EnergyWall

INSTALLATION, OPERATION & MAINTENANCE MANUAL

ENERGY RECOVERY VENTILATORS

TABLE OF CONTENTS

SAFETY INFORMATION

WARNING!

ELECTRIC SHOCK HAZARD

Disconnect all electric power sources prior to working on equipment. Wear protective equipment per NFPA 70 before servicing the electrical cabinet. Failure to comply may result in serious injury or death. Before commissioning or servicing the system, read through this entire document carefully and ensure all precautions are taken. Verify system nameplate electrical requirements match utility power. Refer to electrical schematic prior to wiring. Adhere to all local codes when servicing the system.

CAUTION!

RISK OF INJURY

Each system contains high-speed moving components that risk serious injury. Prior to opening any access panel, disconnect all power supplies and verify there is no voltage to the system. Ensure all moving fan parts and damper have come to a stop. Do not operate the system with any access panels removed.

CAUTION!

HOT SURFACE TEMPERATURES

Certain electrical components such as the supply and exhaust fan motors can reach temperatures that are extremely hot during and soon after operation. Ensure adequate time for these components to cool before servicing the system. It is recommended to use proper PPE when servicing any component within the system.

NOTE

Any damage caused by negligence or improper installation procedures and practices will void the system's warranty. Ensure compliance to all installation instructions and procedures outlined by the manufacturer.

WARRANTY

Parts and System Housing

- 2 years from date of shipment
- Repair or replace defective parts at no charge
- Replaced parts are warrantied for the remainder of applicable period
- Labor not included or other costs incurred for servicing, repairing, removing, installing, shipping, or handling of either defective or replacement

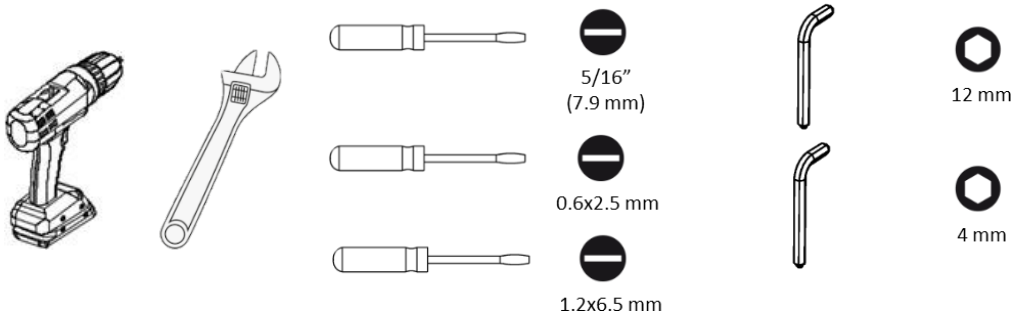
Internal Core

• 5 Years from date of shipment

• Defects due to improper workmanship and/or materials

INSTALLATION

MECHANICAL - REQUIRED TOOLS



MECHANICAL – SYSTEM INSPECTION/SITE PREP

Upon system arrival:

1. Inspect system for any damage caused by shipping or inappropriate storage.
2. If present, immediately record and report any damage to shipping carrier
3. Verify all necessary components are present and intact
4. Verify system is configured as ordered
5. Clear system of any debris

Prior to placing the system:

1. Ensure installation site is structurally sound and clear of any obstructions
2. Verify adequate service clearances
3. Position system in a way that reduces complex duct transitions
4. If mounting outdoors, verify system inlet is positioned in accordance with local building codes

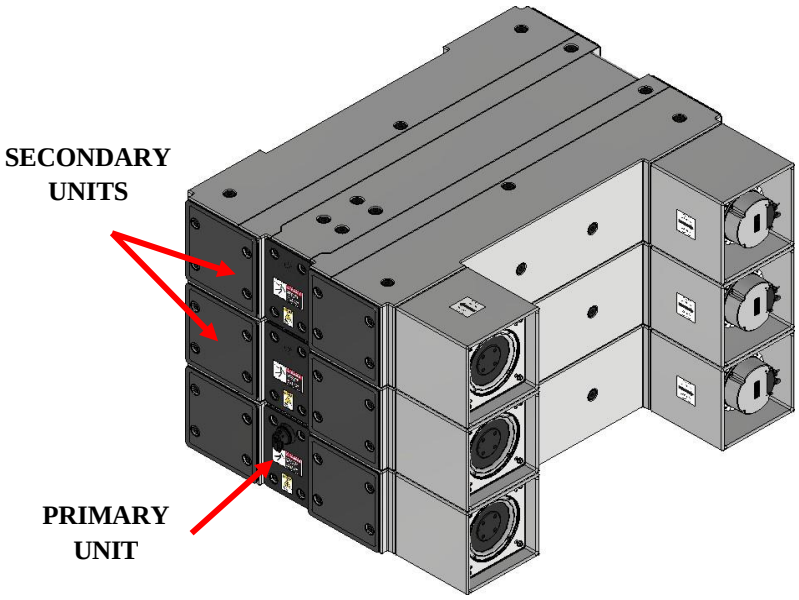
THIS DOCUMENT CONTAINS PROCEDURES FOR GENERATION 4 CONTROLS. PLEASE VISIT www.energywall.com/installation-manuals/ FOR PREVIOUS GENERATION MANUALS.

INSTALLATION

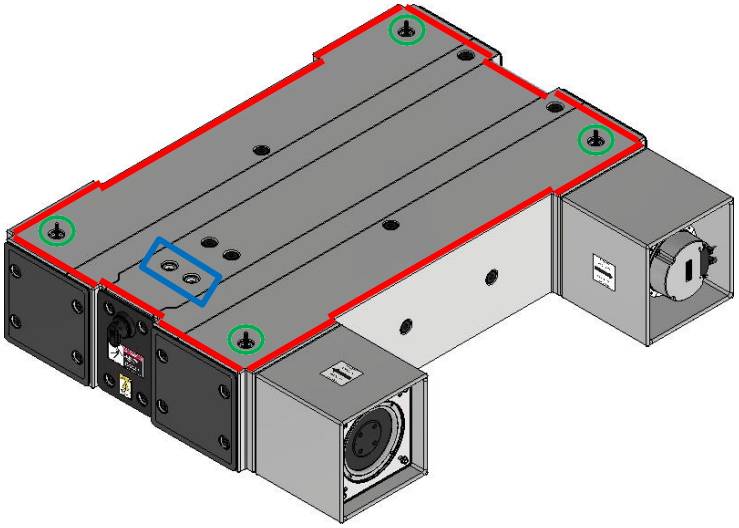
MULTI-UNIT ASSEMBLY

For systems larger than 600, units can be stacked to provide additional airflow and capacity. In these scenarios, a secondary unit kit is provided with mounting hardware, wiring and gasketing.

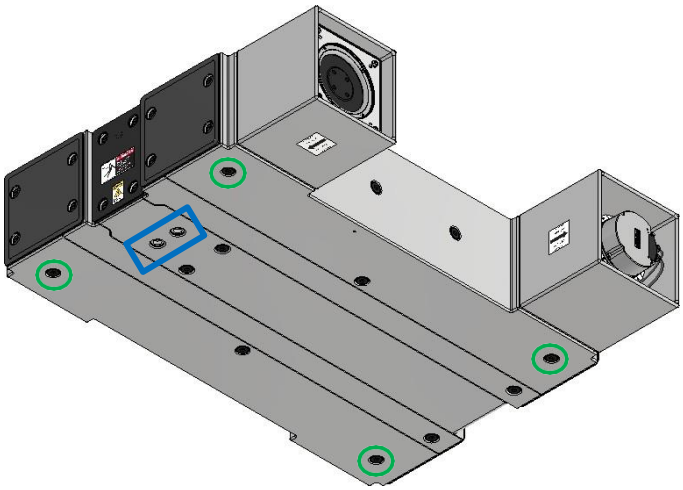
Identify the primary unit with a disconnect handle as shown below. All secondary units will not have a disconnect handle.



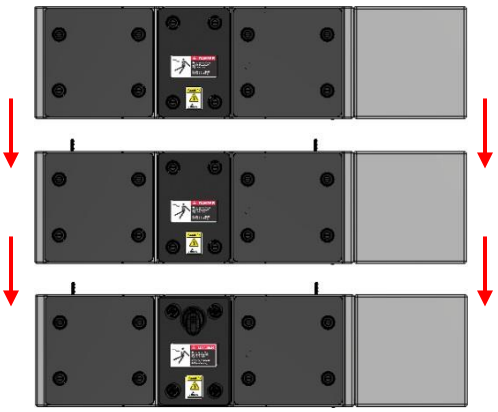
Once the primary unit is positioned, ensure the electrical cabinet wire plugs are removed using a 12mm Allen key (blue), perimeter gasketing is installed at the locations as shown (red), and (4) connecting bolts are installed in each quadrant (green). Repeat on all units except the final unit in the system.



Prior to stacking the secondary unit with the primary, ensure the secondary unit electrical cabinet wire plugs are removed (blue) and receiving plugs w/ a 7/16" dia. hole are installed in each quadrant (green).

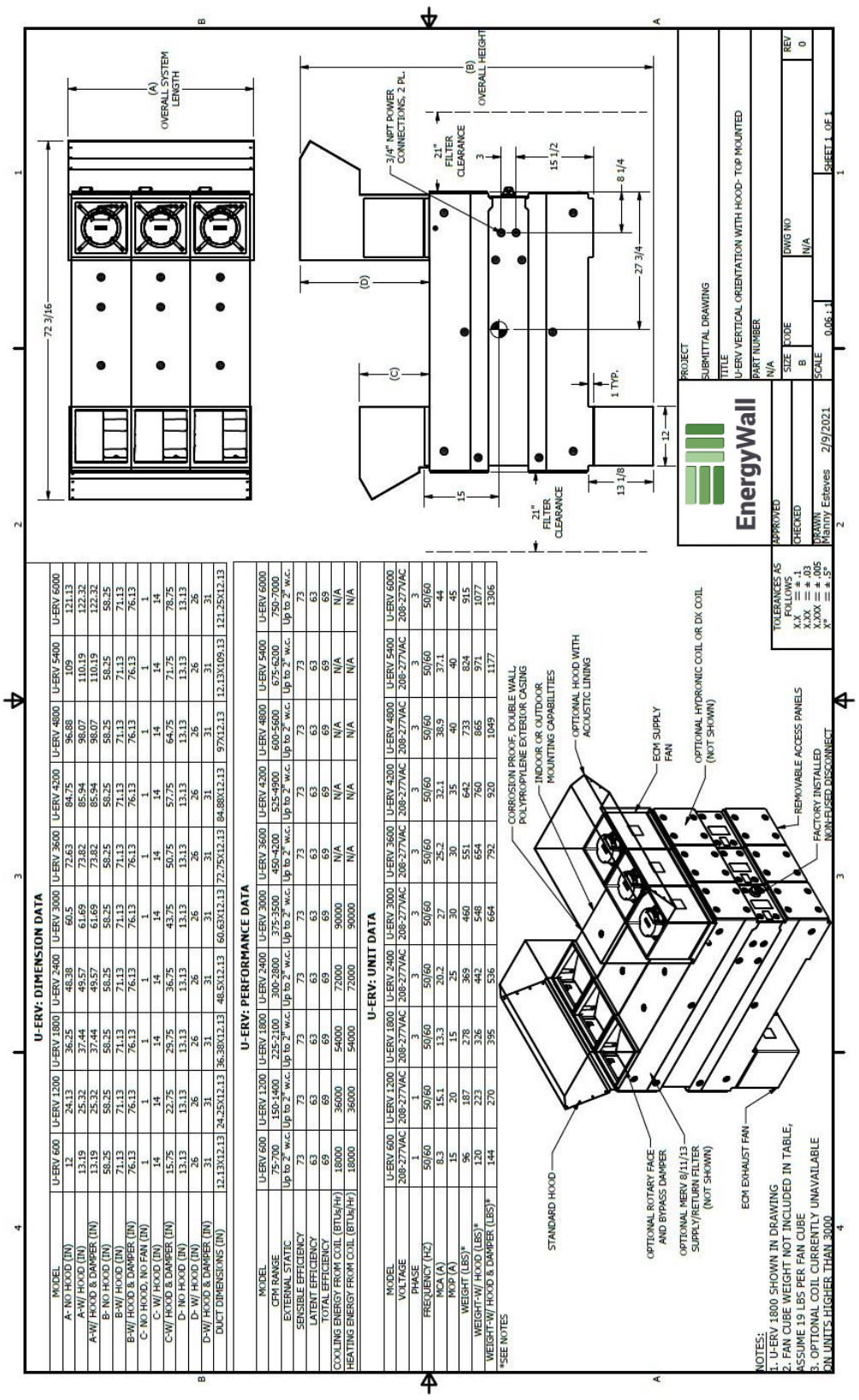


Stack the secondary unit to the primary unit as shown. Tighten the connecting bolts with the hardware provided and wire each unit per the electrical schematics. Repeat as necessary to form the desired system. The final unit will not have connecting bolts.



INSTALLATION

GENERAL UNIT SPECIFICATIONS



U-ERV: DIMENSION DATA

MODEL	U-ERV 600	U-ERV 1200	U-ERV 1800	U-ERV 2400	U-ERV 3000	U-ERV 3600	U-ERV 4200	U-ERV 4800	U-ERV 5400	U-ERV 6000
A- NO HOOD (IN)	12	24.13	36.25	48.38	60.5	72.63	84.75	96.88	109	121.13
A-W/ HOOD (IN)	13.19	25.32	37.44	49.57	61.69	73.82	85.94	98.07	110.19	122.32
A-W/ HOOD & DAMPER (IN)	13.19	25.32	37.44	49.57	61.69	73.82	85.94	98.07	110.19	122.32
B- NO HOOD (IN)	58.25	58.25	58.25	58.25	58.25	58.25	58.25	58.25	58.25	58.25
B-W/ HOOD (IN)	71.13	71.13	71.13	71.13	71.13	71.13	71.13	71.13	71.13	71.13
B-W/ HOOD & DAMPER (IN)	76.13	76.13	76.13	76.13	76.13	76.13	76.13	76.13	76.13	76.13
C- NO HOOD, NO FAN (IN)	1	1	1	1	1	1	1	1	1	1
C- W/ HOOD (IN)	14	14	14	14	14	14	14	14	14	14
C-W/ HOOD & DAMPER (IN)	15.75	22.75	29.75	36.75	43.75	50.75	57.75	64.75	71.75	78.75
D- NO HOOD (IN)	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13	13.13
D- W/ HOOD (IN)	26	26	26	26	26	26	26	26	26	26
D-W/ HOOD & DAMPER (IN)	31	31	31	31	31	31	31	31	31	31
DUCT DIMENSIONS (IN)	12.13X12.13	24.25X12.13	36.38X12.13	48.5X12.13	60.63X12.13	72.75X12.13	84.88X12.13	97X12.13	12.13X109.13	121.25X12.13

U-ERV: PERFORMANCE DATA

MODEL	U-ERV 600	U-ERV 1200	U-ERV 1800	U-ERV 2400	U-ERV 3000	U-ERV 3600	U-ERV 4200	U-ERV 4800	U-ERV 5400	U-ERV 6000
CFM RANGE	75-700	150-1400	225-2100	300-2800	375-3500	450-4200	525-4900	600-5600	675-6200	750-7000
EXTERNAL STATIC	Up to 2" w.c.	Up to 2" w.c.	Up to 2" w.c.	Up to 2" w.c.	Up to 2" w.c.	Up to 2" w.c.	Up to 2" w.c.	Up to 2" w.c.	Up to 2" w.c.	Up to 2" w.c.
SENSIBLE EFFICIENCY	73	73	73	73	73	73	73	73	73	73
LATENT EFFICIENCY	63	63	63	63	63	63	63	63	63	63
TOTAL EFFICIENCY	69	69	69	69	69	69	69	69	69	69
COOLING ENERGY FROM COIL (BTUs/Hr)	18000	36000	54000	72000	90000	N/A	N/A	N/A	N/A	N/A
HEATING ENERGY FROM COIL (BTUs/Hr)	18000	36000	54000	72000	90000	N/A	N/A	N/A	N/A	N/A

U-ERV: UNIT DATA

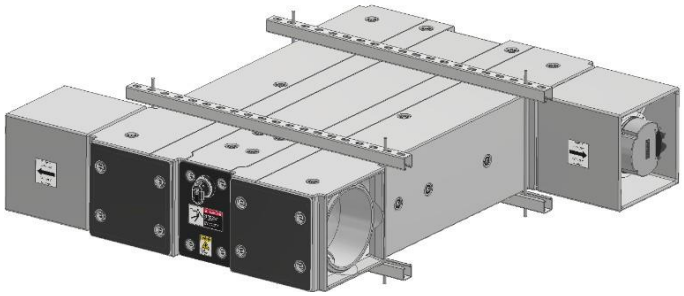
MODEL	U-ERV 600	U-ERV 1200	U-ERV 1800	U-ERV 2400	U-ERV 3000	U-ERV 3600	U-ERV 4200	U-ERV 4800	U-ERV 5400	U-ERV 6000
VOLTAGE	208-277VAC	208-277VAC	208-277VAC	208-277VAC	208-277VAC	208-277VAC	208-277VAC	208-277VAC	208-277VAC	208-277VAC
PHASE	1	1	3	3	3	3	3	3	3	3
FREQUENCY (HZ)	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
MCA (A)	8.3	15.1	13.3	20.2	27	25.2	32.1	38.9	37.1	44
MOP (A)	15	20	15	25	30	30	35	40	40	45
WEIGHT (LBS)*	96	187	278	369	460	551	642	733	824	915
WEIGHT-W/ HOOD (LBS)*	120	223	326	442	548	654	760	865	971	1077
WEIGHT-W/ HOOD & DAMPER (LBS)*	144	270	395	536	664	792	920	1049	1177	1306

*SEE NOTES

INSTALLATION

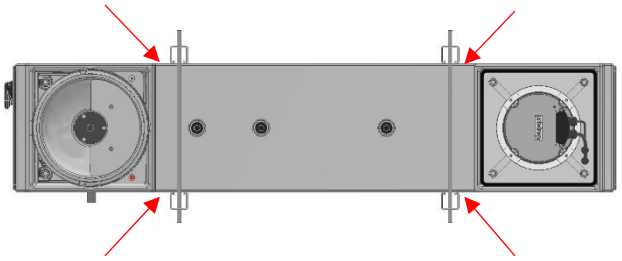
MECHANICAL – HORIZONTAL RAIL MOUNT

Clamp system between 4 pieces of Unistrut as shown below with minimum 3/8” dia. all-thread. Be sure to leave an additional slot on each end to hang the system.



