DiEntry© Owner's Manual

Installation and Operation

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Contents

1 DiEntry 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 system specification information.

Read this manual first: Before you operate DiEntry, 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.

The DiEntry system conforms to NSF/ANSI 42, for specific performance claims as verified and substantiated by test data.

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

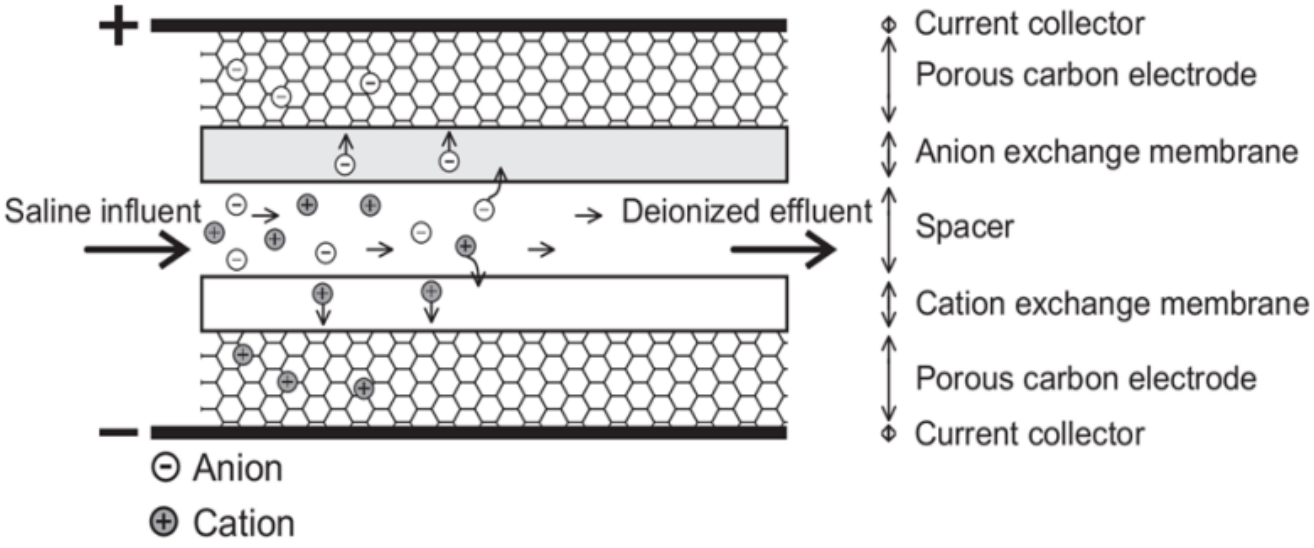
CapDI modules supplied with the DiEntry have been tested and have a guaranteed performance as they have passed Voltea's quality control test (a certificate of analysis will be supplied with each module upon request). Voltea does warrant workmanship (leakage, connections) of the CapDI module for a period 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 DiEntry 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.



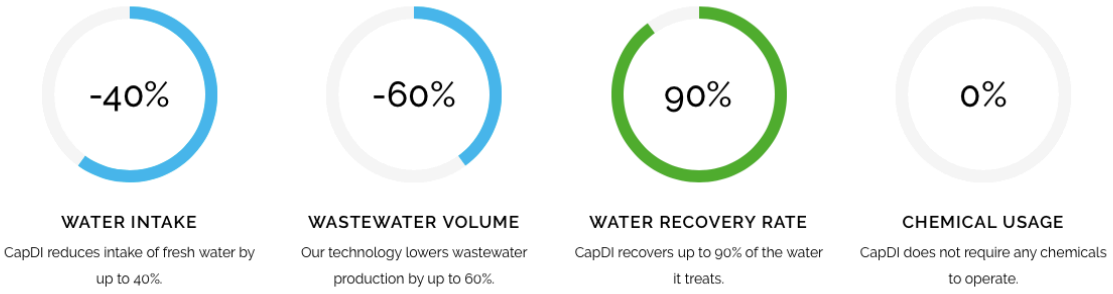
A CapDI module consists of a housing which contains multiple stacks of parallel unit cells. Each unit cell consists of two porous carbon electrodes separated from each other by a spacer. On top of the electrodes, ion exchange membranes are placed. The spacer between the membranes acts as a flow channel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

Voltea's miniaturized version of the CapDI systems, specifically made for the point-of-entry applications. DiEntry 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.

4.1 Features

- Automated System CIP (Clean-In-Place)
- Built in bypass
- Voltea's Remote Monitoring and Control (option)
- Pure outlet conductivity meters (0 – 5 mS/cm)
- Total flow meter (0 – 30 L/min or 0 – 7.9 gpm)
- Built in display

4.2 SPECIFICATIONS

Performance	Produced flow rate*	2 – 12 L/min (0.5 – 3.2 gpm)
	Instant flow rate*	0.6 – 15.1 L/min (0.2 – 4 gpm)
	Salt removal	25 – 90 %
	Water recovery	40 – 90 %
System Specifications	Average power requirements	0.31 kW, Single Phase (110 – 240 V AC / 50 - 60 Hz)
	System dimensions (L x W x H)	0.4 x 0.53 x 1.05 m (1'4'' x 1'9'' x 3'6'')
	Power output to modules	0 -125 A / 0 – 2 V DC
	Weight**	30 kg (67 lbs.)
	Feed inlet coupling	3/8'' push fit (1/2'' adapter included)
	Bypass outlet coupling	1/2'' push fit
	Product outlet coupling	1/2'' push fit
	Concentrate/Waste outlet coupling	1/2'' push fit
Operational Requirements	Water feed pressure	3 - 20 bar (44 - 290 psi) System is equipped with a pressure reducer.
	Water pressure produced***	≤ 4.8 bar (70psi)
	Operating ambient air temperature	Max < 35 °C (95 °F)
In/Out puts	Start/Stop	Pressure switch (standard) or external signal (24 V DC)
Operational Pressure Setpoints	Start****	≤ 3.5 bar (51 psi)
	Bypass****	≤ 2.0 bar (28 psi)
	End****	≤ 4.8 bar (70 psi)
Cleaning	Procedure	Automated cleaning with citric acid
	Control (auto/manual)	Automatic: on cycles of operation
	Storage	3L 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

