



**CRYSTALLINE**  
ENVIRONMENTAL SERVICES

## **COOLING TOWER CONTROLLER**

### **INSTALLATION & COMMISSIONING REPORT for**

**SERCO MIDDLE EAST**

**ZAYED UNIVERSITY**

<b>Client:</b>	Serco Middle East
<b>Contact Person:</b>	Mr. Mohammed Ashar Operations Engineer
<b>Site Details:</b>	Zayed University
<b>Date:</b>	06 FEB 2021



**CRYSTALLINE**  
ENVIRONMENTAL SERVICES

#### **Crystalline Environmental Services**

P.O. Box 131463, Abu Dhabi, U.A.E.

Tel: 02 6508930 Fax: 02 6508942

[info@crystalline-uae.com](mailto:info@crystalline-uae.com)

[www.crystalline-uae.com](http://www.crystalline-uae.com)



# CRYSTALLINE

CLEANING & ENVIRONMENTAL SERVICES

## INSTALLATION & COMMISSIONING REPORT

**CUSTOMER: SERCO MIDDLE EAST**

**CONTACT PERSON: MUHAMMED ASHAR**

**SITE DETAILS: ZAYED UNIVERSITY**

**CONTACT NO: +971 55 936 9739**

**DATE: February 6, 2021**

System Details	Cooling Tower System # 1	Cooling Tower System # 2
Make	Pulsafeeder	
Model	Microvision	
Country of origin	USA	
Power Supply	100VAC - 240 VAC/50/60Hz/8A	
Display	Multicolor graphical LCD	
Measurement range	0 - 9,999 $\mu$ S/cm; 0-14 pH; - 2000 to +2000mV	
Flow switch	125 PSI	
Control output	8 amps Max	
Warranty	1 Year	
Enclosure	IP65	

**Recommendations:** - The cooling tower dosing system was supplied, installed and commissioned.

**Crystalline Representative:**

**Jasman Pinto**

*Jasmanpinto*

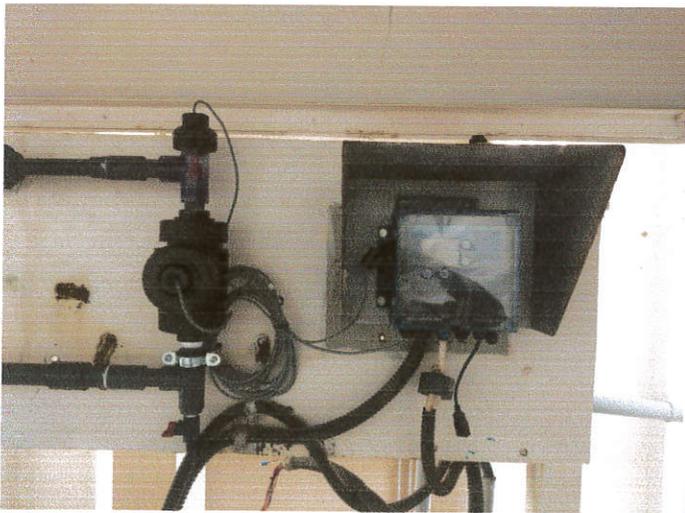




# CRYSTALLINE

CLEANING & ENVIRONMENTAL SERVICES

## BEFORE PICTURES – SYSYTEM 1





# CRYSTALLINE

CLEANING & ENVIRONMENTAL SERVICES

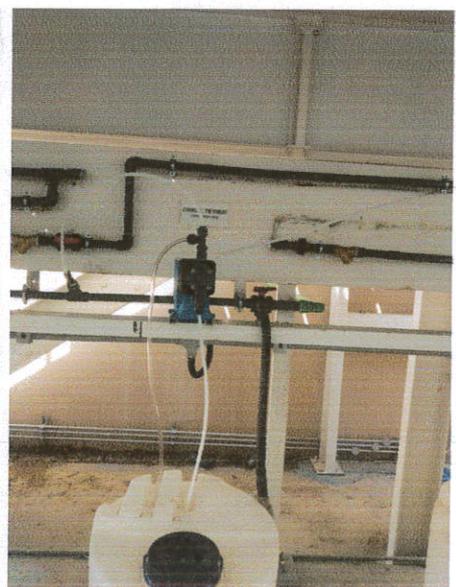
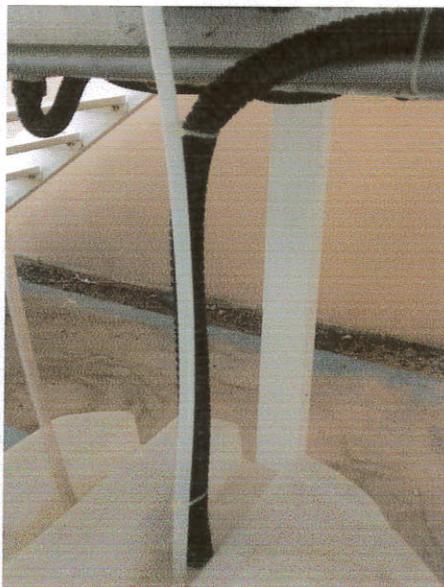