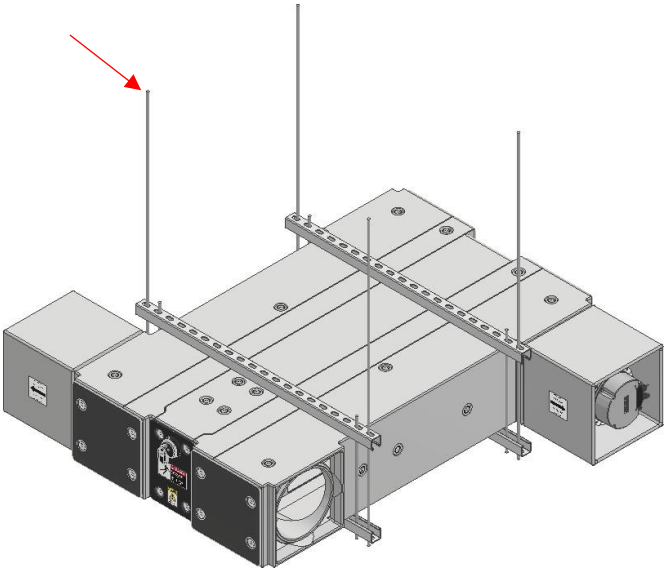
DO NOT EXCEED 20 IN-LBS OF TORQUE WHEN CLAMPING THE SYSTEM

Ensure minimum 1.5” clearance between Unistrut and system flanges to provide adequate duct mounting clearance



Side View

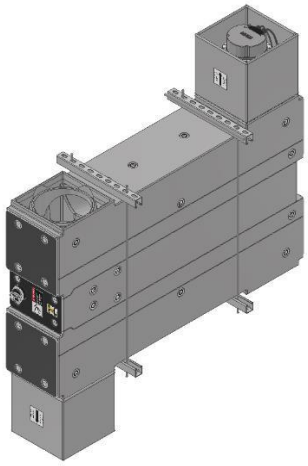
Hang system assembly at desired height using minimum 3/8” dia. all-thread. When mounting the system on a pad, 3/8” dia. all-thread can be substituted with vertical leg assemblies.



INSTALLATION

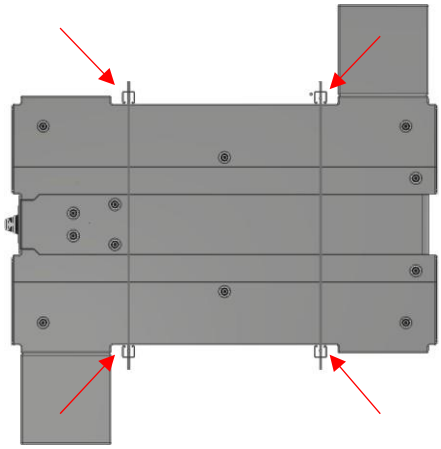
MECHANICAL – VERTICAL RAIL MOUNT

Clamp system between 4 pieces of Unistrut as shown below with minimum 3/8” dia. all-thread. Be sure to leave an additional slot on each end to hang the system.



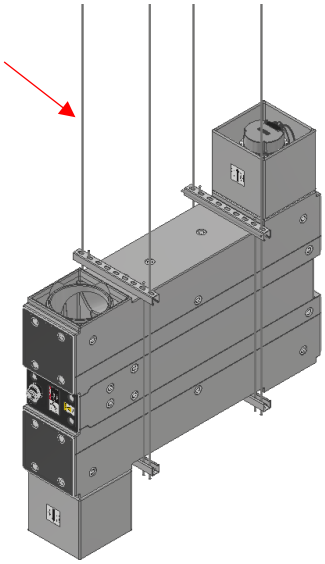
DO NOT EXCEED 20 IN-LBS OF TORQUE WHEN CLAMPING THE SYSTEM

Ensure minimum 1.5” clearance between Unistrut and system flanges to provide adequate duct mounting clearance



Side View

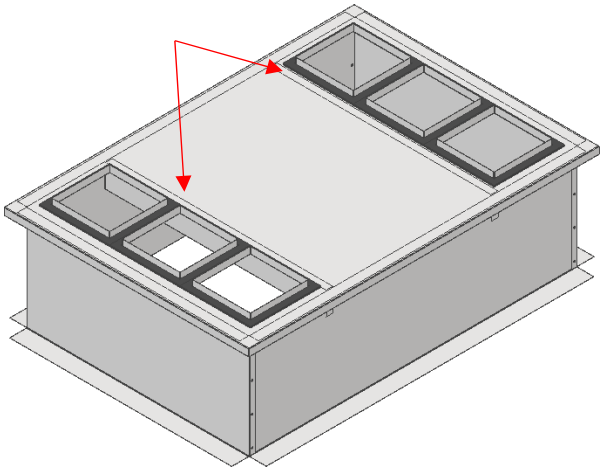
Hang system assembly at desired height using minimum 3/8” dia. all-thread. When mounting the system on a pad, 3/8” dia. all-thread can be substituted with vertical leg assemblies.



INSTALLATION

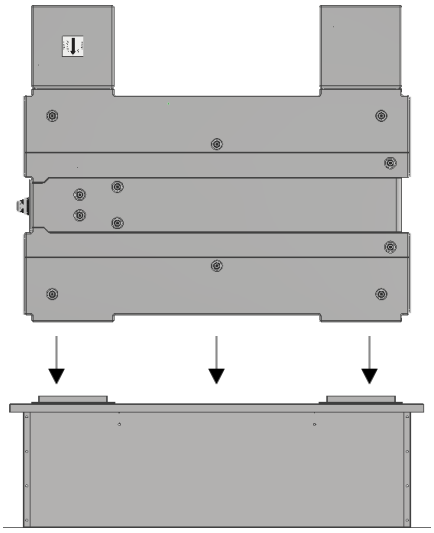
MECHANICAL – CURB MOUNT

Once the curb is positioned and fastened in place, apply the supplied gasket around each flange as shown*

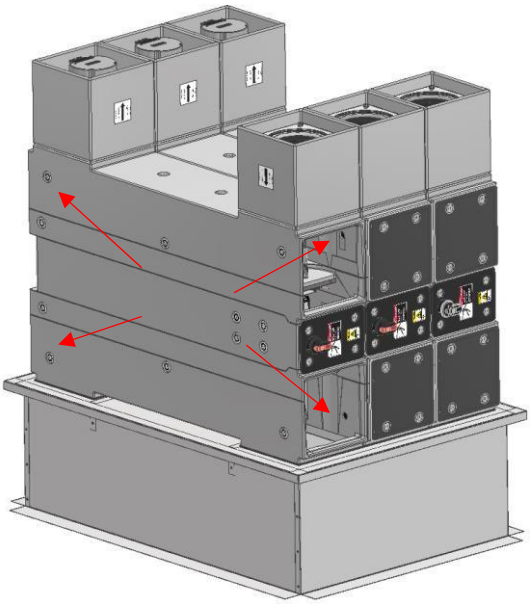


***1800 system shown for reference**

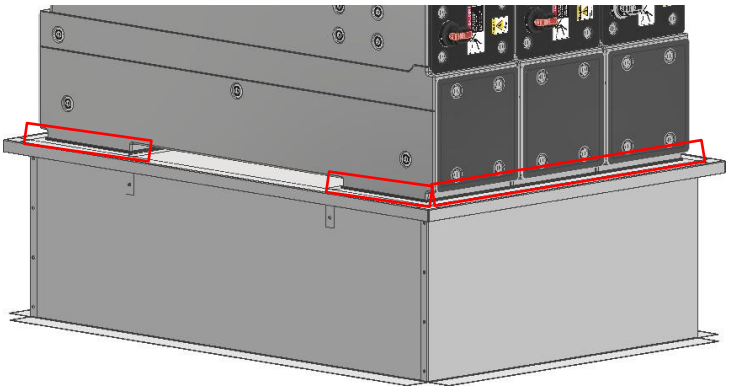
Place the first unit on the curb, over the duct flanges, as shown. **In some instances, the fan cubes will be mounted underneath the unit as opposed to on top. This is acceptable.**



Place the remaining units (if applicable). Fasten the 4 connecting bolts inside each access panel with the hardware provided as shown



Once the system is in place, secure it to the curb duct flanges using #14 x 1.5” long self-drilling screws. A minimum of 4 screws must be used per unit (i.e. an 1800 system requires at least 12 screws)

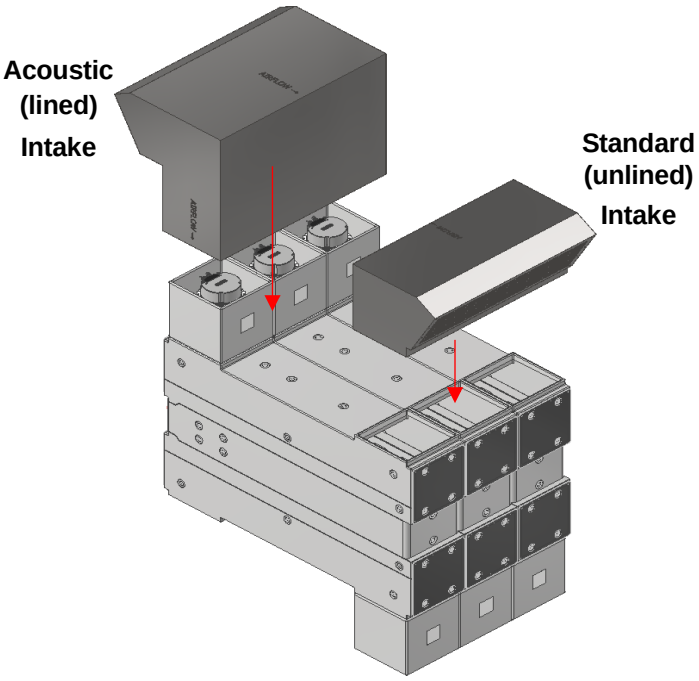


INSTALLATION

MECHANICAL – INTAKES, VERTICAL MOUNT

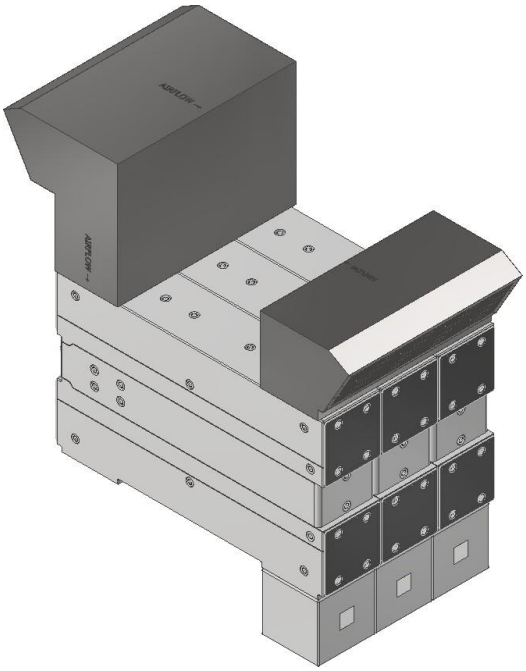
When mounted outdoors, an intake is required to eliminate water infiltration into the intake and exhaust ports of the system. When an intake is required to be installed over a fan cube, it will have an acoustic liner. All other intakes are unlined. Additional intake options with motorized dampers are available upon request.

Slide the intake hood over the fan cube (left) or system flange (right) as shown below*

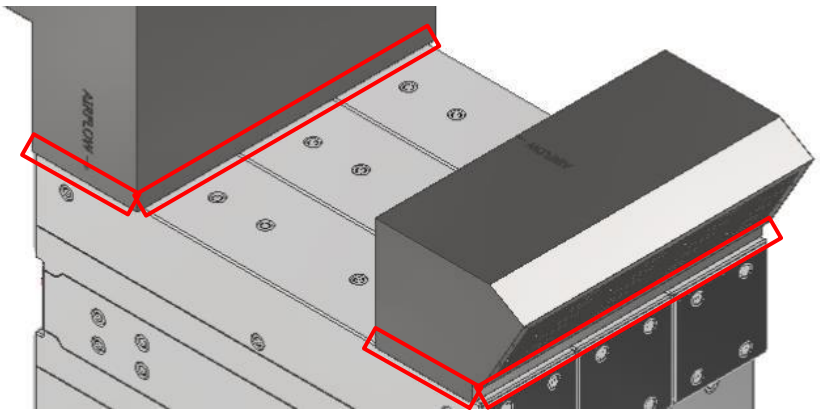


***1800 system shown for reference**

Ensure the intake hood's opening is flush with the horizontal surface of the system as shown



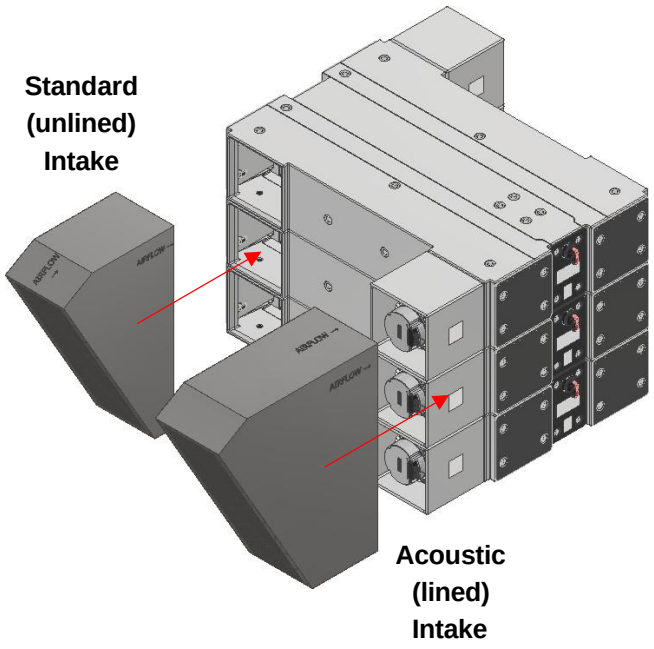
Once the intake is in place, secure it to the system flanges using #14 x 1.25" long self-drilling screws on all 4 sides. A minimum of 2 screws must be used per unit (i.e. an 1800 system requires at least 6 screws per intake)



INSTALLATION

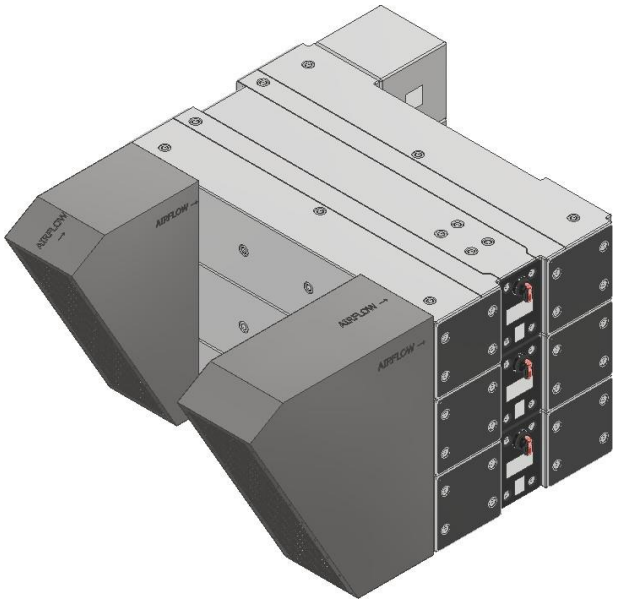
MECHANICAL – INTAKE, HORIZONTAL MOUNT

Slide the intake hood over the fan cube (right) or system flange (left) as shown below*

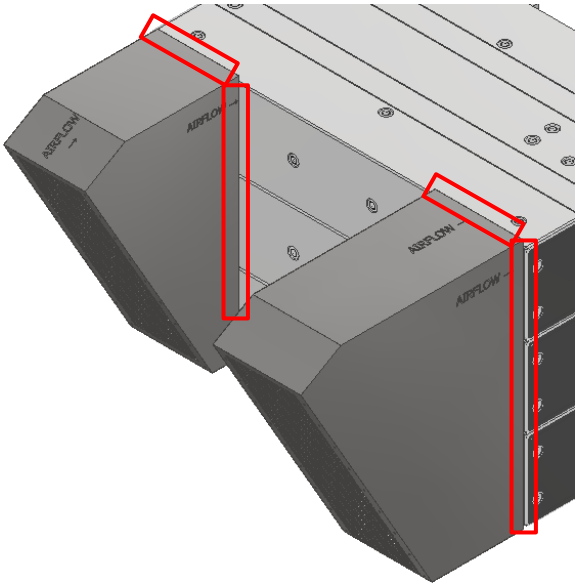


***1800 system shown for reference**

Ensure the intake hood's opening is flush with the vertical surface of the system as shown



Once the intake is in place, secure it to the system flanges using #14 x 1.25" long self-drilling screws on all 4 sides. A minimum of 2 screws must be used per unit (i.e. an 1800 system requires at least 6 screws per intake)



INSTALLATION

MECHANICAL – DUCTWORK

When designing and installing ductwork to each system, SMACNA guidelines and requirements must be adhered to. Additionally:

- A single duct run can and should be used for each system.
- **It is highly recommended to use insulated duct with a minimum of ¾" thick internal insulation.**
- Flexible duct connections should never be used and avoided at all costs.
- All transitions within the ductwork shall be gradual and all elbows shall incorporate a radius on internal and external corners.
- Turning vanes should be utilized whenever possible.
- **NEVER USE THE SYSTEM TO SUPPORT DUCTWORK. All ductwork must have its own support.**
- Verify ductwork properly slides over the system flanges (fan cube when applicable). See next page for recommended duct connection details.
- Minimum straight duct lengths prior to any elbow per the below table must be adhered to. Additional length is recommended to mitigate sound within the space.
- When installing duct from curb hangers, ensure proper alignment of duct with system inlet/discharge. **Gasket must be used to seal the duct flanges with the underside of the curb cap.** Failure to gasket the ductwork flanges will result in airflow leakage and increases the potential for condensation formation.
- Secure ductwork to system using #12 or #14 x 1.25" long self-drilling screws. **DO NOT USE LONGER THAN 1.25" SCREWS.**

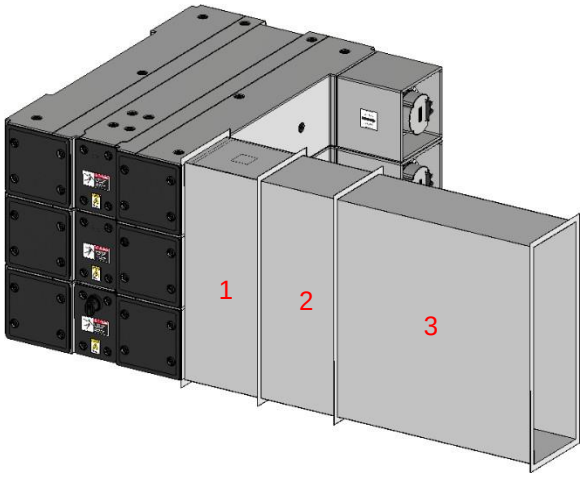
System Size	Recommended Ductwork Size (IN)	Minimum Straight Duct Length (IN)
600	12.13 x 12.13	35
1200	12.13 x 24.25	48
1800	12.13 x 36.38	60
2400	12.13 x 48.5	68
3000	12.13 x 60.63	78
3600	12 13 x 72.75	85
4200	12.13 x 84.88	90
4800	12.13 x 97	98
5400	12.13 x 109.13	103
6000	12.13 x 121.25	108

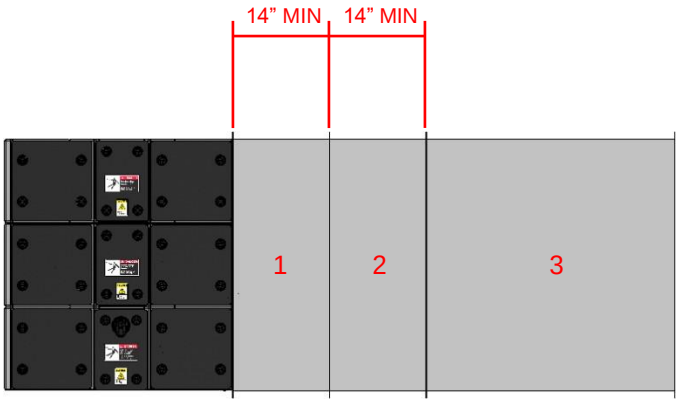
INSTALLATION

MECHANICAL – DUCTWORK

It is highly recommended to A) section the duct that connects to the system with (2) 14" minimum duct sections, or B) provide access panels within the sides of the duct to allow the system to be easily serviced. An example of each duct connection recommendation for an 1800 system is shown below.

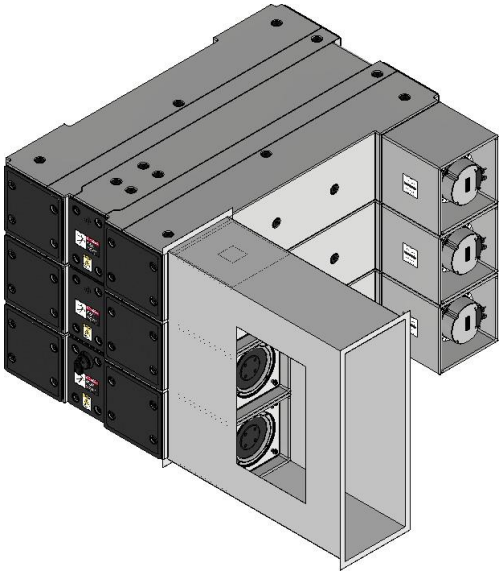
A*

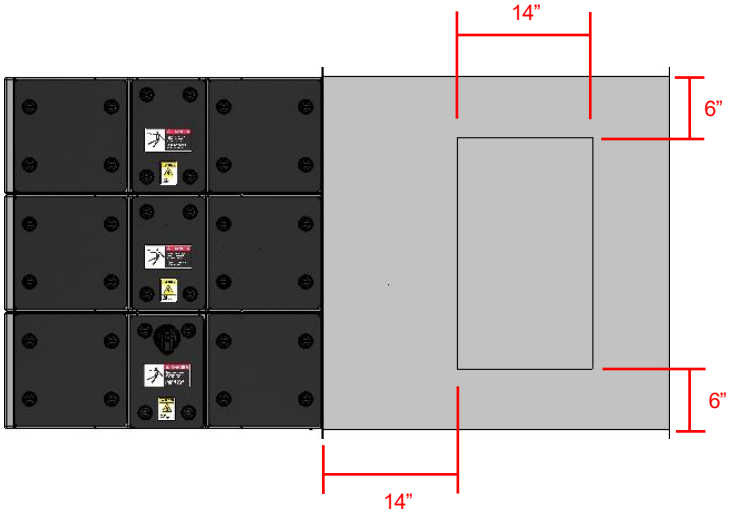




*TO SERVICE A FAN WITHIN DUCT, REMOVE DUCT "2", FOLLOWED BY DUCT "1". ENSURE DUCT "3" IS INDEPENDENTLY SUPPORTED AND DOES NOT RELY ON THE SYSTEM FOR SUPPORT.

B**



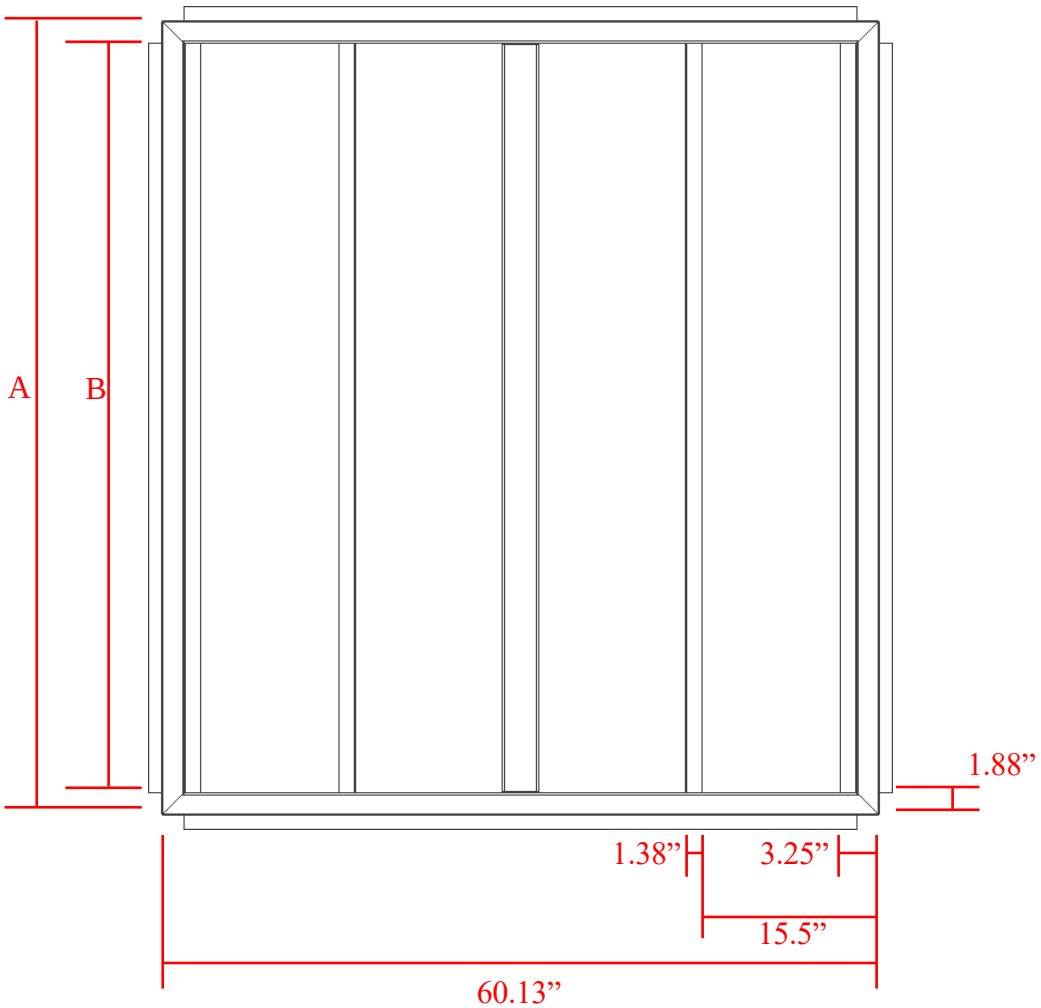


**A WATER-TIGHT ACCESS PANEL CAN BE INSTALLED IN THE LOCATION AND SIZE SPECIFIED WITHIN THE DUCT TO SERVICE A FAN.

INSTALLATION

MECHANICAL – DUCT HANGERS

Refer to the table and image below for duct hanger locations within the curb (curb lid not shown).



System Size	A (IN)	B (IN)
600	17.5	13.75
1200	29.75	26
1800	42	38.25
2400	54.25	50.5
3000	66.5	62.75
3600	78.75	75
4200	91	87.25
4800	103.25	99.5
5400	115.5	111.75
6000	127.75	124

ELECTRICAL INFORMATION

The electrical ratings for each system size are listed below. Consult sales for additional voltage and phase combinations.

SYSTEM ELECTRICAL RATINGS						
System	**Voltage**	**Frequency**	**Phase**	**FLA**	**MCA**	**MOP**
600	208-277V	50/60	1	7.4	8.3	15
1200	208-277V	50/60	1	14.3	15.1	20
1800	208-277V	50/60	3	12.2	13.1	15
2400	208-277V	50/60	3	19.3	20.2	25
3000	208-277V	50/60	3	26.2	27	30
3600	208-277V	50/60	3	24.1	25	30
4200	208-277V	50/60	3	31.2	32.1	35
4800	208-277V	50/60	3	38.1	38.9	40
5400	208-277V	50/60	3	36	36.9	40
6000	208-277V	50/60	3	43.1	44	45

As standard, all supply and exhaust fans utilize a state-of-the-art electrically commutated motor (ECM) to directly drive a mixed flow wheel. Fan specifications are listed below.

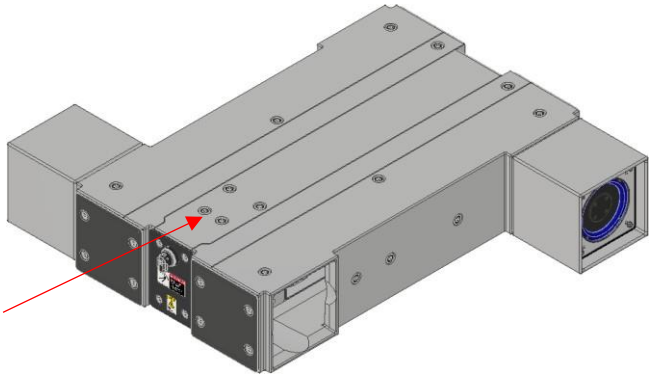
FAN DATA							
System	**Voltage**	**Frequency**	**Supply Fan Quantity**	**Exhaust Fan Quantity**	**Max Supply HP**	**Max Exhaust HP**	**Max Fan RPM**
600	208-277V	50/60	1	1	0.9	0.9	6150
1200	208-277V	50/60	2	2	1.9	1.9	6150
1800	208-277V	50/60	3	3	2.8	2.8	6150
2400	208-277V	50/60	4	4	3.8	3.8	6150
3000	208-277V	50/60	5	5	4.7	4.7	6150
3600	208-277V	50/60	6	6	5.6	5.6	6150
4200	208-277V	50/60	7	7	6.6	6.6	6150
4800	208-277V	50/60	8	8	7.5	7.5	6150
5400	208-277V	50/60	9	9	8.5	8.5	6150
6000	208-277V	50/60	10	10	9.4	9.4	6150

INSTALLATION

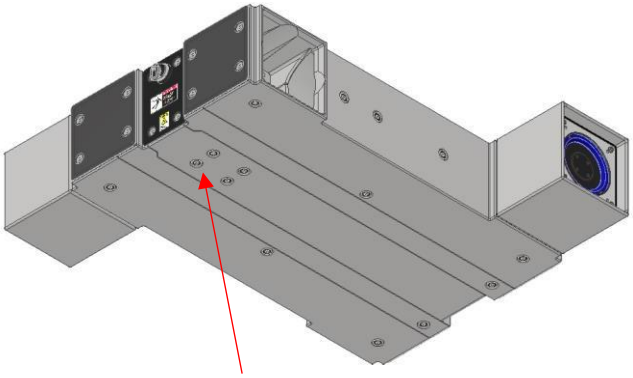
ELECTRICAL – SYSTEM WIRING

WARNING: BEFORE PROCEEDING, DISCONNECT POWER TO THE UNIT. WIRING SHOULD ONLY BE PERFORMED BY AN EXPERIENCED, QUALIFIED ELECTRICIAN

The system has (4) ¾" NPT threaded access ports that can be used for power and control wire connections. (2) on the top and (2) on the bottom. **High voltage wires and low voltage wires should never run in the same conduit as each other, or parallel for long distances.**

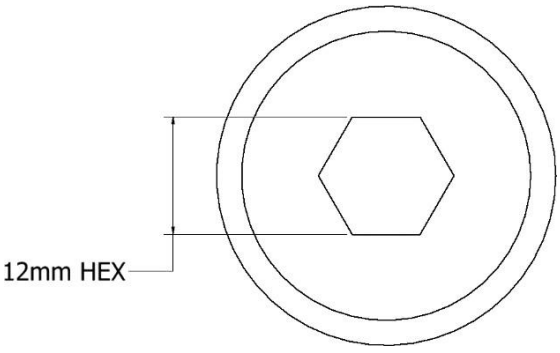


Top View

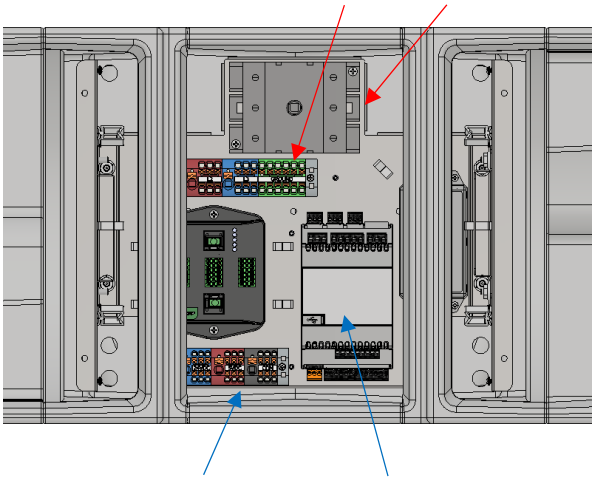


Bottom View

To remove the threaded plug, a 12mm Allen wrench is required. Once removed, a ¾" stress relief can be used to secure the wire run to the system.



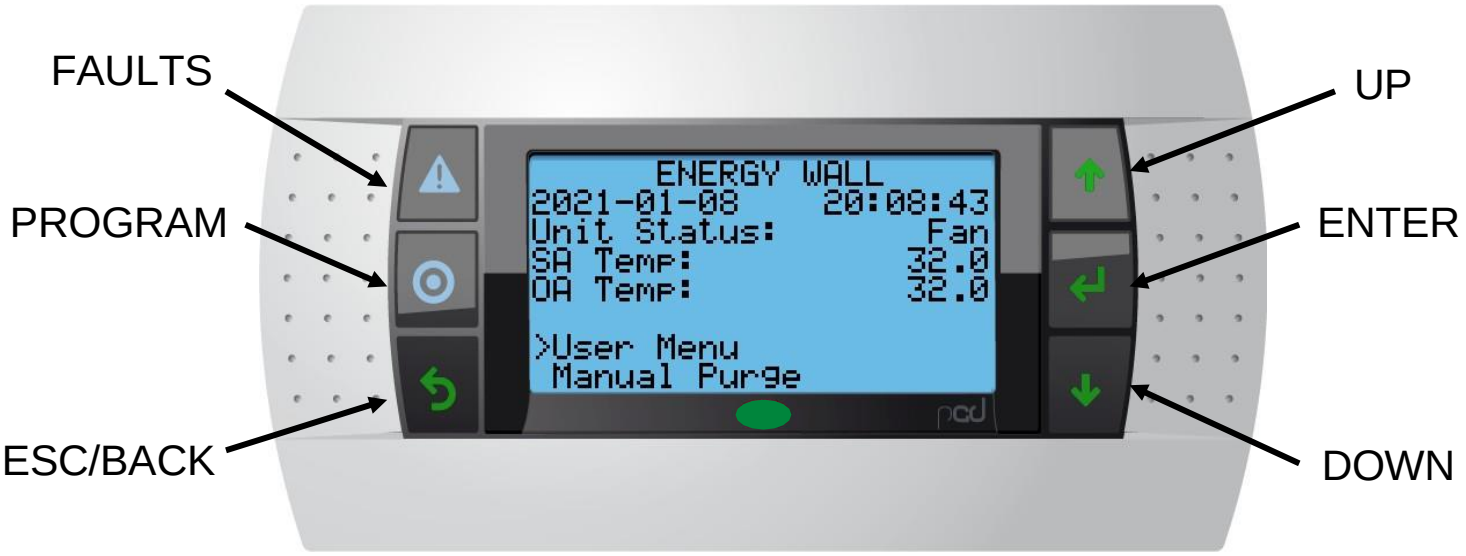
Connect power wires to the disconnect and terminal blocks shown below in red, and control wires (if applicable) to the terminal blocks and primary controller shown below in blue. Detailed schematics will be provided per job.