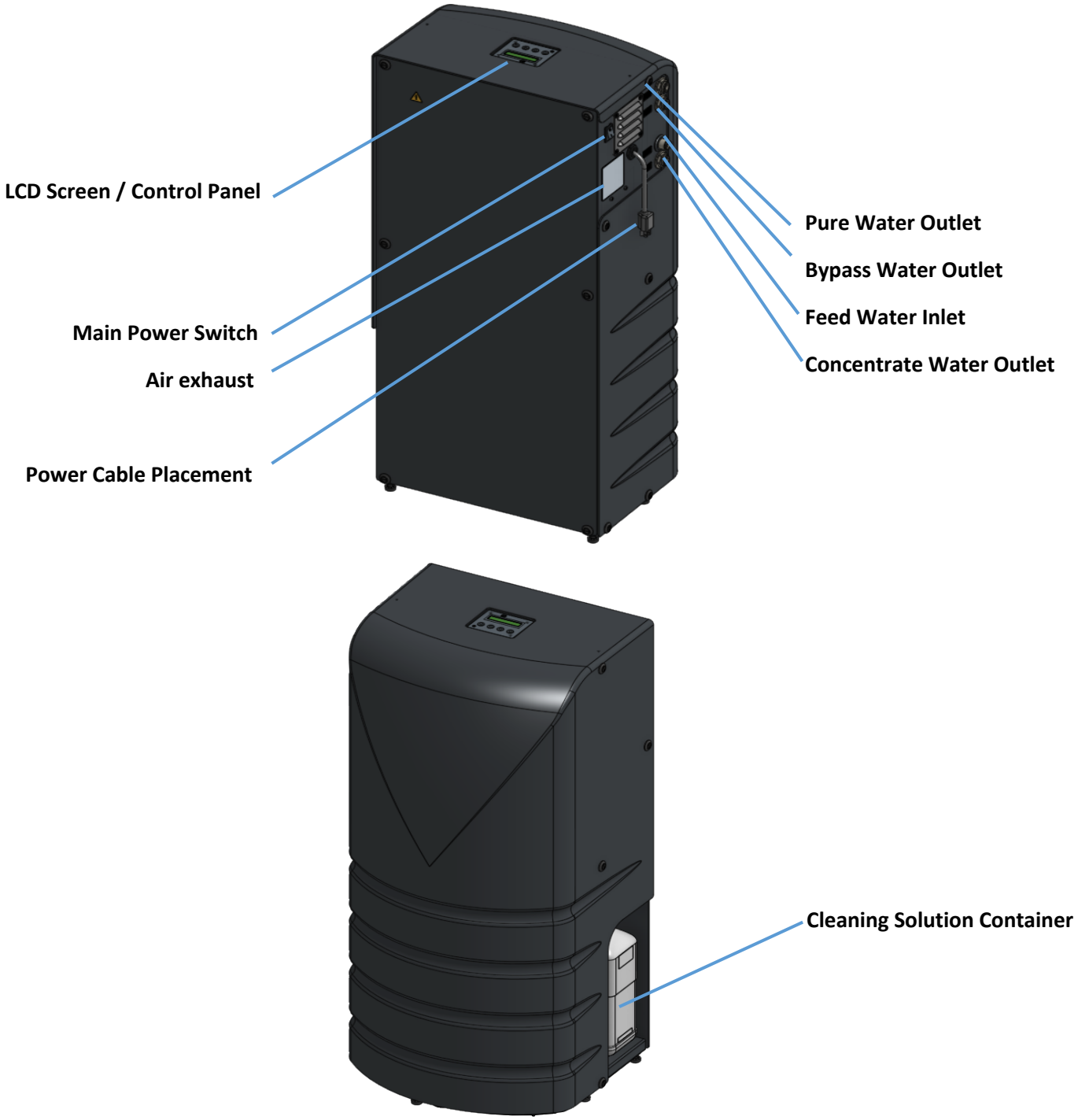
4.3 FEED WATER QUALITY

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 (as $CaCO_3$) *	ppm	< 1000
M Alkalinity (as $CaCO_3$) *	ppm	< 1000
Pre – filtration	μm	Supplied separately
Temperature	^oC /^oF	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 the feed water.

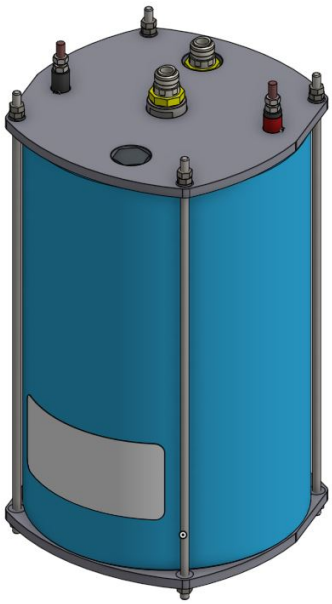
5 SYSTEM OVERVIEW



6 SYSTEM INSTALLATION

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

6.1 PACKING



- The DiEntry system is shipped in two boxes.
- One box contains the module (shown on the left), the other the DiEntry system, spare flow restrictors and power cable.

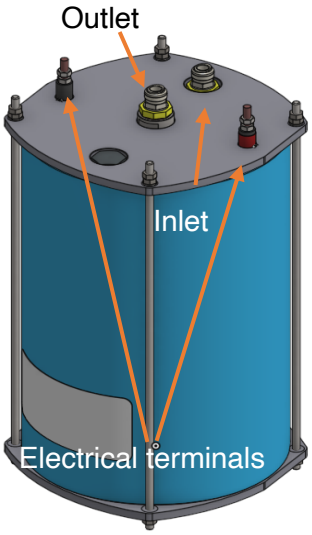
Modules weigh 50kg (110 lbs.). It is recommended that the module is carried by two persons.

6.2 TOOLS AND MATERIALS

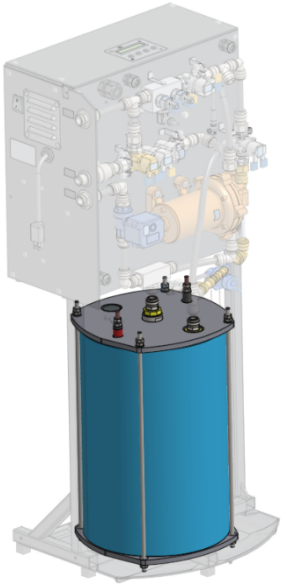
- Safety shoes
- 2x size 13 wrenches
- Hex key number 4

6.3 MODULE INSTALLATION

- Loosen the connections holding the curved cover in place.
- Lift off the curved cover being careful of protruding parts.



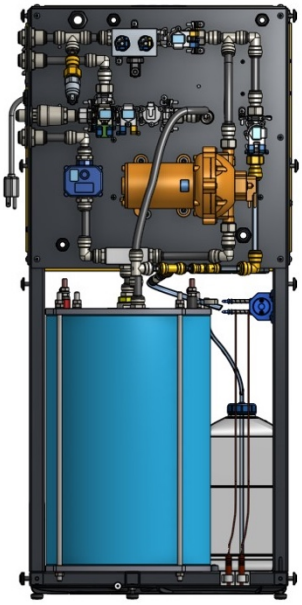
- Remove grey stoppers from module and place the module on the skid.

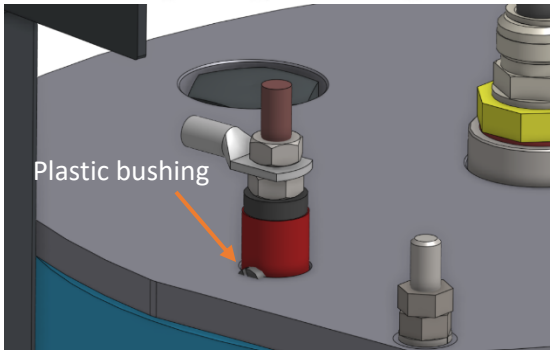


- Rotate the module so the red terminal is on the left and the black terminal is on the right, when facing the water side of the electrical cabinet.
- Push the module on the frame up against the stoppers.

Modules weigh 50kg (110 lbs.) and the system 30 kg (67 lbs.). It is recommended to wear safety shoes during installation.

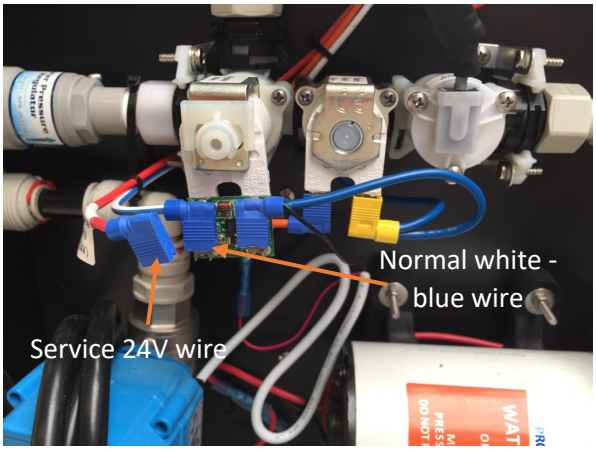
- If done correctly, the module inlet (the connection that is NOT in the middle of the module top) will be facing outward from the system, and the edge of the module will be in line with the edge of the frame.
- The vertical tube that is attached to a T-junction should be pushed into the module outlet. If placed correctly, pulling on the tube firmly should not disconnect it from the module.
- T- junction should be placed with the “waste” sticker facing left and “pure” sticker facing right.





- 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 isn't sitting on the plastic bushing.

