v9ES100

# Smart fog® Installation and Operations Manual

**PLEASE READ THE ENTIRE MANUAL BEFORE STARTING INSTALLATION**

## CONTENTS



# Step 1

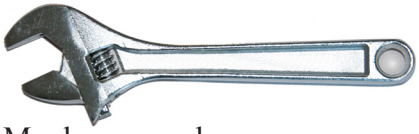
## PREPARING FOR INSTALLATION

**IMPORTANT NOTE:**

**DO NOT** remove plugs from the ES100 units before completely flushing the system as completing instructions on Step 8.


## ESSENTIAL TOOLS FOR INSTALLATION


Pipe Cutter


Monkey wrench


Small (-) Screw Driver


Large (+)Screw Driver


Wire Stripper


Teflon Tape

Driller

# Step 1

## Push-to-connect Fittings Connection Instructions (1/4” - 1/2”)

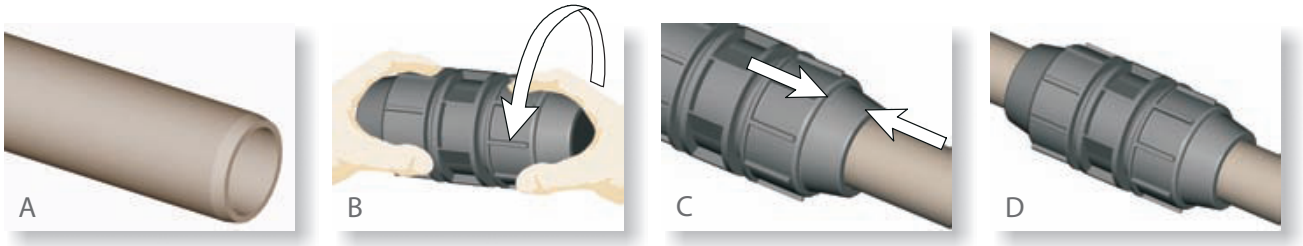
Push-in fitting connecting and disconnecting instructions

To connect push the pipe into fitting until the pipe stops. Pull on the pipe to check it is secure.

**NOTE:**
If there is a leak, **PUSH MORE**!

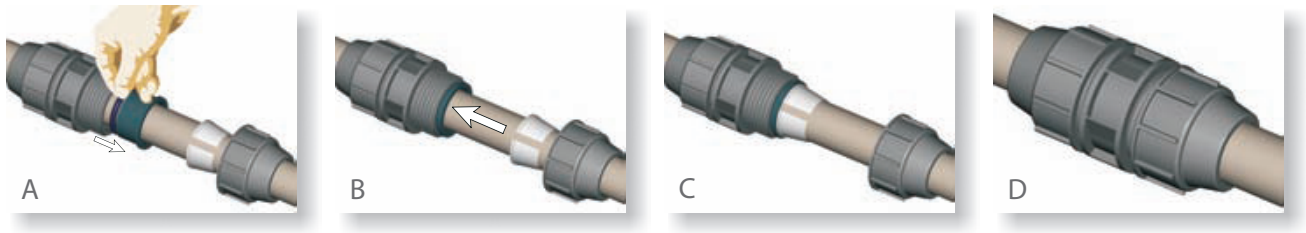
To disconnect ensure the system is depressurized before removing fittings. Push in the collet against the face of the fitting. With the collet held in this position the pipe can be removed. The fitting can then be re-used.

## Compression Fittings Connection Instructions (3/4” - 2”)




To connect a compression fitting scrape an angle off the end of the PE pipe. Unscrew two turns of compression fitting and push the PE pipe into the fitting and tighten the fitting.

## Compression Fittings Connection Instructions (3” - 4”)




To connect a compression fitting scrape an angle off the end of the PE pipe. Unscrew two turns of compression fitting and push the PE pipe into the fitting and tighten the fitting.

# Step 2

## PREPARE THE COMPRESSED AIR SOURCE

Connect the Male Adaptors to the Compressed Air Source. All compressed air supplied to the system should be filtered. Air Filters are normally enclosed inside the ES100PB or are supplied separately.

### AIR CONNECTION

1/2” x 1/2”NPT Male Adaptor should be used to used on the air source to connect to the system teflon on the NPT thread.

AIR COMPRESSOR →


1/2” x 1/2”

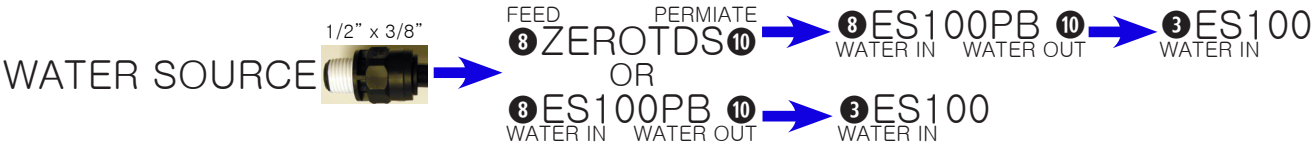

**NOTE:**
In most cases the ES100PB includes an Air Filter, in case an external Air Filter is supplied, place between the Air Compressor and ES100PB.

**NOTE:**
Refer to table on page 15 for pipe sizes.

# Step 3

## PREPARE THE WATER SOURCE

Connect the Male Adaptors to the water source.

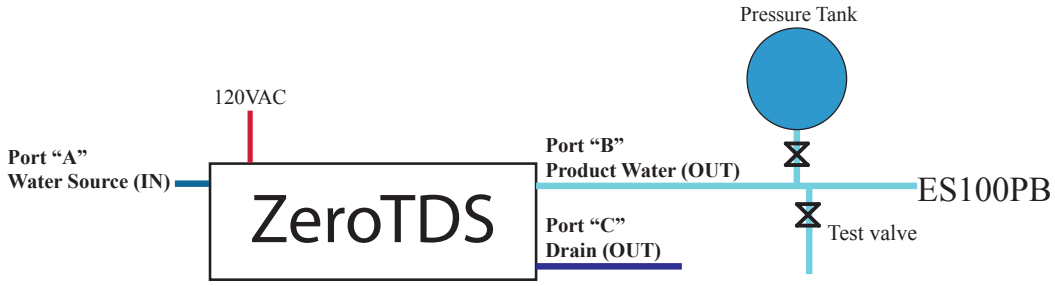



## LEAK DETECTOR SHUTOFF VALVE (OPTIONAL)

Install the leak detector shutoff valve before the ES100PB.

# Step 3

## Installing the ZeroTDS System




| | | | Ports | | | Port "A" | Operating | Electricity (A) | |
|---|---|---|---|---|---|---|---|---|---|
| Model | Dimensions (in) | Weight (lb) | A | B | C | Min (psi) | psi | 110/1 phase | 3 phase |
| 200 | 7 x 17 x 22 | 45 | 3/8" | 3/8" | 1/4" | 10 | 100 | 4/2 | |
| 300 | 7 x 25 x 32 | 50 | 3/8" | 3/8" | 1/4" | 10 | 100 | 6/3 | |
| 500 | 14 x 20 x 27 | 65 | 3/8" | 3/8" | 3/8" | 35 | 100 | 7/3.5 | |
| 1000 | 14 x 20 x 27 | 70 | 3/8" | 3/8" | 3/8" | 35 | 100 | 8.2/4.1 | |
| 1500 | 19 x 23 x 46 | 105 | 3/8" | 3/8" | 3/8" | 35 | 100 | 11.4/5.7 | |
| 2500 | 19 x 23 x 46 | 115 | 3/8" | 3/8" | 3/8" | 35 | 100 | 11.4/5.7 | |
| 4000 | 30 x 38 x 47 | 235 | 3/4" | 1" | 1" | 35 | 100 | 16/7.5 | 3/2 |
| 5000 | 30 x 38 x 47 | 250 | 3/4" | 1" | 1" | 35 | 100 | 17.4/8.7 | 4/3 |

The ZeroTDS Water Flow must be set to the Product (Permeate) and Drain (Concentrate) as specified below.

| ZeroTDS | Feed Water (psi) | | Operating Water (psi) | | Water Flow (GPM) | | |
|---|---|---|---|---|---|---|---|
| Model | Min | Max | Min | Max | Min | Product | Drain |
| 200 | 10 | 60 | 100 | 150 | 0.36 | Auto | Auto |
| 300 | 10 | 60 | 100 | 150 | 0.6 | Auto | Auto |
| 500 | 35 | 60 | 100 | 150 | 0.7 | 0.35 | 0.35 |
| 1000 | 35 | 60 | 100 | 150 | 1.4 | 0.7 | 0.7 |
| 1500 | 35 | 60 | 100 | 150 | 2 | 1 | 1 |
| 2500 | 35 | 60 | 100 | 150 | 3.5 | 1.7 | 1.7 |
| 4000 | 35 | 60 | 100 | 150 | 5.6 | 2.8 | 2.8 |
| 5000 | 35 | 60 | 100 | 150 | 7 | 3.5 | 3.5 |

