

SHOP DRAWING AND SUBMITTAL REVIEW

November 20, 2024

Project Name: **Cabarrus County Behavioral Health**

Project Number: **D22-2545**

Submittal description: **052 237313-052-3 Modular Air Handling Units**

Reviewed By: RD

Engineer's review is only for checking conformance with the design concept and contract documents. Review comments or lack thereof shall not be considered as relieving the contractor from meeting the requirements of the construction documents, including plans and specifications. The contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the fabrication process or to techniques of construction, for and the safety and coordination of the work of all trades.

Reviewed

Revise and Resubmit

Furnish as Corrected

Rejected

[Roy Dayan](#) [11/20/2024](#)

Reviewers Signature and Date

AHU-1 PAGE 32
AHU-2 PAGE 42
AHU-3 PAGE 53
AHU-4 PAGE 64

Comments:

- Coordinate with electrical contractor to ensure correct breakers are ordered.

Built-in cover page

52-3:Performance Data



Status	Open Submitted
Spec section	237313 MODULAR INDOOR CENTRALSTATIONAIR HANDLING UNITS
Manager	Jermaine Barnes (Messer Construction Co.)
Responsible contractor	Alec Carnes (Messer Construction Co.)
Reviewers step 01	Roger Shows (CMTA Inc - Consulting Engineers)

Reviewed

Final "For Record" AHU submittal. Changes include: · 3-point of electrical connection · AHU-4 updated to a coil that has 0.008" AL fins. The 0.006" AL fins are no longer available · AHU-1, AHU-2, AHU-3 & AHU-4 length decreased due to electrical connection changes

Reviewed by:
Jermaine Barnes

Date:
11/19/2024

Messer Construction Co.

EQUIPMENT SUBMITTAL FOR RECORD

PROJECT: CCBH AIR HANDLING UNITS

LOCATION: North Carolina



York Semi-Custom Air Handling Units

EQUIPMENT	York Semi-Custom Air Handling Units
SPECIFICATION SECTION	
UNIT TAGS	AHU-01, 02, 03, & 04
QUANTITY	4
Revision	3

Date: November 15th, 2024



Equipment Sales Office: 9685 Cincinnati Dayton Rd, West Chester Township, OH 45069

Table of Contents

- Clarifications/ Exceptions/ General Notes
- Bill of Material Data
- Semi-Custom Air Handling Units
 - Unit Drawing
 - Performance Report
 - Electrical Diagrams
- Receiving/ Rigging Instructions
- Equipment Release Approval Form
- Standard Warranty
- IOM - to be provided in separate submittal



Equipment Sales Office: 9685 Cincinnati Dayton Rd, West Chester Township, OH 45069

Clarifications/Exceptions/Items Not Included

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General Notes

- Contractor/Engineer to confirm unit performance prior to release.
- Contractor to approve unit dimensions and handling for site coordination purposes.
- All power wiring to unit to be supplied and installed by others. Wiring from Div 26 provided breaker to factory mounted VFDs specifically.

Clarifications and Exceptions – REV03

- 3-point of electrical connection
- AHU-4 updated to a coil that has 0.008" Al fins. The 0.006" AL fins are no longer available
- AHU-1, AHU-2, AHU-3 & AHU-4 length decreased due to electrical connection changes

Clarifications and Exceptions – REV02

- Per RFI responses, 2 VFDs for supply fan array each sized at 50% and 1 VFD for return fan array sized at 100% will be provided
- AHU-1, AHU-2, & AHU-3 length increased due to changes in VFD panels
- AHU-4 length decreased due to changes in VFD panels

Clarifications and Exceptions – REV01

- Duct connections changed to front supply/rear return
- Condensate drain connection changed to side opposite VFD
- ABB Redundant VFD to replace dual VFDs. Each VFD upsized to handle full FLA/HP of respective fan array. Performance sheets, unit drawings, and electrical diagrams have all been revised to reflect this.
- AHU-1, AHU-2, & AHU-3 length decreased due to single VFD panel
- AHU-4 length increased by 1”
- Height increased on all units due to redundant VFD panel height

Clarifications and Exceptions – REV00

- York warrants equipment for a period of 18 months from date of shipment, or 12 months from date of start up, whichever occurs first.
- AHU-3 return fan qty 3 will be controlled by a single VFD since it can't be split evenly
- Controls provided and installed by others in the field
- Actuator provided and installed by others
- Transducers for fan monitoring system provided by others in the field
- Per RFI responses, 2 VFDs are being provided per fan array. Each will control half the fans in the array. No backup VFDs provided.
- Per RFI responses, a factory leakage test will be conducted on each AHU in lieu of field testing
- Cooling coil rows have been selected based on 25% glycol and LAT of 53 deg F
- AHU-2 length increase due to 2 VFDs w/bypass for fan array
- AHU-3 length increase due to 2 VFDs w/bypass for fan array
- AHU-3 height increase to reduce coil face velocity. XTI-66x108 being provided with 481 fpm face velocity in lieu of scheduled 465 fpm. Scheduled XTI-60-108 would have 541 fpm face velocity.
- Per RFI responses, fan type shall not be ECM
- All necessary pipe insulation is furnished and installed by others in the field



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Bill of Material Data

ITEM II: YORK Semi-Custom Indoor Air Handling Units

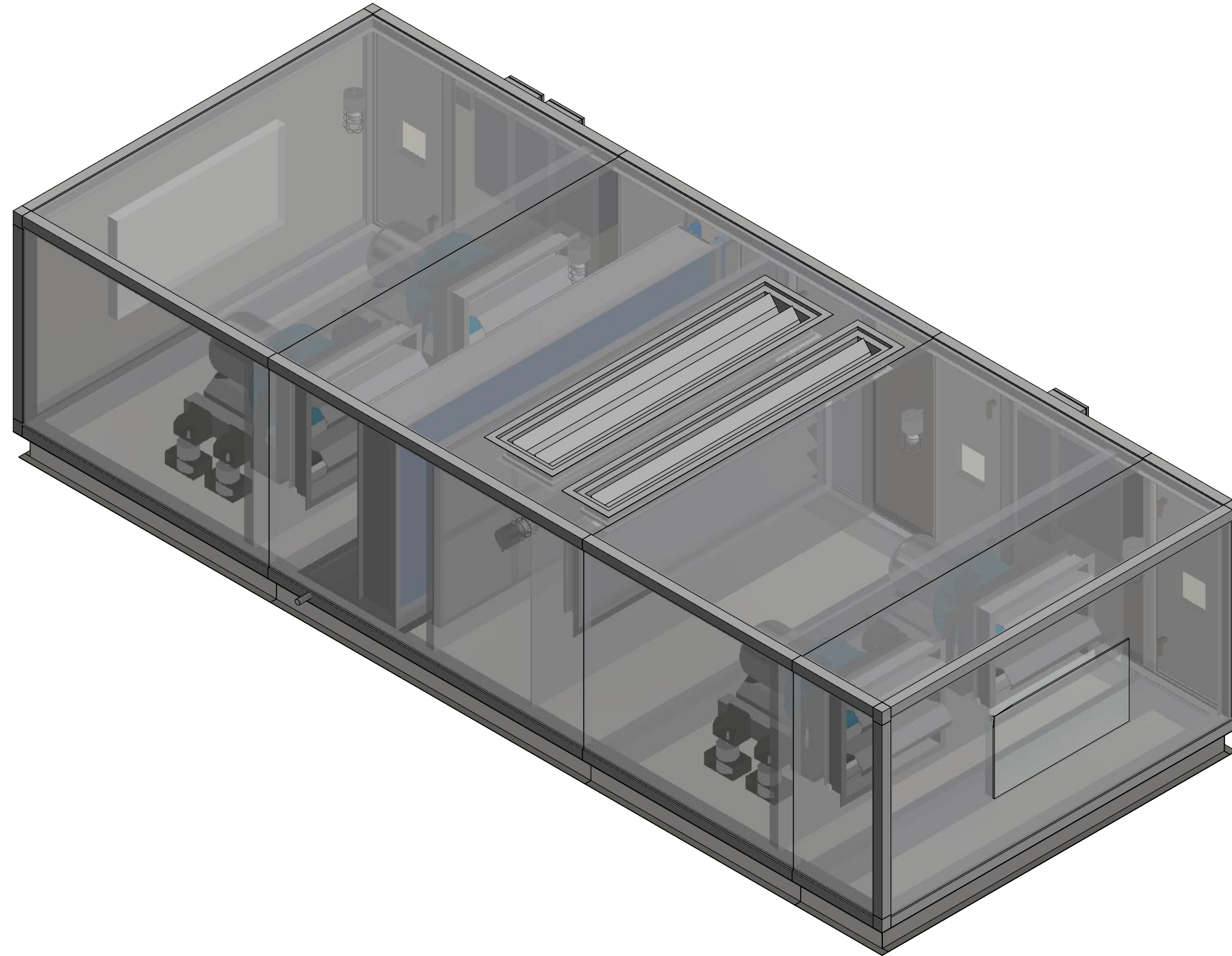
Items Included:

- 2" Insulated, double wall construction, R-16
- Enhanced thermal performance construction
- Galvanized interior and exterior wall panels
- View ports on access doors w/thermal break
 - Side access filter doors will not have viewports
- LED lights in accessible segments
- 6" Base rail
- 460v/3ph/60hz voltage
 - ABB variable frequency drives – factory installed
- Supply & Return Fan Segments
 - Fan array qty per plans
 - Backdraft dampers
 - Shaft Grounding Rings
 - AFMS
 - Inlet screen and fan cages
 - Convenience Outlet - supply fan only
- Cooling Coil Segment (25% PG)
 - IAQ Drain Pan with Stainless Steel Liner
 - Access Door
- Filter Segment
 - 2" MERV 8 pre-filter - 2 sets being provided
 - Side Loaded
- Economizer Segment
 - Outside Air Damper
 - Exhaust/MixedAir Damper
- Discharge Plenum Segment – bottom supply
- Warranty Duration
 - Warranty begins at startup or 6 months from ship date, whichever occurs first
 - Warranty is 2 Year Parts & Labor on AHUs
- Factory Leakage Testing
 - 1% max leakage at +/- 8" total static pressure
 - Test report to be provided following successful testing prior to shipment



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Unit Drawings

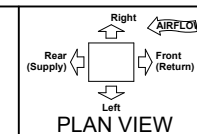


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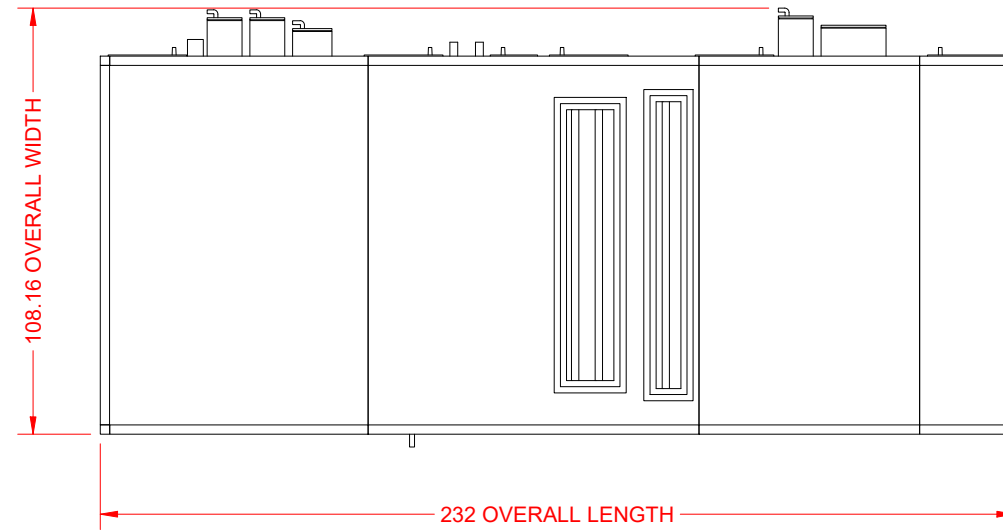
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 PROJECT NAME: MESSER - CCBH CABARRUS

ISOMETRIC VIEW
 SHEET 1 OF 5 CONTRACT#: 4E-870099-02
 UNIT TAG: **AHU-1**

ALL DIMENSIONS SHOWN IN: INCHES
 DRAWING SCALE: NTS
 DIMENSION TOLERANCES: UNIT (+/- 1/2"); PIPING (+/- 2")
 WEIGHT: 6106 (+/- 10%)
DRAWING NOT TO BE USED FOR CONSTRUCTION



TOP [PLAN] VIEW



NOTES:

UNITS WITH A BASERAIL AND A BOTTOM OPENING: DUCT CONNECTION FLUSH WITH THE BOTTOM OF UNIT, NOT FLUSH WITH BOTTOM OF BASERAIL.

REFER TO PERFORMANCE REPORT FOR SHIPPING SPLIT DETAILS.

ALLOW SUFFICIENT SPACE AROUND THE UNIT FOR REMOVING THE ACCESS PANELS AND VARIOUS PARTS OF THE UNIT. A MINIMUM CLEARANCE EQUAL TO THE WIDTH OF THE UNIT MUST BE PROVIDED ON ONE SIDE OF THE UNIT FOR REMOVING THE COIL OR FAN ASSEMBLY.

CONTRACTOR RESPONSIBLE FOR PENETRATIONS AND CONNECTIONS OF ALL ELECTRICAL BOXES AND INTERNAL COIL CONNECTIONS (IF PRESENT).

OVERALL DIMENSIONS ACCOUNT FOR COMPONENTS EXTENDING BEYOND UNIT CABINET IN ORDER TO CONVEY THE TRUE SPACE REQUIREMENTS FOR THE UNIT. THESE ITEMS MAY INCLUDE OUTDOOR ROOF PEAK, MOTOR CONTROL AND/OR FACTORY PACKAGE CONTROL BOXES, WEATHER HOODS, PIPE CHASES, DAMPER/LOUVER ASSEMBLIES, AND/OR UNIT BASE RAIL.

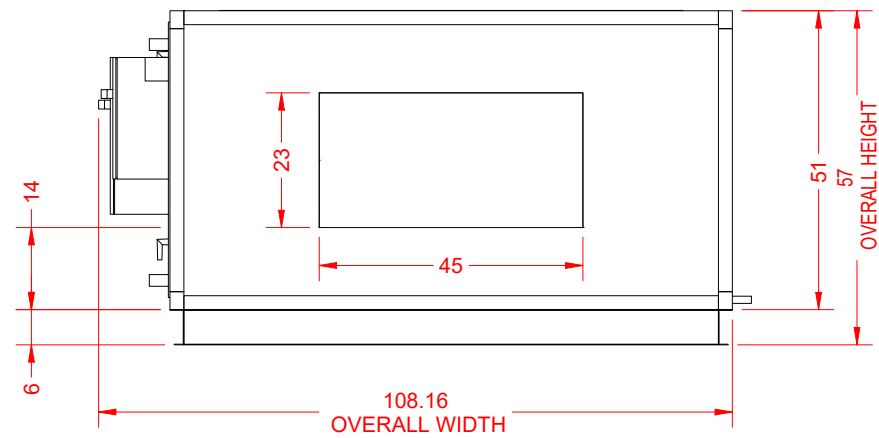
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THE OVERALL UNIT LENGTH MAY INCLUDE ADDITIONAL 1/4" PER SHIPPING SPLIT (IF APPLICABLE) FOR GASKET AND CONNECTION HARDWARE.

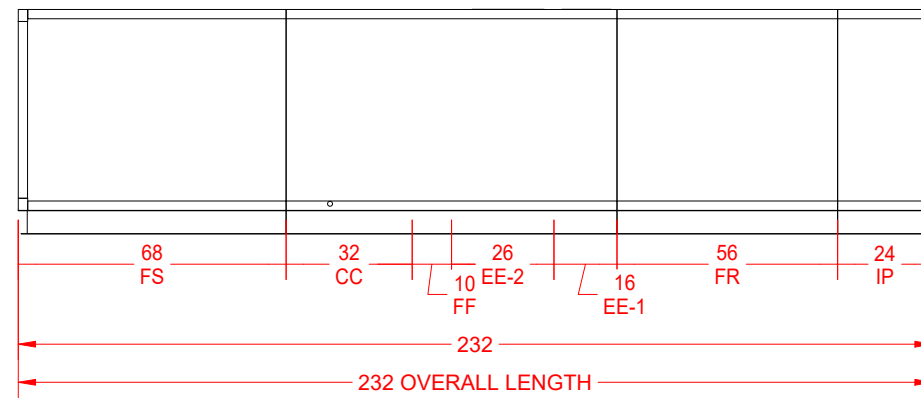
FILTER DIMENSIONS ARE NOMINAL SIZES.

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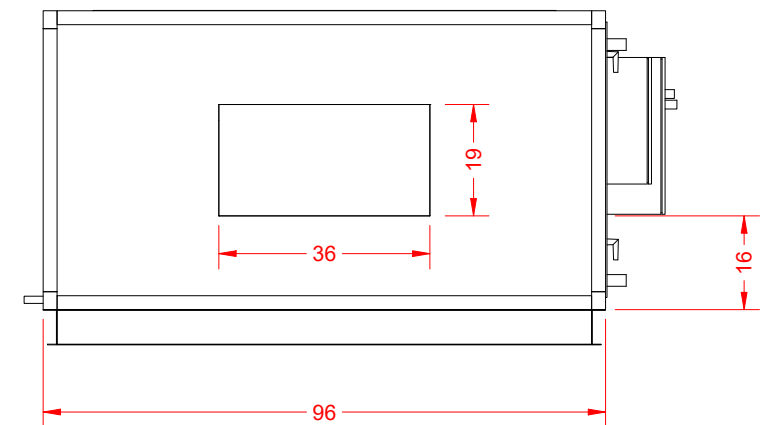
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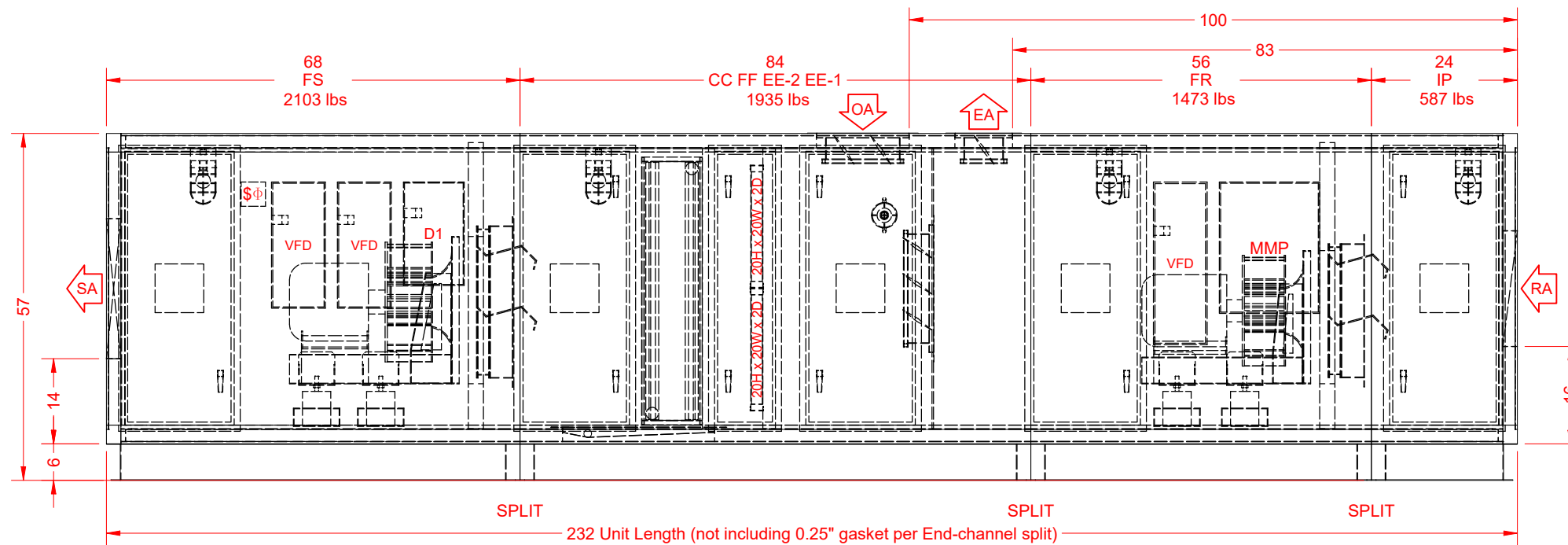
LEFT [ELEVATION] VIEW



FRONT VIEW



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				PROJECT NAME: MESSER - CCBH CABARRUS						



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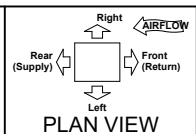
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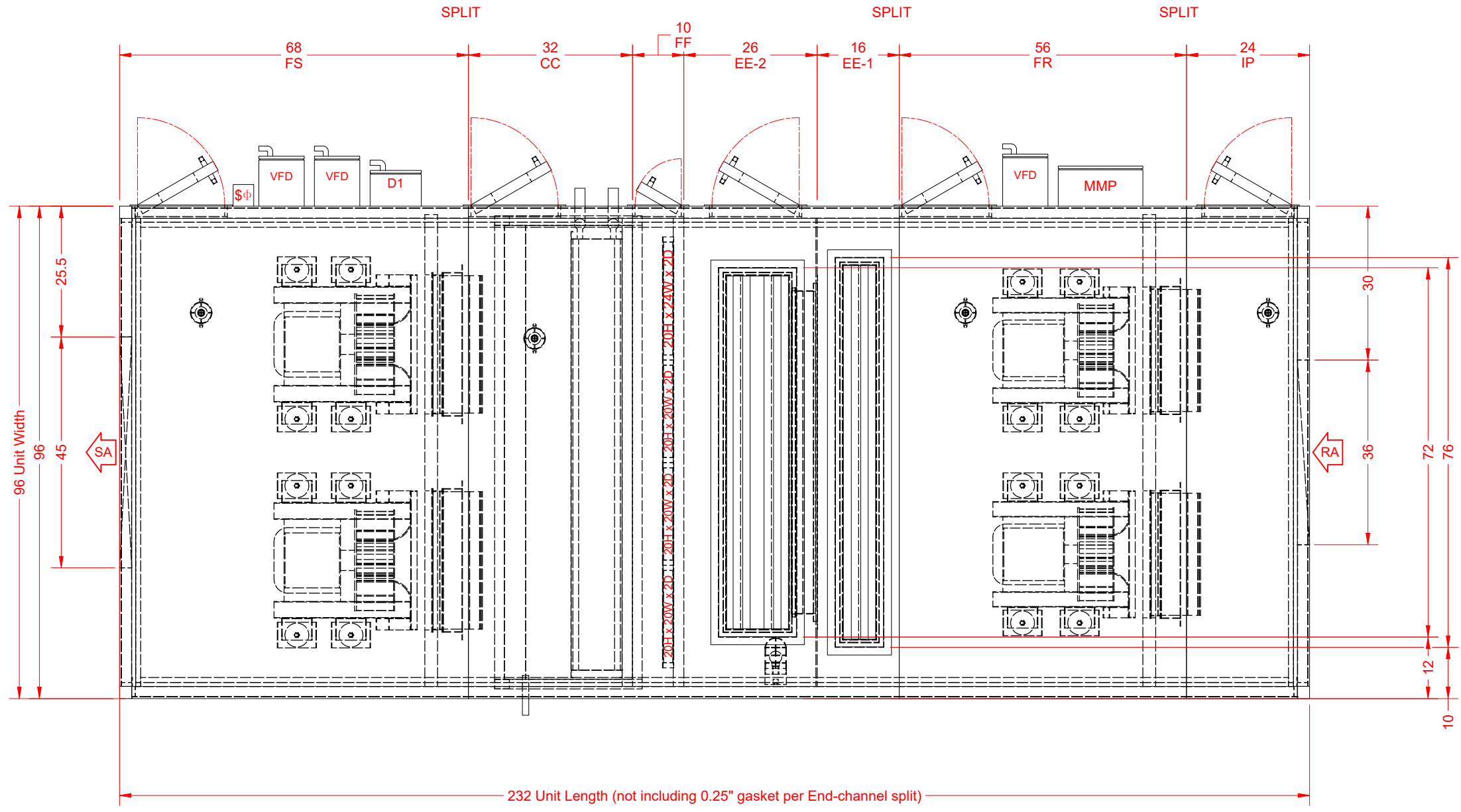
ELEVATION VIEW

SHEET 3 OF 5 CONTRACT#: 4E-870099-02

UNIT TAG: **AHU-1**

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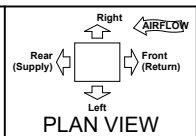


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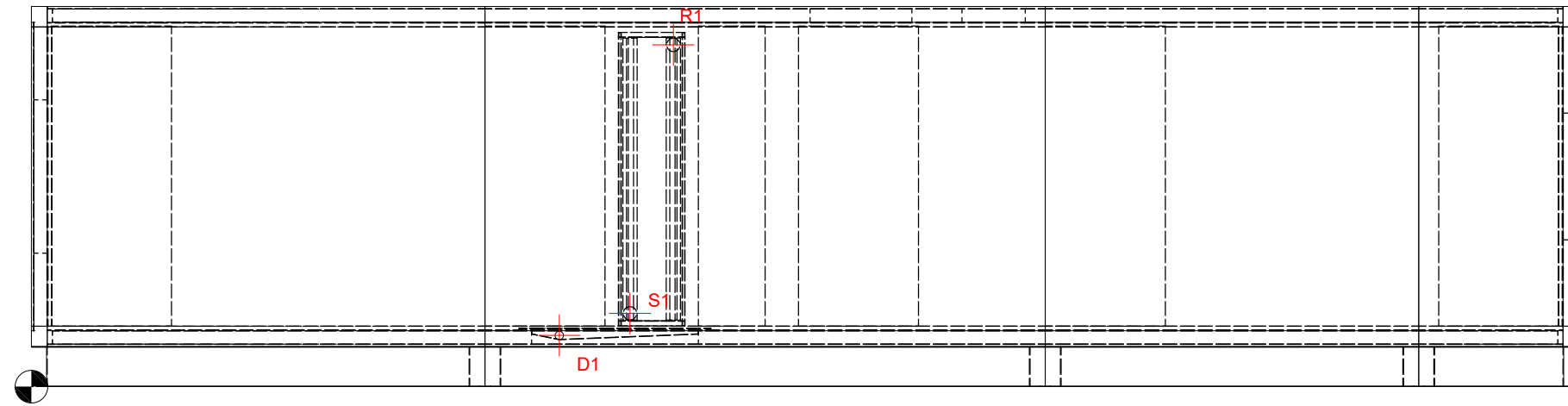
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 SHEET 4 OF 5 CONTRACT#: 4E-870099-02
 UNIT TAG: **AHU-1**

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COIL CONNECTIONS							
CNCT	XDIM	YDIM	SEG	HAND	TYPE	SIZE	SRVC
S1	89.7	11.0	CC	RIGHT	MPT	2	SPLY
R1	96.2	51.2	CC	RIGHT	MPT	2	RTRN
DRAIN CONNECTIONS							
CNCT	XDIM	YDIM	SEG	HAND	TYPE	SIZE	SRVC
D1	79.2	7.7	CC	LEFT	-	1.25	DRAIN

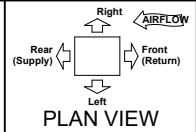


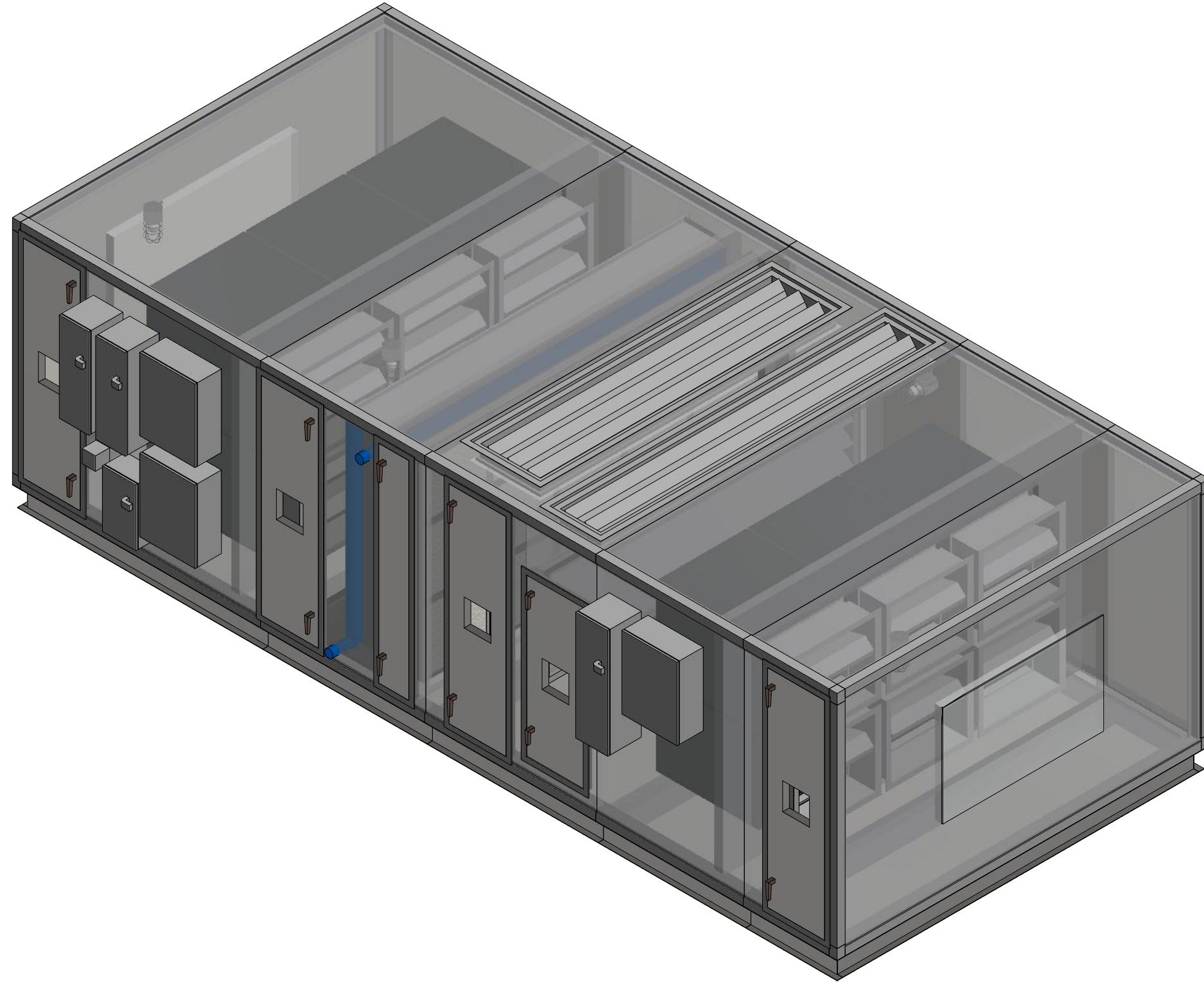
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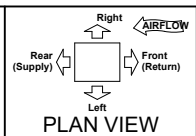