6.4 CLOSING/OPENING THE BYPASS

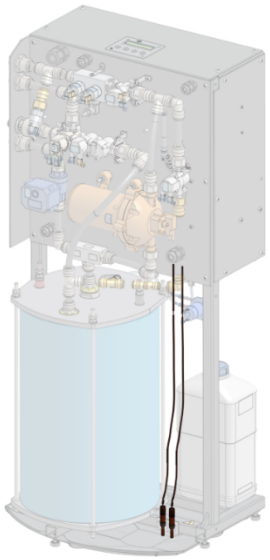


- The bypass valve is normally open. Voltea suggests closing the bypass valve before connecting the module and water connections.

- To close the bypass, remove the white-blue wire (blue wire shoe) from the valve connection and connect the red wire/service 24V (blue wire shoe).

NOTE: Return the bypass valve to its original state (white cable connected) before starting normal operation.

6.5 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.

6.6 PLACING THE COVER

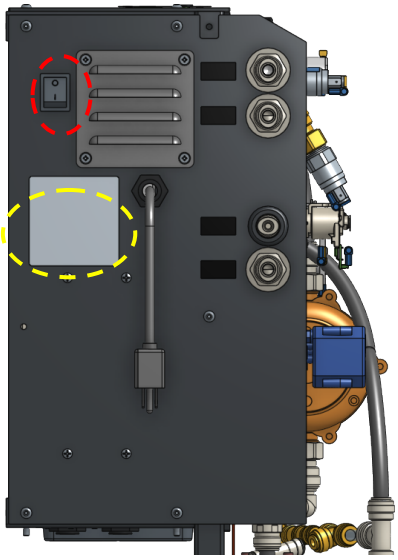
Place the cover back and tighten the connections holding the cover in place being careful of protruding parts (e.g. air filter). Use a hex key number 4 to tighten the screws holding the covers.

6.7 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 1/2" connection. Concentrate (Waste) is discharged through the bottom 1/2'' connection. The BYPASS connection discharges water through a ½" connection. It is recommended to connect the BYPASS to the pure water line after the pressure tank.

Connections are indicated by stickers.

6.8 POWERING THE SYSTEM UP/DOWN



- A power cable is a part of the system and comes out from the cable gland underneath the air vent.

- Plug in and turn the switch on to power the system (circled in red). **I** powers ON the system and **O** powers it OFF.

NOTE: DiEntry systems are specific to either 110V or 240V. Overall system specifications are noted to the side of the unit's cover (circled yellow). If in doubt about the system specifications, please contact Voltea.

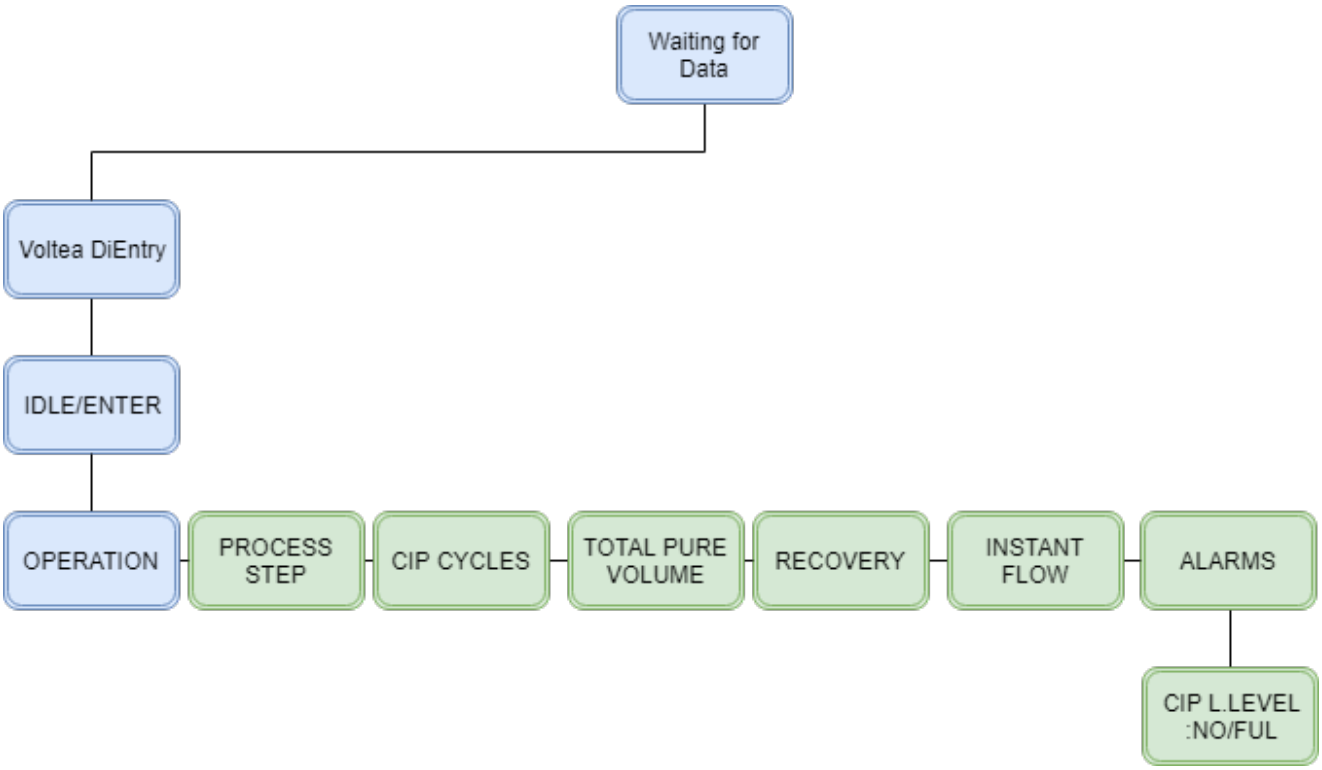
6.9 FILLING THE CLEANING IN PLACE (CIP) CONTAINER

- Unscrew the lid of the CIP container.

WARNING! Acid may splash. Avoid contact with eyes.

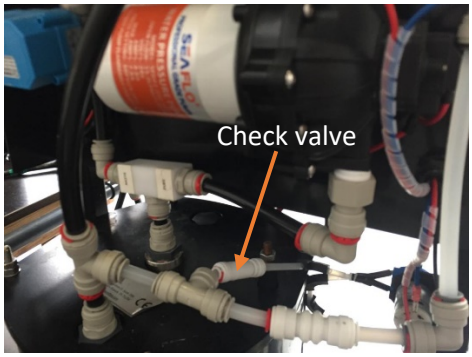
CAUTION! If using citric acid powder always use distilled or sterile water for CIP solution preparation.

- 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 3L of CIP solution. For this reason, it is mandatory to reset the CIP alarm once the CIP bottle is refilled. Around 103 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.

6.10 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.