# CRYSTALLINE

CLEANING & ENVIRONMENTAL SERVICES

## AFTER PICTURES - SYSTEM 1



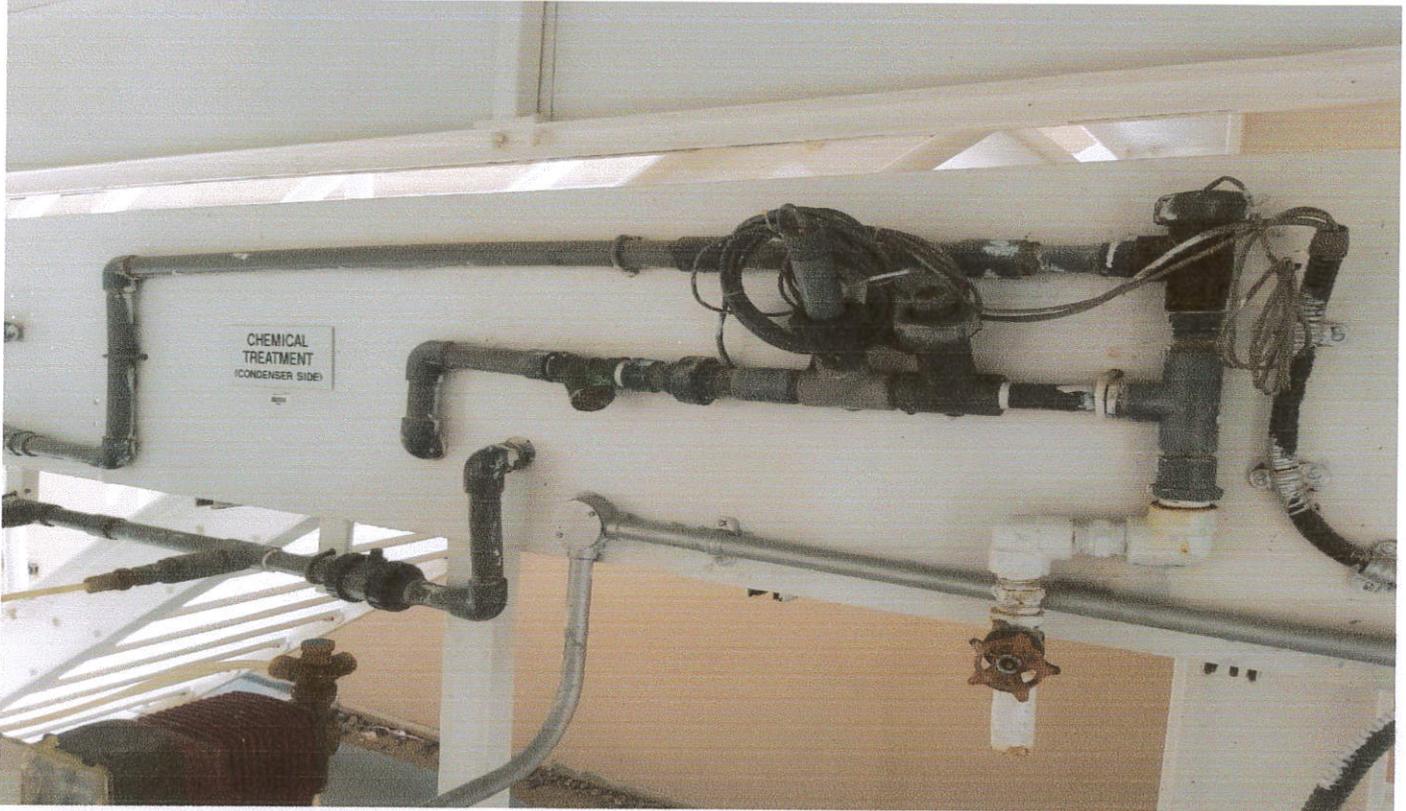
*CLEANER WATER GREENER TOMORROW*



# CRYSTALLINE

CLEANING & ENVIRONMENTAL SERVICES

## BEFORE PICTURES - SYSTEM 2

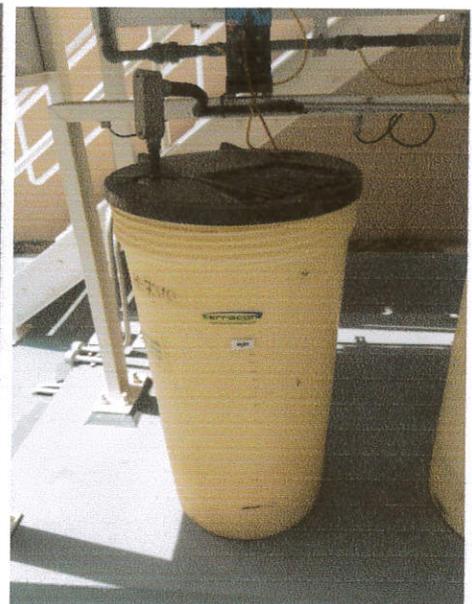
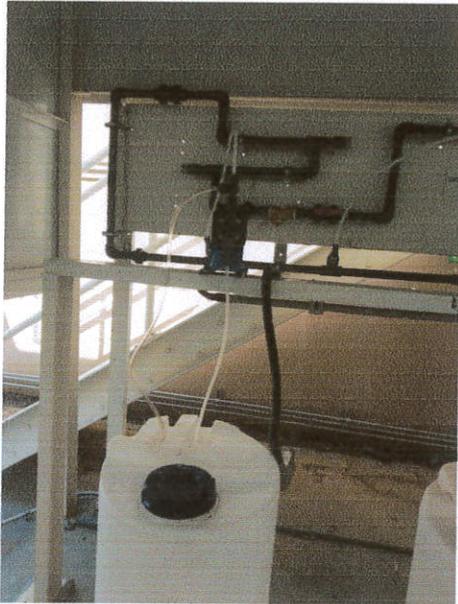


*CLEANER WATER GREENER TOMORROW*



# CRYSTALLINE

CLEANING & ENVIRONMENTAL SERVICES



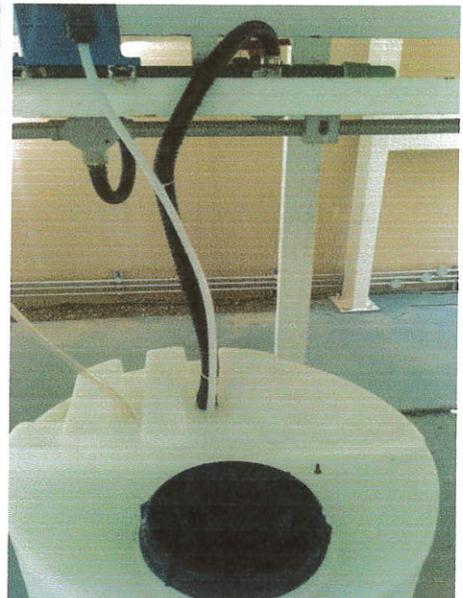
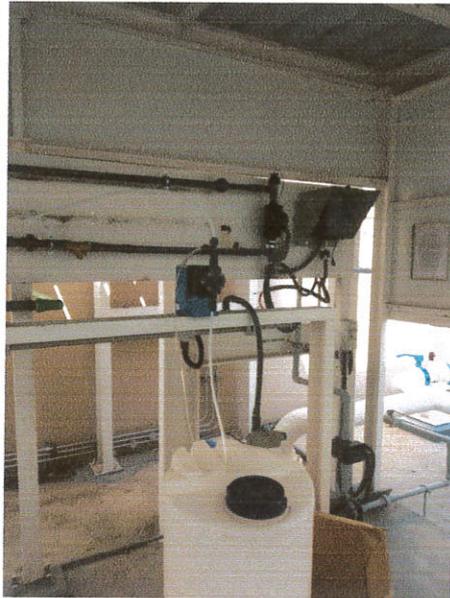
**AFTER PICTURES - SYSTEM 2**





# CRYSTALLINE

CLEANING & ENVIRONMENTAL SERVICES



**PULSAFEEDER®**



# **MicroVision<sup>EX</sup>**

## **COOLING TOWER CONTROLLERS**

**SIMPLE, RELIABLE AND SECURE.**



# WORRY LESS AND DO MORE WITH **MICROVISION EX**

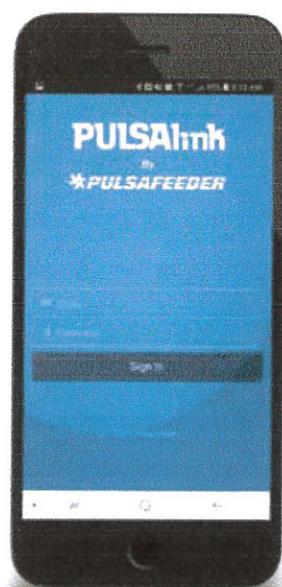
---

## *Pulsafeeder simplifies advanced controller technology.*

**MicroVision EX makes life simpler for water treaters.** Our advanced controller is easier to install, program and operate because of **proven MicroVision software** that utilizes an intuitive user interface. Accurate measurement is achieved by our **toroidal probe**, which is factory-calibrated and maintenance-free. And **PULSAlink cloud-based communication** delivers convenience and the highest security.

MicroVision EX controllers, along with the support of Pulsafeeder sales and technical representatives, ensure water treaters of **quick troubleshooting**, freeing up more time to serve their customers.

**Maintain process control, reduce costs and limit downtime.** Only with MicroVision EX from Pulsafeeder.



## **PULSALINK PUTS YOU IN CONTROL ANYTIME, ANYWHERE.**

Exclusive PULSAlink communication delivers cloud-based, secure mobile access to your MicroVision EX controller. Data is stored safely on the cloud, and AES 256-bit military-grade encryption provides unsurpassed security. Get easy-to-use, interactive reporting and graphing tools — plus quick access to settings and notifications — right from your mobile device. This level of connectivity enables you to monitor and make adjustments anytime, from anywhere.

---

***New PULSAlink app gives water treaters easier access through more streamlined navigation, putting vital information at your fingertips anytime, anywhere.***

# MICROVISION EX. RELIABLE AND VERSATILE.

Built on a proven platform, MicroVision EX is a microprocessor-based cooling tower controller with the versatility to control conductivity, pH, ORP and PTSA. Precisely control your inhibitor feed, protecting costly equipment while optimizing chemical feed. This controller is ideal for all cooling tower applications including comfort cooling, industrial cooling, rinse, industrial process and wastewater.

Water treaters can select from multiple control configurations and probe inputs – with specific models utilizing all available probe options, including toroidal and PTSA.

Control options include:

- **Conductivity Control**
- **Conductivity and pH**
- **Conductivity and ORP**
- **Conductivity, pH and ORP**

## CONTROLLER SPECIFICATIONS

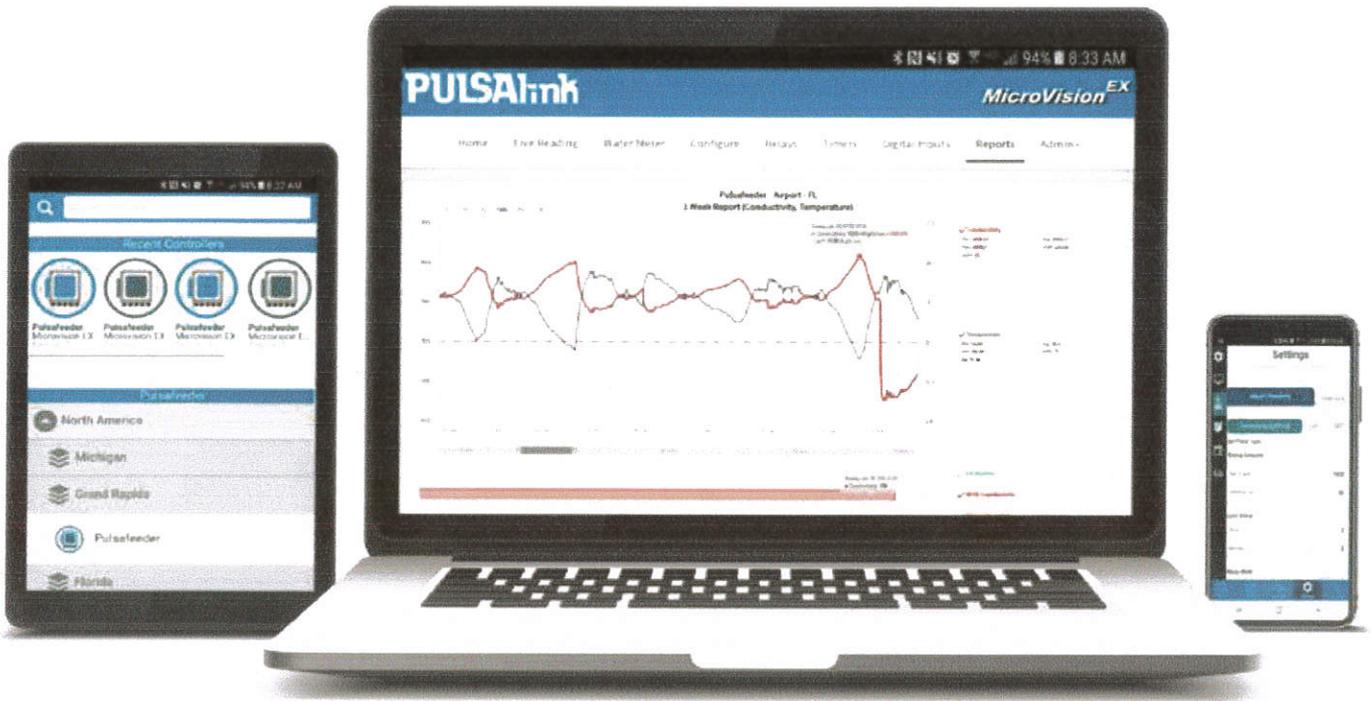
- Enclosure: IP65
- Dimensions: 7.9 in. x 6.5 in. (200.66 mm x 165.1 mm)
- Power Supply: 100 VAC – 240 VAC / 50 / 60Hz / 8A
- Control Output: 8 Amps max (3 Amps / relay)
- Display: Multicolor graphical LCD
- Measurement Range: 0 – 9,999  $\mu$ S/cm; 0 – 14 pH; -2000 – +2000mV
- Set Point Types: Rising or falling
- Languages: English, Spanish, Portuguese

## INNOVATIVE TOROIDAL SENSOR TECHNOLOGY.

Only MicroVision EX features the toroidal conductivity sensor, factory-calibrated for the life of the probe to eliminate routine calibrations and save you valuable service time and money. Because the sensor features no exposed electrodes, cleaning, downtime and erroneous conductivity readings are eliminated when installed according to the manufacturer's instructions.







# **PULSALINK COMMUNICATIONS IS CONVENIENT AND SECURE.**

Save time and money by accessing your MicroVision EX controllers without having to make the drive to site locations. Only MicroVision EX delivers the cloud-based communications capabilities of PULSALink, leveraging military-grade AES 256-bit encryption to ensure the highest data security. Now it's easy to provide your customers with the peace of mind they deserve, while you monitor and make needed adjustments anytime, from anywhere.



## EASY ACCESS ON THE GO.

PULSAlink communications enables you to use your mobile phone, tablet or computer to access your controller anytime from anywhere – putting vital information at your fingertips. The PULSAlink app gives water treaters easier access than the desktop version by offering more streamlined navigation.

### LIVE READINGS

View and monitor cooling tower readings anytime, anywhere using any device with an internet connection.

### CHANGE SETTINGS

MicroVision EX allows you to quickly change system settings remotely.

### EMAIL NOTIFICATIONS

Configure alerts for alarm notifications and live readings to be emailed to any necessary staff.

### REPORTS

Download and create reports without having to be in front of your controller.



## CUSTOMIZATION AT YOUR FINGERTIPS.

Customizable names for relays, water meters and inputs, synced to Controller, PULSAlink website, App iOS/Android, and reports. You deserve reporting capability that lets you do your job quickly and accurately, so you can get more done. And now you have it. PULSAlink doesn't require you to refresh the report to change test parameters. At any time, you can simply drag all parameters onto one screen. With PULSAlink, reporting has never been easier:

- Report page automatically pulls up past week's data
- Toggle from default report page to specific time periods and test output parameters
- Compatible with eServiceReport
- Unsurpassed reporting and graphing
- No need to enter individual dates and variables to develop graphs
- Enhanced charting capabilities
- Customizable timer programs without system reboot
- Robust data logging capabilities



## YOUR SECURITY IS A LOCK.

PULSAlink offers centralized data storage and management for superior control of your equipment. Should your controller ever be offline, your data is safe and accessible. Anyone attempting to access the PULSAlink website will need a login password, which is only generated by Pulsafeeder or your administrator.

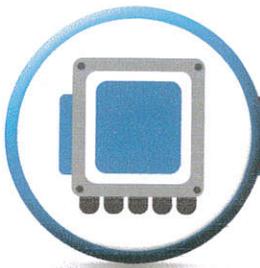
MicroVision EX and PULSAlink are supported by the highest encryption level in the industry:

- Prevents unauthorized manipulation of controller
- Prevents unauthorized data access
- Connects directly to the Internet without the need of an additional modem
- Doesn't require the use of ports that may be affected by a firewall

***Communications with data logging and reporting has become very important in the fight against Legionella. Timely response is vital. MicroVision EX with PULSAlink lets you quickly access your controllers without having to waste time driving to site locations.***

# ADVANCED FEATURES AND FUNCTIONS TO BETTER SERVE YOUR CUSTOMERS.

As a longtime recognized leader in fluids handling technology, Pulsafeeder is now setting the standard for the development of controller technologies through our proven MicroVision controls platform. Rely on our advanced MicroVision EX controller for features that allow you to better serve your customers' specific needs – all while making your job easier.



## DISPLAY INTERFACE MAKES PROGRAMMING AND INSTALLATION QUICK AND EASY.

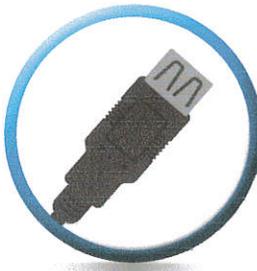
- Intuitive menus make program adjustments easy and understandable
- Soft-keys touch pad delivers ergonomic programming
- Large, easy-to-read color display provides information at a glance
- Pre-wired, conduit connection options make installation easy
- LED function indicators are highly visible in low light
- Touch-pad program keys provide clear and precise system information

## SELECTABLE TIMERS DELIVER PRECISION CONTROL OF ALL SYSTEM PARAMETERS.

- Limit timer
- Percent timer
- Percent post bleed with limit timer
- Water meter pulse timer
- Biocide control timer with pre-bleed, lockout, and conductivity minimum
- Alarm output
- 4–20mA input, pH, or ORP set point control

## DIGITAL INPUTS AND I/O OFFER INCREASED SYSTEM FUNCTIONALITY.

- Flow switch
- 3 drum levels
- Dry contact water meter
- Hall effect water meter
- 4–20mA isolated output
- Dry contact alarm
- Bleed (Solenoid valve or motorized ball valve)
- 4–20mA input, pH or ORP set point control



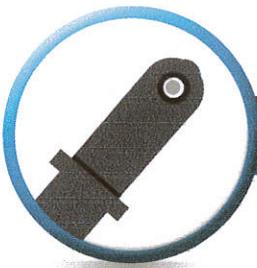
**USB CONNECTIVITY ENHANCES CONTROLS FUNCTIONALITY.**

- Data logging
- Firmware updates
- Programming duplication
- Settings log



**TOROIDAL PROBE BRINGS SUPERIOR RELIABILITY AND SAVINGS.**

- Factory-calibrated and maintenance-free for the life of the probe
- Not susceptible to sensor fouling, which eliminates cleaning downtime and erroneous conductivity readings
- No annual replacement needed
- No exposed electrodes
- No need to complete routine calibrations, which saves time and money and reduces downtime for your customers



**OPTIONAL PTSA PROBES DELIVER EVEN GREATER CONTROLLER FLEXIBILITY.**

- Precisely measures concentrations of active trace chemicals in process
- Includes built-in compensation for water turbidity
- Accurately controls chemical dosage
- Sensor outputs a 4 - 20mA signal proportional to the concentration of trace sensed in the process
- Can be configured to dose chemistry base of the sensor output to control a process



**PULSALINK COMMUNICATIONS SAVES TIME AND OFFERS PEACE OF MIND.**

- Cloud storage
- Military-grade encryption AES 256
- Easy navigation
- Fast data retrieval
- Multi-level user access

# SYSTEM OPTIONS

Time is money. That's why MicroVision EX systems are equipped with all the features you need to bring the industry's most reliable controller online quickly with no installation hassles.

## FLOW SWITCH

- 125 psi max
- Available with or without panel

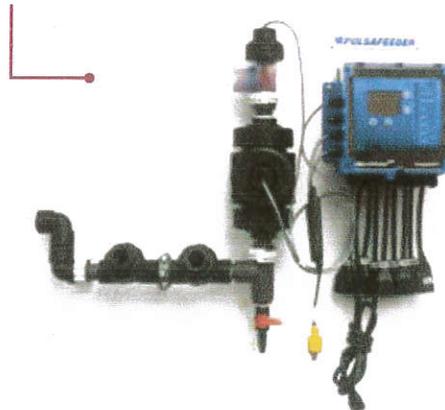
FLOW SWITCH



## STANDARD PANEL AND FLOW ASSEMBLY

- Flow assembly is pre-mounted on poly panel
- Quick, simple installation saves time and gets customer's controller online fast

STANDARD PANEL AND FLOW ASSEMBLY

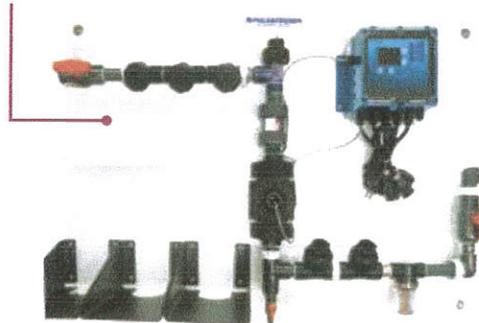


## PANEL-MOUNTED WITH PUMPS

Pulsafeeder's MicroVision EX systems are designed to provide complete, easy-to-install solutions for cooling tower applications.

- Turnkey simplicity
- Industrial-grade durability
- Mounting locations for pumps
- Factory assembled and hydrostatically tested
- Includes strainer, sensor tee, injection tee(s) and rails
- Custom panel mounts and configurations are available

PANEL-MOUNTED WITH PUMPS



# CONTROLLER MODELS

## CONDUCTIVITY CONTROL

MODEL NUMBER <sup>1</sup>	PROBE STYLE	PROGRAMMABLE TIMERS	PANEL / PUMP MOUNTS	PULSALINK CAPABLE
MVECOXPX-XXX-XXX	Torodial	3	None	No
MVECOXPX-XXX-CZXXX	Torodial	3	None	No
MVECOXPF-XXX-XXX	Torodial	3	None	No
MVECOXPF-XXX-CZXXX	Torodial	3	None	No
MVECOXPA-XXX-XXX	Little Dipper PTSA	2	None	No
MVECOXPA-XXX-XXX	Pyxis PTSA	2	None	No
MVECOXPA-XXX-XXX	Torodial	3	Yes / No	No
MVECOXPA-XXX-CZXXX	Torodial	3	Yes / No	No
MVECOXPA-EXX-XXX	Torodial	3	Yes / No	Included
MVECOXPA-EXX-CZXXX	Torodial	3	Yes / No	Included
MVECOXPA-ETX-XXX	Little Dipper PTSA	2	Yes / No	Included
MVECOXPA-EPX-XXX	Pyxis PTSA	2	Yes / No	Included
MVECOXPD-XXX-XXX	Torodial	3	Yes / Yes 3	No
MVECOXPD-XXX-CZXXX	Torodial	3	Yes / Yes 3	No
MVECOXPD-EXX-XXX	Torodial	3	Yes / Yes 3	Included
MVECOXPD-EXX-CZXXX	Torodial	3	Yes / Yes 3	Included
MVECOXPF-XXX-XXX	Torodial	4	None	No
MVECOXPF-XXX-CZXXX	Torodial	4	None	No
MVECOXPA-XXX-XXX	Torodial	4	Yes / No	No
MVECOXPA-XXX-CZXXX	Torodial	4	Yes / No	No
MVECOXPA-EXX-XXX	Torodial	4	Yes / No	Included
MVECOXPD-EXX-XXX	Torodial	4	Yes / Yes 3	Included
MVECOXPD-EXX-CZXXX	Torodial	4	Yes / Yes 3	Included
MVECOXPA-ETX-XXX	Little Dipper PTSA	3	Yes / No	Included
MVECOXPA-EPX-XXX	Pyxis PTSA	3	Yes / No	Included

## CONDUCTIVITY AND PH

MODEL NUMBER <sup>1</sup>	PROBE STYLE	PROGRAMMABLE TIMERS	PANEL / PUMP MOUNTS	PULSALINK CAPABLE
MVECOXPF-XXX-XXX	Torodial	6	None	Order: ACT-PULSALINK
MVECOXPF-XXX-CZXXX	Torodial	6	None	Order: ACT-PULSALINK
MVECOXPA-XXX-XXX	Torodial	6	Yes / No	Order: ACT-PULSALINK
MVECOXPA-XXX-CZXXX	Torodial	6	Yes / No	Order: ACT-PULSALINK
MVECOXPA-EXX-XXX	Torodial	6	Yes / No	Included
MVECOXPA-EXX-XXX	Torodial	6	Yes / No	Included
MVECOXPA-ETX-XXX	Little Dipper PTSA	5	Yes / No	Included
MVECOXPA-EPX-XXX	Pyxis PTSA	5	Yes / No	Included
MVECOXPD-XXX-XXX	Torodial	6	Yes / Yes 3	Order: ACT-PULSALINK
MVECOXPD-XXX-CZXXX	Torodial	6	Yes / Yes 3	Order: ACT-PULSALINK
MVECOXPD-EXX-XXX	Torodial	6	Yes / Yes 3	Included
MVECOXPD-EXX-CZXXX	Torodial	6	Yes / Yes 3	Included

## CONDUCTIVITY AND ORP

MODEL NUMBER <sup>1</sup>	PROBE STYLE	PROGRAMMABLE TIMERS	PANEL / PUMP MOUNTS	PULSALINK CAPABLE
MVECOXPF-XXX-XXX	Torodial	6	None	Order: ACT-PULSALINK
MVECOXPF-XXX-CZXXX	Torodial	6	None	Order: ACT-PULSALINK
MVECOXPA-XXX-XXX	Torodial	6	Yes / No	Order: ACT-PULSALINK
MVECOXPA-XXX-CZXXX	Torodial	6	Yes / No	Order: ACT-PULSALINK
MVECOXPA-EXX-XXX	Torodial	6	Yes / No	Included
MVECOXPA-EXX-CZXXX	Torodial	6	Yes / No	Included
MVECOXPA-ETX-XXX	Little Dipper PTSA	5	Yes / No	Included
MVECOXPA-EPX-XXX	Pyxis PTSA	5	Yes / No	Included
MVECOXPD-XXX-XXX	Torodial	6	Yes / Yes 3	Order: ACT-PULSALINK
MVECOXPD-XXX-CZXXX	Torodial	6	Yes / Yes 3	Order: ACT-PULSALINK
MVECOXPD-EXX-XXX	Torodial	6	Yes / Yes 3	Included
MVECOXPD-EXX-CZXXX	Torodial	6	Yes / Yes 3	Included

## CONDUCTIVITY PH AND ORP

MODEL NUMBER <sup>1</sup>	PROBE STYLE	PROGRAMMABLE TIMERS	PANEL / PUMP MOUNTS	PULSALINK CAPABLE
MVECOXPF-XXX-XXX	Torodial	5	None	Order: ACT-PULSALINK
MVECOXPF-XXX-CZXXX	Torodial	5	None	Order: ACT-PULSALINK
MVECOXPF-EXX-XXX	Torodial	5	None	Included
MVECOXPA-XXX-XXX	Torodial	5	Yes / No	Order: ACT-PULSALINK
MVECOXPA-XXX-CZXXX	Torodial	5	Yes / No	Order: ACT-PULSALINK
MVECOXPA-EXX-XXX	Torodial	5	Yes / No	Included
MVECOXPA-EXX-CZXXX	Torodial	5	Yes / No	Included
MVECOXPA-ETX-XXX	Little Dipper PTSA	4	Yes / No	Included
MVECOXPA-EPX-XXX	Pyxis PTSA	4	Yes / No	Included
MVECOXPD-XXX-XXX	Torodial	5	Yes / Yes 3	Order: ACT-PULSALINK
MVECOXPD-XXX-CZXXX	Torodial	5	Yes / Yes 3	Order: ACT-PULSALINK
MVECOXPD-EXX-XXX	Torodial	5	Yes / Yes 3	Included
MVECOXPD-EXX-CZXXX	Torodial	5	Yes / Yes 3	Included

## MICROVISION EX PARTS

PART NUMBER	DESCRIPTION
12-600-00	Acc kit, Fuse, relay name lables, IOM
16-170-07	Probe Tee
16-170-08	Flow Assembly, Cond, Flow
04-080-01	Little dipper sensor kit, sensor and tee
04-000-21-1	Torodial probe
04-060-00	pH probe
04-060-01	ORP probe
04-080-02	Pyxis sensor kit, Sensor and tee

## MICROVISION EX ACCESSORIES AND EXPANSIONS

PART NUMBER	DESCRIPTION
CK750	Check Valve Kit
PC025	Cable, Cond, Flow - Extension Kit; 25 ft
PC050	Cable, Cond, Flow - Extension Kit; 50 ft
PC075	Cable, Cond, Flow - Extension Kit; 75 ft
PC100	Cable, Cond, Flow - Extension Kit; 100 ft
UGK-MILIN	4-20mA input Upgrade kit (1)
UGK-MILOUT	4-20mA output Upgrade kit (1)
ACT-PULSALINK	PULSALink cloud communications connection kit (required for remote communications)

1. All models feature 6 digital inputs.
2. Does not include flow switch.
3. All models feature 10 digital inputs.

### PROGRAMMABLE TIMER MODES:

- Limit Timer
- Percent Timer
- Percent Post Bleed with Limit Timer
- Biocide Control Timer with Pre-bleed, Lockout, and Conductivity Minimum
- Water Meter Pulse Timer
- 4-20mA Input, pH, or ORP Set Point Control
- Alarm Output

### DIGITAL INPUT ASSIGNMENTS:

- #1 Flow Switch
- #2, 3 & 4 Drum Levels
- #5 Water Meter - Hall Effect or Dry Contact
- #6 & 7 Water Meter - Dry Contact
- #8, 9 & 10 Water Meter-Hall Effect or Dry Contact

USB standard on all controllers.

CZXXX = CE approved, non-pre-wired models, or 230 VAC.

 **PULSAFEEDER**

27101 AIRPORT ROAD · PUNTA GORDA, FL 33982

PH: 941.575.3800 · FAX: 941.575.4085

PULSATRON.COM

**IBEX**

AN ISO 9001 CERTIFIED COMPANY

MVEB001 C18



# **Micro Vision<sup>EX</sup>**

MICROPROCESSOR – BASED  
WATER TREATMENT  
CONTROLLER

**Installation Operation Manual**

4.8.6	Timers – Alarm.....	28
4.8.7	Timers – Set Point Control Mode .....	28
4.8.8	Timers – Disabled (Default).....	28
4.8.9	Timers – Bio Tracking (In All Timer Modes) .....	28
4.9	Communications .....	28
4.10	USB.....	29
4.10.1	USB Graphing Tool.....	30
4.10.2	USB Data log Timer and Tamper Codes: .....	30
4.11	Ethernet (Optional) .....	30
4.11.1	Programming your controller PULSAlink.....	30
4.11.2	Setting Up Your Controller on PULSAlink.....	31
5.	FACTORY DEFAULTS .....	32
6.	TROUBLESHOOTING GUIDE.....	34
7.	MAINTENANCE.....	35
7.1	Conductivity Sensor removal and cleaning.....	35
	To remove the conductivity sensor from its tee for cleaning: .....	35
	To clean conductivity sensor:.....	35
7.2	pH sensor Information .....	35
7.2.1	Preparation .....	35
7.2.2	Sensor Storage .....	36
7.2.3	Sensor Cleaning.....	36
7.3	ORP Sensor Information.....	36
7.3.1	ORP Maintenance and Troubleshooting .....	36
7.3.2	Testing ORP Sensor.....	36
7.3.3	Flow Sensor .....	37
8.	SPECIFICATIONS.....	37
9.	FORSEABLE MISUSE .....	38
10.	MOUNTING HOLE PATTERN (Footprint).....	39

## Drum Levels

Three (3) onboard dry contact inputs serve as Drum Level inputs. When a low level is detected the unit will go into an alarm state and the low drum's identity will be displayed on the screen. The user can program the alarm to deactivate a timer if desired. Drum level #1 is assigned to timer #1, drum level #2 is assigned to timer #2 and drum level #3 is assigned to timer #3.

## Flow Switch

*MicroVision<sup>EX</sup>* has a dry contact flow switch input that will de-activate all of the control output relays upon a no-flow indication. An alarm condition will be indicated and "Flow Switch Alarm" will be displayed. This input is active closed:

Open = no flow; closed = flow.



If a flow switch input or other alarm condition exists, the LED's on the front panel will flash until the alarm condition is cleared.

## 4-20mA Outputs and Inputs

Optional 4-20mA inputs or outputs can be installed to increase the capabilities of the *MicroVision<sup>EX</sup>*. Connect 4-20mA equipment to the + and - terminals as shown on page 9.

## Water Meter

*MicroVision<sup>EX</sup>* has dedicated inputs designed to interface with either Dry Contact (DC) or Hall Effect (HE) type Water Meters. Base models have two (2) Water Meters inputs; All other models have six (6).

Certain inputs are dedicated to a specific Water Meter type as described below:

- Input 1: Compatible with either DC or HE Water Meters*
- Input 2: Compatible with DC Water Meters only*
- Input 3: Compatible with DC Water Meters only*
- Input 4: Compatible with either DC or HE Water Meters*
- Input 5: Compatible with either DC or HE Water Meters*
- Input 6: Compatible with either DC or HE Water Meters*

Each Water Meters input is available to signal a Pulse Timer and can totalize water consumption.

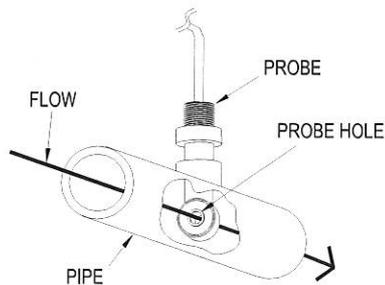
## Alarm Relay

*MicroVision<sup>EX</sup>* has a dedicated Dry Contact Relay available for use with process control equipment or visual indicators. This relay is un-powered.

## 3.4 Sensor Installation

### Conductivity

The controller is supplied with a temperature compensated toroidal conductivity probe installed in a tee. The probe should only be installed where adequate flow is going around and through the hole in the center of the probe in the tee provided.



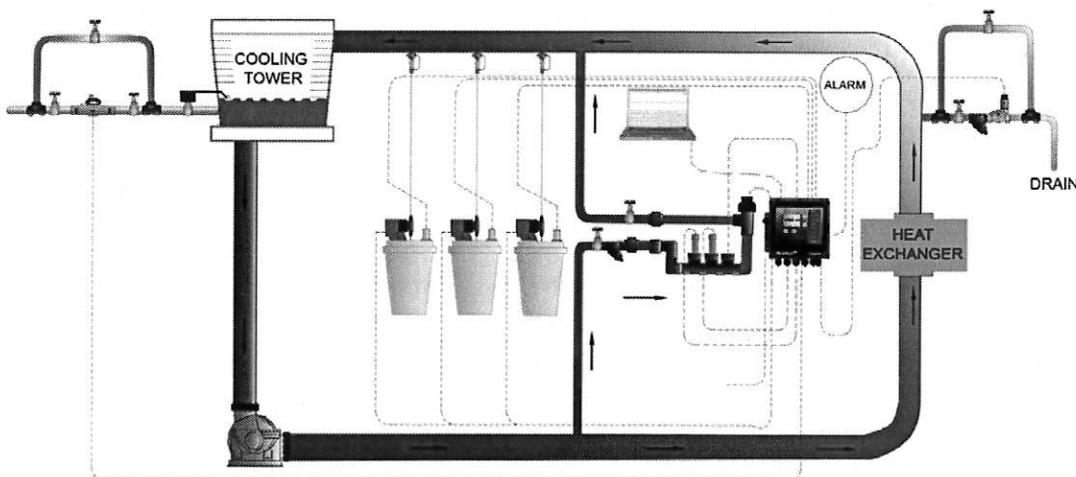
### pH and ORP

When ordered as a pH or ORP model the controller will be supplied with standard pH and ORP probes. The probes are supplied installed in a tee. The probes should only be installed where flow between 1 and 5 GPM is going around the probe.

### Flow Switch

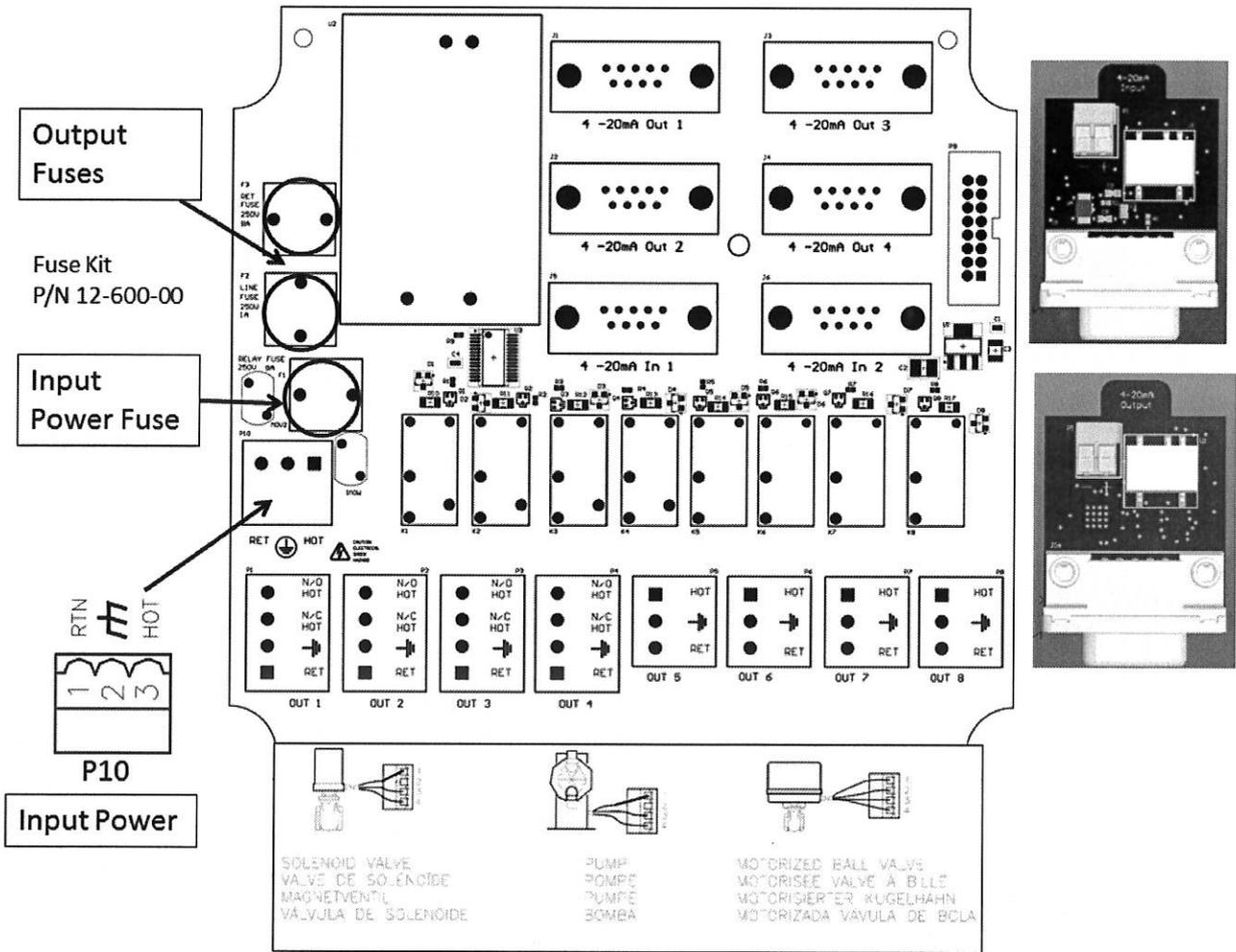
If the controller is provided with a flow switch, install the flow switch so that flow enters into the bottom of the flow switch tee, and out the side of the tee. The flow switch must always be installed in a vertical position so that the sensor wire is coming out of the top, and the internal (red) flow shuttle is able to rise when there is flow and drop when there is no flow. The flow switch is activated when 1 GPM (3,8 LPM) is going through it, and is deactivated when the flow drops below 1 GPM (3,8 LPM).

## 3.5 TYPICAL INSTALLATION



**⚠** Over pressurization of the plumbing can occur when cooling tower is higher than the piping and controller system. Ensure all pressures have been accounted for. Verify piping and sensor allowable temperatures are above maximum temperatures of the system.

# RELAY BOARD CONNECTIONS



## Energy Usage and Duty

The unit utilizes a variety of probes and input signals to control valves, pumps, and numerous other devices. These items are not all used in a continuous fashion. The typical unit has a complicated duty cycle dependent on application. For 120V and a max of 8A, a typical duty cycle of 15 minutes on and 45 minutes off can be used. This results in an energy calculation of

$$120V * 8A * \text{Power Factor} * 25\%$$

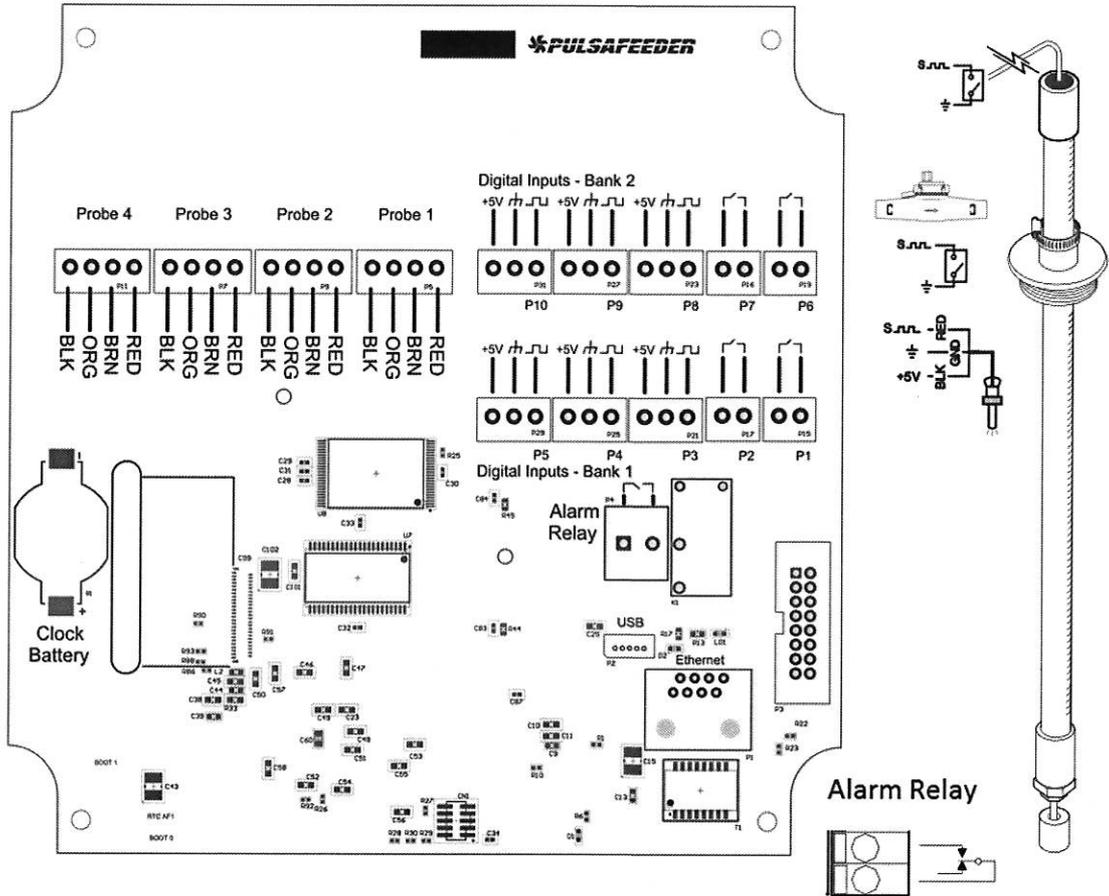
The Power Factor is the cosine of the phase angle between the Current and Voltage of an AC circuit. Typically, 0.8 is a good estimate for US power.

The 25% is the estimate of a typical duty cycle of 15 on and 45 off.

For 240V, the amperage remains constant.

# DIGITAL BOARD CONNECTIONS

The low voltage connections are found on the top board.  
 Use 22-24 AWG (.76 mm<sup>2</sup>) wire for: flow switch, drum levels, dry alarm, and water meter connections. A recommended wire is OMNI cable DS92203. **These signal wires must be run separate from AC power lines.**



Clock Battery # 09-710-04



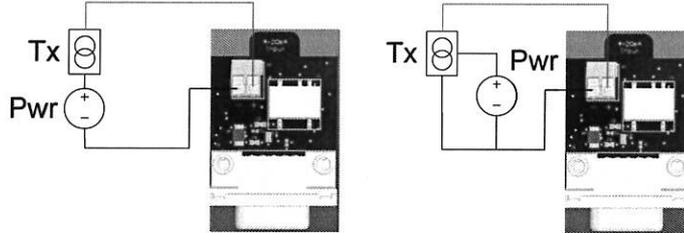
Low voltage signal wires, e.g., water meter, must be run separate from AC power lines.

## Digital Input assignments

There are 6 digital inputs on base conductivity models and up to 10 on featured models.

Digital Inputs	Input 1	Input 2	Input 3	Input 4	Input 5	Inputs 6 & 7	Inputs 8,9 and 10
Function	Flow Switch	Drum Level #1	Drum Level #2	Drum Level #3	Water Meter	Water Meter	Water Meter
Assignment	N/A	Timer #1	Timer #2	Timer #3	WM #1	WM #2 & 3	WM #4 to #6
Location	P1	P2	P3	P4	P5	P6 and P7	P8, P9, P10
Dry Contact	✓	✓	✓	✓	✓	✓	✓
Hall Effect					✓		✓

Each 4-20mA analog input supports 2 wire loop or transmitter powered configurations. Input resistance load is approximately 265 Ohms. Input voltage range is commonly 12V or 24V. Up to 60V is permissible.

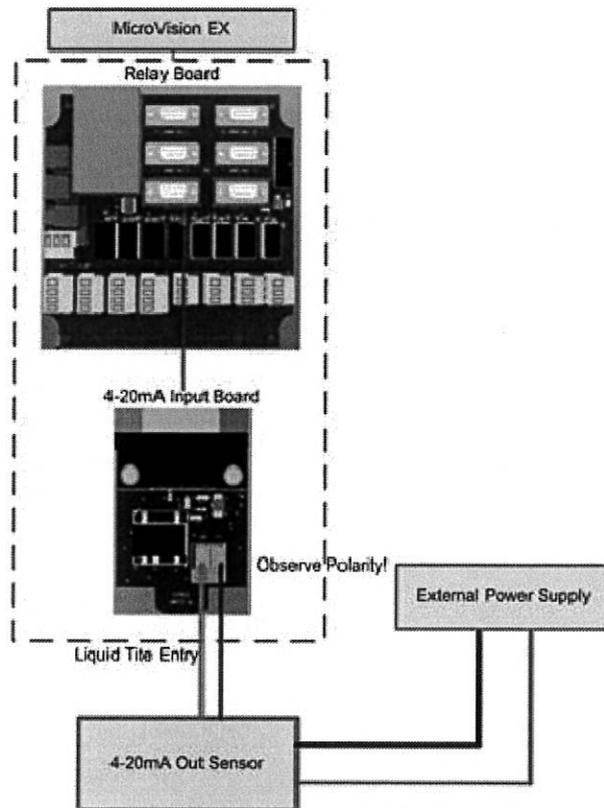


### 3.13.1 Fluorometer – Trace Chemical

MicroVision EX is compatible with Turner LD2 or Pyxis ST-500 Fluorometers. When factory installed the Fluorometers come prewired and calibrated. Alternatively, the Fluorometers can be ordered separately, wired and programmed in the field. Be sure to observe the manufacturers wiring directions.

#### 3.13.1.1 Turner Little Dipper™ 2

The Turner is an inline Fluorometer with a linear 4-20mA output which responds to trace chemical. Typically is set to 4mA = 0 PPB and 20mA = 200 PPB probe has 4 wires; Red, Black, Orange, and Brown. The red is the power supply voltage. Black is the Supply ground. Orange is the positive current loop connection. Brown is the negative current loop connection. The Turner Little Dipper 2 requires an external power supply of 8-32 VDC (1W Max)



Example Wiring Configuration – Please follow the 4-20mA output sensor manufacturer wiring instructions.

## FRONT PANEL DESCRIPTION



### 3.15 Keypad Operation

- UP/DOWN -** Dual function keys are used to move the select (highlighted) box and to increase and decrease values.
- ○ -** Soft keys used for various functions depending on the currently displayed screen. The key's function appears above the key on the display.

### 3.16 Communications (Optional)

The MicroVision EX has a variety of cloud capable controllers. These controllers will ship with a CAT5 cables with an RJ45 connection. To connect the MicroVision EX to PULSAlink, Pulsafeeder's cloud controller management software solution, the controller will need internet access. Please terminate the provided RJ45 connection to an open internet port.

## 4.4 Main Menu

The Main menu is the starting point for all subsequent programming menus.

**Relay HOA** – This menu allows for the control of the relay output states, either manual off, or auto.

**Configure** – This menu allows for setting the time and date, display contrast, water meter, and customizing and naming Probes, Timers, Water Meters, and 4-20mA Inputs.

**Settings** – This menu allows for setting the conductivity, pH and ORP configurations

**Timers**– This menu allows for setting the timers for the different feed modes.

**Communications**– This menu allows for exporting data, exporting settings, importing settings and upgrading the O/S.

## 4.5 Relay HOA

From the HOA Outputs menu manually set the relay control outputs. This is useful for servicing chemical pumps or troubleshooting electrical problems. First select the relay output to be controlled then select the relay state.



Forcing the output to Auto may cause the control output to energize without warning.

## 4.6 Configure

The user may configure the controller from this menu.

**Date/Time** – Set the current date, date format, time, and time format.

**Digital Inputs** – Set the drum level settings, and water meter type and volume.

**4-20mA Out-** Activate or deactivate 4-20mA output options.

**4-20mA In-** Activate or deactivate 4-20mA input options.

**Gal/Lit-** Set the units that the controller displays.

**Meter Totals-** Display and/or reset the water meter totals.

**Language** – Change the controller displayed language.

**Customize** – Adjust display brightness, Home Screen Text, Home Screen scroll rate, Alarm Message size, display dampener, and set custom names for Probes, Timers, Water Meters, and 4-20mA Inputs.

**Password** – Set the user password.

**Software Version** – Displays the current software version.

**Factory Reset** – Restore the parameters to factory default.

**Update Software** – Upgrade controller software without power cycling.

### 4.6.1 Date/Time

From the Date/Time menu set the date and time as well as the date and time display formats.

**Set Date** – Set the current date.

**Set Time** – Set the current time.

**Date Format** – Pick the day/month/year format.

**Time Format** – Pick the 12-hour or 24-hour time of day format.

## 4.6.7 Display Settings

This menu is for setting how the controller display appears.

### 4.6.7.1 Brightness

Select this menu to set how bright the background is, Low, Medium, or High.

### 4.6.7.2 Display Line text

Select this menu to change what text is displayed on the two lines of the main home screen display. (Pulsafeeder and MicroVision EX are the default)

### 4.6.7.3 Home Screen Display Scroll

Select this menu to set the speed that the home screen scrolls from displaying various values, Low (30 seconds), Medium (10 seconds), or High (5 seconds), or OFF for no scrolling of the main menu.

### 4.6.7.4 Display Alarm

Select this menu to set the size of the alarm messages that are displayed in the home screen when they occur.

### 4.6.7.5 Display Dampener

The Display Dampener setting sets how often the actual conductivity reading is updated on the Home Screen. This results in dampening of the controller response to sudden changes in conductivity.



NOTE

The controller takes a conductivity reading once every second. Increasing this value above one second causes the controller to average the readings, hence, slowing down the control functions.

### 4.6.7.6 Customize Probes, Timers, Water Meters, 4-20mA Inputs Names

You can rename your probes, timers, water meters and 4-20mA Inputs (if enabled), in this section (available only on MVEX models manufactured after April 1, 2018, with Series C software). When renaming a parameter, you may choose between a custom nickname or a preset name for commonly used labels.

## 4.6.8 Password Setting

The Controller has two Security Access Codes, each with different system privileges - an Administrator and a User. An Administrator can access all functions of the controller. A User level can only access those items selected by the administrator. A password level is not required for access to the **home menu**.

Both passwords are active when Administrator level password is set. Conversely, both passwords are inactive when the Administrator level password is set to 000000. Each password consists of a six (6) digit numerical code.

The Administrator configures the following parameters to restrict User access to the controller systems

The following is an example of the Security menu options:

**Exit Home Screen** = **Limits access to only the Home Screen.**

## 4.7.1 Conductivity

**Set point Type** - A Set point is a setting at which the controller activates an output, such as a solenoid valve or a metering pump on the relay outputs or dry contact outputs. The type – **Rising** or **Falling** defines which side of the set-point the relay activates. A **Rising** type means that the output activates when the input goes above the set point. A Rising set point is commonly used in conductivity control where you want to keep conductivity below a certain value. A **Falling** type activates the output when the value goes below the set point.

**Set point** – This is the conductivity point where a bleed function will begin.

**Differential** – The differential setting controls when the bleed function stops. This value subtracted from the conductivity set point causes the bleed function to stop.

Example: Rising Set point=1200, Differential=100, the bleed function begins when the conductivity reaches 1200 and ends when the conductivity reaches 1100.

**Limit Timer** – Set this value to the maximum amount of time the bleed output can stay energized before a Bleed Limit alarm is reported. If the next bleed cycle completes without an alarm the alarm will clear itself on the next cycle. Setting the limit timer value to 00:00 will turn off limiting function of the relay.

**Limit Alarm**- Use this option to turn the control relay off on a limit alarm, or to keep it on in automatic mode during a limit alarm. (default is “keep relay on” for the bleed relay)

**Probe Calibration** – Use this function to calibrate the probe.

**Alarm Setp’t** – Use this menu to specify the upper and lower values for alarm reporting.



NOTE

**Settings Menu**- When the settings menu is being displayed, probe control operations stop until all settings changes are completed and the user returns to the Home Screen



NOTE

The conductivity probe is very sensitive to temperature changes. Allow the probe roughly 10 minutes to adjust to the temperature of the test solution or sample. Calibrating the probe without allowing the probe to equilibrate to the sample temperature could result in erroneous controller conductivity readings.



NOTE

Only use a calibration meter that incorporates temperature compensation when performing a probe calibration.

value goes below the set point. A common example of this is ORP control, where maintaining a certain minimum level of an oxidizer in the system is required.

**Set point** – This is the point where a control relay will activate. Once the pH or ORP has reached this value the control relay output will turn on.

**Differential** – The differential setting controls when the control relay deactivates. This value subtracted from the set point causes the relay to stop.  
Example: Set point=7.00, Differential=1.00, the pH begins when the pH reaches 7.0 and ends when the pH reaches 6.0.

**Limit Timer** – Set this value to the maximum amount of time the output can stay energized before a pH or ORP Limit Alarm is reported. If the next control cycle completes without an alarm the limit alarm will clear itself on the next cycle. Setting this value to 00:00 turns off this function.

**Limit Alarm**- Use this option to turn the control relay off on a limit alarm or to keep it on in automatic mode during a limit alarm. (default is "Turn relay off" for the pH and ORP relay)

**Probe Calibration** – Use this function to calibrate the probe.

**Alarm Setp't** – Use this menu to specify the upper and lower values for alarm reporting.



The probe is very sensitive to temperature changes. Allow the probe roughly 10 minutes to adjust to the temperature of the test solution or sample. Calibrating the probe without allowing the probe to equilibrate to the sample temperature could result in erroneous controller readings.

#### 4.7.2.1 pH and ORP Probe Calibration (1 point)

**Probe Calibration** – Use this function to calibrate the probe. Enter the calibrated value based on the calibration method used. For both methods shown below the actual reading from the probe is shown on the screen. This is the un-calibrated value the controller is receiving from the sensor. If the actual value displayed in the calibration screen is not close to the sample that the probe is actually in, or the reading is changing significantly, the probe either needs to be cleaned or replaced, or the solution the probe is in is no longer accurate. Typically ORP does not require a calibration for most applications for that reason only pH is illustrated below.

##### **In-Stream (Best Practice)**

Begin with a clean sensor. With the pH or ORP sensor installed in the system under normal operating conditions ensure flow is going across the probe for at least five (5) minutes for temperature equilibrium.

**Step 1** – Move to the Probe Calibration screen.

To enable a 4-20mA input, see sec 4.6.3. Once the board is enabled, device will appear in the Settings menu. From here you can setup the peripheral. You must select a "type" (i.e. mA, PPM, GAL, etcetera) and calibrate the input.

To configure the type select the mode which resembles your application. Then you must calibrate the input, depending on the input type, you may need buffer solutions to do this. Hold the input device in a low state, enter the correlating value in the controller on the top line, do not exit the setup until the next point has been calibrated, otherwise you will get an error. Place the input in a high state and enter the correlating value in the controller. Your input should now be set-up. If you still get an error exit out and start over. If you wanted to have any timers trigger based on the 4-20mA input you can configure a set point control timer.

**% Minutes to run**=10%

In this example the timer will feed for 10% of 60 minutes, or 6 minutes every 60 minutes.

### 4.8.3 Timers - 28 day (Biocide Timer)

From this menu configure how often and the duration for the biocide 28-day timer to run. This Timer can also perform a pre-bleed, using a conductivity minimum with a fixed time, and a bleed-lockout function for each biocide feed program. Each 28 day timer has four (4) programs (Program A to D) with individually programmable settings as follows:

**Days/Weeks** – Set the days and weeks for the timer to run.

**Start Time** – Set the time of day for the timer to begin. If a pre-bleed is programmed, this is the time that the pre-bleed starts. Setting the value to 00:00 means the start time is ignored.

**Feed Time** – Set this value to the amount of time for the timer to activate the timer control relay for each start time.

**Pre-Bleed** – Set the pre-bleed time to the maximum amount of time for the pre-bleed function to force a bleed cycle without reaching the conductivity minimum. Set the conductivity minimum to the value for the conductivity to reach before the bleed cycle finishes and the biocide feed time.

**Bleed Lockout** – Set this value to the amount of time to lock-out a bleed function during (and after if set longer then the feed time) a biocide feed cycle.



28 day timer programs (A to D) cannot be set to run at the same time, week and day. If two timers have the same run times only the first program, in alphabetical order, set will run (example if A and B are the same, only A will run.)

### 4.8.4 Timers – % Post Bleed

From this menu configure how the timer will run while in percent post bleed mode. This mode uses the bleed time to calculate the run time based on a user defined percentage setting.

**Percentage** – Set this value to the amount of time (as a percentage) for the timer to run after a bleed function has completed.

Example: % of Bleed=25%, the most recent bleed cycle took 20 minutes, the timer will now feed for 25% of 20 minutes, or 5 minutes.

**Limit Time** – Set this value to the maximum amount of time to allow the timer to run after a bleed cycle has completed. Setting the timer to 00:00 turns off this function.

### 4.8.5 Timers – Limit Timer (Bleed and Feed)

From this menu configure how the timer will run with the bleed relay. This mode activates the timer at the same time as the bleed time up to a user defined maximum time. Set this value to the maximum amount of time to allow the timer to run for during bleed cycle. Setting the limit timer value to 00:00 will turn off limiting function of the relay.

## 4.10 USB

When a USB flash drive is inserted into the USB cable the user can take certain actions. If a password has been entered into the controller, the user must first enter the required code to access the USB options screen.

### **Export Data Log**

The controller's data log history file can be downloaded to the USB flash drive in CSV format.

### **Export Config File**

The controller's programming and set points can be down loaded for duplication of the program on other *MicroVision<sup>EX</sup>* controllers or as a record of the current settings.

### **Import Config file**

The controller's programming and set points can be uploaded for duplication of the program from other *MicroVision<sup>EX</sup>* controllers.

### **Erase Data Log**

Use this function to reset the controller's data log records. The current data log will be erased and cannot be recovered

### **Data Log Name**

Use this setting to give the exported data files a unique file name for each controller. The file name length is fixed at 16 characters. However, it is possible to use "\*" symbols in the name to create spaces. The default name is: DataLogFile\*\*\*\*\* this produces CSV file named DataLogFile0.csv

### **Data Log Interval:**

Use this setting to define the data log capacity and record entry rate. Options are "Custom", 30 days @ 1 minute, 60 days @ 1 minute, 90 days @ 1 minute, 180 days @ 1 minute, or 270 @ 1 minute.

The "Custom" setting is used to tailor the data log entry rate. The allowable range is from 2 to 120 minutes per entry.

The "Custom" setting always uses the same size memory block size; Only the record entry rate is configurable.

Example:

Custom range @ 2 Minutes = 60 Days  
Custom range @ 120 minutes = 9.8 Years

Normal data log interval settings create a file that could be as large as 350MB in size. The custom range settings create a file that could be as large as 40MB.



**NOTE**

**In order to access the data stored on the controller remotely the data log interval must be set in either 30 days @ 1 minute or any setting in the custom menu.**



**NOTE**

Changing the Data log interval erases the existing data log file in the controller to create a new one. To avoid losing data, download the current log file before changing this setting.

### **4.11.2 Setting Up Your Controller on PULSAlink**

In order to access your controller online you will need to go to "<https://www.pulsalink.net/login>". Contact your company administrator if you need an account. Note: An administrator must grant access to users for each controller.

**TIMER: PERCENT**

Percent 0%  
Percent Minutes 10

**TIMER: PERCENT POST BLEED**

Bleed Percent 0%  
Maximum Time 01:30 HH:MM

**TIMER: PULSE**

Run Time 00:30 MM:SS  
Pulse Set 10  
Water Meter One

**TIMER: 28-DAY**

Run Time 01:30 HH:MM  
Lock Out 00:00 HH:MM  
Pre Bleed 00:00 HH:MM  
Conductivity Minimum 0  $\mu$ S/CM  
Program: Start Time 00:00 HH:MM  
Program: Week EVERY WEEK  
Program: Day NO DAY

**WATER METER**

Gallons per Pulse 100

**Scroll rate** High (3 seconds)

**SECURITY**

Passwords (NONE)

## 7. MAINTENANCE

The only recommended maintenance required on the controller is periodic inspection of the conductivity sensor every 6 months. It is recommended to establish a regular maintenance schedule designed to meet the needs of each particular application. All other service should be performed by factory authorized personnel only. Modifications to or tampering with the circuit level components makes all warranties, written or implied, and/or manufacturer's responsibility for this controller, null and void.



**DISCONNECT POWER BEFORE OPENING THE UNIT TO ACCESS FUSES. MAKE SURE THAT REPLACEMENT FUSES ARE OF SAME TYPE TO MAINTAIN SAFETY APPROVALS.**

### **⚠ ALWAYS DEPRESSURIZE SYSTEM BEFORE REMOVING PROBES**

<b>FUSE</b>	<b>TYPE</b>
F1 & F3	5 X 20mm, 8A, 250V (Output power)
F2	5 x 20mm, 1A 250 V (Input power)

### 7.1 Conductivity Sensor removal and cleaning

#### **To remove the conductivity sensor from its tee for cleaning:**

1. Remove power to the system.
2. Remove pressure from the system prior to unscrewing the sensor by closing the hand valves located before and after flow assembly.
3. Open the sample port; this will facilitate removal of sensor.
4. Unscrew the coupling nut.
5. Remove the sensor.

#### **To clean conductivity sensor:**

1. Wipe the sensor with a clean cloth.

### 7.2 pH sensor Information

The combination pH sensor supplied with your controller is designed for maximum reliability, accuracy, and ease of use. The reference half-cell is sealed and non-refillable. The sensor is shipped with a protective boot or bottle filled with a junction wetting agent.

#### 7.2.1 Preparation

Remove the lower portion of the protective boot and rinse the sensor tip with tap water. It is possible that air bubbles may have migrated into the pH sensitive bulb during shipment. The sensor is unable to function with air in the bulb. To remove air, gently shake the sensor downward in the same manner as a clinical thermometer. Prior to first usage or after long-term storage, immerse the lower end of the sensor in tap water for thirty minutes. This hydrates the pH bulb and prepares the liquid junction for contact with the test solution. Occasionally during long-term storage or shipment, the sensor may develop a film on the pH bulb. The film may be removed by following sensor cleaning instructions.



**Use proper handling procedures including rubber gloves, eye protection and protective clothing, when handling any acid solution.**

### 7.3.3 Flow Sensor

The Flow Sensor uses differential pressure to cause a shuttle to rise and magnetically activate a reed switch. Occasionally this assembly may become fouled, preventing the shuttle from rising and/or falling.

To clean the assembly:

1. Close isolation valves and relieve system pressure from the flow assembly.
2. Remove flow cap by loosening retaining nut. Remove flow cap from flow body by pulling straight out.
3. Remove red shuttle by pulling it straight out. Note the post, shuttle rides on.
4. Clean all internal surfaces of flow body with soft bristle bottle brush. Be careful of the post that the shuttle rides on, its surfaces must be clean, but do not break it while cleaning.
5. Clean shuttle exterior surfaces and shuttle bore with a soft brush. You may use a mild dish soap if desired. Flush well before re-installing.
6. Re-install shuttle and attach flow cap. Open isolation valves. Check for leaks.

## 8. SPECIFICATIONS

<b>Controller</b>	
Enclosure	IP65
Power supply	120 or 220 VAC; 50/60Hz.
Reading Accuracy	+/- 2% at point of measure
Maximum relay output current	120 VAC: 8 A Resistive/General use. 4LRA/4FLA, 1/10HP (motors) 220 VAC: 8 A Resistive/General use. Not rated for motors
<b>Probe</b>	
Maximum temperature	122° F (50°C)
Temperature compensation range	32°F - 122°F (0° - 50°C)
Maximum pressure	125 PSI (8,6 BAR)
Probe type	Toroidal Conductivity, standard pH and ORP
Maximum cable length	100 Feet (30,5 Meters)
Materials of construction	Polypropylene
Conductivity reading	0-9999 uS/cm; 1 uS/cm increments
pH reading	0.00 to 14.00
ORP	-2000mV to +2000mV
<b>Flow Switch</b>	
Maximum temperature	127°F (52°C)
Maximum pressure	125 PSI (8,6 BAR)
Activate flow rate	Approximately 1 GPM (3,785 LPM)
Materials of construction	PVC and Glass filled Polypropylene

# 10.MOUNTING HOLE PATTERN (Footprint)