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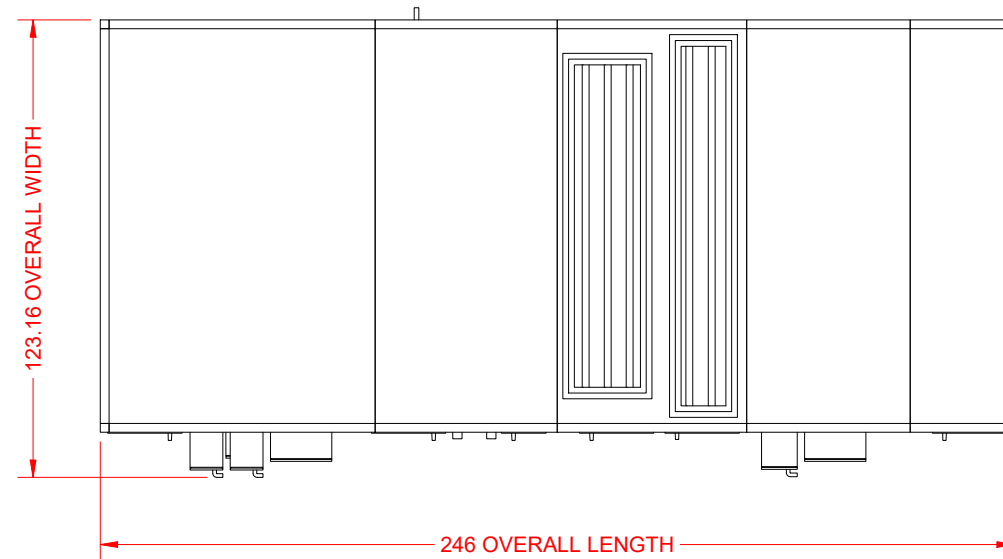
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 SHEET 1 OF 5 CONTRACT#: 4E-870099-03
 UNIT TAG: **AHU-2**

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 WEIGHT: 11943 (+/- 10%)
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TOP [PLAN] VIEW



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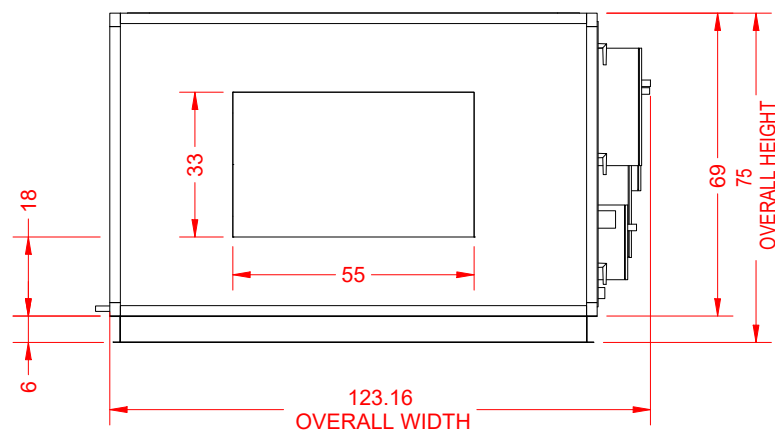
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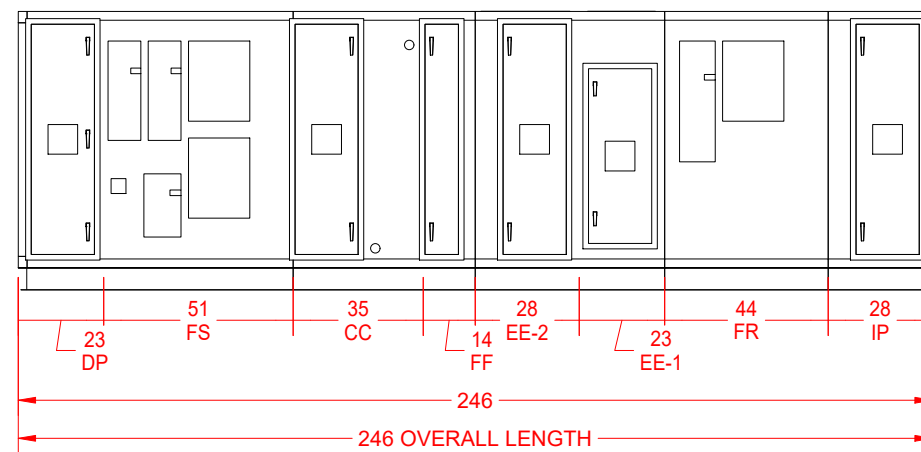
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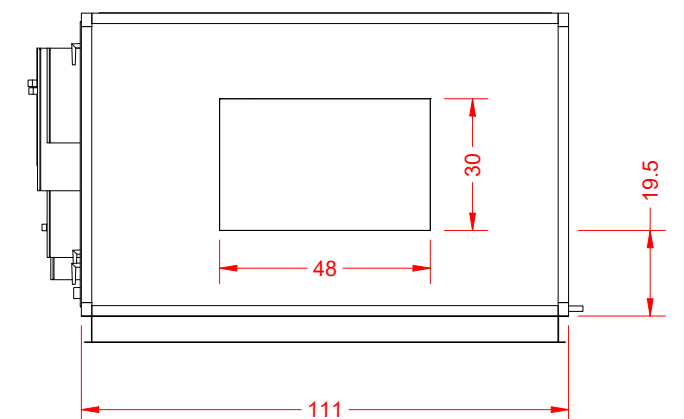
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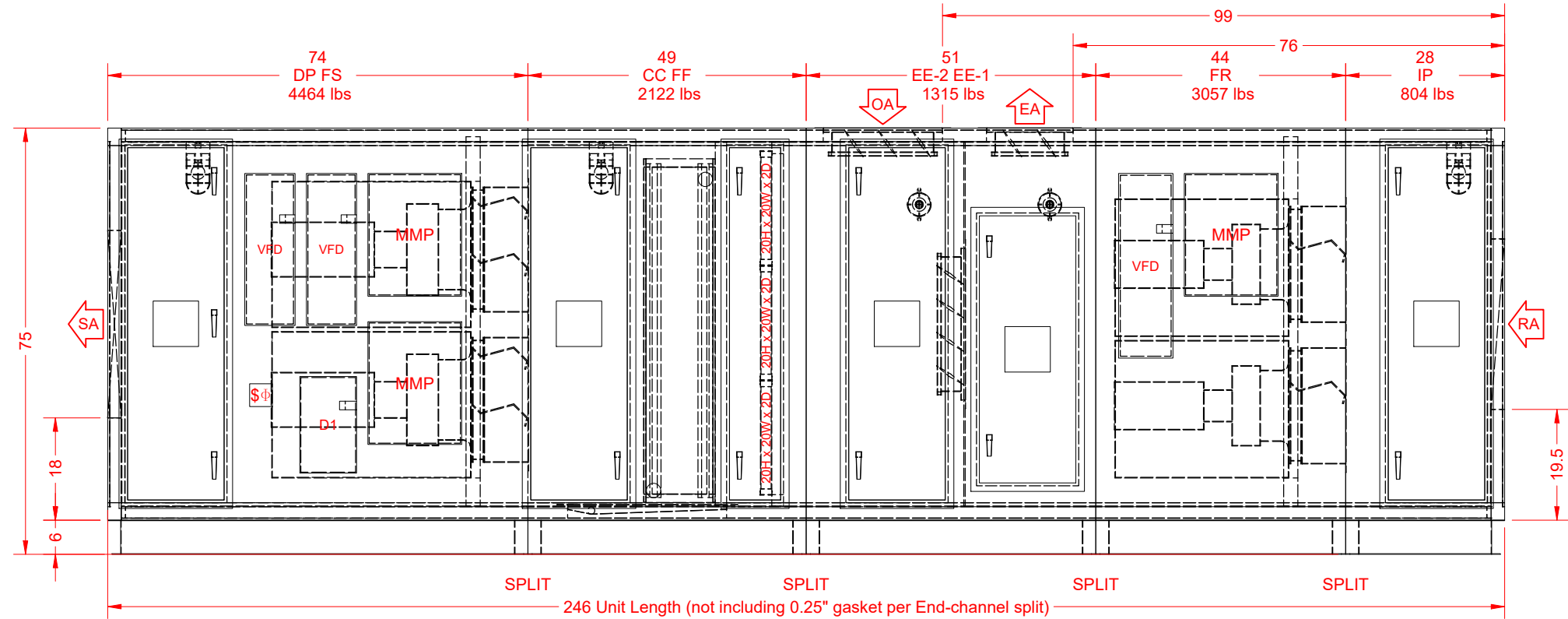
LEFT [ELEVATION] VIEW



FRONT VIEW



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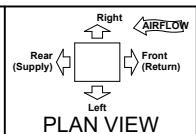


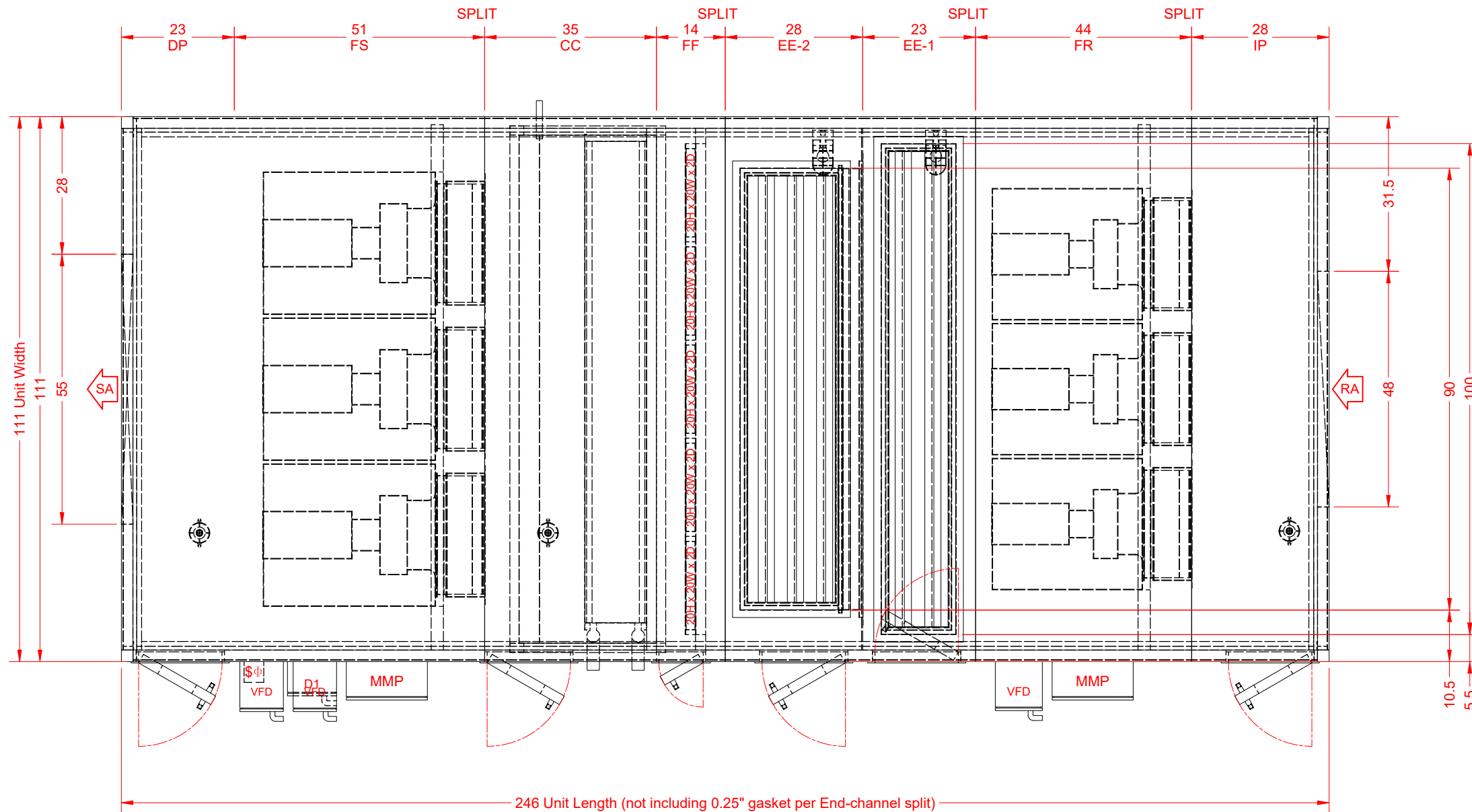
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 PROJECT NAME: MESSER - CCBH CABARRUS

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 UNIT TAG: **AHU-2**

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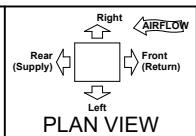


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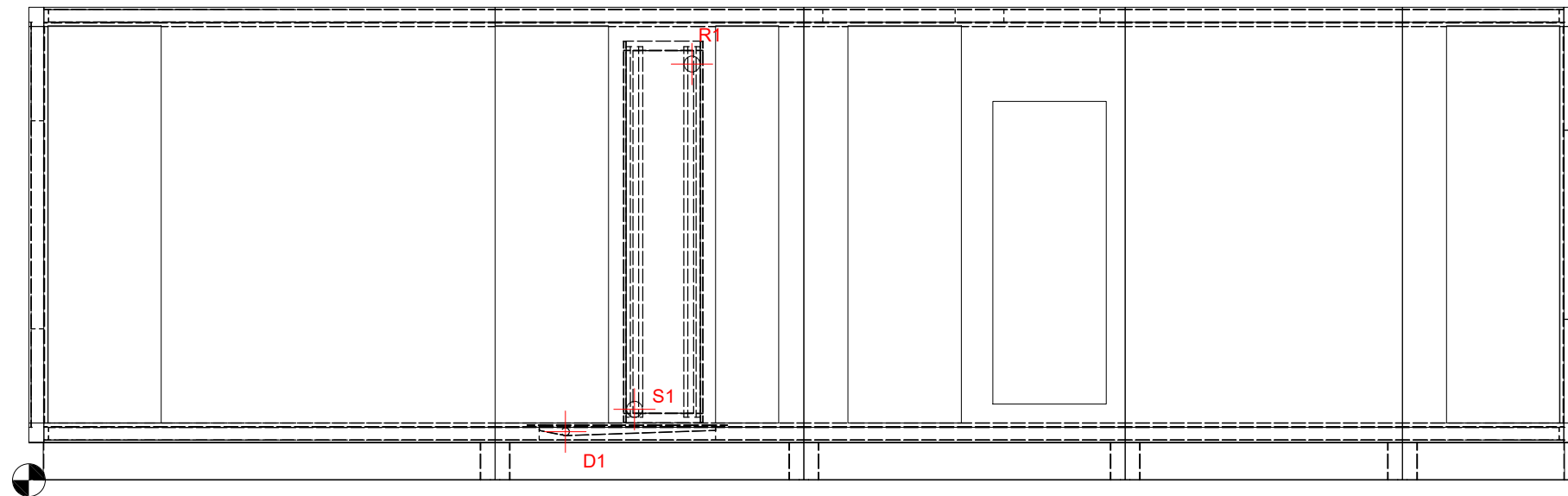
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 PROJECT NAME: MESSER - CCBH CABARRUS

PLAN VIEW
 SHEET 4 OF 5 CONTRACT#: 4E-870099-03
 UNIT TAG: **AHU-2**

ALL DIMENSIONS SHOWN IN: INCHES
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DRAWING NOT TO BE USED FOR CONSTRUCTION



COIL CONNECTIONS							
CNCT	XDIM	YDIM	SEG	HAND	TYPE	SIZE	SRVC
S1	96.1	11.2	CC	LEFT	MPT	2.5	SPLY
R1	105.3	66.0	CC	LEFT	MPT	2.5	RTRN
DRAIN CONNECTIONS							
CNCT	XDIM	YDIM	SEG	HAND	TYPE	SIZE	SRVC
D1	85.2	7.7	CC	RIGHT	-	1.25	DRAIN

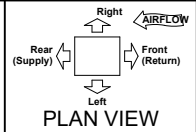


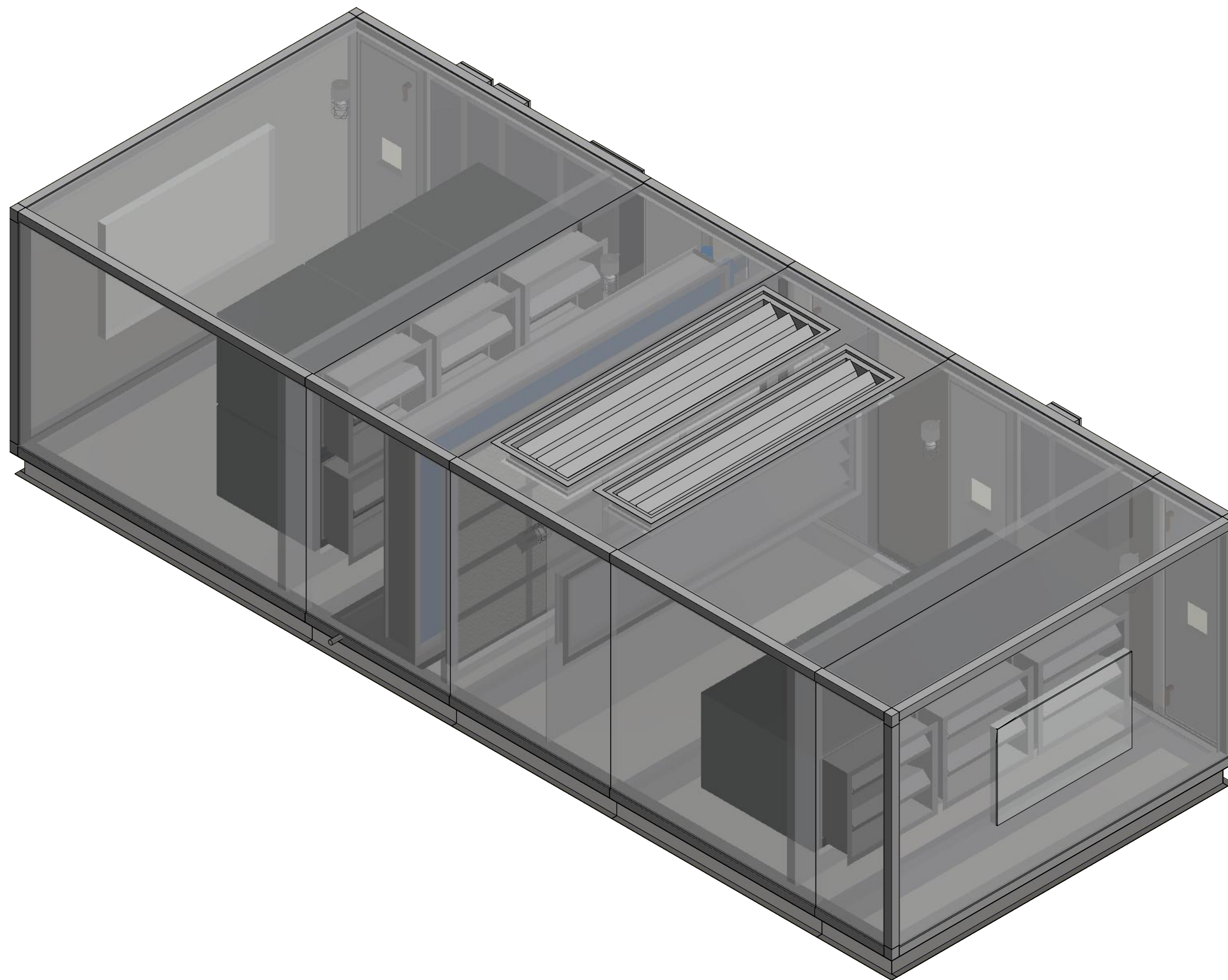
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PIPING CONNECTIONS
 SHEET 5 OF 5 CONTRACT#: 4E-870099-03
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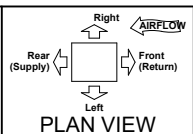


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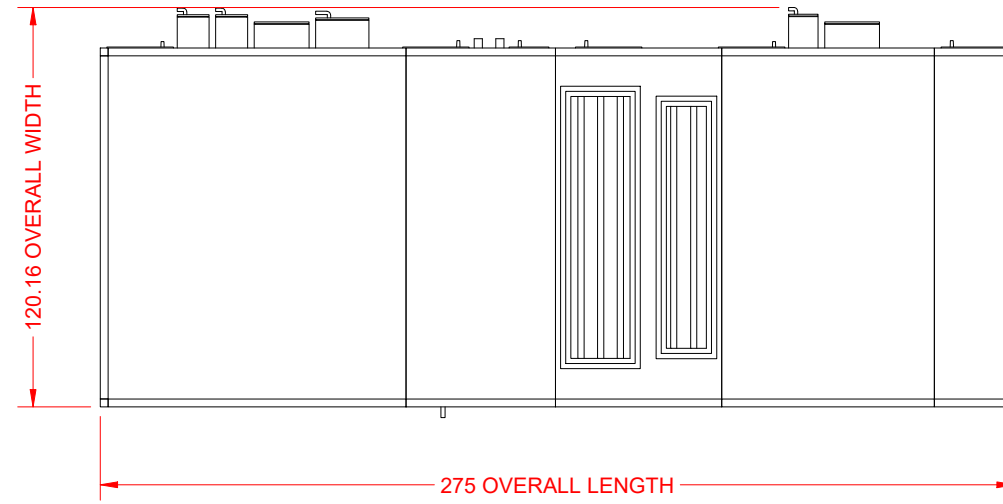
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 UNIT TAG: **AHU-3**

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TOP [PLAN] VIEW



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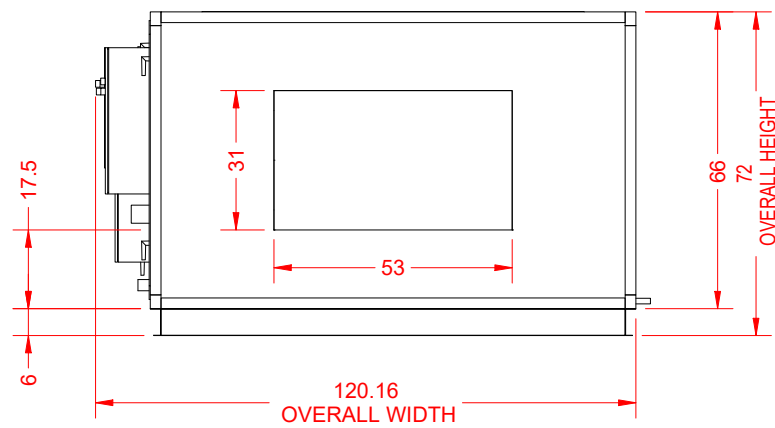
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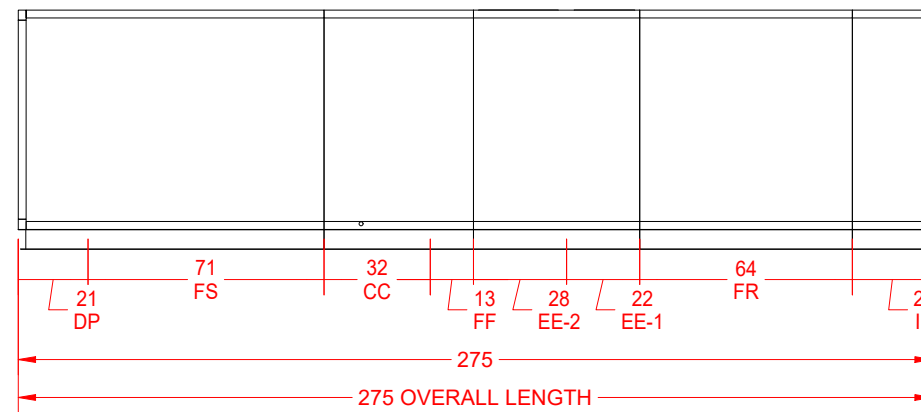
FILTER DIMENSIONS ARE NOMINAL SIZES.

ELECTRICAL DEVICES (LIGHTS, SWITCHES, PANELS, ETC.) INDICATE GENERAL AREA OF UNIT (E.G., SEGMENT); FINAL PLACEMENT DETERMINED DURING MANUFACTURING.

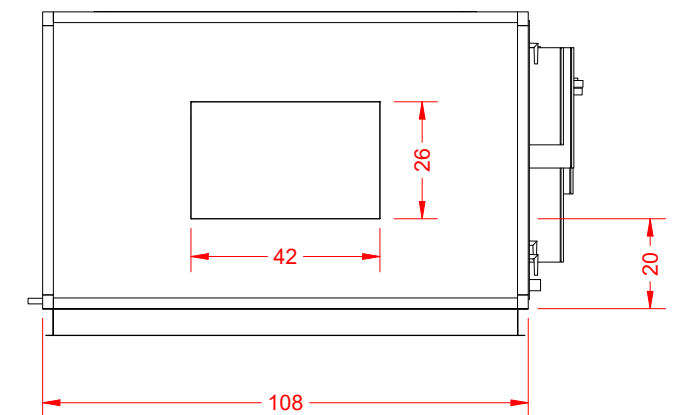
REAR VIEW



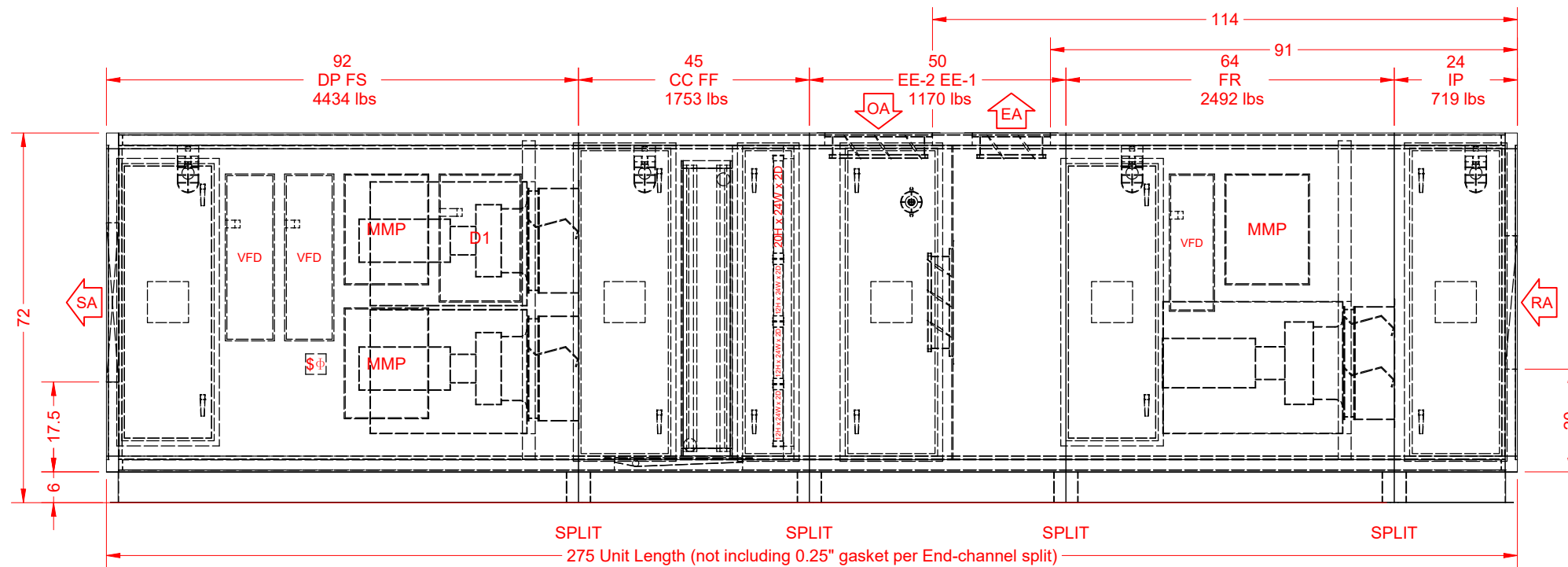
LEFT [ELEVATION] VIEW



FRONT VIEW



REV	DATE	REVISION CHANGE	REV BY	YORK SOLUTION UNIT DRAWING		EXTENTS VIEW		ALL DIMENSIONS SHOWN IN: INCHES DRAWING SCALE: NTS DIMENSION TOLERANCES: UNIT (+/- 1/2"); PIPING (+/- 2") WEIGHT: 10655 (+/- 10%) DRAWING NOT TO BE USED FOR CONSTRUCTION	 PLAN VIEW	
				MODEL: XT1-66x108	11/14/2024 07:57:58 PM UTC	SHEET 2 OF 5	CONTRACT#: 4E-870099-04			
				DESIGNATION: AHU-3		UNIT TAG: AHU-3				
				PROJECT NAME: MESSER - CCBH CABARRUS						



REV	DATE	REVISION CHANGE	REV BY

YORK SOLUTION UNIT DRAWING

MODEL: XT1-66x108 11/14/2024 07:57:58 PM UTC

DESIGNATION: AHU-3

PROJECT NAME: MESSER - CCBH CABARRUS

ELEVATION VIEW

SHEET 3 OF 5 CONTRACT#: 4E-870099-04

UNIT TAG: **AHU-3**

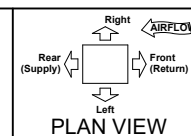
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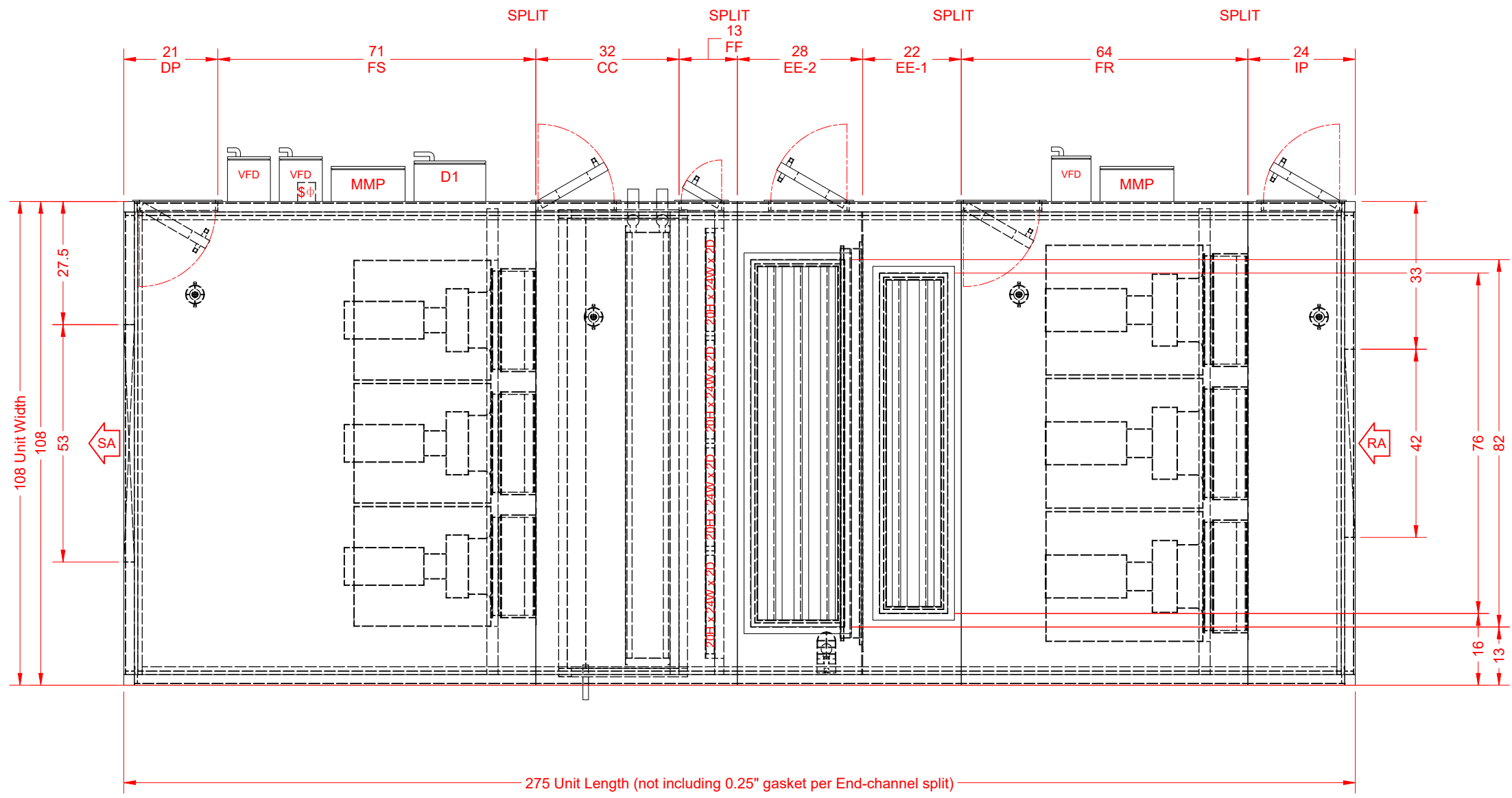
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DIMENSION TOLERANCES: UNIT (+/- 1/2"); PIPING (+/- 2")

WEIGHT: 10655 (+/- 10%)

DRAWING NOT TO BE USED FOR CONSTRUCTION



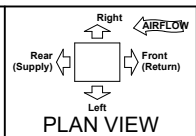


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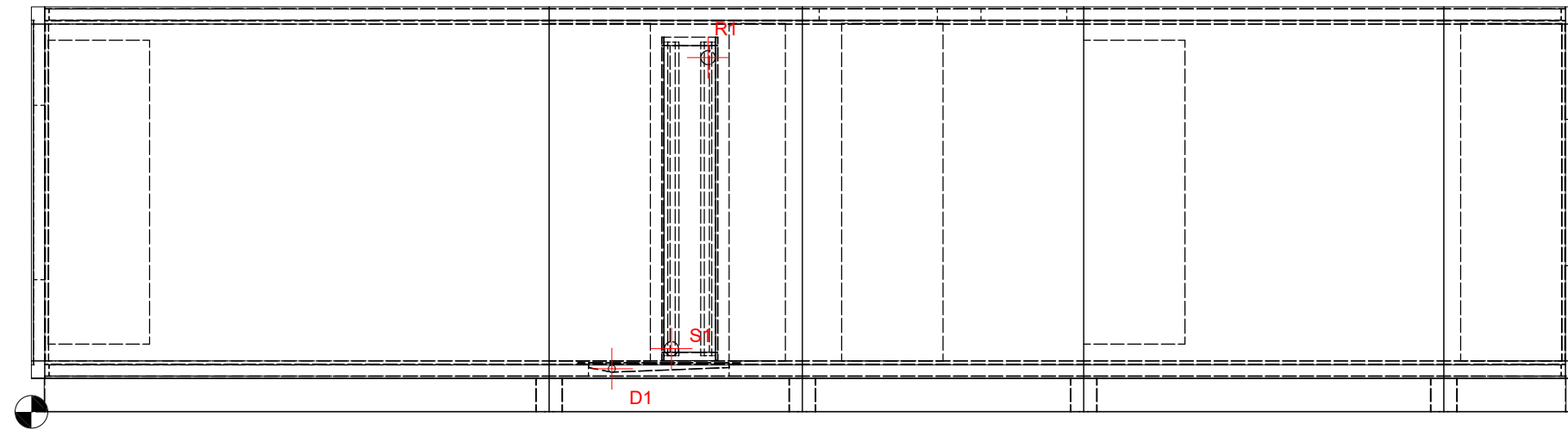
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 MODEL: XT1-66x108 11/14/2024 07:57:58 PM UTC
 DESIGNATION: AHU-3
 PROJECT NAME: MESSER - CCBH CABARRUS

PLAN VIEW
 SHEET 4 OF 5 CONTRACT#: 4E-870099-04
 UNIT TAG: **AHU-3**

ALL DIMENSIONS SHOWN IN: INCHES
 DRAWING SCALE: NTS
 DIMENSION TOLERANCES: UNIT (+/- 1/2"); PIPING (+/- 2")
 WEIGHT: 10655 (+/- 10%)
DRAWING NOT TO BE USED FOR CONSTRUCTION



COIL CONNECTIONS							
CNCT	XDIM	YDIM	SEG	HAND	TYPE	SIZE	SRVC
S1	113.7	11.2	CC	RIGHT	MPT	2.5	SPLY
R1	120.2	63.0	CC	RIGHT	MPT	2.5	RTRN
DRAIN CONNECTIONS							
CNCT	XDIM	YDIM	SEG	HAND	TYPE	SIZE	SRVC
D1	103.2	7.7	CC	LEFT	-	1.25	DRAIN

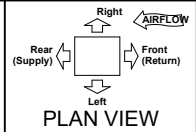


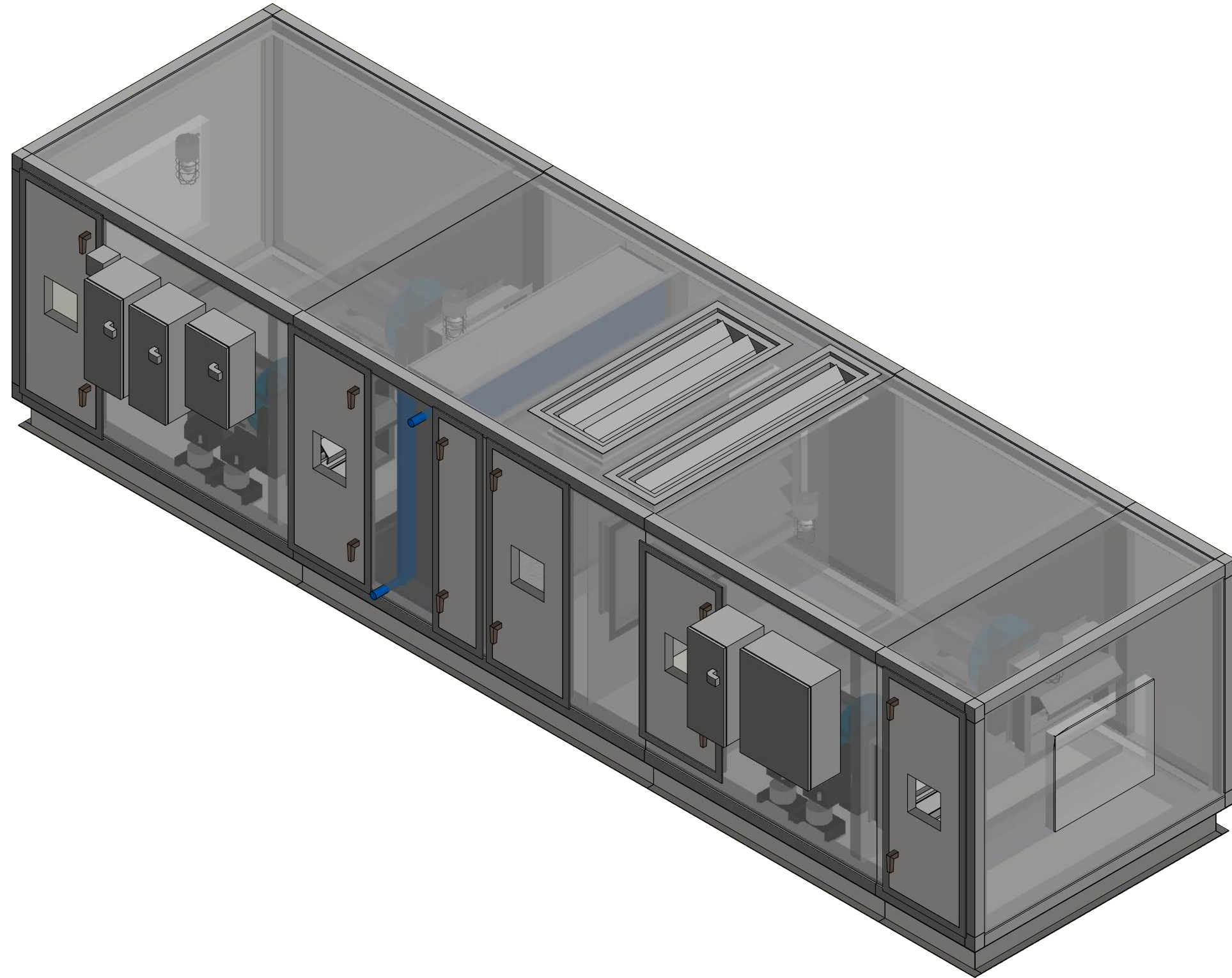
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YORK SOLUTION UNIT DRAWING
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 PROJECT NAME: MESSER - CCBH CABARRUS

PIPING CONNECTIONS
 SHEET 5 OF 5 CONTRACT#: 4E-870099-04
 UNIT TAG: **AHU-3**

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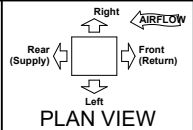


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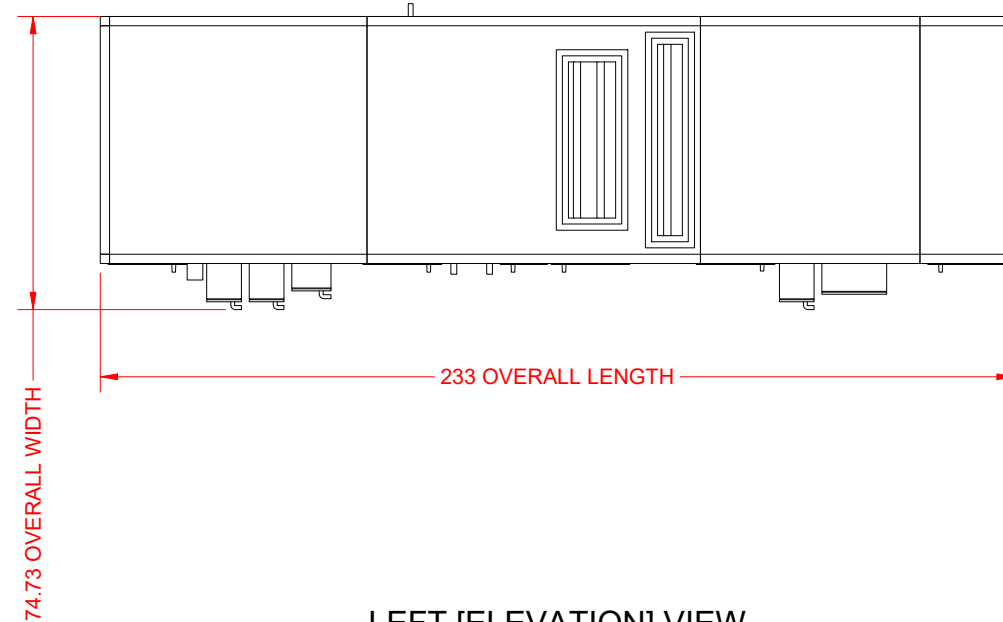
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 MODEL: XT1-51x63 11/15/2024 07:54:52 PM UTC
 DESIGNATION: AHU-4
 PROJECT NAME: MESSER - CCBH CABARRUS

ISOMETRIC VIEW
 SHEET 1 OF 5 CONTRACT#: 4E-870099-05
 UNIT TAG: **AHU-4**

ALL DIMENSIONS SHOWN IN: INCHES
 DRAWING SCALE: NTS
 DIMENSION TOLERANCES: UNIT (+/- 1/2"); PIPING (+/- 2")
 WEIGHT: 4478 (+/- 10%)
DRAWING NOT TO BE USED FOR CONSTRUCTION



TOP [PLAN] VIEW



NOTES:

UNITS WITH A BASERAIL AND A BOTTOM OPENING: DUCT CONNECTION FLUSH WITH THE BOTTOM OF UNIT, NOT FLUSH WITH BOTTOM OF BASERAIL.

REFER TO PERFORMANCE REPORT FOR SHIPPING SPLIT DETAILS.

ALLOW SUFFICIENT SPACE AROUND THE UNIT FOR REMOVING THE ACCESS PANELS AND VARIOUS PARTS OF THE UNIT. A MINIMUM CLEARANCE EQUAL TO THE WIDTH OF THE UNIT MUST BE PROVIDED ON ONE SIDE OF THE UNIT FOR REMOVING THE COIL OR FAN ASSEMBLY.

CONTRACTOR RESPONSIBLE FOR PENETRATIONS AND CONNECTIONS OF ALL ELECTRICAL BOXES AND INTERNAL COIL CONNECTIONS (IF PRESENT).

OVERALL DIMENSIONS ACCOUNT FOR COMPONENTS EXTENDING BEYOND UNIT CABINET IN ORDER TO CONVEY THE TRUE SPACE REQUIREMENTS FOR THE UNIT. THESE ITEMS MAY INCLUDE OUTDOOR ROOF PEAK, MOTOR CONTROL AND/OR FACTORY PACKAGE CONTROL BOXES, WEATHER HOODS, PIPE CHASES, DAMPER/LOUVER ASSEMBLIES, AND/OR UNIT BASE RAIL.

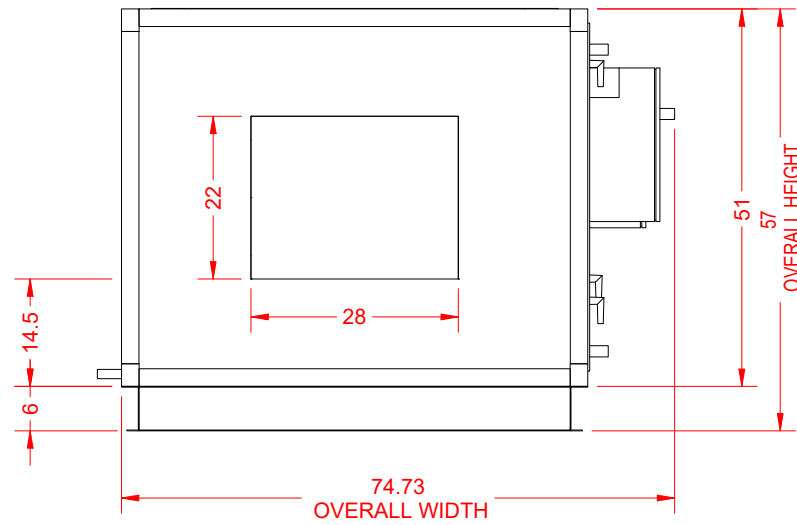
CERTAIN ITEMS MAY EXTEND BEYOND CABINET DIMENSIONS INCLUDING: COIL CONNECTIONS, ROOF TRIM, DOOR HANDLES, LIGHT SWITCHES, ELECTRICAL PANEL HANDLES, LIFTING LUGS, GAS FUEL SYSTEM, ETC.

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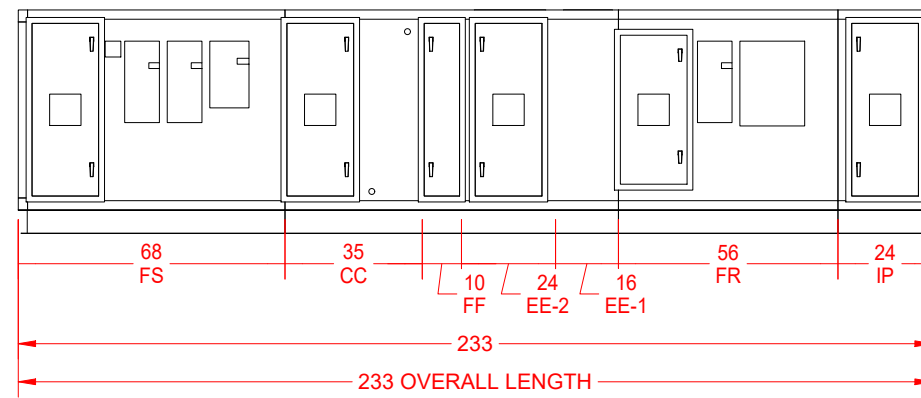
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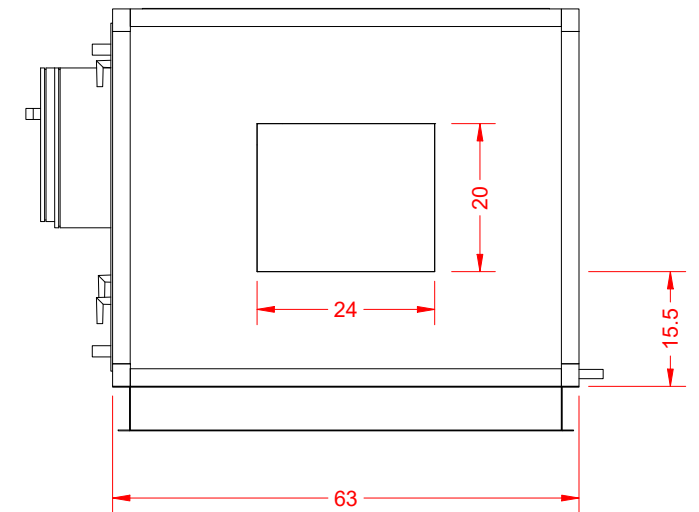
REAR VIEW



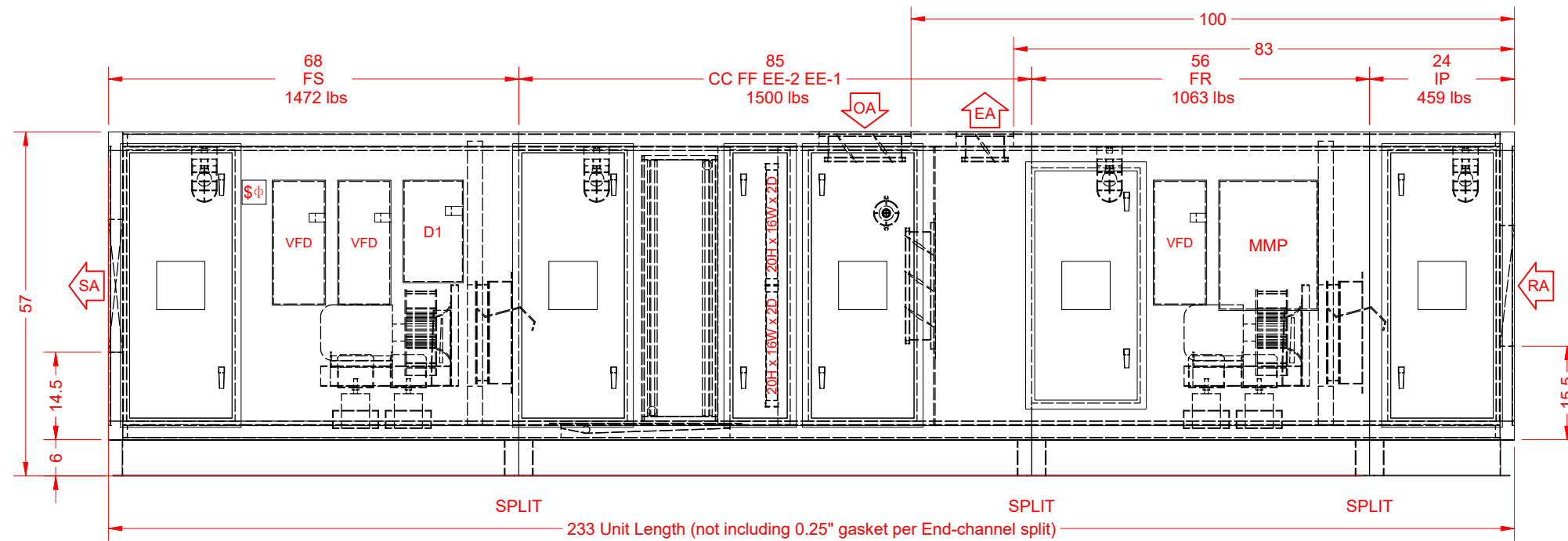
LEFT [ELEVATION] VIEW



FRONT VIEW



REV	DATE	REVISION CHANGE	REV BY	YORK SOLUTION UNIT DRAWING		EXTENTS VIEW		ALL DIMENSIONS SHOWN IN: INCHES DRAWING SCALE: NTS DIMENSION TOLERANCES: UNIT (+/- 1/2"); PIPING (+/- 2") WEIGHT: 4478 (+/- 10%) DRAWING NOT TO BE USED FOR CONSTRUCTION	 PLAN VIEW	
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				DESIGNATION: AHU-4		UNIT TAG: AHU-4				
				PROJECT NAME: MESSER - CCBH CABARRUS						

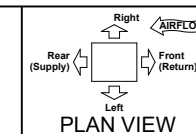


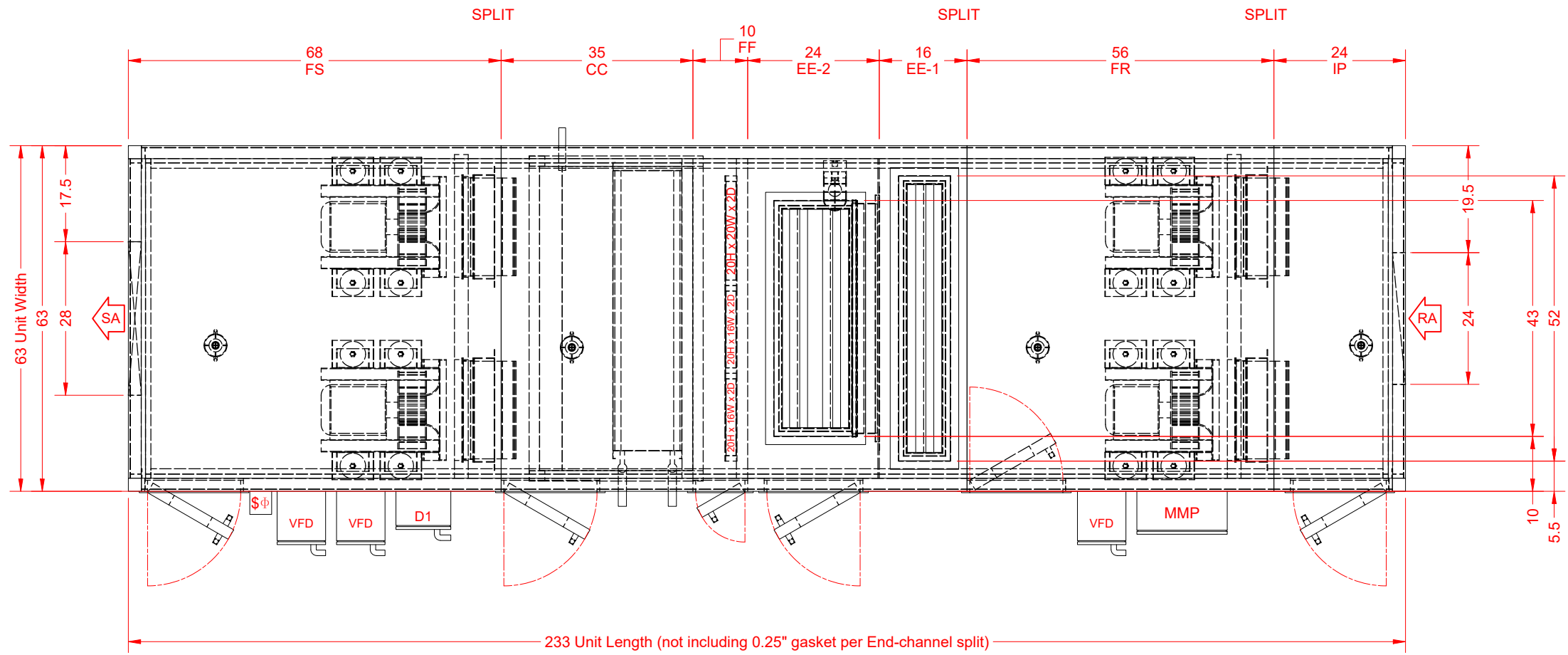
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YORK SOLUTION UNIT DRAWING
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 PROJECT NAME: MESSER - CCBH CABARRUS

ELEVATION VIEW
 SHEET 3 OF 5 CONTRACT#: 4E-870099-05
 UNIT TAG: **AHU-4**

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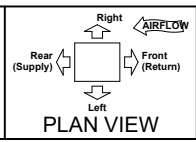


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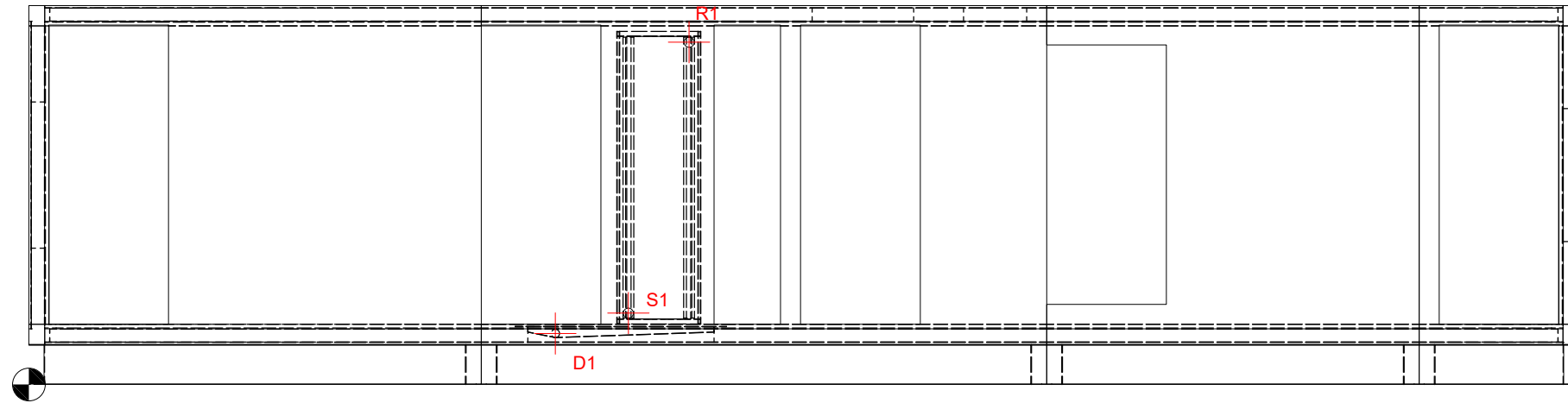
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PLAN VIEW
 SHEET 4 OF 5 CONTRACT#: 4E-870099-05
 UNIT TAG: **AHU-4**

ALL DIMENSIONS SHOWN IN: INCHES
 DRAWING SCALE: NTS
 DIMENSION TOLERANCES: UNIT (+/- 1/2"); PIPING (+/- 2")
 WEIGHT: 4478 (+/- 10%)
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COIL CONNECTIONS							
CNCT	XDIM	YDIM	SEG	HAND	TYPE	SIZE	SRVC
S1	90.1	10.7	CC	LEFT	MPT	1.5	SPLY
R1	99.3	51.5	CC	LEFT	MPT	1.5	RTRN
DRAIN CONNECTIONS							
CNCT	XDIM	YDIM	SEG	HAND	TYPE	SIZE	SRVC
D1	79.2	7.7	CC	RIGHT	-	1.25	DRAIN

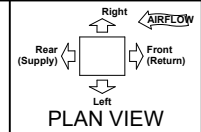


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YORK SOLUTION UNIT DRAWING
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 DESIGNATION: AHU-4
 PROJECT NAME: MESSER - CCBH CABARRUS

PIPING CONNECTIONS
 SHEET 5 OF 5 CONTRACT#: 4E-870099-05
 UNIT TAG: **AHU-4**

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 DIMENSION TOLERANCES: UNIT (+/- 1/2"); PIPING (+/- 2")
 WEIGHT: 4478 (+/- 10%)
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Equipment Sales Office: 9685 Cincinnati Dayton Rd, West Chester Township, OH 45069

Performance Report

Job Summary

Project Name:	Messer - CCBH Cabarrus		
Unit Tag(s):	AHU-1		
Quantity:	1	Environment:	Indoor



Unit Overview

Model	Airflow (CFM)	Altitude (ft)	Weight (lbs)
XTI-51x96	10,900	0	6,106

Segment Sequence

(FS)(CC FF EE-2 EE-1)(FR)(IP)

Unit Construction

Casing Details

Segment(s)	Thickness (in)	Exterior Paint	Exterior Gauge and Material	Interior Gauge and Material	Insulation Thickness and Material	Mylar Lining	Thermal Break	Bulkhead Material
IP, EE-1	2"	None	Standard Ga. G-90 Galvanized	Standard Ga. G-90 Galvanized	2" Foam	-	-	None
FR, EE-2, FF, CC, FS	2"	None	Standard Ga. G-90 Galvanized	Standard Ga. G-90 Galvanized	2" Foam	-	-	Galvanized Steel

Base Details

Segment(s)	Material	Paint
IP, FR, EE-1, EE-2, FF, CC, FS	6" Formed Steel	None

Floor Details

Segment(s)	Gauge and Material	Paint	Insulation	Thermal Break	Attachment	Sub-Floor Gauge and Material
IP, FR, EE-1, EE-2, FF, CC, FS	Standard Ga. G-90 Galvanized	None	2"	-	Screw Down	None

Notes

Enhanced Thermal Performance construction.

Unit Electrical

Circuit Details

#	Component(s)	V/Ph/Hz	Full Load Amps (FLA)	Minimum Current Ampacity (MCA)	Maximum Overcurrent Protection (MOP)
1	Multi-Load Disconnect (on FS), FS VFD-1 (on FS), FS VFD-2 (on FS)	460/3/60	19	21.38	30
2	FR MMP-1 (on FR), FR VFD-1 (on FR)	460/3/60	13.4	15.08	20
3	Electrical Outlet and Light Switch (on FS)	120/1/60	-	-	20

Electrical Details

Minimum Unit SCCR	5 kA rms Symmetrical	ETL Label (UL1995/NEC-2002)	Yes
Unit Light Type	LED	Light Switch Enclosure	Spring Wound Timer

Supply Fan(s)

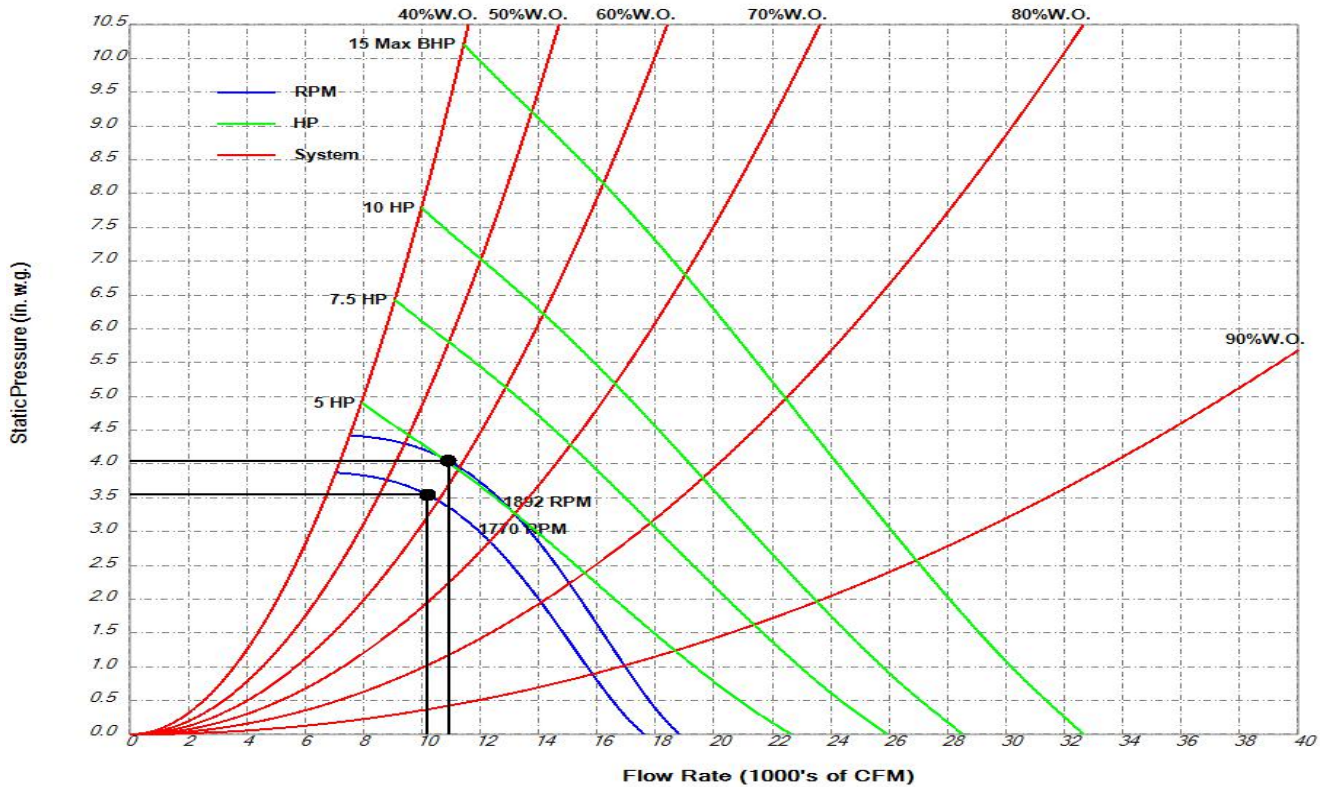
Performance Details													
Fan Manufacturer	Model	# Blades	Class	Size	% Wheel Width	% Wheel Diameter	Quantity	Airflow per Fan (CFM)	Altitude (ft)	TSP (in w.g.)	ESP (in w.g.)	Fan Speed (RPM)	Fan Power (BHP)
Lau	DDPG2	9	II	200	120	100	2	5,450	0	4.05	2.00	1,892	5.03
Max RPM	Wheel Type	Blade Type	Wheel Material	Base Material		Fan Flow Isolation	AirFlow Monitoring		Inverter Drive Balancing	Isolation Type		Thrust Restraints	
2,771	SWSI	Airfoil	Aluminum	Galvanized Steel		Damper	Yes (K=2136.00)		-	2" Spring		Yes	
Drive Type	FEI		FEP (KW)		Inlet Screen	Fan Cage	Fan Stand	Motor Removal Rail	Seismic Snubber				
Direct Drive	1.28		8.60		-	Yes	-	-	-				

Motor Details										
Type / MFG	Motor Power (HP)	V/Ph/Hz	Quantity	Insulation Class	RPM	Frame Size	FLA (Amps)	Efficiency	Location	SGR
TEFC / Baldor	7.5	460/3/60	2	H	1,800	213T	9.50	Premium	Right	Yes

At Motor Synchronous Details			
TSP (in w.g.)	Total Air Flow (CFM)	Fan Speed (RPM)	Fan Power (BHP)
3.54	5,099	1,770	4.12

Notes

Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org

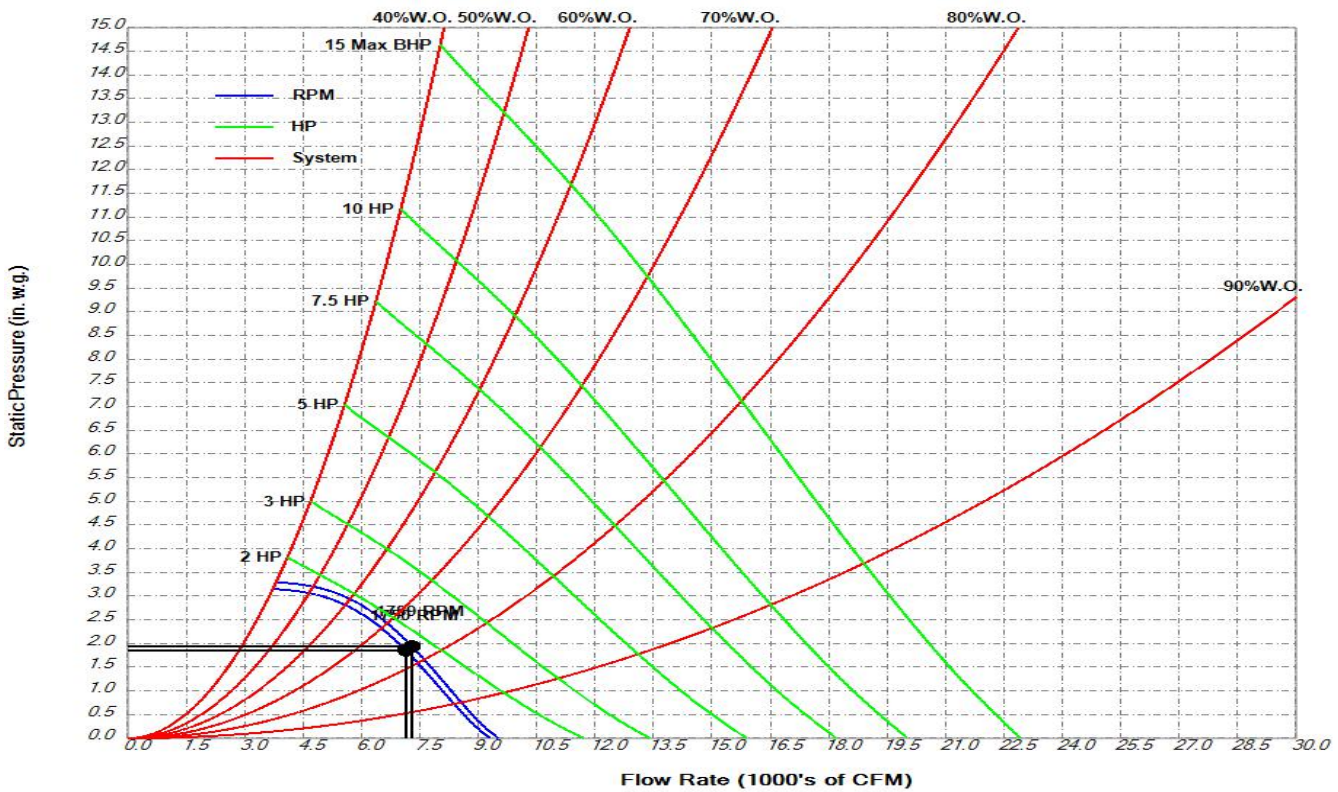


Return Fan(s)

Performance Details													
Fan Manufacturer	Model	# Blades	Class	Size	% Wheel Width	% Wheel Diameter	Quantity	Airflow per Fan (CFM)	Altitude (ft)	TSP (in w.g.)	ESP (in w.g.)	Fan Speed (RPM)	Fan Power (BHP)
Lau	DDPG2	9	II	182	80	100	2	3,650	0	1.94	1.00	1,789	1.76
Max RPM	Wheel Type	Blade Type	Wheel Material	Base Material		Fan Flow Isolation	AirFlow Monitoring		Inverter Drive Balancing	Isolation Type		Thrust Restraints	
2,979	SWSI	Airfoil	Aluminum	Galvanized Steel		Damper	Yes (K=1688.00)		-	2" Spring		Yes	
Drive Type	FEI		FEP (KW)		Inlet Screen	Fan Cage		Fan Stand	Motor Removal Rail		Seismic Snubber		
Direct Drive	1.30		3.13		-	Yes		-	-		-		

Motor Details										
Type / MFG	Motor Power (HP)	V/Ph/Hz	Quantity	Insulation Class	RPM	Frame Size	FLA (Amps)	Efficiency	Location	SGR
TEFC / Baldor	5.0	460/3/60	2	H	1,800	184T	6.70	Premium	Right	Yes

At Motor Synchronous Details			
TSP (in w.g.)	Total Air Flow (CFM)	Fan Speed (RPM)	Fan Power (BHP)
1.86	3,570	1,750	1.65



Glycol Coil(s)

Coil Information								
Segment[Index]	Coil Tag	Coil Duty	Fluid Type	Glycol Percentage	Airflow (cfm)	Flow Direction	Density	Altitude (ft)
CC[1]	-	Cooling	Propylene Glycol	25	10900	Horizontal	Standard	0

Coil Bank Configuration

Segment[Index]	Tube Diameter (in) Fin Type	Total Fin Height (in)	Fin Length per Coil (in)	Face Velocity (fpm)	Stacking Rack Material	Coils High	Coils Wide	Coil Configuration	Coil Stagger (in)	Coil Pull Panel
CC[1]	0.500 Corrugated	42.50	84.00	440	-	1	1	Standard	0	Right Side

Airside Performance

Segment[Index]	EAT-DB (°F)	EAT-WB (°F)	LAT-DB (°F)	LAT-WB (°F)	TMBH	SMBH	Air Pressure Drop (in w.g.)
CC[1]	79.3	64.8	53.3	52.3	402	313	0.66

Fluidside Performance

Segment[Index]	EFT (°F)	LFT (°F)	Fluid Velocity (fps)	Fluid Flow (gpm)	Fluid Pressure Drop (ft)	Rows	Tubes Per Circuit	Reynolds Number
CC[1]	42.0	56.0	4.1	59.9	17.9	6	8	4863

Fin and Tube Configuration

Segment[Index]	Fin Thickness (in) / Material	Fin Spacing (fpi)	Tube Thickness (in)	Turbulators	Return Bend Thickness	Casing Material	Coil Coating	Fouling Factor (hr.ft².°F/BTU)
CC[1]	0.010 Aluminum	12	0.016	No	0.016	Stainless	None	-

Header and Connection Configuration

Segment[Index]	Header Material	Connection Material	Connection Diameter (in)	Connection Offset (in)	Connection Type	Connection Location/Rotation
CC[1]	Copper	Steel	2	0	MPT	Right

Other Performance

Segment[Index]	Dry Weight (lbs)	Fluid Weight (lbs)	Internal Volume (ft³)
CC[1]	480	120	2.1

Notes

- Performance is shown for the entire coil bank. Performance is not per coil.
- Coil index indicates position in segment. Example: CC-1, index 1; Spacer, index 2; CC-1, index 3
- Ratings are for coils manufactured by Johnson Controls, Inc., 507 E. Michigan St., Milwaukee WI 53202.
- CC[1]: AHRI Certified:Yes.All Coils: certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the range of Standard rating conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.
- All Coils: BDW Tube Spacing: 1.25 x 1.08
- All Coils: Coil DII Version: 8.8

Drain(s)

Details

Segment	Drain Pan		
	Liner Material	Connection Location	Liner Coating
CC	Stainless Steel, 304	Left	None

Filter(s)

Details								
Segment	Type	Depth	Filter Loading	Media/MERV	# of Spares	Spare Filter Media	Frame Material	
FF	Primary Filter	2"	Side	Pleated 30% Efficiency (MERV 8)	1	Pleated 30% Efficiency (MERV 8)	Galvanized Steel	

Sizes						Filter Gauge Details		
Segment	Filter	1 st Filter Size H x W (in)	1 st Qty	2 nd Filter Size H x W (in)	2 nd Qty	Location	Type	Range (in w.g)
FF	Primary Filter	20x20	6	20x24	2	Door	Magnehelic with Flag	0 - 1.0

Damper(s)

Details												
Segment	Air Path	H x W (in)	Qty	Total Face Velocity (ft/min)	Face Area (ft ²)	Airflow (CFM)	Min Airflow Measurement (CFM)	Type	Config	Model	Material	Blade Orientation
FR	Return Air	22.00 x 25.00	2	956	7.6	3,650	-	Counterbalanced Backdraft	100%	CBD6	Aluminum	Parallel
EE-1	Exhaust Air	9.50 x 76.00	1	1,456	5.0	7,300	-	Control	100%	CD60	Galvanized	Parallel
EE-2	Mixed Air	21.00 x 66.00	1	1,132	9.6	10,900	-	Control	100%	CD60	Galvanized	Parallel
EE-2	Outside Air	15.25 x 72.00	1	1,430	7.6	10,900	-	Control	100%	CD60	Galvanized	Parallel
FS	Inlet Air	25.00 x 28.00	2	1,121	9.7	5,450	-	Counterbalanced Backdraft	100%	CBD6	Aluminum	Parallel

Door(s)

Details												
Segment(s)	Location	Swing	Hinge Location	H x W x T (in)	View Port	ViewPort Wire	Test Port	Spare Gasket	Thermal Break	Fastener Type	Safety Latch	Noncontact Safety Interlock
EE-2	Right	Outward	Front	45 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
FF	Right	Outward	Front	45 x 10 x 2	None	-	Yes	-	Yes	Plated	-	-
CC	Right	Outward	Rear	45 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
FS	Right	Outward	Rear	45 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	Yes	-
IP	Right	Outward	Front	45 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
FR	Right	Outward	Rear	45 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	Yes	-

Motor Control(s)

VFD Details									
Segment	Type	V/Ph/Hz	Input/Output Amps*	Efficiency (%)	Heat Loss (at 100% load)	Enclosure	Bypass	Disconnect Type	RFI/EMI EMC Filter
FR	AYK-580	460/3/60	14/14	98	228	NEMA 1	-	Fused	Yes
FS	AYK-580	460/3/60	12/12	98	174	NEMA 1	-	Fused	Yes
FS	AYK-580	460/3/60	12/12	98	174	NEMA 1	-	Fused	Yes

Notes (ABB VFD)

*Drives are rated for use below 3,000 ft and 104°F. Refer to the Air-Mod Engineering Guide Form 100.42-EGI (813) for additional information.

Drives are current rated devices. The HP ratings provided are for reference only and are based on typical 4-pole motors at nominal voltages (NEC Table 430-150). If full motor torque is required, ensure the drive has a continuous current rating equal to, or greater than, the full load amp rating of the motor.

Storage Temperature: -40°F to 158°F (-40°C to 70°C).

Ambient Operating Temperature: Temperate 5°F to 104°F (-15°C to 40°C). De-rating to operate at 122°F (50°C).

Relative Humidity: 5% to 95% non-condensing. Maximum relative humidity is 60% in the presence of corrosive gasses.

Altitude: 100% Load Capacity (No De-rating) up to 3,300 ft. (1,000 m). 1% derating for each 330 ft. above 3,300 ft. Installations above 6,600ft. (2,000 m) require review.

If 8KHZ Switching Frequency is used, de-rate output current to 80%.

Overload Current Rating: 110% for 1 minute every 10 minutes and is capable of 130% short term-overload rating for 2 seconds our of each minute.

If applicable, motor overload protection in the bypass mode is provided by a Class 20 motor overload relay.

The customer is responsible for providing either a platform/catwalk or portable means to access the VFD when the VFD is installed where the center of the handle of the disconnecting means in its uppermost position is greater than 78" above the finished floor.

Input line Impedance: 5% Equivalent Input Impedance with internal reactor(s). Patented swinging choke design for superior harmonic mitigation.

Use Copper Conductors Only. Do not use aluminum wire.

Manual Motor Protection Details

Location Segment	Disconnect Type	Enclosure Type	V/Ph/Hz	# of Fans Served	Motor HP (Each)
FR	None	NEMA 3R	460/3/60	2	5
Total Combined HP	Total Amps	Drain/Vent Assembly	Service	# of Circuits	
10	13.4	-	Return Fan motor(s)	2	

Notes

Use Copper Conductors Only. Do not use aluminum wire.

The Class 10 trip rating of the MMP device will not withstand an across-the-line start of a fan and should not be used with VFDs with bypass circuits.

Face Velocity and Static Pressure

Summary						
Segment	Description	Face Area (ft ²)	Airflow (CFM)	Face Velocity (ft/min)	Supply Fan Static Pressure (in w.g.)	Exhaust/Return Fan Static Pressure (in w.g.)
EE-2	CD60 (Control Damper 60 - Galvanized Airfoil)	7.6	10,900	1,430	0.08	0.00
EE-2	Outside Air Opening	7.6	10,900	1,430	0.34	0.00
FF	2" Pleated 30% Efficiency (MERV 8)	23.3	10,900	467	0.26	0.00
FF	Dirty Filter Allowance	0.0		0	0.26	0.00
CC	Cooling - 6 Row - 12 Fins Per Inch	24.8	10,900	440	0.66	0.00
FS	CBD6 (Backdraft Damper With Counterbalance)	4.9	5,450	1,121	0.06	0.00
FS	Supply Air Opening	7.2	10,900	1,517	0.39	0.00
FS	External Static - User Entered	0.0		0	2.00	0.00
IP	Return Air Opening	4.8	7,300	1,537	0.00	0.40
FR	CBD6 (Backdraft Damper With Counterbalance)	3.8	3,650	956	0.00	0.04
FR	External Static - User Entered	0.0		0	0.00	1.00
EE-1	CD60 (Control Damper 60 - Galvanized Airfoil)	5.0	7,300	1,456	0.00	0.14
EE-1	Exhaust Air Opening	5.0	7,300	1,456	0.00	0.36
Total					4.05	1.94

Dimensions and Weight

Details					
Segment	Description	Length ¹ (in)	Height (in)	Width ² (in)	Weight ³ (lbs)
IP	Inlet Plenum	24	51	96	559
FR	Fan (Return)	56	51	96	1,445
EE-1	Economizer	16	51	96	236
EE-2	Economizer	26	51	96	570
FF	Flat Filter	10	51	96	144
CC	Cooling Coil	32	51	96	1,077
FS	Fan (Supply)	68	51	96	2,075
Overall		232			

Notes

¹The length includes bottom tier segments only.

²The width does not include coil connection extensions or door latches that extend beyond the unit casing. The width does not include the depth of any pipe chases.

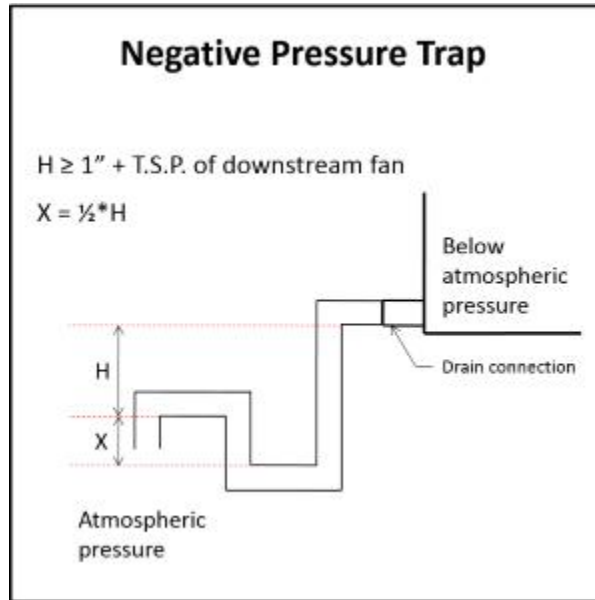
³See Shipping Summary for notes on weights.

Factory Testing

Summary							
Leak Test	Deflection Test	Deflection Test Includes Roof	Test Static Pressure	Airflow Test	Customer Witness Test	Opening Covers for Job Site Leak Test/Quantity (Testing by Others)	Fan Vibration Test
1.0 Percent	None	-	-6.225:6.225	None	-	-	None
Notes							

Recommended Trap Height

Details									
Segment	Applicable Fan	Fan TSP (in w.g.)	Positive or Negative	Calculated Dimensions (in)			Recommended Dimensions (in)		Base Rail Height (in)
				H	X	H + X	H	H + X	
CC	Supply Fan	4.05	Negative	4.60	2.30	6.90	4.75	7.00	6



Notes

Formulas and calculations are recommendations only. Contractor shall determine actual dimensions required for each trap based on jobsite conditions, and application requirements.

Refer to the Installation Manual of the IOM for more information.

Statement of Compliance

Details

Air Handling Unit AHU's meet IBC seismic requirements for non-critical equipment ($I_p = 1.0$) for locations with design spectral response $S_d \leq 0.43$. Units must be rigid mounted.

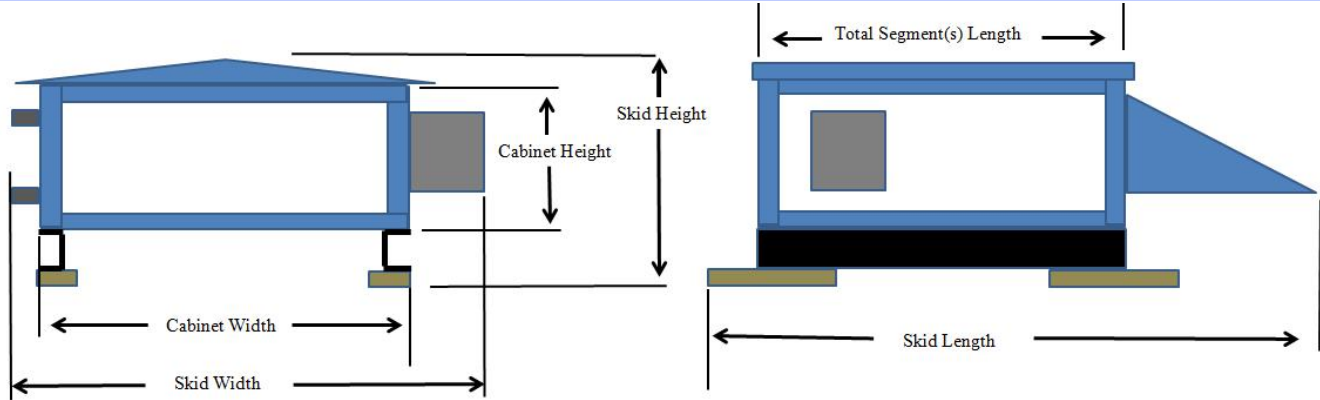
The anchorage of the unit to the ground or building structure needs to be evaluated by and is the responsibility of the engineer of record. Specification of seismic requirements is the responsibility of the project design engineer. If formal certification is required, please contact your sales representative and/or application engineer for review. Certain application and site requirements may require additional cost and/or lead time.

Component locations are listed as Segment Hand (Unit Hand): ex. Left (Right). See Submittal Drawing for additional details.

Air handling unit parameters vary depending on conditions. Parameters such as airflows, air pressure drops, and coil capacities are shown for design conditions.

Shipping Summary

Details				
Skid	Skid Length (in)	Skid Height (in)	Skid Width (in)	Skid Weight (lbs)
IP	30	63	104	587
FR	62	63	113	1,473
CC FF EE-2 EE-1	90	64	104	1,935
FS	74	63	112	2,103
Overall				6,098



Notes

Skid Width: Total width of the shipping skid, including any items that may extend beyond the cabinet (this includes any door handles, coil connections, drain connections, lifting lugs, mounted pipe-chases, electrical/control components, tie-down brackets, side dampers).

Skid Height: Total height of the shipping skid, including any items that may extend beyond the cabinet (this includes any base-rails, shipping wood-blocks, roof peak, discharge flanges, mounted gas-furnace flue pipes).

Skid Length: Total length of the shipping skid, including any items that may extend beyond the cabinet (this includes any mounted rain-hoods, discharge flanges, tie-down brackets, shipping wood-blocks, front dampers, split connectors, electrical/control components, outrigging extensions, isolation dampers, inlet baskets).

Skid Weight: Weight values represent the estimated operational weight with a tolerance of +/- 10% for values greater than 5,000 lbs. Values less than 5,000 lbs. may have higher percentage variation but not any consequential shipping impact. Operational weight estimate includes unit shell, internal components and structure, and known ship loose and/or field-installed items (weather hoods, pipe chases, factory-provided filter media and estimated fluid weight in coils). Actual operating weight will be heavier due to additional field installed materials including but not limited to field-provided filter media, piping, control devices, and/or inertia base concrete.

Job Summary

Project Name:	Messer - CCBH Cabarrus		
Unit Tag(s):	AHU-2		
Quantity:	1	Environment:	Indoor



Unit Overview

Model	Airflow (CFM)	Altitude (ft)	Weight (lbs)
XTI-69x111	19,100	0	11,943

Segment Sequence

(DP FS)(CC FF)(EE-2 EE-1)(FR)(IP)

Unit Construction

Casing Details

Segment(s)	Thickness (in)	Exterior Paint	Exterior Gauge and Material	Interior Gauge and Material	Insulation Thickness and Material	Mylar Lining	Thermal Break	Bulkhead Material
IP, EE-1, DP	2"	None	Standard Ga. G-90 Galvanized	Standard Ga. G-90 Galvanized	2" Foam	-	-	None
FR, EE-2, FF, CC, FS	2"	None	Standard Ga. G-90 Galvanized	Standard Ga. G-90 Galvanized	2" Foam	-	-	Galvanized Steel

Base Details

Segment(s)	Material	Paint
IP, FR, EE-1, EE-2, FF, CC, FS, DP	6" Formed Steel	None

Floor Details

Segment(s)	Gauge and Material	Paint	Insulation	Thermal Break	Attachment	Sub-Floor Gauge and Material
IP, FR, EE-1, EE-2, FF, CC, FS, DP	Standard Ga. G-90 Galvanized	None	2"	-	Screw Down	None

Notes

Enhanced Thermal Performance construction.

Unit Electrical

Circuit Details					
#	Component(s)	V/Ph/Hz	Full Load Amps (FLA)	Minimum Current Ampacity (MCA)	Maximum Overcurrent Protection (MOP)
1	Multi-Load Disconnect (on FS), FS MMP-1 (on FS), FS MMP-2 (on FS), FS VFD-1 (on FS), FS VFD-2 (on FS)	460/3/60	40.2	41.88	45
2	FR MMP-1 (on FR), FR VFD-1 (on FR)	460/3/60	25.2	26.25	30
3	Electrical Outlet and Light Switch (on FS)	120/1/60	-	-	20

Electrical Details				
Minimum Unit SCCR	5 kA rms Symmetrical	ETL Label (UL1995/NEC-2002)		Yes
Unit Light Type		Light Switch Enclosure		
LED		Spring Wound Timer		

Supply Fan(s)

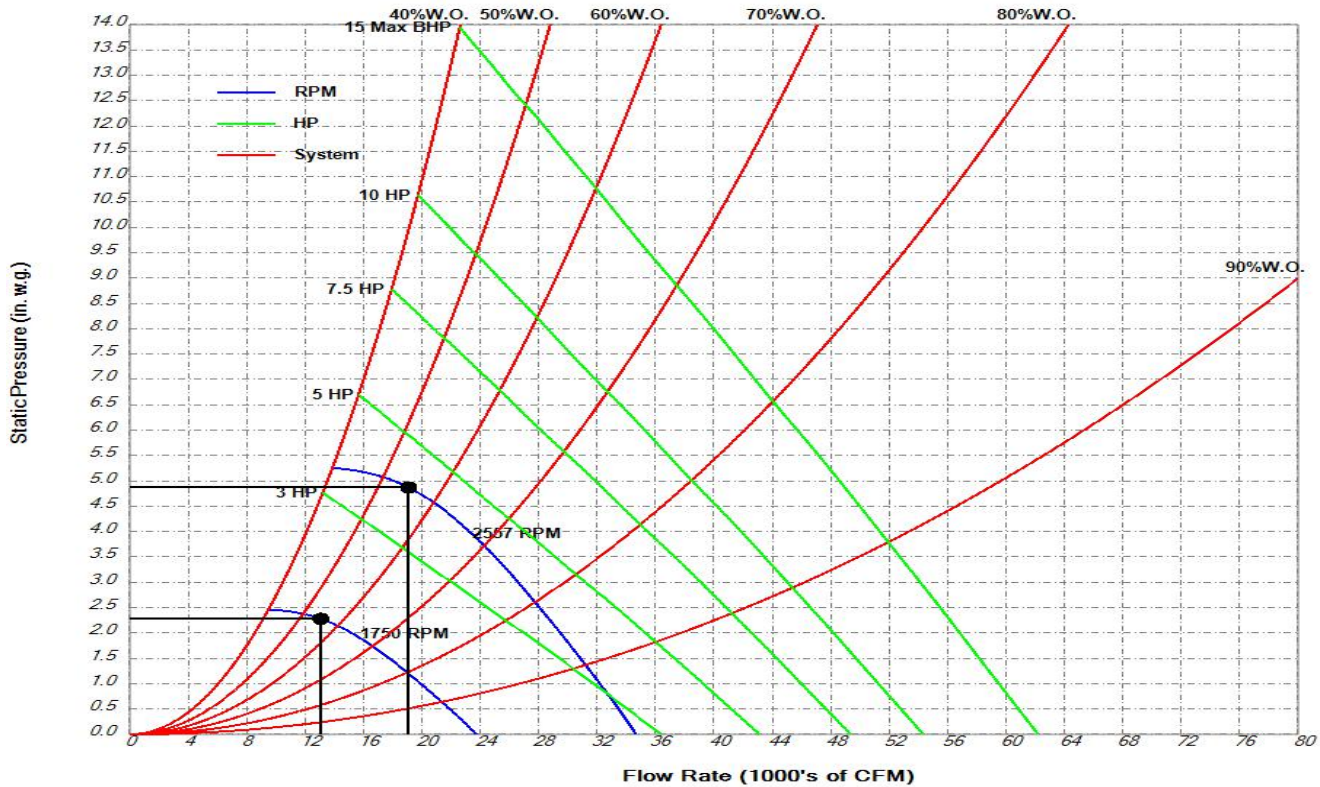
Performance Details													
Fan Manufacturer	Model	# Blades	Class	Size	% Wheel Width	% Wheel Diameter	Quantity	Airflow per Fan (CFM)	Altitude (ft)	TSP (in w.g.)	ESP (in w.g.)	Fan Speed (RPM)	Fan Power (BHP)
Lau	SF	9	II	165	100	100	6	3,183	0	4.87	2.50	2,557	4.08
Max RPM	Wheel Type	Blade Type	Wheel Material	Base Material		Fan Flow Isolation	AirFlow Monitoring		Inverter Drive Balancing	Isolation Type		Thrust Restraints	
3,550	SWSI	Airfoil	Aluminum	-		Damper	Yes (K=1450.00)		-	Rubber Pad		-	
Drive Type	FEI		FEP (KW)		Inlet Screen	Fan Cage	Fan Stand	Motor Removal Rail	Seismic Snubber				
Direct Drive	1.05		21.13		-	-	-	-	-				

Motor Details										
Type / MFG	Motor Power (HP)	V/Ph/Hz	Quantity	Insulation Class	RPM	Frame Size	FLA (Amps)	Efficiency	Location	SGR
TEFC / Baldor	5.0	460/3/60	6	H	1,800	184T	6.70	Premium	Left	Yes

At Motor Synchronous Details			
TSP (in w.g.)	Total Air Flow (CFM)	Fan Speed (RPM)	Fan Power (BHP)
2.28	2,178	1,750	1.31

Notes

Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org

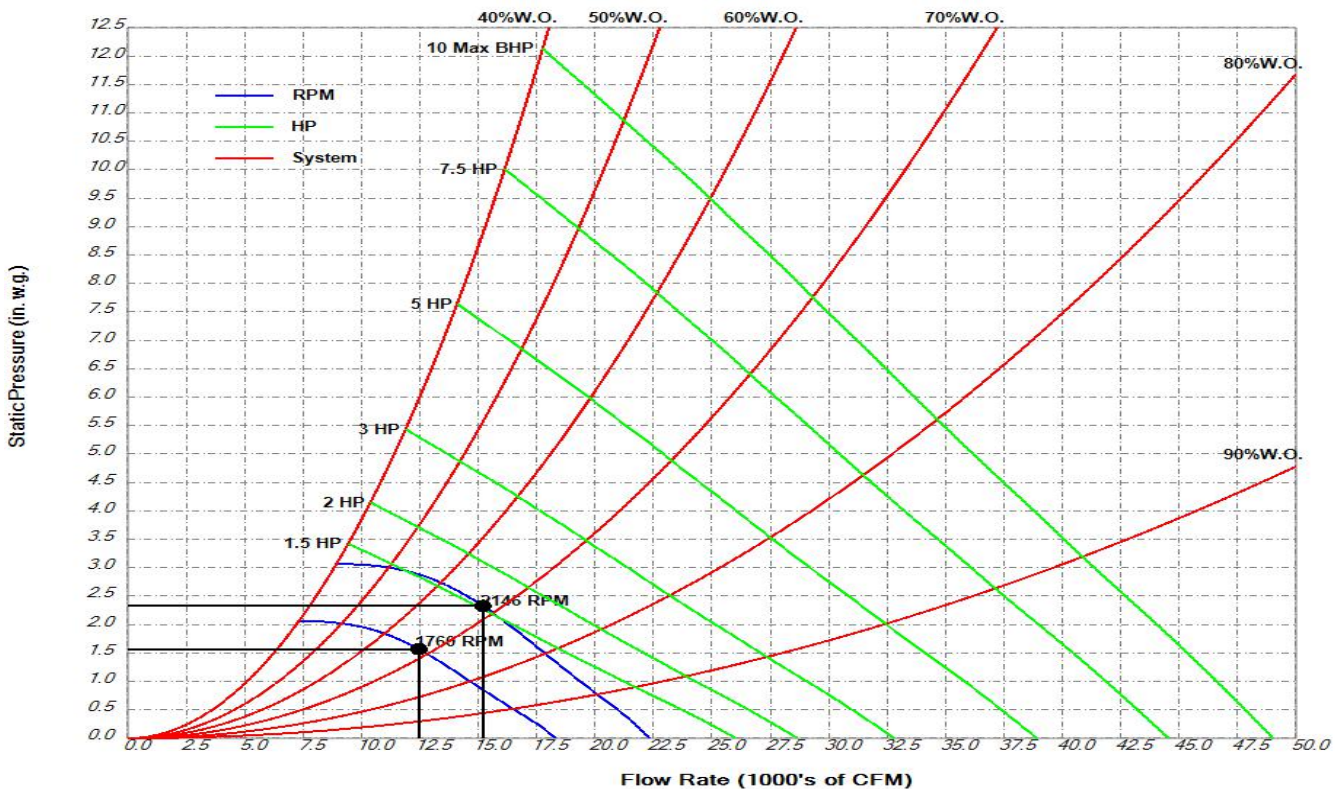


Return Fan(s)

Performance Details													
Fan Manufacturer	Model	# Blades	Class	Size	% Wheel Width	% Wheel Diameter	Quantity	Airflow per Fan (CFM)	Altitude (ft)	TSP (in w.g.)	ESP (in w.g.)	Fan Speed (RPM)	Fan Power (BHP)
Lau	SF	9	II	150	100	100	6	2,533	0	2.33	1.50	2,146	1.53
Max RPM	Wheel Type	Blade Type	Wheel Material	Base Material		Fan Flow Isolation	AirFlow Monitoring		Inverter Drive Balancing	Isolation Type	Thrust Restraints		
3,950	SWSI	Airfoil	Aluminum	-		Damper	Yes (K=1147.00)		-	Rubber Pad	-		
Drive Type	FEI		FEP (KW)		Inlet Screen	Fan Cage	Fan Stand	Motor Removal Rail	Seismic Snubber				
Direct Drive	1.15		8.22		-	-	-	-	-				

Motor Details										
Type / MFG	Motor Power (HP)	V/Ph/Hz	Quantity	Insulation Class	RPM	Frame Size	FLA (Amps)	Efficiency	Location	SGR
TEFC / Baldor	3.0	460/3/60	6	H	1,800	182T	4.20	Premium	Left	Yes

At Motor Synchronous Details			
TSP (in w.g.)	Total Air Flow (CFM)	Fan Speed (RPM)	Fan Power (BHP)
1.57	2,077	1,760	0.84



Glycol Coil(s)

Coil Information								
Segment[Index]	Coil Tag	Coil Duty	Fluid Type	Glycol Percentage	Airflow (cfm)	Flow Direction	Density	Altitude (ft)
CC[1]	-	Cooling	Propylene Glycol	25	19100	Horizontal	Standard	0

Coil Bank Configuration

Segment[Index]	Tube Diameter (in) Fin Type	Total Fin Height (in)	Fin Length per Coil (in)	Face Velocity (fpm)	Stacking Rack Material	Coils High	Coils Wide	Coil Configuration	Coil Stagger (in)	Coil Pull Panel
CC[1]	0.625 Sine	57.50	98.00	488	-	1	1	Standard	0	Left Side

Airside Performance

Segment[Index]	EAT-DB (°F)	EAT-WB (°F)	LAT-DB (°F)	LAT-WB (°F)	TMBH	SMBH	Air Pressure Drop (in w.g.)
CC[1]	76.5	63.0	53.1	52.7	569	492	1.03

Fluidside Performance

Segment[Index]	EFT (°F)	LFT (°F)	Fluid Velocity (fps)	Fluid Flow (gpm)	Fluid Pressure Drop (ft)	Rows	Tubes Per Circuit	Reynolds Number
CC[1]	42.0	57.0	2.3	78.7	6.9	8	8	3422

Fin and Tube Configuration

Segment[Index]	Fin Thickness (in) / Material	Fin Spacing (fpi)	Tube Thickness (in)	Turbulators	Return Bend Thickness	Casing Material	Coil Coating	Fouling Factor (hr.ft².°F/BTU)
CC[1]	0.010 Aluminum	11	0.020	No	0.020	Stainless	None	-

Header and Connection Configuration

Segment[Index]	Header Material	Connection Material	Connection Diameter (in)	Connection Offset (in)	Connection Type	Connection Location/Rotation
CC[1]	Copper	Steel	2.5	0	MPT	Left

Other Performance

Segment[Index]	Dry Weight (lbs)	Fluid Weight (lbs)	Internal Volume (ft³)
CC[1]	1143	320	5.5

Notes

- Performance is shown for the entire coil bank. Performance is not per coil.
- Coil index indicates position in segment. Example: CC-1, index 1; Spacer, index 2; CC-1, index 3
- Ratings are for coils manufactured by Johnson Controls, Inc., 507 E. Michigan St., Milwaukee WI 53202.
- CC[1]: AHRI Certified:Yes.All Coils: certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the range of Standard rating conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.
- All Coils: CDW Tube Spacing: 1.50 x 1.30
- All Coils: Coil DII Version: 8.8

Drain(s)

Details

Segment	Drain Pan		
	Liner Material	Connection Location	Liner Coating
CC	Stainless Steel, 304	Right	None

Filter(s)

Details							
Segment	Type	Depth	Filter Loading	Media/MERV	# of Spares	Spare Filter Media	Frame Material
FF	Primary Filter	2"	Side	Pleated 30% Efficiency (MERV 8)	1	Pleated 30% Efficiency (MERV 8)	Galvanized Steel
Sizes				Filter Gauge Details			
Segment	Filter	1 st Filter Size H x W (in)	1 st Qty	Location	Type	Range (in w.g)	
FF	Primary Filter	20x20	15	Door	Magnehelic with Flag	0 - 1.0	

Damper(s)

Details												
Segment	Air Path	H x W (in)	Qty	Total Face Velocity (ft/min)	Face Area (ft ²)	Airflow (CFM)	Min Airflow Measurement (CFM)	Type	Config	Model	Material	Blade Orientation
FR	Return Air	20.45 x 23.03	6	774	19.6	15,200	-	Counterbalanced Backdraft	100%	CBD6	Aluminum	Parallel
EE-1	Exhaust Air	15.25 x 100.00	1	1,435	10.6	15,200	-	Control	100%	CD60	Galvanized	Parallel
EE-2	Mixed Air	26.75 x 93.00	1	1,106	17.3	19,100	-	Control	100%	CD60	Galvanized	Parallel
EE-2	Outside Air	21.00 x 90.00	1	1,455	13.1	19,100	-	Control	100%	CD60	Galvanized	Parallel
FS	Inlet Air	22.00 x 25.28	6	824	23.2	19,100	-	Counterbalanced Backdraft	100%	CBD6	Aluminum	Parallel

Door(s)

Details												
Segment(s)	Location	Swing	Hinge Location	H x W x T (in)	View Port	ViewPort Wire	Test Port	Spare Gasket	Thermal Break	Fastener Type	Safety Latch	Noncontact Safety Interlock
EE-2	Left	Outward	Front	63 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
FF	Left	Outward	Front	63 x 10 x 2	None	-	Yes	-	Yes	Plated	-	-
CC	Left	Outward	Rear	63 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
DP	Left	Outward	Rear	63 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	Yes	-
IP	Left	Outward	Front	63 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
EE-1	Left	Inward	Front	48 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-

Motor Control(s)

VFD Details									
Segment	Type	V/Ph/Hz	Input/Output Amps*	Efficiency (%)	Heat Loss (at 100% load)	Enclosure	Bypass	Disconnect Type	RFI/EMI EMC Filter
FR	AYK-580	460/3/60	27/27	98	430	NEMA 1	-	Fused	Yes
FS	AYK-580	460/3/60	23/23	98	322	NEMA 1	-	Fused	Yes
FS	AYK-580	460/3/60	23/23	98	322	NEMA 1	-	Fused	Yes

Notes (ABB VFD)

*Drives are rated for use below 3,000 ft and 104°F. Refer to the Air-Mod Engineering Guide Form 100.42-EGI (813) for additional information. Drives are current rated devices. The HP ratings provided are for reference only and are based on typical 4-pole motors at nominal voltages (NEC Table 430-150). If full motor torque is required, ensure the drive has a continuous current rating equal to, or greater than, the full load amp rating of the motor.

Storage Temperature: -40°F to 158°F (-40°C to 70°C).

Ambient Operating Temperature: Temperate 5°F to 104°F (-15°C to 40°C). De-rating to operate at 122°F (50°C).

Relative Humidity: 5% to 95% non-condensing. Maximum relative humidity is 60% in the presence of corrosive gasses.

Altitude: 100% Load Capacity (No De-rating) up to 3,300 ft. (1,000 m). 1% derating for each 330 ft. above 3,300 ft. Installations above 6,600ft. (2,000 m) require review.

If 8KHZ Switching Frequency is used, de-rate output current to 80%.

Overload Current Rating: 110% for 1 minute every 10 minutes and is capable of 130% short term-overload rating for 2 seconds our of each minute. If applicable, motor overload protection in the bypass mode is provided by a Class 20 motor overload relay.

The customer is responsible for providing either a platform/catwalk or portable means to access the VFD when the VFD is installed where the center of the handle of the disconnecting means in its uppermost position is greater than 78" above the finished floor.

Input line Impedance: 5% Equivalent Input Impedance with internal reactor(s). Patented swinging choke design for superior harmonic mitigation.

Use Copper Conductors Only. Do not use aluminum wire.

Manual Motor Protection Details

Location Segment	Disconnect Type	Enclosure Type	V/Ph/Hz	# of Fans Served	Motor HP (Each)
FR	None	NEMA 3R	460/3/60	6	3
FS	None	NEMA 3R	460/3/60	6	5
FS	None	NEMA 3R	460/3/60	6	5
Total Combined HP	Total Amps	Drain/Vent Assembly	Service	# of Circuits	
18	25.2	-	Return Fan motor(s)	6	
30	20.1	-	Supply Fan motor(s)	3	
30	20.1	-	Supply Fan motor(s)	3	

Notes

Use Copper Conductors Only. Do not use aluminum wire.

The Class 10 trip rating of the MMP device will not withstand an across-the-line start of a fan and should not be used with VFDs with bypass circuits.

Face Velocity and Static Pressure

Summary						
Segment	Description	Face Area (ft ²)	Airflow (CFM)	Face Velocity (ft/min)	Supply Fan Static Pressure (in w.g.)	Exhaust/Return Fan Static Pressure (in w.g.)
EE-2	CD60 (Control Damper 60 - Galvanized Airfoil)	13.1	19,100	1,455	0.05	0.00
EE-2	Outside Air Opening	13.1	19,100	1,455	0.36	0.00
FF	2" Pleated 30% Efficiency (MERV 8)	41.7	19,100	458	0.26	0.00
FF	Dirty Filter Allowance	0.0		0	0.25	0.00
CC	Cooling - 8 Row - 11 Fins Per Inch	39.1	19,100	488	1.03	0.00
FS	CBD6 (Backdraft Damper With Counterbalance)	23.2	19,100	824	0.03	0.00
FS	External Static - User Entered	0.0		0	2.50	0.00
DP	Supply Air Opening	12.6	19,100	1,515	0.39	0.00
IP	Return Air Opening	10.0	15,200	1,520	0.00	0.39
FR	CBD6 (Backdraft Damper With Counterbalance)	19.6	15,200	774	0.00	0.02
FR	External Static - User Entered	0.0		0	0.00	1.50
EE-1	CD60 (Control Damper 60 - Galvanized Airfoil)	10.6	15,200	1,435	0.00	0.07
EE-1	Exhaust Air Opening	10.6	15,200	1,435	0.00	0.35
Total					4.87	2.33

Dimensions and Weight

Details					
Segment	Description	Length ¹ (in)	Height (in)	Width ² (in)	Weight ³ (lbs)
IP	Inlet Plenum	28	69	111	776
FR	Fan (Return)	44	69	111	3,029
EE-1	Economizer	23	69	111	448
EE-2	Economizer	28	69	111	839
FF	Flat Filter	14	69	111	310
CC	Cooling Coil	35	69	111	2,105
FS	Fan (Supply)	51	69	111	3,734
DP	Discharge Plenum	23	69	111	702
Overall		246			

Notes

¹The length includes bottom tier segments only.

²The width does not include coil connection extensions or door latches that extend beyond the unit casing. The width does not include the depth of any pipe chases.

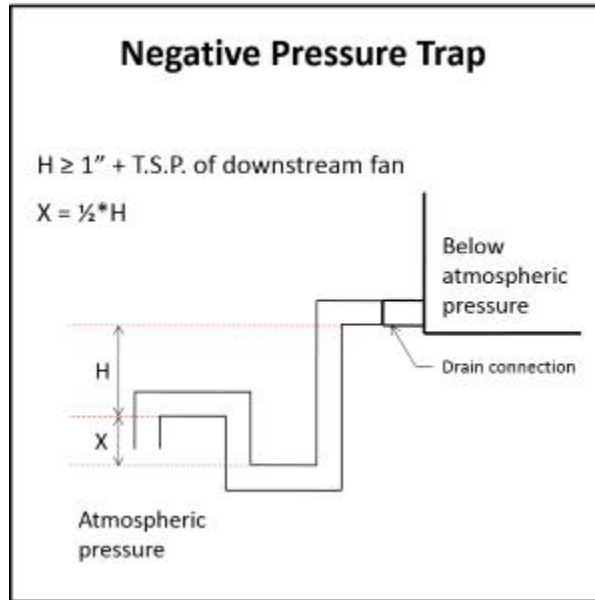
³See Shipping Summary for notes on weights.

Factory Testing

Summary							
Leak Test	Deflection Test	Deflection Test Includes Roof	Test Static Pressure	Airflow Test	Customer Witness Test	Opening Covers for Job Site Leak Test/Quantity (Testing by Others)	Fan Vibration Test
1.0 Percent	None	-	-7.32:7.32	None	-	-	None
Notes							

Recommended Trap Height

Details									
Segment	Applicable Fan	Fan TSP (in w.g.)	Positive or Negative	Calculated Dimensions (in)			Recommended Dimensions (in)		Base Rail Height (in)
				H	X	H + X	H	H + X	
CC	Supply Fan	4.87	Negative	5.45	2.72	8.18	5.50	8.25	6



Notes

Formulas and calculations are recommendations only. Contractor shall determine actual dimensions required for each trap based on jobsite conditions, and application requirements.

Refer to the Installation Manual of the IOM for more information.

Statement of Compliance

Details

Air Handling Unit AHU's meet IBC seismic requirements for non-critical equipment ($I_p = 1.0$) for locations with design spectral response $S_d \leq 0.43$. Units must be rigid mounted.

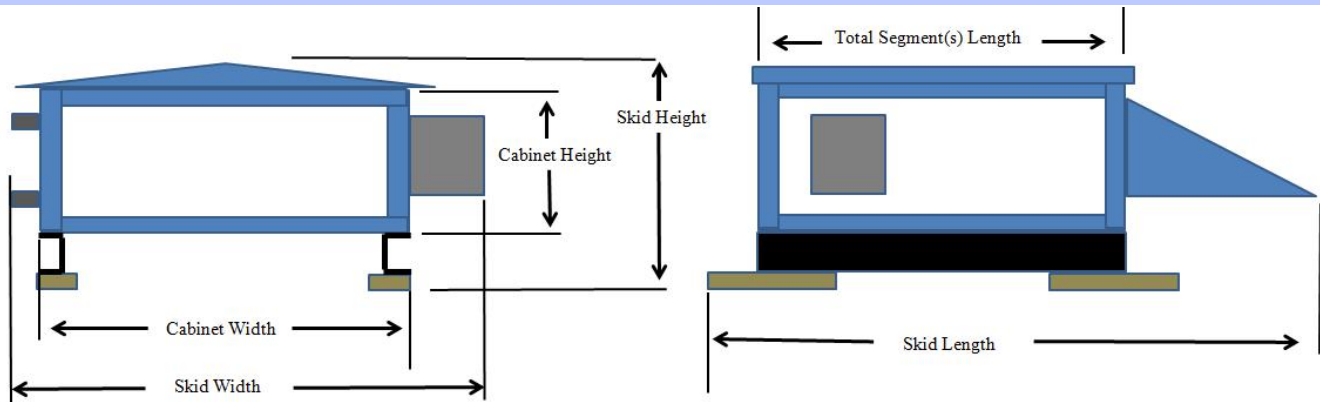
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Component locations are listed as Segment Hand (Unit Hand): ex. Left (Right). See Submittal Drawing for additional details.

Air handling unit parameters vary depending on conditions. Parameters such as airflows, air pressure drops, and coil capacities are shown for design conditions.

Shipping Summary

Details				
Skid	Skid Length (in)	Skid Height (in)	Skid Width (in)	Skid Weight (lbs)
IP	34	81	119	804
FR	50	81	127	3,057
EE-2 EE-1	57	82	119	1,315
CC FF	55	81	119	2,122
DP FS	80	81	128	4,464
Overall				11,762



Notes

Skid Width: Total width of the shipping skid, including any items that may extend beyond the cabinet (this includes any door handles, coil connections, drain connections, lifting lugs, mounted pipe-chases, electrical/control components, tie-down brackets, side dampers).

Skid Height: Total height of the shipping skid, including any items that may extend beyond the cabinet (this includes any base-rails, shipping wood-blocks, roof peak, discharge flanges, mounted gas-furnace flue pipes).

Skid Length: Total length of the shipping skid, including any items that may extend beyond the cabinet (this includes any mounted rain-hoods, discharge flanges, tie-down brackets, shipping wood-blocks, front dampers, split connectors, electrical/control components, outrigging extensions, isolation dampers, inlet baskets).

Skid Weight: Weight values represent the estimated operational weight with a tolerance of +/- 10% for values greater than 5,000 lbs. Values less than 5,000 lbs. may have higher percentage variation but not any consequential shipping impact. Operational weight estimate includes unit shell, internal components and structure, and known ship loose and/or field-installed items (weather hoods, pipe chases, factory-provided filter media and estimated fluid weight in coils). Actual operating weight will be heavier due to additional field installed materials including but not limited to field-provided filter media, piping, control devices, and/or inertia base concrete.

Job Summary

Project Name:	Messer - CCBH Cabarrus		
Unit Tag(s):	AHU-3		
Quantity:	1	Environment:	Indoor



Unit Overview

Model	Airflow (CFM)	Altitude (ft)	Weight (lbs)
XTI-66x108	17,300	0	10,655

Segment Sequence

(DP FS)(CC FF)(EE-2 EE-1)(FR)(IP)

Unit Construction

Casing Details

Segment(s)	Thickness (in)	Exterior Paint	Exterior Gauge and Material	Interior Gauge and Material	Insulation Thickness and Material	Mylar Lining	Thermal Break	Bulkhead Material
IP, EE-1, DP	2"	None	Standard Ga. G-90 Galvanized	Standard Ga. G-90 Galvanized	2" Foam	-	-	None
FR, EE-2, FF, CC, FS	2"	None	Standard Ga. G-90 Galvanized	Standard Ga. G-90 Galvanized	2" Foam	-	-	Galvanized Steel

Base Details

Segment(s)	Material	Paint
IP, FR, EE-1, EE-2, FF, CC, FS, DP	6" Formed Steel	None

Floor Details

Segment(s)	Gauge and Material	Paint	Insulation	Thermal Break	Attachment	Sub-Floor Gauge and Material
IP, FR, EE-1, EE-2, FF, CC, FS, DP	Standard Ga. G-90 Galvanized	None	2"	-	Screw Down	None

Notes

Enhanced Thermal Performance construction.

Unit Electrical

Circuit Details					
#	Component(s)	V/Ph/Hz	Full Load Amps (FLA)	Minimum Current Ampacity (MCA)	Maximum Overcurrent Protection (MOP)
1	Multi-Load Disconnect (on FS), FS MMP-1 (on FS), FS MMP-2 (on FS), FS VFD-1 (on FS), FS VFD-2 (on FS)	460/3/60	54	56.25	60
2	FR MMP-1 (on FR), FR VFD-1 (on FR)	460/3/60	20.1	21.78	25
3	Electrical Outlet and Light Switch (on FS)	120/1/60	-	-	20

Electrical Details				
Minimum Unit SCCR	5 kA rms Symmetrical	ETL Label (UL1995/NEC-2002)		Yes
Unit Light Type		Light Switch Enclosure		
LED		Spring Wound Timer		

Supply Fan(s)

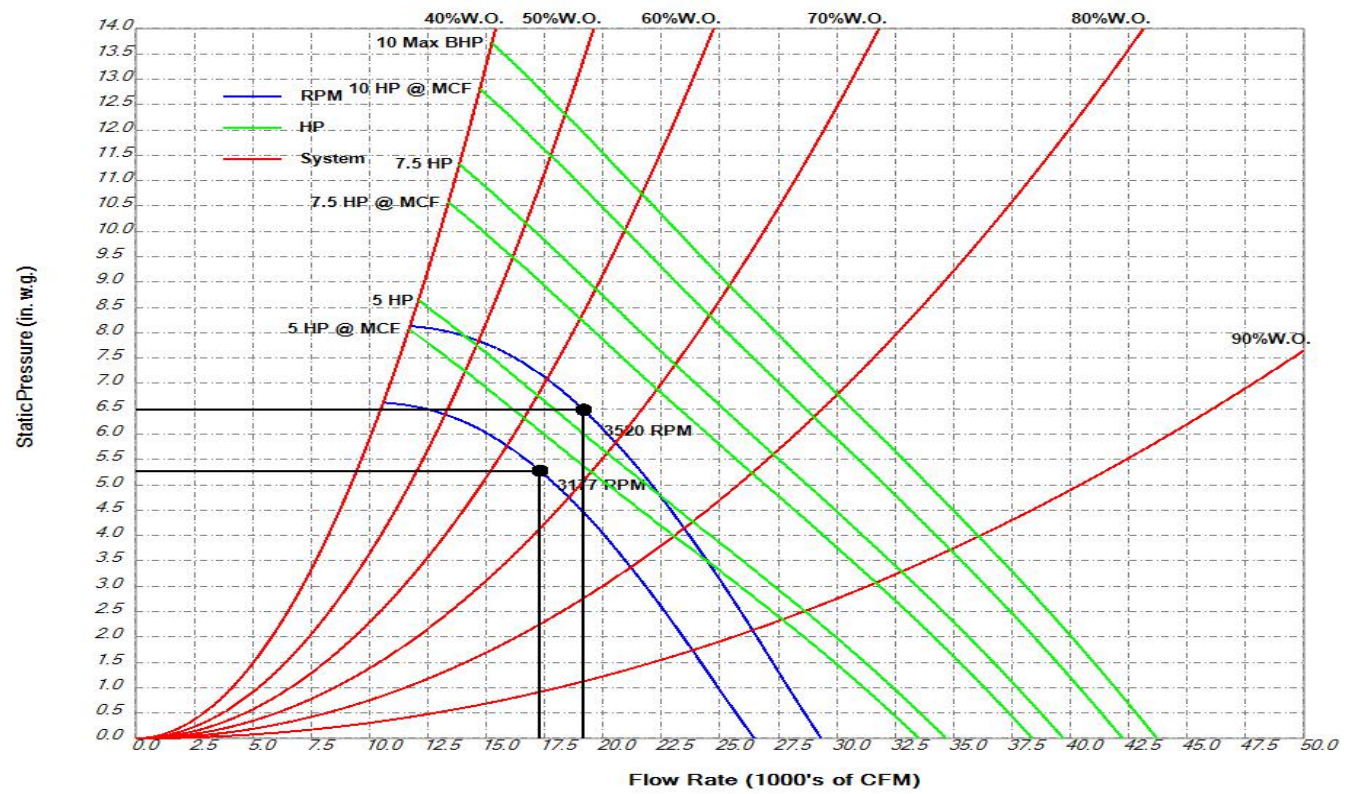
Performance Details													
Fan Manufacturer	Model	# Blades	Class	Size	% Wheel Width	% Wheel Diameter	Quantity	Airflow per Fan (CFM)	Altitude (ft)	TSP (in w.g.)	ESP (in w.g.)	Fan Speed (RPM)	Fan Power (BHP)
Lau	SF	9	II	150	80	100	6	2,883	0	5.28	3.00	3,177	3.95
Max RPM	Wheel Type	Blade Type	Wheel Material	Base Material		Fan Flow Isolation	AirFlow Monitoring		Inverter Drive Balancing	Isolation Type		Thrust Restraints	
3,950	SWSI	Airfoil	Aluminum	-		Damper	Yes (K=1147.00)		-	Rubber Pad		-	
Drive Type	FEI		FEP (KW)		Inlet Screen	Fan Cage	Fan Stand	Motor Removal Rail	Seismic Snubber				
Direct Drive	1.07		20.28		-	-	-	-	-				

Motor Details										
Type / MFG	Motor Power (HP)	V/Ph/Hz	Quantity	Insulation Class	RPM	Frame Size	FLA (Amps)	Efficiency	Location	SGR
TEFC / Baldor	7.5	460/3/60	6	F	3,600	213T	9.00	Premium	Right	Yes

At Motor Synchronous Details			
TSP (in w.g.)	Total Air Flow (CFM)	Fan Speed (RPM)	Fan Power (BHP)
6.48	3,194	3,520	5.37

Notes

Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org

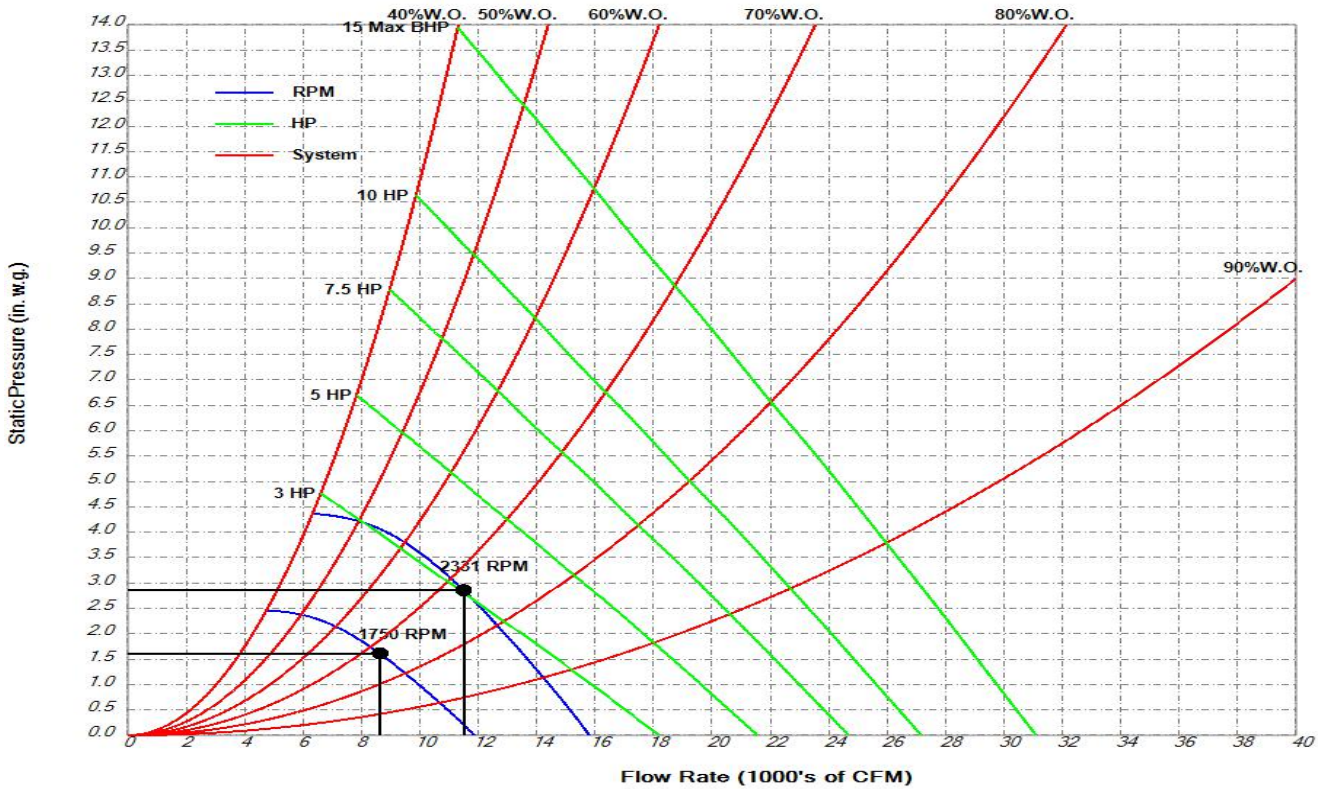


Return Fan(s)

Performance Details													
Fan Manufacturer	Model	# Blades	Class	Size	% Wheel Width	% Wheel Diameter	Quantity	Airflow per Fan (CFM)	Altitude (ft)	TSP (in w.g.)	ESP (in w.g.)	Fan Speed (RPM)	Fan Power (BHP)
Lau	SF	9	II	165	100	100	3	3,833	0	2.86	2.00	2,331	3.04
Max RPM	Wheel Type	Blade Type	Wheel Material	Base Material	Fan Flow Isolation	AirFlow Monitoring	Inverter Drive Balancing	Isolation Type	Thrust Restraints				
3,550	SWSI	Airfoil	Aluminum	-	Damper	Yes (K=1450.00)	-	Rubber Pad	-				
Drive Type	FEI	FEP (KW)	Inlet Screen	Fan Cage	Fan Stand	Motor Removal Rail	Seismic Snubber						
Direct Drive	1.09	7.88	-	-	-	-	-						

Motor Details										
Type / MFG	Motor Power (HP)	V/Ph/Hz	Quantity	Insulation Class	RPM	Frame Size	FLA (Amps)	Efficiency	Location	SGR
TEFC / Baldor	5.0	460/3/60	3	H	1,800	184T	6.70	Premium	Right	Yes

At Motor Synchronous Details			
TSP (in w.g.)	Total Air Flow (CFM)	Fan Speed (RPM)	Fan Power (BHP)
1.61	2,878	1,750	1.29



Glycol Coil(s)

Coil Information								
Segment[Index]	Coil Tag	Coil Duty	Fluid Type	Glycol Percentage	Airflow (cfm)	Flow Direction	Density	Altitude (ft)
CC[1]	-	Cooling	Propylene Glycol	25	17300	Horizontal	Standard	0

Coil Bank Configuration

Segment[Index]	Tube Diameter (in) Fin Type	Total Fin Height (in)	Fin Length per Coil (in)	Face Velocity (fpm)	Stacking Rack Material	Coils High	Coils Wide	Coil Configuration	Coil Stagger (in)	Coil Pull Panel
CC[1]	0.625 Sine	54.50	95.00	481	-	1	1	Standard	0	Right Side

Airside Performance

Segment[Index]	EAT-DB (°F)	EAT-WB (°F)	LAT-DB (°F)	LAT-WB (°F)	TMBH	SMBH	Air Pressure Drop (in w.g.)
CC[1]	79.4	64.9	53.4	52.9	613	494	0.95

Fluidside Performance

Segment[Index]	EFT (°F)	LFT (°F)	Fluid Velocity (fps)	Fluid Flow (gpm)	Fluid Pressure Drop (ft)	Rows	Tubes Per Circuit	Reynolds Number
CC[1]	42.0	57.0	3.5	84.7	12.7	6	8	5181

Fin and Tube Configuration

Segment[Index]	Fin Thickness (in) / Material	Fin Spacing (fpi)	Tube Thickness (in)	Turbulators	Return Bend Thickness	Casing Material	Coil Coating	Fouling Factor (hr.ft².°F/BTU)
CC[1]	0.010 Aluminum	12	0.020	No	0.020	Stainless	None	-

Header and Connection Configuration

Segment[Index]	Header Material	Connection Material	Connection Diameter (in)	Connection Offset (in)	Connection Type	Connection Location/Rotation
CC[1]	Copper	Steel	2.5	0	MPT	Right

Other Performance

Segment[Index]	Dry Weight (lbs)	Fluid Weight (lbs)	Internal Volume (ft³)
CC[1]	846	227	3.9

Notes

- Performance is shown for the entire coil bank. Performance is not per coil.
- Coil index indicates position in segment. Example: CC-1, index 1; Spacer, index 2; CC-1, index 3
- Ratings are for coils manufactured by Johnson Controls, Inc., 507 E. Michigan St., Milwaukee WI 53202.
- CC[1]: AHRI Certified:Yes.All Coils: certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the range of Standard rating conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.
- All Coils: CDW Tube Spacing: 1.50 x 1.30
- All Coils: Coil DII Version: 8.8

Drain(s)

Details

Segment	Drain Pan		
	Liner Material	Connection Location	Liner Coating
CC	Stainless Steel, 304	Left	None

Filter(s)

Details								
Segment	Type	Depth	Filter Loading	Media/MERV	# of Spares	Spare Filter Media	Frame Material	
FF	Primary Filter	2"	Side	Pleated 30% Efficiency (MERV 8)	1	Pleated 30% Efficiency (MERV 8)	Galvanized Steel	
Sizes						Filter Gauge Details		
Segment	Filter	1 st Filter Size H x W (in)	1 st Qty	2 nd Filter Size H x W (in)	2 nd Qty	Location	Type	Range (in w.g)
FF	Primary Filter	12x24	12	20x24	4	Door	Magnehelic with Flag	0 - 1.0

Damper(s)

Details												
Segment	Air Path	H x W (in)	Qty	Total Face Velocity (ft/min)	Face Area (ft ²)	Airflow (CFM)	Min Airflow Measurement (CFM)	Type	Config	Model	Material	Blade Orientation
FR	Return Air	22.00 x 25.28	3	992	11.6	11,500	-	Counterbalanced Backdraft	100%	CBD6	Aluminum	Parallel
EE-1	Exhaust Air	15.25 x 76.00	1	1,429	8.0	11,500	-	Control	100%	CD60	Galvanized	Parallel
EE-2	Mixed Air	21.00 x 90.00	1	1,318	13.1	17,300	-	Control	100%	CD60	Galvanized	Parallel
EE-2	Outside Air	21.00 x 82.00	1	1,447	12.0	17,300	-	Control	100%	CD60	Galvanized	Parallel
FS	Inlet Air	20.45 x 23.03	6	881	19.6	17,300	-	Counterbalanced Backdraft	100%	CBD6	Aluminum	Parallel

Door(s)

Details												
Segment(s)	Location	Swing	Hinge Location	H x W x T (in)	View Port	ViewPort Wire	Test Port	Spare Gasket	Thermal Break	Fastener Type	Safety Latch	Noncontact Safety Interlock
EE-2	Right	Outward	Front	60 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
FF	Right	Outward	Front	60 x 10 x 2	None	-	Yes	-	Yes	Plated	-	-
CC	Right	Outward	Rear	60 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
DP	Right	Inward	Rear	54 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
IP	Right	Outward	Front	60 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
FR	Right	Inward	Rear	54 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-

Motor Control(s)

VFD Details									
Segment	Type	V/Ph/Hz	Input/Output Amps*	Efficiency (%)	Heat Loss (at 100% load)	Enclosure	Bypass	Disconnect Type	RFI/EMI EMC Filter
FR	AYK-580	460/3/60	23/23	98	322	NEMA 1	-	Fused	Yes
FS	AYK-580	460/3/60	34/34	98	525	NEMA 1	-	Fused	Yes
FS	AYK-580	460/3/60	34/34	98	525	NEMA 1	-	Fused	Yes

Notes (ABB VFD)

*Drives are rated for use below 3,000 ft and 104°F. Refer to the Air-Mod Engineering Guide Form 100.42-EGI (813) for additional information. Drives are current rated devices. The HP ratings provided are for reference only and are based on typical 4-pole motors at nominal voltages (NEC Table 430-150). If full motor torque is required, ensure the drive has a continuous current rating equal to, or greater than, the full load amp rating of the motor.

Storage Temperature: -40°F to 158°F (-40°C to 70°C).

Ambient Operating Temperature: Temperate 5°F to 104°F (-15°C to 40°C). De-rating to operate at 122°F (50°C).

Relative Humidity: 5% to 95% non-condensing. Maximum relative humidity is 60% in the presence of corrosive gasses.

Altitude: 100% Load Capacity (No De-rating) up to 3,300 ft. (1,000 m). 1% derating for each 330 ft. above 3,300 ft. Installations above 6,600ft. (2,000 m) require review.

If 8KHZ Switching Frequency is used, de-rate output current to 80%.

Overload Current Rating: 110% for 1 minute every 10 minutes and is capable of 130% short term-overload rating for 2 seconds out of each minute. If applicable, motor overload protection in the bypass mode is provided by a Class 20 motor overload relay.

The customer is responsible for providing either a platform/catwalk or portable means to access the VFD when the VFD is installed where the center of the handle of the disconnecting means in its uppermost position is greater than 78" above the finished floor.

Input line Impedance: 5% Equivalent Input Impedance with internal reactor(s). Patented swinging choke design for superior harmonic mitigation.

Use Copper Conductors Only. Do not use aluminum wire.

Manual Motor Protection Details

Location Segment	Disconnect Type	Enclosure Type	V/Ph/Hz	# of Fans Served	Motor HP (Each)
FR	None	NEMA 3R	460/3/60	3	5
FS	None	NEMA 3R	460/3/60	6	7.5
FS	None	NEMA 3R	460/3/60	6	7.5
Total Combined HP	Total Amps	Drain/Vent Assembly	Service	# of Circuits	
15	20.1	-	Return Fan motor(s)	3	
45.0	27	-	Supply Fan motor(s)	3	
45.0	27	-	Supply Fan motor(s)	3	

Notes

Use Copper Conductors Only. Do not use aluminum wire.

The Class 10 trip rating of the MMP device will not withstand an across-the-line start of a fan and should not be used with VFDs with bypass circuits.

Face Velocity and Static Pressure

Summary						
Segment	Description	Face Area (ft ²)	Airflow (CFM)	Face Velocity (ft/min)	Supply Fan Static Pressure (in w.g.)	Exhaust/Return Fan Static Pressure (in w.g.)
EE-2	CD60 (Control Damper 60 - Galvanized Airfoil)	12.0	17,300	1,447	0.05	0.00
EE-2	Outside Air Opening	12.0	17,300	1,447	0.35	0.00
FF	2" Pleated 30% Efficiency (MERV 8)	37.3	17,300	463	0.26	0.00
FF	Dirty Filter Allowance	0.0		0	0.25	0.00
CC	Cooling - 6 Row - 12 Fins Per Inch	36.0	17,300	481	0.95	0.00
FS	CBD6 (Backdraft Damper With Counterbalance)	19.6	17,300	881	0.03	0.00
FS	External Static - User Entered	0.0		0	3.00	0.00
DP	Supply Air Opening	11.4	17,300	1,516	0.39	0.00
IP	Return Air Opening	7.6	11,500	1,516	0.00	0.39
FR	CBD6 (Backdraft Damper With Counterbalance)	11.6	11,500	992	0.00	0.05
FR	External Static - User Entered	0.0		0	0.00	2.00
EE-1	CD60 (Control Damper 60 - Galvanized Airfoil)	8.0	11,500	1,429	0.00	0.08
EE-1	Exhaust Air Opening	8.0	11,500	1,429	0.00	0.34
Total					5.28	2.86

Dimensions and Weight

Details					
Segment	Description	Length ¹ (in)	Height (in)	Width ² (in)	Weight ³ (lbs)
IP	Inlet Plenum	24	66	108	691
FR	Fan (Return)	64	66	108	2,464
EE-1	Economizer	22	66	108	371
EE-2	Economizer	28	66	108	771
FF	Flat Filter	13	66	108	310
CC	Cooling Coil	32	66	108	1,642
FS	Fan (Supply)	71	66	108	3,762
DP	Discharge Plenum	21	66	108	644
Overall		275			

Notes

¹The length includes bottom tier segments only.

²The width does not include coil connection extensions or door latches that extend beyond the unit casing. The width does not include the depth of any pipe chases.

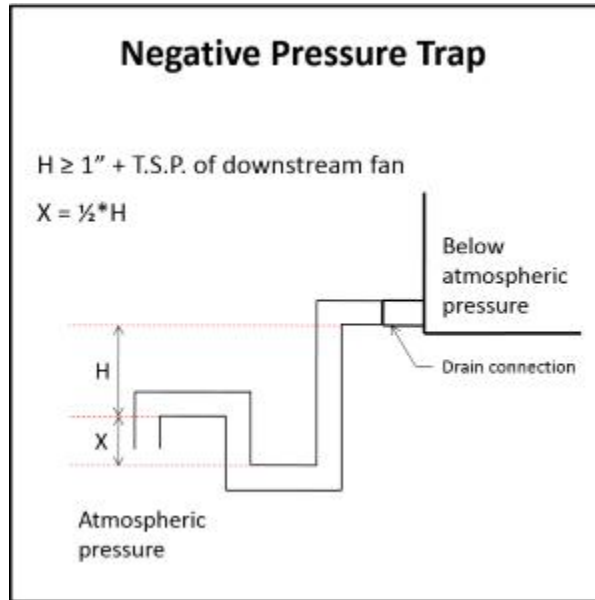
³See Shipping Summary for notes on weights.

Factory Testing

Summary							
Leak Test	Deflection Test	Deflection Test Includes Roof	Test Static Pressure	Airflow Test	Customer Witness Test	Opening Covers for Job Site Leak Test/Quantity (Testing by Others)	Fan Vibration Test
1.0 Percent	None	-	-7.32:7.32	None	-	-	None
Notes							

Recommended Trap Height

Details									
Segment	Applicable Fan	Fan TSP (in w.g.)	Positive or Negative	Calculated Dimensions (in)			Recommended Dimensions (in)		Base Rail Height (in)
				H	X	H + X	H	H + X	
CC	Supply Fan	5.28	Negative	5.86	2.93	8.79	6.00	8.75	6



Notes

Formulas and calculations are recommendations only. Contractor shall determine actual dimensions required for each trap based on jobsite conditions, and application requirements.

Refer to the Installation Manual of the IOM for more information.

Statement of Compliance

Details

Air Handling Unit AHU's meet IBC seismic requirements for non-critical equipment ($I_p = 1.0$) for locations with design spectral response $S_d \leq 0.43$. Units must be rigid mounted.

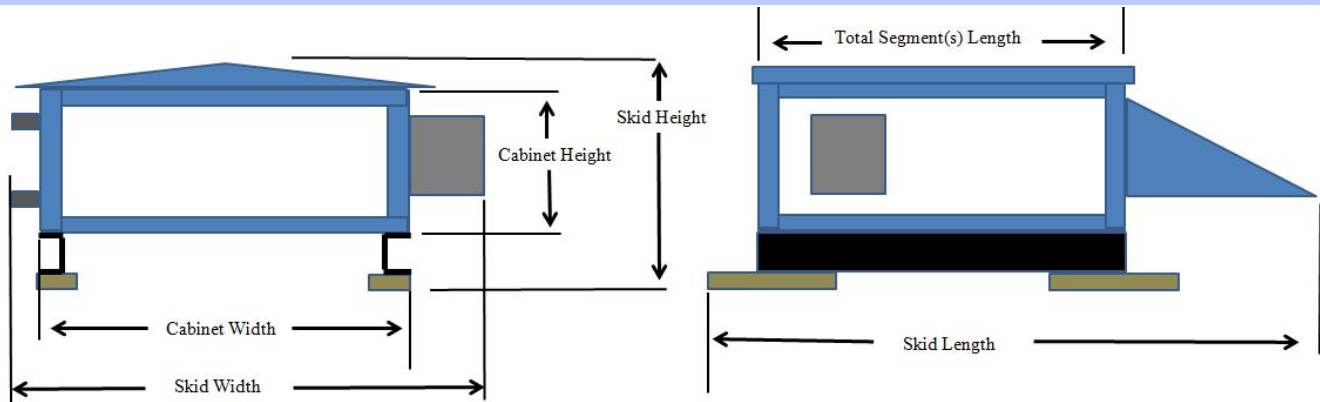
The anchorage of the unit to the ground or building structure needs to be evaluated by and is the responsibility of the engineer of record. Specification of seismic requirements is the responsibility of the project design engineer. If formal certification is required, please contact your sales representative and/or application engineer for review. Certain application and site requirements may require additional cost and/or lead time.

Component locations are listed as Segment Hand (Unit Hand): ex. Left (Right). See Submittal Drawing for additional details.

Air handling unit parameters vary depending on conditions. Parameters such as airflows, air pressure drops, and coil capacities are shown for design conditions.

Shipping Summary

Details				
Skid	Skid Length (in)	Skid Height (in)	Skid Width (in)	Skid Weight (lbs)
IP	30	78	116	719
FR	70	78	125	2,492
EE-2 EE-1	56	79	116	1,170
CC FF	51	78	116	1,753
DP FS	98	78	124	4,434
Overall				10,568



Notes

Skid Width: Total width of the shipping skid, including any items that may extend beyond the cabinet (this includes any door handles, coil connections, drain connections, lifting lugs, mounted pipe-chases, electrical/control components, tie-down brackets, side dampers).

Skid Height: Total height of the shipping skid, including any items that may extend beyond the cabinet (this includes any base-rails, shipping wood-blocks, roof peak, discharge flanges, mounted gas-furnace flue pipes).

Skid Length: Total length of the shipping skid, including any items that may extend beyond the cabinet (this includes any mounted rain-hoods, discharge flanges, tie-down brackets, shipping wood-blocks, front dampers, split connectors, electrical/control components, outrigging extensions, isolation dampers, inlet baskets).

Skid Weight: Weight values represent the estimated operational weight with a tolerance of +/- 10% for values greater than 5,000 lbs. Values less than 5,000 lbs. may have higher percentage variation but not any consequential shipping impact. Operational weight estimate includes unit shell, internal components and structure, and known ship loose and/or field-installed items (weather hoods, pipe chases, factory-provided filter media and estimated fluid weight in coils). Actual operating weight will be heavier due to additional field installed materials including but not limited to field-provided filter media, piping, control devices, and/or inertia base concrete.

Job Summary

Project Name:	Messer - CCBH Cabarrus		
Unit Tag(s):	AHU-4		
Quantity:	1	Environment:	Indoor



Unit Overview

Model	Airflow (CFM)	Altitude (ft)	Weight (lbs)
XTI-51x63	6,500	0	4,478

Segment Sequence

(FS)(CC FF EE-2 EE-1)(FR)(IP)

Unit Construction

Casing Details

Segment(s)	Thickness (in)	Exterior Paint	Exterior Gauge and Material	Interior Gauge and Material	Insulation Thickness and Material	Mylar Lining	Thermal Break	Bulkhead Material
IP, EE-1	2"	None	Standard Ga. G-90 Galvanized	Standard Ga. G-90 Galvanized	2" Foam	-	-	None
FR, EE-2, FF, CC, FS	2"	None	Standard Ga. G-90 Galvanized	Standard Ga. G-90 Galvanized	2" Foam	-	-	Galvanized Steel

Base Details

Segment(s)	Material	Paint
IP, FR, EE-1, EE-2, FF, CC, FS	6" Formed Steel	None

Floor Details

Segment(s)	Gauge and Material	Paint	Insulation	Thermal Break	Attachment	Sub-Floor Gauge and Material
IP, FR, EE-1, EE-2, FF, CC, FS	Standard Ga. G-90 Galvanized	None	2"	-	Screw Down	None

Notes

Enhanced Thermal Performance construction.

Unit Electrical

Circuit Details

#	Component(s)	V/Ph/Hz	Full Load Amps (FLA)	Minimum Current Ampacity (MCA)	Maximum Overcurrent Protection (MOP)
1	Multi-Load Disconnect (on FS), FS VFD-1 (on FS), FS VFD-2 (on FS)	460/3/60	11.6	13.05	15
2	FR MMP-1 (on FR), FR VFD-1 (on FR)	460/3/60	5.8	6.53	15
3	Electrical Outlet and Light Switch (on FS)	120/1/60	-	-	20

Electrical Details

Minimum Unit SCCR	5 kA rms Symmetrical	ETL Label (UL1995/NEC-2002)	Yes
Unit Light Type	LED	Light Switch Enclosure	Spring Wound Timer

Supply Fan(s)

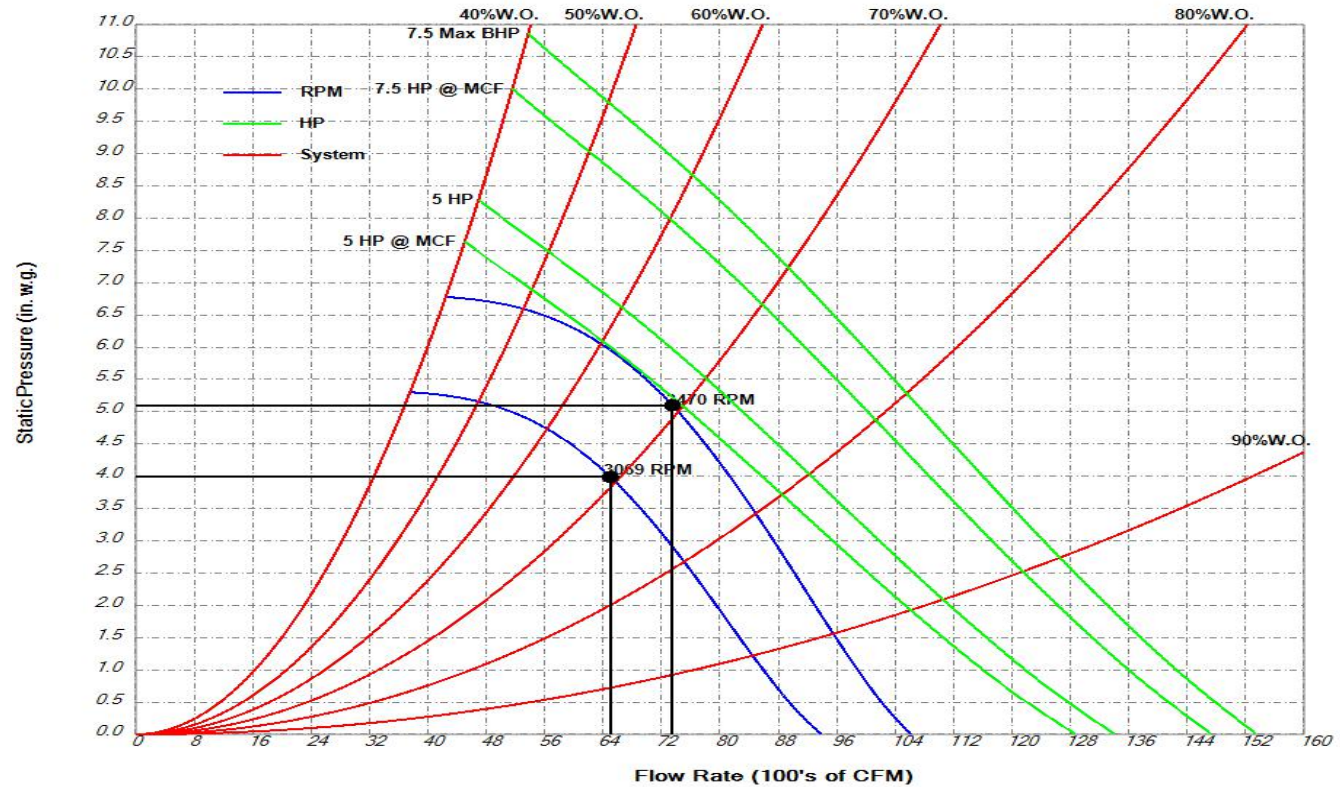
Performance Details													
Fan Manufacturer	Model	# Blades	Class	Size	% Wheel Width	% Wheel Diameter	Quantity	Airflow per Fan (CFM)	Altitude (ft)	TSP (in w.g.)	ESP (in w.g.)	Fan Speed (RPM)	Fan Power (BHP)
Lau	DDPG2	9	II	135	120	100	2	3,250	0	3.99	2.00	3,069	2.99
Max RPM	Wheel Type	Blade Type	Wheel Material	Base Material		Fan Flow Isolation	AirFlow Monitoring		Inverter Drive Balancing	Isolation Type		Thrust Restraints	
4,038	SWSI	Airfoil	Aluminum	Galvanized Steel		Damper	Yes (K=910.00)		-	2" Spring		Yes	
Drive Type	FEI		FEP (KW)		Inlet Screen	Fan Cage	Fan Stand	Motor Removal Rail	Seismic Snubber				
Direct Drive	1.26		5.33		-	Yes	-	-	-				

Motor Details										
Type / MFG	Motor Power (HP)	V/Ph/Hz	Quantity	Insulation Class	RPM	Frame Size	FLA (Amps)	Efficiency	Location	SGR
TEFC / Baldor	5.0	460/3/60	2	H	3,600	184T	5.80	Premium	Left	Yes

At Motor Synchronous Details			
TSP (in w.g.)	Total Air Flow (CFM)	Fan Speed (RPM)	Fan Power (BHP)
5.10	3,675	3,470	4.32

Notes

Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org

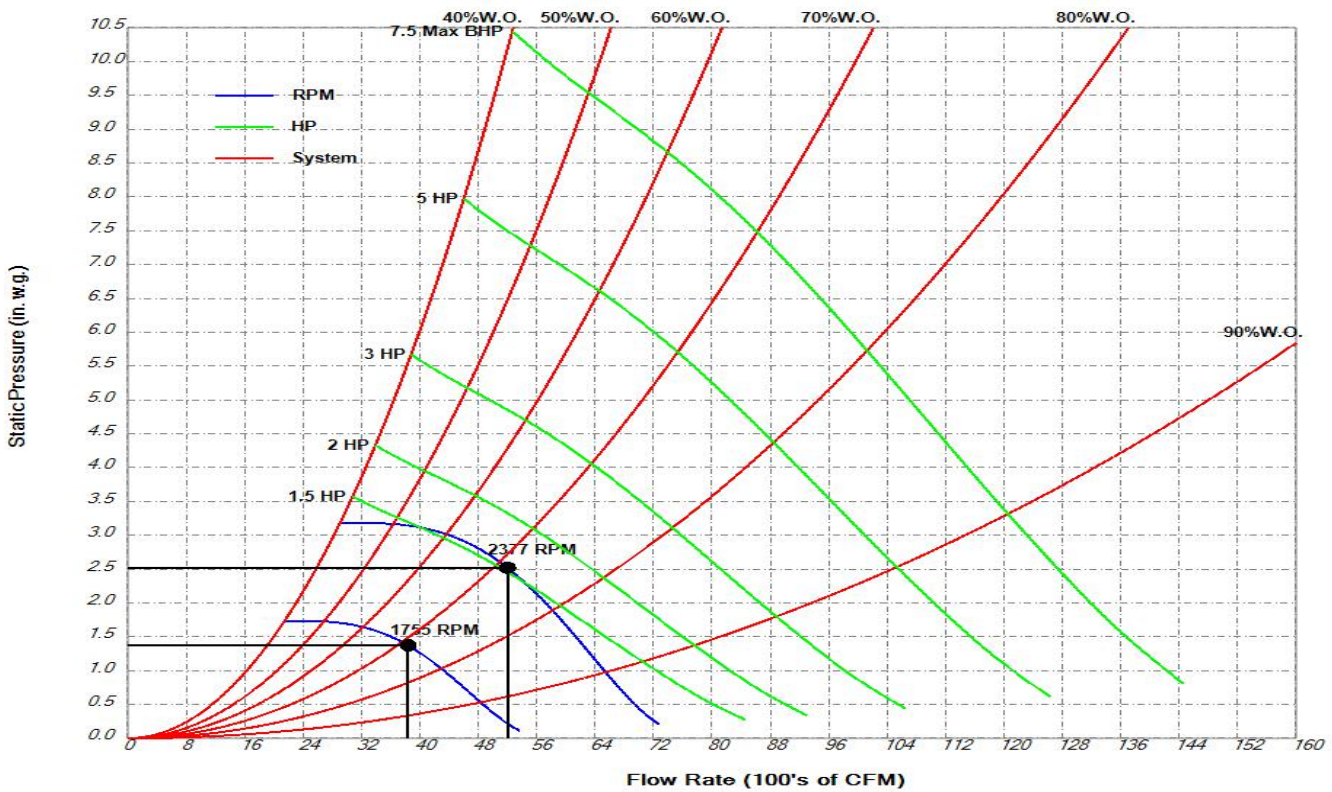


Return Fan(s)

Performance Details													
Fan Manufacturer	Model	# Blades	Class	Size	% Wheel Width	% Wheel Diameter	Quantity	Airflow per Fan (CFM)	Altitude (ft)	TSP (in w.g.)	ESP (in w.g.)	Fan Speed (RPM)	Fan Power (BHP)
Lau	DDPG2	12	II	135	120	100	2	2,600	0	2.52	1.50	2,377	1.53
Max RPM	Wheel Type	Blade Type	Wheel Material	Base Material		Fan Flow Isolation	AirFlow Monitoring		Inverter Drive Balancing	Isolation Type		Thrust Restraints	
4,038	SWSI	Airfoil	Aluminum	Galvanized Steel		Damper	Yes (K=910.00)		-	2" Spring		-	
Drive Type	FEI		FEP (KW)		Inlet Screen	Fan Cage	Fan Stand	Motor Removal Rail	Seismic Snubber				
Direct Drive	1.31		2.82		-	Yes	-	-	-				

Motor Details										
Type / MFG	Motor Power (HP)	V/Ph/Hz	Quantity	Insulation Class	RPM	Frame Size	FLA (Amps)	Efficiency	Location	SGR
TEFC / Baldor	2.0	460/3/60	2	H	1,800	145T	2.90	Premium	Left	Yes

At Motor Synchronous Details			
TSP (in w.g.)	Total Air Flow (CFM)	Fan Speed (RPM)	Fan Power (BHP)
1.37	1,920	1,755	0.62



Glycol Coil(s)

Coil Information								
Segment[Index]	Coil Tag	Coil Duty	Fluid Type	Glycol Percentage	Airflow (cfm)	Flow Direction	Density	Altitude (ft)
CC[1]	-	Cooling	Propylene Glycol	25	6500	Horizontal	Standard	0

Coil Bank Configuration

Segment[Index]	Tube Diameter (in) Fin Type	Total Fin Height (in)	Fin Length per Coil (in)	Face Velocity (fpm)	Stacking Rack Material	Coils High	Coils Wide	Coil Configuration	Coil Stagger (in)	Coil Pull Panel
CC[1]	0.500 Corrugated	42.50	51.00	432	-	1	1	Standard	0	Left Side

Airside Performance

Segment[Index]	EAT-DB (°F)	EAT-WB (°F)	LAT-DB (°F)	LAT-WB (°F)	TMBH	SMBH	Air Pressure Drop (in w.g.)
CC[1]	76.4	62.9	52.5	51.9	206	171	0.57

Fluidside Performance

Segment[Index]	EFT (°F)	LFT (°F)	Fluid Velocity (fps)	Fluid Flow (gpm)	Fluid Pressure Drop (ft)	Rows	Tubes Per Circuit	Reynolds Number
CC[1]	42.0	57.1	2.9	28.4	13.7	8	16	3427

Fin and Tube Configuration

Segment[Index]	Fin Thickness (in) / Material	Fin Spacing (fpi)	Tube Thickness (in)	Turbulators	Return Bend Thickness	Casing Material	Coil Coating	Fouling Factor (hr.ft².°F/BTU)
CC[1]	0.008 Aluminum	10	0.016	No	0.016	Stainless	None	-

Header and Connection Configuration

Segment[Index]	Header Material	Connection Material	Connection Diameter (in)	Connection Offset (in)	Connection Type	Connection Location/Rotation
CC[1]	Copper	Steel	1.5	0	MPT	Left

Other Performance

Segment[Index]	Dry Weight (lbs)	Fluid Weight (lbs)	Internal Volume (ft³)
CC[1]	313	96	1.7

Notes

- Performance is shown for the entire coil bank. Performance is not per coil.
- Coil index indicates position in segment. Example: CC-1, index 1; Spacer, index 2; CC-1, index 3
- Ratings are for coils manufactured by Johnson Controls, Inc., 507 E. Michigan St., Milwaukee WI 53202.
- CC[1]: AHRI Certified:Yes.All Coils: certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the range of Standard rating conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.
- All Coils: BDW Tube Spacing: 1.25 x 1.08
- All Coils: Coil DII Version: 8.11

Drain(s)

Details

Segment	Drain Pan		
	Liner Material	Connection Location	Liner Coating
CC	Stainless Steel, 304	Right	None

Filter(s)

Details								
Segment	Type	Depth	Filter Loading	Media/MERV	# of Spares	Spare Filter Media	Frame Material	
FF	Primary Filter	2"	Side	Pleated 30% Efficiency (MERV 8)	1	Pleated 30% Efficiency (MERV 8)	Galvanized Steel	
Sizes						Filter Gauge Details		
Segment	Filter	1 st Filter Size H x W (in)	1 st Qty	2 nd Filter Size H x W (in)	2 nd Qty	Location	Type	Range (in w.g)
FF	Primary Filter	20x16	4	20x20	2	Door	Magnehelic with Flag	0 - 1.0

Damper(s)

Details												
Segment	Air Path	H x W (in)	Qty	Total Face Velocity (ft/min)	Face Area (ft ²)	Airflow (CFM)	Min Airflow Measurement (CFM)	Type	Config	Model	Material	Blade Orientation
FR	Return Air	17.00 x 19.00	2	1,159	4.5	2,600	-	Counterbalanced Backdraft	100%	CBD6	Aluminum	Parallel
EE-1	Exhaust Air	9.50 x 52.00	1	1,516	3.4	5,200	-	Control	100%	CD60	Galvanized	Parallel
EE-2	Mixed Air	21.00 x 45.00	1	990	6.6	6,500	-	Control	100%	CD60	Galvanized	Parallel
EE-2	Outside Air	15.25 x 43.00	1	1,427	4.6	6,500	-	Control	100%	CD60	Galvanized	Parallel
FS	Inlet Air	17.00 x 19.00	2	1,449	4.5	3,250	-	Counterbalanced Backdraft	100%	CBD6	Aluminum	Parallel

Door(s)

Details												
Segment(s)	Location	Swing	Hinge Location	H x W x T (in)	View Port	ViewPort Wire	Test Port	Spare Gasket	Thermal Break	Fastener Type	Safety Latch	Noncontact Safety Interlock
EE-2	Left	Outward	Front	45 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
FF	Left	Outward	Front	45 x 10 x 2	None	-	Yes	-	Yes	Plated	-	-
CC	Left	Outward	Rear	45 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
FS	Left	Outward	Rear	45 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	Yes	-
IP	Left	Outward	Front	45 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-
FR	Left	Inward	Rear	39 x 18 x 2	Standard Double Pane	-	Yes	-	Yes	Plated	-	-

Motor Control(s)

VFD Details									
Segment	Type	V/Ph/Hz	Input/Output Amps*	Efficiency (%)	Heat Loss (at 100% load)	Enclosure	Bypass	Disconnect Type	RFI/EMI EMC Filter
FR	AYK-580	460/3/60	7.6/7.6	98	133	NEMA 1	-	Fused	Yes
FS	AYK-580	460/3/60	7.6/7.6	98	133	NEMA 1	-	Fused	Yes
FS	AYK-580	460/3/60	7.6/7.6	98	133	NEMA 1	-	Fused	Yes

Notes (ABB VFD)

*Drives are rated for use below 3,000 ft and 104°F. Refer to the Air-Mod Engineering Guide Form 100.42-EGI (813) for additional information.

Drives are current rated devices. The HP ratings provided are for reference only and are based on typical 4-pole motors at nominal voltages (NEC Table 430-150). If full motor torque is required, ensure the drive has a continuous current rating equal to, or greater than, the full load amp rating of the motor.

Storage Temperature: -40°F to 158°F (-40°C to 70°C).

Ambient Operating Temperature: Temperate 5°F to 104°F (-15°C to 40°C). De-rating to operate at 122°F (50°C).

Relative Humidity: 5% to 95% non-condensing. Maximum relative humidity is 60% in the presence of corrosive gasses.

Altitude: 100% Load Capacity (No De-rating) up to 3,300 ft. (1,000 m). 1% derating for each 330 ft. above 3,300 ft. Installations above 6,600ft. (2,000 m) require review.

If 8KHZ Switching Frequency is used, de-rate output current to 80%.

Overload Current Rating: 110% for 1 minute every 10 minutes and is capable of 130% short term-overload rating for 2 seconds our of each minute.

If applicable, motor overload protection in the bypass mode is provided by a Class 20 motor overload relay.

The customer is responsible for providing either a platform/catwalk or portable means to access the VFD when the VFD is installed where the center of the handle of the disconnecting means in its uppermost position is greater than 78" above the finished floor.

Input line Impedance: 5% Equivalent Input Impedance with internal reactor(s). Patented swinging choke design for superior harmonic mitigation.

Use Copper Conductors Only. Do not use aluminum wire.

Manual Motor Protection Details

Location Segment	Disconnect Type	Enclosure Type	V/Ph/Hz	# of Fans Served	Motor HP (Each)
FR	None	NEMA 3R	460/3/60	2	2
Total Combined HP	Total Amps	Drain/Vent Assembly	Service	# of Circuits	
4	5.8	-	Return Fan motor(s)	2	

Notes

Use Copper Conductors Only. Do not use aluminum wire.

The Class 10 trip rating of the MMP device will not withstand an across-the-line start of a fan and should not be used with VFDs with bypass circuits.

Face Velocity and Static Pressure

Summary						
Segment	Description	Face Area (ft ²)	Airflow (CFM)	Face Velocity (ft/min)	Supply Fan Static Pressure (in w.g.)	Exhaust/Return Fan Static Pressure (in w.g.)
EE-2	CD60 (Control Damper 60 - Galvanized Airfoil)	4.6	6,500	1,427	0.07	0.00
EE-2	Outside Air Opening	4.6	6,500	1,427	0.34	0.00
FF	2" Pleated 30% Efficiency (MERV 8)	14.4	6,500	450	0.25	0.00
FF	Dirty Filter Allowance	0.0		0	0.25	0.00
CC	Cooling - 8 Row - 10 Fins Per Inch	15.0	6,500	432	0.57	0.00
FS	CBD6 (Backdraft Damper With Counterbalance)	2.2	3,250	1,449	0.12	0.00
FS	Supply Air Opening	4.3	6,500	1,519	0.39	0.00
FS	External Static - User Entered	0.0		0	2.00	0.00
IP	Return Air Opening	3.3	5,200	1,560	0.00	0.41
FR	CBD6 (Backdraft Damper With Counterbalance)	2.2	2,600	1,159	0.00	0.07
FR	External Static - User Entered	0.0		0	0.00	1.50
EE-1	CD60 (Control Damper 60 - Galvanized Airfoil)	3.4	5,200	1,516	0.00	0.15
EE-1	Exhaust Air Opening	3.4	5,200	1,516	0.00	0.39
Total					3.99	2.52

Dimensions and Weight

Details					
Segment	Description	Length ¹ (in)	Height (in)	Width ² (in)	Weight ³ (lbs)
IP	Inlet Plenum	24	51	63	431
FR	Fan (Return)	56	51	63	1,035
EE-1	Economizer	16	51	63	186
EE-2	Economizer	24	51	63	408
FF	Flat Filter	10	51	63	150
CC	Cooling Coil	35	51	63	824
FS	Fan (Supply)	68	51	63	1,444
Overall		233			

Notes

¹The length includes bottom tier segments only.

²The width does not include coil connection extensions or door latches that extend beyond the unit casing. The width does not include the depth of any pipe chases.

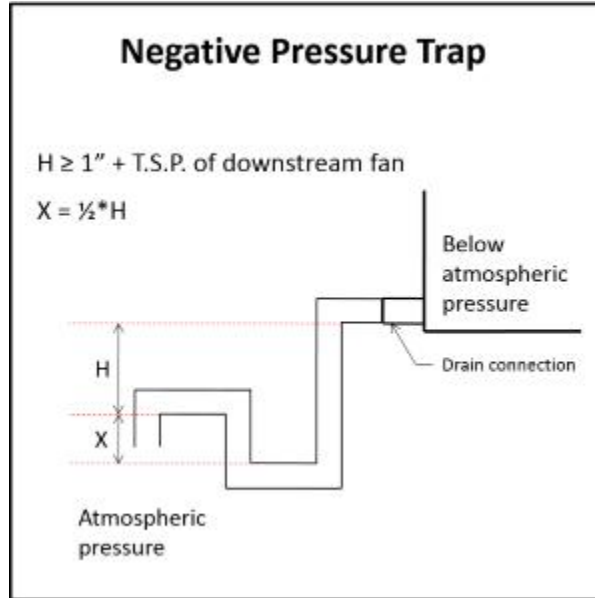
³See Shipping Summary for notes on weights.

Factory Testing

Summary							
Leak Test	Deflection Test	Deflection Test Includes Roof	Test Static Pressure	Airflow Test	Customer Witness Test	Opening Covers for Job Site Leak Test/Quantity (Testing by Others)	Fan Vibration Test
1.0 Percent	None	-	-6.225:6.225	None	-	-	None
Notes							

Recommended Trap Height

Details									
Segment	Applicable Fan	Fan TSP (in w.g.)	Positive or Negative	Calculated Dimensions (in)			Recommended Dimensions (in)		Base Rail Height (in)
				H	X	H + X	H	H + X	
CC	Supply Fan	3.99	Negative	4.48	2.24	6.72	4.50	6.75	6



Notes

Formulas and calculations are recommendations only. Contractor shall determine actual dimensions required for each trap based on jobsite conditions, and application requirements.

Refer to the Installation Manual of the IOM for more information.

Statement of Compliance

Details

Air Handling Unit AHU's meet IBC seismic requirements for non-critical equipment ($I_p = 1.0$) for locations with design spectral response $S_d \leq 0.43$. Units must be rigid mounted.

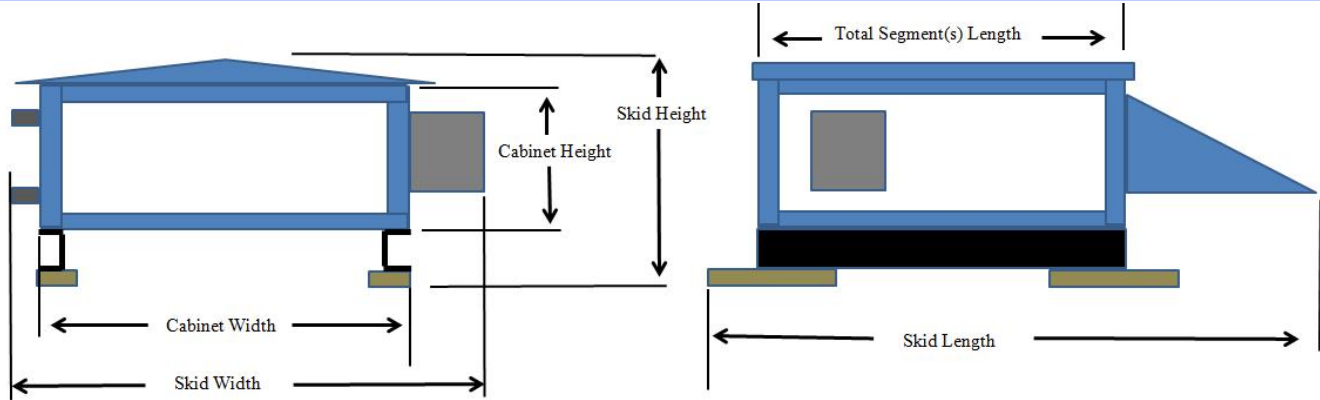
The anchorage of the unit to the ground or building structure needs to be evaluated by and is the responsibility of the engineer of record. Specification of seismic requirements is the responsibility of the project design engineer. If formal certification is required, please contact your sales representative and/or application engineer for review. Certain application and site requirements may require additional cost and/or lead time.

Component locations are listed as Segment Hand (Unit Hand): ex. Left (Right). See Submittal Drawing for additional details.

Air handling unit parameters vary depending on conditions. Parameters such as airflows, air pressure drops, and coil capacities are shown for design conditions.

Shipping Summary

Details				
Skid	Skid Length (in)	Skid Height (in)	Skid Width (in)	Skid Weight (lbs)
IP	30	63	71	459
FR	62	63	79	1,063
CC FF EE-2 EE-1	91	64	71	1,500
FS	74	63	79	1,472
Overall				4,494



Notes

Skid Width: Total width of the shipping skid, including any items that may extend beyond the cabinet (this includes any door handles, coil connections, drain connections, lifting lugs, mounted pipe-chases, electrical/control components, tie-down brackets, side dampers).

Skid Height: Total height of the shipping skid, including any items that may extend beyond the cabinet (this includes any base-rails, shipping wood-blocks, roof peak, discharge flanges, mounted gas-furnace flue pipes).

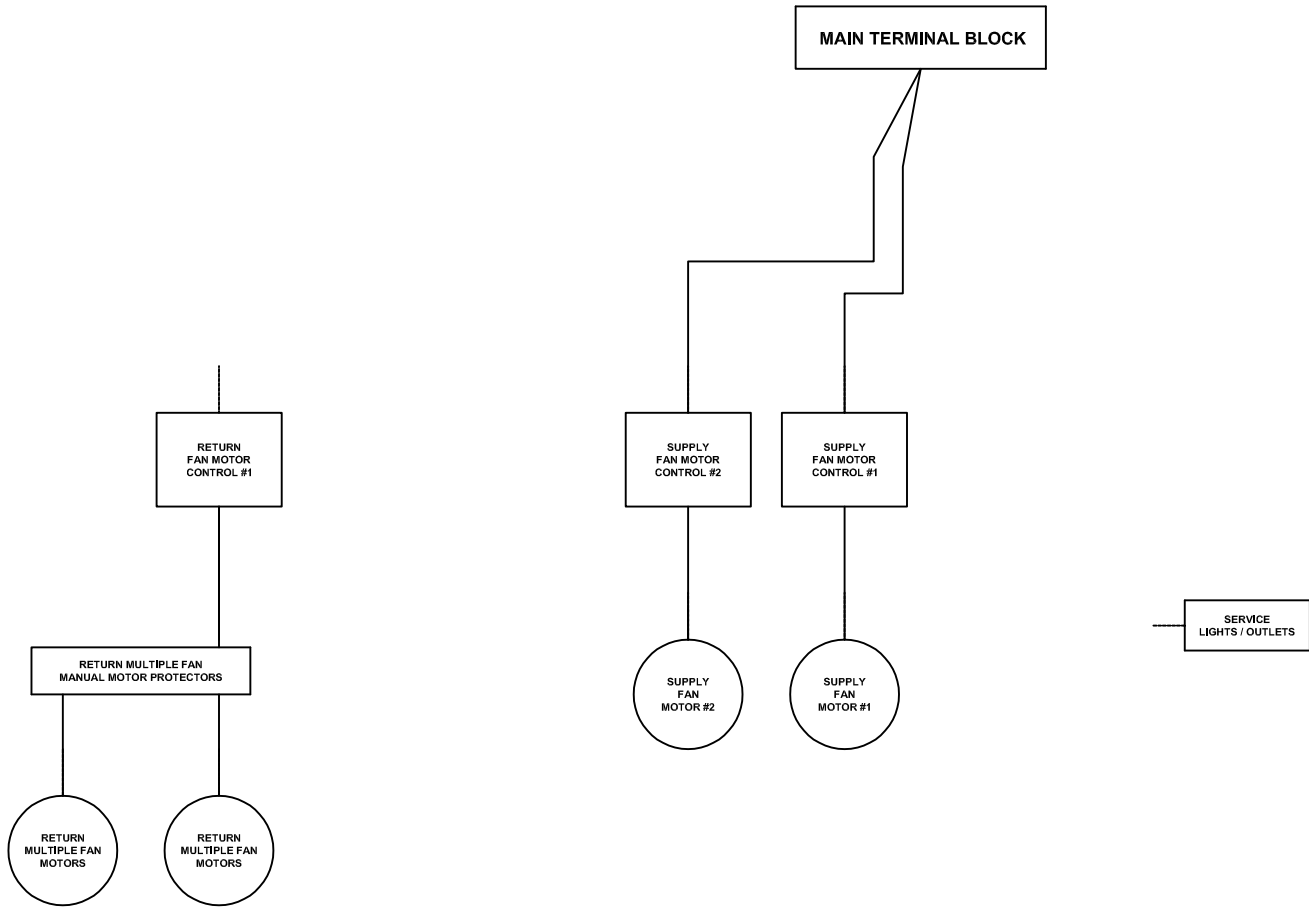
Skid Length: Total length of the shipping skid, including any items that may extend beyond the cabinet (this includes any mounted rain-hoods, discharge flanges, tie-down brackets, shipping wood-blocks, front dampers, split connectors, electrical/control components, outrigging extensions, isolation dampers, inlet baskets).

Skid Weight: Weight values represent the estimated operational weight with a tolerance of +/- 10% for values greater than 5,000 lbs. Values less than 5,000 lbs. may have higher percentage variation but not any consequential shipping impact. Operational weight estimate includes unit shell, internal components and structure, and known ship loose and/or field-installed items (weather hoods, pipe chases, factory-provided filter media and estimated fluid weight in coils). Actual operating weight will be heavier due to additional field installed materials including but not limited to field-provided filter media, piping, control devices, and/or inertia base concrete.



Equipment Sales Office: 9685 Cincinnati Dayton Rd, West Chester Township, OH 45069

Electrical Drawings



PRODUCT DRAWING

AHU Field Wiring
 MODEL:
 NOT FOR CONSTRUCTION

Project Name: Messer - CCBH Cabarrus
 Location: ,
 Engineer:
 Contractor:
 For:

Sold To:
 Cust Purch Order#:
 Contract#: 4E-870099-02

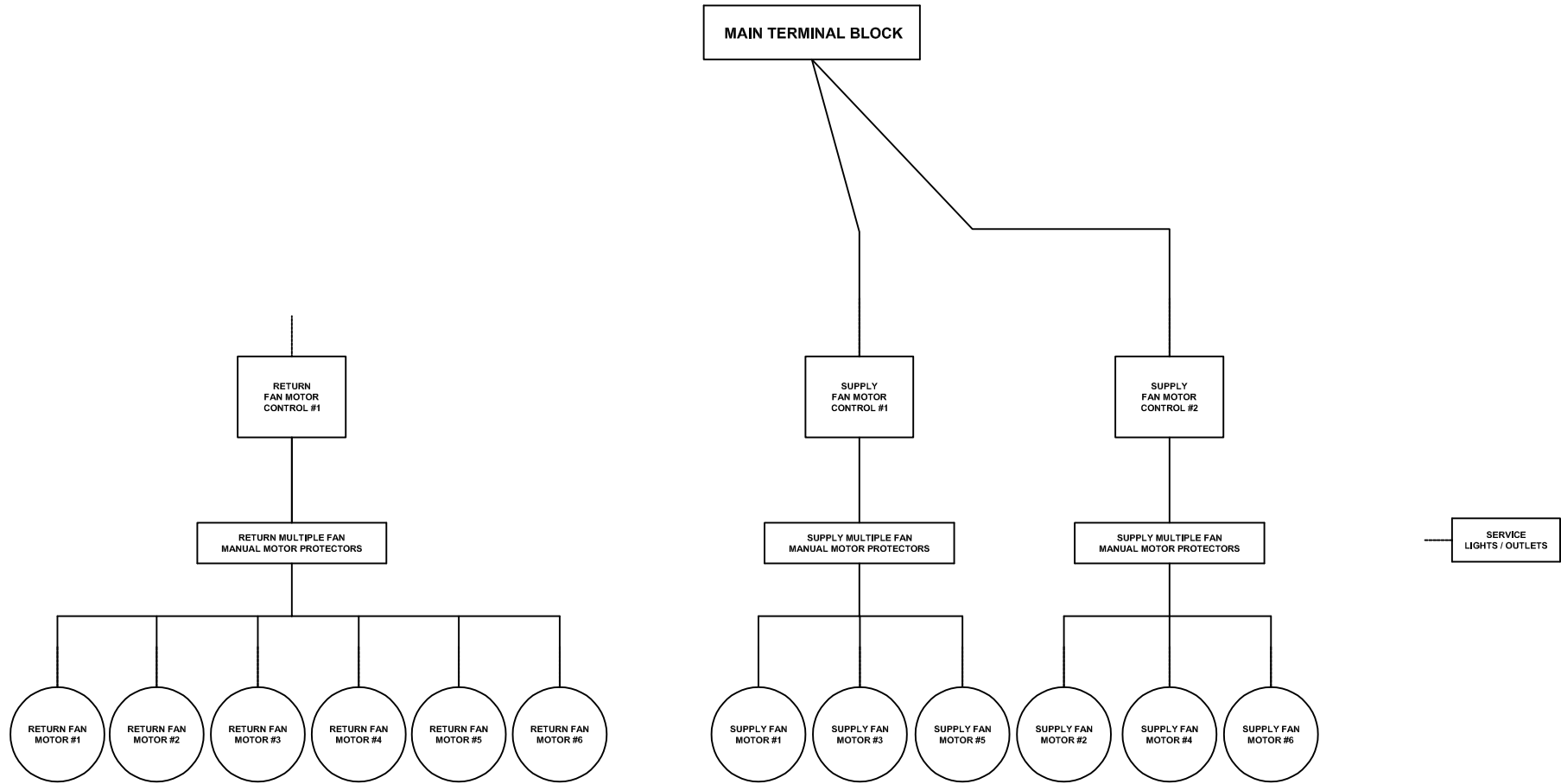
UNIT
 TAG: **AHU-1 - Sheet 1**
 For:

Date: 11/11/2024 1:50:02 PM (UTC)

Form No.: 100,09-EG1
 Dwg. Lev.: 12/03
 Dwg. Scale: NTS

Serial Number:
 SQ Database Number:
 YORKworks Release:
 Dwg. Name:
 Dwg. Location:





PRODUCT DRAWING

AHU Field Wiring

MODEL:

NOT FOR CONSTRUCTION

Project Name: Messer - CCBH Cabarrus

Location: ,

Engineer:

Contractor:

For:

Sold To:

Cust Purch Order#:

Contract#: 4E-870099-03

UNIT

TAG: AHU-2 - Sheet 1

Date: 11/11/2024 2:17:50 PM (UTC)

Form No.: 100,09-EG1

Dwg. Lev.: 12/03

Dwg. Scale: NTS

Serial Number:

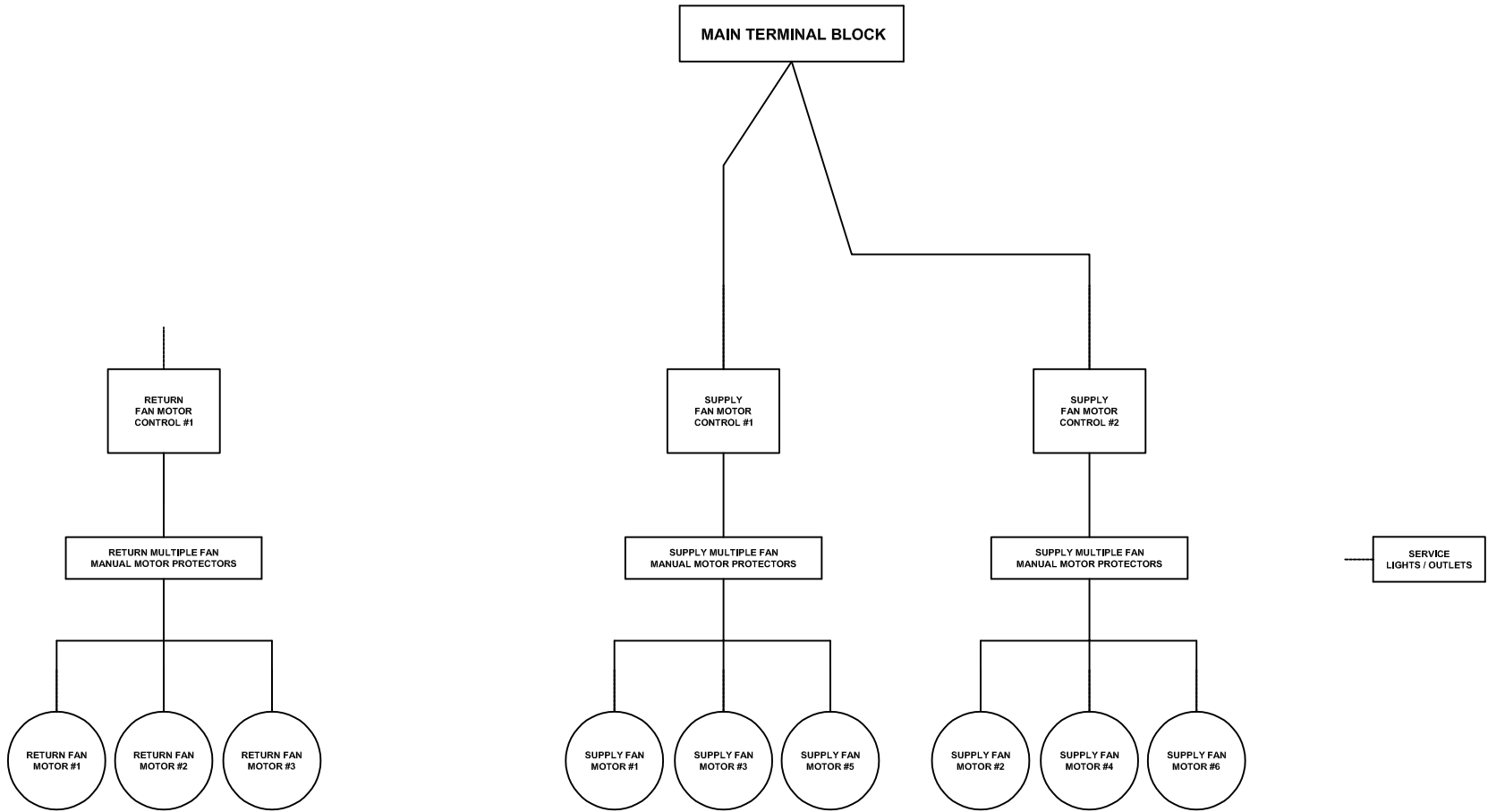
SQ Database Number:

YORKworks Release:

Dwg. Name:

Dwg. Location:





PRODUCT DRAWING
 AHU Field Wiring
 MODEL:
NOT FOR CONSTRUCTION

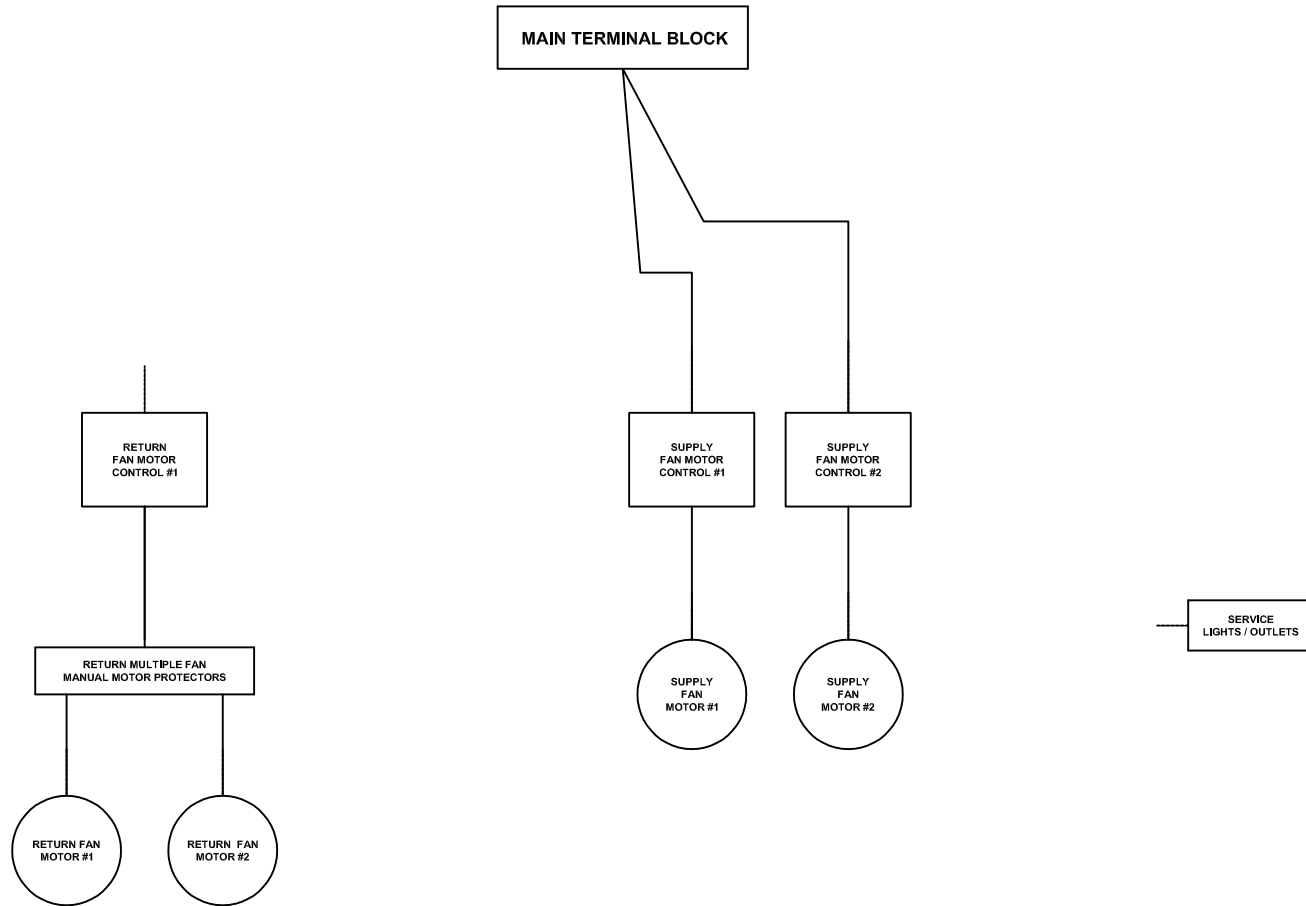
Project Name: Messer - CCBH Cabarrus
 Location: ,
 Engineer:
 Contractor:
 For:

Sold To:
 Cust Purch Order#:
 Contract#: 4E-870099-04
 UNIT
 TAG: **AHU-3 - Sheet 1**

Date: 11/11/2024 2:23:37 PM (UTC)
 Form No.: 100,09-EG1
 Dwg. Lev.: 12/03
 Dwg. Scale: NTS

Serial Number:
 SQ Database Number:
 YORKworks Release:
 Dwg. Name:
 Dwg. Location:





PRODUCT DRAWING

AHU Field Wiring

MODEL:

NOT FOR CONSTRUCTION

Project Name: Messer - CCBH Cabarrus

Location: ,

Engineer:

Contractor:

For:

Sold To:

Cust Purch Order#:

Contract#: 4E-870099-05

UNIT

TAG: AHU-4 - Sheet 1

Date: 11/11/2024 2:30:18 PM (UTC)

Form No.: 100,09-EG1

Dwg. Lev.: 12/03

Dwg. Scale: NTS

Serial Number:

SQ Database Number:

YORKworks Release:

Dwg. Name:

Dwg. Location:





Equipment Sales Office: 9685 Cincinnati Dayton Rd, West Chester Township, OH 45069

Receiving/ Rigging Instructions



Equipment Sales Office: 9685 Cincinnati Dayton Rd, West Chester Township, OH 45069

RECEIVING / RIGGING INSTRUCTIONS

The installing contractor is responsible to provide Johnson Controls / YORK with a contact to coordinate the delivery of the equipment in this submittal. Please fill out the information requested in the Submittal Approval Form section in the back of this submittal.

It is the installing contractor's responsibility to verify the following prior to signing the bill of lading presented by the transportation company:

Ensure everything on the bill of lading was delivered.

Visually perform a thorough inspection of all equipment for any signs of shipping damage.

Any short-shipments or shipping damage must be noted on the bill of landing prior to signing.

The transportation company will provide you with instructions for filing a claim. It is the installing contractor's responsibility to work directly with the transportation company to resolve any shipping claims.

SECTION 2 - PRODUCT DESCRIPTION

The AHU features segmented construction, and is factory assembled. Segment arrangements will vary to suit the job application as shown in *Figure 1 on page 15*. Features of the AHU include:

- Heavy gauge galvanized steel, stainless steel, and aluminum can be used on the exterior and interior of the AHU.
- Access doors are provided for accessibility to the various sections.
- Panels and doors are constructed with double walls.
- Panels, doors, and structural frame are insulated with spray-injected foam.

TYPICAL AHU OPERATION

The operation of the AHU is divided into four systems:

1. Ventilation
2. Economizer (Return Air/Mixing Box Section)
3. Heating and Cooling
4. Cleaning

Ventilation System

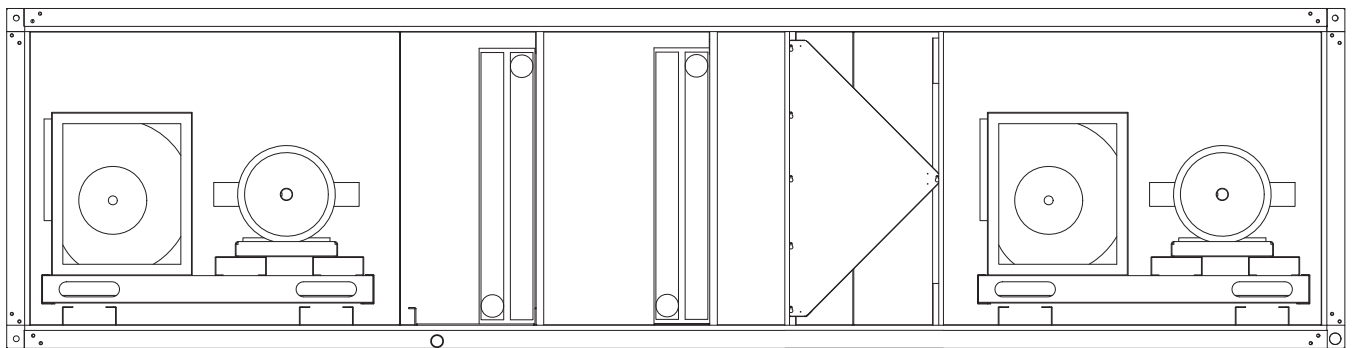
The purpose of a ventilation system is to remove air that is substandard to creature comfort or a process, and replace it with suitable air. Depending on the application, the system will operate at various specified rates, volumes, and conditions. A ventilation system may employ an AHU with a supply fan working in conjunction with a remote exhaust fan(s). A more effective method would employ a supply fan and an exhaust fan in the AHU.

Economizer System (Typical)

The economizer system typically consists of:

- Outdoor and return air dampers
- Damper actuator
- Enthalpy control
- Minimum outdoor air adjustment
- Exhaust air control

The economizer system provides the first stage of cooling whenever the outdoor air is cool and dry enough to satisfy the internal cooling demand. The outdoor and the return air dampers are operated by individual actuators. As the outdoor air dampers are opened by the damper actuator, the return air dampers are closed.



LD13764

FIGURE 1 - CUTAWAY OF AHU SHOWING SEGMENTED CONSTRUCTION

Heating and Cooling System

Various types of heating and cooling may be applied, which include:

- Hot water or steam coils
- Electric or fuel burner heat
- Factory mounted chilled water coils
- Direct expansion refrigerant coils

Cleaning

Various types of cleaning include filters and UV lights.

HAND ORIENTATION

Coil connections and other components are located and described as left or right hand. The proper orientation to describe the proper hand is when airflow is at your back as shown in *Figure 2 on page 16*.

AHU IDENTIFICATION (ID)

Indoor and outdoor AHUs are labeled with the following ID labels:

- AHU
- Skid
- Loose Components

Indoor AHUs are shrink wrapped with skid ID labels on the outside of the wrapping and on each skid.

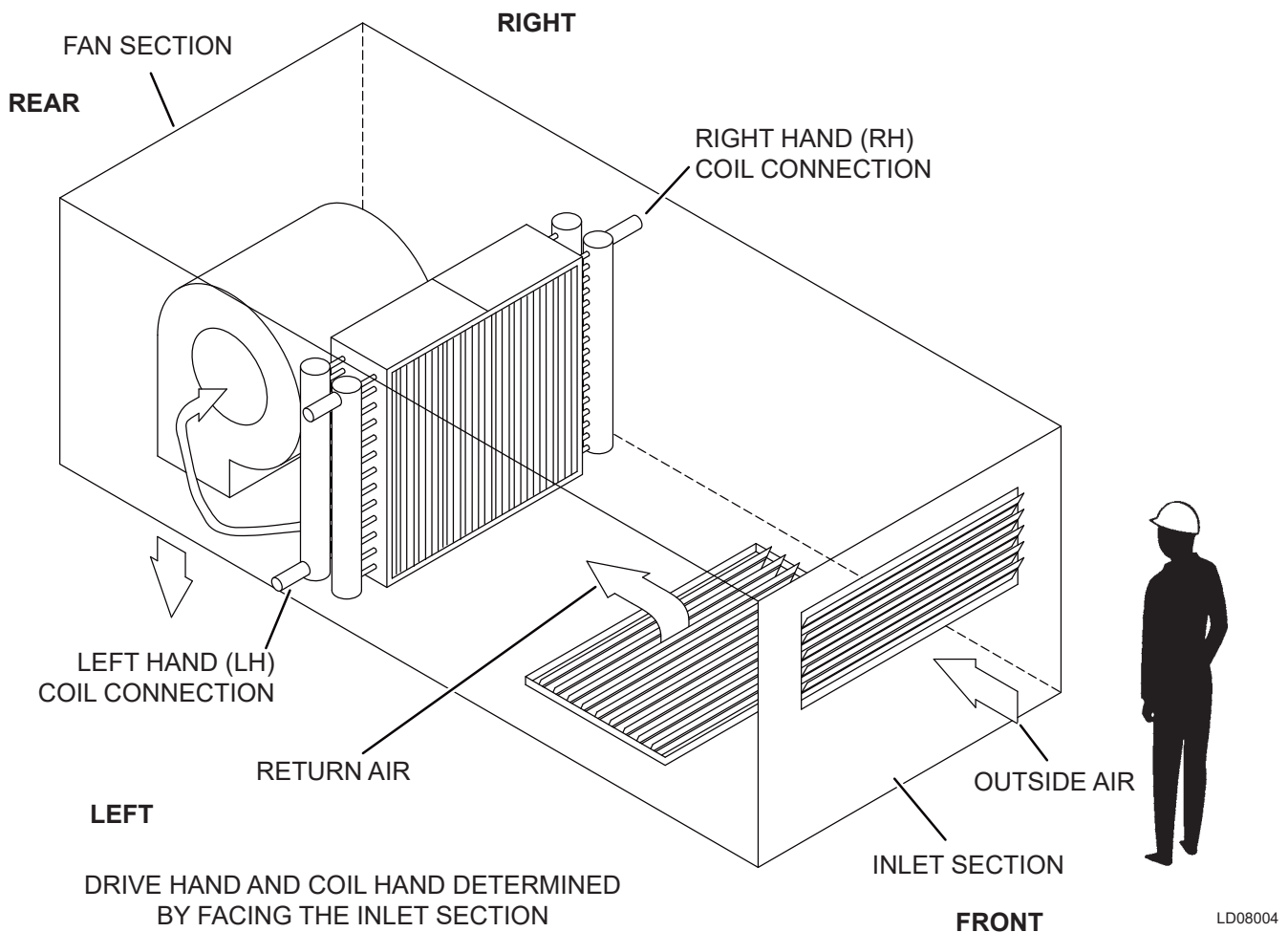


FIGURE 2 - AHU AND COIL HAND IDENTIFICATION

TABLE 1 - DEFINITION OF SEGMENT IDS

FAN SEGMENTS
FS – SUPPLY
Forward Curved DWDI
Airfoil DWDI
Industrial Airfoil DWDI
SWSI Airfoil Plenum (Belt and Direct Drive)
FR – RETURN
Forward Curved DWDI
Airfoil DWDI
Industrial Airfoil DWDI
SWSI Airfoil Plenum (Belt and Direct Drive)
FE – EXHAUST
Forward Curved DWDI
Airfoil DWDI
Industrial Airfoil DWDI
SWSI Airfoil Plenum (Belt and Direct Drive)
COIL SEGMENTS
CC – COOLING COIL
HC – HEATING COIL
VC – VERTICAL COIL
MZ – MULTI-ZONE
HEAT SEGMENTS
IC – INTEGRAL FACE AND BYPASS COIL
IG – INDIRECT GAS FIRED FURNACE
EH – ELECTRIC HEATER
ENERGY RECOVERY
ER – HEAT WHEEL
HW – HEAT WHEEL

FILTER SEGMENTS
FF – FLAT FILTER (2 or 4 in.)
AF – ANGLE FILTER (2 or 4 in.)
RF – HIGH EFFICIENCY FILTER
Rigid Filter (12 in.)
Bag Filter (21 in.)
Mini-Pleat Filter (4 in.)
HF – HIGH EFFICIENCY FILTER
INLET SEGMENTS
MB – MIXING BOX
FM – FILTER/MIXING BOX
EF – FILTER/ECONOMIZER
EE – ECONOMIZER
IP – INLET PLENUM
VE – VERTICAL ECONOMIZER
VF – VERTICAL FILTER/ECONOMIZER
IO – INLET/OUTLET
ACCESSORY SEGMENTS
VP – VERTICAL PLENUM
DP – DISCHARGE PLENUM
TN – TURNING PLENUM
DI – DIFFUSER
XA – ACCESS SEGMENT
AB – AIR BLENDER
EB – EXTERNAL BYPASS
IB – INTERNAL BYPASS
FD – FACE DAMPER
HM – HUMIDIFIER
AT – SOUND ATTENUATOR
UV – UV LIGHTS

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SECTION 3 - HANDLING, STORAGE, AND INSTALLATION

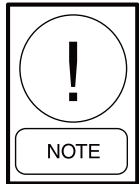
DELIVERY AND STORAGE

To ensure consistent quality and maximum reliability, all AHUs are tested and inspected before leaving the factory.

Inspection, Damage, and Shortage

Check the AHU shipment on arrival to make sure that all major pieces, boxes, and crates are received. Check each AHU on the trailer or rail car when received, before unloading, for any visible signs of damage. Report any damage or signs of possible damage to the transportation company immediately for its inspection.

After inspecting the AHU for damage, open all containers and check the contents against the packing list. Report any material shortage to Johnson Controls immediately.



JOHNSON CONTROLS WILL NOT BE RESPONSIBLE FOR ANY DAMAGE OR LOSS OF PARTS IN SHIPMENT OR AT JOB SITE. REFER TO SHIPPING DAMAGE CLAIMS (FORM MP50.15-NM).

Short Term



Indoor AHUs: Under no circumstances should outdoor storage be used.

- ***Remove of ventilate wrapping to prevent condensation.***

Outdoor AHUs: Recover AHUs after inspection or use tarps during storage.

Short term storage is six months or less from date of shipment. Storage maintenance during this time is usually limited to the following:

- Rotate fans every four weeks, starting on the delivery date to prevent moisture from damaging the bearing.
- If the AHUs are going to be stored out-of-doors, prior to installation, special care must be taken to cover and protect the AHUs from:
 - Dust
 - Rain and snow
 - Rodents
 - Construction vehicles and personnel.
 - Condensation / Ventilation required
- Protect all parts and porous materials from rain and other sources of moisture. Decontaminate or

replace parts as needed to make sure microbial growth is not introduced to the AHU.

- Store the AHU on a firm, flat surface to prevent distortion. Block the AHU off the ground to protect components from water or ground moisture.

Long Term

Long term storage is more than six months from the date of shipment. If long term storage is anticipated, contact the Johnson Controls sales representative for the proper instructions and requirements.

It is mandatory that a detailed record be maintained during this long term period, such as, but not limited to the following:

- Proper sealing of the cabinet,
- Rotation of the blowers and bearings, and
- Protection of all motors from moisture.

Refer to *Long Term Storage Requirement - Field Preparation (Form MP50.20-NM3)* and *Long Term Storage Periodic Checklist and Logs (Form MP50.20-CL3)* for more information.

Preventive Maintenance Prior to Long Term Storage



Failure to fulfill the long term storage requirements will void the warranty.

Receiver's Responsibility

The receiver is solely responsible for noting the freight bill and filling out the freight claims IMMEDIATELY. In addition, the receiver must:

- Note the visible damage on the signed and dated bill of lading with a request that the carrier inspect the damage within 72 hours of notification.
- Remove the shipping wrapper, and replace it with a tarp or similar protective covering. Any concealed damage reported after 15 days will compromise a claim settlement.
- Request inspections by telephone or in person, but confirm in writing. If assistance is needed with the claim process, contact a Johnson Controls sales representative and refer to the shipping damage form.

Take the following precautions prior to extended storage:

- Grease the fan and motor bearings per the manufacturer's specifications.
- Protect the motors and sheaves from free moisture or high humidity, which may be accomplished by:
 - Spraying components with an anti-rust solution (P/N 026-37707-000).
 - Disconnecting the belts. Wrapping the sheaves and motor and sealing them with plastic. Inserting a desiccant to absorb moisture that may penetrate the plastic protection.
- Meg the fan motor windings and record for comparison prior to placing the AHU in service.
- If the fan housing was supplied with a drain connection, remove the plug to prevent moisture from accumulating in this part of the fan during storage.

Periodic Fan Check

On a monthly basis, perform the following tasks:

- Rotate the fan and motor several times to replenish the bearing surfaces with fresh grease.
- Turn the fan impeller 180° from the previous month's position to prevent the belts from taking a set position.

Monthly Log Sheet

It is the customer's responsibility to submit a monthly log sheet from the *Long Term Storage Periodic Checklist and Logs (Form 50.20-CL3)* that shows the condition of the AHU and to note any discrepancies. Send a copy of the log sheet to the Johnson Controls Field Service Office for its records.

Indoor AHUs

It is Johnson Controls' intention that a shipping wrapper be applied to unpainted indoor AHUs for protection from weather, road dirt, etc. during inland transit. Remove the wrapper at the time of delivery to allow for a thorough inspection, both inside and out. Under no circumstances should outdoor storage be used.

Outdoor AHUs

Generally, outdoor AHUs are not fully wrapped. Exposed openings will be covered for protection from weather, road dirt, etc. during inland transit. Conduct a thorough inspection, inside and out, at the time of delivery.

Occasionally, an outdoor AHU may be entirely wrapped in plastic, which should not be removed until the AHU is installed, to prevent damage from job site dirt and various weather conditions. If the AHU is covered with plastic, cut the wrap in the outline of the door(s), and proceed to access the AHU using the information (above). Close the cut with duct tape.

Shipped Loose Parts

Check the packing list, which notes the number and types of parts, for non-mounted shipped loose parts in all segments of the AHU. Report shortages within 10 days after receipt of the order.

LIFTING WEIGHTS

AHU section weights are furnished on the job submittal form. Due to the variance in weight of each AHU design, it is not possible to list AHU weights in these instructions. Refer to the job submittal form when selecting a crane for rigging and figuring out roof weight loads. Contact a Johnson Controls sales representative, if there are questions regarding the AHU weights.

MOVING THE AHU

Prior to moving the AHU, make sure that the installation site is suitable for installing the AHU, and is easily capable of supporting the weight of the AHU and all associated services.

LIFTING AND HANDLING

The unit will ship (as specified on unit submittal) either assembled, as a subassembly (collection of parts), or as individual sections.

To prepare for safely lifting the air-handling unit, estimate the approximate center of gravity. Internal placement of components may cause the weight to be unevenly distributed, with more weight in the coil and fan areas.

An experienced and reliable rigger must handle the unloading and final placement of the AHU and must be advised of the following:

- AHU contains internal components and should be handled in an upright position.
- Car must be exercised to avoid twisting the equipment structure.
- Prevent unnecessary jarring or rough handling.

Removable lifting lugs are provided to raise the unit. (Lifting lugs are typically shipped in fan section and must be installed before lifting. *Lifting lugs are attached to unit base when shipping section is ordered with “fully wrap” shipping cover.) Spreader bars are required to prevent damage to the cabinet and protruding components during a lift. Use all lifting lugs provided. Adjust the tension in each line for proper load distribution.



Unit sections are bolted together for shipping purposes. Sections must be separated and sealed prior to final installation and operation.

WARNING

Failure to follow these instructions could result in death, serious injury or equipment damage.

Follow all warnings and instructions in the unit's Manual(s).

<p>EN Installation Instructions for the technician / fitter</p> <p>PL Instrukcja instalacji dla technika / monter</p> <p>SV Installationsguide för installatör / montör</p> <p>CS Pokyny k instalaci pro techniky a montéry</p>	<p>IT Istruzioni d'installazione per il personale specializzato</p> <p>NL Installatiehandleiding voor de vakman / monteur</p> <p>DE Installationsanleitung für die Fachkraft / Monteur</p> <p>ES Instrucciones de instalación para el técnico / contratista especializado</p>	<p>JA 一般仕様・取扱説明書</p> <p>FR Manuel d'installation pour le spécialiste / monteur</p> <p>RU Инструкция по установке для техника/монтажника</p> <p>ZH 适用于技术人员与安装人员的 安装说明书</p>	
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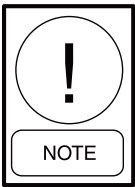
1. Follow all applicable regulations and safety practices during rigging and lifting.
2. Prepare and follow written rigging and lifting plan.
3. Rigging must be directed by trained professional rigger.
4. Spreader bars must be used and be long enough to prevent rigging from contacting unit.
5. Use all and only designated lift points according to units manual(s).
6. Locate center of gravity through trial lifts to account for possible variations in unit configuration.
7. Use rigging and lifting techniques that keep unit stable and level.
8. Keep clear of unit when lifted.

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Rigging and lifting should only be done by a professional rigger in accordance with a written rigging and lifting plan. The most appropriate rigging and lifting method will depend on job specific factors, such as the rigging equipment available and site needs. Therefore, a professional rigger must determine the rigging and lifting method to be used, and it is beyond the scope of this manual to specify rigging and lifting details.



Use a spreader bar to avoid damage to the unit, accommodate multiple lifting lugs, and maintain maximum specified angles..

BOLTED LOOSELY / SHIPPED IN ONE PIECE

Split units may be shipped “loosely” assembled to reduce freight costs. The split sections are fastened together using a minimum number of bolts for transit and can be removed off the truck to the ground. Disassembly is required before lifting to the roof. Each section must be lifted individually to the roof.

Rigging



Remember - when lifting; use all lifting lugs to avoid damage and/or personal injury. Lifting lugs are shown in Figure 5 - Lifting Lugs on page 23.

If there are no lifting lugs, a belt type sling should be used to raise the unit. Be cautious in avoiding protrusions such as electrical boxes, coil connections, and door handles.

Do not lift non-base units or subassemblies by attaching clevis, hooks, pins, bolts, etc. to casing, casing hardware, angles, tabs or flanges.

Lift the air-handling unit only in an upright position. Never lift or move a unit on its side or upside-down.

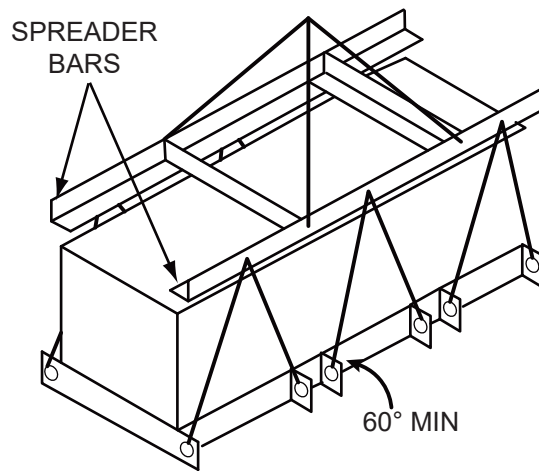


If you do not rig or lift the unit carefully, you could damage the unit, hurt yourself or others. Use Caution!



Outdoor Custom units have an optional roof coating applied where light foot traffic is permitted, but storage of materials typically found on construction sites are not permitted to be placed on roofs. Care must be taken not to damage the roof coating.

If other than light foot traffic or storage of materials becomes necessary, plywood may be placed on the roof provided the weight applied does not exceed 50lbs. per sq. ft.



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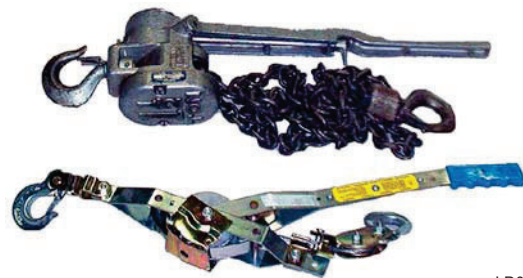
FIGURE 3 - RECOMMENDED LIFTING WITH MULTIPLE POINTS

USING FORK LIFT IN SPECIAL CIRCUMSTANCES

Forklifts should not be used to off-load AHUs except in special circumstances. If moving an AHU with a fork lift or similar equipment becomes necessary, make sure the lifting forks are long enough to reach from the fork truck to the opposite side and slightly beyond the AHU. Leave the shipping blocks attached to the bottom of the AHU until it is moved to its final location. There is no structural support under the equipment except what is visible from the perimeter.

COME-A-LONGS (POWER PULLS)

If the AHU has multiple sections, use come-a-longs (power pulls) as shown in Figure 4 on page 22 to pull the sections or skids together.



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FIGURE 4 - TYPICAL COME-A-LONGS

PROPER LIFTING WITH SHACKLES

Shackles are fastened to a sling or chain, which is used to lift and lower the sections in a tiered AHU. