

CITY AND BOROUGH OF WRANGELL, ALASKA

INVITATION TO BID

RECREATION CENTER HVACUPGRADES

ADDENDUM TO THE PROJECT DOCUMENTS

Addendum No: 1

Current Bid Date:

December 9, 2022 at 2:00 pm
AK Standard Time

Addendum Date: December 6, 2022

Pages This Addendum: Seventy-six (76), including 2 drawing sheets and supplier information referenced

Previous Addenda: None

To: All Proposers.

The following corrections, changes, additions, deletions, revisions and/or clarifications are hereby made a part of the Documents for the Invitation to Bid for the Recreation Center HVAC Upgrades project. In case of conflicts between this Addendum and previously issued documents, this Addendum shall take precedence. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This addendum _____ does, X does not change the bid opening date.

Item 1: Information only regarding changing out Fanwalls

- Huntair Fanwall Low Profile Backdraft Damper O&M (31 pages)
- Damper Replacement Photo Log (30 pages)

Item 2: SHEET M-001, PART 1, EQUIPMENT SUBSTITUTIONS, SECTION 6

Various substitutions for mechanical equipment have been proposed since this project has gone out for bid. The attached, proposed equipment appear to meet the “or equal” requirements of the mechanical specification on sheet M-001:

- SF-7 fan: A cube style fan with filter bank would be an acceptable substitution for SF-7 if it meets all of the requirements including proper coating. See the attached, representative supplied fan information that appears to meet substitution requirements. See attached Twin City Fan’s proposed submittal for DSI – Square Inline Centrifugal Fan, Direct Drive (4 pages).
 - SF-5, SF-6, RF-8: The Q-PAC submittals that utilizes ECM motors for speed control appears to be an acceptable substitution for SF-5, SF-6 and RF-8. See attached Q-Pac Preliminary Fan Selections (7 pages).
-

Note that the statements above do not alleviate the contractor from the requirements for equipment substitutions. When a substitution is approved, perform additional design and provide equipment and materials to provide a fully operational system meeting the intent of the original design, at no cost to the Owner. Alternate designs shall be submitted for review, and obtain Owner's approval before purchase of equipment. The Contractor is responsible for additional costs to other disciplines related to substitutions.

Item 3: SHEET M-102, Replace Sheet M-102 with attached Sheet M-102 – Addendum No 1

Sheet M-102 – Addendum No 1 adds the following: HC-5 REVISE PIPING AND VALVES. REMOVE P-13, REPLACE 3-WAY CONTROL VALVE WITH OWNER FURNISHED, CONTRACTOR INSTALLED THE 2-WAY. THIS VALVE IS TO BE SUPPLIED BY A SEPERATE CONTROLS CONTRACT AND INSTALLED BY THE CONTRACTOR.

Item 4: SHEET M-103, Replace Sheet M-103 with attached Sheet M-103 – Addendum No 1

Sheet M-103 – Addendum No 1 adds the following: HC-6 REVISE PIPING AND VALVES. REMOVE P-14, REPLACE 3-WAY CONTROL VALVE WITH OWNER FURNISHED, CONTRACTOR INSTALLED THE 2-WAY. THIS VALVE IS TO BE SUPPLIED BY A SEPERATE CONTROLS CONTRACT AND INSTALLED BY THE CONTRACTOR.

END OF ADDENDUM NO. 1

FANWALL® Low Profile Backdraft Damper

Near Zero System Effect



CONSTRUCTION

MODELS

- (5) sizes that serve the 10", 12", 14", 16", 18", 20" and 22" FANWALL cone sizes

FRAME

- Low profile 4" deep non-corrosive extruded aluminum 6063 (T6)
- Integrated
 - Curved inlet
 - Perimeter seal gasket track
 - Bearing track
 - Discharge mounting flange

BLADES

- 1.5" wide non-corrosive extruded aluminum 6063 (T6)
- Integrated blade seal gasket track

BEARINGS

- Low friction sealed metal ball bearings for long life and continuous operation.

MAXIMUM VELOCITY

- 2000 fpm

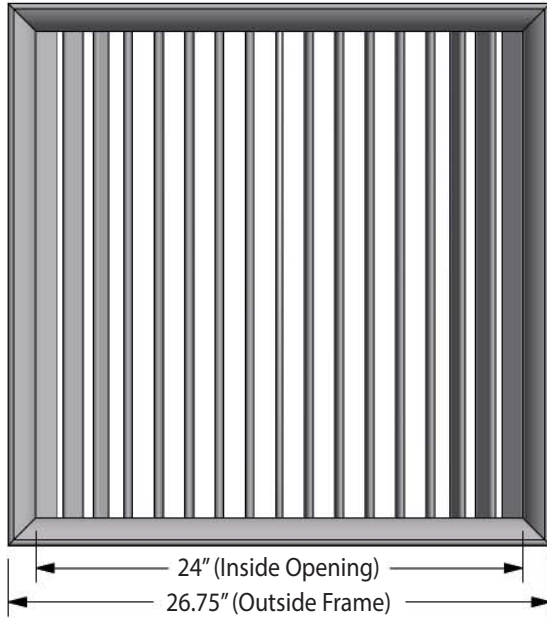
The patent pending FANWALL Low Profile backdraft damper prevents parasitic losses due to backflow through idled fans and motors. It is the only commercially available means that does so automatically and with near zero impact (or system effect) on airflow while fans and motors are operating normally. When closed, the damper has an extremely low leak rate of 3.5 cfm/sq. ft. at 4" static pressure, which is less than half the 8 cfm/sq. ft. at 4" static pressure required for highest Class 1A rating of AMCA Standard 511. Alternative dampers used for the same purpose can introduce 0.5" to as much as 1.25" of static pressure penalty every minute the system is operating, with cataloged leak rates as high as 17.5 cfm/sq. ft. at 1" static pressure when they are closed!



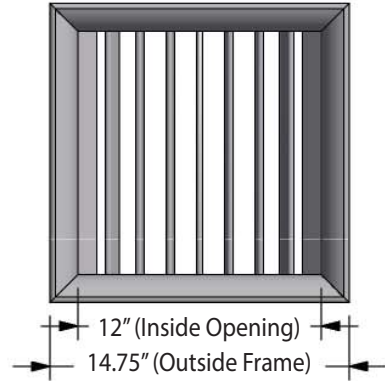
FANWALL® Low Profile Backdraft Damper

Near Zero System Effect

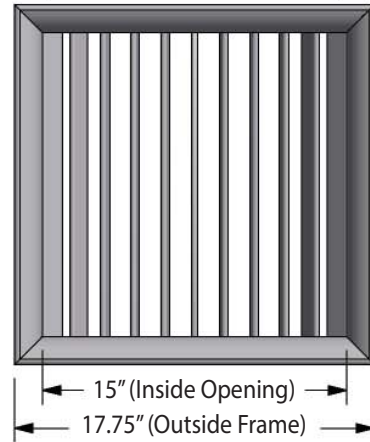
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(Serves the 22" Cone)



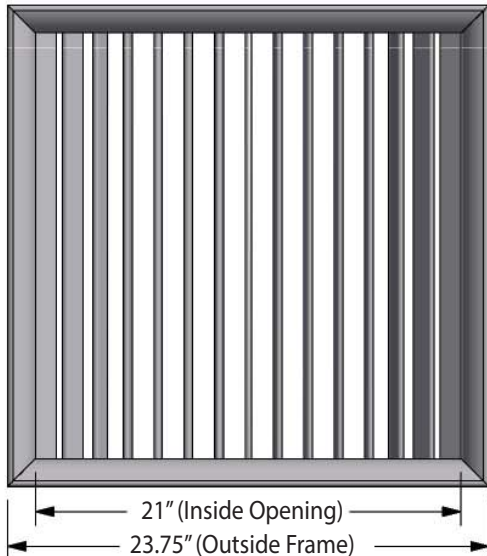
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(Serves the 10" Cone)



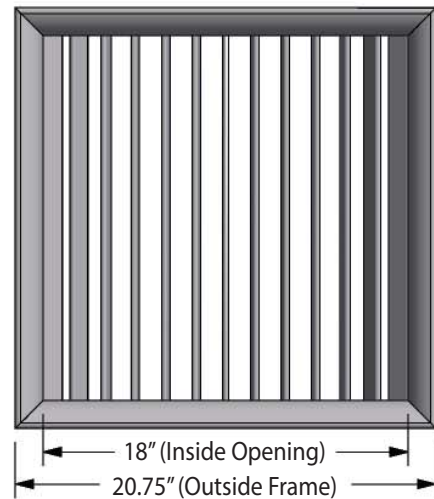
Model #: HBD0210
(Serves the 12" & 14" Cone)



Model #: HBD0214
(Serves the 18" & 20" Cone)



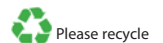
Model #: HBD0212
(Serves the 16" Cone)



www.huntair.com info@huntair.com

Huntair has a policy of continuous product improvement and reserves the right to change design and specifications without notice. This product is covered by one or more of the following U.S. patents (7,137,775; 7,179,046; 7,527,468; 7,597,534; 8,087,877) and other pending U.S. or Canadian patent applications and/or foreign patents. HUNTAIR® is a CES Group Brand. ©2014 CES Group, LLC.

HUN-FWTLPBD-SB-1





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Retrofit Guide

Featuring Generation II Fan Cell Construction

INSTALLATION, OPERATION, AND MAINTENANCE GUIDE



FOR YOUR SAFETY

Improper installation, adjustment, alteration service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

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The manufacturer reserves the right to modify the materials and specifications resulting from a continuing program of product improvement or the availability of new materials.

GENERAL DESCRIPTION

Huntair Fanwall Technology[®] is a fan-array approach to air handler design that uses several smaller fans to replace one larger fan, providing design flexibility, reducing maintenance costs, and increasing energy savings.

Safety Considerations

Installing and servicing air conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install or service air conditioning equipment.

INSTALLATION CODES

Electrical characteristics are shown on the unit rating plate.

The unit shall be carefully installed in accordance with the standards of the National Fire Protection Association (National Electrical Code).

Authorities having jurisdiction should be consulted before installations are made to verify local codes and installation procedures.

INSTALLATION PRECAUTIONS

1. The services of qualified field service personnel are mandatory for safe and proper installation of this equipment.
2. Air volumes and external static pressures that do not coincide with those listed on the rating plate will adversely affect the performance of the unit. Please consult the factory if either of these values change.
3. The following clearances from combustible materials are to be maintained: Top - 6", control side - 48", opposite controls - 6", bottom - 0". If roof curb is provided by others, it must be at least 4" high and constructed from non-combustible material.
4. This unit is designed for installation on a level surface.
5. Do not locate the supply inlet opening within 10' of any exhaust discharge point or within 24" of any obstruction.

Untrained personnel can perform basic maintenance, such as cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on air conditioning equipment, observe precautions in literature and on tags and labels attached to unit.

Follow all safety codes. Wear safety glasses and work gloves.



WARNING

Before installing or servicing system, always turn off main power to system. There may be more than one disconnect switch.

If your unit has permanent magnet motors, high voltage can be generated whenever the motor is rotating, even if power is off. **ALWAYS MAKE SURE MOTORS CANNOT ROTATE DURING SERVICING.**

Turn off accessory heater power if applicable. Electrical shock can cause personal injury or death.

CAUTION: Before proceeding, make sure all electrical service to unit is locked in "Off" position.



Tools needed

T40 Torx Allen Wrench



T40 Torx bit, 4" & 6" lengths and Phillips bit



Screw gun



Wrench set



Parts Provided per fan cell

Motor Assembly (Motor Pedestal, Fan Wheel and Motor).

5/16-18 x 1.125 Torx screw for attaching corner brackets to the extrusions.

3/8-16 x 3/4 Carriage bolts and 3/8-16 Whiz nuts, for bolting the fan cubes together.

10-16 x flat head phil tek screws

10-16 Pan head phil tek screws

#10 x 3/4 tek screws

5/16 x 1.25 fender washers

5/16 flat washer

Perforated side panels

Faceplate (solid)

Side Rail Assembly

Insulation for sides

Inlet cone

Backdraft Damper

Silicone caulking (Alum Gray)

Optional Red and Blue 1/4 O.D. UV resistant Poly Tubing for VFD Controls

Electrical enclosure (if applicable).

Electrical Connections

All electrical wiring and connections including electrical grounding must be made in accordance with the latest edition of the National Electric Code (or the edition your authority having jurisdiction has adopted). There may also be local ordinances that apply.

- a. The Fanwall Technology (FWT) nameplate and the drawings in the submittal package state the line voltage and minimum amperage requirements for this unit. A separate line voltage power supply should be run directly from the building distribution panel to the electrical panel provided on the side of the FWT unit. The quantity of wires and the connection terminals are identified on the wiring diagram in the submittal package. All external wiring must be within approved conduit and have a minimum temperature rating of 90°C.
- b. **IMPORTANT:** If any of the original wire supplied with the unit must be replaced, it must be replaced with type THHN 90°C wire or its equivalent, except for miscellaneous 120 volt control wiring that must be type SJO 90°C.
- c. Refer to the submittal package for other control interface connections.

General Maintenance

HUNTAIR's FANWALL TECHNOLOGY[®] pays careful attention given to balance in the design and construction of the units. Each unit uses standardized precision parts, and is individually spin-balanced at the factory to eliminate vibration. **For this reason, whenever maintenance work is done on the motor or if the fan is removed from the motor shaft, rebalancing the fan is required.**

FANWALL Assembly
DANGER! Risk of Electric Shock

Always disconnect power to the fan control panel before maintenance. Follow all lockout / tag out procedures. Failure to follow these procedures may result in injury or even death.

Verify factory furnished components are complete against enclosed packing list. Each FANWALL retrofit cube is numbered and must be located in the array with #1 on the very top left corner looking from the motor side of the cube. See Images below.



Fancells banded on shipping skid



Cell Identification



Fancells banded on shipping skid and shrink wrapped

1	2	3
4	5	6
7	8	9

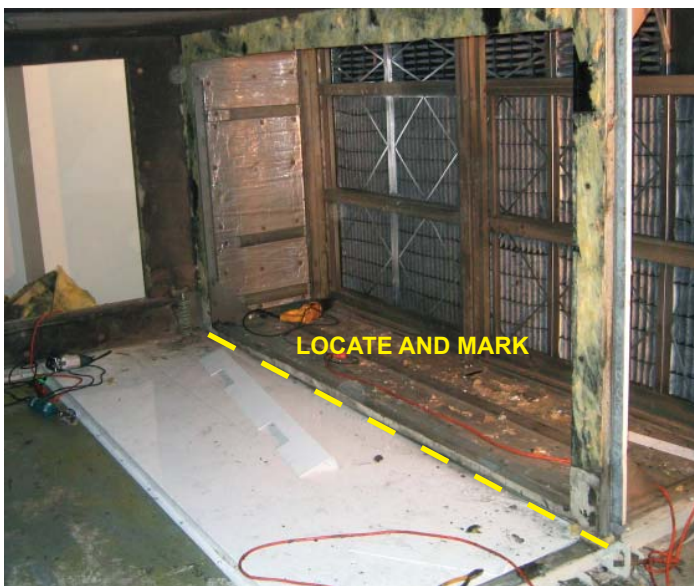
Fan cells are banded to a skid and shrink wrapped for shipment. Cells may or may not be equipped with Coplaner Silencer option.

Individual components such as the motor removal rail, etc. are shipped on a separate skid.

Prior to Demolition of Existing Fan:

Verify that FANWALL cube dimensions are correct and assembled array will fit inside existing air handling unit. Internal dimensions of air handler were provided to HUNTAIR by others.

1. Disconnect power to the existing fan at the main disconnect control panel.
2. Make note of all wire locations for reinstallation later.
3. Disconnect existing fan motor power cable from terminal located in motor J-Box and conduit fitting from J-Box as shown in the demolition drawings.
4. Remove existing fan/motor assembly and clean the area thoroughly.


FANWALL Assembly

5. Make sure that floor on airhandler is flat, level and rigid. Make sure that the fan cubes are setting on structural supports along the front, back also along sides if possible. **Do Not Shim** fan array to bring to level.
6. Determine the offset for the assembled array (from inside panels) on both sides of unit so that the fan array is centered in the air tunnel and mark accordingly.

This section addresses fan cells that were shipped individually due to access restrictions. If your retrofit array was shipped assembled in an array please skip to step 11.

7. Align the first fan cell frame needed at the bottom row, furthest from the access door. Make sure to maintain the correct distance from the unit side panel. Run a bead of Alum gray silicone caulking between inlet plate support members. See Figure 1. Place the next fan cell next to the first one. Line up the corner cubes and slide a 3/8-16 x 3/4 carriage bolt through the square holes in the corner cubes. Finger tighten a 3/8 whiz nut onto the end. Make sure fan cubes are level. Shim as needed. SEE FIGURE 2.
8. Repeat this process until the proper number of fan cell per row has been obtained. To create columns stack fan cells on top of the first row of fan cells, run a bead of caulking along the top of the base cube. Line up the corner cubes and slide a 3/8-16 x 3/4 carriage bolt through the square holes in the corner cubes. Note the configuration of carriage bolts and whiz nuts in FIGURE 3. Once all bolts are in place, tighten to 25 ft-lbs.

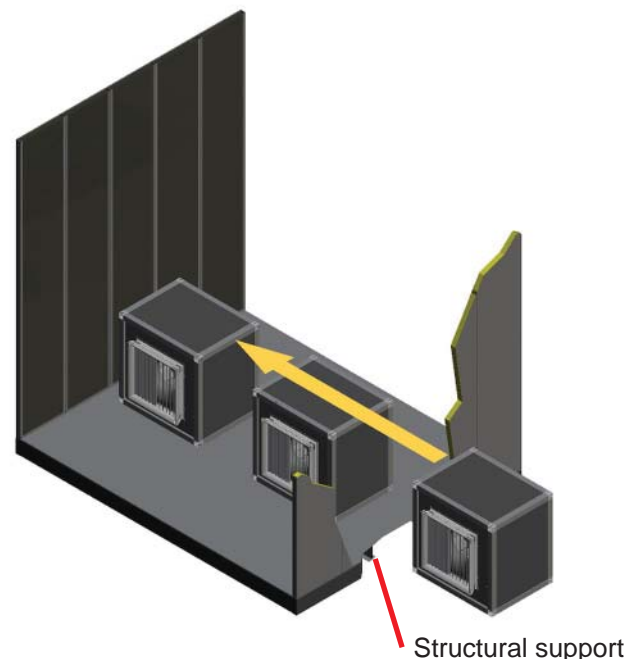


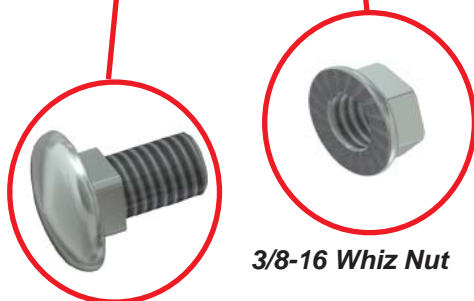
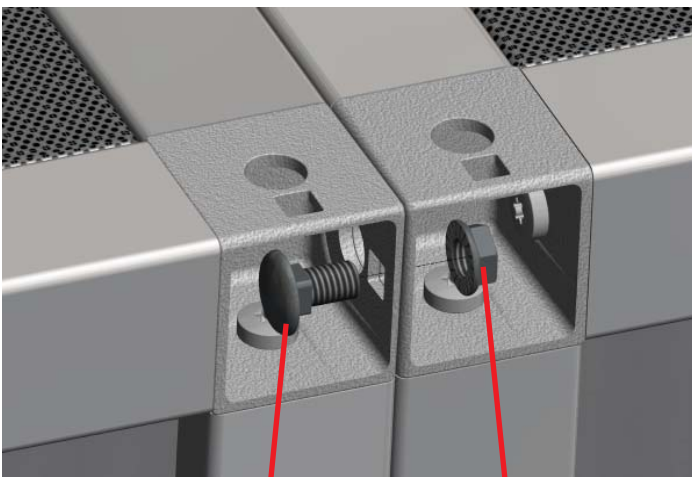


FIGURE 1



Note the configuration of the Carriage Bolts and Whiz Nuts. This configuration allows for easier movement of tools within the corner pieces.

FIGURE 3



3/8-16 x 3/4 Carriage Bolt

3/8-16 Whiz Nut

FIGURE 2

DANGER! Risk of Injury or Death

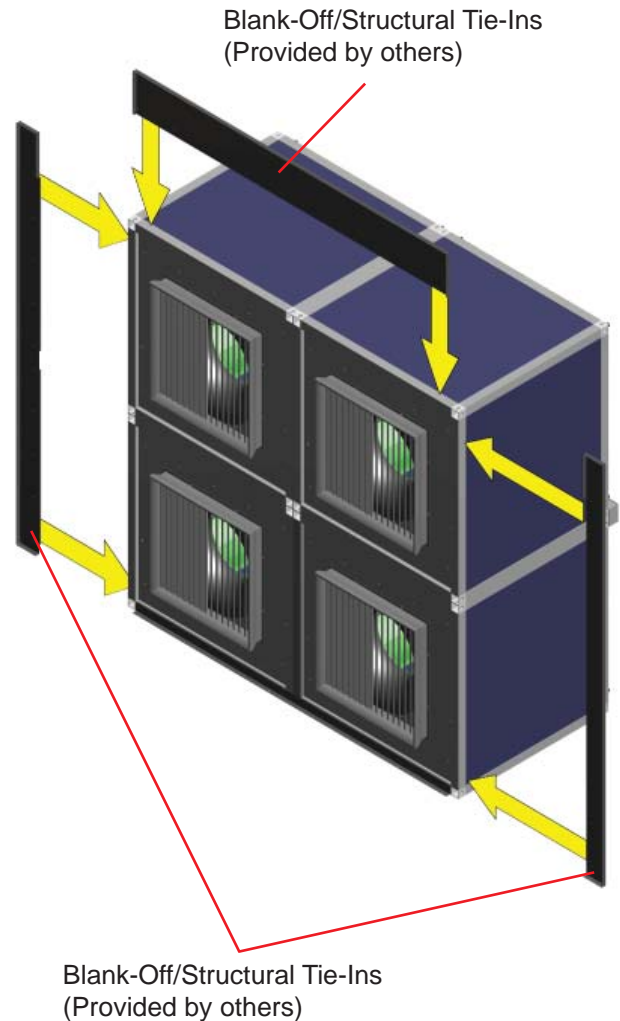
Minimum material gauge for blank-offs, when required 16 gauge minimum. Maximum side and top blank-offs "width" before reinforcement required 12" maximum.
Failure to follow these procedures may result in injury or even death.

Note: All blankoff/structural tie-ins get screws every 10" on center.

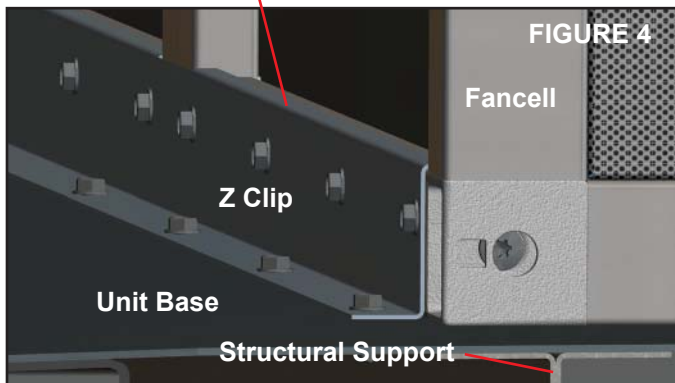
9. Starting on the sides, use #10 x 3/4 tek screws and attach the blankoff/structural tie-in to the leading air side edge of the cube frame extrusion. **(Sheet steel side panels of fan cubes are not structural tie-in points for perimeter blank-off/structural tie-ins).** Make sure to attach to a solid structural support. After both side blankoff/structural tie-ins have been attached, screw top blankoff/structural tie-in to the fanwall then to the side solid structural supports. Be sure that every screw hole in the blankoff/structural tie-ins has a screw. Make sure to caulk all seams around the blankoff/structural tie-ins. Caulk all seams on the the entering leading air side of the fanwall.

10. Once all the insulation and blank-off/structural tie-ins have been installed. Secure the FANWALL to the base by using the Z-clip and #12-24 x 1-1/2" unslotted HWT self tapping tek screws and 1/4 inch flat washer. Make sure to screw into the structural supports. SEE FIGURE 4.

Note: Z-clips are provided for both the inlet and outlet sides of the fan array. Z-clip come with screw holes that are pre-punched.



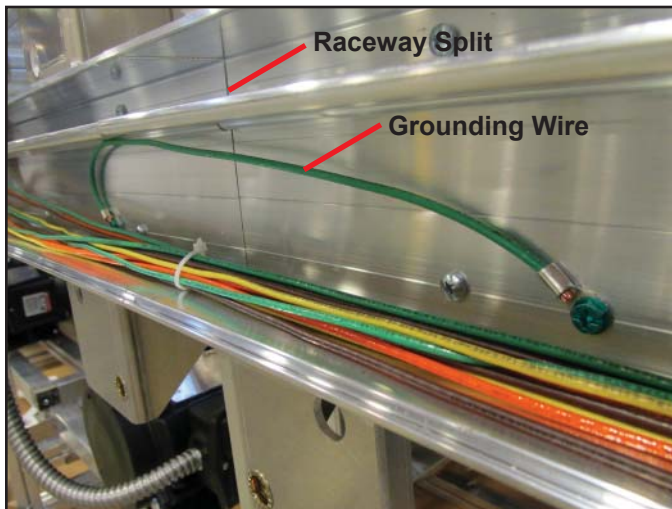
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FANWALL Electrical Installation
DANGER! Risk of Electric Shock

Always disconnect power to the fan control panel before maintenance. Follow all lockout and tag out procedures.

1. Verify fanwall assembly install is complete.
2. Install electrical chase on the discharge side between cells using drive screws. See separate installation design drawings. Attach electrical chase using #10 x 3/4 tek screws. Raceway is noncontinuous, code requires grounding wire pigtail run section to section (by others).

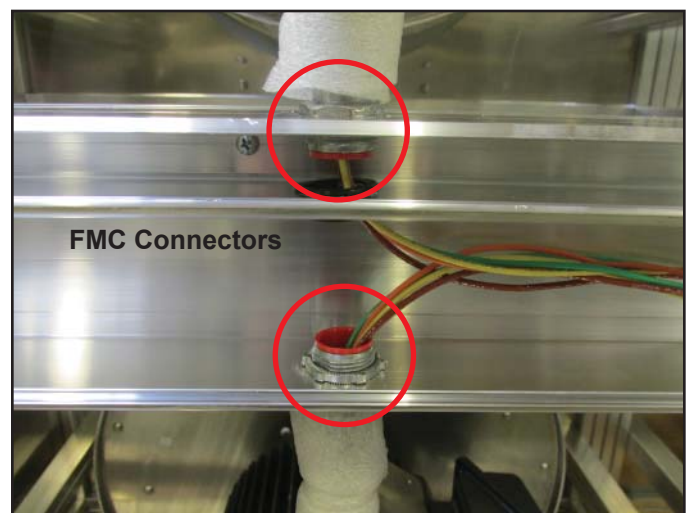
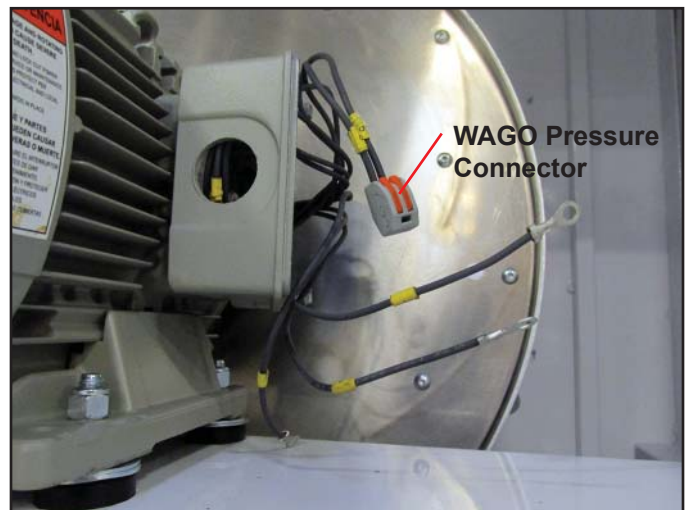
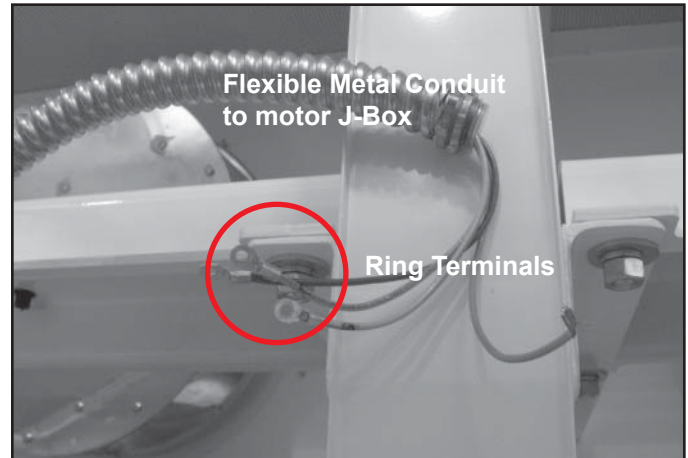


3. Attach FMC (flexible metal conduit) from motor j-box (Pecker head) to electrical chase using FMC connectors.
4. Size wire (per NEC code) and pull from motor(s) to enclosure/j-box.
5. Wire internal motor connection (for 208 volt system).
 - a. Crimp on ring terminals.
 - b. Bolt terminals together for what ever voltage you are using (see motor nameplate).
 - c. First layer wrap with Friction tape (3M Varnished Cambric).
 - c. Second layer with rubber splicing tape (3M 130C).
 - e. Third layer use vinyl tape (3M Super33).

Note: 3 wraps on all taped layers.

For systems with 12 or 14 ga. wiring use WAGO pressure connectors.

6. Hi-pot wires.
7. Connect wires to Enclosure / j-box.



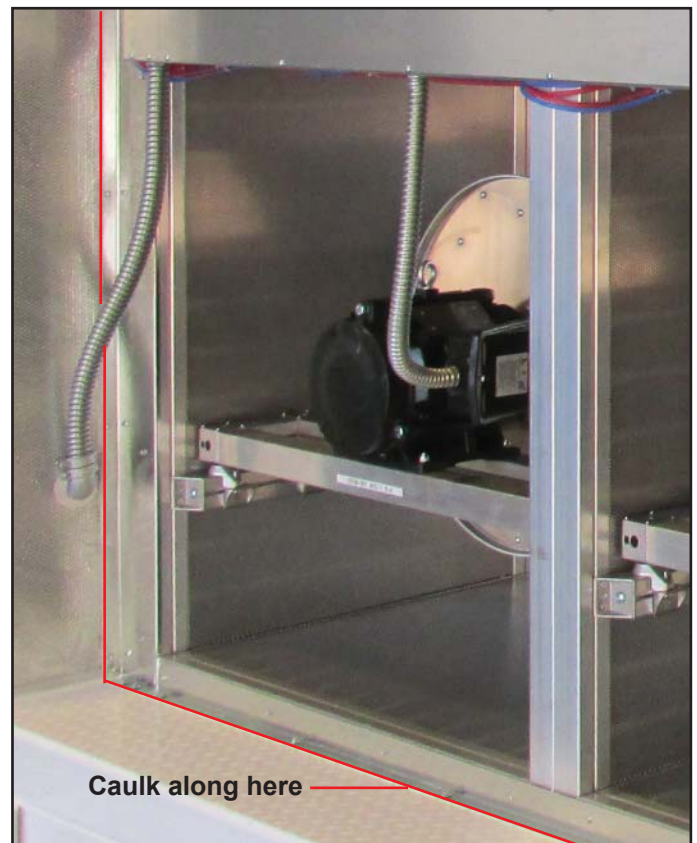
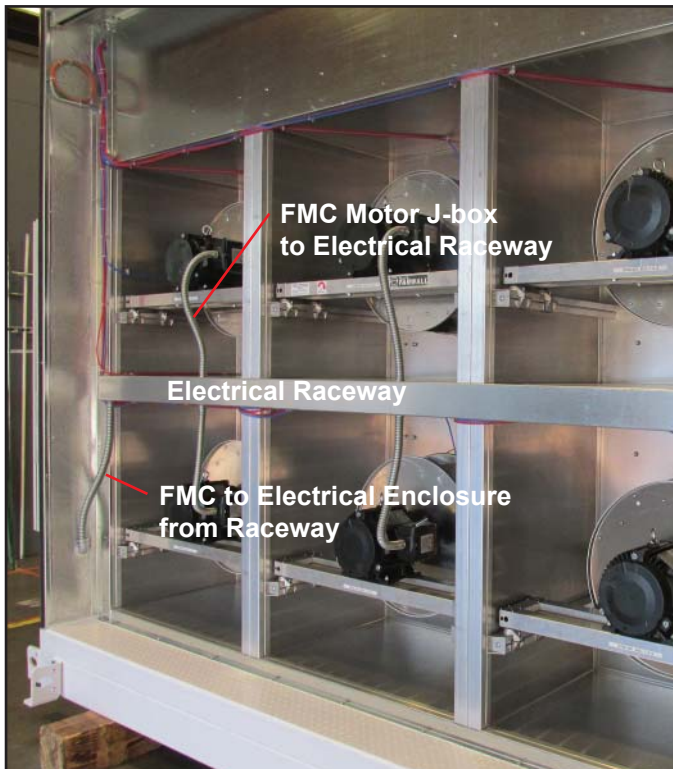
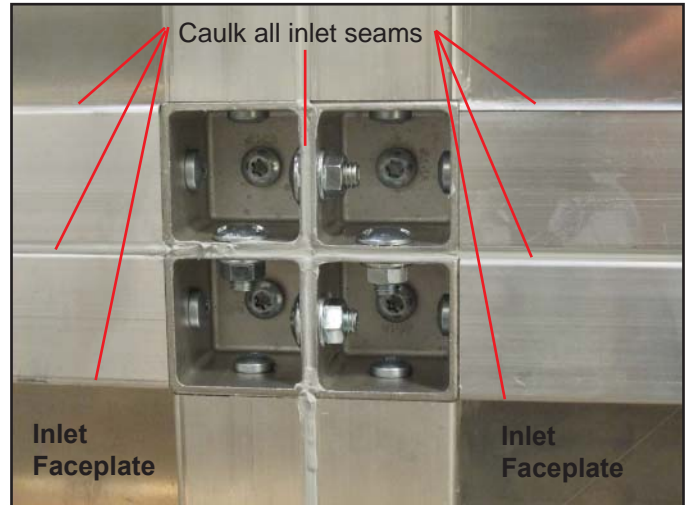
8. Install electrical chase cover.
9. Re-assemble air handling unit walls, doors, safety devices etc. that removed during retrofit per manufacturer's recommendations.
10. Prior to connection to main power check fan wheel/cone alignment per instructions starting on page 10.
11. Perform VFD startup as specified by VFD manufacturer.
12. Verify that the fans are rotating in the correct direction as indicated by the fan rotation sticker and operating at required CFM at design static pressure.

Note: If fans are rotating in the opposite direction of the fan rotation sticker. **DO NOT** correct rotation by switching Line or Load wiring of the drive units. Change rotation by switching wires on the Load side of the MSP.

ELECTRICAL Note

All electrical work must be performed by a licenced electrician. All grounds are pulled continuously thru fanwall chase without splicing to accommodate for box fill calculations.

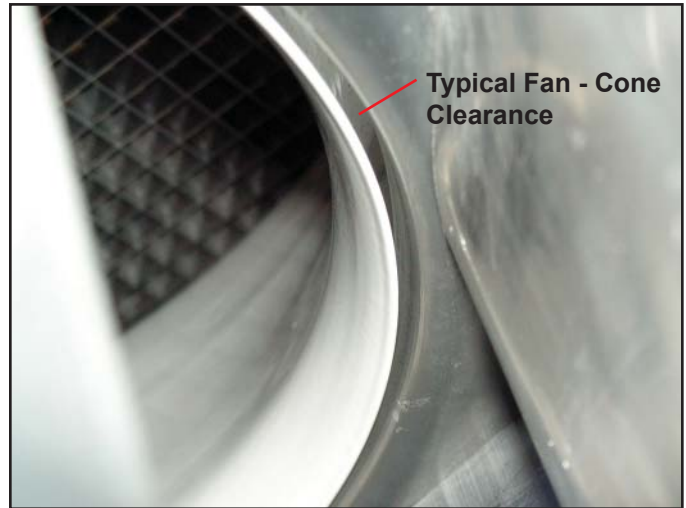
1. After wiring is completed caulk all inlet seams.
2. Caulk the seams between the roof and the blank-offs. Caulk the seams between the side panels and the blank-offs
3. Caulk all flanges bolting the blank-off together and caulk all flanges bolting the blank-offs the the FANWALL array.
4. Caulk seam between the floor and the bottom of the FANWALL array.



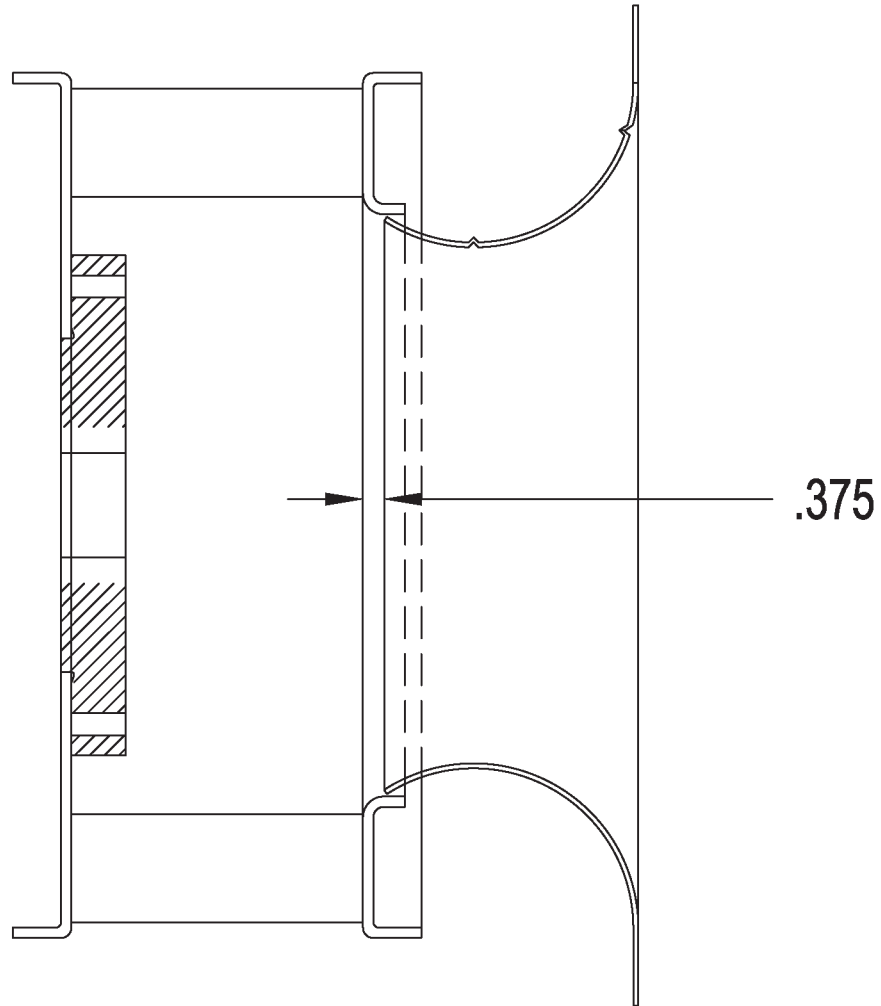
1. Temporarily attach the cone to the cell inlet using the screws and washers provided, or slightly loosen the screws holding the cone if already installed (remove the backdraft damper to access the cone). Use a minimum of four screws for this step.
 - a. Refer to the fan wheel overlap drawings provided to determine where to set the wheel with respect to the cone. See page 11.
 - b. Adjust the amount of overlap by moving the motor pedestal forward or backward to line up the cone with the wheel (wheel/cone overlap is designed to insert the cone 50% of the distance of the rolled shroud lip on the wheel). Once you have the wheel approximately located tighten the ½" pedestal bolts to 90ft-lbs.

2. Center the cone in the wheel shroud.
 - a. The cone alignment can be a tedious process as there are no tools that effectively work to align the cone. It is a hands on process to align the cone. Huntair cones have a running clearance of about 1/16" (see image top right).
 - b. Start by loosening the four screws that were used to hold the cone for the depth alignment. Hold the cone with one hand and with the other use a drill to attach a screw to hold the cone in place. Feel between the wheel inlet shroud and the cone and set the gap to approximately 1/16" and tighten the screw in that location (top of the cone is usually the best place to start). At this point you should be able to move the cone about that screw location, adjust the cone on the left or right until there is approximately a 1/16" gap.
 - c. Spin the wheel by hand at this point to check for any clearance issues. If the wheel spins clear tighten the remaining screws on the cone. Check that the wheel spins clear after tightening each screw.

3. Attach the inlet backdraft damper using the predrilled holes in the faceplate (see middle image).
 - a. Start by loosely installing (don't tighten screws all the way) the top two screws. Align the holes on the sides.
 - b. Loosely install screws on side. Install bottom 2 screws.
 - c. Tighten all screws (middle image).
 - d. Install safety screen on discharge side if applicable.



WHEEL / CONE ALIGNMENT

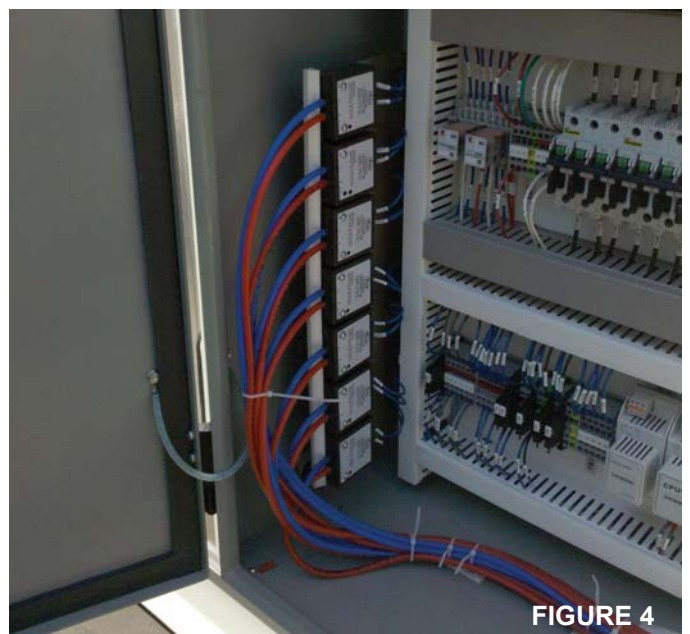
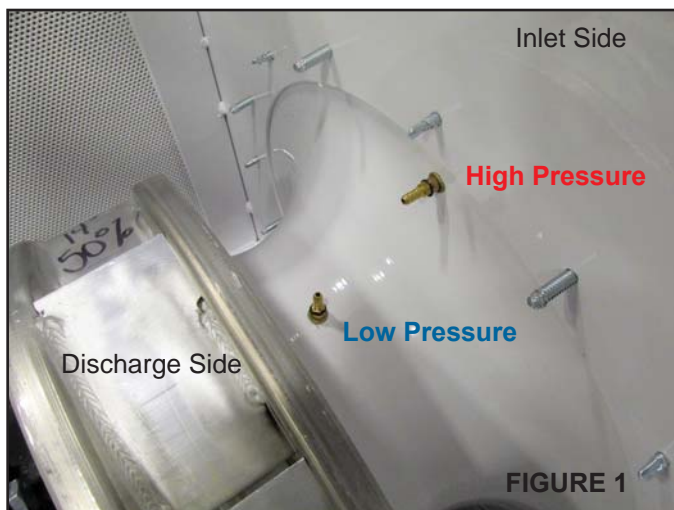
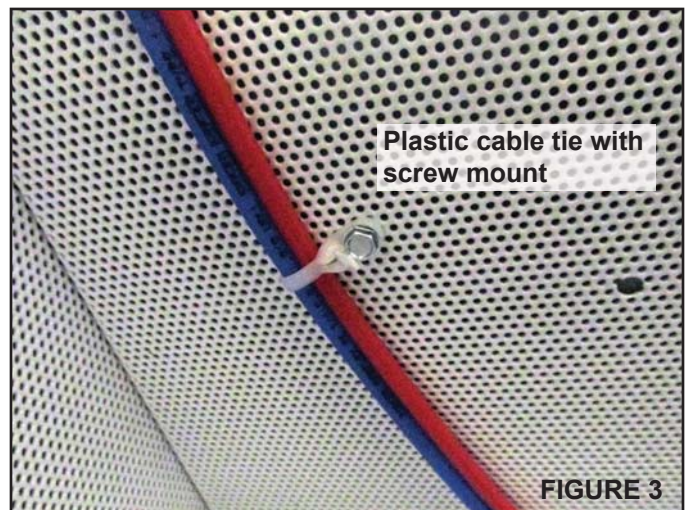


If the retrofit comes with the VFD (variable frequency drive) option use the following steps for installation of the red and blue poly tube.

1. Starting at the cone, connect the red poly tubing to the barbed nipple on the inlet side of the cone. Connect the blue poly tubing to the barbed nipple on the discharge side of the cone. (SEE FIGURE 1)
2. Making sure not to kink the tubing, route the tubing along the top of the fan cells toward the control panel securing tubing as it is being routed. (SEE FIGURE 2)
3. Secure tubing to perf panels with plastic cable tie with screw mount. (SEE FIGURE 3)
4. Install the pressure in-line orifice restrictors on both the high and low pressure tubing no less than 4ft from pressure transducers. Restrictors can be installed in either direction.



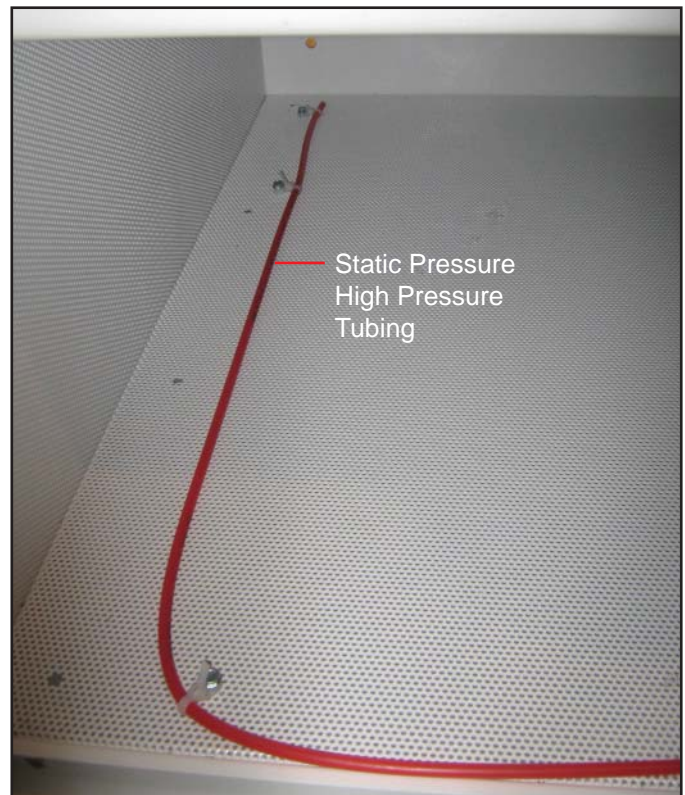
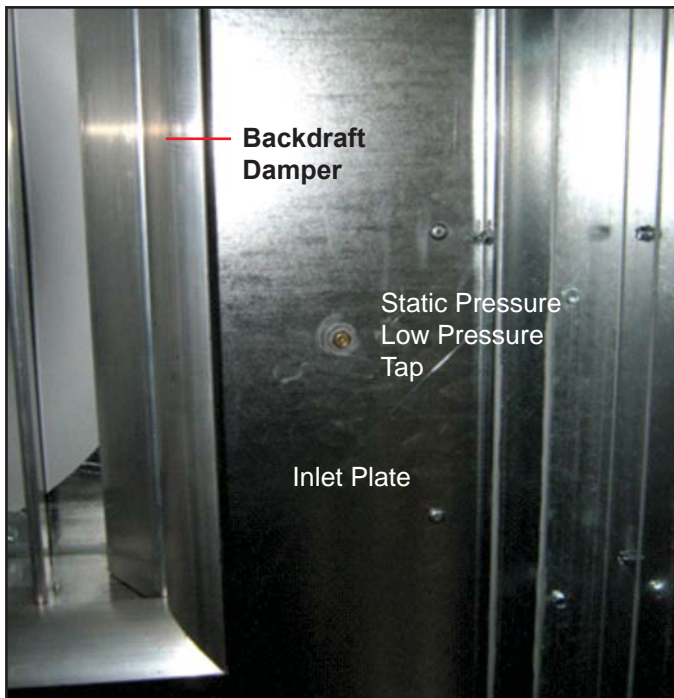
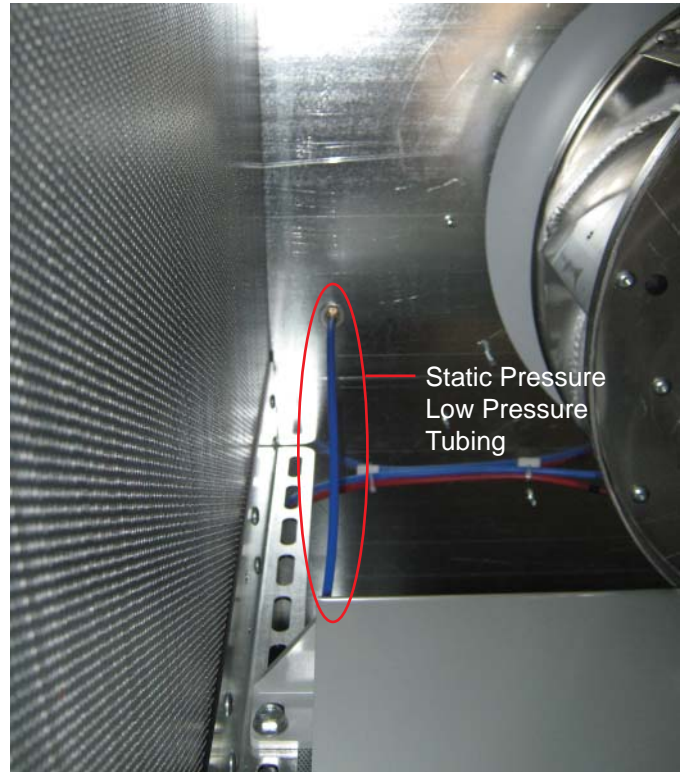
5. Route tubing to the control panel. Attach tubing to the transmitters. See figure 4 for transmitter location and see electrical schematics for which transmitter is designated to which fan.



Static pressure measuring tubing installation

1. Install the low pressure tap and blue tubing in the upper left most fan cell. Drill hole for tap half way between the bottom two bolts of the damper and center between the damper and the outer edge of th inlet plate.
2. Install the hight pressure red tubing in the upper left most fan cell. Make sure to install the tube on the bottom left hand side of the fan cube. Make sure that the end of the tube is within an inch of the inlet plate.
3. Route static pressure tubing along the same path as the air monitoring tubing to the electrical panel.
4. Install the pressure in-line orifice restrictor on both the high and low pressure tubing no less then 4-ft from pressure transducers on the unit.

Note: In-line orifice restrictor can be installed in either direction.



CAUTION: This unit has rotating parts, high voltage, and possibly high temperature solutions or components. Safety precautions must be exercised during installation, operation and maintenance. Service should only be performed by a qualified technician who has been specially trained to service air conditioning equipment.

PRELIMINARY INSPECTION

1. Disconnect all power to unit. Lockout and label all disconnect means to prevent accidental power application.
2. Verify that all field electrical wiring and connections including electrical grounding are made in accordance with the National Electrical Code and local codes. Verify that supply voltage(s) agree with unit data plate. Check all wiring for completeness and terminals for tightness.
3. Inspect all supplementary cooling (if any) piping for leaks and conformance with the Uniform Plumbing Code and local codes.
4. Remove supply and exhaust fan compartment covers and make sure all steel banding, bolts and wood braces installed for shipping have been removed from fans prior to starting the unit.
5. Remove filter section access panel and ensure all filters are securely in place. Replace and secure the access panel.
6. Check all unit manual reset devices and reset if necessary.
7. Check supply and exhaust ducts for obstructions and damper positions and open all diffusers.

FAN START-UP

1. Open the fan access door and inspect the fan and drive assembly. A typical fan and motor arrangement using Fanwall Technology is shown above.
2. Before operation, start the motor slowly to ensure the fan rotation is correct. It should be rotating "CWR" when looking at the motor end. If the fan wheel is not rotating correctly, check the motor power leads for proper installation. Also check inlet cone alignment to the fan wheel. Fan wheel should not be rubbing on the inlet cone. If cone alignment is required loosen the retaining fasteners for the cone and adjust cone for proper clearance from fan wheel.
3. Replace and fasten down the fan housing access panel.



FAN / MOTOR ARRANGEMENT

AIRFLOW VERIFICATION

IMPORTANT NOTE: Air quantities as specified on the unit data plate are essential for safe and economic operation. The unit fan RPMs were carefully set at the factory to deliver the specified air quantity at the specified external static pressure. We cannot overemphasize that these values be field verified as external static pressures are often found to be different than what was anticipated.

- a. Air volume measurements should be made using AMCA suggested methods. This would normally be a traverse of the supply duct or ducts. For test and measurement guidelines, write to: AMCA, 30 West University Drive, Arlington Heights, IL 60004
- b. Start the fan, observe the motorized inlet air damper (if any) to be certain that it fully opens (90°). Check the fan for proper rotation.
- c. Measure airflow and compare to the value stamped on the CSU data plate. Adjust the supply fan motor drive pitch to increase or decrease the fan speed until the desired airflow is reached.
- d. Once the proper air volume has been established, check the supply motor AMP draw against the motor nameplate full load amp's to be sure the motor is not overloaded. All access doors must be closed while checking amps.