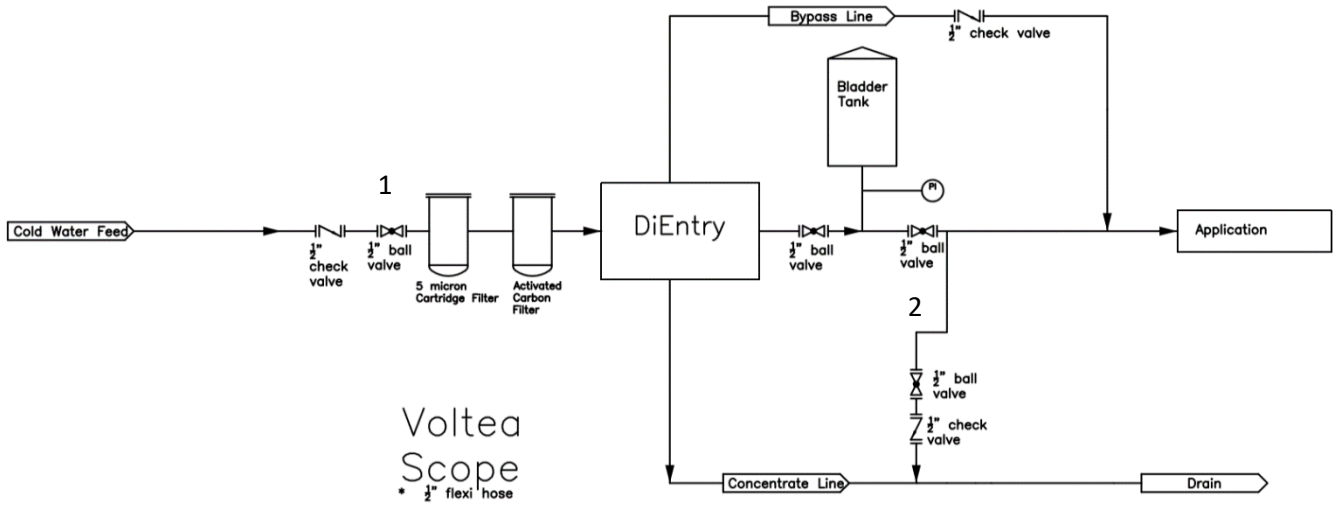
7 System Start Up - Operation

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

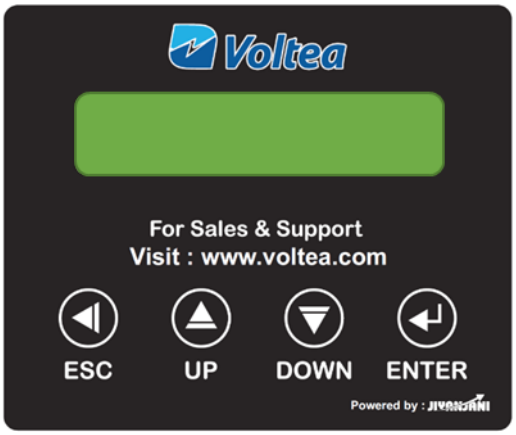
NOTE: It may take up to 8 operational cycles for the unit to adjust and output water of the desired quality.

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

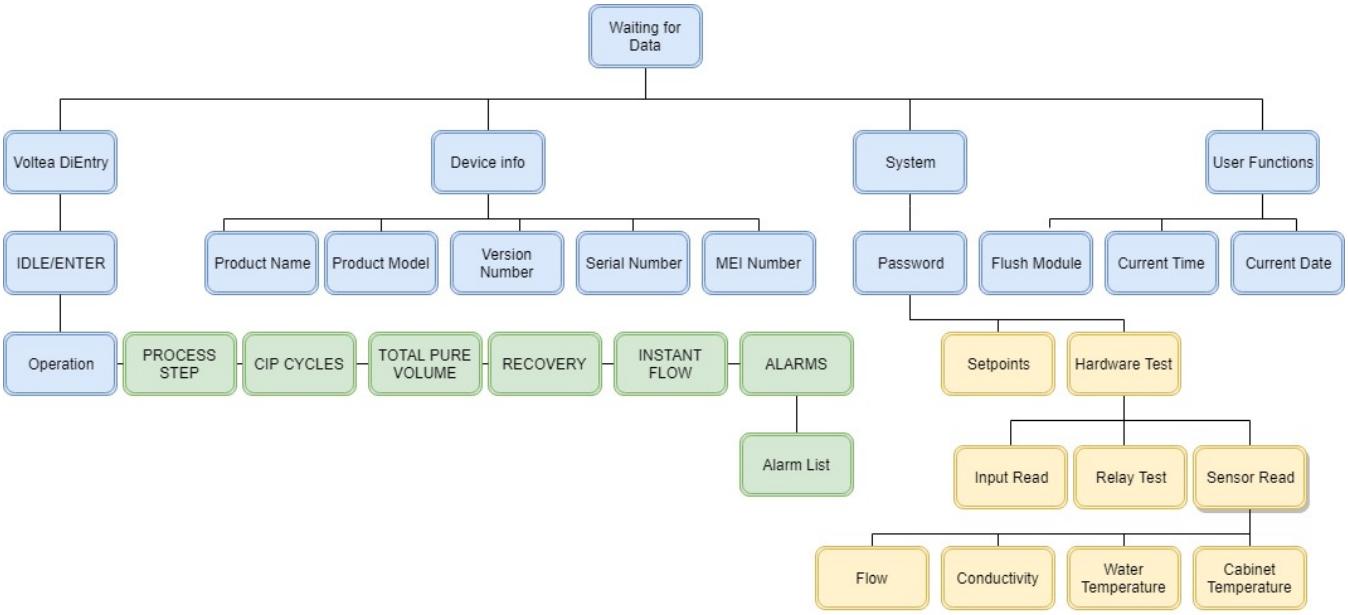


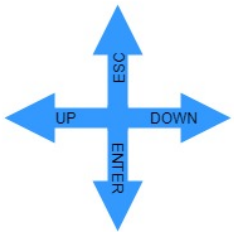
The system can be controlled using the LCD screen and the keypad. Navigate through the screens using the UP and DOWN buttons, confirm selection with ENTER, and return to the previous screen by pressing ESC**.**

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

8.1 DiEntry Screen Navigation Chart

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





NOTE: The password is available to authorized dealers.

8.2 Voltea DiEntry

Voltea DiEntry 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 (Pure - Waste - Prepure) 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.
Check	CHECK	Voltage and currents to be applied to the module for the following cycle are calculated. Cabinet temperature is also checked.
Wait	WAIT	Resembles a standby state in which the unit will not produce desalinized water as long as pure line pressure exceeds 3.5 bar (51 psi). It is triggered when the pressure switch is engaged due to pressure being greater than 3.5 bar (51psi).
CIP Dosing On	CIP DOSING	CIP Pump operating. Waste valve is open to release system pressure.
CIP Recirculation	CIP RECIRCULATION	CIP solution is being recirculated within the system.
CIP Flush	CIP FLUSH	System is flushed after CIP acid cleaning.
High Temperature	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 HT	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 & 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

OPERATION **100uS/cm !**

If an alarm occurs, the alarm symbol "**!**" will appear in the process step screen. Critical alarms can result in DiEntry shut down.
Alarm screen will show a binary representation of which alarms are active. Pressing ENTER will navigate to the alarms list. In the alarms list tab, it is possible to scroll through alarms and determine the date and time at which the alarm last occurred. Active alarms are 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 bypass (P3) pressure switch (2 bar / 28 psi) for more than 900 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 3L 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 5 µS/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.

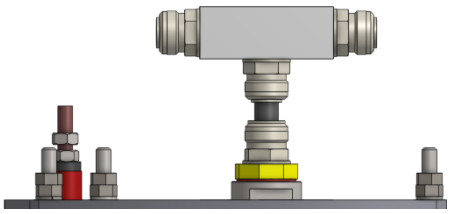
A cursor shows which digit is being edited. UP increases the value, and DOWN decreases it. Press ENTER to move onto the next digit. The edit will only be saved when ENTER is pressed on the final digit.</td></tr>
<tr><td>Hardware test</td><td>From Hardware Test, Input Read, Relay Test, and Sensor Test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

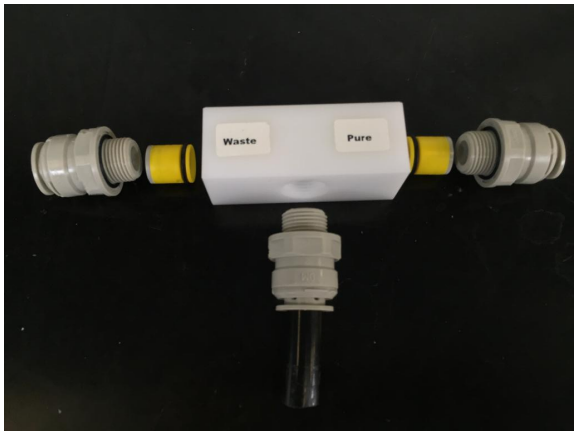
Input read:<table><tr><td>1</td><td>Unassigned</td></tr><tr><td>2</td><td>Bypass</td></tr><tr><td>3</td><td>Leak sensors</td></tr><tr><td>4</td><td>Start signal</td></tr></table>Input variables can have 2 values, Lo and Hi. Hi when the signal is received and Lo when there is no signal. E.g.:
When the 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
BPAS: Bypass valve
POV: Pure outlet valve
WOV: Waste outlet valve
CIP: CIP pump
PVR: Shunt relay
NVR: Polarity changing relay
PAE: Power supply
Sensor read: Gives access to Flow, Conductivity, Water Temperature and Cabinet temperature live measurements.</td></tr>
</table>

