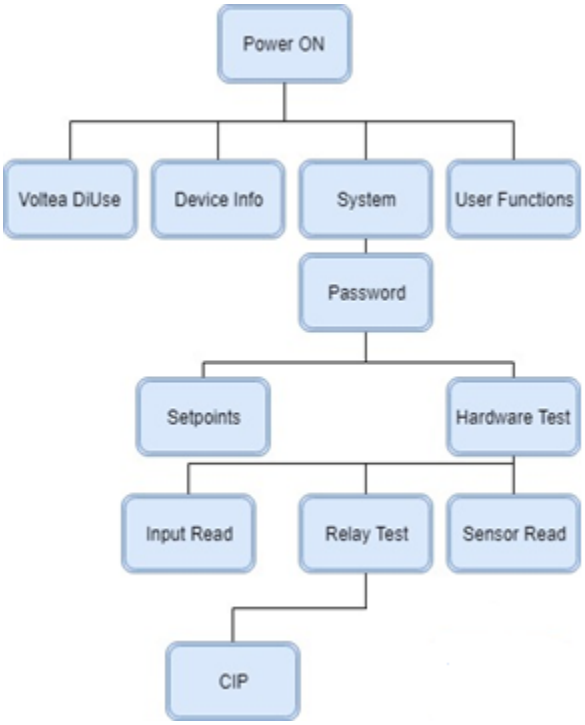
When filling the CIP container for the first time, the CIP line needs to be primed.



- Disconnect the CIP line check valve.



- Use a small beaker to collect the acid during priming.



- Through the main controls go to RELAY TEST and open the CIP Pump (**CIP**) by pressing ENTER. The CIP solution will start flowing through the CIP line. Once the solution reaches the beaker, stop the CIP pump by pressing ESC. Reconnect the check valve. The CIP line is now primed.

6.9 FLUSHING THE MODULE

Before normal operation the modules should be flushed for a minimum of 15 minutes. Module flush is a build in process, please refer to chapter 8.5.

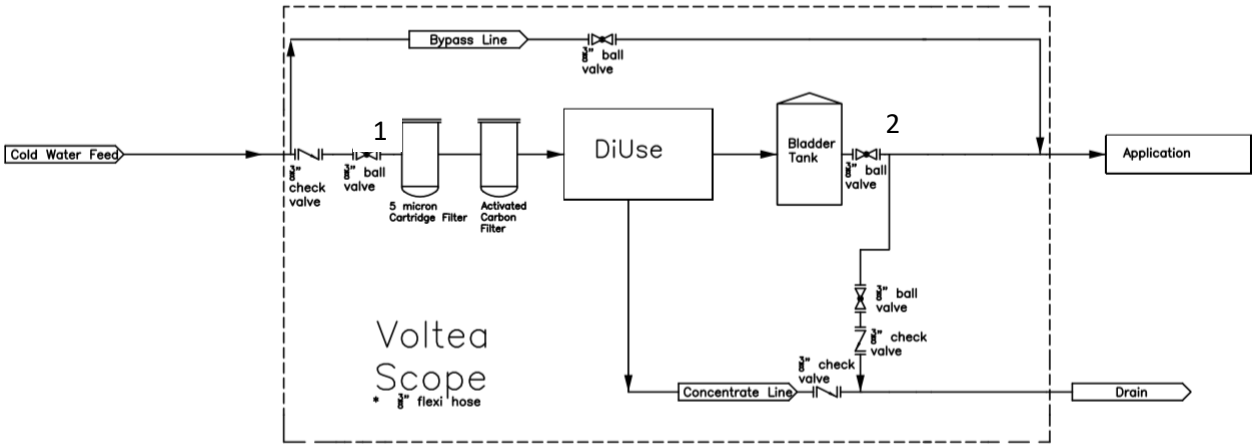
7 System Start Up - Operation

Power the system up. Using the buttons on the LCD screen, press ENTER to go from Voltea DiUse to IDLE-START. Press ENTER again to start operation.

NOTE: It may take up to 8 operational cycles for the unit to adjust and output water of the desired quality.

NOTE: If the system is not reaching target pure conductivity, a flow restrictor change may be necessary. Voltea or a trained reseller can assist with choosing the best option for the specific conditions.

When operating for the first time, it is advised to fill the tank while the connection to the application (2) is closed, this can take several minutes depending on the pure flow rate. The inlet valve (1) should remain open. When the tank is full, and system is in WAIT mode you can open valve 2.



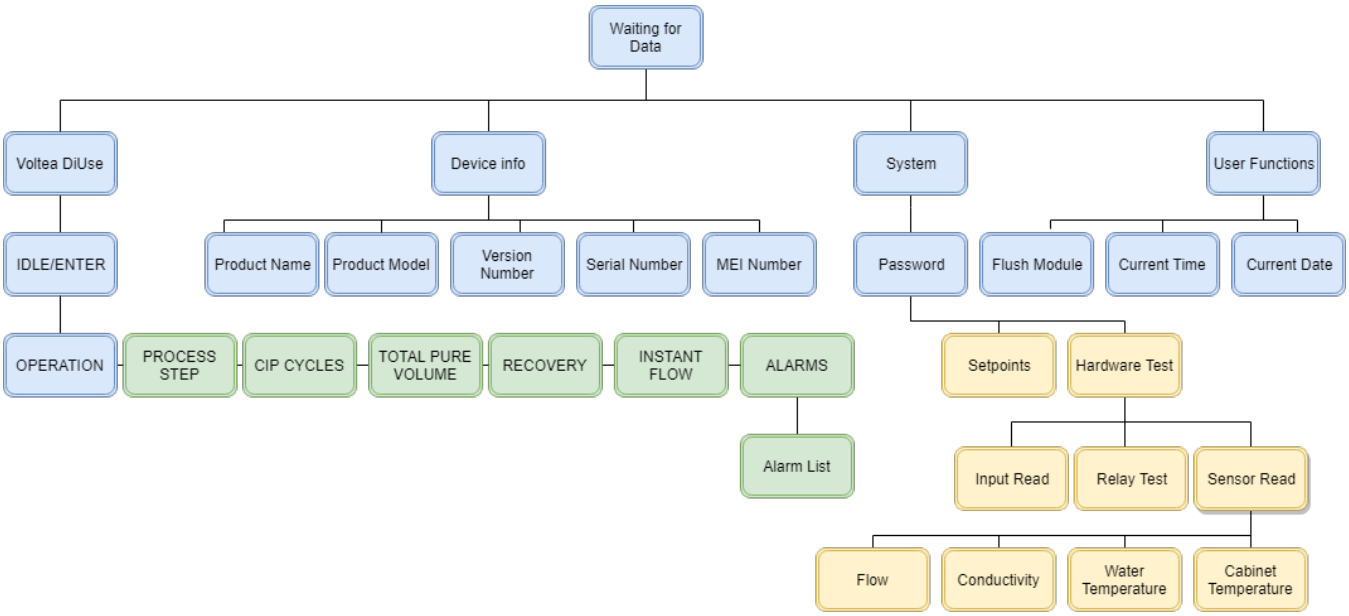
8 System Control Through LCD

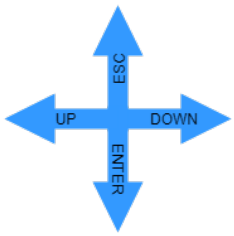
The system can be controlled using the LCD screen and the keypad. Navigate through the screens using the UP and DOWN buttons, confirm selection with ENTER, and return to the previous screen by pressing ESC.

NOTE: If the screen is blank, unresponsive or flickering for more than 2 seconds, please contact Voltea.

8.1 DiUse Screen Navigation Chart

The flow chart gives an overview of the DiUse functions and parameters that can be controlled through the LCD.





NOTE: The password is available to authorized dealers.

8.2 Voltea DiUse

Voltea DiUse Branch		
IDLE/ENTER	**IDLE/ENTER** **100 uS/cm**	• This is the initial screen appearing after powering up. System is in IDLE, activate the system by pressing ENTER. • Average conductivity of the last 5 cycles is also presented.
OPERATION/ CLEANING	**OPERATION** **100 uS/cm**	• The system is operating and cycling through the process steps. • Average conductivity of the last 5 cycles is also presented.

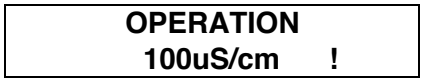
	CLEANING **100 uS/cm**	• The system is performing a cleaning in place (CIP). • Average conductivity of the last 5 cycles is also presented.
PROCESS/CIP STEP	**PROCESS/CIP STEP** **110/110**	• In this screen you can see the process or CIP step currently active. • For a detailed explanation of all the process steps please refer to chapter 7.2.1 • The numbers below the process/CIP step represents the total time of the step and the time remaining in seconds.
CIP CYCLES	Cycle count displays the complete cycles remaining until the next CIP. A CIP occurs by default after 432 cycles. After a complete cycle (Prepure -Pure - Waste - HF Waste) the Cycle counter is reduced by 1. When the Cycle counter reads **Cycle: 0/432** a CIP step will follow.	
TOTAL PURE VOLUME	The total pure volume produced in litres or gallons since the start of operation.	
RECOVERY	5 cycle averaged water recovery of the system.	
INSTANT FLOW	Current flow	
ALARM	All the alarms are presented in 3 forms: If the alarm never occurred. **Alarm type: NO** **1/1/1 0:0** If the alarm is currently active. **Alarm type: YES** **yy/mm/dd/ time** To acknowledge the alarm press, ENTER. If the alarm occurred in the past and it is already acknowledged/resolved. **Alarm type: NO** **yy/mm/dd/ time** For a more detailed explanation of all the alarms please refer to chapter 7.2.2	

8.2.1 Process steps

PROCESS STEPS		
STEP Name	**LCD Name**	**Description**
Idle	IDLE	System powered but not operating. The Idle step is potentially caused by an alarm during operation or if operation was abruptly stopped.
Prepurify	PREPURIFY	Occurs after waste step, flushes any remaining wastewater from the module.

Purify	PURIFY	CapDI applying power to the module to remove salt and lower conductivity.
Waste	WASTE	Module regenerating. High conductivity, concentrated water is being sent to drain.
High Flow Waste	HIGH FLOW WASTE	High flow waste. Part of the waste step that has a high flow to help clear out the module.
Wait	WAIT	Resembles a standby state in which the unit will not produce desalinized water as long as pure line pressure exceeds 2 bar /28 psi. It is triggered when the pressure switch is engaged due to pressure being greater than 2 bar / 28 psi).
CIP Dosing On	CIP DOSING ON	CIP Pump operating. Waste valve is open to release system pressure.
CIP Dosing Off	CIP DOSING OFF	CIP pump turns off, small amount of water pushed in to push acid into the module.
CIP Pulse On	CIP PULSE ON	CIP solution flows through the module and is discharged through the waste line.
CIP Pulse Off	CIP PULSE OFF	No flow. Pulse is on and off to increase the residence time of the acid in the module cells.
CIP Flush	CIP FLUSH	System flushing water through the CapDI module.
High Temp	HITP	High temperature, operation is paused until the temperature inside the cabinet drops below the setpoint, then the unit will go to W-HT step.
Wait High Temperature	W-HT	Following HITP step, the system does a check every 600 seconds. If the temperature remains lower than the setpoint, operation will restart.
Flush and Shunt	FLUSH+SHUNT	Flushes the module for 40 seconds while setting the module to 0 Volts. **NOTE:** Flush – Shunt duration cannot be modified in setpoints.

8.2.2 Alarms



If an alarm occurs, the alarm symbol "**!**" will appear in the process step screen. Critical alarms can result in DiUse shut down.
Alarms screen will show a binary representation of which alarms are active. Pressing ENTER will navigate to the alarms list. In the alarms list, it is possible to scroll through alarms and see the date and time at which they last occurred, with any active alarms indicated by a "Yes".