Fan Wheel/Motor Replacement

DANGER! Risk of Electric Shock

Always disconnect power to the fan control panel before maintenance. Follow all lockout and tag out procedures.


DANGER! Risk of Shock

Always disconnect power to the fan motor before maintenance. Follow all lockout and tag out procedures.

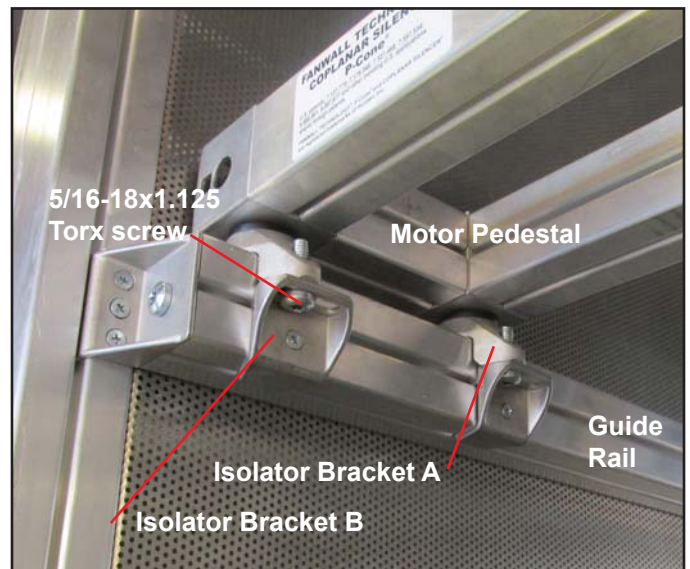
If your unit has permanent magnet motors, high voltage can be generated whenever the motor is rotating, even if power is off. **ALWAYS MAKE SURE MOTORS CANNOT ROTATE DURING SERVICING.**



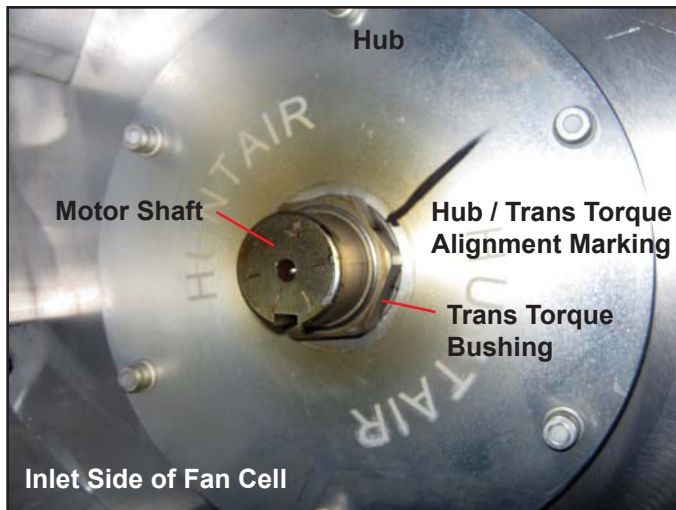
Note: Tools required for fan removal include torque wrench with 12" extension, 1-3/4" socket, and a length of pipe or wood block to brace fan wheel from spinning.



1. To replace a fan wheel/motor assembly, first disconnect power to the FWT at the main control panel.
2. To gain access to the fan/motor cartridge, remove the personnel safety screen on the discharge side if applicable.
3. Disconnect power to the existing fan at the main disconnect control panel.
4. Make note of all wire locations for reinstallation later.
5. Disconnect existing fan motor power cable from terminal located in motor J-Box and conduit fitting from electrical chase.
6. Loosen and remove (4) 5/16-18x1.125 Torx screws at the bottom of Isolator Bracket B that retain the motor pedestal to the guide rails.
7. After removing the mounting bolts slide the motor pedestal to the point where the motor lifting ring is exposed enough to use. If a mechanical device is available for use, attach it to the lifting ring for use. Lift the motor/fan/pedestal assembly and turn 180°. Set back down on the motor guide rails so that the fan is now facing you.



8. Push the pedestal back in to the fan cell so that the fan wheel is in the cell. Block the fan from rotating by using a wood block or a pipe.
9. Mark the location of the transtorgue bushing on the shaft and the fan. To remove the fan wheel from the motor shaft, remove the trans torque bushing retaining hex nut by turning counterclockwise. Loosen progressively until bushing is free from wheel hub and motor shaft. Remove fan/hub assembly.
10. If needed the motor may now be removed for service by removing the 3/8" motor bolts.



11. With the motor pedestal on the guide rails that run front to back along the cell, set the motor on the pedestal using the same holes. Use proper lifting techniques, crane or motor/rail system if possible for lifting the motor into position. Once the motor is placed on the pedestal align the bolt holes on the motor to the bolt holes on the pedestal making sure that the motor shaft is pointing towards you.
 - a. Next, insert 3/8" bolts into the holes from the underside, make sure to use a standard washer on the bolt side, only a locknut is required on the motor side.
 - b. Square the motor and tighten the bolts to 40 ft-lbs.
12. Reinstall the fan on the motor shaft with the hub facing towards you. Line up the markings on the hub/trans torque bushing/shaft. Make sure that the trans torque bushing nut is flush to the hub, tighten the bushing nut to 80 ft-lbs.
13. Once the fan/motor/pedestal assembly is done, turn it 180° so the fan is facing the inlet of the fan cell. Slide the pedestal forward lining up Isolator Brackets A & B.
 - a. Insert (4) 5/16-18x1.125 Torx screws into the holes. Do not tighten down all the way. Leave loose so that the motor assembly can slide back and forth freely.
14. Follow Fan / Cone Alignment procedures starting on page 10.

Important: Before Restarting

Re-balance fan wheel once the complete motor pedestal/fan wheel/motor assembly is re-installed.

Before operation, start the motor slowly to ensure the fan rotation is correct.

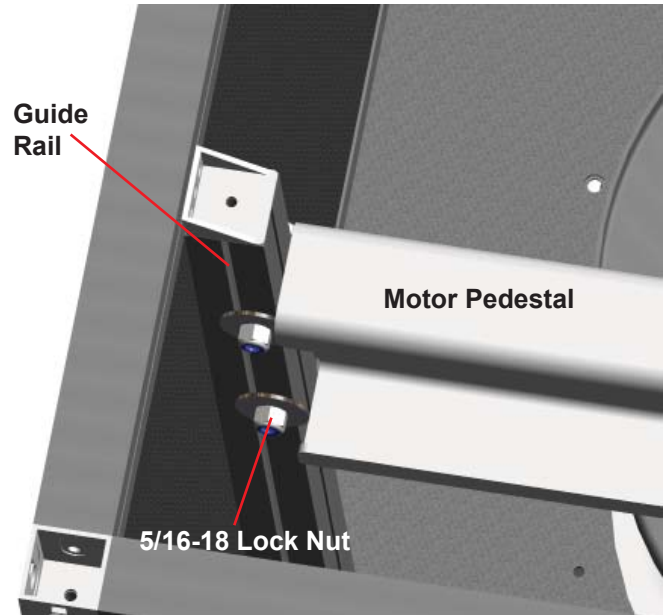
Drive Side = Clockwise rotation when looking at motor end
Inlet side = Counter-clockwise rotation looking at fan.

Extruded Fan Cell W/Formed Pedestal Fan Wheel/Motor Replacement

DANGER! Risk of Electric Shock

Always disconnect power to the fan control panel before maintenance. Follow all lockout and tag out procedures.

Note: Tools required for fan removal include torque wrench with 12" extension, 1-3/4" socket, and a length of pipe or wood block to brace fan wheel from spinning.



1. To replace a fan wheel/motor assembly, first disconnect power to the FWT at the main control panel.
2. To gain access to the fan/motor cartridge, remove the personal safety screen on the discharge side if applicable.
3. Disconnect power to the existing fan at the main disconnect control panel.
4. Make note of all wire locations for reinstallation later.
5. Disconnect existing fan motor power cable from terminal located in motor J-Box and conduit fitting from electrical chase.
6. Loosen and remove (4) 5/16-18 lock nuts at the bottom of the guide rails.
7. After removing the mounting bolts slide the motor pedestal to the point where the motor lifting ring is exposed enough to use. If a mechanical device is available for use, attach it to the lifting ring for use. Lift the motor/fan/pedestal assembly and turn 180°. Set back down on the motor guide rails so that the fan is now facing you.
8. Push the pedestal back in to the fan cell so that the fan wheel is in the cell. Block the fan from rotating by using a wood block or a pipe.
9. Mark the location of the transtorgue bushing on the shaft and the fan. To remove the fan wheel from the motor shaft, remove the trans torque bushing retaining hex nut by turning counterclockwise. Loosen progressively until bushing is free from wheel hub and motor shaft. Remove fan/hub assembly.
10. If needed the motor may now be removed for service by removing the 3/8" motor bolts.
11. With the motor pedestal on the guide rails that run front to back along the cell, set the motor on the pedestal using the same holes. Use proper lifting techniques, crane or motor/rail system if possible for lifting the motor into position. Once the motor is placed on the pedestal align the bolt holes on the motor to the bolt holes on the pedestal making sure that the motor shaft is pointing towards you.
 - a. Next, insert 3/8" bolts into the holes from the underside, make sure to use a standard washer on the bolt side, only a locknut is required on the motor side.
 - b. Square the motor and tighten the bolts to 40 ft-lbs.
12. Reinstall the fan on the motor shaft with the hub facing towards you. Line up the markings on the hub/trans torque bushing/shaft. Make sure that the trans torque bushing nut is flush to the hub, tighten the bushing nut to 80 ft-lbs.
13. Once the fan/motor/pedestal assembly is done, turn it 180° so the fan is facing the inlet of the fan cell. Slide the pedestal forward to the line up with the holes in the motor rail.
 - a. Insert 5/16 x 18 bolts into the holes. Hand tighten the nuts for now.
14. Follow Fan / Cone Alignment procedures starting on page 10.

Extruded Fan Cell Fan Wheel/Motor Replacement Continue

15. For removing polymer fan wheel, you start by removing the two set screws in the taper lock bushing.
16. Reinsert one set screw in the middle hole and start tightening the set screw. This will separate the taper lock bushing from the fan wheel hub.
17. Once the two have been separated, carefully remove the taper lock bushing from the motor shaft. Make sure not to damage the polymer fan wheel when removing the taper lock bushing. Once the polymer fan wheel has been removed from the motor shaft, place taper lock bushing back into the fan wheel hub. Align the three half holes in the bushing with the half holes in the fan wheel hub. Reinsert set screws far enough so that the bushing and set screw do not fall out of the fan wheel hub.
18. Replace bad motor on the pedestal. After the new motor has been installed on the pedestal, align the keyway in the bushing to the keyway on the motor shaft and carefully slide fan wheel on.
19. In an alternating pattern, tighten set screws. Make sure the fan wheel is no less than 1/4 inch from the shaft bearing. Torque set screws to the specs in the table below.
20. Inspect polymer fan wheel for any cracks or damage.
21. Once the fan/motor/pedestal assembly is done, turn it 180° so the fan is facing the inlet of the fan cell. Slide the pedestal forward lining up Isolator Brackets A & B.
 - a. Insert (4) 5/16-18x1.125 Torx screws into the holes. Do not tighten down all the way. Leave loose so that the motor assembly can slide back and forth freely.
22. Follow Fan / Cone Alignment procedures starting on page 10.

Important: Before Restarting

Re-balance fan wheel once the complete motor pedestal/fan wheel/motor assembly is re-installed.

Before operation, start the motor slowly to ensure the fan rotation is correct.

Drive Side = Clockwise rotation when looking at motor end

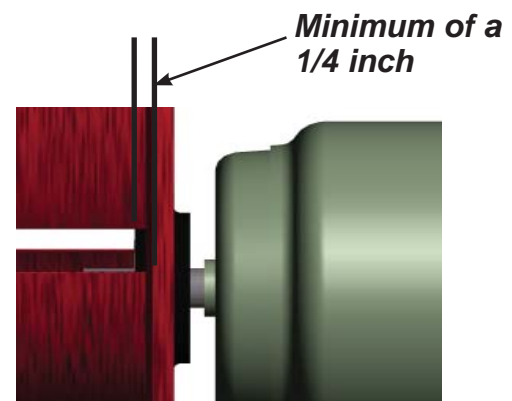
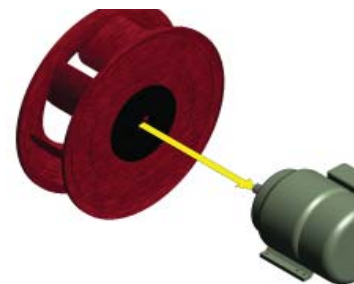
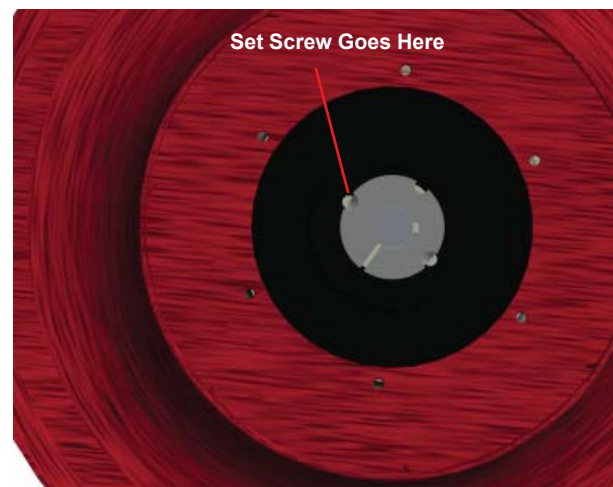
Inlet side = Counter-clockwise rotation looking at fan.

Polymer Fan Wheels:

Drive Side = Counter-clockwise rotation when looking at motor end

Inlet side = Clockwise rotation looking at fan.

Recommended Torque	
Bushing No.	LB. – Ft.
1210	15
2012	24
2517	36



Extruded Fan Cell w/Polymer Wheel and ECMI motor Replacement

DANGER! Risk of Electric Shock

Always disconnect power to the fan control panel before maintenance. Follow all lockout and tag out procedures.

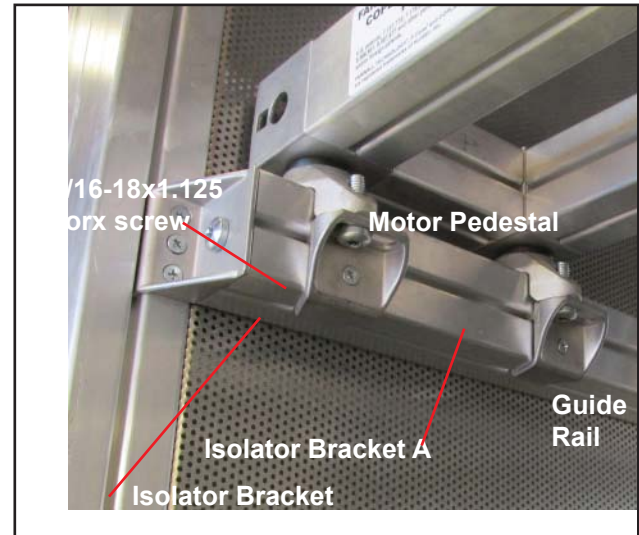
1. To replace a fan wheel/motor assembly, first disconnect power to the fan control panel.
2. To gain access to the fan/motor cartridge, remove the personal safety screen on the discharge side if applicable.
3. Disconnect power to the existing fan at the main disconnect control panel.
4. With a T20 Torx bit, remove the back plate on the ECMI motor.
5. Make note of all wire locations for reinstallation later.
6. With a small straight screw driver. Loosen the terminal block screws and remove the power and data cable wires.
7. Loosen and remove (4) 5/16-18x1.125 Torx screws at the bottom of Isolator Bracket B that retain the motor pedestal to the guide rails.
8. After removing the mounting bolts slide the motor pedestal to the point where the motor lifting ring is exposed enough to use. If a mechanical device is available for use, attach it to the lifting ring for use.
9. Slowly raise the motor/fan wheel/pedestal and remove from the fan cell. Slowly lower the motor/fan wheel/pedestal to the floor.
10. Removing the 3/8" motor bolts and attach the replacement motor and fan wheel, and insert the 3/8" motor bolts and finger tighten.
11. Lifting the motor/fan wheel/pedestal into position. Square the motor and tighten the bolts to 40 ft-lbs.
13. Slide the pedestal forward lining up Isolator Brackets A & B. Insert (4) 5/16-18x1.125 Torx screws into the holes. Do not tighten down all the way. Leave loose so that the motor assembly can slide back and forth freely.
14. Follow Fan / Cone Alignment procedures starting on page 10.

Important: Before Restarting

Before operation, start the motor slowly to ensure the fan rotation is correct.

Drive Side = Counter-clockwise rotation when looking at motor end

Inlet side = Clockwise rotation looking at fan.



Motors are provided with a means to minimize electrical pitting due to arcing across bearings. Motors provided with hybrid ceramic bearings require no maintenance. Motors with an external spring-loaded shaft grounding stick should be checked after 3 years of run time for active length on the grounding stick, and every year thereafter, and replaced if necessary.

Every Six Months

1. Check supply fan and/or exhaust fan wheels for dirt and grease accumulation. Clean as necessary. Do not use caustic cleaning solutions.
2. If applicable, clean/replace fan filters on the electrical enclosures.

Yearly

1. Lightly lubricate damper bushings and associated linkage. Use a petroleum-based penetrant and corrosion inhibitor lubricant.
2. Lightly lubricate control valve linkage.

Every Two Years

1. Examine unit housing for signs of corrosion. Clean, replace or touch up with paint, as necessary.

Please Direct Service Needs To:

HUNTAIR Customer Service Manager:

Phone: (503) 639-0113

Fax: (503) 639-1269

Email: service@huntair.com

Address: 19855 SW 124th Ave.

Tualatin, OR. 97062

<u>What Happened</u>	<u>Probable Cause</u>	<u>Possible Solution</u>
Fan fails to start	<ol style="list-style-type: none"> 1. No main power supply. 2. Tripped overloads on motor starters. 3. Tripped lock-out device such as damper or door interlock switches if so equipped. 	<ol style="list-style-type: none"> 1. Check main power fuses and replace if necessary. Check disconnect switch. 2. Excessive current draw. Reset overloads and check operating current of motor. 3. Check linkage to switch. Check voltage supply to switch.
Excessive vibration and noise	<ol style="list-style-type: none"> 1. Fan isolator shipping restraints have not been changed to operating position. 2. Worn Motor bearings. 3. Check Fan wheel setscrews and bolts for tightness. 	<ol style="list-style-type: none"> 1. See Submittal for shipping restraint release procedure. 2. Inspect bearings. 3. Tighten or replace as required.
Motor fails to start	<ol style="list-style-type: none"> 1. Motor overloaded. 2. Improper supply voltage. 	<ol style="list-style-type: none"> 1. Check for proper fan rotation. Check for excessive cfm and/or static pressure. 2. Check for proper wiring at motor. Check voltage at motor.
Fan capacity to low	<ol style="list-style-type: none"> 1. Incorrect fan rotation. 2. Fan RPM to slow. 3. High external static pressure. 4. Dampers improperly positioned. 5. Airflow is restricted. 	<ol style="list-style-type: none"> 1. Check fan rotation on drive side. 2. Verify fan RPM vs design RPM. 3. Check actual static pressure against fan design pressure. 4. Verify proper damper position. 5. Inspect inlet dampers, and filters for restricted airflow.

VFD UNIT MODELS

Huntair recommends that the following FWT Start-up Report be performed on each unit and the results filed with the appropriate facility engineering office.

Unit Nameplate Data:

Model No.

Serial No.

Supply CFM:

Supply HP:

Exhaust/Return CFM:

Exhaust/Return HP:

Mechanical System Checks

- 1 Visually inspect fanwall for damage.
 - a. On Discharge side look for damage to Fans, Motors, Cells, etc.
 - b. On Inlet side look for damage to inlet straightening grid and frame as well as cells.
- 2 Fan Wheel / Motor
 - a. Rotate fan wheel by hand to ensure it is properly aligned with inlet cone.
 - b. Check motor bearings as fan wheel is rotating. Bearings should operate freely and be free of noise.
 - c. Check that the shaft grounding kit has been installed correctly.
 - d. Check backdraft damper for smooth operation if supplied. Open damper by hand to ensure a full range of motion without obstruction.
- 3 HVAC System
 - a. Check that all ducts, dampers and registers are set.
 - b. Check that all openings and penetrations are sealed.

Electrical System Checks

- 1 De-Energized
 - a. Check for any loose connections
 - b. Check circuit breaker disconnect mechanisms / Mechanical interlocks operate properly
 - c. Check VFD size and rating (voltage and horsepower)
 - d. Check and set motor start protectors (MSP) for correct size and setting.
 - e. Ensure all system components are adjusted to proper settings (temperature, amperage)
- 2 Energized
 - a. Connect proper input voltage power to line side of panel
 - b. Energize incoming power circuit.
 - c. Check for proper line voltage.
 - d. Check voltage between all neutral terminations and panel ground (should be zero volts)
 - e. Check internal power supplies for proper voltage output(s) and adjust as required
 - f. Test and verify proper operations of all GFCI devices
 - g. Check operation of cabinet cooling fans, adjust thermostat as specified on drawing
 - h. Check and record all voltage readings
 - i. Energize MSP one at a time to ensure correct motor rotation.
 - j. Ensure that CFM monitoring system is functioning (if applicable).

Comments

JOB NAME _____

JOB # _____

Unit Tag # _____

CAUTION: Read and familiarize yourself with the installation and operating instructions shipped with unit.

1. GENERAL UNIT INSPECTION:

- a. Is there any shipping or rigging damage?
 Yes No N/A
- b. Is there any damage to the seals at joints and seams?
 Yes No N/A
- c. Is the unit level?
 Yes No N/A
- d. Is the unit clearance from combustible material?
 Top — 6" Yes No N/A
 Control side — 48" Yes No N/A
 Opposite controls — 6" Yes No N/A
 Bottom — 0" Yes No N/A

Follow the instructions for initial start-up and put unit into operation.

2. FAN SYSTEM:

- a. Was the fan and drive assembly inspected?
 Yes No N/A
- b. Is the fan rotating in the correct direction?
 Yes No N/A
- c. Does fan rotate freely without rubbing on cone?
 Yes No N/A

All cooling system checks must be made with heat/cool changeover control set lower than ambient temperature.

3. WATER SYSTEM:

- a. Are all the water supply and drain connections connected and tight?
 Yes No N/A
- b. Is power supplied to the unit?
 Yes No N/A
- c. Are all the water level switches off?
 Yes No N/A

3. WATER SYSTEM CONTINUE:

- d. Was each level switch manually toggled and checked that they are closed?
 Yes No N/A
- e. Was PRV installed on the supply line and set at 20 lbs?
 Yes No N/A
- f. Was stage valves 1 and 2, cycle valve, and bleed cycle valve individually opened and operating correctly?
 Yes No N/A
- g. Was water flowing through the media after stage 1 valve was open, pump activated, and UV light if any was turned on?
 Yes No N/A
- h. If there is a stage 2. Was water flowing through media when valve pump was turned on?
 Yes No N/A
- i. Is float valve functioning correctly and not sticking?
 Yes No N/A
- j. Did water go through media after stage valves were opened and supply flush valve opened?
 Yes No N/A
- k. Pump
 Yes No N/A
- l. Pump Status:
 Yes No N/A
- m. Level Switches:
 Low: Yes No N/A
 High: Yes No N/A
 High High: Yes No N/A
- n. Drain:
 Yes No N/A
- o. Fill:
 Yes No N/A
- p. Flush:
 Yes No N/A
- q. Stage 1:
 Yes No N/A
- r. Stage 2:
 Yes No N/A
- s. UV:
 Operational: Yes No N/A
 Status: Yes No N/A
- t. Conductivity meter set:
 Yes No N/A

4. AIR SUPPLY:

- a. Was each damper visually inspected for impedance of movement and complete linkage?
 Yes No N/A
- b. Are dampers mounted straight and solid?
 Yes No N/A
- c. Is the actuator drive shaft connection tight?
 Yes No N/A
- d. Did the all damper actuators open 100% open and 100 % closed when operated?
 Yes No N/A
- e. Did damper blades seal completely?
 Yes No N/A
- f. Dampers - Operation Feedback
 SA Open: _____ Close: _____
 RA Open: _____ Close: _____
 BP Open: _____ Close: _____
 OSA Open: _____ Close: _____
 MOSA Open: _____ Close: _____

g. Supply Air Temp:

#1 _____ #2 _____

h. Supply Air Humidity:

#1 _____ #2 _____

i. Return Air Temp: _____

j. Return Air Humidity: _____

k. Mixed Air Temp: _____

l. Filter DP jumper set?

Yes No N/A

m. CFM meter jumper set?

Yes No N/A

5. VFD:

- a. VFD speed command?
 Yes No N/A
- b. VFD speed feedback?
 Yes No N/A
- c. VFD fault?
 Yes No N/A
- d. VFD status?
 Yes No N/A

JOB NAME _____
JOB # _____
Unit Tag # _____

6. HOA:

- a. HOA Off? Yes No N/A
- b. HOA Auto? Yes No N/A
- c. HOA Hand? Yes No N/A

7. PRESSURE SWITCH

- a. High: _____
- b. Low: _____

8. ELECTRICAL PANEL:

- a. Have all wiring connections check for tightness?
 Yes No N/A
- b. Are relays seated?
 Yes No N/A
- c. If possible check VFD parameter list to VFD setting.
 Yes No N/A
- d. Verify customer connections to schematic
 Yes No N/A
- e. When BMS starts test, check set points and unit response.
 Yes No N/A
- f. Verify safety connection and that unit will shut down.
 Yes No N/A
- g. Verify MSP overload settings to motor name plate.
 Yes No N/A

9. FANWALL:

- a. Check for wall securing, caulking around front of unit, and blank-offs.
 Yes No N/A
- b. Verify motor connections to remote panel.
 Yes No N/A

10. COMMENTS

Signature _____ Date _____

NAS recommends that the following field check list be performed on each unit and the results filed with the appropriate facility engineering office.

Startup/Test Conditions

Job # _____

Operating Hz _____

Tag # _____

Operating TSP _____

Date _____

Operating CFM _____

	Voltage L1	Voltage L2	Voltage L3	Amps L1	Amps L2	Amps L3
Fan #1						
Fan #2						
Fan #3						
Fan #4						
Fan #5						
Fan #6						
Fan #7						
Fan #8						
Fan #9						
Fan #10						
Fan #11						
Fan #12						
Fan #13						
Fan #14						
Fan #15						
Fan #16						
Fan #17						
Fan #18						

**NORTEK AIR SOLUTIONS LIMITED WARRANTY****NORTH AMERICA**

Unless otherwise agreed in writing signed by Seller:

(a) Seller warrants: (i) All Products (excluding software and spare parts) manufactured by Seller will conform to the specifications and submittals provided by Seller and will be free of defects in material and workmanship (“Defects”) for 12 months following start-up or 18 months following ship date, whichever occurs first, under normal use and regular service and maintenance, if installed and maintained pursuant to Seller’s instructions. Extended warranties, if offered, may be purchased for an additional fee at the time of Product sale. For warranty purposes, start-up occurs when the equipment (or any portion thereof) is started for operation regardless of when the building may be ready for operation. (Per submittal, certain DX Products require Seller or its authorized Agent to perform start up or Product warranties are void. Any Seller required completed start-up form shall be delivered to Seller within six (6) months from shipment, or start-up will be deemed to have occurred on the ship date.) With the exception of OEM parts that may provide a longer pass-through warranty term from the third party manufacturer, new spare parts will be free of Defects for 3 months following ship date. Refer to New Spare Parts Warranty Policy. Buyer must notify Seller in writing of any Defect promptly upon discovery and if such notification occurs within the applicable warranty period, Seller shall remedy such Defect by, at Seller’s option, adjustment, repair or replacement of Products or any affected portion of Products, or providing a refund of the portion of the purchase price attributable to the defective portion of the Product. Buyer must grant Seller access to the premises at which Products are located at all reasonable times so that Seller may evaluate the Defect and make repairs or replacements on site. Repaired or replaced portions of Products are warranted until the later of the end of the original warranty period applicable to the defective portion of Products repaired or replaced or 30 days following the completion of the repair or ship date of the replacement parts; and (ii) Services will be of workmanlike quality. If Buyer notifies Seller in writing of any nonconforming Services within 30 days after Services are completed, Seller shall re-perform, if able to be cured, those Services directly affected by such failure, at its sole expense. Buyer’s sole remedy for such nonconforming Services is limited to Seller’s cost of re-performing the Services.

(b) Buyer is responsible for disassembly, removal and re-assembly or otherwise of non-Seller supplied products. Seller does not warrant and shall have no obligation with respect to any Products or parts that: (i) have been repaired or altered by someone other than Seller or Seller’s authorized representative; (ii) have been subject to misuse, abuse, neglect, intentional misconduct, accident, Buyer or third party negligence, unauthorized modification or alteration, use beyond rated capacity, improper grounding, voltage irregularities, a Force Majeure Event, or improper, or a lack of, maintenance; (iii) are comprised of materials provided by, or designed pursuant to instructions from Buyer; (iv) have failed due to ordinary wear and tear; or (v) have been exposed to adverse operating or environmental conditions, including but not limited to contaminants, corrosive agents, chemicals or minerals, (vi) were manufactured or furnished by others and which are not an integral part of a product manufactured by Seller, or (vii) have not been fully paid for by Buyer. Refrigerants, fluids, oils and expendable items such as filters are not covered by this Limited Warranty. If Seller has relied upon any specifications, information, representations or descriptions of operating conditions or other data supplied by Buyer or its agents to Seller in the selection or design of Products, and actual operating conditions or other conditions differ, any warranties or other provisions contained herein that are affected by such conditions will be null and void.

(c) Buyer is solely responsible for determining the fitness and suitability of Products for the use contemplated by Buyer. Buyer shall ensure that (i) the Products are used only for the purposes and in the manner for which they were designed and supplied, (ii) all persons likely to use or come into contact with the Products receive appropriate training and copies of applicable instructions and documentation supplied by Seller, (iii) all third parties who use or may be affected by or rely upon the Products are given

55-01-F01-NAS LW rev. date 01Jan2016

EF-6A
71234
BASEMENT

EMT 5
ALLOY E-2 PULL 1/2 IN. EMT 5
ALLOY E-2 PULL 1/2 IN.



Control Panel location

YORK



ATION

RETURN AIR P

ISOLAT

Pull both panels and stud between to open up big "access hole"




EF-6A
71234
BASEMENT



Fan Inlet side

Remove fan inlet
wall entirely





Fan wheel assembly

Fan frame base





CAUTION













Fan wheel disposal



Fan Inlet wall - Demo

Fan frame - Demo







Fan base
removal



Channel base
to set fan cells



Huntair
Fanwall cell







Channel bases to set the fan cells on for mounting.





Silicone seal

Bolt together





EF-6A discharge
side.






Conduit to Huntair panel outside cabinet

Electrical chase provided.



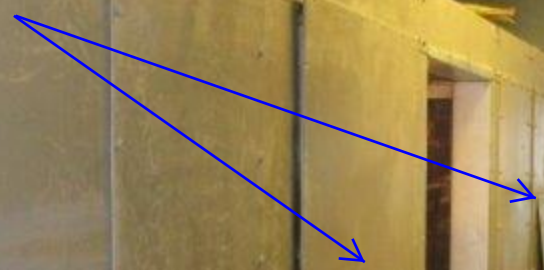




Fan wall inlet side

Vertical blade
backdraft dampers

Re-installing stud and cabinet panels.



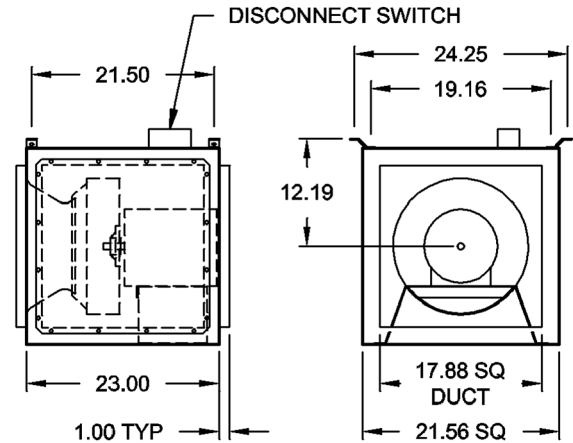


Tag: N/A
Customer: MECHANICAL SOLUTIONS INC
Job ID: 22-3000
Date: December 05, 2022

DSI - Square Inline Centrifugal Fan, Direct Drive

Construction Features

- Heavy-gauge galvanized steel housing.
- Backward inclined, non-overloading, aluminum wheel statically and dynamically balanced.
- Removable side panels provide access to power assembly without removal of duct connections.
- Galvanized steel mounting brackets for easy mounting in horizontal or vertical position.
- Disconnect switch is mounted to the side panel of unit.



DAMPER SIZE 18.00 X 18.00

Description	Qty	Model	Size	Wt (lb.)
	1	DSI	135AE	257

Approximate weight each, includes fan, motor and accessories.

Performance	CFM	SP (in WC)	RPM	Oper. BHP
	2,500	0.750	1,696	0.92

Temperature: 70 °F Altitude: 0 ft

Regulation Metrics	FEI	FEP (KW)	System FEI	System FEP (KW)
	0.95	0.83	0.95	0.83

Fan Energy Index (FEI) is an overall efficiency (wire-to-air) metric which includes not only the impact of the fan efficiency, but also each of the drive components used to operate the fan.

Fan Electrical Input Power (FEP) is the amount of power of a given fan at an operating point characterized by a value of flow and pressure.

Motor Data	HP	RPM	Volt/Ph/Hz	Encl	Technology
	1	1,750	115V/1/60	ECODP	EC

Efficiency: Standard

Sound Data	Octave Bands	1	2	3	4	5	6	7	8	LwA	dBA	Sones
	Level at Inlet	76	76	78	80	78	75	69	62			

LwA: The overall (single value) fan sound power level in dB re. 10⁻¹² Watts, 'A' weighted.

dBA: Estimated sound pressure level (re:0.0002 microbar) based on a single ducted installation at 5 ft., using a directivity factor of 1.

Accessories Included

- Vibration Isolators - Hanging, Spring with Hanger Brackets
- Filter Box - 2" Thick Disposable Paper
- All Aluminum Construction - w/ Mild Steel Shaft
- Nameplate - Aluminum
- 0-10 VDC Lead, Included By Motor Manufacturer
- Speed Controller, Remote Mounted Dial, Shipped Loose
- GridPoint Controller, Shipped Loose
- Disc Switch-Unfused (NEMA 1), Shipped Loose



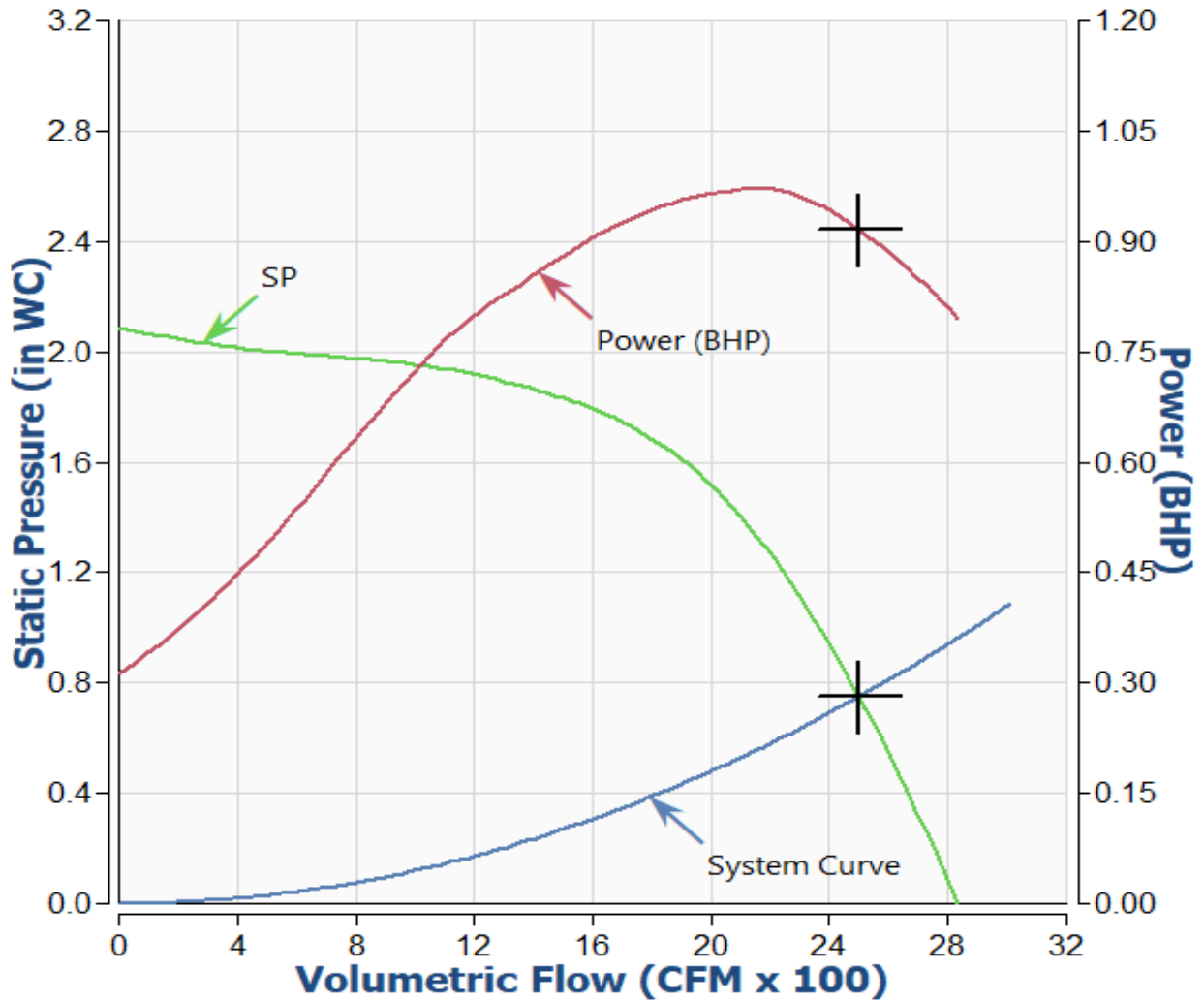
D4210D DSI 135





Tag: N/A
Customer: MECHANICAL SOLUTIONS INC
Job ID: 22-3000
Date: December 05, 2022

Standard Plot

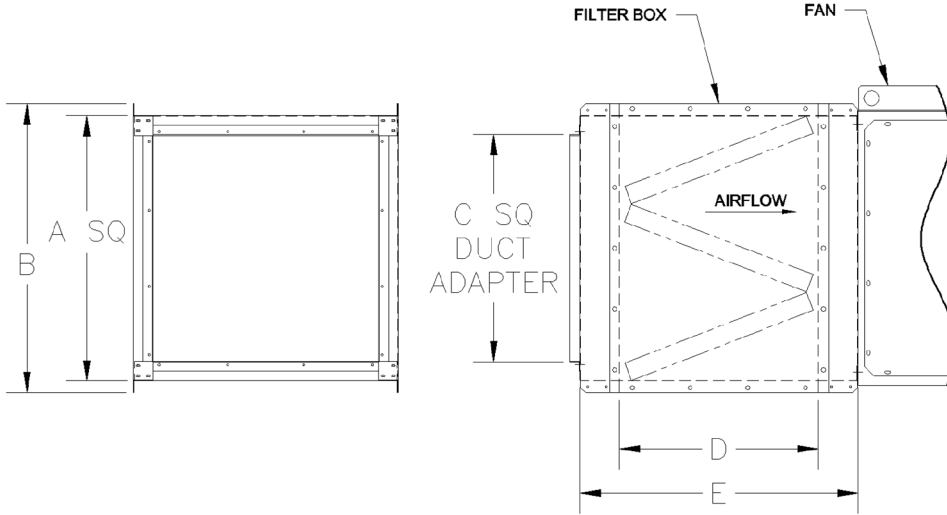


SUBMITTAL

Job Name: Wrangell Rec Center



Tag: N/A
 Customer: MECHANICAL SOLUTIONS INC
 Job ID: 22-3000
 Date: December 05, 2022



SIZE	A	B	C	D	E	FILTER SIZE	FILTER QTY
080/090	16.00	18.50	11.88	21.44	28.38	25 X 16	1
100	18.06	20.56	13.88	19.88	26.75	25 X 16	1
120/120HP	19.62	22.12	15.88	24.50	31.38	25 X 16	2
135/135HP	21.75	24.25	17.88	24.00	32.00	25 X 20	2
150/150HP	23.94	26.44	19.88	23.75	32.00	25 X 20	2
165/165HP	26.62	29.12	22.88	19.56	28.00	25 X 20	3
180/180HP	29.12	31.62	23.88	19.25	26.50	25 X 20	3
210/210HP	32.44	34.94	27.88	21.00	31.00	25 X 16	4
225/225HP	34.25	36.75	29.88	24.00	33.00	25 X 16	6
245/245HP	37.75	40.25	32.88	18.88	30.00	25 X 20	2
						25 X 16	2
270/270HP	40.25	42.75	35.88	23.00	33.00	25 X 20	6
300/300HP	44.25	46.75	39.88	24.00	33.00	25 X 20	8
330/330HP	48.94	51.44	43.88	23.50	34.00	25 X 16	12
365/365HP	50.25	52.75	45.88	19.75	30.50	25 X 20	12
402/402HP	55.50	58.00	51.88	24.75	36.00	25 X 20	12
						25 X 16	6

D4205-1.037-4104



Customer: MECHANICAL SOLUTIONS INC
Job ID: 22-3000
Date: December 05, 2022

AMCA Statements

Tag:

1. Twin City Fan certifies that the model DSI is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.
2. Performance certified is for Installation Type A: Free inlet, Free outlet.
3. Performance ratings do not include the effects of appurtenances (accessories).
4. The sound ratings shown are loudness values in fan sones at 5 ft. (1.5m) in a hemispherical free field calculated per AMCA Standard 301. Values shown are for installation Type A: Free inlet hemispherical sone levels.
5. dBA levels are not licensed by AMCA International.





Submittal Data

Job Name: Wrangell Rec Center
To: Anchorage
Prepared By: Zane Boylan <zane@msi-ak.com>
Date: 11/29/2022

Q-PAC Schedule

Array	Qty	Performance						Physical Data						Electrical Data						Sound Data				
		Air Volume (CFM) (total/each)	Static Pressure	Single Fan Motor Data (HP)			Speed (rpm)		Bulkhead Width (in)	Bulkhead Height (in)	Quantity of Fans	Fan Model	Wheel Diameter (in)	Single Fan Weight (lbs)	Blade Material	Electrical Supply	Single Fan FLA (A)	MCA (A)	MOCP (A)	SCC Rating	QCB1 MCA (A)	QCB2 MCA (A)	Inlet (dB)	Outlet (dB)
				Motor HP	Input Power	Equiv BHP	Operating	Maximum																
SF-5	1	7,300 / 3,650	2.00"	4.83	2.07	1.89	1,703	2,260	74	45.5	2	FA1700072	17.7	92.6	HP Composite	3~ 200-240V 60Hz	11.00	25.20	35.00	100 KAIC	24.75	-	79	86
SF-6	1	13,000 / 4,333	2.00"	4.83	2.73	2.48	1,890	2,260	83	54	3	FA1700072	17.7	92.6	HP Composite	3~ 200-240V 60Hz	11.00	36.20	45.00	100 KAIC	35.75	-	85	92
RF-8	1	14,000 / 4,667	1.00"	4.83	2.10	1.91	1,801	2,260	83	54	3	FA1700072	17.7	92.6	HP Composite	3~ 200-240V 60Hz	11.00	36.20	45.00	100 KAIC	35.75	-	86	93

Job Name: Wrangell Rec Center
To: Anchorage
Prepared By: Zane Boylan <zane@msi-ak.com>
Date: 11/29/2022



SF-5
QTY: 1

Performance

Airflow (total)	7,300 CFM
Airflow (each)	3,650 CFM
Total Static Pressure	2.00"
Input HP (each)	2.07 HP
Max HP (each)	4.83 HP
Equiv BHP (each)	1.89 BHP
Operating RPM	1,703 RPM
Max RPM	2,260 RPM
System Efficiency	55.6%
Redundancy	81%

Physical

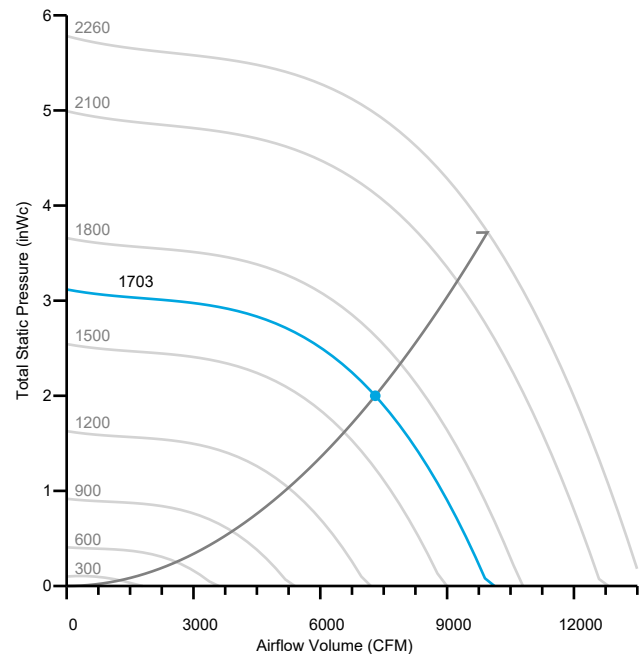
Bulkhead Width	74"
Bulkhead Height	45.5"
Quantity of Fans	2
Fan Model	FA1700072
Wheel Diameter	17.7"
Single Fan Weight	93 lbs
System Weight	394 lbs
Blade Material	HP Composite
Handing	Left
Backflow Device	Backdraft Damper
Backdraft Damper Size	22.125" W x 21.625" H (ID)
Control Panel Width	15.0"
Control Panel Height	23.8"
Control Panel Depth	10.1"

Electrical

Electrical Supply	3~ 200-240V 60Hz
Single Fan FLA	11.00 A
System MCA	25.20 A
System MOCP	35.00 A
QCB1 MCA	24.75 A
QCB2 MCA	-
SCC Rating	100 KAIC; Fused

Controls

Type	Premium
Rating	Indoor



Fan model is rated in accordance with AMCA Sound and Air Performance without Accessories. Performance shown is for Free Inlet/Free Outlet installations in accordance to DIN EN ISO 5801

Job Name: Wrangell Rec Center
To: Anchorage
Prepared By: Zane Boylan <zane@msi-ak.com>
Date: 11/29/2022

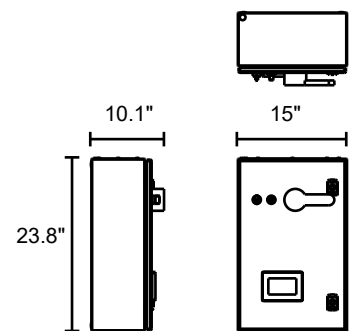
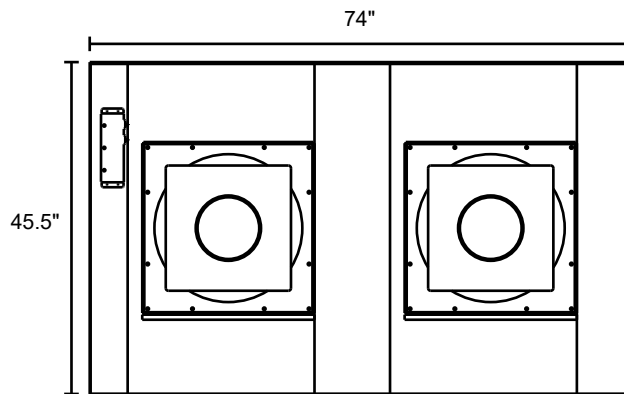
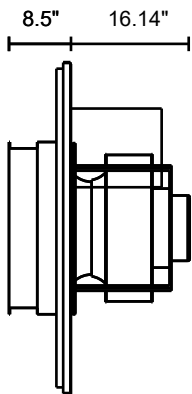
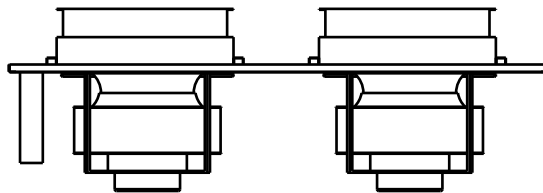
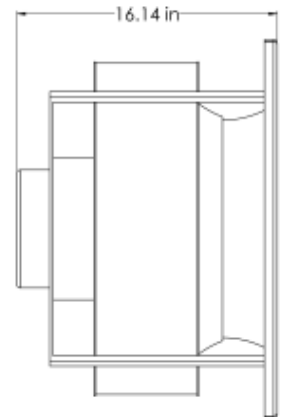
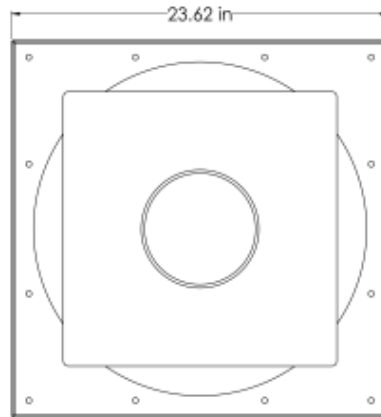


SF-5

QTY: 1

System Sound Power (dB)

Frequency	System Discharge	System Inlet
63 Hz	74	72
125 Hz	80	76
250 Hz	86	79
500 Hz	83	77
1,000 Hz	81	71
2,000 Hz	77	69
4,000 Hz	75	69
8,000 Hz	73	68



*Installation Height Range: 45.375" - 45.625"

*Installation Width Range: 73.75" - 74.125"

Job Name: Wrangell Rec Center
To: Anchorage
Prepared By: Zane Boylan <zane@msi-ak.com>
Date: 11/29/2022



SF-6
QTY: 1

Performance

Airflow (total)	13,000 CFM
Airflow (each)	4,333 CFM
Total Static Pressure	2.00"
Input HP (each)	2.73 HP
Max HP (each)	4.83 HP
Equiv BHP (each)	2.48 BHP
Operating RPM	1,890 RPM
Max RPM	2,260 RPM
System Efficiency	50.2%
Redundancy	89%

Physical

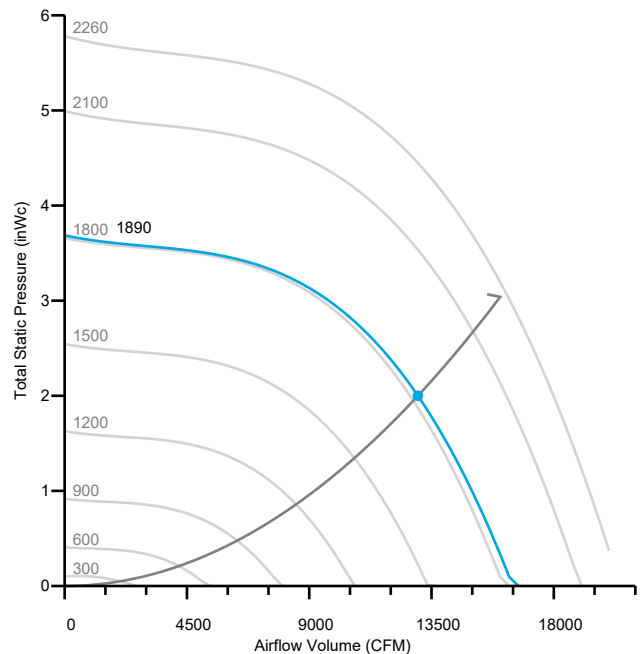
Bulkhead Width	83"
Bulkhead Height	54"
Quantity of Fans	3
Fan Model	FA1700072
Wheel Diameter	17.7"
Single Fan Weight	93 lbs
System Weight	538 lbs
Blade Material	HP Composite
Handing	Left
Backflow Device	Backdraft Damper
Backdraft Damper Size	22.125" W x 21.625" H (ID)
Control Panel Width	15.0"
Control Panel Height	23.8"
Control Panel Depth	10.1"

Electrical

Electrical Supply	3~ 200-240V 60Hz
Single Fan FLA	11.00 A
System MCA	36.20 A
System MOCP	45.00 A
QCB1 MCA	35.75 A
QCB2 MCA	-
SCC Rating	100 KAIC; Fused

Controls

Type	Premium
Rating	Indoor



Fan model is rated in accordance with AMCA Sound and Air Performance without Accessories. Performance shown is for Free Inlet/Free Outlet installations in accordance to DIN EN ISO 5801

Job Name: Wrangell Rec Center
To: Anchorage
Prepared By: Zane Boylan <zane@msi-ak.com>
Date: 11/29/2022

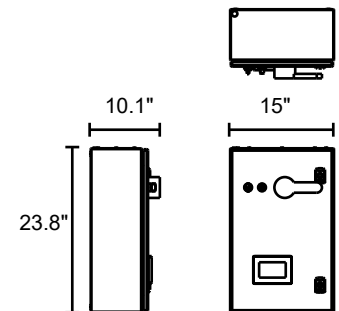
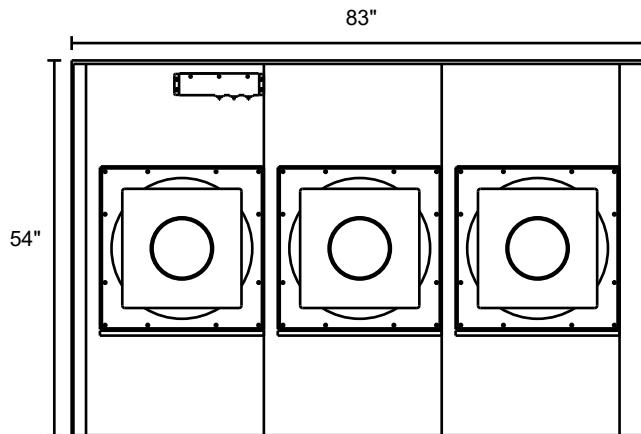
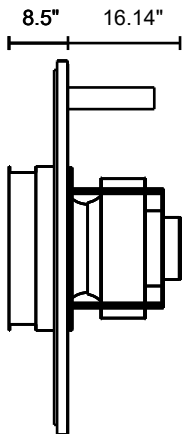
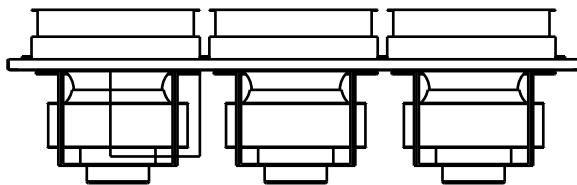
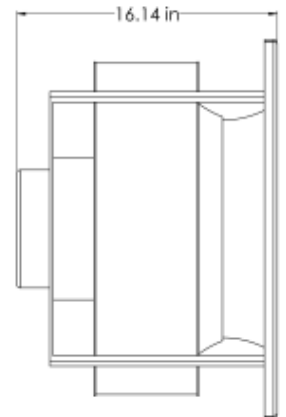
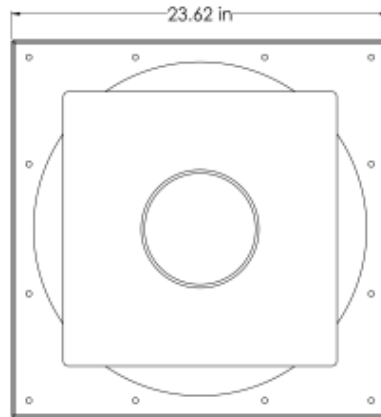


SF-6

QTY: 1

System Sound Power (dB)

Frequency	System Discharge	System Inlet
63 Hz	79	77
125 Hz	82	78
250 Hz	93	84
500 Hz	88	82
1,000 Hz	87	77
2,000 Hz	82	74
4,000 Hz	80	73
8,000 Hz	81	78



*Installation Height Range: 53.625"- 54.375"

*Installation Width Range: 82.5"- 83.375"

Job Name: Wrangell Rec Center
To: Anchorage
Prepared By: Zane Boylan <zane@msi-ak.com>
Date: 11/29/2022



RF-8
QTY: 1

Performance

Airflow (total)	14,000 CFM
Airflow (each)	4,667 CFM
Total Static Pressure	1.00"
Input HP (each)	2.10 HP
Max HP (each)	4.83 HP
Equiv BHP (each)	1.91 BHP
Operating RPM	1,801 RPM
Max RPM	2,260 RPM
System Efficiency	35.1%
Redundancy	90%

Physical

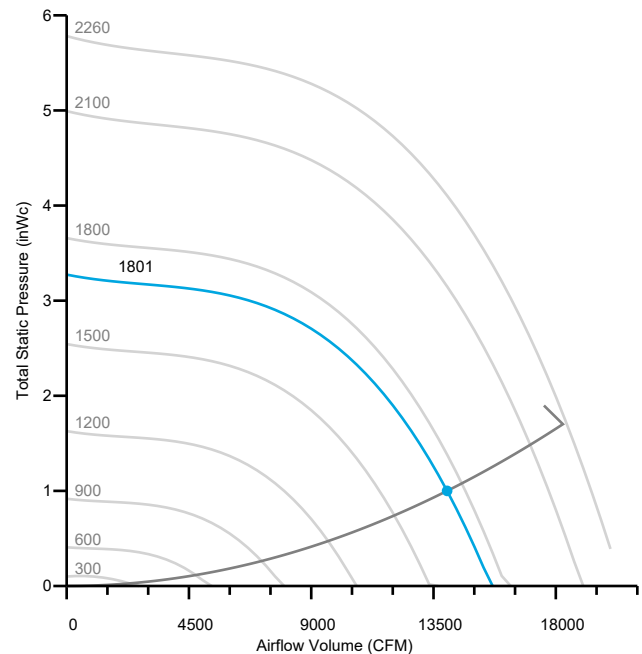
Bulkhead Width	83"
Bulkhead Height	54"
Quantity of Fans	3
Fan Model	FA1700072
Wheel Diameter	17.7"
Single Fan Weight	93 lbs
System Weight	538 lbs
Blade Material	HP Composite
Handing	Left
Backflow Device	Backdraft Damper
Backdraft Damper Size	22.125" W x 21.625" H (ID)
Control Panel Width	15.0"
Control Panel Height	23.8"
Control Panel Depth	10.1"

Electrical

Electrical Supply	3~ 200-240V 60Hz
Single Fan FLA	11.00 A
System MCA	36.20 A
System MOCP	45.00 A
QCB1 MCA	35.75 A
QCB2 MCA	-
SCC Rating	100 KAIC; Fused

Controls

Type	Premium
Rating	Indoor



Fan model is rated in accordance with AMCA Sound and Air Performance without Accessories. Performance shown is for Free Inlet/Free Outlet installations in accordance to DIN EN ISO 5801

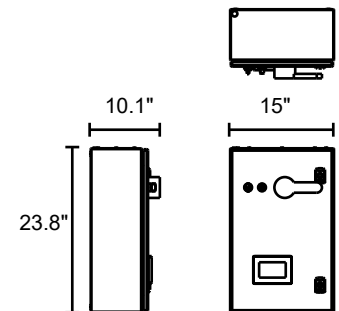
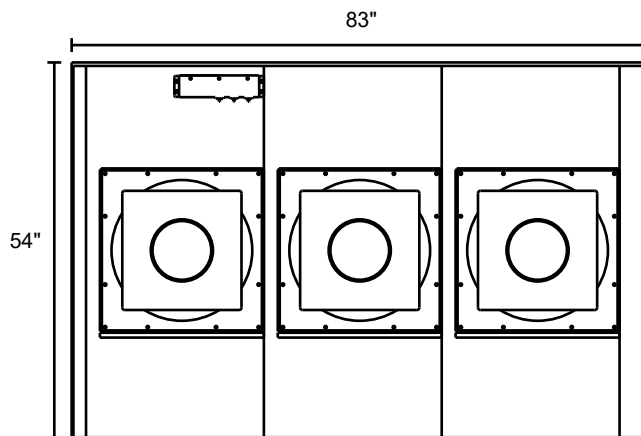
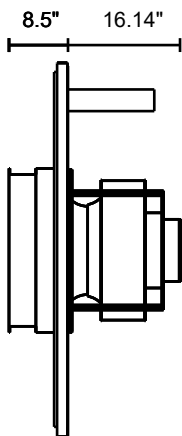
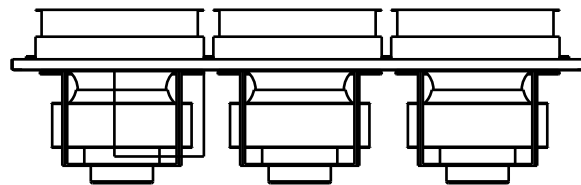
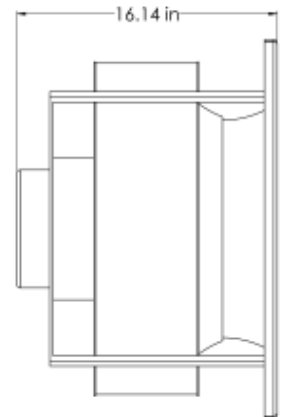
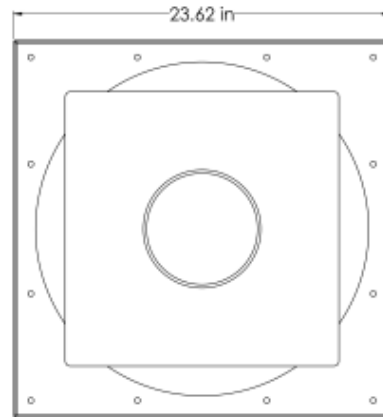
Job Name: Wrangell Rec Center
To: Anchorage
Prepared By: Zane Boylan <zane@msi-ak.com>
Date: 11/29/2022



RF-8
 QTY: 1

System Sound Power (dB)

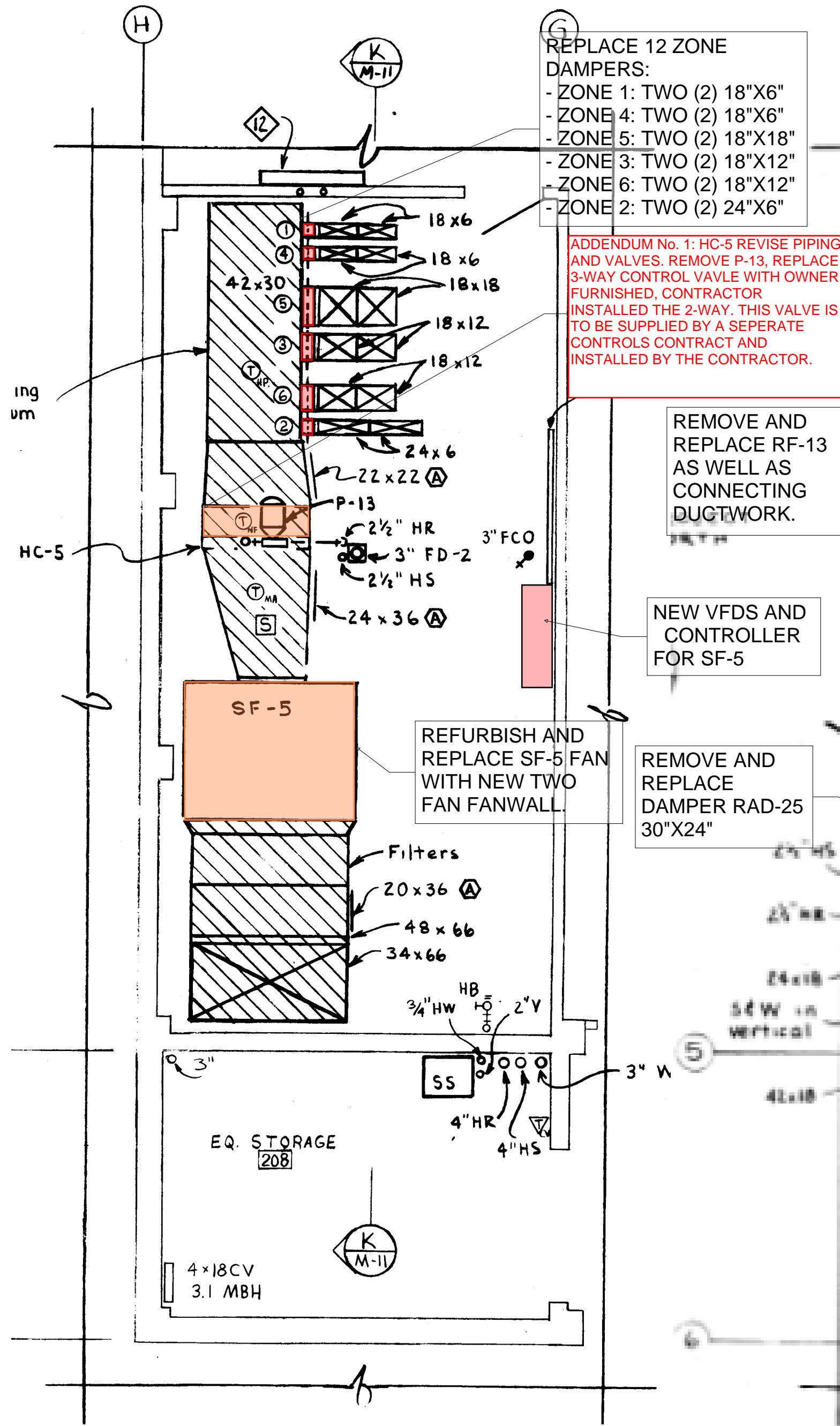
Frequency	System Discharge	System Inlet
63 Hz	81	79
125 Hz	85	81
250 Hz	93	85
500 Hz	89	84
1,000 Hz	88	78
2,000 Hz	82	75
4,000 Hz	80	75
8,000 Hz	84	82



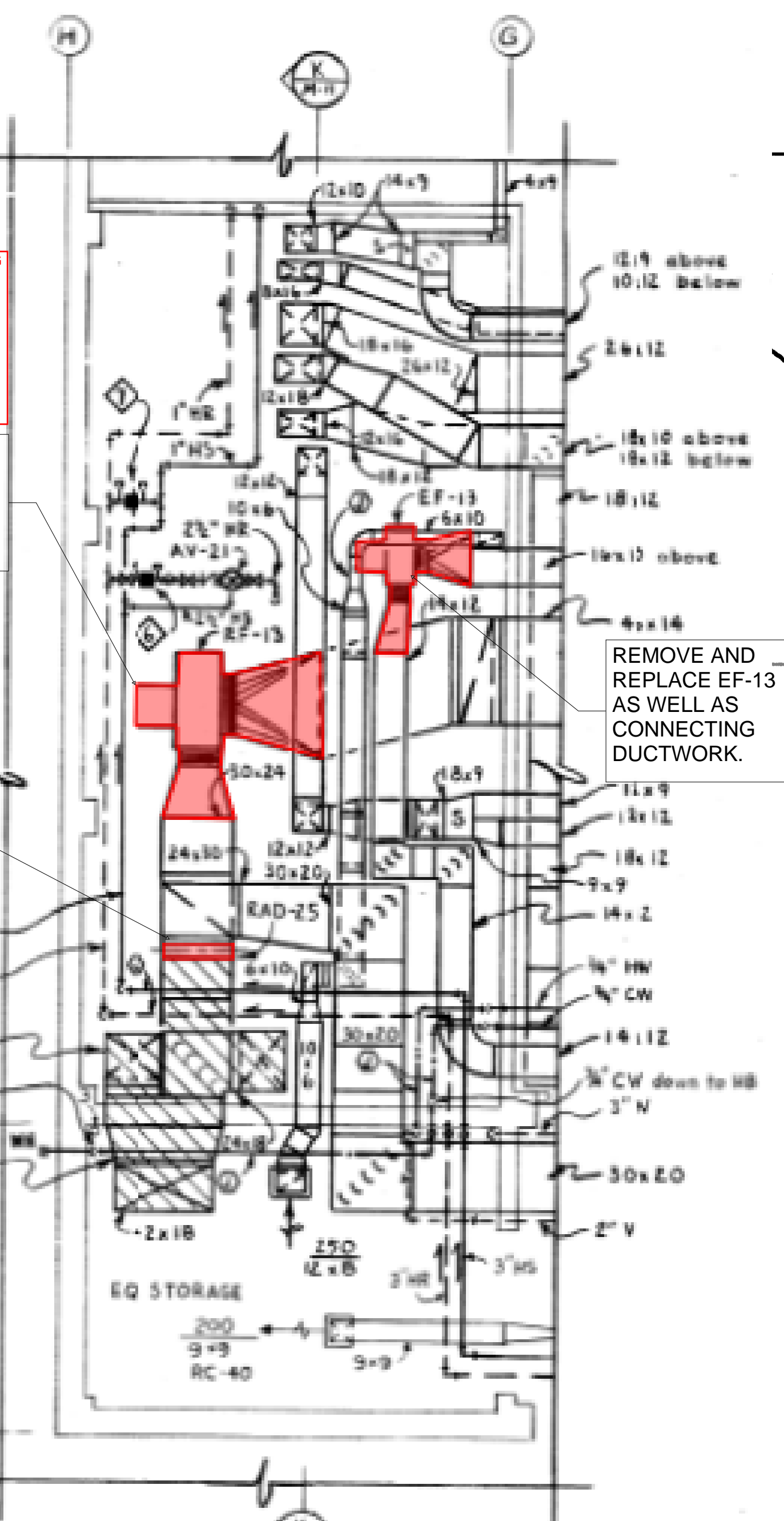
*Installation Height Range: 53.625"- 54.375"

*Installation Width Range: 82.5"- 83.375"

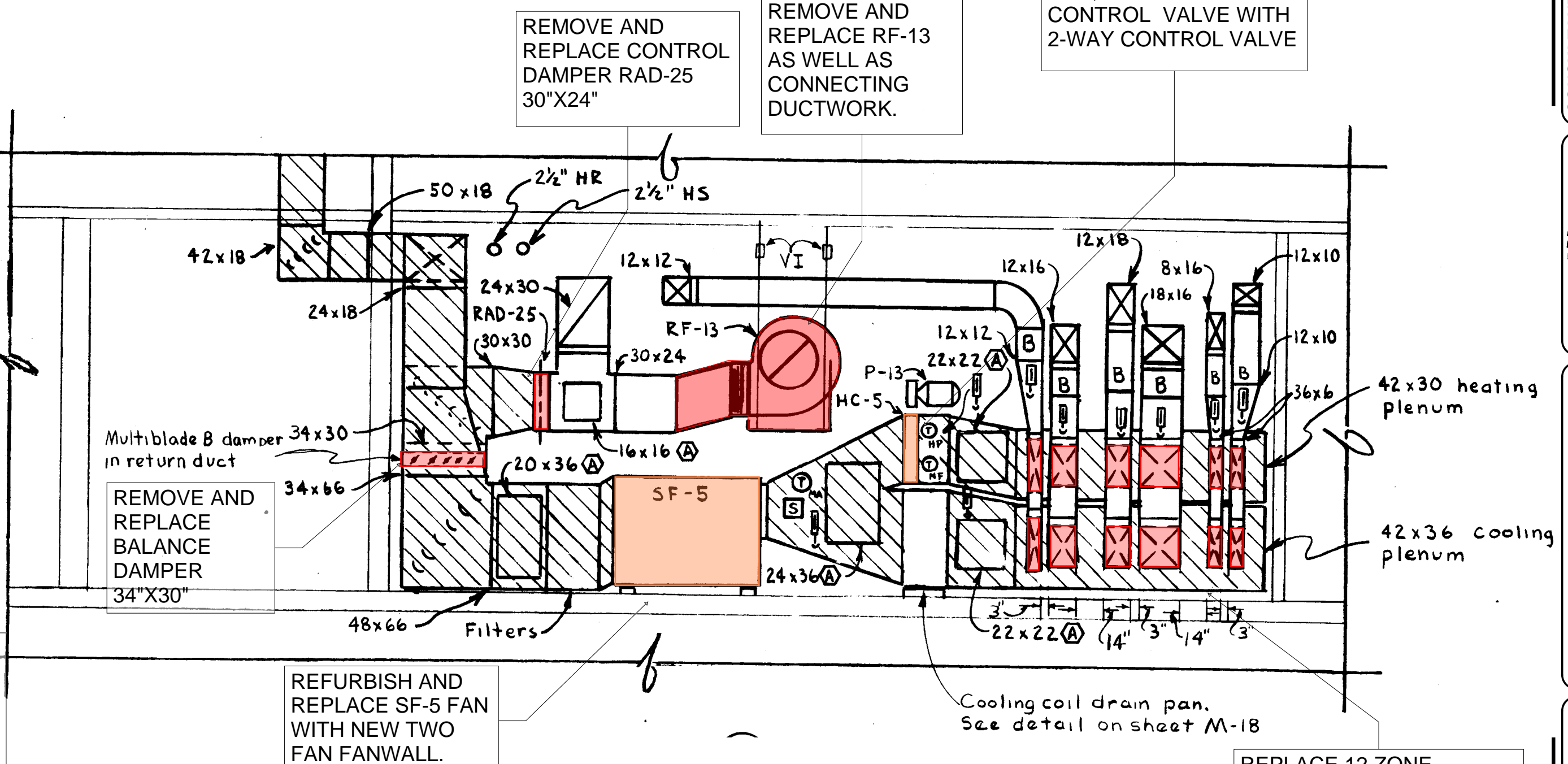
IF THIS BAR DOES NOT MEASURE EXACTLY ONE INCH, THE SCALE OF THIS DRAWING HAS BEEN ALTERED DURING ITS PRODUCTION. AFFECTING ALL LABELED SCALES.



LOWER LEVEL PLAN - MECH ROOM 209



UPPER LEVEL PLAN - MECH ROOM 209



MECH ROOM 209 - SECTION K

REPLACE 12 ZONE DAMPERS:
 - ZONE 1: TWO (2) 18"x6"
 - ZONE 4: TWO (2) 18"x6"
 - ZONE 5: TWO (2) 18"x18"
 - ZONE 3: TWO (2) 18"x12"
 - ZONE 6: TWO (2) 18"x12"
 - ZONE 2: TWO (2) 24"x6"

ADDENDUM No. 1: HC-5 REVISE PIPING AND VALVES. REMOVE P-13, REPLACE 3-WAY CONTROL VALVE WITH OWNER FURNISHED, CONTRACTOR INSTALLED THE 2-WAY. THIS VALVE IS TO BE SUPPLIED BY A SEPARATE CONTROLS CONTRACT AND INSTALLED BY THE CONTRACTOR.

REMOVE AND REPLACE RF-13 AS WELL AS CONNECTING DUCTWORK.

NEW VFDS AND CONTROLLER FOR SF-5

REFURBISH AND REPLACE SF-5 FAN WITH NEW TWO FAN FANWALL

REMOVE AND REPLACE DAMPER RAD-25 30"x24"

REMOVE AND REPLACE EF-13 AS WELL AS CONNECTING DUCTWORK.

REMOVE AND REPLACE CONTROL DAMPER RAD-25 30"x24"

REMOVE AND REPLACE RF-13 AS WELL AS CONNECTING DUCTWORK.

HC-5: REVISE PIPING AND VALVES. REMOVE P-13, REPLACE 3-WAY CONTROL VALVE WITH 2-WAY CONTROL VALVE

REMOVE AND REPLACE BALANCE DAMPER 34"x30"

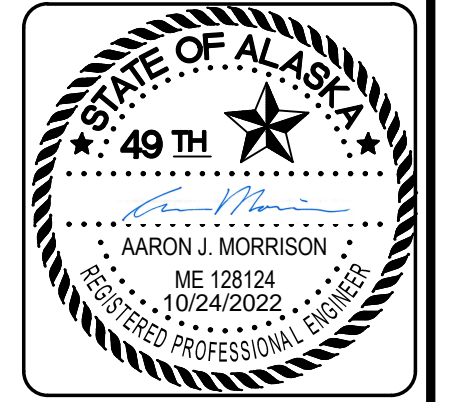
REFURBISH AND REPLACE SF-5 FAN WITH NEW TWO FAN FANWALL.

REPLACE 12 ZONE DAMPERS:
 - ZONE 1: TWO (2) 18"x6"
 - ZONE 4: TWO (2) 18"x6"
 - ZONE 5: TWO (2) 18"x18"
 - ZONE 3: TWO (2) 18"x12"
 - ZONE 6: TWO (2) 18"x12"
 - ZONE 2: TWO (2) 24"x6"

SHEET NOTES

1. COORDINATE MECHANICAL HVAC WORK WITH CONTROLS AND FIRE PROTECTION MODIFICATIONS.
2. REFER TO THE ELECTRICAL DRAWING E-102 FOR POWER CONNECTIONS.
3. DUCT SMOKE DETECTOR AND RELAY TO FANS AND AIR HANDLERS ARE TO BE REPLACED IN A SEPARATE FIRE ALARM CONTRACT. COORDINATE THE CONNECTION OF THE SHUT DOWN RELAY WITH THE FIRE ALARM CONTRACT.

CONSULTANT:



Juneau, AK
 9109 Mendocino Mall Rd. Ste. 4
 Juneau, AK 99901
 Phone: 907.780.6060
 Fax: 907.586.3771
 AECC163270



PROJECT: CITY AND BOROUGH OF WRANGELL RECREATION FACILITY HVAC UPGRADES WRANGELL, ALASKA

SHEET TITLE: MECHANICAL ROOM 209 CONSTRUCTION BID SET

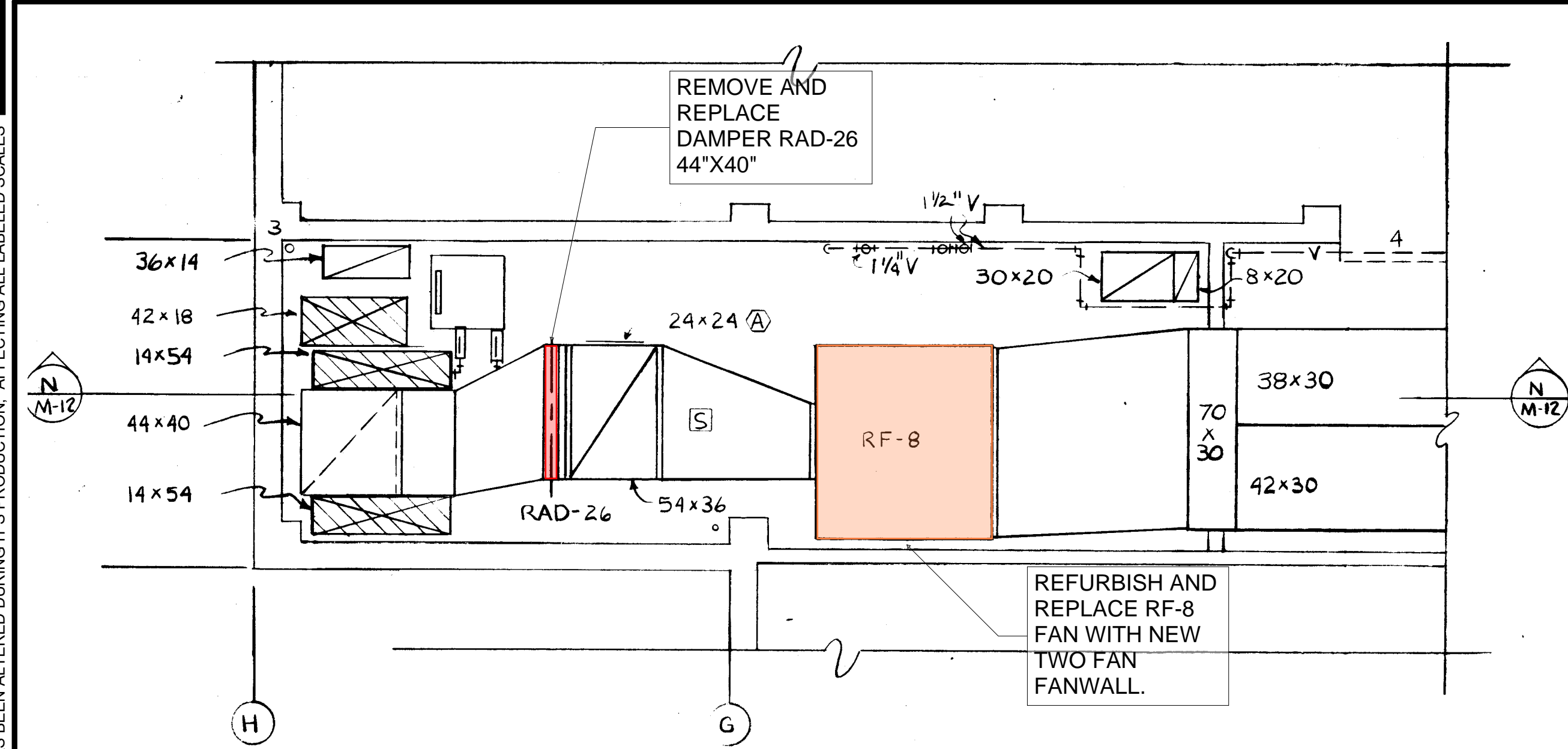
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DRAWN	AM
CHECKED	DHM
DATE	10/24/2022

PROJECT No. 10296.22002
 SHEET NUMBER

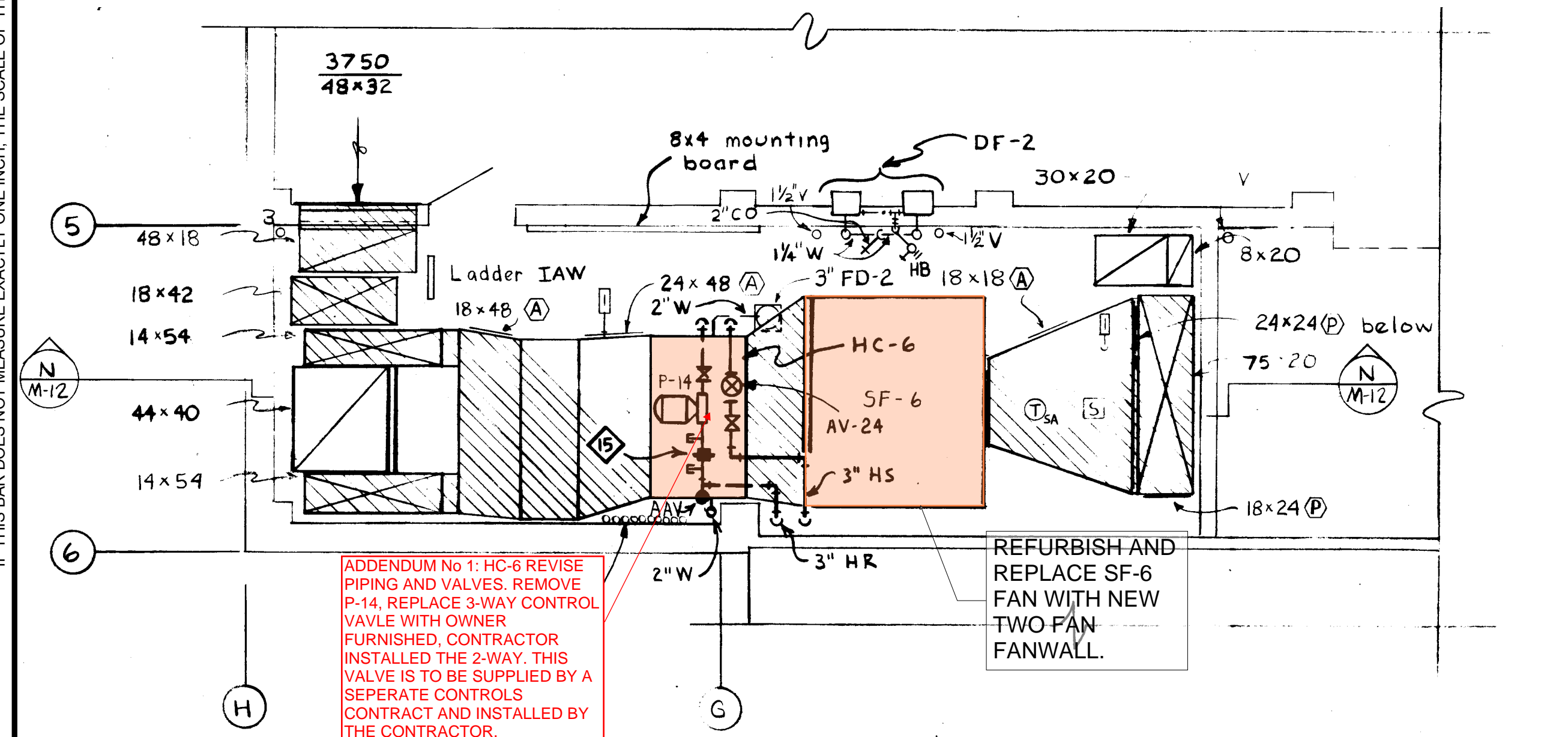
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No.	Date	Item
REVISIONS	12/6/22	Addendum No. 1

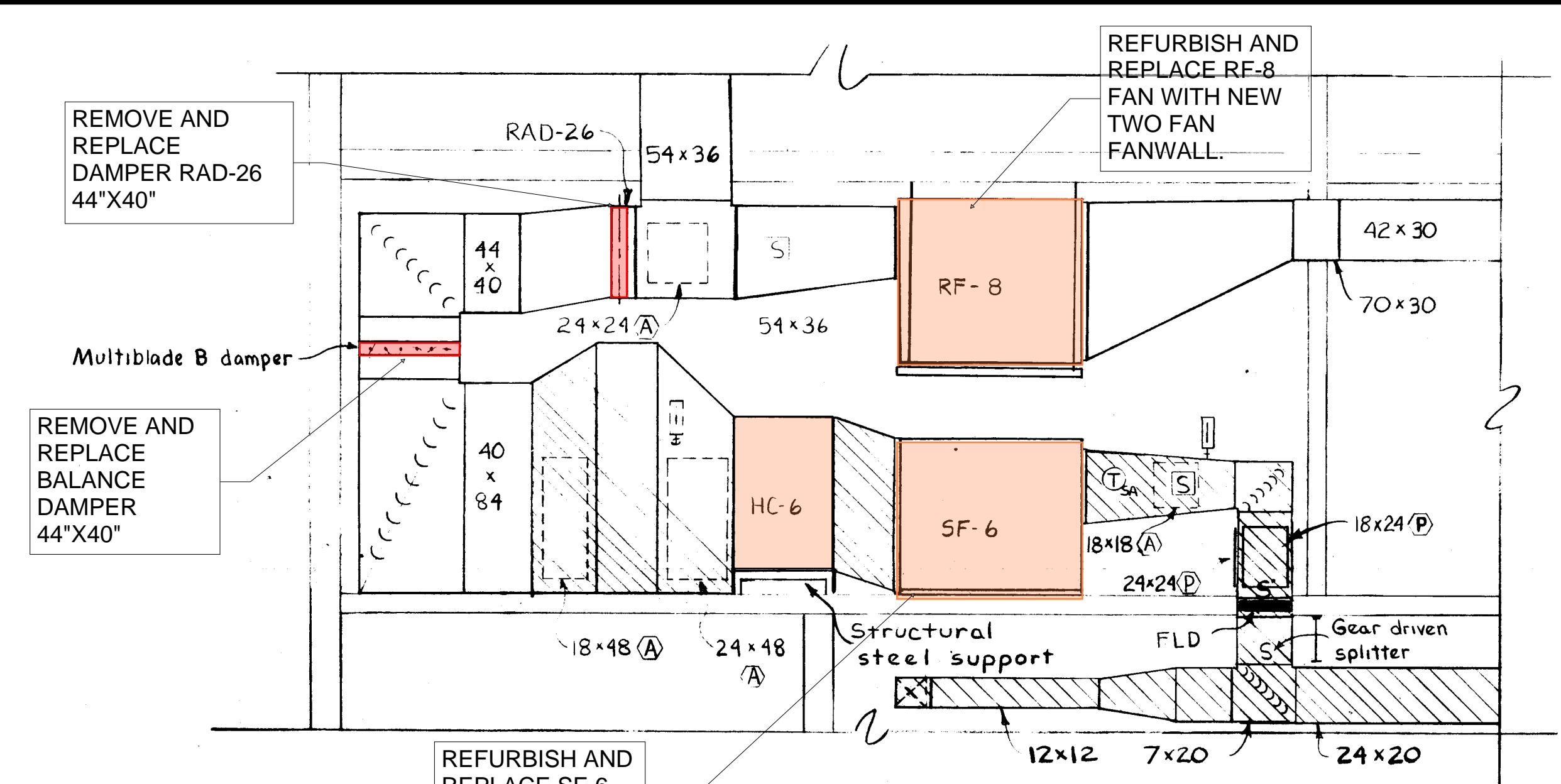
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MECHANICAL RM. 303 - UPPER LEVEL
 $\frac{1}{4}'' = 1'-0''$



MECHANICAL RM. 303 - LOWER LEVEL
 $\frac{1}{4}'' = 1'-0''$



SECTION N-M-12
 $\frac{1}{4}'' = 1'-0''$

SHEET NOTES

1. COORDINATE MECHANICAL HVAC WORK WITH CONTROLS AND FIRE PROTECTION MODIFICATIONS.
2. REFER TO THE ELECTRICAL DRAWING E-103 FOR POWER CONNECTIONS.
3. DUCT SMOKE DETECTOR AND RELAY TO FANS AND AIR HANDLERS ARE TO BE REPLACED IN A SEPERATE FIRE ALARM CONTRACT. COORDINATE THE CONNECTION OF THE SHUT DOWN RELAY WITH THE FIRE ALARM CONTRACT.

CONSULTANT:

Juneau, AK
 9109 Mendocino Mall Rd., Ste. 4
 Juneau, AK 99801
 Phone: 907.780.6060
 Fax: 907.586.3771
 AECC163270

PROJECT:
**CITY AND BOROUGH OF WRANGELL
 RECREATION FACILITY HVAC
 UPGRADES**
 WRANGELL, ALASKA

SHEET TITLE:
**MECHANICAL ROOM 303
 CONSTRUCTION BID SET**

DESIGN	AM
DRAWN	AM
CHECKED	DHM
DATE	10/24/2022

PROJECT No.
10296.22002
 SHEET NUMBER

M-103

No.	Date	Item
REVISIONS	12/6/22	Addendum No. 1