8.5 USER FUNCTIONS

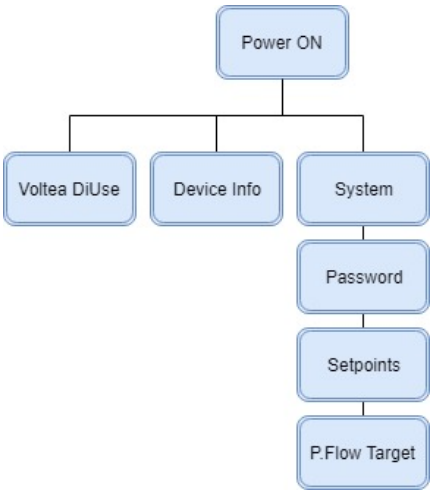
User Functions Branch	
Flush Module	Starts module flush with feed water.
Current Time	Displays system time in UTC (Coordinated Universal Time) Navigate to the **Current Time** tab on the LCD. The cursor shows which digit is being edited. UP increases the value, and DOWN decreases it. Press ENTER to move 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





- DiEntry is shipped with a 2 L/m (0.5 gpm) flow restrictor in the waste line and a 6 L/m (1.58 gpm) flow restrictor in pure line.
- DiEntry is shipped with additional flow restrictors of different colors and flows, for more information refer to appendix.
- To remove the connections holding the flow restrictors in place, unscrew the push fittings on the manifold. Carefully remove the pre-installed flow restrictors, by unscrewing all the connections. Use a hex key in the bottom (non labelled connection) and push the flow restrictor out.
- Replace these flow restrictors with the desired ones making sure that the “Pure” restrictor is facing towards the pure outlet of the manifold, and the “Waste” restrictor is facing the waste outlet of the manifold.
- Screw the push fittings back onto the manifold assembly.



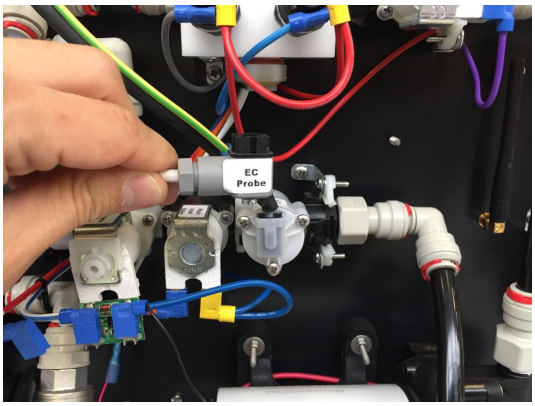
NOTE: Flow restrictor change is only advised after consulting Voltea

- On the LCD, update the Pure Flow Target set point in the Systems/Set Points tab. This value is in liters per minute (L/min). If adding an X values flow restrictor in the pure line, set the Pure Flow target to X minus 0.2, i.e. if you add a 2 l/m flow restrictor, set the Pure Flow target to 1.8 L/min.
- After flow restrictor replacement the low flow pure and low flow waste alarm setpoints need to be updated. The new values should be the pure flow restrictor value divided by 2 for the low flow pure alarm setpoint, and the waste flow restrictor value divided by 2 for the low flow waste setpoint.

10 ELECTRICAL CONDUCTIVITY PROBE CALIBRATION

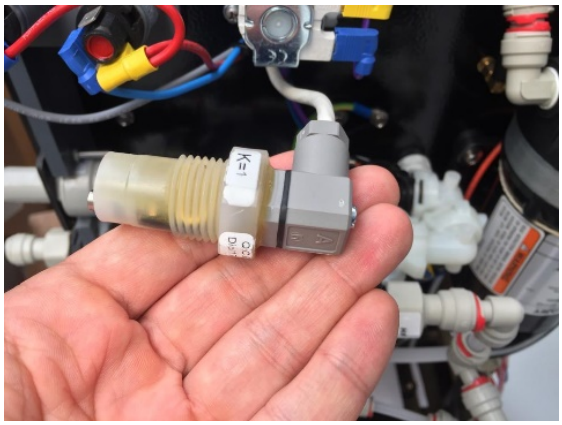
Equipment needed:

- 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.
- Hex key number 4.
- Phillips screwdriver.
- External EC probe.
- External mounted EC probe.
- Laptop and USB to micro-USB cable



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

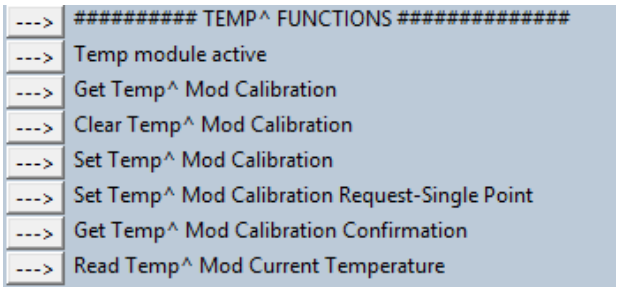
- Remove the covers.
- Using a cross head screwdriver, loosen the screw on the top.
- When the screw is loosened the upper part can be removed.



- Connect the external probe.

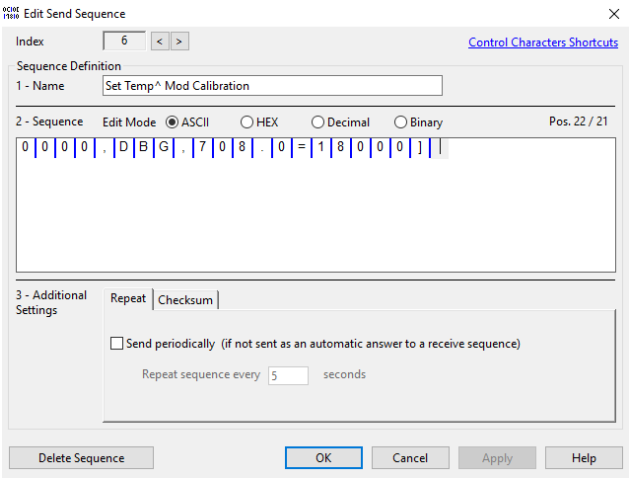
- Power on the system.

Conductivity probe is calibrated through Docklight. Before EC calibration, temperature has to be calibrated.
For more information on how to use Docklight please refer to chapter 9.2.1. Open the program and perform the following by pressing the **Send** button.



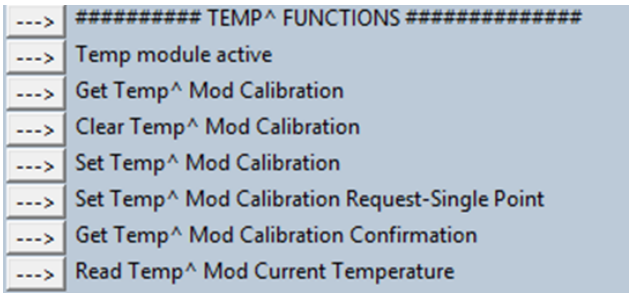
Temperature calibration:

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

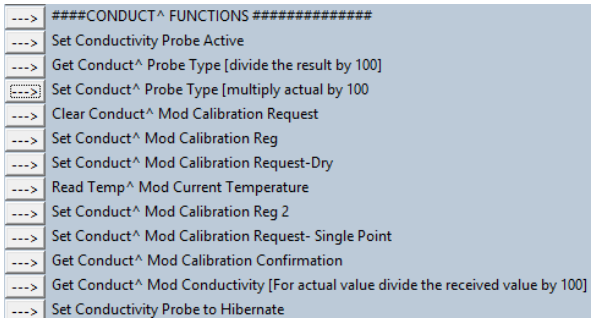


- Read current room temperature using an external probe
- **Click on the text of the Set Temp^ Mod Calibration** to set temperature according to the room temperature measured in previous step. A pop-up window will open. By default, the temperature is set to 25 degrees Celsius (25000 in Docklight). Replace this value with the room temperature measured via the external probe, e.g. if the probe reads 18 ₀C 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.