Alarms are separated in three categories:

- Not Urgent Alarms: Alarms that do not stop operation and do not resolve automatically, such as the CIP low level alarm. When alarms of this type are triggered, they can be acknowledged by navigating to the alarms screen and pressing ENTER.
- Important Alarms: Alarms that do not stop operation and automatically resolve when their triggering condition is no longer active, such as bypass alarm.

- Critical Alarms: Alarms that force the unit to disrupt operation. These alarms automatically reset when you press ENTER while in the Idle screen. The unit resumes operation if the triggering condition is no longer active, for example the leakage alarm.

ALARMS			
Name on screen	**Description**	**Resolves Automatically**	**Alarm Category**
LOW PURIFY	Low flow during the Purify step. Set in the Setpoints screen. Only triggered at the end of the Purify phase. Unit jumps to Idle, press ENTER to resume operation.	No	Critical
LOW WASTE	Low flow during the Waste phase. Set in the Setpoints screen. Only triggered at the end of the Waste phase. Unit jumps to Idle, press ENTER to resume operation.	No	Critical
BYPASS ALARM	Pure line pressure has dropped below the set point of the starting signal pressure switch (2 bar / 28 psi) for more than 1200 seconds. Alarm will resolve automatically when pressure increases above 2 bar / 28 psi.	Yes	Important
CAB. TEMP	High temperature within the electrical cabinet. Unit jumps to HT-Wait until it cools down then resumes normal operation.	Yes	Important
LEAKAGE	If the two leakage sensors come into contact with water, this alarm will be triggered, and the system will go to Idle.	No	Critical
CIP L. LEVEL	CIP solution tank is almost empty. **NOTE:** CIP solution level is calculated based on the CIP's pump capacity to exhaust the 1L of CIP solution. When this alarm is triggered refill the CIP tank and reset the alarm in the alarm's screen.	No	Not Urgent
PAE ###	PCB related issue. Contact Voltea for support.	Contact Voltea	Important
I2C	EC probe communication interrupted.	Yes	Important
ZERO EC	Conductivity reading less than 5µS/cm for more than 30 seconds, unit goes to Idle.	Yes	Critical
TEMP. ERR	Water temperature reading out of range. Unit uses last known temperature – Resolves automatically.	Yes	Important

8.3 DEVICE INFO

In this section the product name, product model, firmware version, serial and IMEI number are available.

8.4 SYSTEM

<table>
<tr><th colspan="2">System Branch</th></tr>
<tr><td>Password</td><td>To access System, you will be asked for a password. The password is available to authorized dealers.</td></tr>
<tr><td>Setpoints</td><td>When advised by Voltea, settings can be adjusted via the LCD.

Navigate to the Setpoints tab on the LCD screen.

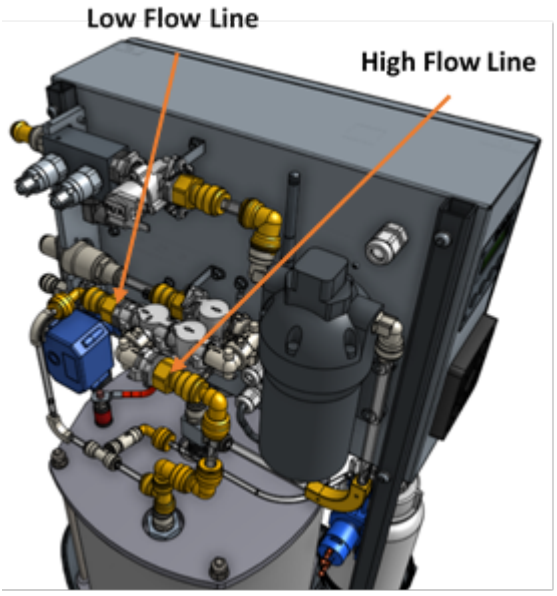
A cursor shows which digit is being edited. UP increases the value, and DOWN decreases it. Press ENTER to move onto the next digit. The edit will only be saved when ENTER is pressed on the final digit.</td></tr>
<tr><td>Hardware Test</td><td>From Hardware Test the Input Read, Relay test and Sensor Test are accessible.

Input read:<table><tr><td>1</td><td>Unassigned</td></tr><tr><td>2</td><td>Bypass</td></tr><tr><td>3</td><td>Leak sensors</td></tr><tr><td>4</td><td>Start signal</td></tr></table>Input variables can have 2 values, Lo and Hi. Hi when the signal is received and Lo when there is no signal. E.g.:
When the bypass is not active and no leakage while starting signal is active it should read 1Lo 2Lo 3Lo 4Hi
When the bypass is connected it should read 1Lo 2Hi 3Lo 4Hi
When there is a leakage it should read 1Lo 2Lo 3Hi 4Hi
Relay test: Gives access to manual operation for the valves, CIP pump and relays.
MIV: Main inlet valve
HFIV: High flow valve
POV: Pure outlet valve
WOV: Waste outlet valve
CIP: CIP pump
PVR: Shunt relay
NVR: Polarity changing relay
PUMP: Power supply
Sensor read: Gives access to Flow, Conductivity, Water Temperature and Cabinet temperature live measurements.</td></tr>
</table>

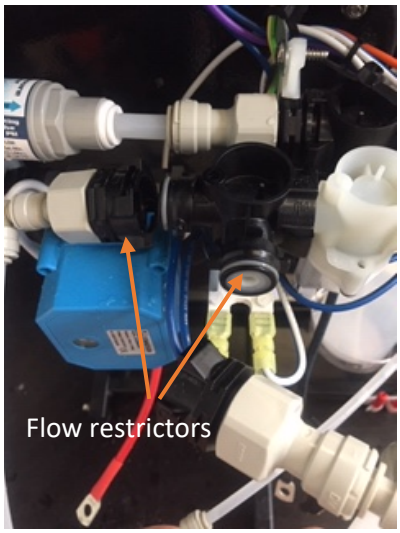
8.5 USER FUNCTIONS

User Functions Branch	
Flush Module	Starts module flush with feed water.
Current Time	Displays system time in UTC (Coordinated Universal Time) Navigate to the **Current Time** tab on the LCD. The cursor shows which digit is being edited. UP increases the value, and DOWN decreases it. Press ENTER to move onto the next digit. The edit will only be saved when ENTER is pressed on the final digit. **NOTE:** If a SIM card is active, system will automatically synchronize with the network time.
Current Date	Displays system date. Navigate to the **Current Date** tab on the LCD. The cursor shows which digit is being edited. UP increases the value, and DOWN decreases it. Press ENTER to move onto the next digit. The edit will only be saved when ENTER is pressed on the final digit. **NOTE:** If a SIM card is active, system will automatically synchronize with the network date.