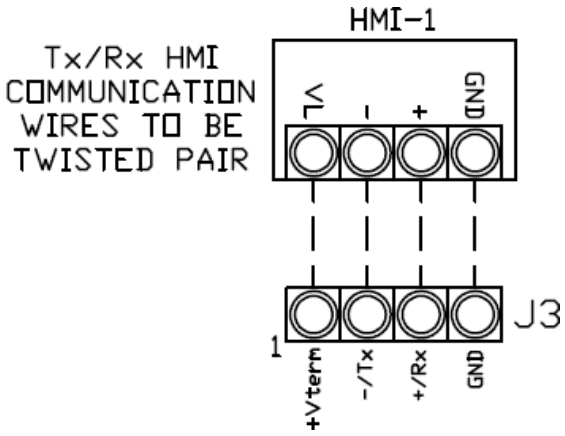
INSTALLATION

ELECTRICAL – REMOTE HMI

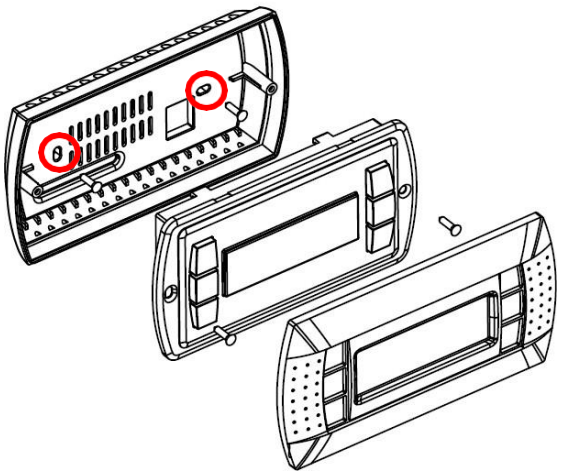
For applications that require system control and menu navigation from the space, a remote human-machine interface (HMI) can be used as shown below.



Typical HMI Wiring

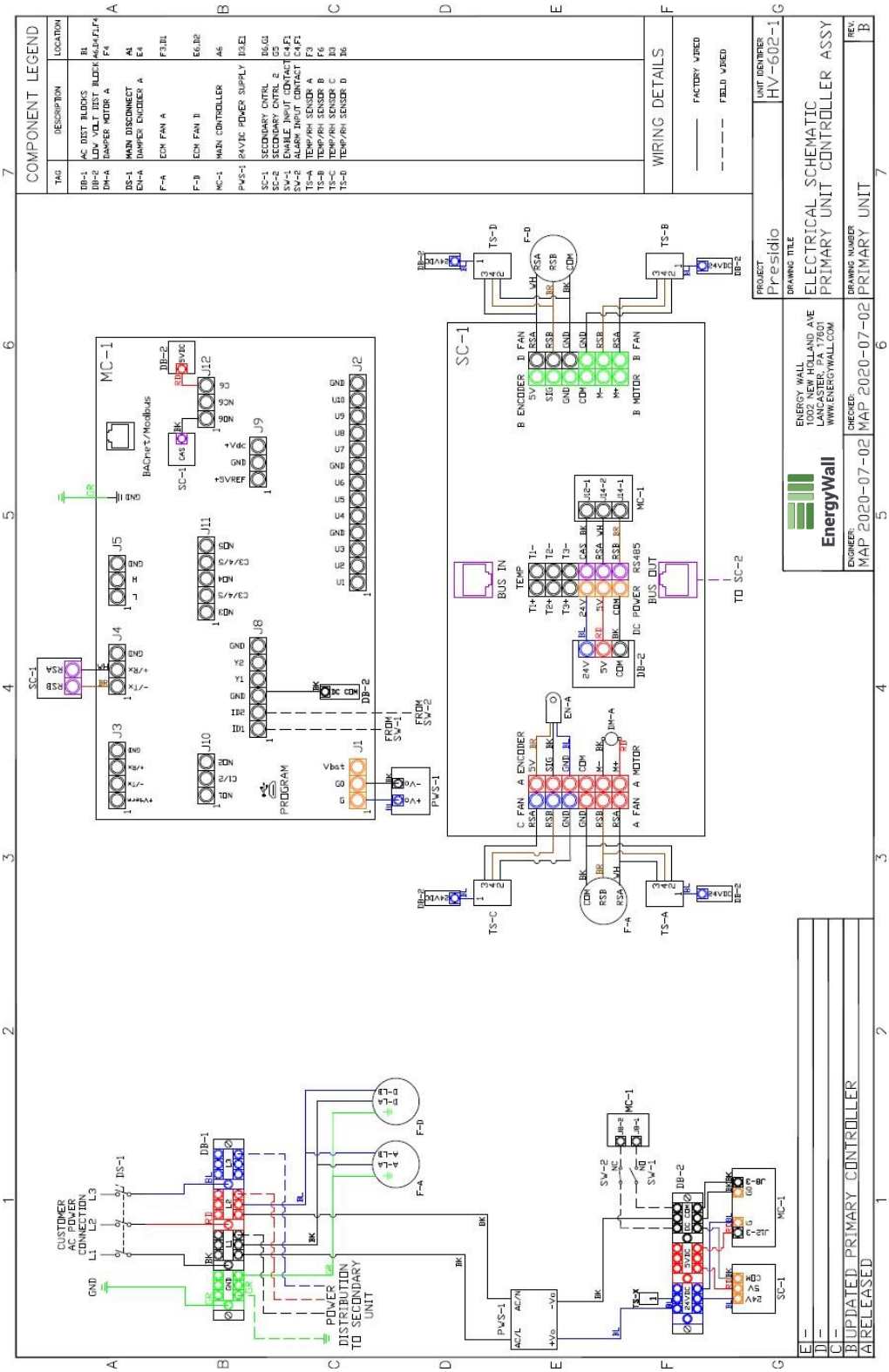


The HMI can be mounted in a standard junction box via the screw holes shown below. All hardware required to physically mount the HMI is included.



INSTALLATION

ELECTRICAL – GENERAL WIRING SCHEMATIC



OPERATION

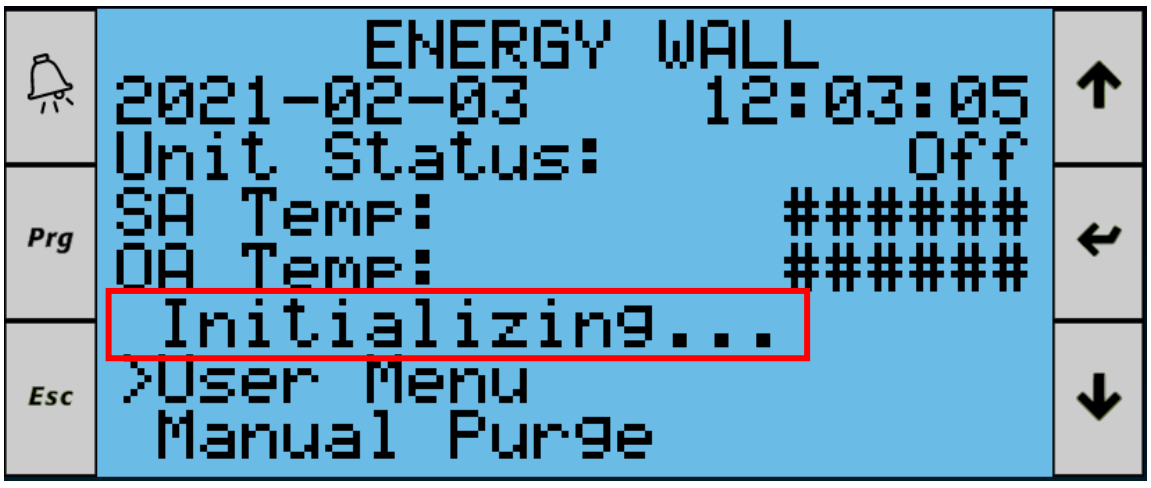
SYSTEM START-UP PROCEDURE

Prior to powering the unit, verify there are no loose parts or documentation within the system, or debris in the airstreams.

1) Inspect all moving parts and verify they are free and clear of any obstructions.
2) Verify all hardware is tight.
3) Verify there are no loose wires.
4) Examine all duct connections and ensure there are no visible gaps that could cause airflow and water leaks. If any are identified, seal as necessary.
5) Confirm all access panels are secured in place.
6) Once steps 1-5 have been completed, turn the disconnect to the “ON” position.

Most applications will be configured per job from the factory. If new software is required, or the controller needs to be programmed, follow the “System Commissioning” instructions on page 14 of this document.

Once the system is powered, it will begin an initialization sequence to identify secondary units. The initialization sequence can be identified on the remote HMI or main controller home screen as shown below. This occurs every time the system is power cycled. Once completed, the “Initializing...” term will no longer be displayed. The system is now ready to operate.



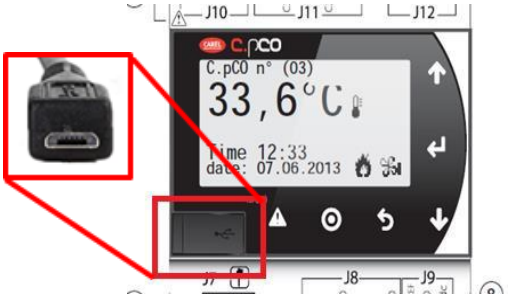
OPERATION

SYSTEM COMMISSIONING

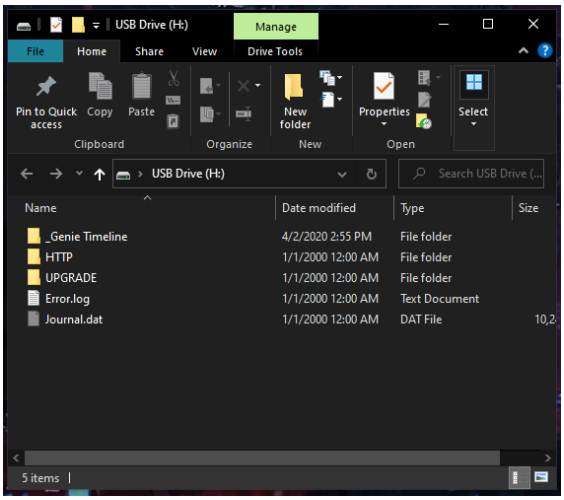
Although each system comes programmed from the factory, some situations may require the primary controller to be re-programmed in the field. Once the system is powered on, there are two ways to connect to the primary controller, USB and Ethernet.

USB

To connect via USB, plug a Micro-usb cable (shown below) into the controller and your PC. The controller will appear as a USB mass storage device.



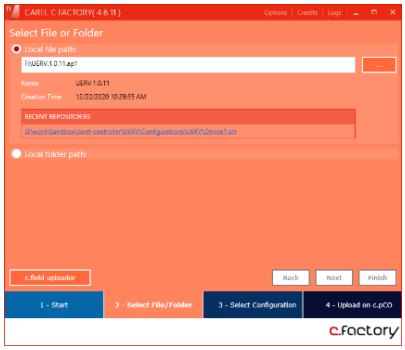
The application file (UERV-x.xx.xx.ap1) can be copied to the UPGRADE folder on the controller.



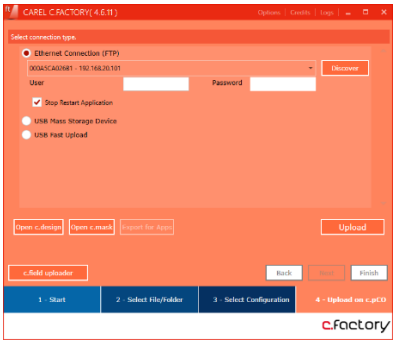
Ethernet

Connect the controller into a network. The network address settings for the device can be found by holding Alarm and Enter for two seconds. Then go to the SETTINGS menu, and select TCP/IP SETTINGS.

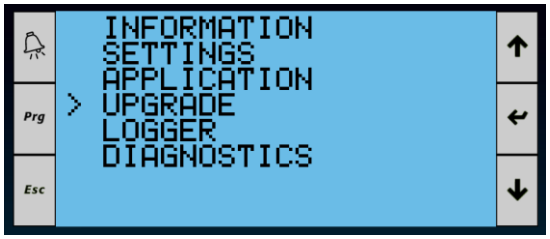
Open c.Factory from Carel, and select the application file (UERV-x.xx.xx.ap1) on tab 2. On tab 4, select Ethernet Connection (FTP).

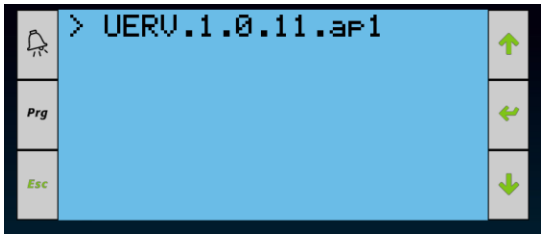


If the controller's address is not discovered automatically, it can be entered in manually. Leave User and Password blank then click finish.



If the controller does not ask to install the upgrade file, access the controller system menu by holding the Alarm and Enter buttons for two seconds, then select the UPGRADE option. The software file should be listed. Once uploaded, power cycle the system.

