



# **EWCO Systems prebuilt with pH Control**

## **Installation & Operation Manual**

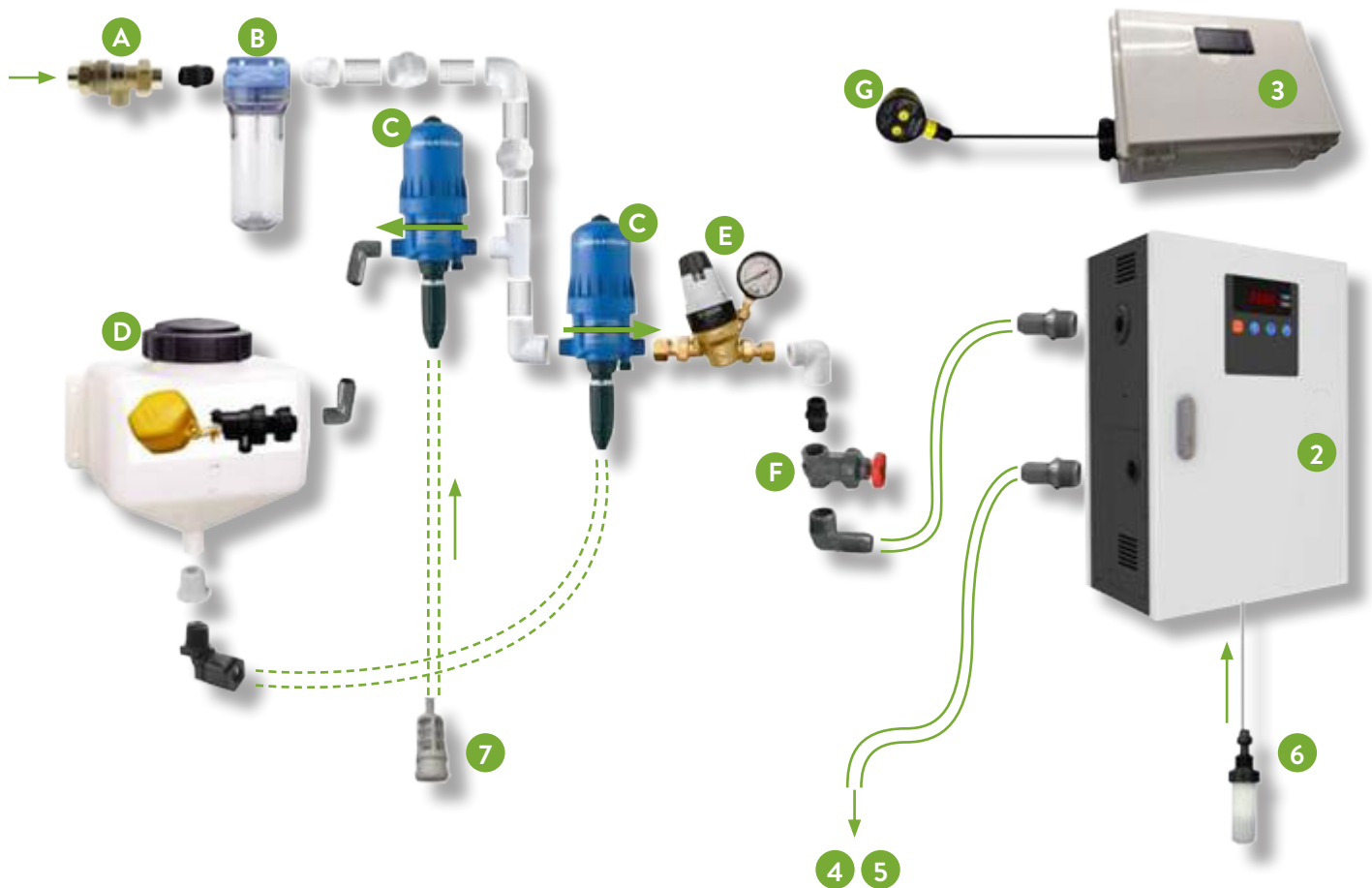
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# System parts



Picture 1 Shows system components, arrows shows flow direction

1. Backboard with pH control and system bracket (*backboard not shown on picture*)
  - a. Back flow preventer
  - b. Water filter
  - c. Dosing units
  - d. Holding tank with float valve
  - e. Pressure reducer
  - f. Flow control
2. EWCO 240 or 1200 unit
3. Control box Pump/level
  - g. Level sensor
4. HOCl storage tank (*option, not on picture*)
5. Distribution pump (*option, not on picture*)
6. Brine tank (*option, not on picture. 6 shows location*)
7. Hydrochloric acid (HCl) connection

## System parts description

### Backflow preventer



Picture 2 Backflow preventer

The backflow preventer (a) is installed to protect the water system from being contaminated in the case of a backflow. The backflow preventer uses an atmospheric vent for any abnormal situation. This vent is therefore to be kept unobstructed. Keep in mind that water might come out of this vent.

The backflow preventer is flow directional.

### Water filter



Picture 3  
Water filter

The water filter (b) will help keep the system running longer and make sure the final product is as clean as possible.

On the top of the filter housing is a red button. This bottom is used to release pressure when changing the filter.

The filter housing can be removed by twisting the housing to the left. To help remove the housing a specialty tool can be purchased.

See maintenance section for further information on filter change interval.

### Dosing unit



Picture 4  
Dosing unit

The dosing unit (c) uses the water's pressure to mix in a concentrate. The injection rate of the concentrate can be adjusted using the scale at the bottom of the unit. The dose of concentrate will be directly proportional to the volume of water entering the unit, regardless of variations in flow or pressure. The ratio can be adjusted using the scale shown in picture 5. Make sure the locking ring at the bottom of the adjusting "handle" is loosened before any movement of the adjusting ring. All adjustments should be made without pressure on the unit. The eyelet in the white part of the adjusting handle is used to set the current setting and is used when adjusting the ratio. The dosing unit is flow directional, the flow direction is indicated with an arrow, between the inlet and outlet.

There are two different versions of the same scale. One is a percentage and the other is ratio. The scales are on opposite sides of the unit and will do the exact same thing.



Picture 5 Dosing unit scale



Picture 6  
Holding tank

## Holding tank

The holding tank (d) is filled automatic from dosing unit (c). The level is controlled by the in-tank installed float valve (picture 7).

The holding tank stores a mix of water and Hydrochloric acid until it is used to lower the pH of the feed water going to the EWCO system.

Nothing is added by the operator at this point and the screw lid is only use to inspect and measure the content. The level of the tank is maintained by the float valve installed inside the tank.

The float valve can be locked in the closed position and has a build in check valve. The fill level is pre-adjusted from factory, but can be changed, if needed, by adjusting the yellow floats position.



Picture 6.a Float valve



Picture 6.b Float valve  
in-side tank



Picture 7 Pressure regulator

## Pressure reduction valve

The pressure reduction valve (e), regulates the water pressure going to the EWCO system. The EWCO (E1200/E240) system has a maximum allowed pressure of 50 psi. This is to protect the internal parts of the system.

The pressure reduction valve (e) is pre-adjusted from factory to 45 psi, so no action is needed from the customer, side.



Picture 8  
Flow control valve

## Flow control valve

The flow control valve (f) can adjust the flow though the EWCO system. The flow can be adjusted to anything within the EWCO system flow range. For the E1200 that is 4 to 24 liter/minute. E240 is 1 to 5 liter/min.