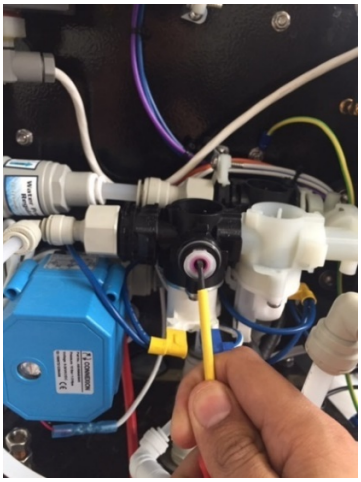
9 CHANGING FLOW RESTRICTORS



- DiUse is shipped with 2.15 l/m (0.56 gpm) flow restrictor in High flow line and 0.9 l/m (0.23 gpm) flow restrictor in Low flow line.
- DiUse is shipped with 5 spare flow restrictors of different colors and flows, for more information refer to appendix.
- To remove the connections holding the flow restrictors in place, use a flathead screwdriver to hold the latching mechanism in place, whilst rotating the black fitting counterclockwise by 90 degrees.

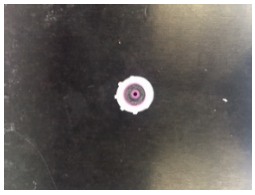


- This will unlock the fitting which can then be removed by pulling away from the assembly.

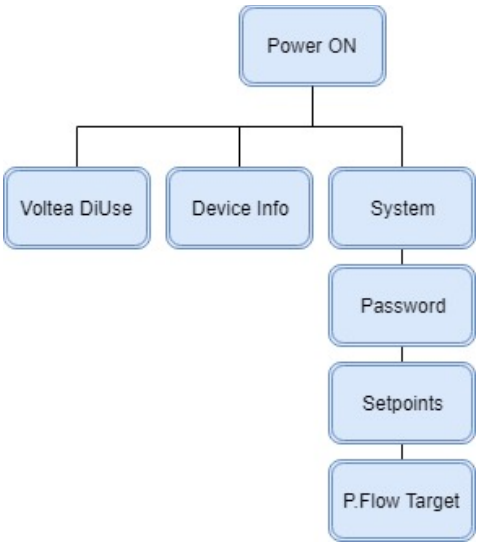


- Once the fittings are removed, use a small flathead screwdriver to lever out the flow restrictor, being careful not to damage the central mechanism.

- Replace these flow restrictors with the desired ones. First remove the old flow restrictor from the flow restrictor housing by gently pushing with a screwdriver. Then insert the desired flow restrictor by reversing the procedure described above.
- Push the black fittings back onto the valve assembly rotating them 90 degrees clockwise to lock in position.



NOTE: Flow restrictor change is only advised after consulting Voltea.



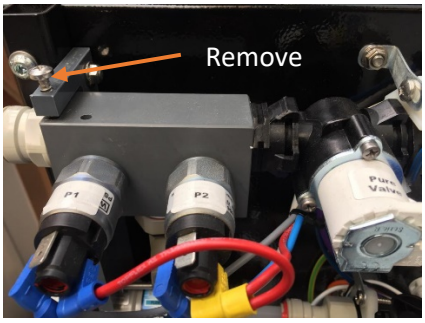
- On the LCD, update the Pure Flow Target set point in Systems/Set Points. This value is only in liters per minute (L/min). If adding an X l/m flow restrictor in the High flow and a Y l/m flow restrictor in Low flow, set the pure flow target to X plus Y minus 0.2, i.e. if you add a 2 l/min flow restrictor in the high flow and 0.9 l/m flow restrictor in the low flow, set the Pure Flow Target to 2.7 l/min.
- After flow restrictor replacement the low flow pure and low flow waste alarm setpoints need to be updated. The new value should be the low flow restrictor value divided by 2 for waste and the sum of the two flow restrictors values divided by 2 for pure.

10 Electrical Conductivity Probe Calibration

Equipment needed:

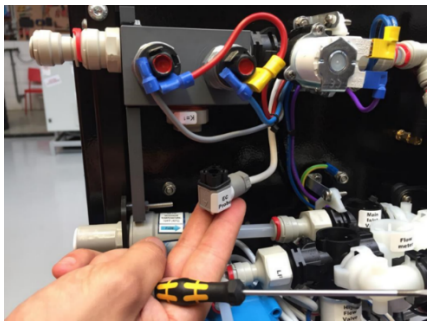
- Temperature probe (capable of reading atmospheric temperature).
- Calibration solution.
  Note: Voltea recommends 147 µS/cm standard solution if pure outlet removal target is between 50 µS/cm to 200 µS/cm. Contact Voltea if desired removal target is outside this range.
- Flathead screwdriver.
- Philips screwdriver.
- Hex key number 4.
- External EC probe.
- External mounted EC probe.
- Laptop and USB to micro-SUB cable

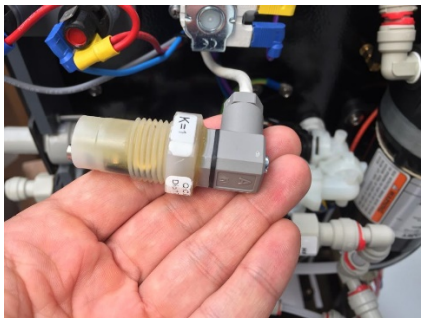
To calibrate the electrical (EC) probe, do the following:



- Remove the covers
- Unmount the pure line by removing the pin.
- Using a cross head screwdriver, loosen the screw on the top of the EC probe.