For larger models please refer to the specific ZeroTDS Operation Manual

# Step 3

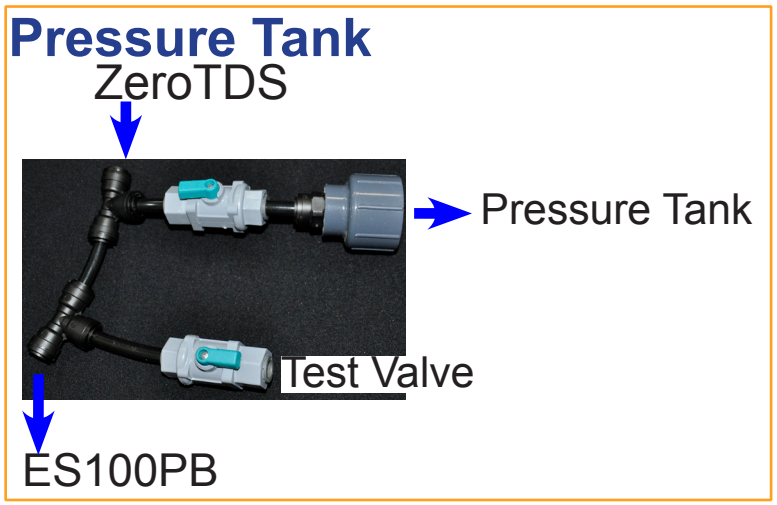
## STARTING UP THE ZEROTDS SYSTEM (MODELS: 200-300)

The 200 and 300 models are pre calibrated and will run correctly as soon as they are plugged into the electricity. On initial start-up before connecting the ZeroTDS to the ES100PB drain the clean water for 20 minutes.

**! IMPORTANT NOTE:**

- **Feed Water Pressure must not exceed 40 psi**
- **CONCENTRATE = DRAIN and it MUST be hooked not PLUGGED!!**

Water Source “A” 3/8” Product “B” 3/8” Drain “C” 1/4”


**NOTE:**
The TDS meter on the unit should indicate less then 10 on the “IN” and on the “OUT” less then “1”. Please call us for higher TDS is indicated.

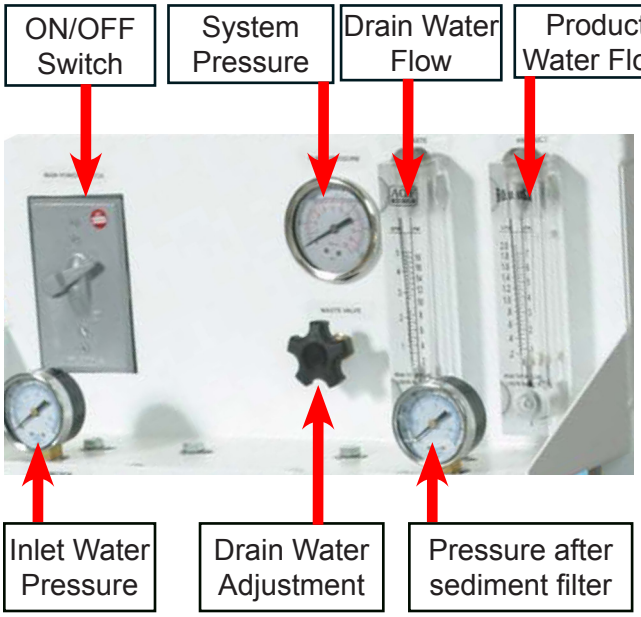
**NOTE:**
When the ZeroTDS is operating 50% of the flow will be drained in order to extend the life of the membranes.

## ZeroTDS SETTING

| ZeroTDS Model | Feed psi Min | Feed psi Max | Operating P psi Min | Operating P psi Max | Feed Min GPM | Product GPM | Waste GPM | TDS In | TDS Out | Water P at PB Box psi Start | Water P at PB Box psi Stop | Tank Air P psi |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | 10 | 60 | 100 | 150 | 0.4 | 0.13 | 0.23 | 0-10 | 0-5 | 20 | 40 | 8 |
| 300 | 10 | 60 | 100 | 150 | 0.6 | 0.21 | 0.39 | 0-10 | 0-5 | 20 | 40 | 8 |

# Step 3

## Starting Up the ZeroTDS System (Models: 500-5000)




| Flow, Pressure and TDS Table | Min | Max | Replace elements |
|---|---|---|---|
| Inlet water Pressure (psi) | 35 | 60 | |
| Pressure after Sediment Filter (psi) | 35 | 60 | 15% below Inlet water pressure |
| System Water Pressure | 125 | 160 | |
| Drain water flow (GPM) | | | Refer to table on page 5 |
| Product water flow (GPM) | | | Refer to table on page 5 |
| TDS on product water (Point 1) | 0 | 10 | Over 10, replace the Membrane |
| TDS on product water (Point 2) | 0 | 10 | Over 10, replace the DI element |

### Adjusting the Pressure and Flow

To adjust the pressure and flow use the Drain (concentrate) water adjustment handle located in the front panel. Turning right, increases the pressure and the flow of the product water. Turning left will decrease the pressure and increase the drain flow.

**The product water (Permeate) and the Drain (concentrate) should have the same flow rate.**

## ZEROTDS SETTING

| ZeroTDS | Feed psi | | Operating P psi | | Feed Min | Product | Waste | TDS | | Water P at PB Box psi | | Tank Air P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model | Min | Max | Min | Max | GPM | GPM | GPM | In | Out | Start | Stop | psi |
| 200 | 10 | 60 | 100 | 150 | 0.4 | 0.13 | 0.23 | 0-10 | 0-5 | 20 | 40 | 8 |
| 300 | 10 | 60 | 100 | 150 | 0.6 | 0.21 | 0.39 | 0-10 | 0-5 | 20 | 40 | 8 |
| 500 | 35 | 60 | 150 | 200 | 0.7 | 0.35 | 0.35 | 0-10 | 0-5 | 40 | 60 | 38 |
| 1000 | 35 | 60 | 150 | 200 | 1.4 | 0.7 | 0.7 | 0-10 | 0-5 | 40 | 60 | 38 |
| 1500 | 35 | 60 | 150 | 200 | 2 | 1 | 1 | 0-10 | 0-5 | 40 | 60 | 38 |
| 2500 | 35 | 60 | 150 | 200 | 4 | 1.7 | 1.7 | 0-10 | 0-5 | 40 | 60 | 38 |
| 4000 | 35 | 60 | 150 | 200 | 6 | 2.8 | 2.8 | 0-10 | 0-5 | 40 | 60 | 38 |
| 5000 | 35 | 60 | 150 | 200 | 7 | 3.5 | 3.5 | 0-10 | 0-5 | 40 | 60 | 38 |

# Step 4

## Specify ES100 Placement Location

In locating an appropriate position for the ES100, please locate a position which the enforcement zone (refer to figures 2 and 3) does not come in contact with any object.

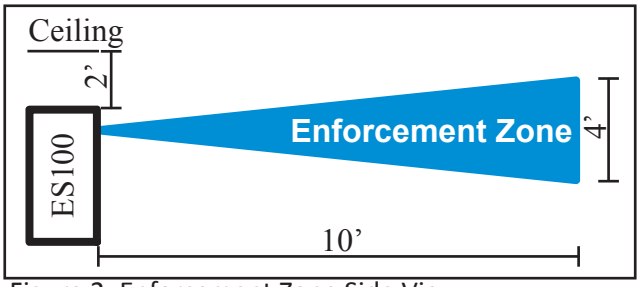



Figure 2: Enforcement Zone Side View

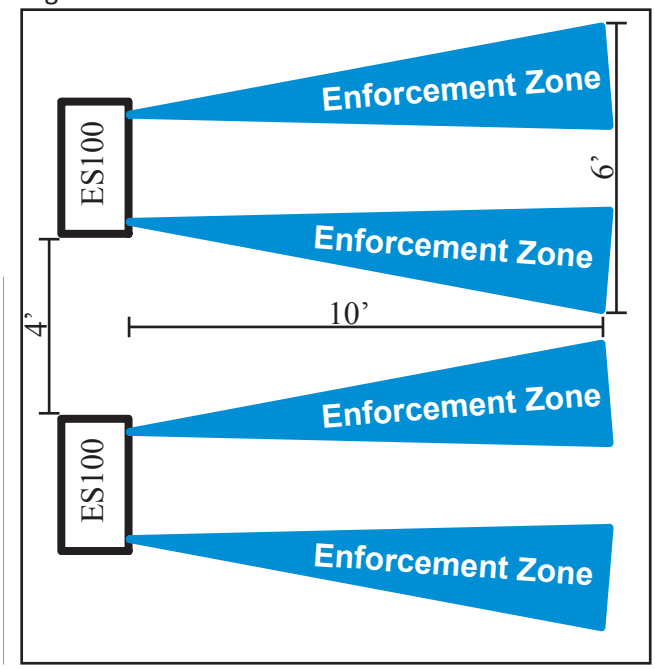



Figure 3: Enforcement Zone Top View

If there are fans (chiller or other) in the room, the ES100 units must be installed in front or parallel to the fans. Do not place the ES100 unit behind the fans or on the opposite wall facing the fans. If there are no fans in the room the ES100 units can be installed on any of the walls.

When two or more ES100 units are being installed in a room, the units will need to be distributed equally. Make sure the enforcement zone does not collide with each other.

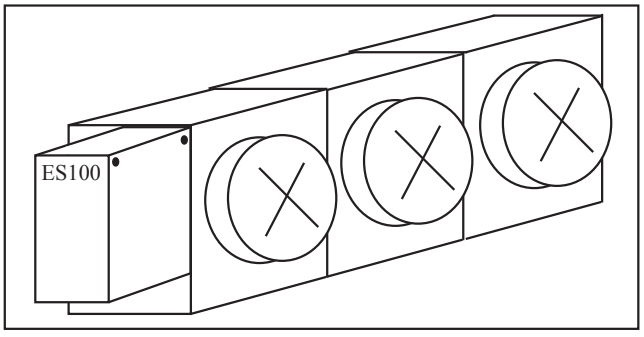



Figure 4: ES100 installed on chiller fan

**If you have any concerns or questions regarding placement location, you can send a sketch or a drawing of the space, and we will be happy to assist you.**

**IMPORTANT NOTE:**

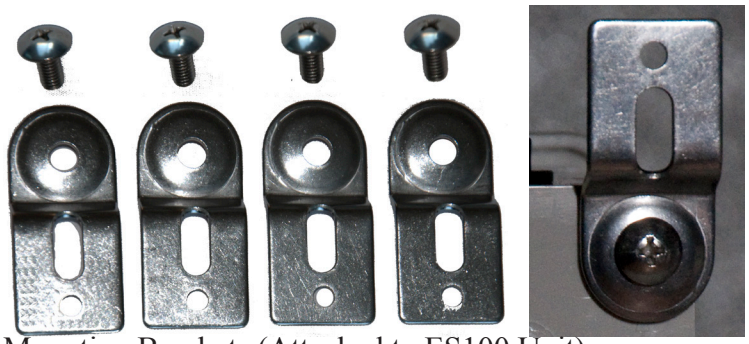
**DO NOT PLACE THE ES100 UNIT AGAINST THE AIR FLOW.**

# Step 4

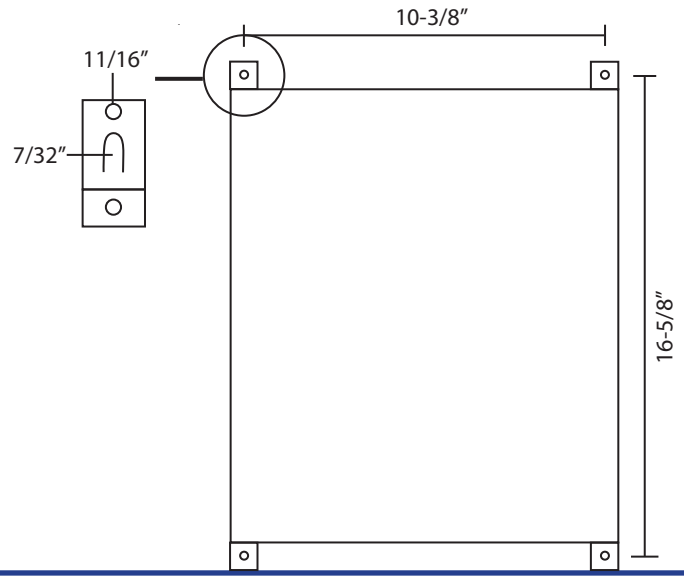
## MOUNTING THE ES100

The ES100 is an enclosed system. The ES100 enclosure box can be mounted utilizing the four (4) mounting brackets. Please find the mounting brackets attached. Screw each bracket tightly in to the enclosure four back corners.

If mounting in front or parallel to the fans the horizon or vertical brackets are needed to mount the ES100 units on the ceiling or wall.



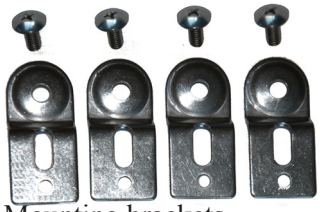
Mounting Brackets (Attached to ES100 Unit)




# Step 5

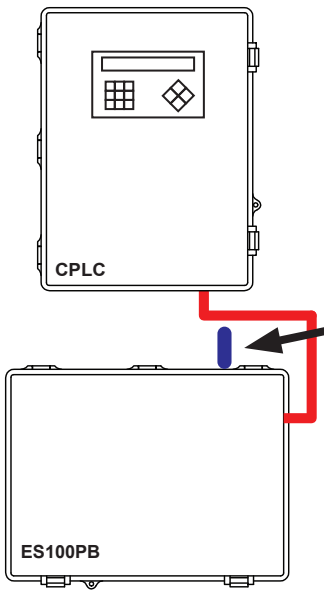
## MOUNTING THE CONTROLLER (CPLC) AND THE ES100PB

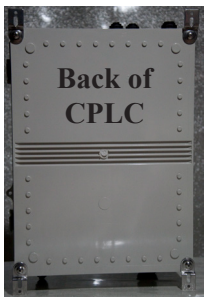
**IMPORTANT NOTE:**
When mounting the CPLC and the ES100PB, please make sure they are in an assessable location.



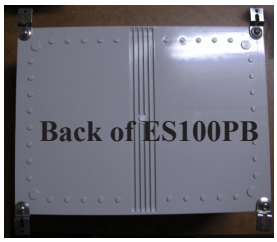
Mounting brackets
(Attached to each unit)

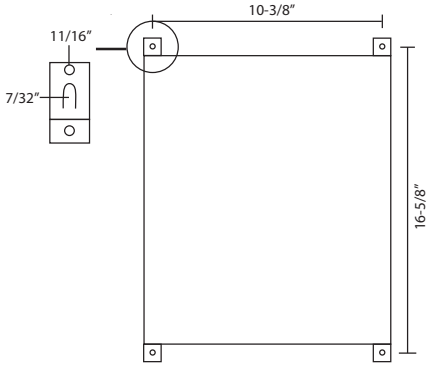
The CPLC Controller and the Control Center (ES100PB) can be mounted utilizing the four (4) mounting brackets. Screw each bracket tightly. The units can be mounted in vertically as shown below or in separate locations.

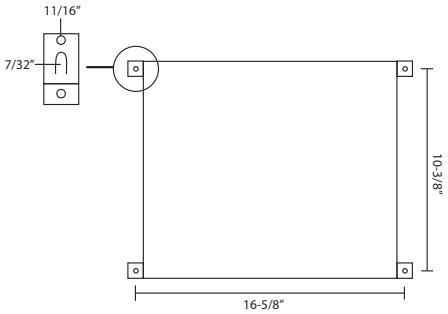



**NOTE:** Plug-in the silencer




**NOTE:** When mounting the Smart Fog Controller (CPLC) please select a location, which is accessible and convenient for day to day monitoring and control.

# Step 6

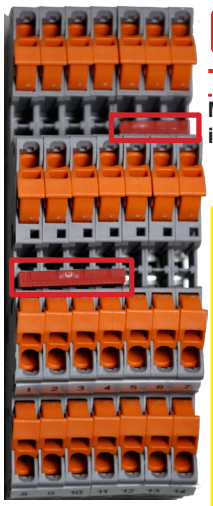
## CPLC CONTROLLER WIRING GUIDE

**NOTE:** Wires recommended to be shielded 22 or 18 gauge wire.

## MODEL: CPLC2A

2 Zone Relative Humidity Control with Air Pressure Sensor

| | UP | | DOWN | |
|---|---|---|---|---|
| ZONE 2 (VALVE) | 1 | (2V- 24VDC) | 8 | (1V+ 24VDC) |
| ZONE 1 (VALVE) | 2 | (2V- 24VDC) | 9 | (1V+ 24VDC) |
| (V- 24VDC) / (AIR PSI) | 3 | (V- 24VDC) | 10 | (V- 24VDC) |
| rH (ZONE 1 / ZONE 2) | 4 | (V- 24VDC) | 11 | (V- 24VDC) |
| AIR PSI (SENSOR) | 5 | P | 12 | (V+ 24VDC) |
| ZONE 2 (rH SENSOR) | 6 | rH | 13 | (V+ 24VDC) |
| ZONE 1 (rH SENSOR) | 7 | rH | 14 | (V+ 24VDC) |




**Terminal Bridge**

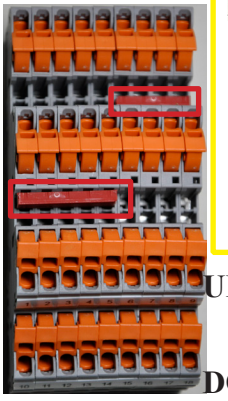
**Make sure terminal bridges are inserted as shown below:**

To connect the wire simply insert the wire into the yellow terminal and lock the terminal upwards as shown above.
**DO NOT STRIP THE WIRE.**

## MODEL: CPLC3A

3 Zone Relative Humidity Control with Air Pressure Sensor

| | UP | | DOWN | |
|---|---|---|---|---|
| ZONE 3 (VALVE) | 1 | (2V- 24VDC) | 10 | (1V+ 24VDC) |
| ZONE 2 (VALVE) | 2 | (2V- 24VDC) | 11 | (1V+ 24VDC) |
| ZONE 1 (VALVE) | 3 | (2V- 24VDC) | 12 | (1V+ 24VDC) |
| (ZONE 3 rH / AIR PSI) | 4 | (V- 24VDC) | 13 | (V- 24VDC) |
| rH (ZONE 1 / ZONE 2) | 5 | (V- 24VDC) | 14 | (V- 24VDC) |
| Air PSI (SENSOR) | 6 | P | 15 | (V+ 24VDC) |
| ZONE 3 (SENSOR) | 7 | rH | 16 | (V+ 24VDC) |
| ZONE 2 (SENSOR) | 8 | rH | 17 | (V+ 24VDC) |
| ZONE 1 (SENSOR) | 9 | rH | 18 | (V+ 24VDC) |



# Step 6

## CPLC CONTROLLER WIRING GUIDE

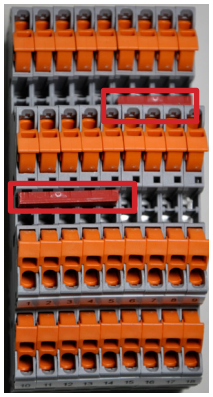
### MODEL: CPLC2AW

2 Zone Relative Humidity Control with Air Pressure Sensor and Water Leak Prevention

| | UP | | DOWN | |
|---|---|---|---|---|
| WATER (VALVE) | 1 | (V- 24VDC) | 10 | (V+ 24VDC) |
| ZONE 2 (VALVE) | 2 | (2V- 24VDC) | 11 | (1V+24VDC) |
| ZONE 1 (VALVE) | 3 | (2V- 24VDC) | 12 | (1V+24VDC) |
| (AIR PSI/WATER METER) | 4 | (V- 24VDC) | 13 | (V- 24VDC) |
| rH (ZONE 1 / ZONE 2) | 5 | (V- 24VDC) | 14 | (V- 24VDC) |
| WATER METER | 6 | WM | 15 | (V+ 24VDC) |
| AIR PSI (SENSOR) | 7 | P | 16 | (V+ 24VDC) |
| ZONE 2 (SENSOR) | 8 | rH | 17 | (V+ 24VDC) |
| ZONE 1 (SENSOR) | 9 | rH | 18 | (V+ 24VDC) |

**Terminal Bridge**

**Make sure terminal bridges are inserted as shown below:**



UP

DOWN

### MODEL: CPLC3AW

3 Zone Relative Humidity Control with Air Pressure Sensor and Water Leak Prevention

| | UP | | DOWN | |
|---|---|---|---|---|
| WATER (VALVE) | 1 | (V- 24VDC) | 13 | (V+ 24VDC) |
| ZONE 3 (VALVE) | 2 | (2V- 24VDC) | 14 | (1V+ 24VDC) |
| ZONE 2 (VALVE) | 3 | (2V- 24VDC) | 15 | (1V+ 24VDC) |
| ZONE 1 (VALVE) | 4 | (2V- 24VDC) | 16 | (1V+ 24VDC) |
| (WATER METER) | 5 | (V- 24VDC) | 17 | (V- 24VDC) |
| (ZONE 3 rH /AIR PSI) | 6 | (V- 24VDC) | 18 | (V- 24VDC) |
| rH (ZONE1 / ZONE2) | 7 | (V- 24VDC) | 19 | (V- 24VDC) |
| WATER METER | 8 | WM | 20 | (V+ 24VDC) |
| AIR PSI (SENSOR) | 9 | P | 21 | (V+ 24VDC) |
| ZONE 3 (SENSOR) | 10 | rH | 22 | (V+ 24VDC) |
| ZONE 2 (SENSOR) | 11 | rH | 23 | (V+ 24VDC) |
| ZONE 1 (SENSOR) | 12 | rH | 24 | (V+ 24VDC) |

UP

DOWN

# Step 6

## CPLC CONTROLLER WIRING GUIDE

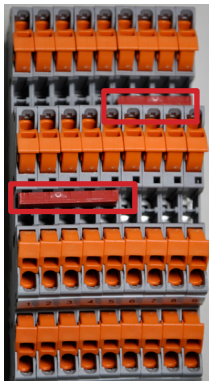
### MODEL: CPLC1J

1 Zone Relative Humidity Control with Injection

| | UP | DOWN |
|---|---|---|
| ZONE 1 (VALVE) | 1 (2V- 24VDC) | 9 (1V+ 24VDC) |
| ALARM | 2 (V- 24VDC) | 10 AL |
| INJECTOR | 3 (V- 24VDC) | 11 INJ |
| rH (ZONE 1) | 4 (V- 24VDC) | 12 (V- 24VDC) |
| ZONE 1 (SENSOR) | 5 rH | 13 (V+ 24VDC) |
| CHEM METER | 6 CHM | 14 (V+ 24VDC) |
| CHEM SWITCH | 7 CHMS | 15 (V+ 24VDC) |
| WATER METER | 8 WM | 16 (V+ 24VDC) |

**Terminal Bridge**

**Make sure terminal bridges are inserted as shown below:**

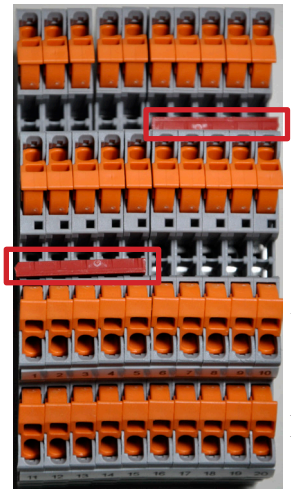


UP

DOWN

### MODEL: CPLC2J

| | UP | DOWN |
|---|---|---|
| ZONE 2 (VALVE) | 1 (2V- 24VDC) | 11 (1V+24VDC) |
| ZONE 1 (VALVE) | 2 (2V- 24VDC) | 12 (1V+24VDC) |
| ALARM | 3 (V- 24VDC) | 13 AL |
| INJECTOR | 4 (V- 24VDC) | 14 INJ |
| rH (ZONE 1 / ZONE 2) | 5 (V- 24VDC) | 15 (V- 24VDC) |
| ZONE 2 (SENSOR) | 6 rH | 16 (V+ 24VDC) |
| ZONE 1 (SENSOR) | 7 rH | 17 (V+ 24VDC) |
| CHEM METER | 8 CHM | 18 (V+ 24VDC) |
| CHEM SWITCH | 9 CHMS | 19 (V+ 24VDC) |
| WATER METER | 10 WM | 20 (V+ 24VDC) |



UP

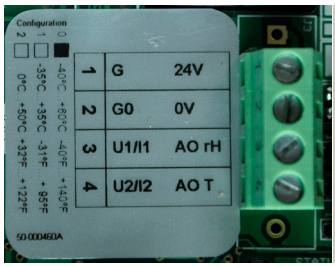
DOWN

# Step 6

## WIRING AND MOUNTING THE RH SENSORS

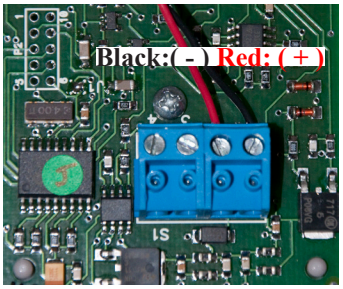
In locating an appropriate position for the Relative Humidity Sensor, please locate a position which 6' off the floor.