Picture 9 Level / pump  
control unit

## Level / pump control

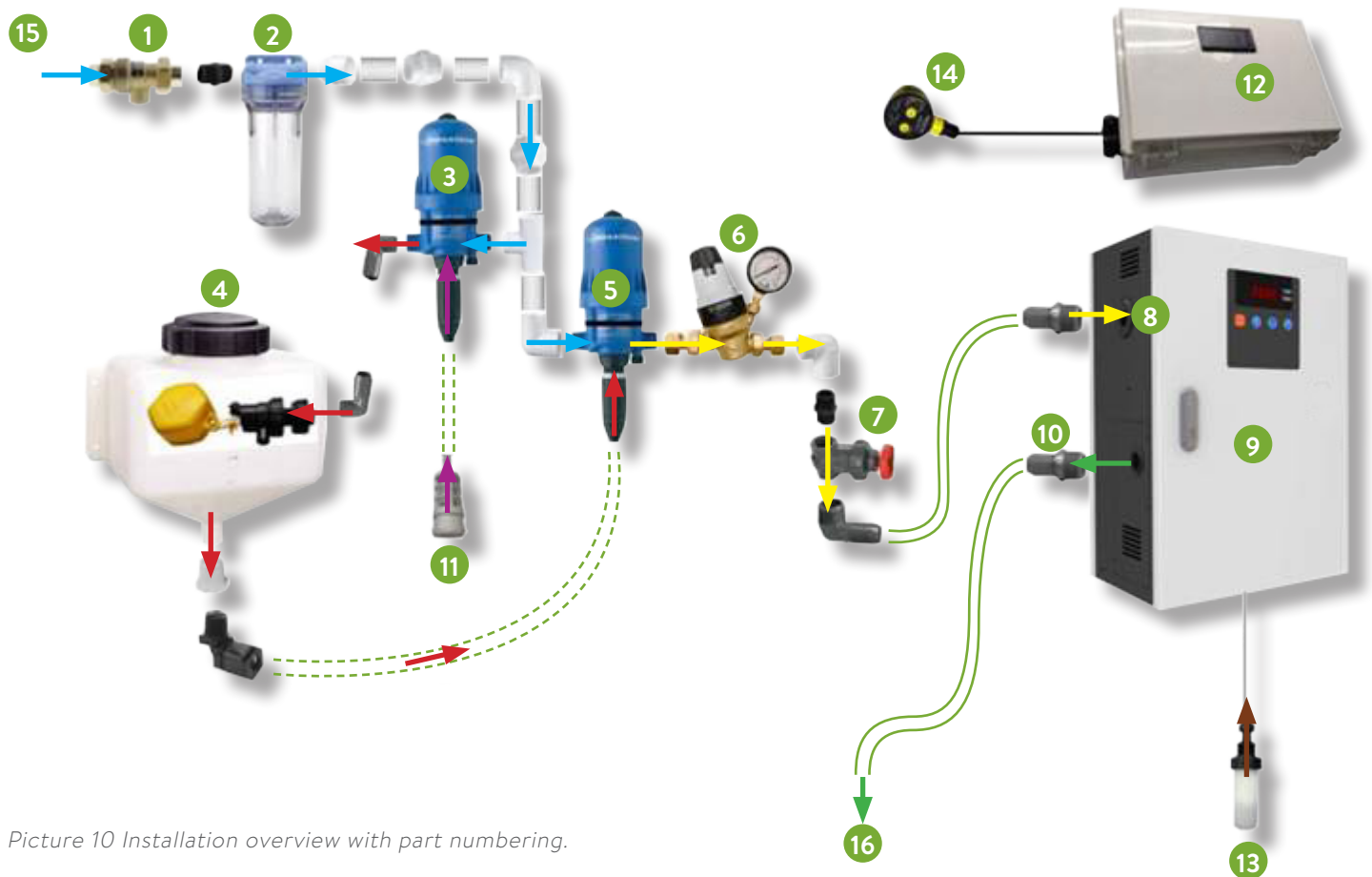
Tank level / pump control (3) is an option that can be added when ordering a system. The programmable LED display will show tank level as a percentage, and control start/stop of the EWCO system.