- When the screw is loosened the upper part can be removed.





- Connect the external calibration probe.

- Power on the system.

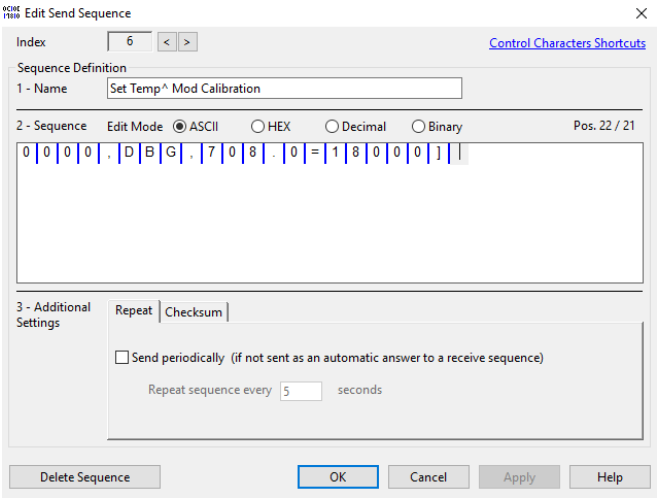
Conductivity probe is calibrated through Docklight. Before EC calibration, temperature has to be calibrated.
Open the program and perform the following by pressing the **Send** button.

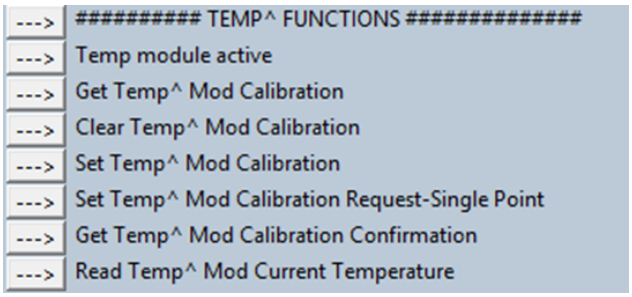
--->	########## TEMP^ FUNCTIONS ##############
--->	Temp module active
--->	Get Temp^ Mod Calibration
--->	Clear Temp^ Mod Calibration
--->	Set Temp^ Mod Calibration
--->	Set Temp^ Mod Calibration Request-Single Point
--->	Get Temp^ Mod Calibration Confirmation
--->	Read Temp^ Mod Current Temperature

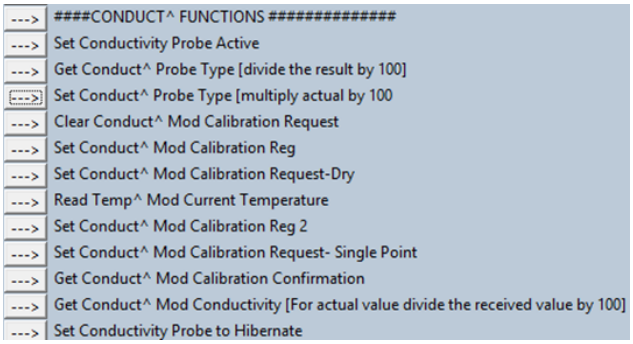
Temperature calibration:

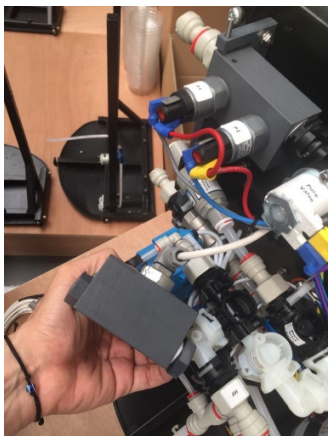
- Click - **Temp module active** to activate the probe.
- Click - **Get Temp^ Mod Calibration.**
- Click – **Clear Temp^ Mod Calibration** to clear any previous calibration request.

- Read current room temperature using an external probe
- **Click on the text of the Set Temp^ Mod Calibration** to set temperature according to the room temperature measured in previous step. A pop-up window will open. By default, the temperature is set to 25 degrees Celsius (25000 in Docklight). Replace this value with the room temperature measured via the external probe, e.g. if









the probe reads 18 °C the value in Docklight should be 18000

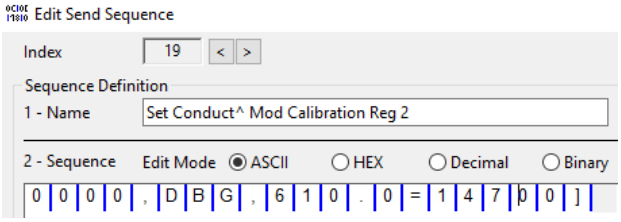
Note: If the probe is not at room temperature, wait for 5 minutes for it to reach room temperature before calibrating. Clicking the Read Temp^ Mod Current Temperature will display on screen the probe temperature reading. When this reading is stable the probe reached room temperature.

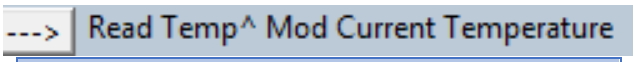
- Click – **Set Temp^ Mod Calibration Request-Single Point** to calibrate the temperature.
- Click – **Get Temp^ Mod Calibration Confirmation** to confirm calibration
- Clicking – **Read Temp^ Mod Current Temperature** will display the temperature reading of the probe.

Conductivity calibration:

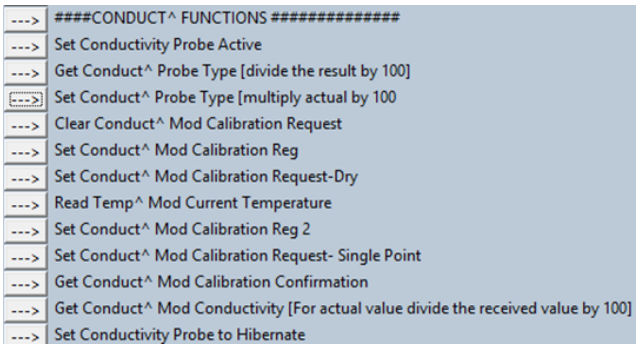
- Click – **Set conductivity Probe Active** to activate the EC probe.
- Click – **Set Conduct^ Probe Type**
- Click – **Get Conduct^ Probe Type** Response should be “100”.
- Click – **Clear Conduct^ Mod Calibration Request** to clear previous calibration request.
- Click - **Set Conduct^ Mod Calibration Reg**. Make sure the probe is not in contact with any liquid or surface.
- Click - **Set Conduct^ Request-Dry,** to calibrate for dry.

- Disconnect the external EC probe from the PCB and connect the EC probe mounted on the special manifold. Fill the manifold with the calibration solution. Voltea suggests using a 147μS/cm standard solution.





Temperature (°C)	EC (µS/cm)
15	119
16	122
17	125
18	127
19	130
20	133
21	136
22	139
23	142
24	145
25	147
26	150
27	153
28	156
29	159
30	162



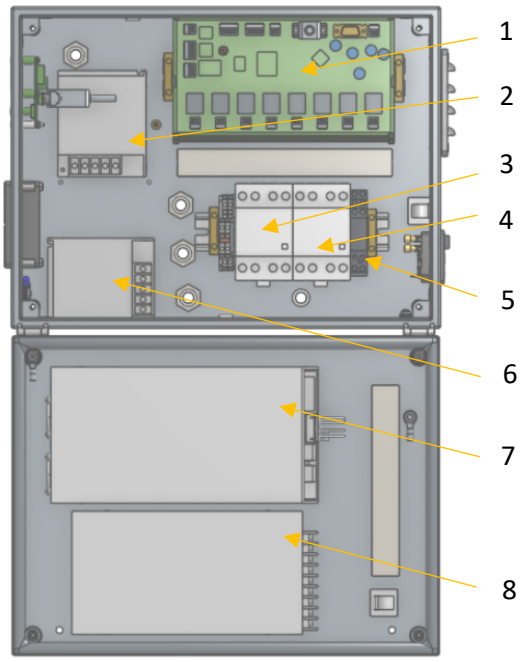
- If a different calibration solution is used, click on the **Set Conduct^ Mod Calibration Reg 2** command. A new window will pop up. Input your desired calibration value and add two times zero at the end. E.g. if a 300 µS/cm calibration solution is used delete the 14700 preset value and add 30000, click OK.

- The calibration value should be uncompensated for temperature. If you don't know the calibration solution temperature, you can use the **Read Temp^ Mod Current Temperature** command to read the calibration solution temperature, e.g. the 147 µS/cm solution has this EC only at 25°C. If the solution temperature is 20°C the EC value used for calibration should be 133 µS/cm

- Click - **Set Conduct^ Mod Calibration Reg 2** to save the conductivity value of the calibration solution used.
- Click **- Set Conduct^ Calibration Request** - **Single Point** to calibrate the probe.
- Click - **Get Conduct^ Mod Calibration Confirmation** to receive confirmation
- Click - **Get Conduct^ Mod Conductivity** to get a conductivity measurement.
- Click - **Set Conductivity Probe to Hibernate**.
- Click **- Reset controller** to save all changes to the PCB.
- Disconnect the calibration EC probe and re-connect the system EC probe on the PCB. Disconnect the USB cable and close the cabinet. Jumper should remain in the open position.

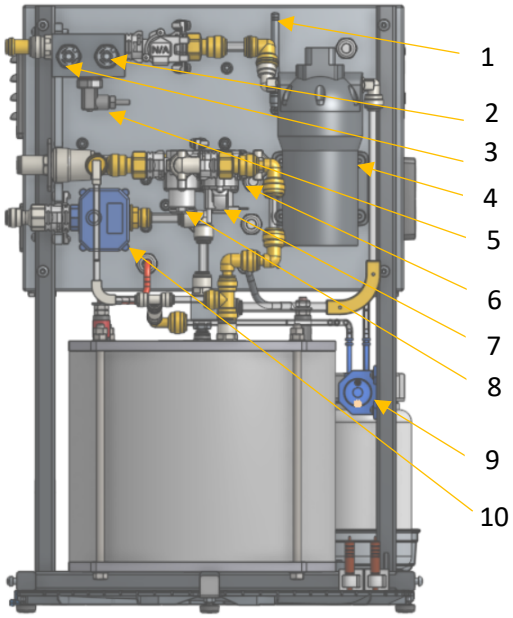
11 SYSTEM COMPONENTS

11.1 ELECTRIC CABINET



1. PCB
2. Power supply
3. Shunt relay
4. Main relay
5. PCB reset relay
6. Power supply
7. Power supply (12V - 800W)
8. (12V - 150W)

11.2 VALVES, SWITCHES AND PUMPS



1. GSM antenna
2. Pressure switch 3.5 bar / 51 psi
3. Pressure switch 2.0 bar / 28 psi
4. System pump
5. EC probe
6. Solenoid valve
7. Flow meter
8. Solenoid valve
9. CIP pump
10. Connection valve

APPENDIX

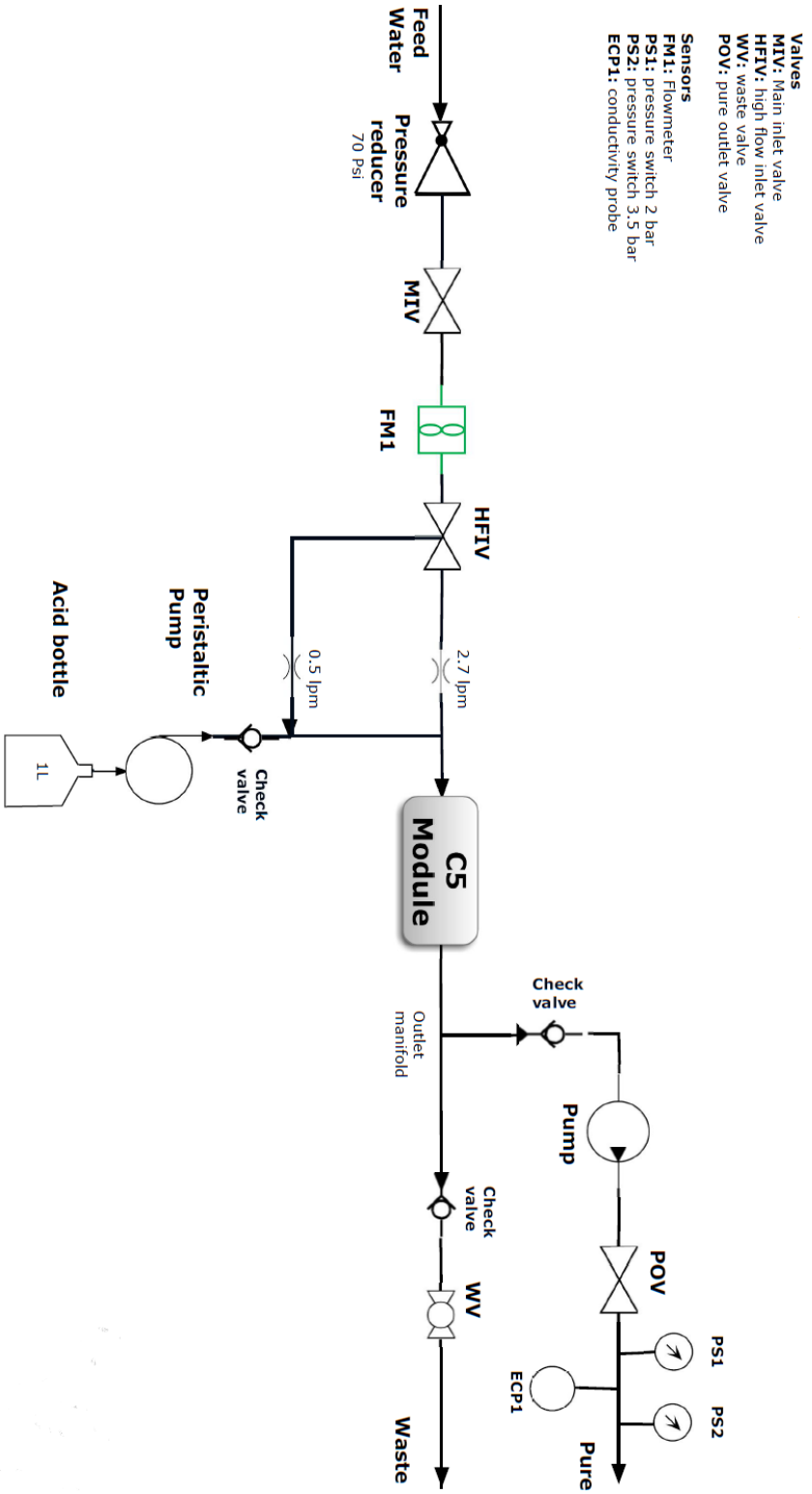
FLOW RESTRICTOR COLOR AND FLOW

Order Number	Color	Flow (L/m)	Flow (gpm)	Availability
102238	Red	0.25	0.06	Shipped with DiUse
102239	Lime	0.50	0.13	Shipped with DiUse
102014	Cyan	0.90	0.23	Pre-installed in low flow
102240	White	1.10	0.29	Shipped with DiUse
102241	Yellow	1.70	0.44	Shipped with DiUse
102015	Violet	2.15	0.56	Pre-installed in high flow
102242	Black	2.70	0.71	Shipped with DiUse

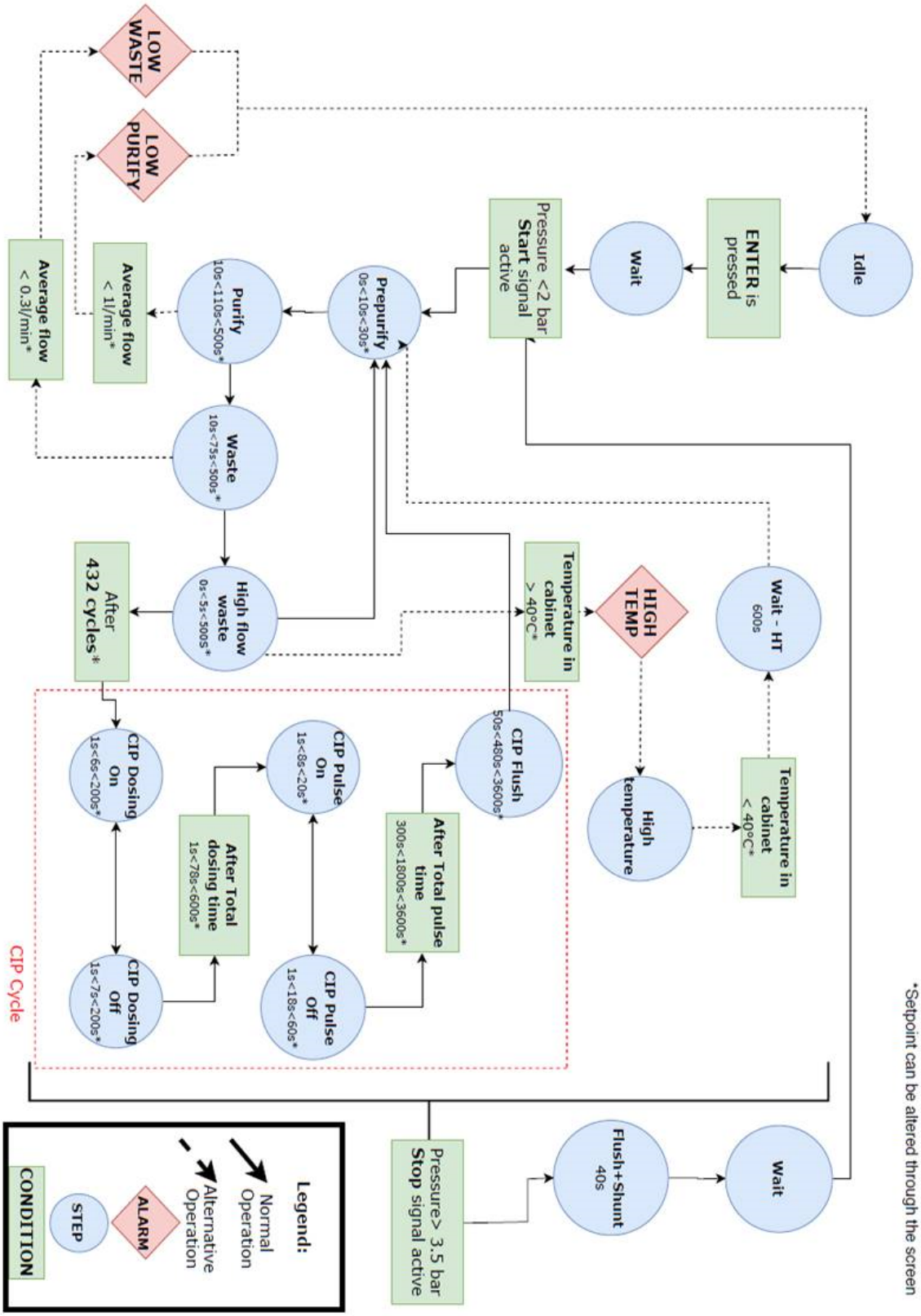
SPARE PARTS LIST

Voltea part #	Description
101839	Motor valve
102013	Flow meter
102684	Pressure switch 3.5 bar / 51 psi
102683	Pressure switch 2.0 bar / 28 psi
102022	Flow meter
102018	Solenoid valve A
102661	ADDA 80 mm fan
102019	Solenoid valve C
102377	Acid peristaltic pump
102028	Acid check valve
101414	Nut M8 fine thread
101477	Nut M8
102244	C-5-24 DDRG Module
102677	PCB 1.3
101796	800W power supply
102652	System pump
102047	63A relay
102024	150W power supply
102066	50W power supply
102394	PAE relay

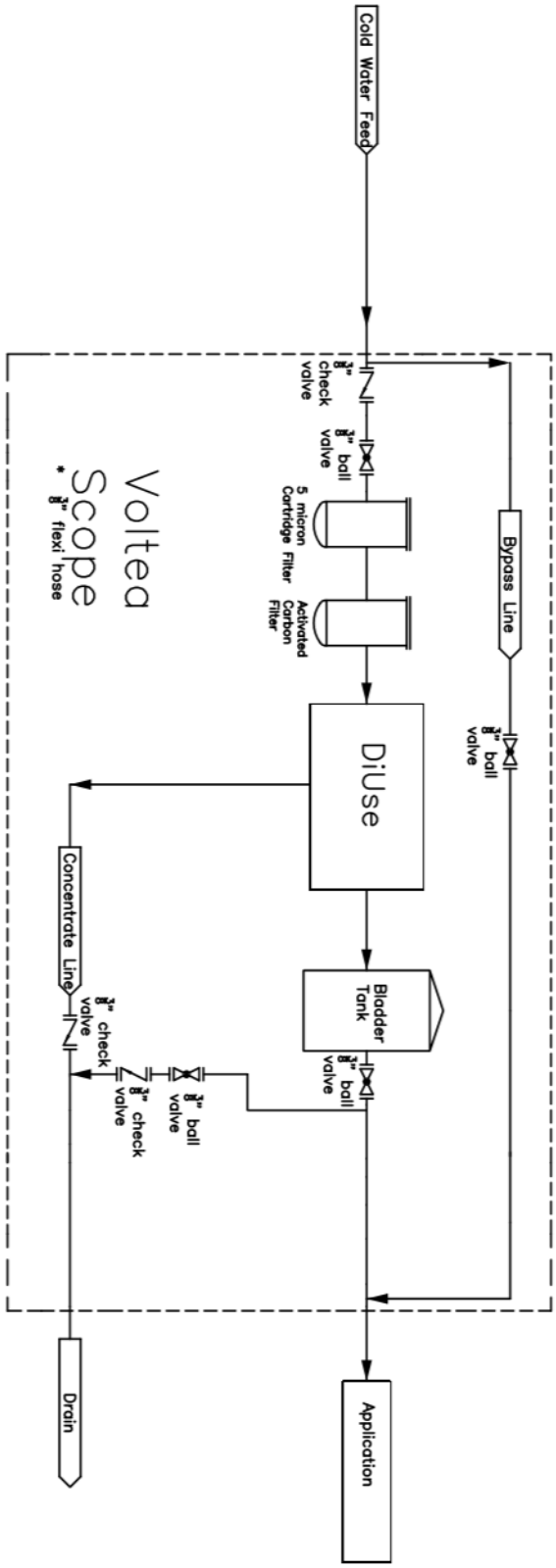
P&ID


Valves
MIV: Main inlet valve
HFIV: high flow inlet valve
WV: waste valve
POV: pure outlet valve
Sensors
FM1: Flowmeter
PS1: pressure switch 2 bar
PS2: pressure switch 3,5 bar
ECP1: conductivity probe
Feed Water
Pressure reducer
70 Psi
MIV
FM1
HFIV
0.5 lpm
2.7 lpm
Peristaltic Pump
Acid bottle
1L
Check valve
C5 Module
Outlet manifold
Check valve
Pump
Check valve
POV
WV
PS1
PS2
ECP1
Pure
Waste

PROCESS FLOW DIAGRAM



DiUse installation PFD



WEEKLY CHECKLIST SHEET

Date _____

1 Alarms

No Alarms ☐

Alarms: _____

_____

_____

_____

2 Water

EC on target ☐

EC (µs/cm) _____

3 CIP solution

CIP solution above minimum level ☐

4 Notes

_____

_____

_____

_____

_____

_____

_____

_____

_____

Completed by _____

Signature _____

Changelog			
Change	**Author**	**Date Rev**	**Revision**
Document initiation	GT	27-Aug-2019	Rev1
Document Cosmetic Edits	HL	28-April-2020	Rev2
Updated System Renderings	HL	01-October-2020	Rev3