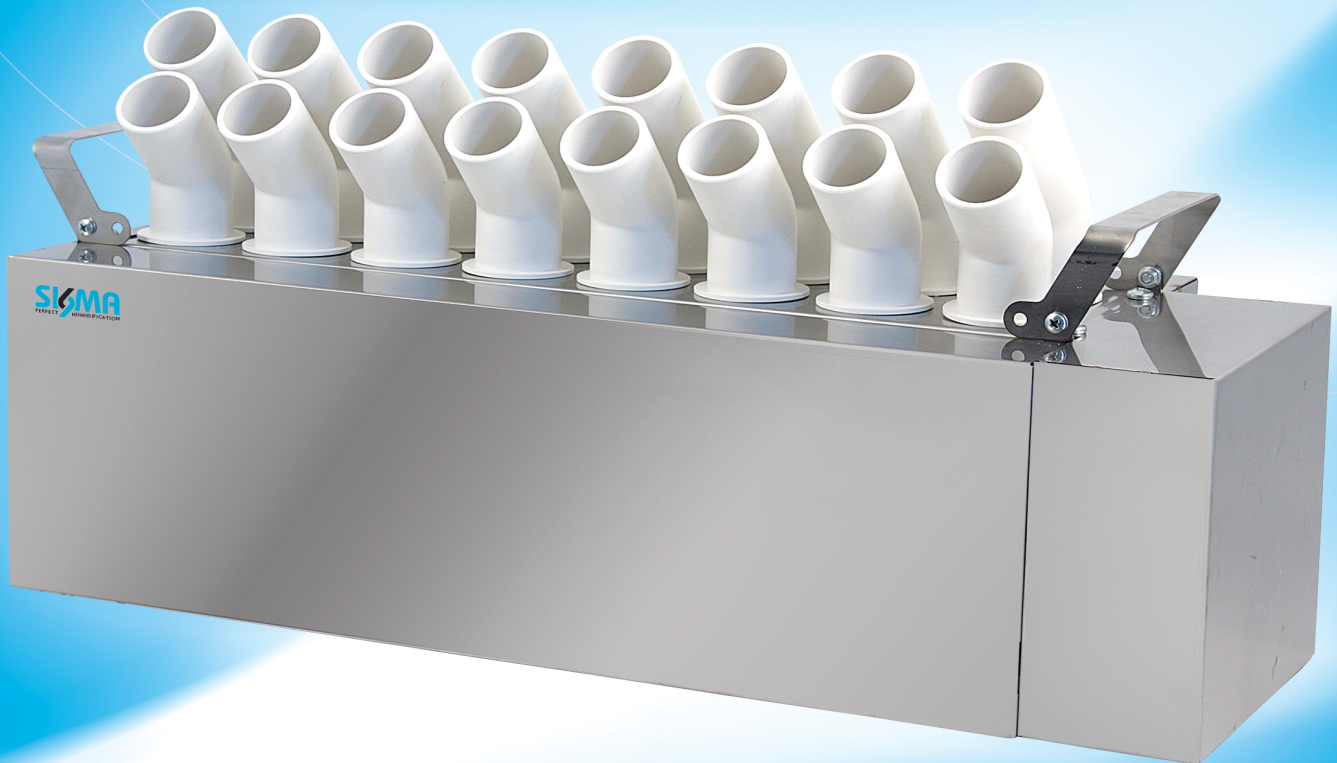




## ***UPV-SERIES***

### **VENTILATION ULTRASONIC HUMIDIFIER SUBMITTAL MANUAL**



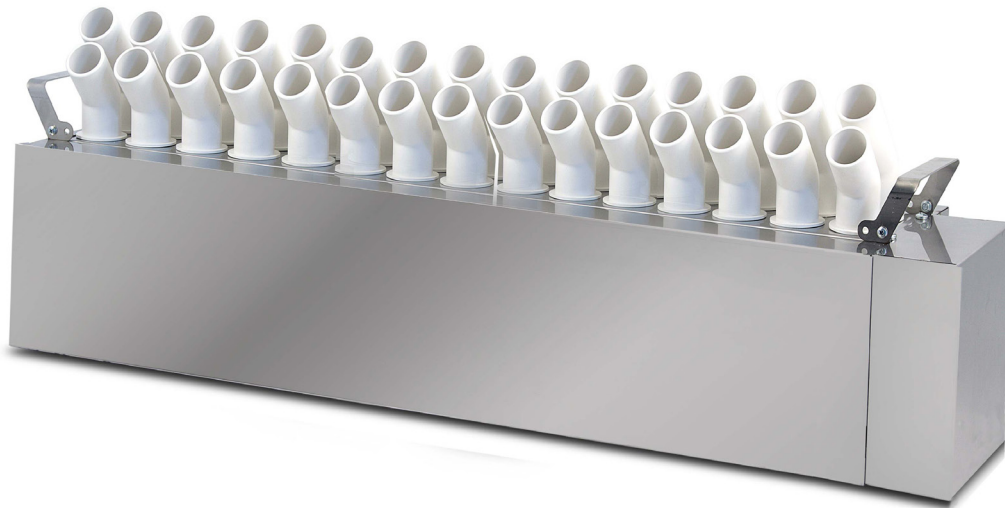
# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

Si6ma ventilation series Ultrasonic humidification for duct/air handler mounted humidification. High frequency vibrations of 10-30 transducers (1.7 MHz) producing extremely fine droplets delivering cool mist out of the cabinet into the duct with approximately 1M size droplets. Si6ma Ultrasonic humidifiers use 93% less power than electrode or infrared humidifiers.

Ultrasonic (adiabatic) type humidification systems use mechanical energy to generate extremely small water droplets that evaporate into the air using forced air from the air handler.

Energy extracted from the air stream is approximately 1,000 BTU/lb of moisture



# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

Ultrasound technology uses a voltage input signal that is transformed via an oscillating circuit into a high frequency signal (1.7 MHz). This signal supplies a transducer, the top of which is in contact with the water, which starts vibrating at high frequency. The surface of the transducer vibrates at very high speed (1.7 million times a second), a speed that does not allow the water to move, due to its inertial mass. Consequently, a column of water is created above the transducer. During the negative amplitude of the transducer cycle, a void is created that is not filled by the water (as this cannot respond to the extremely fast movements of the transducer). The cavity thus created leads to the production of bubbles that are pushed to the edge of the water column during the positive amplitude of the cycle, thus colliding. During this process, very fine particles of water are atomized on the edge of the water column. The resulting intersecting sound waves created directly underneath the surface of the water cause very small droplets of water to separate, forming a fine mist of vapor that is immediately absorbed by the forced air flow of the air handler.

### **Clean/Purified Mist**

Using UltraPure Systems RODI cabinets combined with Si6ma humidifiers takes the guess work relying on a third party to deliver water quality. Ultrasonic Humidification needs to deliver the finest results.

By monitoring PPM (parts per million) water quality. If water quality exceeds 150PPM and/or 10PPM DI and/or visual alarm are activated on each water cabinet notifying the customer of immediate need for filter maintenance.

Although Si6ma humidifiers are not designed to drain water as part of their normal cycle. Periodically washing occurs every 48 hours (user adjustable) from last use assuring that no standing water will be held inside the ultrasonic unit during extended off cycles.

If power is shut off to humidifier drain valve opens thereby draining all water within each humidifier.

# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

### **Simple ordering with all options included.**

Si6ma ventilation humidifiers are standard off the shelf humidifiers. Each Si6ma humidifier operates using (1) Master Panel for use with up to (3) Aux. Controller for a total of (4) humidifiers. This architecture allows for future humidifiers to be added easily without adding additional Master Panels. Maximum (3) Aux.Panels per (1) Master Panel

Each Master Controller & Aux Controller'(s) require 115v (table on page 7) to operate associated humidifier.

Master Panels and Aux. Panels are not outdoor rated.

All Si6ma humidifiers are shipped set up with proportional control in the Master Panel setup sequence. Using the front display on the Master Panel user can change the control method without any additional hardware. (see page 15-16 for control options)

# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

### Description of Components

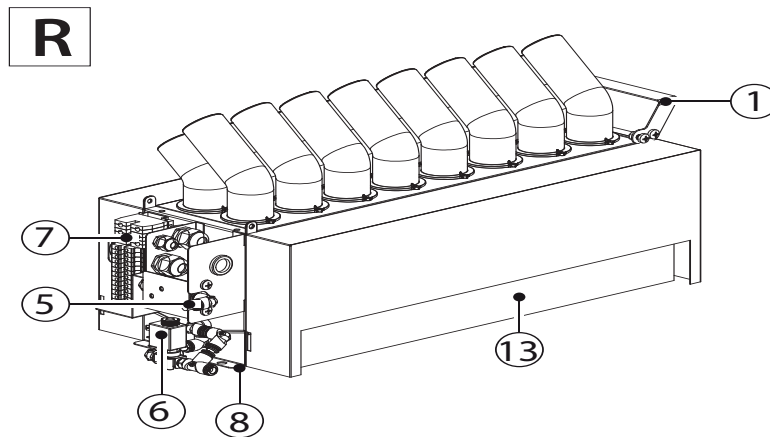
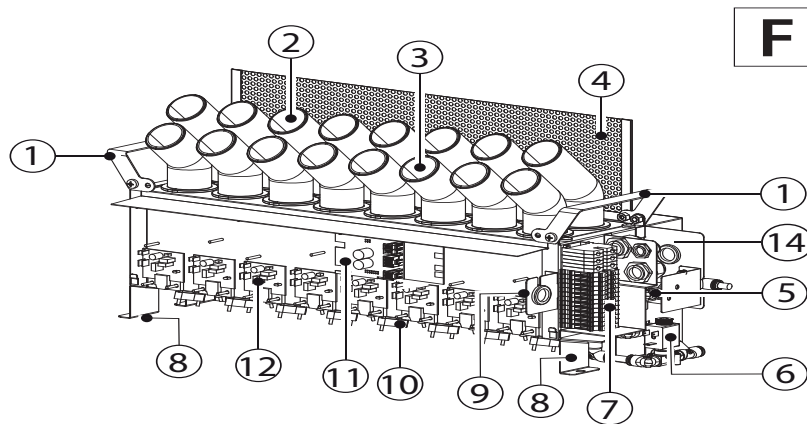


Fig. 1.a

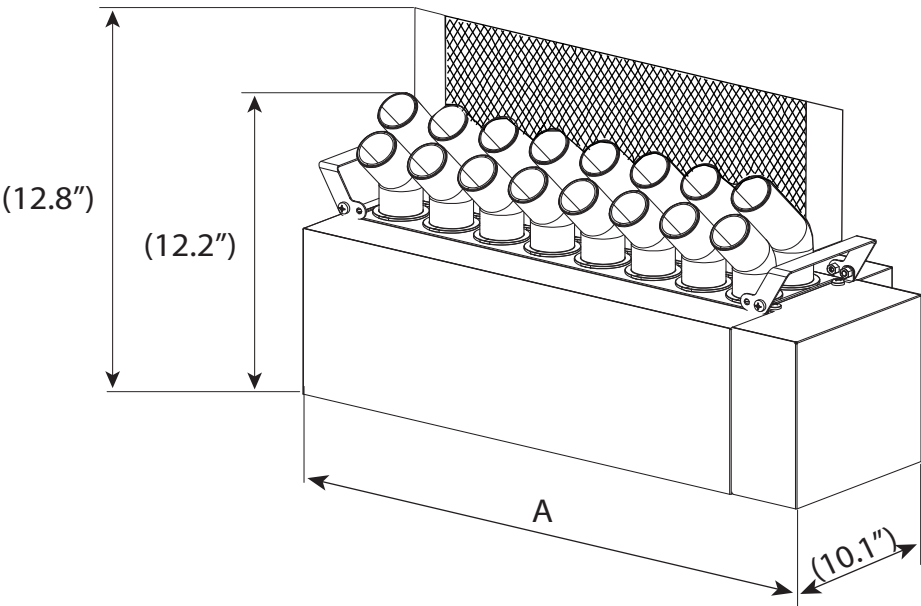
#### Key

|   |                 |    |                           |
|---|-----------------|----|---------------------------|
| F | Front           | 7  | Terminal block            |
| R | Rear            | 8  | Fastening bracket         |
| 1 | Lifting handles | 9  | Bracket with cable glands |
| 2 | Rear diffuser   | 10 | Piezoelectric transducer  |
| 3 | Front diffuser  | 11 | Electronic control board  |
| 4 | Baffle          | 12 | Driver                    |
| 5 | Fill valve      | 13 | Air intake                |
| 6 | Drain valve     | 14 | Quick Connect Fittings    |

# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

### Dimensions



1.1

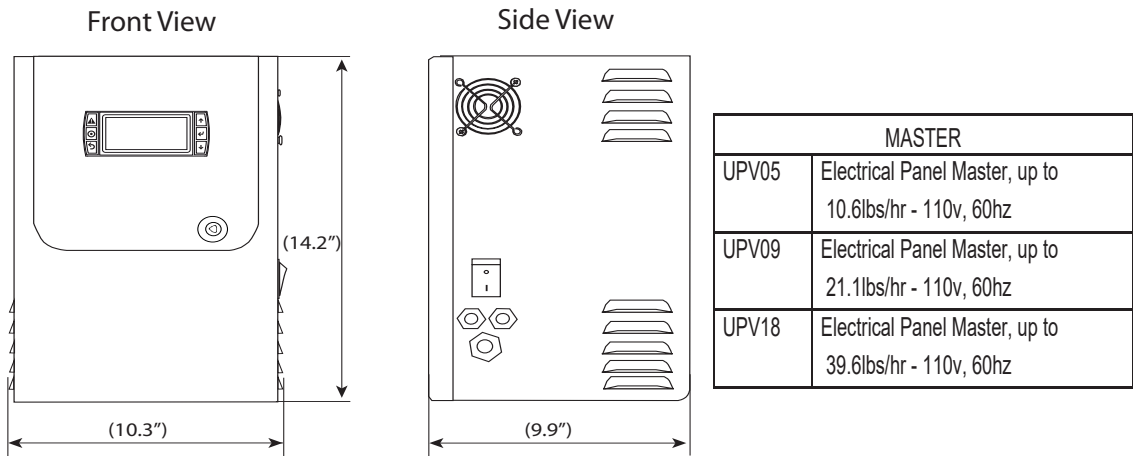
| MODEL                                     | UPV05 | UPV09 | UPV18 |
|-------------------------------------------|-------|-------|-------|
| Production lbs/hr                         | 10.6  | 21.1  | 39.6  |
| Height with Baffle (in)                   | 12.8  |       |       |
| Height (in)                               | 12.2  |       |       |
| Depth (in)                                | 10.1  |       |       |
| Width A (in)                              | 15.2  | 25    | 42.3  |
| Weight (lb)                               |       |       |       |
| Packaged                                  | 16.3  | 24.2  | 39.2  |
| Empty                                     | 14.1  | 20.9  | 39.2  |
| Installed *                               | 18.5  | 28.9  | 50.7  |
| * in normal operating , filled conditions |       |       |       |

# VENTILATION ULTRASONIC HUMIDIFIER

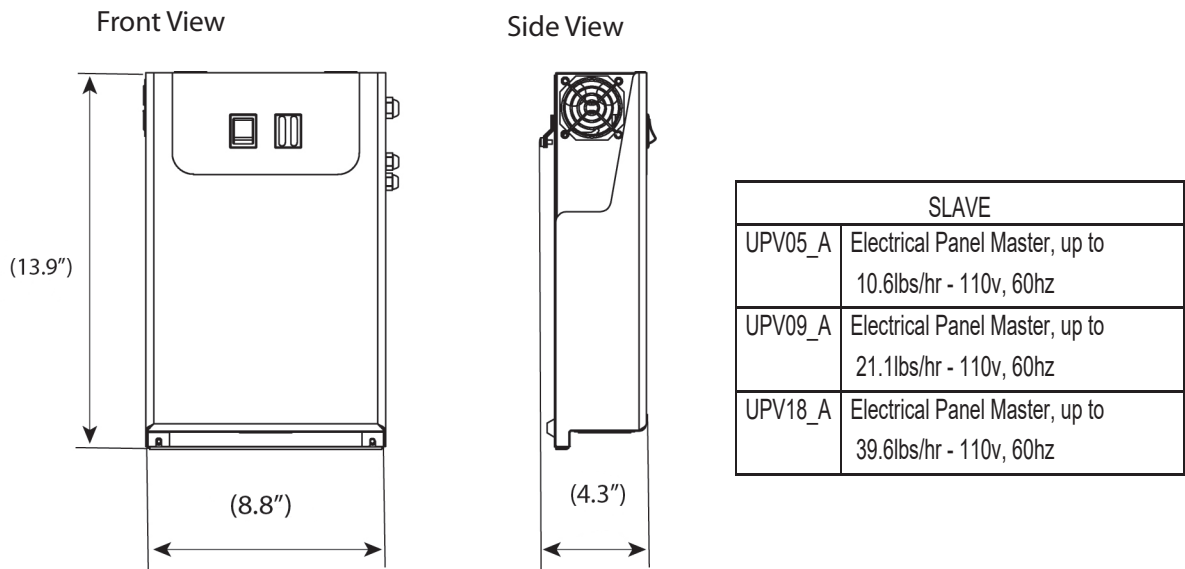
## SUBMITTAL DATA:

### Dimensions

#### Master Controller Cabinet



#### Aux. Controller Cabinet



# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

### Supply Water Requirements

To ensure proper operation, Sigma humidifiers require DI (deionized) water.

UltraPure offers a complete line of RODI systems designed for Ultrasonic applications.

### Drain Water Requirements

Sigma humidifiers are factory set to drain water every 12hrs. User adjustable on master display if required upon startup

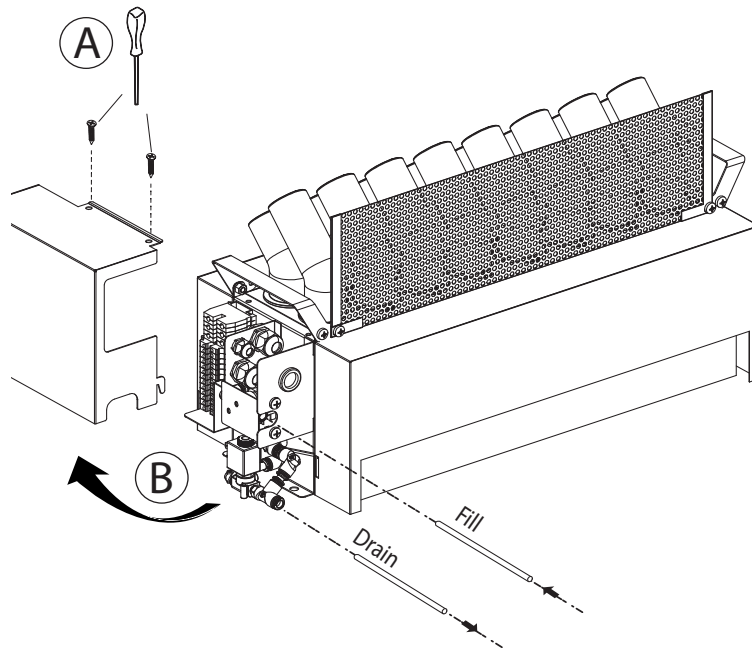
Take into consideration sizing an RODI may be effected by drain rates.



# VENTILATION ULTRASONIC HUMIDIFIER

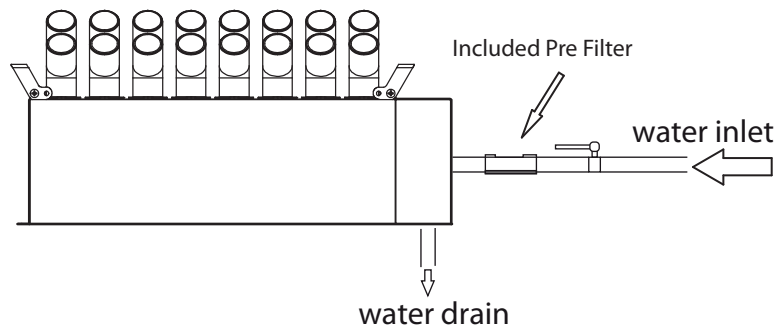
## SUBMITTAL DATA:

### Water Connections



Inlet Water connection 3/8" push connection

Drain Water connection 1/2" push connection



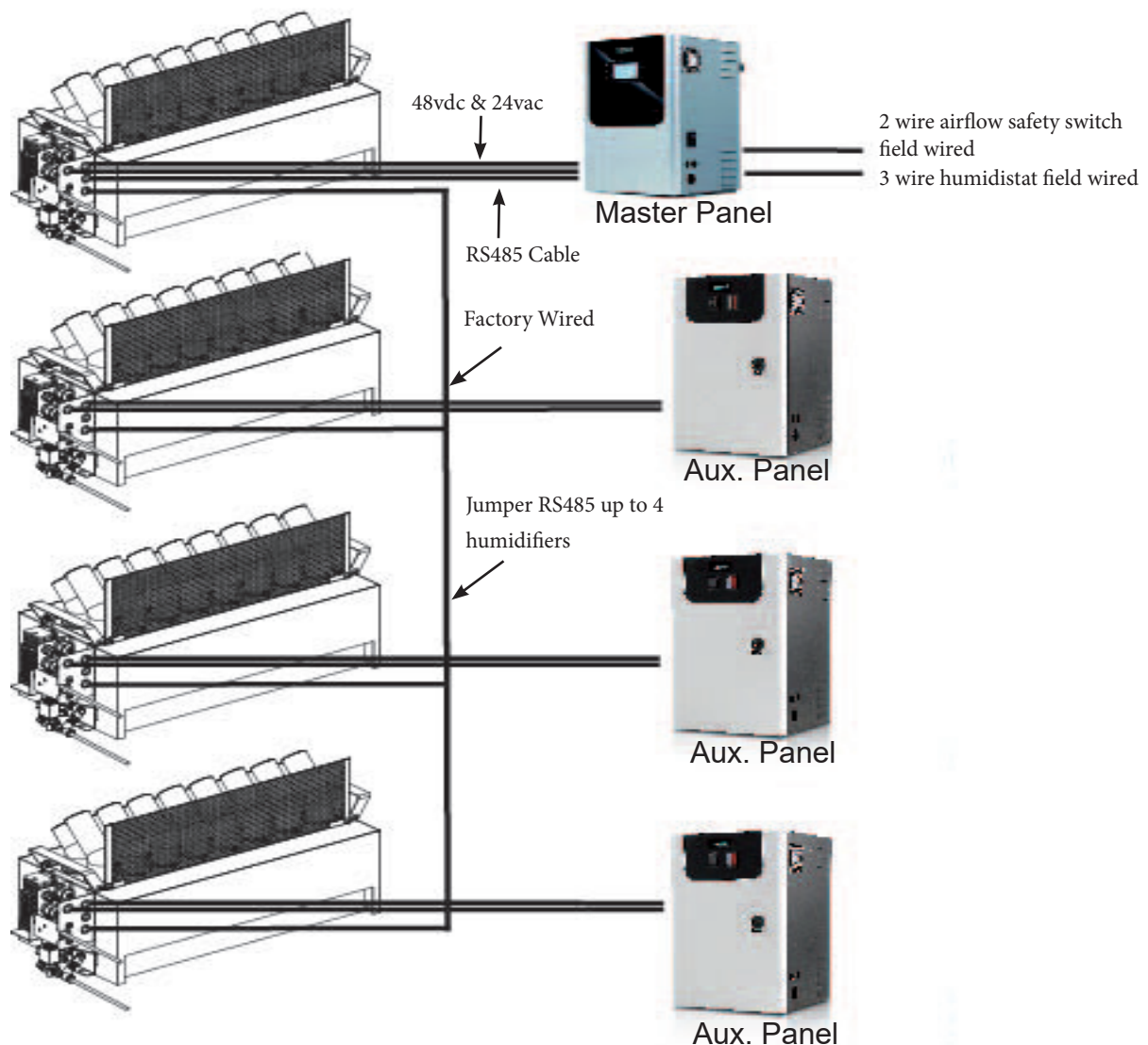
# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

### Electrical Connections

Si6ma humidifiers are shipped with (4) 10' quick connect fittings that plug into humidifier(s). Run cables into Master Panel when one humidifier is used.

If more than 1 humidifier is used, run cables into subsequent aux. cabinet. panels. RS485 cable is daisy chained between humidifiers (see below image)



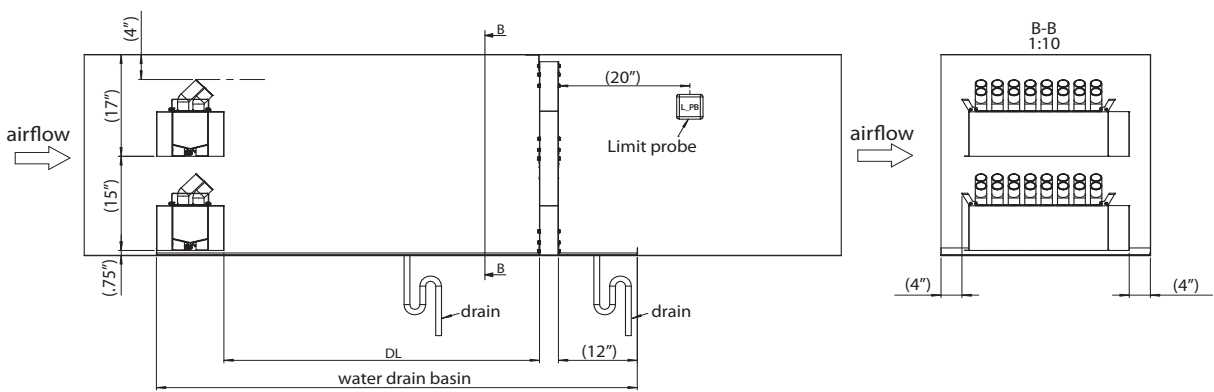
# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

### Humidifier Placement

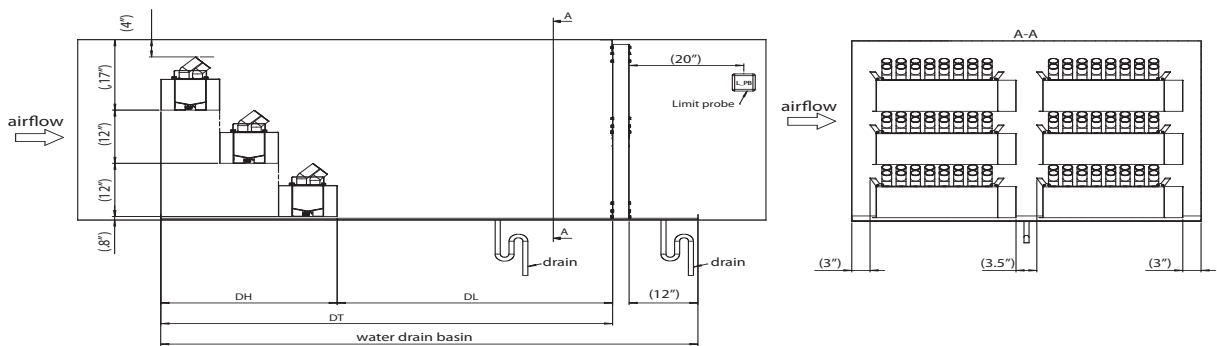
#### Vertical Layout:

When stainless steel rack (optional) is not used, placement of humidifiers is critical for optimal mist absorption. Diagram below shows distance required between humidifiers.



#### Cascade Layout:

Units are positioned on different levels and along different vertical sections. Image below shows minimum distance for humidifier placement within the same duct.



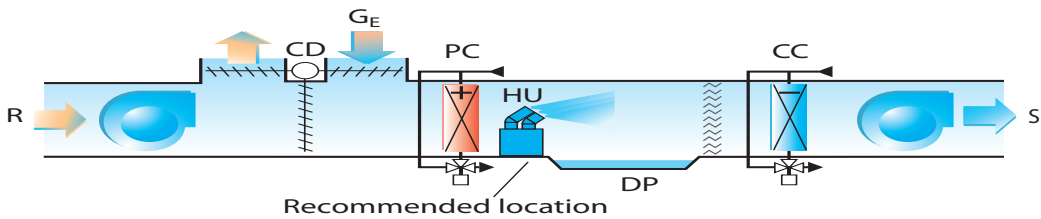
| KEY |                                  |
|-----|----------------------------------|
| DH  | Sigma Humidifier Total Dimension |
| DL  | 6-8" Absorption Distance         |
| DT  | Total Length                     |

# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

### Air Handler Location

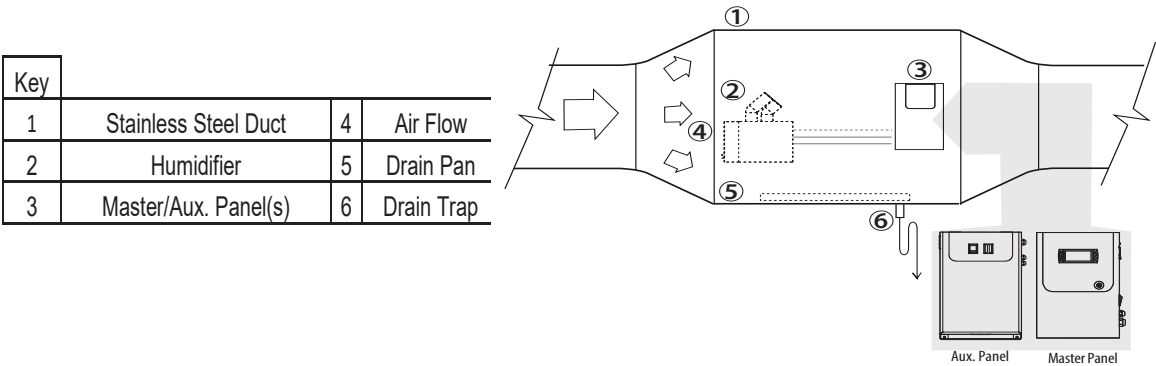
Si6ma humidifiers work best downstream of heating coil. This allows for conditioned air to move across humidifier and limits potential stripping of moisture due to air being too cold for proper absorption.



| KEY |                     |
|-----|---------------------|
| CD  | Dampers             |
| GE  | Outside Air Dampers |
| HU  | Humidifier          |
| DP  | Drain Pan           |
| CC  | Cooling Coil        |
| R   | Return Air          |
| S   | Supply Air          |

### Duct Location

Proper sizing of duct work is critical for proper mist absorption. Terminal velocity must be within:  
 Minimum velocity 295 fpm  
 Maximum velocity 590 fpm



# WALL MOUNTED ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

### ASSEMBLED RACKING OPTION

Si6ma humidifiers can be ordered with 1, 2, 3 or 4 tier aluminum single point connection racks. Humidifiers are delivered assembled attached to rack(s). See below dimensional data for rack dimensions



| MODEL #       | HEIGHT | LENGTH |
|---------------|--------|--------|
| <b>UPV 05</b> |        |        |
| 1 TIER        | 16"    | 21"    |
| 2 TIER        | 31"    | 21"    |
| 3 TIER        | 46"    | 21"    |
| 4 TIER        | 61"    | 21"    |
| <b>UPV 09</b> |        |        |
| 1 TIER        | 16"    | 31"    |
| 2 TIER        | 31"    | 31"    |
| 3 TIER        | 46"    | 31"    |
| 4 TIER        | 61"    | 31"    |
| <b>UPV 18</b> |        |        |
| 1 TIER        | 16"    | 48"    |
| 2 TIER        | 31"    | 48"    |
| 3 TIER        | 46"    | 48"    |
| 4 TIER        | 61"    | 48"    |



# VENTILATION ULTRA SONIC HUMIDIFIER

## SUBMITTAL DATA:

### Plumbing

Each humidifier has John Guest - push connection fittings on back of cabinet.

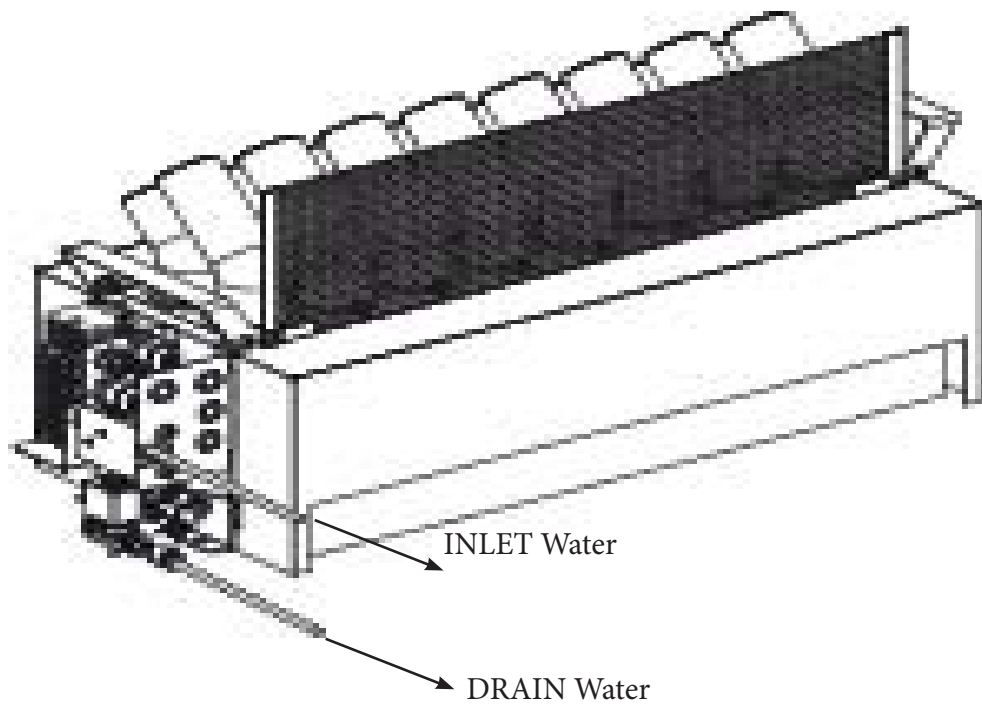
3/8" RED = DI Inlet Water

1/2" BLACK = Drain Water

Route inlet supply water into back of the humidifier and secure using included red safety clips

Use the 1/2" John Guest-type fitting on back of humidifier to drain trap (field supplied) below humidifier and route to approved drain. Vent required for proper draining.

Stainless Steel is not required for drain fittings or piping.

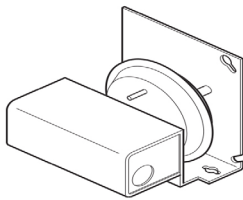


# VENTILATION ULTRASONIC HUMIDIFIER

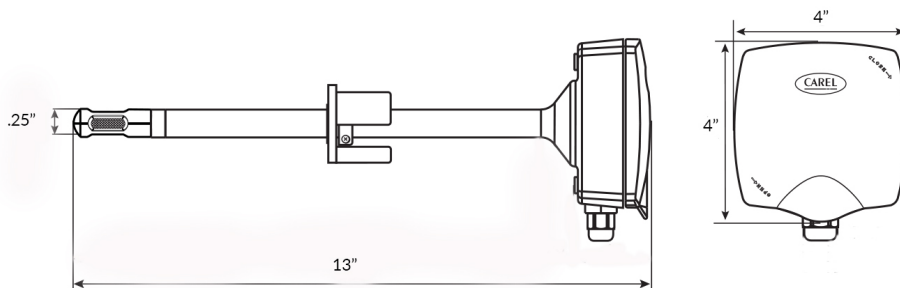
## SUBMITTAL DATA:

### Factory Supplied Sensors/Safety

*Safety Pressure Switch:* Included in each Si6ma **Master Panel** cabinet is (1) two position air flow pressure safety switch that can be placed upstream/downstream of humidifier. This mechanical switch will open contacts to humidifier(s) when CFM-pressure is not sufficient for mist absorption.



*High Limit RH Safety Switch:* Included in each Si6ma **Master Panel** is (1) RH (Relative Humidity) sensor. This 3 wire sensor can be placed **down stream** approx. 8-10' of humidifier. Once installed the Master Panel can be programmed to a user adjustable setpoint. When high limit setpoint has been exceeded humidifier mist will be reduced and alarm Master Panel.



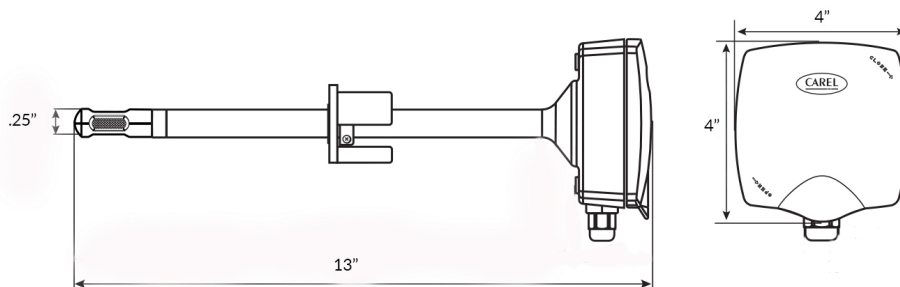
# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

### Optional Control Sensors

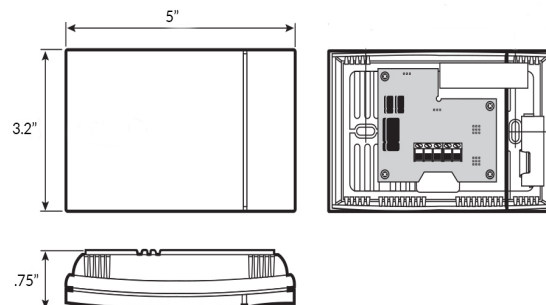
#### OPTION 1

*Relative Humidity RH%* can be controlled via duct work or air handler sensor. This sensor can be mounted on side of ductwork. Probe is penetrated into ductwork or mounted inside of air handler. 3 wire 18g cable is routed back to Master Panel and terminated. Temperature is read only.



#### Option 2

*Relative Humidity RH%* can be controlled via room mounted sensor. This sensor can be mounted on wall in controlled space. 3 wire 18g cable is routed back into Master Panel and terminated. Temperature is read only.



# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

### *OPTION 3*

#### *External Proportional Control*

Si6ma humidifiers can be controlled via an external signal using 0-10vdc, 0-1vdc or 0-5 vdc 2 wire 18g cable is routed back into Master Panel and terminated.

Master Panel parameter Fa01 to regulator & Fa04 to type of signal for external proportional control

### *OPTION 4*

#### *ON-OFF Control*

Si6ma humidifiers can be ordered with on-off control only. This control method allows humidifier to turn on or off via humidistat NTC type or remote contacts



# VENTILATION ULTRASONIC HUMIDIFIER

## SUBMITTAL DATA:

### BMS Communications

(1) BMS card is pre installed in each Sigma humidifier Master Panel. This card includes read/write registries that can be found in the IOM manual.

Master Panel is native MODBUS only. If BACnet MS/TP or IP communications is preferred. UltraPure Gateway can be used. (see below image)