The programmable LED display will also protect distribution pump in some specific operational situations if this option is added.

## Installation

The system is intended to be installed vertically on a wall. The system is intended to be installed vertically on a wall and will not work correctly if laying down.

Installation hardware is not included with the system, and customer will have to supply their own.



Picture 10 Installation overview with part numbering.

## System process

The colored arrows in picture 12, indicates the flow direction of water through the system. For every color change of the arrows the water/product undergoes a change. This change can be the addition of an additive or a chemical change through the use of electrolysis. Different colors are also used to indicate additives used in the process.

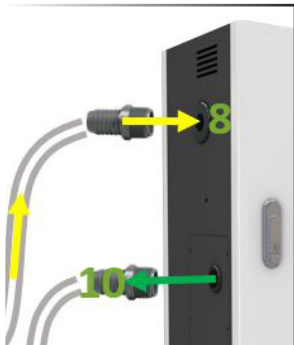
### Process steps

- 1) Blue color.** The blue color is normal water before any changes are made. The water inlet splits up into two separate streams. The water that goes into dosing unit 3 is a low flow rate. The main part of the water goes through dosing unit 5.
- 2) Red color.** The red color indicates the addition of the purple product (HCl). The HCl is added to the water in dosing unit 3. The mix is stored in tank 4 and has a very low pH level at this point.
- 3) Yellow color.** The Yellow is a mix of red (HCl and water) and blue (water). The dosing unit 5 controls the amount of concentrate (red) that is needed to produce the desired pH level in the final solution. Location 6 & 7 does not change the solution.
- 4) Green color:** The green color is the final HOCl product. The final solution is made by adding brine (brown arrow) to the electrolysis cell inside the EWCO system.

## Water connection

Water is connected at location 15 on the drawing. The water is connected directly to the backflow preventer (1). Use included barb connection if  $\frac{3}{4}$ " hose is used. Water pressure should not exceed 85 psi at the inlet, as this is the max acceptable pressure of the pH control system (first part of the backboard). Water purity should not exceed 80 TDS (total dissolved solids). Make sure the filter housing has a filter installed.

## EWCO system Water connection



Picture 11 EWCO 1200 in/out-put

The pH regulated water enters the EWCO system at this location 8 (yellow arrow) and the final product (HOCl) comes out at location 10 (green arrow) see picture 10.

The EWCO system located at position 9 on the overview can either be a 240 or a 1200 unit. Which unit used depends on the concentration and volume needed.

If the EWCO 240 unit is used, in and out locations are switched. The E240 also uses push-fit connections.

The E240 has an internal Brine tank (NaCl) which needs no additional setup. The E1200 uses an external brine tank which uses filter 13 in picture 9, as a suction filter. The filter is lowered into the tank used for the brine. Filter and additional hose is included in the system.



Picture 12 EWCO 1200 unit, brine filter

Additional information on the specific EWCO system can be found in the unit's manual.

E1200 unit: <https://www.EWCO.com/pdf/e1200soperationmanual.pdf>

E240 unit: <https://www.EWCO.com/pdf/e240soperationmanual.pdf>

## Power connection

Depending on what options have been chosen, the power is connected differently. The pH control part of the setup does not use electrical power for its operation. The only power needed for operation is therefore the E240/1200 unit. Both units connect directly to an outlet and are compatible with most outlets around the world (100 – 230 Vac, 50/60Hz). Both have an on/off button on the side.

## Level sensor / pump

With the addition of a level sensor the power connection is moved to the electrical box right over the EWCO unit. Power cable comes with a US plug (US customers only) that goes into the electrical box and distributes power from there. The power inlet cable is connected to a normal power outlet. Control box is compatible with the same voltages as the EWCO systems. Customers outside the US will have to supply and install a power plug that fits their region.





Picture 13  
Brine (NaCl) filter

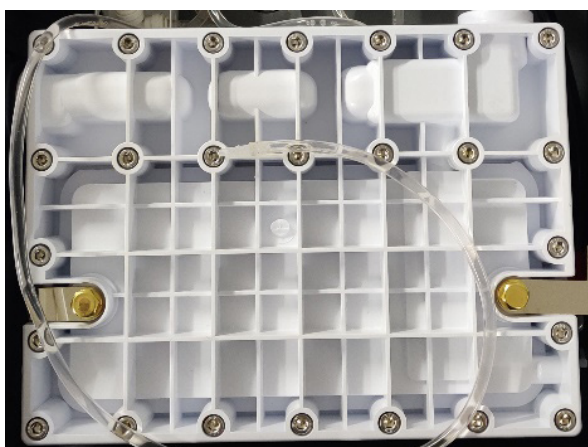
## Brine (NaCl)

The brine connection depends on the EWCO system being used. The E240 unit has an internal brine tank, so no further action is needed.

The E1200 unit uses an external brine tank (NaCl). Included in the system is a 1/8" hose and filter (see picture 11 & 12). Use filter and hose to connect external brine tank to the E1200 system.



Picture 14 1/8 tubing for  
brine tank



Picture 15 Electrolysis cell inside E1200 unit. Brine  
hose connection

## E1200 brine hose connection.

Open front door of the E1200 unit to find the Electrolysis cell (pic 15). The brine is connected to the E1200 system through the hose seen in picture 14. The cell hose can be found in the bottom left side of the E1200 unit next to the Electrolysis cell. There are two hoses in this area, one goes to the cell and the other is for the brine. The hose can also be hidden behind the cell. The hose can also be rolled up on top of the cell.

The brine tank is connected to the system using the hose in picture 14. The hose is run out through the hole in the bottom left side of the unit. Avoid having height differences in

system and brine tank location. System pump cannot handle more than 2-3 meters height difference. Try to keep the length of the brine hose at a minimum.



Picture 16 Location of HCL  
additive to system

## Hydrochloric Acid

Hydrochloric Acid is connected at location (11) on picture 10 (purple arrow). The concentration of HCl to be used is between 32-37%. If the finished HOCl product is used directly on food, the HCL must be food grade.

Use included chemical resistant hose, filter and blue cable ties for installation. Filter is secured to the hose using the two blue cable ties before submerged into the HCL. Use full strength 32-37% HCl.

Use appropriate PPE when handling hazardous chemicals.

**Do not add HCl to the system anywhere else.**



Picture 17  
HCL filter





Picture 18 Control box

## Level / Pump control

The control box (12) is installed if the optional level sensor was added. The programmable LED display will show the tank level as a percentage of the sensor scale. The LED display is used to control the EWCO unit start/stop. The EWCO will also stop the distribution pump from running dry when tank level is too low or signal is outside normal range.

There are 4 relays that control those functions. Relay 1 and 2 control the EWCO unit and relay 3&4 the pump. Relay 1 is set to 95% and will stop the HOCl production when reached. Relay 2 will start HOCl production when level goes below 50%. Relay 3 will stop the pump from running when level goes below 10%. Relay 4 will stop pump when level shows 101.5% which is outside normal operation.

The relay settings can be changed by the operator. Press the up or down arrow on the display when default screen is displayed to access “fast set-point”. Press up/down arrow to choose the wanted relay to change. Press the “ok” button to access the desired relay set-point. Relay 2 setpoint should always be lower than relay 1 setpoint.

Pressing the “ok” button when default screen is display will prompt you for a password. Enter the password to change setup of the programmable LED unit.

Relay number	Description	Setting %
1	EWCO system is stopped at this setting	95
2	EWCO system is started at this setting	50
3	Pump is stopped, to avoid running dry	10
4	Pump is stopped as level signal is outside normal range	101.5



Picture 19 Level sensor

## Ultrasonic level sensor

The ultrasonic level sensor (14) connects to the control box. The M12 connector used for the sensor can only be installed in one position, make sure the M12 connector is connect straight and all the way (do not use any tools). The ultrasonic level sensor is mounted to the HOCl storage tank, in a way that leaves a free line of sight to the measured liquid.

The sensor has a dead band of 300 mm, meaning that the sensor has to be minimum 300 mm from the measured liquid. Maximum range of the default sensor is 3 meters.

The sensors signal strength is indicated on top of the sensor using a red LED. Make sure the red LED is on for the sensor to work correctly.

## Distribution pump

The optional distribution pump is a constant pressure pump that uses a build in VFD. The pump uses a pressure sensor to measure the pumps output pressure. The pump speed is adjusted to maintain the correct pressure.

The pump connects to the Backboard control box with two cables. Cable 1 supply the needed power (Vac). The second cable is used for pump protection in specific situations.

The pump starts on its own when the pressure in the outlet line drops. The pump stops again when the pressure in the output line is higher than the setpoint. The pump pressure can be adjusted on the pump by pressing the arrows on the top. The storage tank is connected to the pump inlet and all consumers connect to the output.

## System start-up

Make sure all topics in the installation part of this manual is resolved before starting the start-up phase. Depending on our specific setup, you might have additional parts to consider.

### Step by step

1. Make sure all relevant parts for your system is installed and ready, as described in the installation section.
2. Make sure EWCO system (9) is not turned on at this time.
3. Close flow regulation valve (7)
4. Disconnect hose from bottom of mixing tank (4).
  - a. Unscrew the ½ inch hose connection to allow water out of the small tank (4).
5. Open water connection to system (max 85 psi)
6. Vent dosing units, by pressing button on top of unit (3&5). Hold down the button until the water flows out in a steady stream.
7. Prime the dosing unit (3) by running the unit until HCL is soaked into the unit body. Dosing unit scale can be adjusted to allow faster filling of hose and unit.
8. Adjust dosing unit scale to half way position.
9. Let dosing unit run and check pH level in mixing tank. Allow adequate time for changes to take effect after any changes. Mixing tank pH level should be between pH 1 and 1.5 depending upon feed water pH. The pH level can be adjusted using the scale on dosing unit 1. Moving the ‘Handle’ on the scale up, lowers the pH level in the tank (4).
10. When desired pH level is reached the hose at the bottom of tank (4) can be reattached.
11. Let tank (4) fill with water at the correct pH level and make sure the float valve controls the level as intended.
12. Adjust scale on dosing unit 5 to 50 % (half way).
13. There are two different ways to do the next part.
  - a. Run EWCO system
  - b. Disconnect water inlet (8) from EWCO system and let the solution run into a bucket for testing and then drain.

For this start up instruction, I have chosen to use option b.
14. Open flow valve to allow the solution to flow into the bucket.
15. Let the solution run into the bucket and watch dosing unit 2 suck in the solution from mixing tank (4).
16. Test the pH level of solution running into the bucket. The pH level at this point should be 1 to 2 pH below the desired final product. The exact pH level depends on the setting of the EWCO system.
17. The pH level can be adjusted using the scale on the second dosing unit. Adjusting the “handle” up towards the unit body will lower the pH level of the solution.
18. When the correct pH level has been reached close the flow valve to stop the flow.
19. Reattached the hose to the EWCO system inlet (8)
20. Open the flow control valve. The valve can be adjusted to the desired flow rate later on.

*The pressure regulator has been adjusted to 45 psi from factory and therefore does not need further adjustments.*

- 21.** Turn the EWCO system on.
  - a.** If you have the control box turn that on as well.
- 22.** If you have the control box and level sensor, then jump to the “calibrating the level sensor” before continuing.
- 23.** Run the complete system and test the pH of the final product. The pH does most likely need some minor adjustment here to get the desired pH level.
- 24.** Use the scale on dosing unit (5) (closest to the EWCO system) for fine adjustments of pH level. Do not change the setting on the first dosing unit at this point.
- 25.** Both dosing units’ adjustments can be locked after the final pH level has been reached.

## Calibrating the level sensor

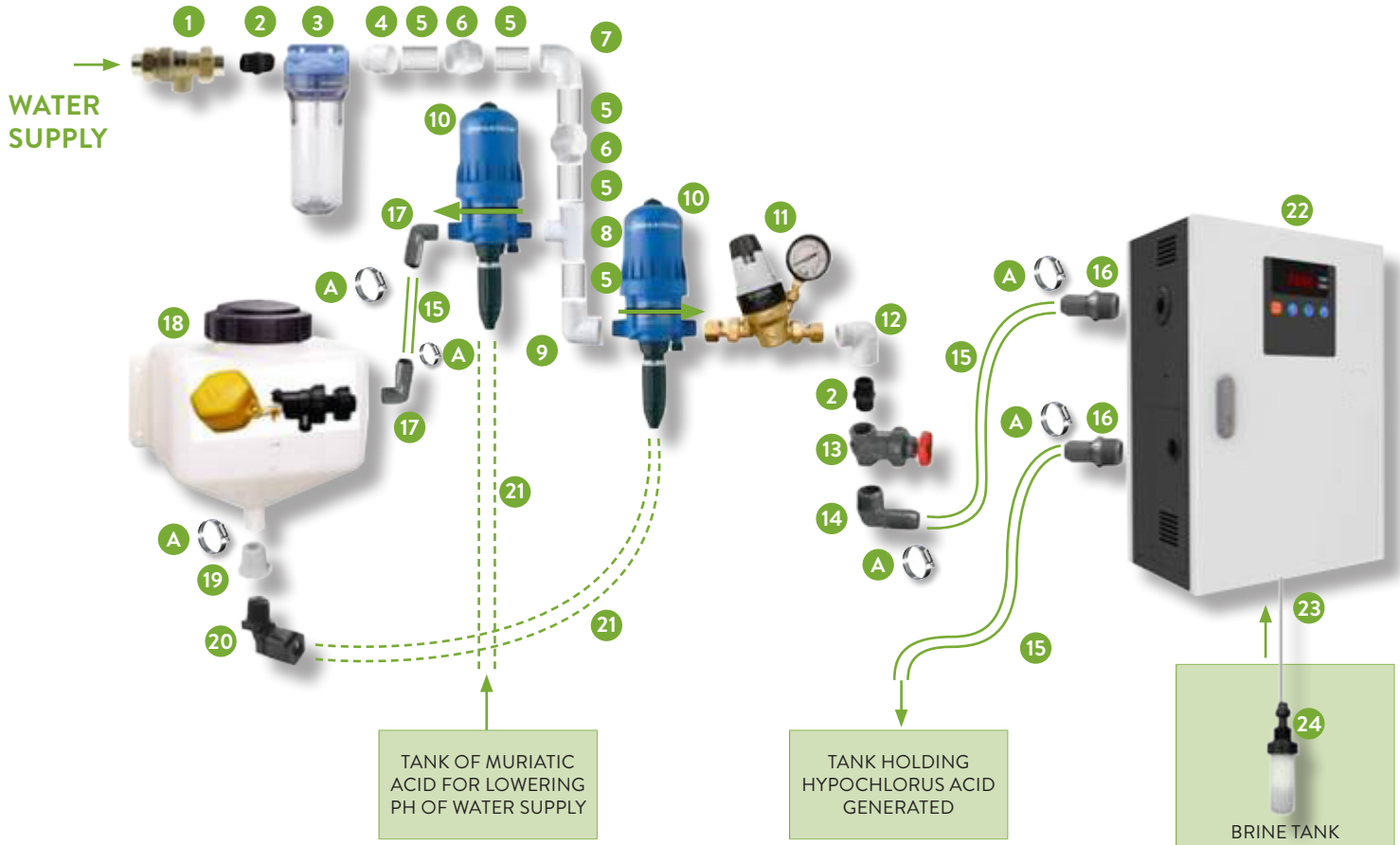
- 1.** Make sure the sensor is on. The green LED on the unit should be lit. The red LED indicates the signal strength of the signal the unit sees. Under normal operation this light is on, if the red LED is not on the sensor is not at the right angle or we are outside the 3-meter range.
- 2.** Install the sensor in the desired location. Make sure there are no edge the sensor can see. If the sensor sees sharp edges the reading will be off.
- 3.** Push and hold the “analog button” for longer than 2 seconds.  
Power LED = off, Output LED = on
- 4.** Hold a piece of cardboard at the position which equals 100% full tank.
- 5.** The red LED (signal) must be on or flashing
- 6.** ‘Click’ analog button  
Power LED = off, Output LED = flashing
- 7.** Remove cardboard from 100% full and let the sensor see 0 % full
- 8.** “Click” analog button
- 9.** The red LED must be on or flashing
- 10.** If the operation was successful the Power and Output LED will be on

## Pump start-up

Prime the pump before use. Open the inlet and outlet valves (if installed) to allow the pump to fill up with HOCl. Open up some of the outlet to allow HOCl to “escape” the setup. Some pumps need to be primed by losing a vent bolt. To find specifics on this type of priming please see pump manual. Turn on the pump and watch operation. Make sure pump is running without excess noise.

System is now ready for operation.

# Spare parts list



1	3/4" FPT Dual Check Backflow Preventer w/ Atmospheric Vent (SKU: P-4501)	10	Dosatron Pump D14MZ2VFII (SKU: P-4473)	19	3/4" MPT x 1/2" FPT Hex Bushing (SKU: P-1030)
2	3/4" MPT Nipple Hex (SKU: P-4251)	11	3/4" FPT Compact PRV Prescal w/ Gauge (SKU: P-4500)	20	1/2" Compression x MPT Male 90 Deg Elbow (SKU: P-4526)
3	Filter Housing 3/4" FPT (SKU: P-1015) 5 Micron Filter Cartridge (SKU: P-1020)	12	3/4" FPT x MPT PVC 90 Degree Elbow (SKU: P-4516)	21	1/2" OD Versilon FEP Tubing (SKU: T-4552)
4	3/4" MPT x Socket PVC Male Adapter Sch 40 (SKU: P-4512)	13	3/4" FPT PVC Gate Valve (SKU: P-4377)	22	EWCO 1200 (SKU: E-1200)
5	3/4" PVC Sch 40 Pipe (SKU: T-1137)	14	3/4" Insert x 3/4" MPT Adapter Elbow (SKU: P-1029)	23	1/4" OD Silicone Tubing (SKU: T-1126)
6	3/4" Socket PVC Union (SKU: P-4488)	15	3/4" Reinforced Tubing, 70 psi (SKU: T-1040)	24	Foot Valve Strainer, 1/4" OD (SKU: T-1026)
7	3/4" Socket PVC 90 Degree Elbow Sch 40 (SKU: P-4510)	16	3/4" Insert x 3/4" MPT Adapter (SKU: P-1028)	25	Compact Float Valve, 3/4", Yellow/Black (SKU: P-4519)
8	3/4" Socket x Socket x FPT PVC Tee Sch 40 (SKU: P-4513)	17	3/4" Insert x 3/4" FPT Adapter Elbow (SKU: P-4489)	A	316 SS Hose Clamp SAE #12 (SKU: P-4431)
9	3/4" Socket x FPT PVC 90 Deg Elbow Sch 40 (SKU: P-4515)	18	2.5 Gallon Rectangle Blow Molded Tank (SKU: P-4523)		