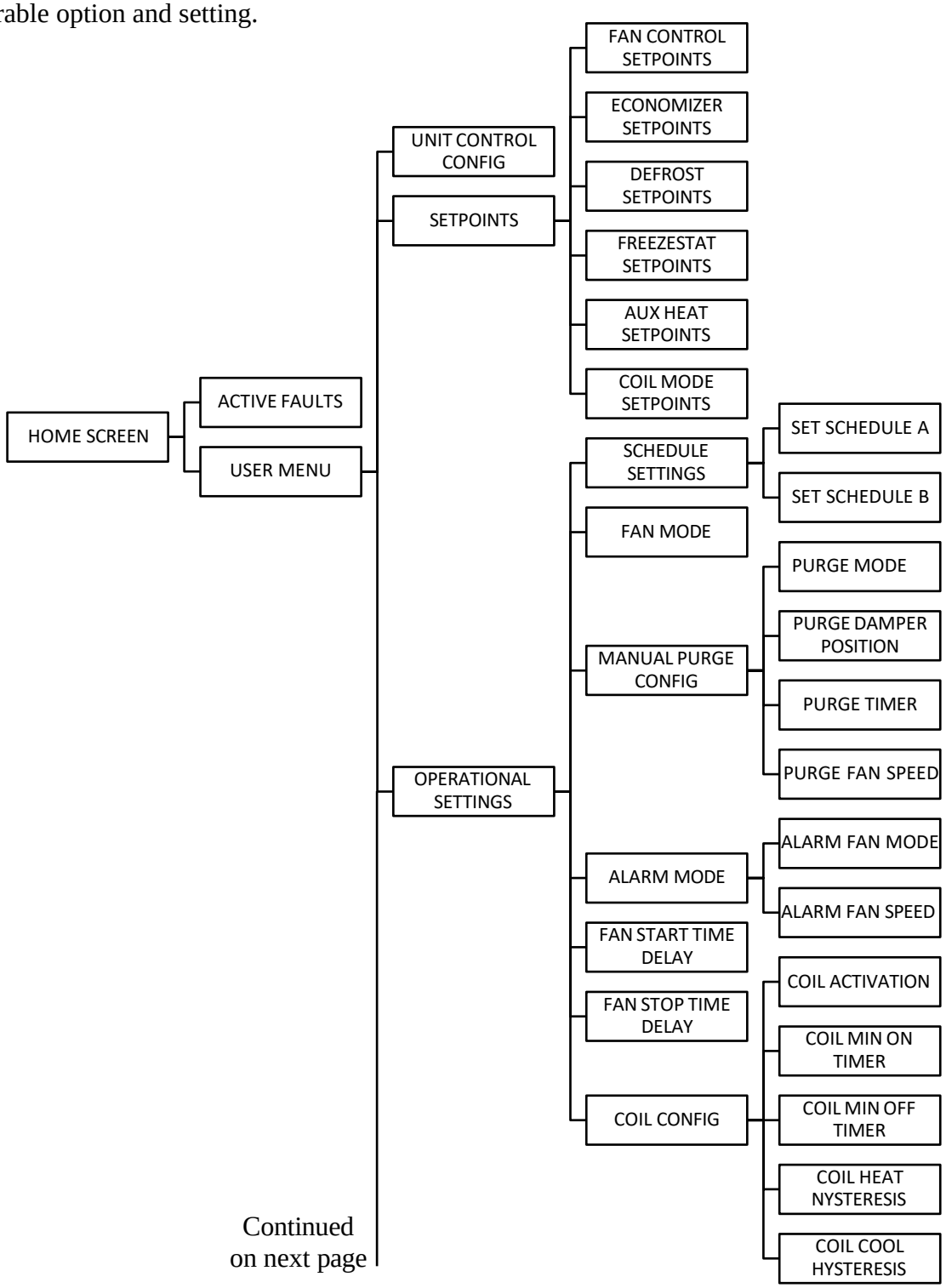




OPERATION

MENU LAYOUT

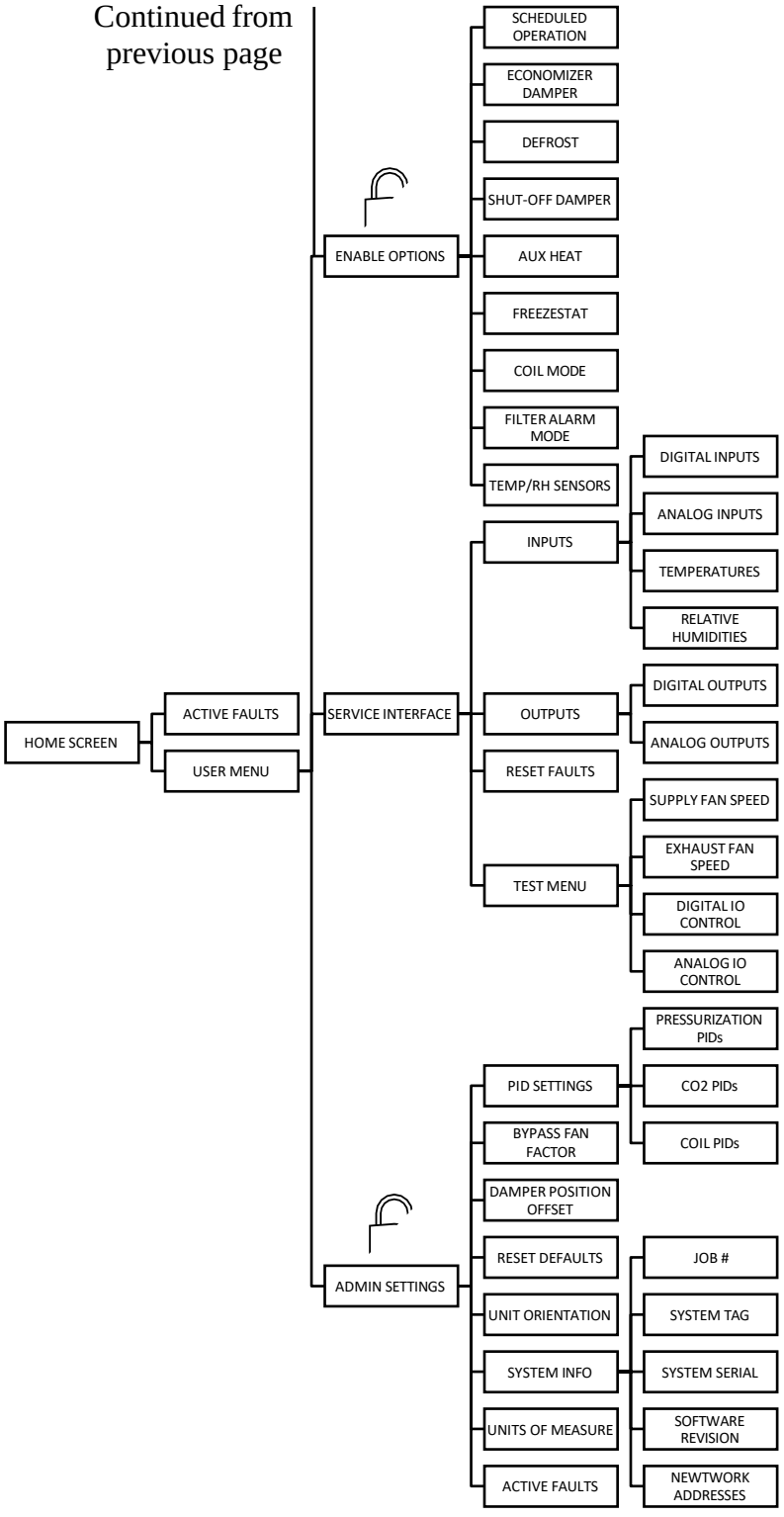
The following section outlines each menu within software along with a brief description of each configurable option and setting.



Continued on next page

OPERATION

MENU LAYOUT



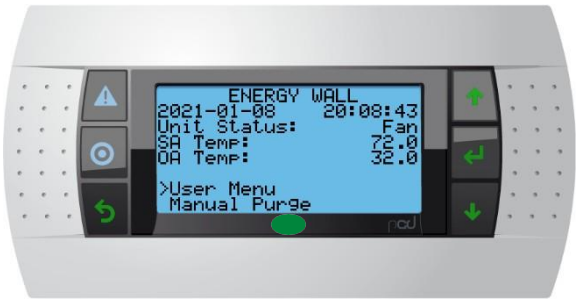
MENU DESCRIPTIONS

The following section briefly explains the function of each menu within software.

HOME SCREEN

The home screen is the default screen within software. The “BACK/ESC” button will ultimately navigate to this screen. The below information can be found on the home screen:

- Date
- Time
- Unit Status
- Supply Air (SA) Temperature
- Outdoor Air (OA) Temperature
- User Menu Selection
- Manual Purge Mode Selection



FAULTS

The active faults & fault history screen can be accessed by pressing the “FAULTS” button on the HMI at any time. When selected, this menu will display all active faults. If the “ENTER” key is selected while in the “FAULTS” screen, the timestamped fault history will be displayed.

USER MENU

Accesses all subsequent menus within software.

UNIT CONTROL CONFIG

When this menu is entered, the user can manually enable or disable the system. If the unit is controlled via BMS, it will be noted as such within this menu.

SETPOINTS

All adjustable setpoints that control how the unit operates can be found within this menu.

OPERATION

MENU DESCRIPTIONS

FAN CONTROL SETPOINTS
All fan speed control set points, minimums, and maximums for the supply and exhaust air streams in any fan mode can be found within this menu. If scheduling is enabled, an occupied and unoccupied set point can be set for each airstream. More details on fan mode functionality can be found under the menu "FAN MODE."

ECONOMIZER SETPOINTS
All setpoints to control the enthalpy or temperature only economizer can be found within this menu.

ECONOMIZER TEMP BAND
When in economizer temperature mode, the economizer temp band is used to determine the damper bypass percentage by relating it to the economizer activation temperature, the return temperature, and the outdoor air temperature.

ECONOMIZER ENTHALPY BAND
When in economizer enthalpy mode, the economizer enthalpy band is used to determine the damper bypass percentage by relating it to the economizer activation enthalpy, the return enthalpy, and the outdoor air enthalpy.

ECONOMIZER DISABLE TEMP
The economizer disable temp will restrict the economizer from activating and also shut the economizer off while active when the outdoor air temperature drops below the economizer disable temp. Used in both enthalpy and temperature economizer modes.

ECONOMIZER ACTIVATION TEMP
The economizer activation temp will enable the economizer when the outdoor air temperature drops below the economizer activation temp. Used in both enthalpy and temperature economizer modes.

ECONOMIZER ACTIVATION ENTHALPY
The economizer activation enthalpy will enable the economizer when the outdoor air enthalpy drops below the economizer activation enthalpy. Used in enthalpy economizer mode only.

DEFROST SETPOINTS
All setpoints to control the defrost operation can be found within this menu.

DEFROST SUPPLY TEMP
The defrost supply temp is used to set the damper bypass percentage or fan speed so the supply air never drops below setpoint.

DEFROST SUPPLY DEADBAND

Once defrost is active and the supply air temperature is met, the supply air deadband will restrict the damper or fan speed (dependent on defrost mode) from oscillating the supply air temperature around the supply air temperature set point. The damper or fan speed will only begin to modulate again once the supply air temperature exceeds the supply air temperature set point +/- the supply air deadband.

DEFROST CYCLE MIN OFF TIMER

The defrost cycle minimum OFF timer restricts the defrost cycle from short cycling by waiting for a user defined timeframe prior to activating again.

DEFROST CYCLE MIN ON TIMER

The defrost cycle minimum ON timer restricts the defrost cycle from short cycling by waiting for a user defined timeframe after activation prior to deactivating defrost.

FREEZESTAT SETPOINTS

All setpoints to control freezestat operation can be found within this menu.

FREEZESTAT ACTIVATION TEMP

The freezestat activation temp setpoint determine at what supply temperature the system will begin a freezestat timer. Once the timer expires, the system will shut down and display a manual reset fault on the HMI.

FREEZESTAT TIMER

The freezestat timer is used when freezestat operation is enabled to determine how long the supply air temperature must consistently measure below the freezestat activation temp before shutting the system down and triggering a fault.

AUXILIARY HEAT SETPOINTS

All setpoints to control an auxiliary heater can be found within this menu.

AUXILIARY HEAT ACTIVATION TEMP

When auxiliary heat is enabled, a 10k thermistor can be wired into the system's controller. This sensor can be placed up or downstream of the system within the supply airsteam, depending on application. When the airstream temperature drops below the auxiliary heat activation temp, an on-board relay will close. If scheduling is enabled, an occupied and unoccupied auxiliary heat activation temp setpoint can be set.

AUXILIARY HEAT HYSTERESIS

When the aux heat thermistor reads a temperature above the aux heat setpoint + aux heat hysteresis, auxiliary heat will deactivate.

OPERATION

MENU DESCRIPTIONS

COIL MODE SETPOINTS

All setpoints related to coil control are currently being developed and will be released in the next version of software.

OPERATIONAL SETTINGS

All configurable settings related to the operation of the unit can be found within this menu.

SCHEDULE SETTINGS

All settings to set an onboard schedule for the system can be found within this menu.

SET SCHEDULE A/B

There are two different 7-day schedules that can be set to put the unit into an occupied or unoccupied state. Adding a schedule will enable the use of various setpoints for each schedule state.

FAN MODE

There are 5 modes to control the supply and exhaust fans when the unit is enabled as defined below.

MANUAL

When fan mode is set to manual, the supply and exhaust fans will operate independently at fixed speeds as defined in the fan control setpoints menu when the system is enabled. When scheduling is enabled, an occupied and unoccupied setpoint can be set.

ANALOG

When fan mode is set to analog and the system is enabled, the supply and exhaust fans will modulate linearly between a minimum and maximum setpoint for each airstream as defined in the fan control setpoints menu. Each airstream has its own 0-10VDC input and can modulate independent from the other. To modulate the supply and exhaust airstreams from one input signal, the input signal can be jumped across terminals as defined in the electrical schematics. When scheduling is enabled, occupied and unoccupied supply and exhaust minimum and maximum setpoints can be set.

BMS

When fan mode is set to BMS, the supply and exhaust fans will be controlled by the building management system via Modbus TCP/IP or BACnet IP. Additionally, the unit can only be enabled by the BMS or a wired enable signal.

CO2

When fan mode is set to CO2, the supply and exhaust fans will modulate based on a PID loop to maintain a specific CO2 PPM as defined by a PPM set point. The supply and exhaust fans will each be bound by a global minimum and maximum setpoint. The CO2 PPM level is calculated based on a 0-10VDC input in conjunction with a minimum and maximum CO2 PPM. The calculated CO2 level will scale linearly between the minimum and maximum CO2 PPM set points based on the 0-10VDC input. By adjusting the min and max CO2 PPM, the software can accommodate various third-party CO2 sensors.

All setpoints besides the PID loop settings can be found within the fan control setpoints menu. The PID loop settings can be found within the PID settings menu. When scheduling is enabled, occupied and unoccupied supply, exhaust, and CO2 PPM setpoints can be set.

PRESSURE

When fan mode is set to pressure, the supply and exhaust fans will modulate based on a PID loop to maintain a specific duct or building pressure (IN W.C.) as defined by a pressure set point. The supply and exhaust fans will each be bound by a global minimum and maximum setpoint. The pressure level is calculated based on a 0-10VDC input in conjunction with a minimum and maximum pressure. The calculated pressure will scale linearly between the minimum and maximum pressure set points based on the 0-10VDC input. By adjusting the min and max pressure setpoints, the software can accommodate various third-party pressure sensors.

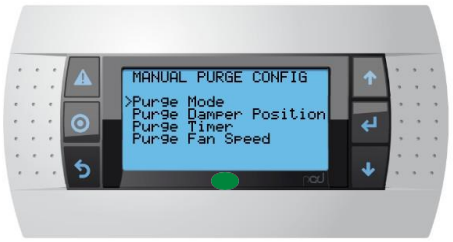
All setpoints besides the PID loop settings can be found within the fan control setpoints menu. The PID loop settings can be found within the PID settings menu. When scheduling is enabled, occupied and unoccupied supply, exhaust, and pressure setpoints can be set.

OPERATION

MENU DESCRIPTIONS

MANUAL PURGE CONFIG

When the manual purge feature is enabled via the home screen, the fans and/or bypass damper will adjust based on configured settings for a defined period. Once the timer expires, the system will continue standard operation. If the manual purge feature is disabled at any time within the defined period, the system will return to standard operation.



PURGE MODE

A purge selection on the home screen will force the supply fan and/or exhaust fan to the desired setpoint for a defined time as set in the purge fan speed and purge timer menus.

PURGE DAMPER POSITION

The purge damper position sets the damper to run in full core bypass or no core bypass when manual purge mode is enabled.

PURGE TIMER

The purge timer determines how long the manual purge feature runs for before expiring.

PURGE FAN SPEED

The purge fan speed determines at what speed the supply and exhaust fan operate at when the manual purge feature is enabled.

ALARM INPUT CONFIG

When an alarm input signal is received, the system will enter an alarm state. "Alarm Fan Mode" can be configured in one of the following modes: **Unit Shutdown** - supply and exhaust fans off, **Supply** - supply fan speed set to "Alarm Fan Speed", **Exhaust** - exhaust fan speed set to "Alarm Fan Speed", **Both** - Supply and Exhaust speeds set to "Alarm Fan Speed. "Alarm Fan Speed" can be set between 0-100% fan speed.

ALARM FAN MODE
The alarm fan mode can be set to either shut the unit down, shut the supply fan down, or shut both fans down.

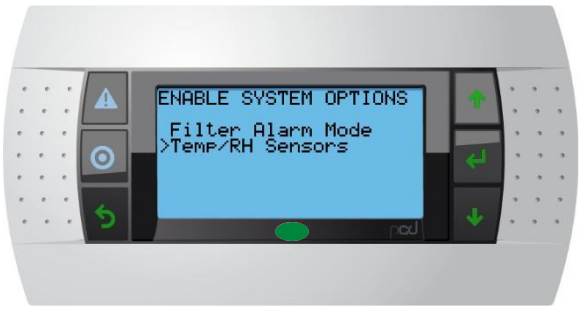
ALARM FAN SPEED
The alarm fan speed determines the speed at which the supply and/or exhaust fan will run when the system is in an alarm state.

FAN START DELAY TIMER
The fan start delay timer will delay the fans from starting by a defined period after the system has been enabled.

FAN STOP DELAY TIMER
The fan stop delay timer will delay the fans from shutting down by a defined period after the system has been disabled.

COIL CONFIG
All settings related to coil configuration are currently being developed and will be released in the next version of software.

ENABLED OPTIONS (PW: 56789)
The enable options menu is a password protected menu that allows the user to enable, disable, or select the type of various control features. Once a feature is enabled, various settings and setpoints can be set to tune the feature's operation.



SCHEDULED OPERATION
Enables or disables scheduled operation of the system.

ECONOMIZER DAMPER
Allows the user to select temperature, enthalpy, or no economizer operation.

DEFROST
Allows the user to select modulating bypass damper, modulating supply fan, or no defrost operation.

OPERATION

MENU DESCRIPTIONS

SHUT-OFF DAMPER
Enables or disables an onboard relay to control an auxiliary shut off damper. When enabled, the fan start delay timer will be set to a minimum of 45 seconds and the onboard relay will close when the system receives an enable command.

AUXILIARY HEAT
Enables or disables an onboard relay to control an auxiliary heater. When enabled, the system will utilize an auxiliary heat 10k thermistor to determine when to activate the auxiliary heat relay. The auxiliary heat relay can only close when the system is enabled, and the supply fan is running.

FREEZESTAT
Enables or disables the freezestat feature.

COIL MODE
The coil mode configuration is currently being developed and will be released in the next version of software.

FILTER ALARM MODE
The filter alarm mode is currently being developed and will be released in the next version of software.

TEMP/RH SENSORS
Enables or disables temperature and relative humidity (RH) sensors within all four quadrants of the system. Temp/RH sensors can be utilized with a BMS, economizer, defrost, freezestat, and other optional features.

SERVICE INTERFACE
The service interface can be used to troubleshoot, diagnose, and test various features of software by resetting faults and having read/write capability for all inputs and outputs. **ENSURE ADEQUATE AIRFLOW IN DESIRED AIRSTREAM IF TESTING ANY HEAT/COOL FUNCTIONALITY.**

MENU DESCRIPTIONS

SERVICE INPUTS
This menu is used to view all inputs into the system.

DIGITAL INPUT STATUS
All digital inputs into the controller can be monitored here.

ANALOG INPUT STATUS
All analog inputs into the controller can be monitored here.

TEMPERATURES
When temperature/RH sensors are enabled, all temperatures read by the controller can be monitored here.

RELATIVE HUMIDITIES
When temperature/RH sensors are enabled, all relative humidities read by the controller can be monitored here.

SERVICE OUTPUTS
This menu is used to view all outputs into the system.

DIGITAL OUTPUT STATUS
All digital outputs from the controller can be monitored here.

ANALOG OUTPUT STATUS
All analog outputs from the controller can be monitored here.

RESET FAULTS
When a critical fault occurs, the fault can be manually reset via this menu.

TEST MENU
Various features and components can be tested and controlled via the test menu. Once the test menu is entered, standard unit operation will be stopped until the service interface menu has been exited. The test menu will automatically timeout after 60 minutes of being idle.

OPERATION

MENU DESCRIPTIONS

SUPPLY FAN SPEED
The supply fan speed can be manually adjusted to the desired setpoint via this menu.

EXHAUST FAN SPEED
The exhaust fan speed can be manually adjusted to the desired setpoint via this menu.

DIGITAL OUTPUT CONTROL
All digital outputs from the controller can be toggled on/off via this menu.

ANALOG OUTPUT CONTROL
All 0-10VDC analog outputs from the controller can be toggled via this menu.

ADMIN SETTINGS (PW: 39255)
The admin settings menu is a password protected menu that allows the user to access system settings, unit configuration settings, and various settings associated with core functionality of the system's logic.

PID SETTINGS
All PID control settings for fan pressure control, fan CO2 control, and coil capacity control (future software release) can be found within this menu.

PRESSURIZATION PIDS

The P, I, and D values to control the fan pressure PID loop can be found within this menu. It is highly recommended to leave the default values.

CO2 PIDS

The P, I, and D values to control the fan CO2 PID loop can be found within this menu. It is highly recommended to leave the default values.

COIL PIDS

The coil PID settings is currently being developed and will be released in the next version of software.

BYPASS FAN FACTOR

To maintain supply CFM to the space and maintain downstream supply air pressure, the bypass fan factor is used to reduce the supply fan's speed when the damper bypasses the core.

DAMPER POSITION OFFSET

Up to 10 dampers can have their position calibrated via the damper position offset. Adjusting this value will independently "zero" any of the dampers within a system.