## WIRING S1 SERIES RELATIVE HUMIDITY SENSOR

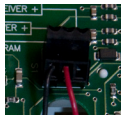



**Red: ( V+ 24VDC)**
**Black:( V- 24VDC )**
**White: ( rH )**
**Blue: ( Temp )**

Zone 1 or Zone 2:

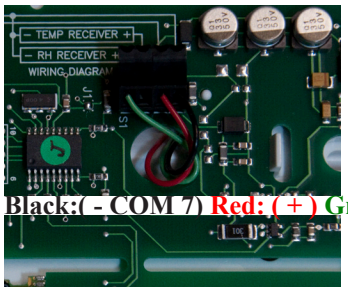



Old Type:



**Black:( - ) Red: ( + )**

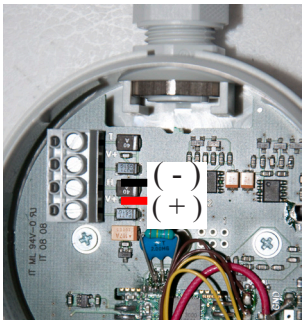
Zone 3:



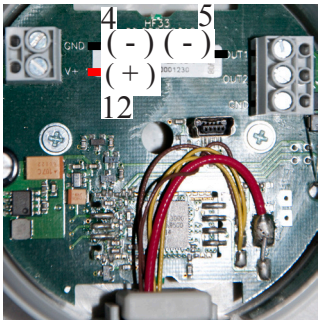

**Black:( - COM ?) Red: ( + ) Green: ( - )**

## WIRING S2 SERIES RELATIVE HUMIDITY SENSOR

Zone 1 or Zone 2:




Zone 3:




Old Type:

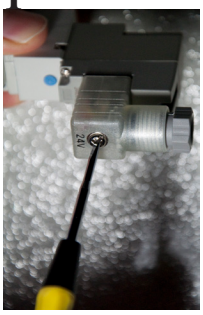
( + ) ( - )

# Step 6

## WIRING THE AIR VALVE (ES100PB)

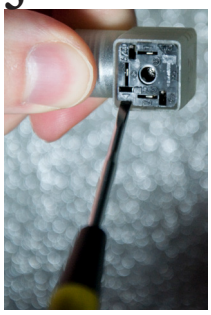
**Take out the Valve Terminal**

1



2

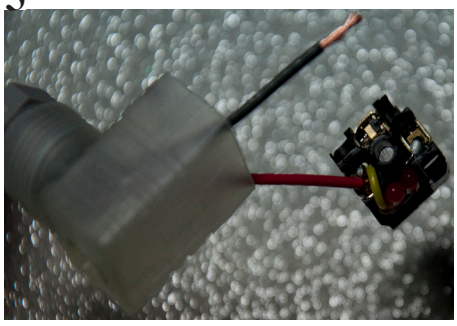
3



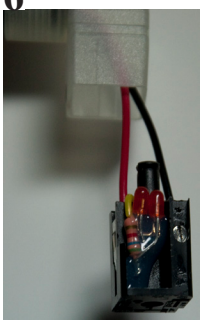
**Connect the wires from the SF Controller (CPLC) to the Valve Terminal**

4

5



6



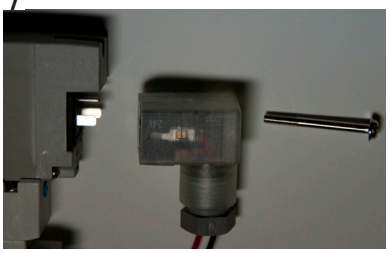
**NOTE:**
Refer to Wiring Guide

**Valve Terminal 1:**
**( 1V+ 24VDC) Red**
**Valve Terminal 2:**
**( 2V- 24VDC) Black**

* Other voltage options available
(+/-) Polarities do not change.

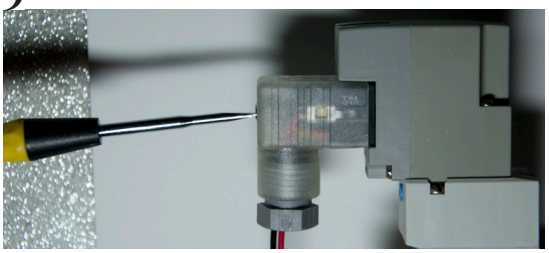
**Insert the valve terminal back to the Air Valve**

7



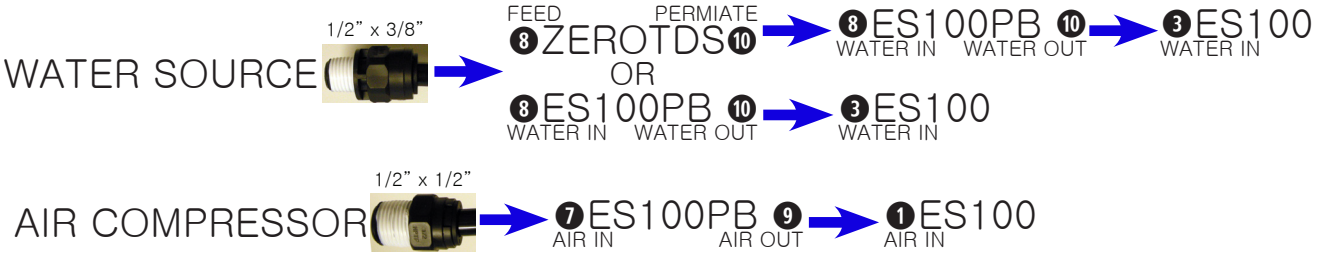
8

9



# Step 7

## PLUMING THE AIR, CONTROL AND WATER



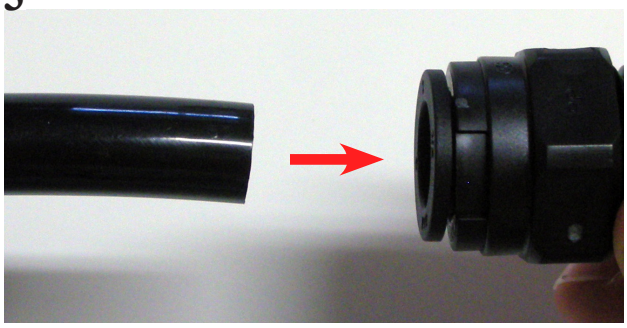

**NOTE:**
In most cases the ES100PB includes an Air Filter, in case an external Air Filter is supplied, place between the Air Compressor and ES100PB.

**NOTE:**
Refer to table on page 15 for pipe sizes.

1

2

3



4

Step 7

# PLUMBING AIR, CONTROL AND WATER

If the ES100PB has an “Air Out” and “Water Out” outlet, run the appropriate pipe from the ES100PB to the ES100. Otherwise run the Air line from the air filter and the water pipe from the ZeroTDS unit or water source directly to the ES100 Units.

Pull 1/4” air control pipe from the ES100PB to the ES100 Unit(s). You can use a mounting clip to mount all pipes together to the wall or a zip tie to affix to existing piping. Please select the shortest distance possible from the ES100PB Control Centre to the ES100 Unit(s). Pull the pipes to the end of the last ES100 unit and cut the two pipes.

### IMPORTANT NOTE ABOUT THE AIR PIPE LENGTH

As shown in the table below, to avoid air pressure drop to each ES100 unit - please consider the relation of the pipe length and the number of units attached to each pipe. For example: if you’re air pipe is 1/2” and 50 ft long, you can only attach to it 3 x ES100-2 Units. If you have more units, you must run another pipe from the air filter or use a larger pipe. To run another pipe from the ES100PB please use a tee connector (see photos below).

**Please don’t hesitate to contact us if you have any questions regarding the air pipe length.**

## IMPORTANT TABLE FOR THE AIR AND WATER PIPE LENGTH:

| | | No of Units per Air Line | | | No of Units per Water Line | | |
|---|---|---|---|---|---|---|---|
| Pipe Size | Pipe Length (ft) | ES100-1 | ES100-2 | ES100-3 | ES100-1 | ES100-2 | ES100-3 |
| 2" | 100 - 200 | 100 | 50 | 33 | | | |
| 2" | 50 - 100 | 160 | 80 | 53 | | | |
| 2" | < 50 | 200 | 100 | 67 | | | |
| 1" | 100 - 200 | 15 | 8 | 5 | | | |
| 1" | 50 - 100 | 20 | 10 | 7 | | | |
| 1" | < 50 | 30 | 15 | 10 | | | |
| 3/4" | 200 | 6 | 3 | 2 | 250 | 125 | 83 |
| 3/4" | 100 - 150 | 8 | 4 | 3 | 250 | 125 | 83 |
| 3/4" | 50 - 100 | 11 | 6 | 4 | 250 | 125 | 83 |
| 3/4" | < 50 | 12 | 6 | 4 | 250 | 125 | 83 |
| 1/2" | 100-200 | 2 | 1 | 1 | 50 | 25 | 17 |
| 1/2" | 50-100 | 4 | 2 | 1 | 50 | 25 | 17 |
| 1/2" | < 50 | 6 | 3 | 2 | 50 | 25 | 17 |

# Step 7

## PLUMING THE AIR, CONTROL AND WATER

**IMPORTANT NOTE:**

- **DO NOT** remove plugs from the ES100 units before complely flushing the system as compleing instructions on Step 8.


### PULL PIPES FROM ES100PB CONTROL CENTER

Please follow the procedure below:

1: Cut the pipe using a pipe cutter and plug in the appropriate size (see table below) tee into the main pipe.

| Pipe Type | Tee Size |
|---|---|
| Air | 1/2 x 1/2 x 1/2 or 3/4” x 1/2” x 3/4” or 2” x 1/2” x 2” |
| Water | 3/8 x 3/8 x 3/8 |
| Control | 1/4 x 1/4 x 1/4 |

2: Cut the appropriate length of pipes to insert into the tee & ES100 unit box. However, DO NOT INSERT THEM INTO THE ES100 Unit yet. (Complete the flushing procedure before removing the plugs from the ES100.

3: Complete the Flushing procedure before removing the plugs & inserting the pipes into the ES100.

**IMPORTANT NOTE:**

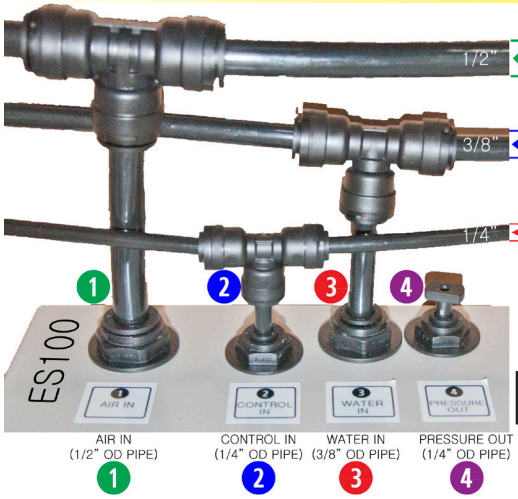
**Never connect the pipe directly into the ES100, always use a TEE, even if its only one ES100 Unit.**

# Step 7

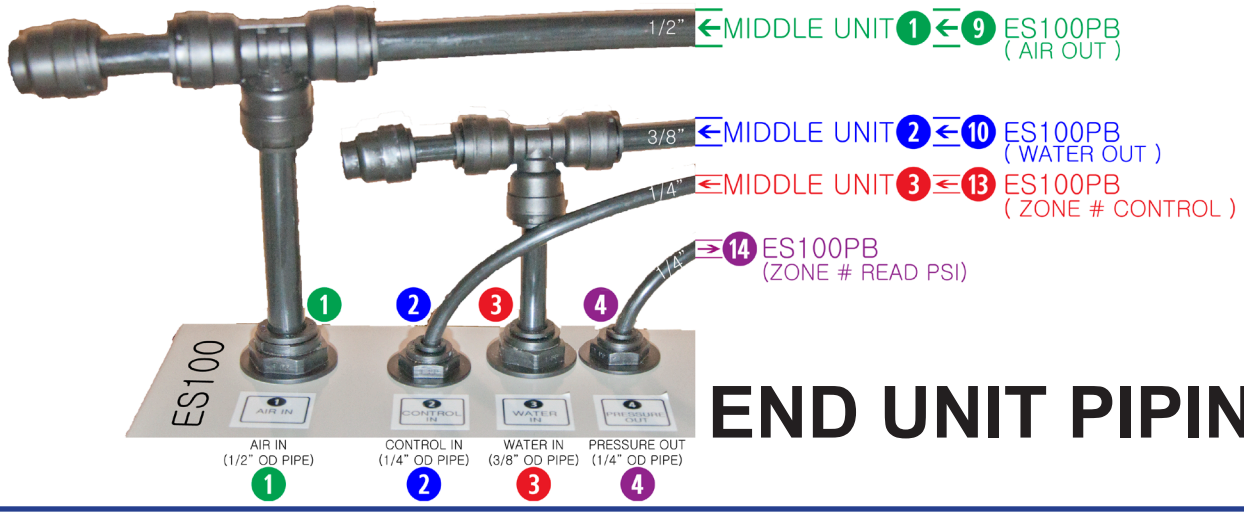
## PLUMING THE AIR, CONTROL AND WATER

**IMPORTANT NOTE:**

**DO NOT** remove plugs from the ES100 units before complely flushing the system as compleing instructions on Step 8.


## MIDDLE UNITS PIPING




## END UNIT PIPING

Step 8

# PIPES FLUSHING PROCEDURES

**THIS IS ONE OF THE MOST IMPORTANT STEPS IN THE INSTALLATION PROCESS. PLEASE FOLLOW THE INSTRUCTIONS CAREFULLY:**

(A) Please make sure that the end caps at the end of each air & water pipe is off.

**(B) Make sure none of the pipes are plugged into the ES100 Unit.**

(C) Please make sure that the end caps at the end of each air & water pipe is off.

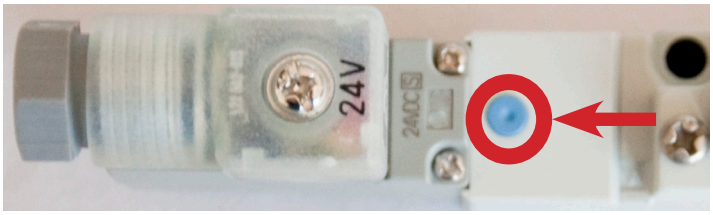
(D) If you have a ZeroTDS filter is connected to the system, drain all the product water for 10-20 min before connecting to the system.

(E) To flush the water - turn on the water, and let the water run for 2 min or until you see the water coming out. If you have a ZeroTDS filter connected to the system, this may take some time until the pressure tank will be ready. This may take up to 10 min. Once you see the water is coming out, close the valve and plug in the water pipe end caps.

(F) To flush the air, turn on the main air valve and flush it for 2 min after the air comes out of the ends. Make sure the air is coming out and close the valve and plug in the air pipe end caps.

(G) Finally - to flush the air control line, open the main air valve. Then, open the ES100PB Control Center box. Locate the air valve. Press the manual operation button (see picture below) for 30 sec. When you confirm air is coming out, close the valve and let go of the manual operation button.

Above : end cap and pipe.




See above the manual operation button of the air control valve.

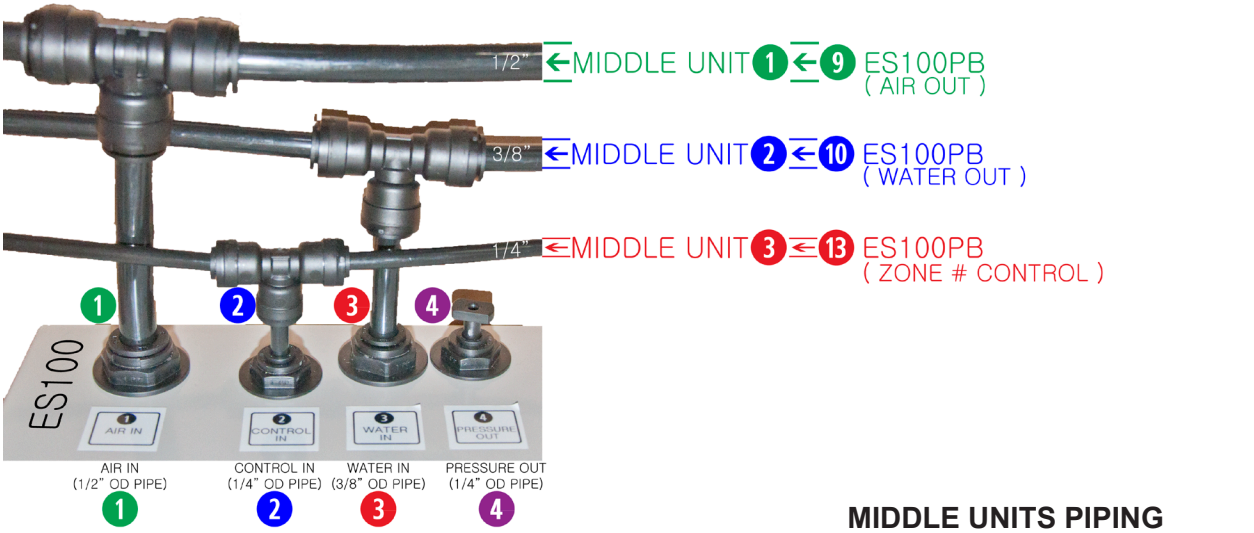
# Step 8

## CONNECT ALL PIPES TO ES100

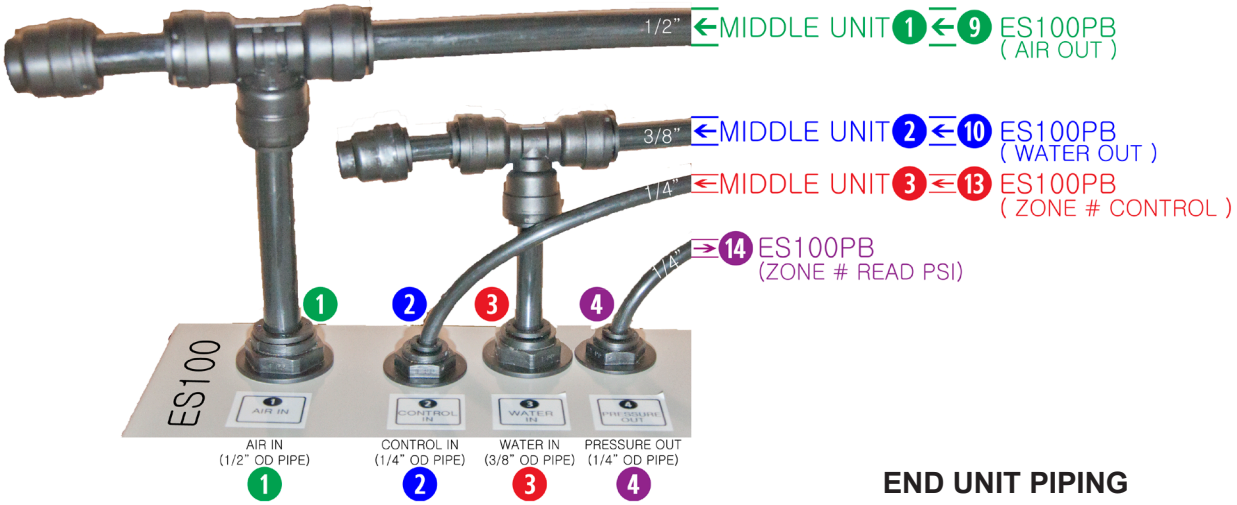
**AFTER FLUSHING,** unplug the air, control and water plugs on the ES100 unit.

Plug in all the pipes into the ES100 unit, as shown on the left.

**The control pipe should be plugged in directly into the last ES100 unit. No need for a tee.**




**MIDDLE UNITS PIPING**



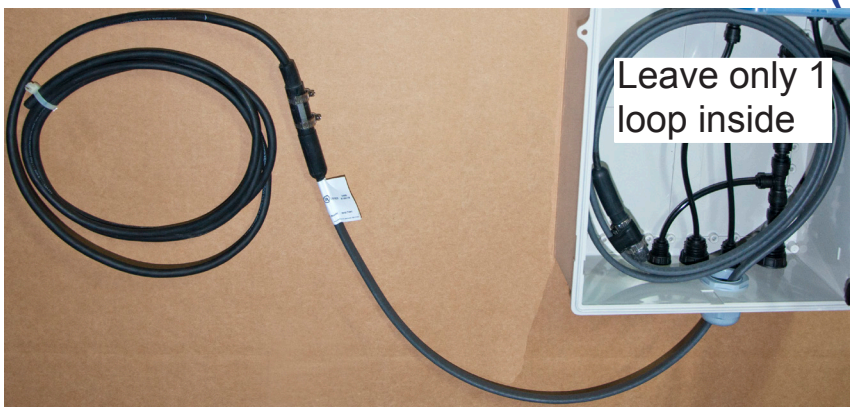

**END UNIT PIPING**

Step 9

5 HEAT TRACE

**Heat Trace**
Below 40°F(4°C) all air and water tubing must be combined with heat trace and insulated.

## HEATING TRACE AND INSULATION (ONLY FOR ES100H)



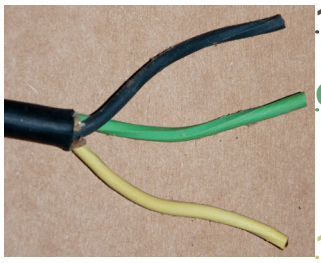

Open the ES100H enclosure, from the [ 5 ] HEAT TRACE gently pull the heat trace out until only 1 loop is left inside the enclosure.

Insulate the air, control, water together with the heating trace utilizing flexible insulation as shown below.

Once insulated, connect to electrocity.

Completely insulate the air, control, water together with the heating trace utilizing flexible insulation as below.

**CONNECT TO ELECTROCITY:**



120VAC

GROUND

120VAC

# Step 10

## STARTING UP AND TESTING THE SYSTEM

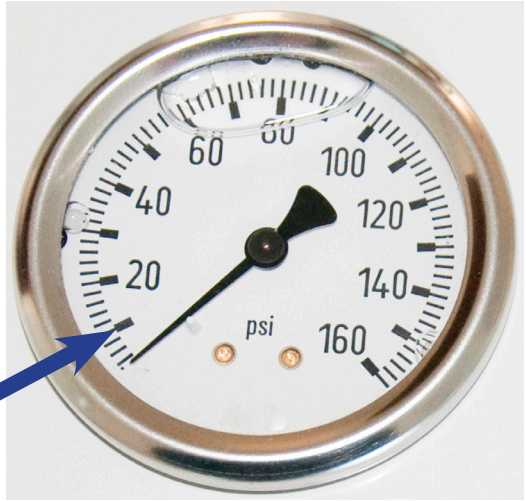
- Before operating the system, all pipes must be tightly pushed into the push-in fittings.
- When the ES100 units are running the ES100PB (⓮ZONE # READ PSI) pressure gauge should read 110 psi or more. If the gauge is reading under 100 psi, recheck all connections and the air compressor settings and capacity.
- For optimal operation, the ES100PB (⓯WATER READ PSI) should read above 10 psi.
- To start the system power up the CPLC controller. Refer to the CPLC Controller Manual to set the desired parameters of operation.

**NOTE:**
When the ZeroTDS Filter is installed the Pressure Gauge will read between 40-60 psi.

**ES100PB** (⓮ZONE # READ PSI)

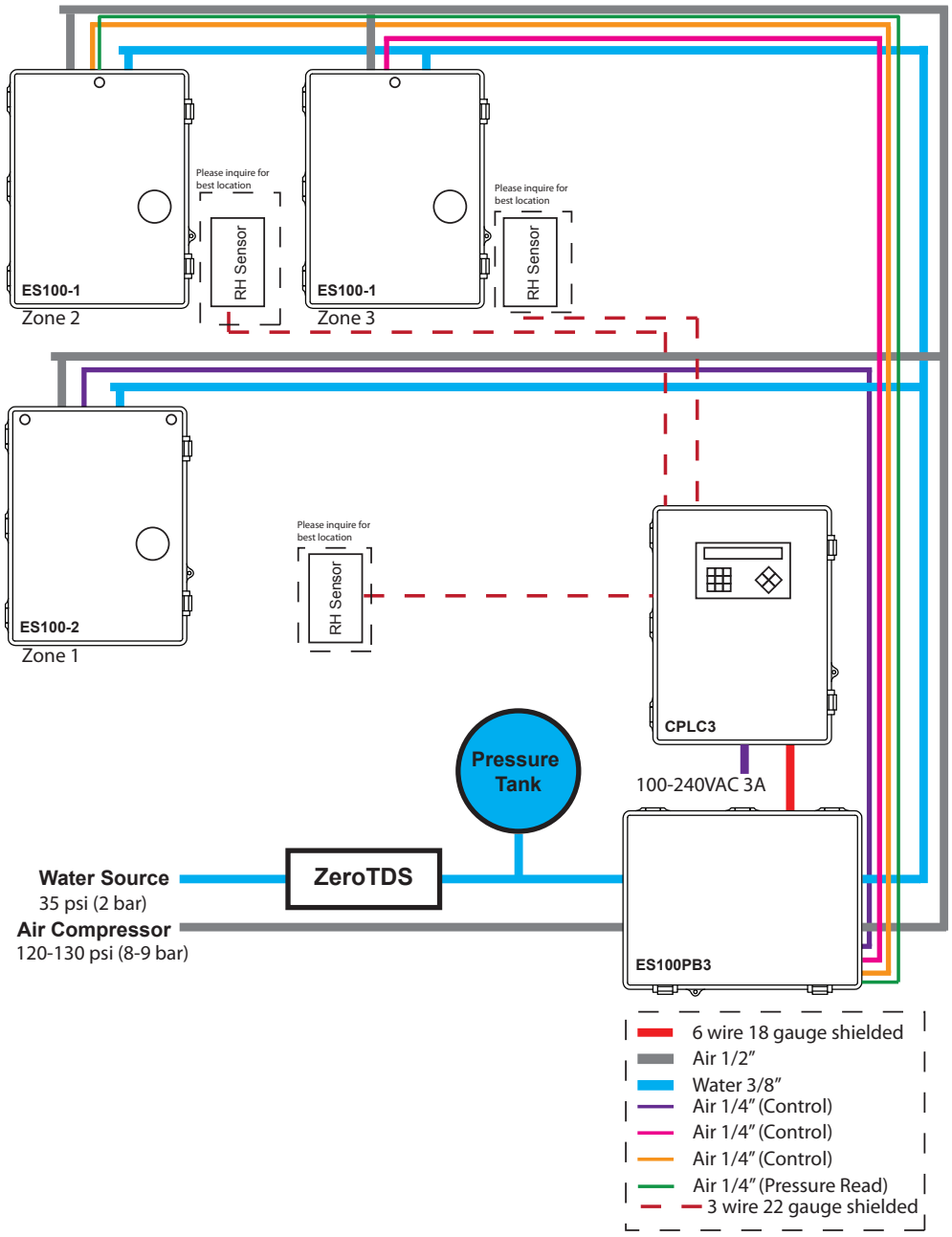

COMPRESSED AIR

**ES100PB** (⓯WATER READ PSI)




WATER

# SYSTEM SAMPLE LAYOUT AND REQUIREMENTS




**Flow Requirements:**
*ES100-1: 2 cfm*
*ES100-2: 4 cfm*

*ES100-1H: 2 cfm*
*ES100-2H: 4 cfm*

**Please note:**
Each zone of the specified units of ES100 is controlled by a output in the Control Center (ES100PB). The Control Center (ES100PB) are controlled by the CPLC Controller.

**NOTE:**
**Sensors can be located near the CPLC controller or in a safe spot in the room. Select a location where the sensor is not located on the opposite side of ES100 units.**

# TROUBLESHOOTING CHECKLIST

Smart Fog Inc. employees strive to provide quick and hassle free customer service and technical support. Before contacting us for technical assistance, please collect the following information:

_____ psi Compressed air pressure (Check the general setup at the CPLC, refer to CPLC Manual)
_____ psi Water pressure on the ES100PB Box
_____ psi Water pressure on the ZeroTDS Water Filter
_____rH% Target relative humidity, refer to CPLC
_____rH% Current relative humidity, refer to CPLC
_____ON cycle sec, refer to CPLC
_____OFF cycle sec, refer to CPLC

IF SYSTEM IS NOT WORKING FIRST CHECK:

☑ Check Air Pressure (Must be 110 psi or greater)
☑ Check Water Pressure (Must be 10 psi or greater)
☑ Check Electricity
☑ Make sure all connectors & wires inside the CPLC are secure.
☑ Check if controller is showing the Humidity Level
☑ To bypass sensor set relative humidity to 100%
☑ Check water at the ES100 ZeroTDS
☑ If no water, check if ZeroTDS is working.
☑ Check for air and water leaks
If a leak is found, push the pipe into the connectors more.

☑ IF THERE IS NO WATER/FOG COMING OUT OF THE ES100
Check water pressure at the ES100PB, pressure must be above 10psi. Check filter or water source.

☑ IF NO AIR IS COMING OUT OF THE ES100
Check if the led light on the air valve inside the ES100PB box is lighting up. Refer to CPLC.
If not check the connection between the air valve and the CPLC.
See that the wires are connected to 1 and 2 on the CPLC.

☑ IF ES100 IS LEAKING WATER
Check water pressure to the ES100PB, pressure must be below 30psi. If above use regulator.

☑ CHECK AMBIENT TEMPERATURE
IF the ambient temperature is below 45°F, the system must be equipped with heat trace to maintain air and water temperature about 50°F.

☑ IF CPLC IS NOT WORKING:
Check breaker, the breaker may have tripped due to fluctuations in electricity.
Check if all wires are secure and check if the red bridges are in place. Refer to CPLC section.

# TROUBLESHOOTING CHECKLIST

☑ IF ES100 IS DRIPPING AT THE NOZZLE

IF the ES100 is dripping, this may be due to mineral buildup on the outlet of the fog. Check the ZeroTDS water filter, please check ZeroTDS and replace the filter elements.
If there is still dripping, check the air pressure when the unit is working. It needs to be above 100 psi. If the air pressure is ok than use the restrictor on the water line inside the ES100 box and adjust the water volume.

☑ ZEROTDS NOT PRODUCING ENOUGH WATER

IF the ZeroTDS filter not producing enough water, check water pressure. For the units above 500 GPD the source water pressure should be above 40 psi. Check if the pump is working. Check what is the water pressure on 200/300 which should be 100 psi and on units 500 and above 150 psi. Check if there is consentrate water coming out. For units 500 and above check producing which should be 1 gallon on 1 gallon product water. If all above is reading ok then replace memebranes. You can call us to get the replacement kit. In general, we recommend to change the filter elements once in 2 years.

☑ IF rH% = 0

If the relative humidity shows 0 then the sensors are malfuctioning or wires are disconnected.
Check the wires between the CPLC and the sensor. Check first if there is 24VDC at the sensor. For the S1 sensor there is a red light led indicator: if the sensor is working correctly it will flash every 5 sec.
If it is every 1 sec, the sensor malfunctioning and there is a need to open the tip of the sensor to check that the sensor is plugged right.

☑ I DO NOT SEE THE READING ON THE ZONES ON THE CPLC?

If you can not see the sensor reading and there is more then 1 Zone, push #7 on the CPLC and select the correct zone by the up and down buttons.

☑ I DO NOT SEE THE READING ON THE ZONES ON THE CPLC?

If you can not see the sensor reading and there is more then 1 Zone, push #7 on the CPLC and select the correct zone by the up and down buttons.

For Rooms under 100 sq ft Only:

TOO MUCH WATER SPRAYING OUT/HUMIDITY RAISES TOO QUICKLY

You can adjust the needle valve inside the ES100 humidifier. By turning the knob clock-wise you can restrict the water. Turn it gently, and check performance before turning too much. If you need assistance, feel free to call us and speak with one of our expert engineers.

# System Maintenance

AIR FILTERS:

- We recommend to replace all air filters elements every 2 years or if filter elements become drenched with oil or water.

## HOW TO REPLACE THE FILTER ELEMENTS:

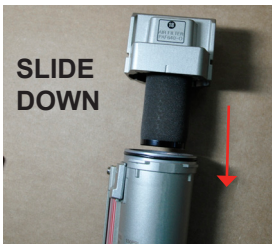
1. Unscrew the housing from the filter body by pushing down on A (see photo below).



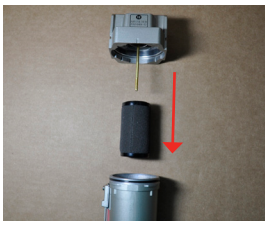

1 Filter cartridge for Air Filter 18

2 Filter cartridge for Air Filter 17

2. Slide down the filter cover to reveal the element.




3. Unscrew the filter element and replace.



Filter elements can be purchased from Smart Fog.

Smart Fog offer extended warranty service plans which can be purchased at any time please call us for more details.

## ZeroTDS Water Filter Maintenance Guide:

- Change membrane if the product flow under normal flows (refer to page 5)
- Change membrane if the TDS Meter shows more than 10 ppm “IN”
- Change DI filter if TDS Meter OUT show more than 2 ppm “OUT”

**ZEROTDS FILTER MAINTENANCE:**

❶ Flush the ZeroTDS every week (ZeroTDS 500-5000 only).
To flush the system, decrease the pressure to 50 psi and run for 10 minutes, then increase the pressure as indicated on the table above and open the product water valve.
❷ Check TDS level of ZeroTDS every month (If TDS is above levels indicated below contact us).
❸ Replace all filter cartridges every 2 years.

## Smart Fog® ZeroTDS® Cartridge Replacement Instructions

### Replace the 5 Micron, Carbon and DI Cartridge

1. Unscrew the housing from the filter body
2. Remove the old cartridge from the housing.
3. Remove the wrap paper from the new Cartridge
4. Insert the new cartridge into housing. Make sure the cartridge is inserted in the correct direction as shown on the left.
5. Screw in the housing

### Replace the Membrane Cartridge

1. Carefully remove the white clip, from the housing. Use a pliers to pull out the white clip while assisting with a minus screw driver.
2. To remove the external black door, screw in a 3/8” long nipple (10”). Pull the nipple while gentle moving up and down until the door comes out.
3. Pull out the old membrane Cartridge using pliers.


4. Remove the wrap paper from the new cartridge.
5. Insert the new Membrane Cartridge the same direction as the old cartridge came out.
6. Insert back the black door and the white clip. Push the black door until the white clip sit in place.

**MEMO:**