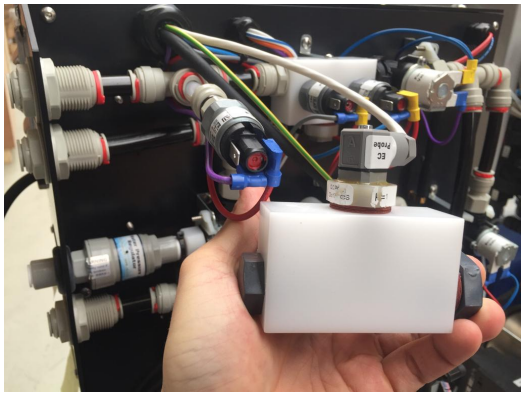


- Click – **Set Temp^ Mod Calibration Request-Single Point** to calibrate the temperature.
- Click – **Get Temp^ Mod Calibration Confirmation** to confirm calibration
- Clicking – **Read Temp^ Mod Current Temperature** will display the temperature reading of the probe.

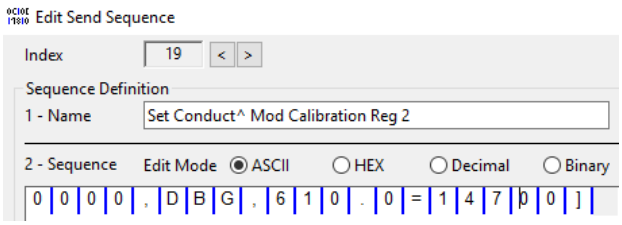


Conductivity calibration:

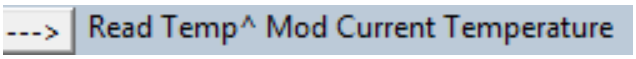
- Click – **Set conductivity Probe Active** to activate the EC probe.
- Click – **Set Conduct^ Probe Type**
- Click – **Get Conduct^ Probe Type** Response should be “100”.
- Click – **Clear Conduct^ Mod Calibration Request** to clear previous calibration request.
- Click - **Set Conduct^ Mod Calibration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



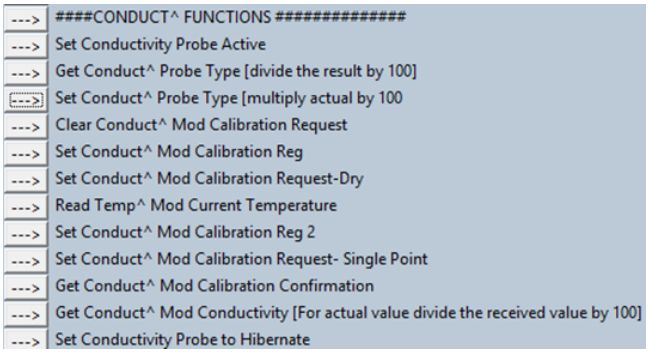
- Disconnect the external EC probe and connect the EC probe mounted on the special manifold. Fill the manifold with the calibration solution. Voltea suggests using a 147μS/cm standard solution.



- 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



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



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. Disconnect the USB cable and close the cabinet. Jumper should remain in the open position.

APPENDIX

FLOW RESTRICTOR COLOR AND FLOW

Order number	Colour	Flow (L/m)	Flow (gpm)	Availability
102509	olive	2.0	0.52	Pre-installed in Waste line
102539	brown	3.0	0.79	Shipped with DiEntry
102590	grey	4.0	1.05	Shipped with DiEntry
102536	yellow	5.0	1.32	Shipped with DiEntry
102538	black	6.0	1.58	Pre-installed in Pure line
102540	green	7.0	1.84	Shipped with DiEntry
102591	natural	8.0	2.11	Shipped with DiEntry
102537	orange	9.0	2.37	Shipped with DiEntry
102510	light blue	10.0	2.64	Shipped with DiEntry
102592	red	12.0	3.17	Shipped with DiEntry
102593	pink	14.0	3.69	Shipped with DiEntry
102594	lime	15.0	3.96	Shipped with DiEntry
101467	blue	16.0	4.22	Shipped with DiEntry

SPARE PARTS LIST

Voltea part #	Description
101414	Nut M8 fine thread
101477	Nut M8
101839	Motor valve
102018	Atlas flowmeter
102028	Acid check valve
102377	Acid peristaltic pump
102459	Bypass solenoid valve
102460	Flow meter

50% W/W CITRIC ACID SOLUTION PREPARATION

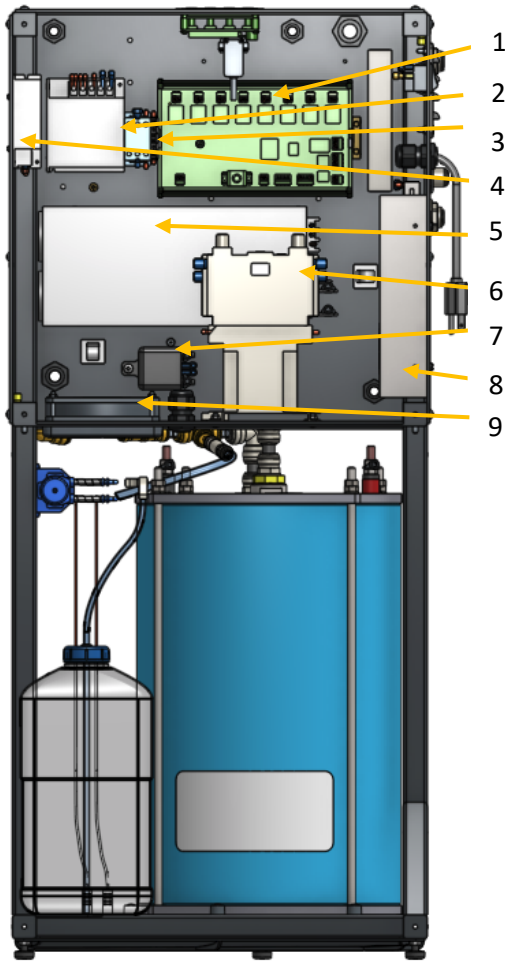
1. Required materials
    a. Citric acid (solid, >95%, no specific grade)
    b. 3L (0.79 gallons) graduated container
    c. Stirring rod or stirring device
    d. Personal protective equipment, as described in the citric acid data sheet.
    e. Distilled/sterile water
2. Fill the container with 1500 ml (0.39 gallons) distilled/sterile water
3. Weigh out 1,872kg (4.12pounds) of citric acid.
4. Add acid to water and gradually stir.

NOTE: Add acid to water instead of water to acid to reduce the risk of splashing corrosive solution.

NOTE: It expected that the solution will become colder. If citric acid stops dissolving gently heat the solution to increase solubility.

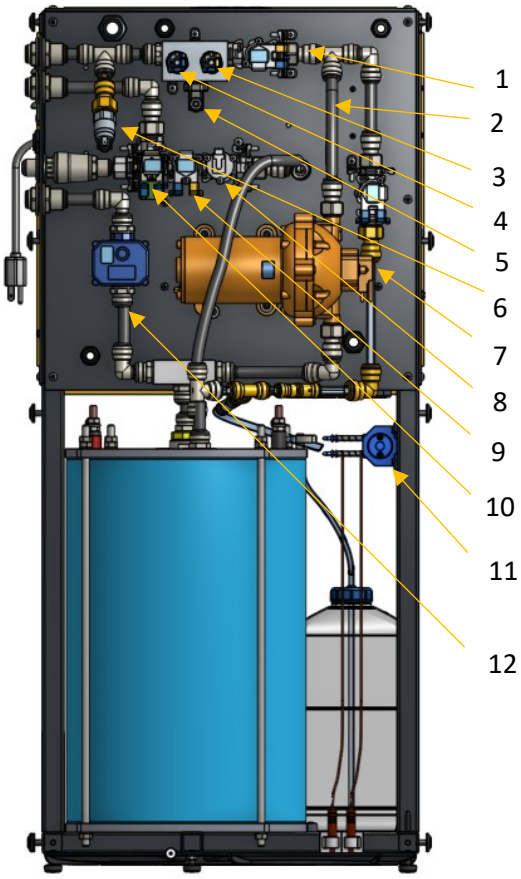
5. Once all the citric acid is dissolved fill the container with distilled/sterile water and stir.

ELECTRIC CABINET COMPONENTS



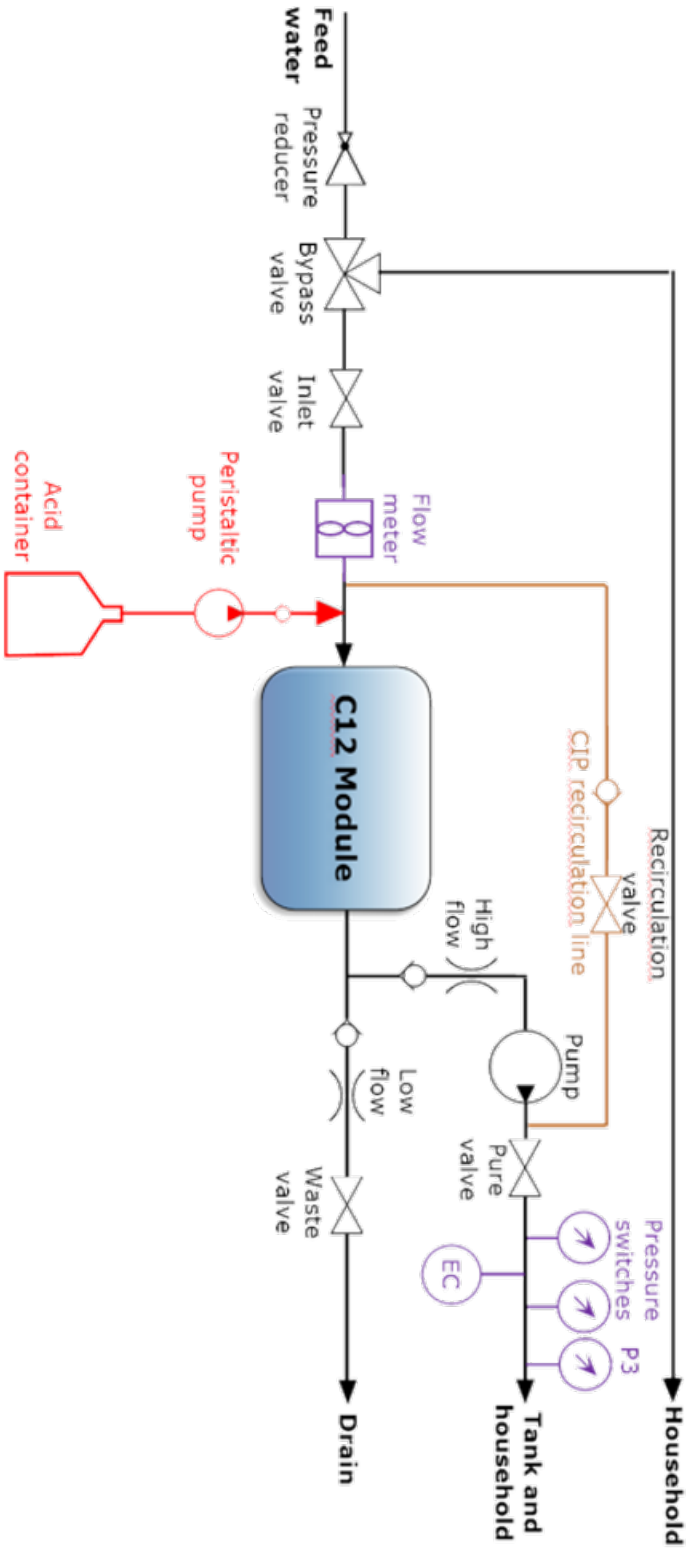
1. PCB
2. Power supply (24V - 50W)
3. Relay
4. Power supply (24V - 50W)
5. Power supply (12V - 1500W)
6. Relay
7. Shunt Relay
8. Power supply (24V - 300W)
9. Fan

VALVES, SWITCHES AND PUMPS

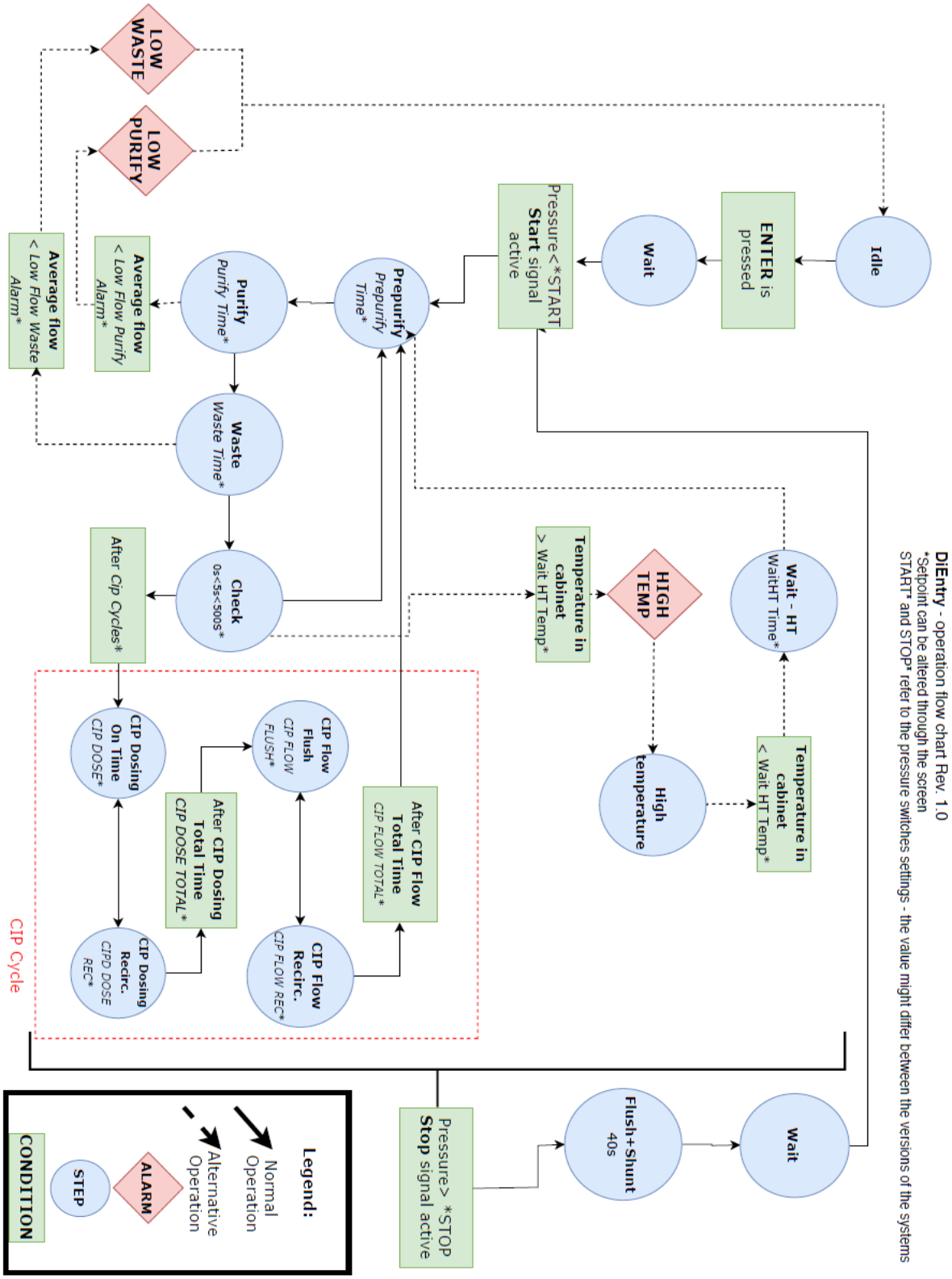


1. Solenoid valve
2. GSM antenna
3. Pressure switch 3.5 bar (51 psi)
4. Pressure switch 4.8 bar (70 psi)
5. EC probe
6. Pressure switch 2.0 bar (28 psi)
7. System pump
8. Flow sensor
9. Solenoid valve
10. Solenoid valve
11. CIP pump
12. Motor valve

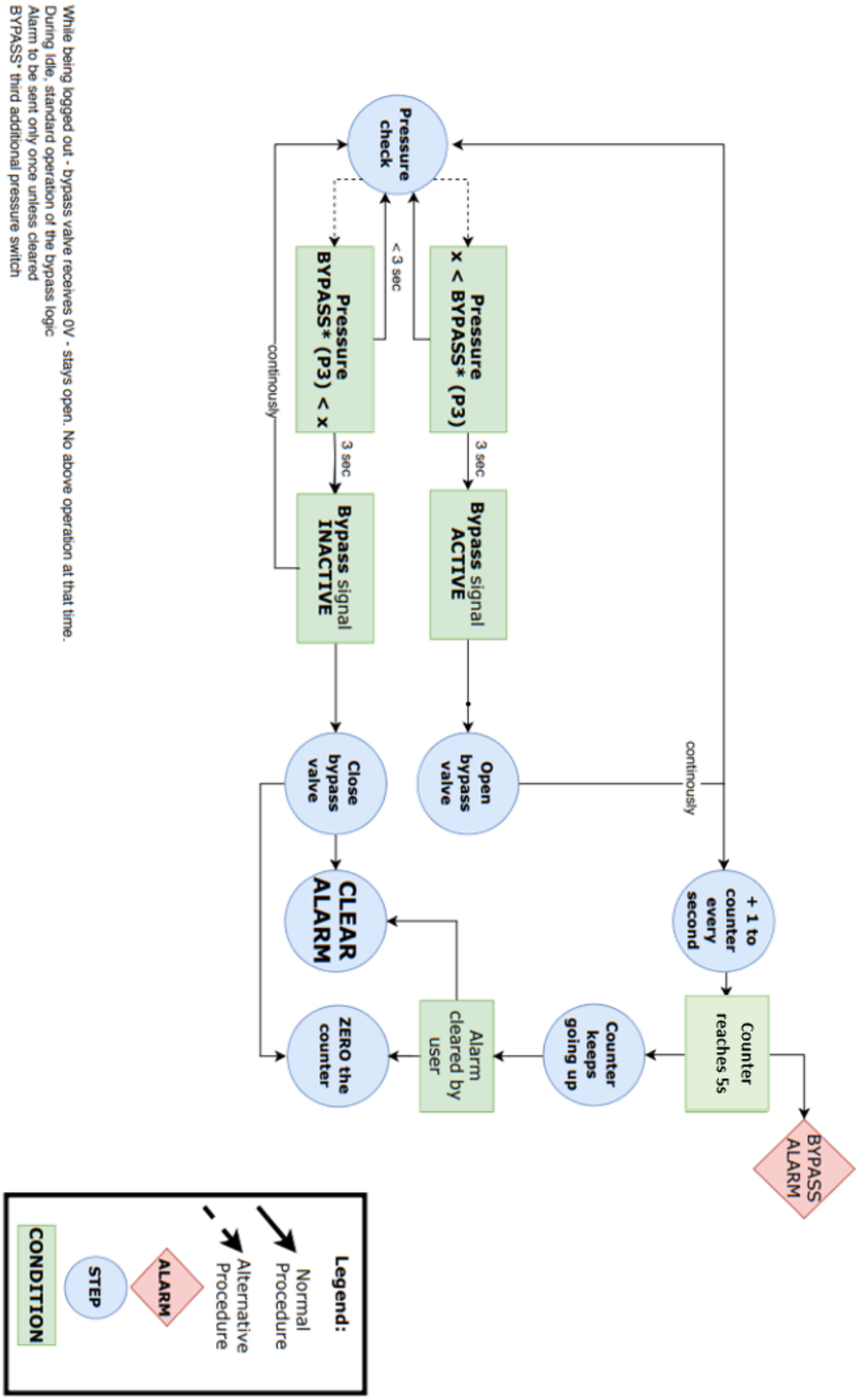
P&ID


Feed water
Pressure reducer
Bypass valve
Inlet valve
Flow meter
Peristaltic pump
Acid container
C12 Module
CIP recirculation line
Recirculation valve
High flow
Low flow
Pump
Pure valve
Waste valve
Pressure switches
P3
EC
Household
Tank and household
Drain

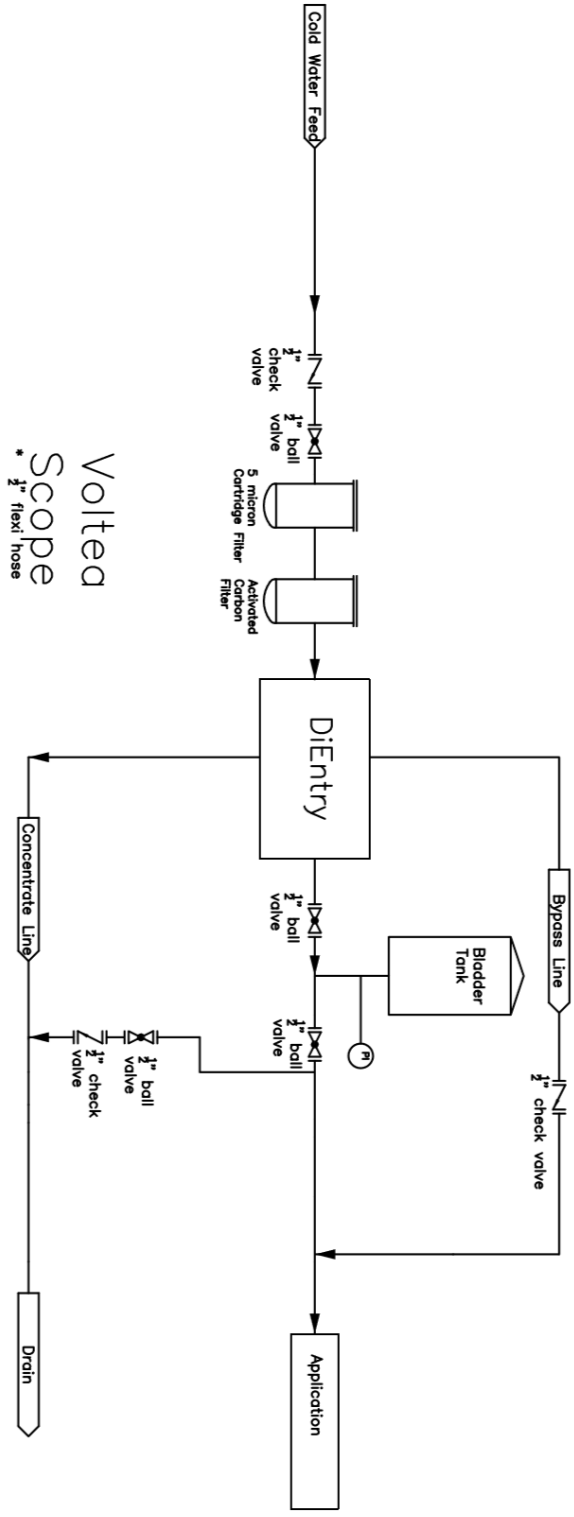
PROCESS FLOW DIAGRAM



BYPASS FUNCTIONALITY DIAGRAM



DiEntry 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**
R1.1 update	GT	20-Mar-19	1.1
Feed water quality spec update	RS	09-Apr-19	1.12
Page 16: It may take up to 8 operational cycles for the unit to adjust and output water of the desired quality.	GT	12-Jun-19	1.13
Volume Unit setpoint added (page 24-25)	GT	12-Jun-2019	1.13
Document Cosmetic Edits	HL	28-April-2020	1.14
New DiEntry Rendering	HL	05-October-2020	1.15