RESET DEFAULTS

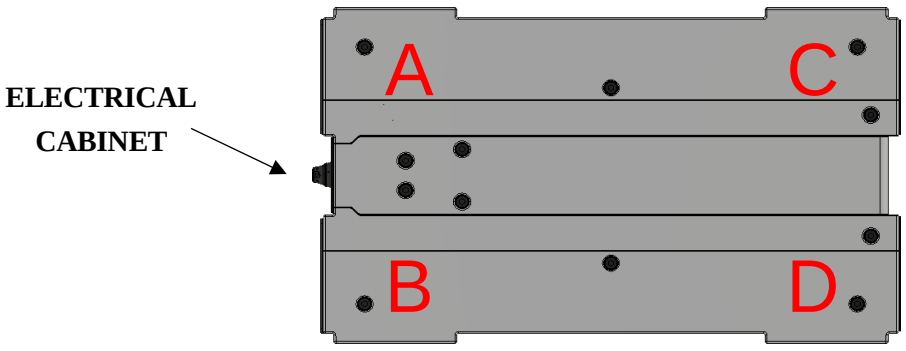
This menu resets all configuration settings and setpoints to the default values when software was initially uploaded to the system.

UNIT ORIENTATION SETTINGS

The settings used to configure the physical system configuration can be found within this menu.

QUADRANT "A" AIRSTREAM

Once quadrant "A's" airstream is identified, the system can automatically define the remaining airstreams. Each quadrant's position is shown below.



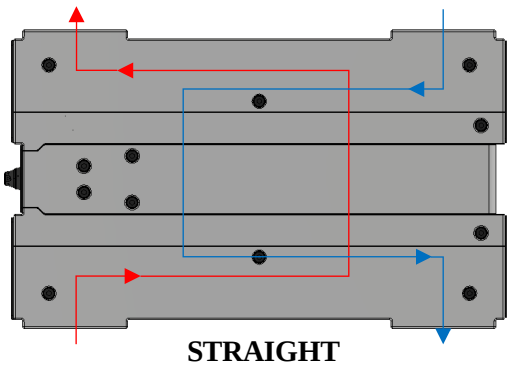
TOP VIEW

OPERATION

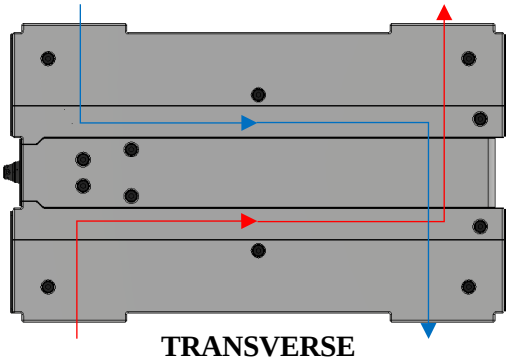
MENU DESCRIPTIONS

AIRFLOW ORIENTATION

A straight or transverse airflow orientation can be set within this menu. Default systems are built for straight airflow.



STRAIGHT



TRANSVERSE

SYSTEM SIZE

The system size (600 through 6000) can be configured within this menu.

QUADRANT "A" FAN

Quadrant "A" fan should be enabled if a fan is installed in quadrant "A". Note if the fan quadrants are not enabled properly, fans will not operate as desired.

QUADRANT "B" FAN

Quadrant "B" fan should be enabled if a fan is installed in quadrant "B". Note if the fan quadrants are not enabled properly, fans will not operate as desired.

QUADRANT "C" FAN

Quadrant "C" fan should be enabled if a fan is installed in quadrant "C". Note if the fan quadrants are not enabled properly, fans will not operate as desired.

QUADRANT "D" FAN

Quadrant "D" fan should be enabled if a fan is installed in quadrant "D". Note if the fan quadrants are not enabled properly, fans will not operate as desired.

SYSTEM INFORMATION

System specific information such as Job #, System Tag, System Serial #, and Software revision can be found within this menu. All values are read only and uploaded from the factory.

NETWORK ADDRESSES

To access the network address, the "ALARM" and "ENTER" button on the primary controller should be held for 3 seconds. Once entered, navigate to SETTINGS > TCP/IPv4 SETTINGS to view the controllers network settings.

On/Off Coils (Read/Write)

On/Off Coils are boolean values (on/off) that can be read and written.

Name	Modbus Address	BACnet ID	Description
Unit Enable Request	00001	2	In BMS mode, this will turn the unit enable on.
Manual Purge Mode	00002	3	This will activate manual purge mode
Reset Faults	00003	163	This will reset the unit from Fault status
Save parameters	00005	94	See the note on parameters that need to be saved using this coil.
Scheduled Operation Mode Enable	00006	126	
Shutoff Damper Mode Enable	00007	127	
Aux Heat Mode Enable	00008	128	
Freezestat Mode Enable Enable	00009	129	
Filter Alarm Mode Enable	00010	130	
Reset Defaults	00011	131	Performs a factory Reset of the unit
Metric UOM on HMI display	00012	132	
Crossflow Orientation	00013	133	
Fan in Quadrant A	00014	134	
Fan in Quadrant B	00015	135	
Fan in Quadrant C	00016	136	
Fan in Quadrant D	00017	137	
Temp/RH sensors installed/enabled	00018	164	
Schedule setup	00019 - 00032	226 - 239	See Schedule Section

OPERATION

BACNET/MODBUS POINTS

Discrete Inputs

Discrete Inputs are boolean (on/off) values that are read only

Name	Modbus Address	BACnet ID	Description
Unit Enable	10001	95	This indicates the unit is enabled.
ID1 (J8-1)	10002	104	This will read on when the output is floating, zero when grounded.
ID2 (J8-2)	10003	105	
NO1 (J10-1)	10004	106	Normally open relays; on indicates the relay has been closed.
NO2 (J10-3)	10005	107	
NO3 (J11-1)	10006	108	
NO4 (J11-3)	10007	109	
NO5 (J11-5)	10008	110	
Relay 6 (J12-1 and -2)	10009	111	On indicates this relay is closed.

Input Registers (read only values)

Name	Modbus Address	BACnet ID	Format	Description
Fan Tachometers	30001 - 30040	17 - 56	16 bit signed integer	Indicates the RPM of each possible fan. If a fan is not present or operating, RPM will be -1 (See Fan Section)
Fault Status	30041	85	16 bit integer	This is a bit field indicating any faults that are present. (See section below)
Supply Air Temperature	30042 - 30043	86	32 bit floating point.	The temperature in degrees C. If no sensor installed, the value will be 2000
Outside Air Temperature	30044 - 30045	87		
Exhaust Air Temperature	30046 - 30047	88		
Return Air Temperature	30048 - 30049	89		

Input Registers (read only values) Continued

Name	Modbus Address	BACnet ID	Format	Description
Supply Air Relative Humidity	30050 - 30051	90	32 bit floating point.	The relative humidity in percent. If no sensor is installed, the value will be zero.
Outside Air Relative Humidity	30052 - 30051	91		
Exhaust Air Relative Humidity	30054 - 30051	92		
Return Air Relative Humidity	30056 - 30051	93		
Analog input U3	30058 - 30059	96		The input voltage in volts.
Analog input U4	30060 - 30061	97		
Analog input U5	30062 - 30063	98		
Analog input U6	30064 - 30065	99		
Analog input U7	30066 - 30067	100		
Analog input U8	30068 - 30069	101		
Analog input U9	30070 - 30071	102		
Analog input U10	30072 - 30073	103		
Analog Output U1	30074 - 30075	112		The output Voltage in volts.
Analog Output U2	30076 - 30077	113		
Analog Output Y1	30078 - 30079	114		
Analog Output Y2	30080 - 30080	115		
Bypass Fan Factor	30082	149	16 bit integer	The system bypass supply fan factor in percent
System Tag String	30083 - 30092	240	ASCII string	Each modbus register contains two characters. Null-terminated, up to 20 characters.
Aux Heat Temperature Sensor Reading	30105 - 30106	162	32 bit floating point	Temperature reading in degrees C
Job Number String	30107 - 30116	165	ASCII string	Each modbus register contains two characters. Null-terminated, up to 20 characters.

OPERATION
BACNET/MODBUS POINTS

Input Registers Continued (read only values)

Name	Modbus Address	BACnet ID	Format	Description
System Serial Number	30117	166	16 bit unsigned integer	
Software Version	30118 - 30119	167	Special	Each Octet is one number. 30118 major version, 30119 MSB is the minor version, 30119 LSB is the revision number.
Unit Status	30120	168	16 bit unsigned integer	0: Off 1: Fan 2: Heat 3: Cool 4: Service 5: Alarm 7: Fault 8: Purge

Holding Registers (read/write numerical values)

Name	Modbus Address	BACnet ID	Format	Description
Supply Fan Speed	40001	0	16 bit unsigned integer	Indicates or sets the fan speed in percent (0 - 100). In BMS mode this sets the requested speed. In other modes it gives the current commanded speed.
Exhaust Fan Speed	40002	1		
Economizer Disable Temp	40003 - 40004	6	32 bit floating point	Degrees C
Economizer Activation Temp	40005 - 40006	7		
Economizer Activation Temp Band	40007 - 40008	8		
Economizer Activation Enthalpy	40009 - 40010	9		Enthalpy in kJ/Kg
Economizer Activation Enthalpy Band	40011 - 40012	10		
Defrost Supply Temp	40013 - 40014	11		Degrees C
Defrost Supply Temp Hysteresis	40015-40016	12		

BACNET/MODBUS POINTS

Holding Registers Continued (read/write numerical values)

Name	Modbus Address	BACnet ID	Format	Description
Defrost Cycle Min Off Timer	40017	13	16 bit integer	Time in minutes
Defrost Cycle Max Off Timer	40018	14		
Freezestat Activation Temp	40019 - 40020	15	32 bit floating point	Degrees C
Freezestat Timer	40021	16	16 bit integer	Time in minutes
Pressure Mode PID Kp Value	40022 - 40023	116	32 bit floating point	
Pressure Mode PID Ti Value	40024 - 40025	117		
Pressure Mode PID Td Value	40026 - 40027	118		
CO_2 Mode PID Kp Value	40028 - 40029	119		
CO_2 Mode PID Ti Value	40030 - 40031	120		
CO_2 Mode PID Td Value	40032 - 40033	121		
Aux Heat Temperature Set point	40034 - 40035	122		Degrees C
Aux Heat Temperature Set point (occupied)	40036 - 40037	123		
Aux Heat Temperature Set point (Unoccupied)	40038 - 40039	124		
Aux Heat Temperature Hysteresis	40040 - 40041	125		
Purge Fan Mode	40042	138	16 bit integer	1: Supply 2: Exhaust 3: Both
Purge Damper Position	40043	139		0: No bypass 1: full bypass
Purge Mode Timer	40044	140		Time in Minutes
Purge Fan Speed	40045	141		0 - 100 %
Alarm Fan Speed	40046	142		

OPERATION

BACNET/MODBUS POINTS

Holding Registers Continued (read/write numerical values)

Name	Modbus Address	BACnet ID	Format	Description
Alarm Fan Mode	40047	143	16 bit integer	0: Shutdown 1: Supply 2: Exhaust 3: Both
Fan Start Delay Time	40048	144		Time in Seconds
Fan Stop Delay Time	40049	145		
Economizer Damper Mode	40050	146		0: Off 1: Temperature 2: Enthalpy
Defrost Mode	40051	147		0: Off 1: Modulating Bypass 2: Modulating Fan
Occupied Supply Fan Speed	40053	59		0 - 100 %
Occupied Exhaust Fan Speed	40054	60		
Unoccupied Supply Fan Speed	40055	61		
Unoccupied Exhaust Fan Speed	40056	62		
Supply Fan Speed	40057	57		
Exhaust Fan Speed	40058	58		
Supply Fan Min Speed	40059	63		
Supply Fan Max Speed	40060	64		
Exhaust Fan Min Speed	40061	65		
Exhaust Fan Max Speed	40062	66		
Occupied Supply Fan Min Speed	40063	67		
Occupied Supply Fan Max Speed	40064	68		

Holding Registers Continued (read/write numerical values)

Name	Modbus Address	BACnet ID	Format	Description
Occupied Exhaust Fan Min Speed	40065	69		
Occupied Exhaust Fan Max Speed	40066	70		
Unoccupied Supply Fan Min Speed	40067	71		
Unoccupied Supply Fan Max Speed	40068	72		
Unoccupied Exhaust Fan Min Speed	40069	73		
Unoccupied Exhaust Fan Max Speed	40070	74		
CO_2 PPM Setpoint	40071 - 40072	75	32 bit unsigned integer	Parts Per Million
CO_2 Occupied PPM Setpoint	40073 - 40074	76		
CO_2 Unoccupied PPM Setpoint	40075 - 40076	77		
Pressure Differential Setpoint	40077 - 40078	78	32 bit floating point	Pascals
Pressure Differential Occupied Setpoint	40079 - 40080	79		
Pressure Differential Unoccupied Setpoint	40081 - 40082	80		
Quadrant A Airstream	40083	160	16 bit integer	0: Outside Air 1: Supply Air 2: Return Air 3: Exhaust Air
System Size	40084	161		0: 600 CFM 5:3600 CFM 1: 1200 CFM 6:4200 CFM 2: 1800 CFM 7:4800 CFM 3: 2400 CFM 8:5400 CFM 4: 3000 CFM 9:6000 CFM
Damper Offsets	40085 - 40104	150 - 159	32 bit signed integer	-180 to 180 degrees, each of ten dampers has two modbus registers.
Fan Control Mode	40105	169	16 bit integer	0: Manual 3: CO_2 1: Analog 4: Pressure 2: BMS
Schedule Times	40106 - 40161	170 - 225		See Schedule Section

OPERATION BACNET/MODBUS POINTS

Fans (Modbus / BACnet Registers)

The first forty Input Registers are the fan tachometer readings, four fans per units and ten units.

	Quadrant A	Quadrant B	Quadrant C	Quadrant D
Primary System	30001 / 17	30002 / 18	30003 / 19	30004 / 20
1st Secondary	30005 / 21	30006 / 22	30007 / 23	30009 / 24
2nd Secondary	30009 / 25	30010 / 26	30011 / 27	30012 / 28
3rd Secondary	30013 / 29	30014 / 30	30015 / 31	30016 / 32
4th Secondary	30017 / 33	30018 / 34	30019 / 35	30020 / 36
5th Secondary	30021 / 37	30022 / 38	30023 / 39	30023 / 40
6th Secondary	30025 / 41	30026 / 42	30027 / 43	30028 / 44
7th Secondary	30029 / 45	30030 / 46	30031 / 47	30032 / 48
8th Secondary	30033 / 49	30034 / 50	30035 / 51	30036 / 52
9th Secondary	30037 / 53	30038 / 54	30039 / 55	30040 / 56

Schedules (Modbus / BACnet Registers)

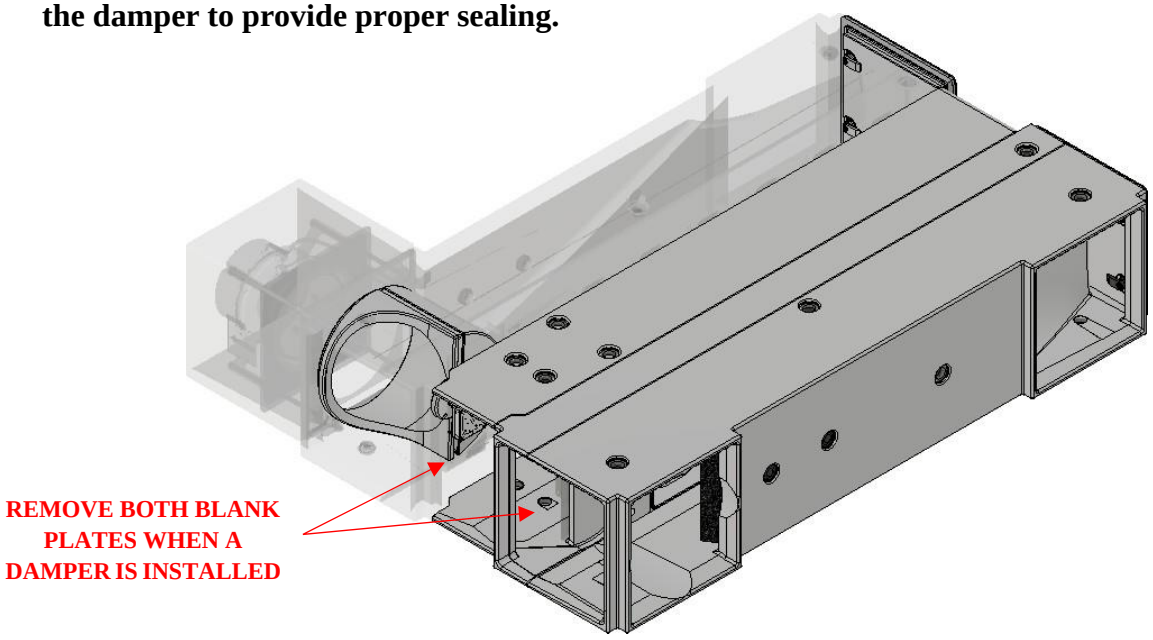
	Enabled	Start Hour	Start Minute	End Hour	End Minute
Schedule A Monday	00019 / 226	40108 / 172	40109 / 173	40106 / 170	40107 / 171
Schedule A Tuesday	00020 / 227	40112 / 176	40113 / 177	40110 / 174	40111 / 171
Schedule A Wednesday	00021 / 228	40116 / 180	40117 / 181	40114 / 178	40115 / 179
Schedule A Thursday	00022 / 229	40120 / 184	40121 / 185	40118 / 182	40119 / 180
Schedule A Friday	00023 / 230	40124 / 188	40125 / 189	40122 / 186	40123 / 187
Schedule A Saturday	00024 / 231	40128 / 192	40129 / 193	40126 / 190	40127 / 191
Schedule A Sunday	00025 / 232	40132 / 196	40133 / 197	40130 / 194	40131 / 195
Schedule B Monday	00026 / 233	40136 / 200	40137 / 201	40134 / 198	40135 / 199
Schedule B Tuesday	00027 / 234	40140 / 204	40141 / 205	40138 / 202	40139 / 203
Schedule B Wednesday	00028 / 235	40144 / 208	40145 / 209	40142 / 206	40143 / 207
Schedule B Thursday	00029 / 236	40148 / 212	40149 / 213	40146 / 210	40147 / 211
Schedule B Friday	00030 / 237	40152 / 216	40153 / 216	40150 / 214	40151 / 215
Schedule B Saturday	00031 / 238	40156 / 220	40157 / 221	40154 / 218	40155 / 219
Schedule B Sunday	00032 / 239	40160 / 224	40161 / 225	40158 / 222	40159 / 223

OPTIONAL FEATURES

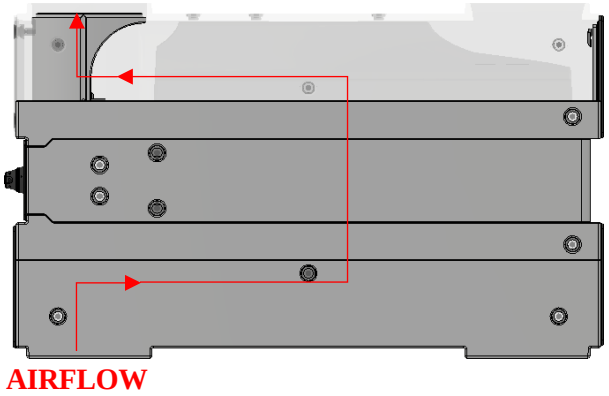
ECONOMIZER/DEFROST

When the economizer and/or defrost function is selected, a bypass damper will be installed within the desired quadrant as shown below. Temperature and relative humidity sensors will be required within each quadrant. A digital encoder is used to verify damper position and ensure proper orientation during standard, economizer and defrost operations.

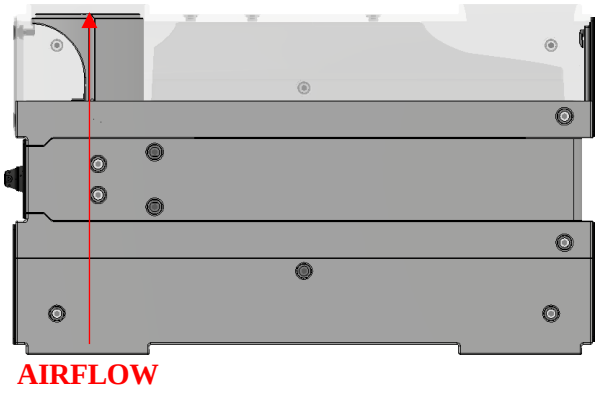
Note: A fan cube or fan cube support (an empty fan cube) is needed in the same quadrant as the damper to provide proper sealing.



BYPASS DAMPER INSTALLED IN QUADRANT A IN 100% ECONOMIZER/DEFROST



0% ECONOMIZER/DEFROST



100% ECONOMIZER/DEFROST

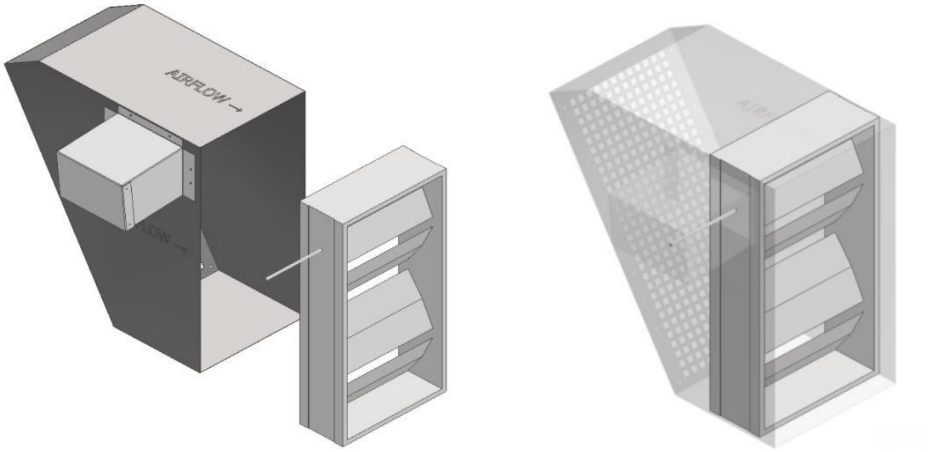
OPERATION

OPTIONAL FEATURES

AUXILIARY DAMPER

An ON/OFF motorized auxiliary damper can be installed up or downstream of the system within the supply airstream, exhaust airstream, or both supply and exhaust airstream. All auxiliary dampers are controlled by the same dry contact within the primary controller that will close on a system enable command.

When the auxiliary damper option is configured ON, the fan start delay is set to a minimum of 45s to ensure dampers are open prior to moving air.

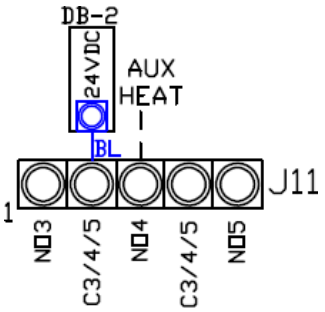


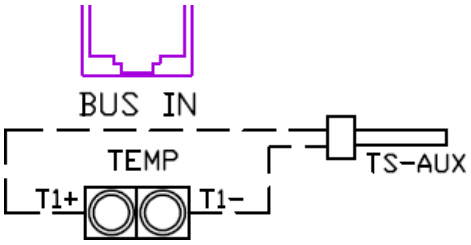
INTAKE HOOD WITH MOTORIZED AUXILIARY DAMPER

AUXILIARY HEATER

An auxiliary heater can be used in conjunction with the system to provide upstream or downstream heating to the supply airstream. When enabled, a dry contact on the primary controller will close when the provided, shipped loose 10k thermistor reads a temperature below the auxiliary heat activation set point.

The shipped loose thermistor with 20’ long wires should be installed upstream of the heater within the supply duct or intake to properly activate heat. Be sure the thermistor placement reflects an accurate average of the incoming temperature. Refer to example wiring schematics below.





PERFORMANCE

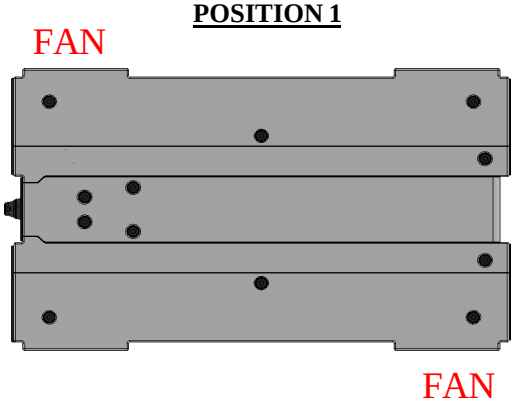
AIRFLOW

There are (3) different combinations of fan positions that affect airflow performance as displayed below.

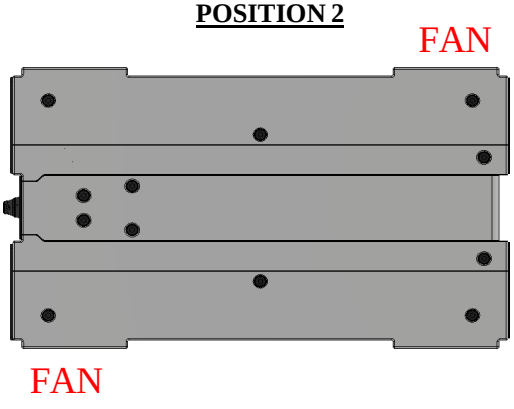
For each fan curve, additional options such as filters, coils, duct pressure, etc. should be summed together and added to the "External Static Pressure" to determine each system's airflow capabilities.

For systems larger than 600, divide the desired CFM by 600 and round up to the nearest whole number to determine the number of units in the system. Then divide the total number of units calculated by the desired CFM. **This resultant CFM is what should be used when reading each fan curve.**

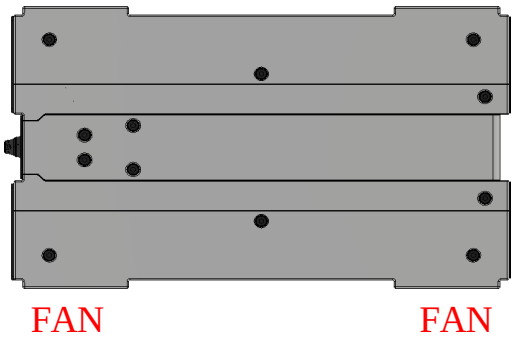
POSITION 1



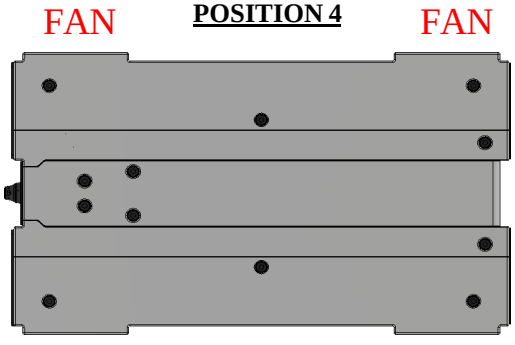
POSITION 2



POSITION 3



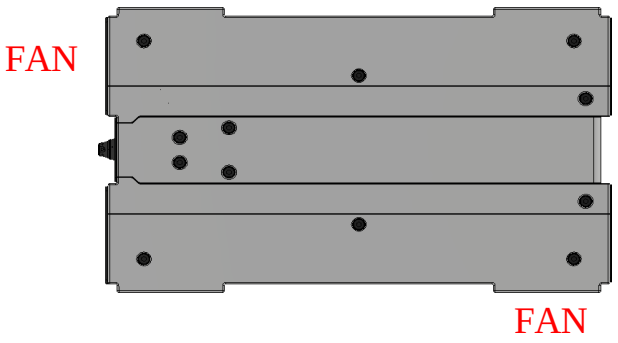
POSITION 4



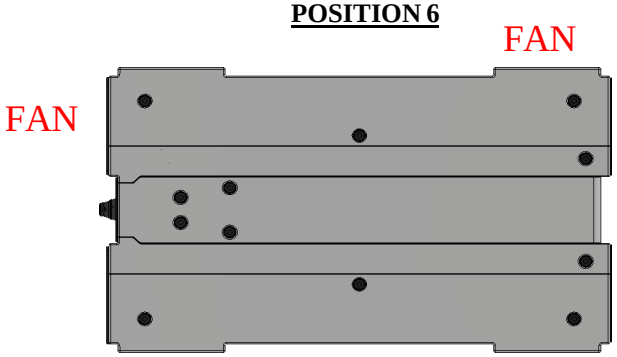
PERFORMANCE

AIRFLOW

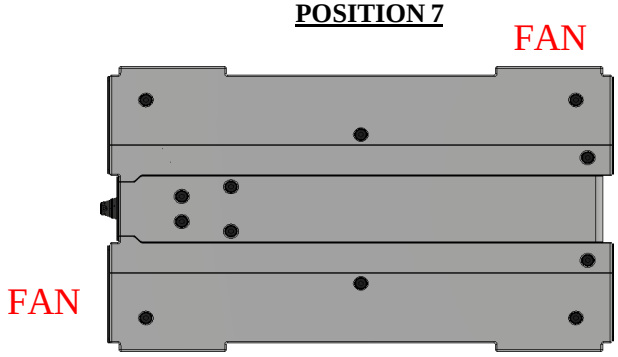
POSITION 5



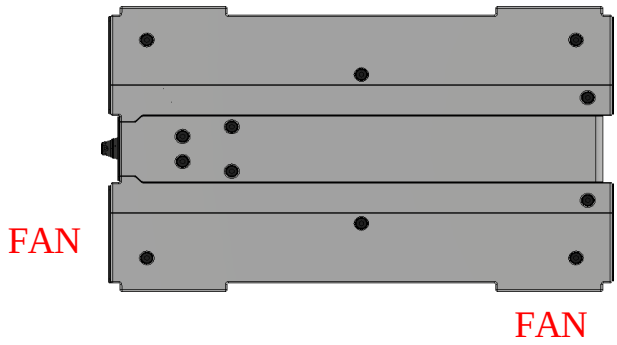
POSITION 6



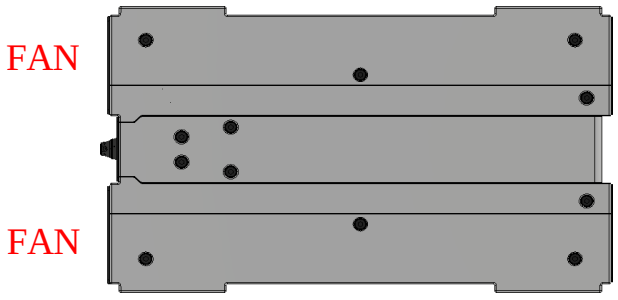
POSITION 7



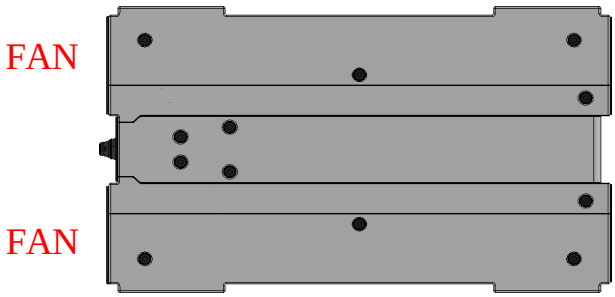
POSITION 8



POSITION 9



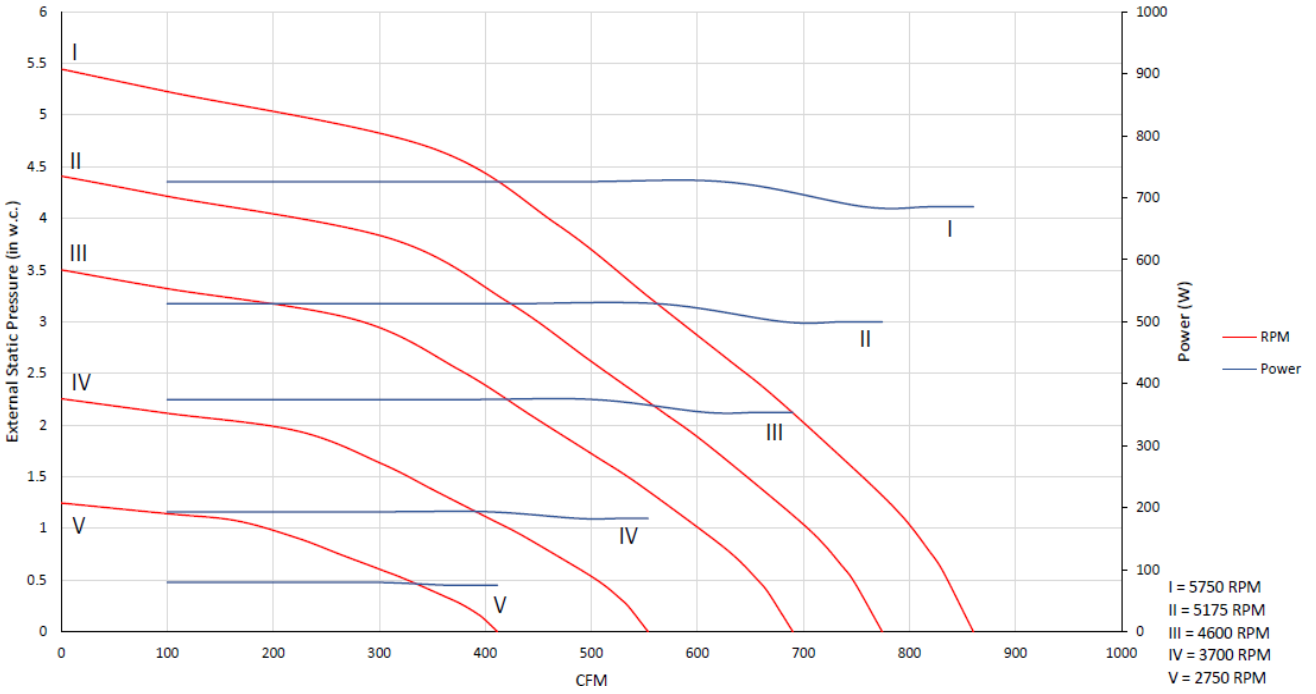
POSITION 10



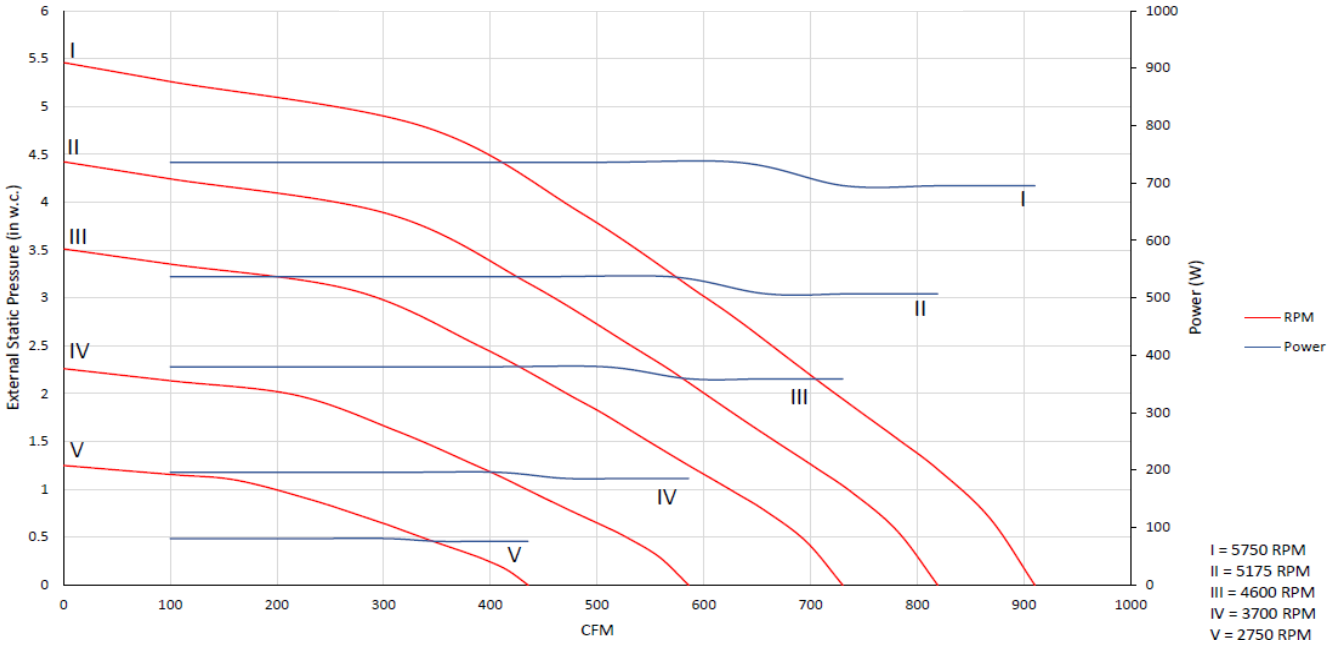
PERFORMANCE

AIRFLOW

U-ERV/HRV-600, Fan Positions 1-4



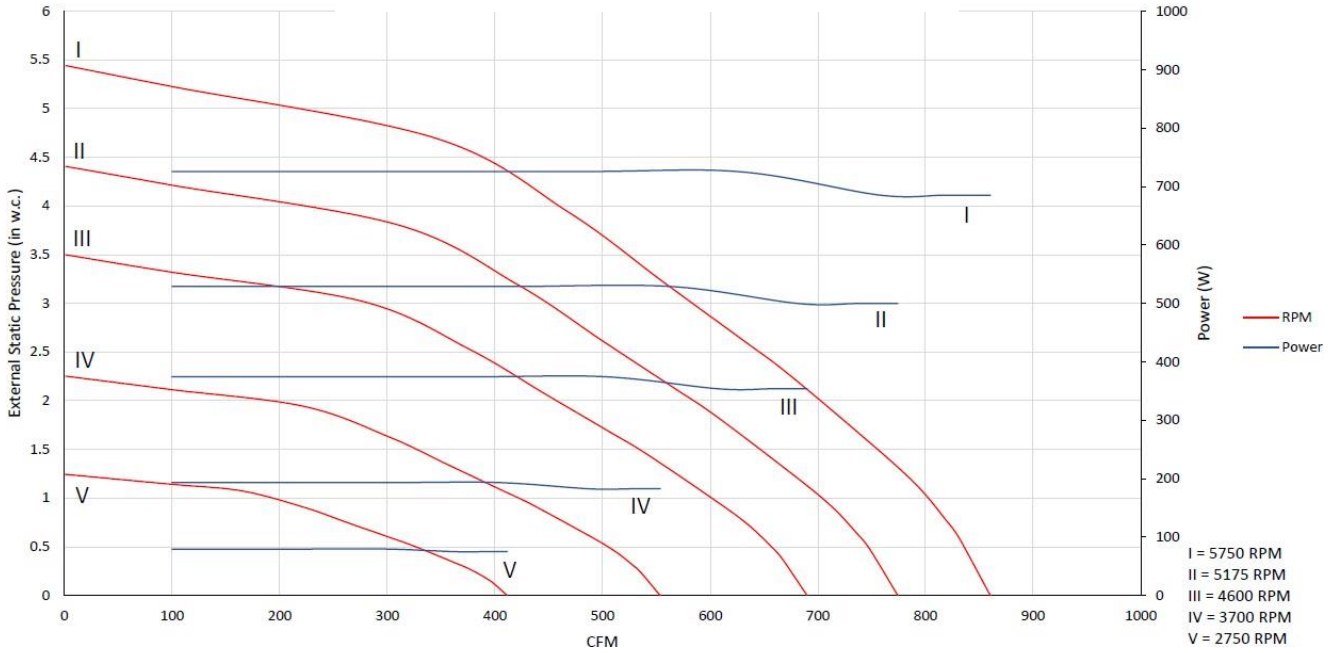
U-ERV/HRV-600, Fan Positions 5-8



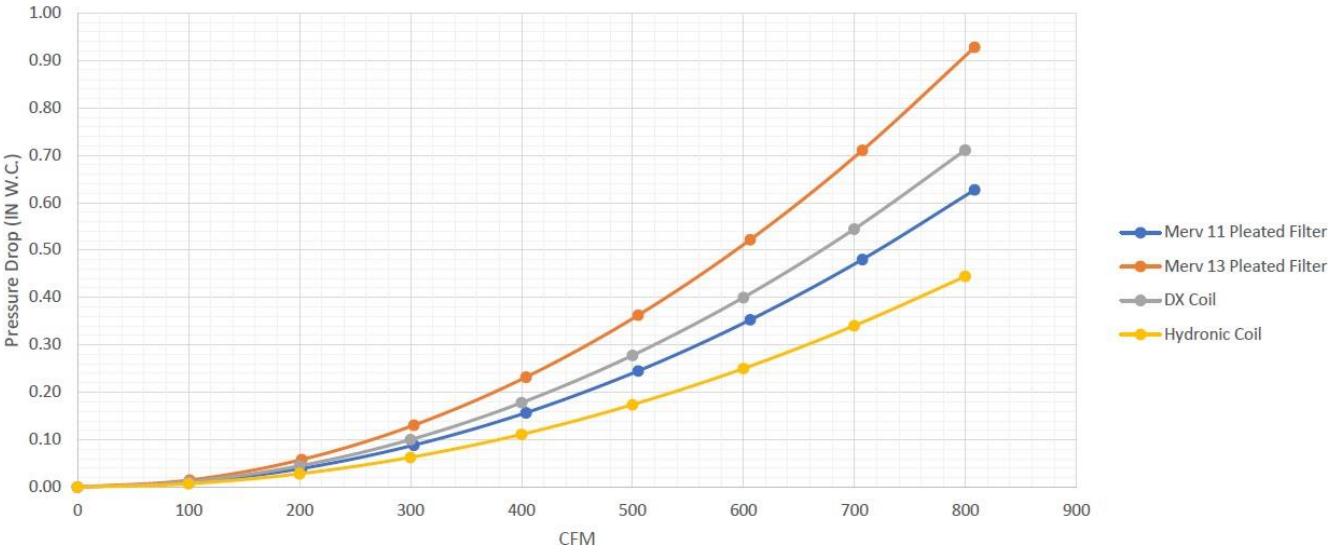
PERFORMANCE

AIRFLOW

U-ERV/HRV-600, Fan Positions 9 &10



Optional Pressure Drops (Add to Fan as External Static Pressure)



PERFORMANCE

ACOUSTIC

Acoustic performance for a 600 system with and without insulated ducting is listed below.

Decibels with Insulated Ducting

Fan Speed %	At 3ft	At 10ft
0	<25	<25
10	<25	<25
20	<25	<25
30	31.8	<25
40	35.1	<25
50	38.7	28.2
60	48.5	38
70	53.7	43.2
80	54.7	44.2
90	55.8	45.3
100	56.0	45.5

Decibels without Ducting

Fan Speed %	At 3ft	At 10ft
0	<25	<25
10	41.7	31.2
20	56.3	45.8
30	59.3	48.8
40	61	50.5
50	62.1	51.6
60	64.9	54.4
70	69.1	58.6
80	71.5	61
90	72.8	62.3
100	73.6	63.1

SERVICE & MAINTENANCE TROUBLESHOOTING

Issue	Potential Cause	Resolution
System does not power up	There is no power to the system	Safely verify building power is present and properly correct
	Disconnect is turned to the "OFF" position	Turn disconnect to the "ON" position
	Loose/incorrect wiring	Trace back power/communication wires and verify wiring per electrical schematic. Ensure there are no loose cables or wires
System powers up, but never starts	System is not enabled	Verify an enable command is being sent to the system via HMI, BMS, or wire input
	System is not configured correctly	Verify all unit orientation settings are correct
	Loose/incorrect wiring	Trace back power/communication wires and verify wiring per electrical schematic. Ensure there are no loose cables or wires
	An active fault is restricting the system from starting	Resolve and clear any active faults
	Bad primary controller	Replace primary controller
Fan(s) not operating correctly	System is not enabled	Verify an enable command is being sent to the system via HMI, BMS, or wire input
	System is not configured correctly	Verify all unit orientation settings are correct
	Loose/incorrect wiring	Trace back power/communication wires and verify wiring per electrical schematic. Ensure there are no loose cables or wires
	Bad motor	Replace fan cube
Secondary unit (s)/fan (s) are not operating	Secondary unit wiring kit was never installed	Wire per electrical schematic
	Loose/incorrect wiring	Trace back power/communication wires and verify wiring per electrical schematic. Ensure there are no loose cables or wires
	Primary controller is not auto identifying each unit	Verify wiring. Replace secondary controller is the issue persists
	System is not configured correctly	Verify all unit orientation settings are correct
	Bad secondary controller	Replace secondary controller
Damper does not rotate	Obstruction is blocking movement	Carefully inspect damper area and verify you can freely move the damper manually. Note that the damper shaft has a uni-directional bearing that restricts rotation in one direction.
	System is not configured correctly	Verify an option that requires the damper is enabled (economizer, defrost, purge, etc.)
	Damper motor is wired backwards	Correct wiring
	Bad damper motor	Replace damper motor
Economizer is not functioning correctly	Damper installed backwards	Remove damper and install 180 degrees from original position
	Temperature sensors wired to incorrect quadrant	Correct and wire per electrical schematics
	System is not configured correctly	Verify economizer is enabled and configured as desired

SERVICE & MAINTENANCE

FAULT LIST

When the system enters a fault condition, one of the below faults will be displayed on all HMIs. Depending on the type of fault, the system may:

1. Require a manual reset
2. Disable certain features from activating/operating or,
3. Be disabled until corrective action is taken

Fault	Description	Reset Type
Supply Fan Proving	Supply fan RPM feedback is lower than expected	Automatic
Exhaust Fan Proving	Exhaust fan RPM feedback is lower than expected	Automatic
Bypass Damper Motor Fault	The damper motor overcurrent protection has triggered a fault	Automatic
Bypass Damper Jammed	When economizer or defrost is enabled and the bypass damper has jammed, this fault will be displayed until the obstruction is cleared	Automatic
Freezestat	When the supply air temperature has dropped below the freezestat set point for a continuously defined period, the freezestat fault will activate	Manual
CO2 PPM Out of Range	The indicated CO2 value has remained significantly above the setpoint for more than 10 minutes	Automatic
Temp/RH Sensors Missing	The temp/RH sensors are not enabled when they should be. Verify configuration settings are properly set	Automatic
Unit 1 Comm Error	A communication error to the supply fan, exhaust fan, temp/RH sensors, or secondary controller has occurred in unit 1	Automatic
Unit 2 Comm Error	A communication error to the supply fan, exhaust fan, temp/RH sensors, or secondary controller has occurred in unit 2	Automatic
Unit 3 Comm Error	A communication error to the supply fan, exhaust fan, temp/RH sensors, or secondary controller has occurred in unit 3	Automatic
Unit 4 Comm Error	A communication error to the supply fan, exhaust fan, temp/RH sensors, or secondary controller has occurred in unit 4	Automatic
Unit 5 Comm Error	A communication error to the supply fan, exhaust fan, temp/RH sensors, or secondary controller has occurred in unit 5	Automatic
Unit 6 Comm Error	A communication error to the supply fan, exhaust fan, temp/RH sensors, or secondary controller has occurred in unit 6	Automatic
Unit 7 Comm Error	A communication error to the supply fan, exhaust fan, temp/RH sensors, or secondary controller has occurred in unit 7	Automatic
Unit 8 Comm Error	A communication error to the supply fan, exhaust fan, temp/RH sensors, or secondary controller has occurred in unit 8	Automatic
Unit 9 Comm Error	A communication error to the supply fan, exhaust fan, temp/RH sensors, or secondary controller has occurred in unit 9	Automatic
Unit 10 Comm Error	A communication error to the supply fan, exhaust fan, temp/RH sensors, or secondary controller has occurred in unit 10	Automatic
Too Many Mem Writings	Internal controller error. Reach out to sales for assistance	Automatic
Retain Mem Write Error		Automatic

SERVICE & MAINTENANCE FILTER REPLACEMENT

All systems require a 2” wide MERV 11 or MERV 13 filter upstream of the core in both return and outdoor airstreams. It is recommended to have a service contract to replace filters at least once every 3 months. Note that filter replacement timeframes may differ depending on application and surrounding environment.

Ensure a minimum of 21” of clearance on all 4 sides of the system for filter access. A single 40.38” long filter or double 20.18” long filters in series can be used in each airstream. Standard filters from the factory utilize (2) 20.18” long filters per airstream.

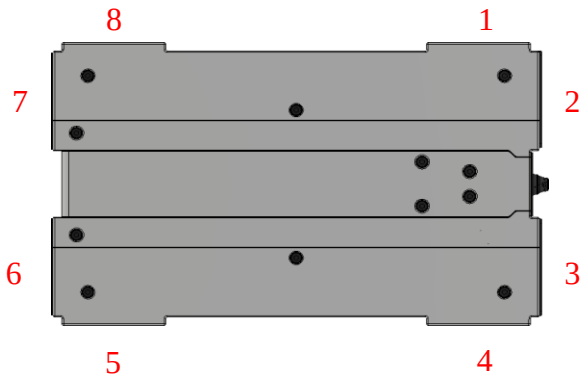
Filter Quantity and Size Per System

System Size	Filter Size	Total Filter Quantity
600	5.13 x 40.38 x 2"	2
	5.13 x 20.18 x 2"	4
1200	5.13 x 40.38 x 2"	4
	5.13 x 20.18 x 2"	8
1800	5.13 x 40.38 x 2"	6
	5.13 x 20.18 x 2"	12
2400	5.13 x 40.38 x 2"	8
	5.13 x 20.18 x 2"	16
3000	5.13 x 40.38 x 2"	10
	5.13 x 20.18 x 2"	20
3600	5.13 x 40.38 x 2"	12
	5.13 x 20.18 x 2"	24
4200	5.13 x 40.38 x 2"	14
	5.13 x 20.18 x 2"	28
4800	5.13 x 40.38 x 2"	16
	5.13 x 20.18 x 2"	32
5400	5.13 x 40.38 x 2"	18
	5.13 x 20.18 x 2"	36
6000	5.13 x 40.38 x 2"	20
	5.13 x 20.18 x 2"	40

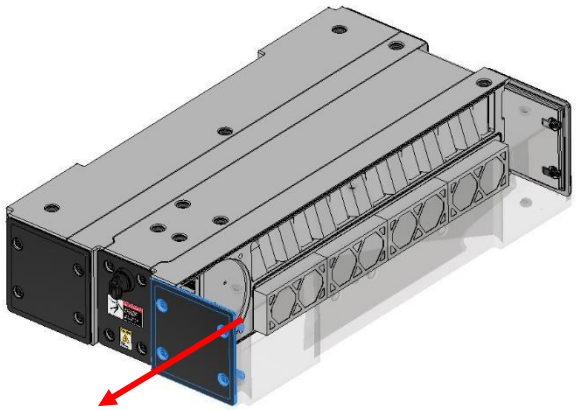
SERVICE & MAINTENANCE

FILTER REPLACEMENT

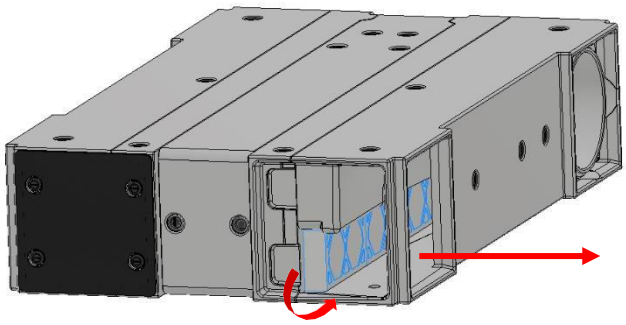
If a 40.38" long filter is used, the filter must be removed from positions 2, 3, 6, or 7. If 20.18" long filters are used, they can be removed from any position as shown below.



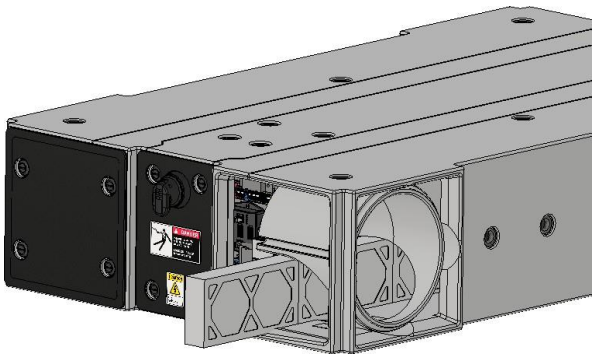
To replace the filter, simply remove the access panel shown below and slide the filter out of its track. Depending on system configuration, the access panel to remove the filter may vary locations from what is shown.



20.18" long filters can be rotated out of its track and removed from either access locations as shown below.



Before taking any access panel off, ensure the disconnect is turned to the "OFF" position. If the optional rotary bypass damper is installed, the filter can be removed by manually rotating the damper in the position shown below and sliding the filter out as indicated earlier. **Note the damper rotates in only one direction.**



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SERVICE & MAINTENANCE

GENERAL MAINTENANCE

To ensure optimal system performance over its lifespan, it is recommended to follow the below general maintenance procedures and timelines. **In all situations, electrical power supply must be disconnected prior to servicing the unit.**

General Maintenance

- Clear any debris within the unit's airstreams whenever the system is serviced.
- Verify all access panels are properly secured and all fasteners are tightened to the required specifications.
- Ensure there is no air leakage between fan cubes or ducting and verify any duct sealant is not dried or cracking.
- Inspect all moving parts for obstructions or irregularities. Correct as needed prior to restarting the system.
- Inspect filters every month and replace at a minimum of once every three months or sooner.

Service Log

Date	Description of Service	Service Representative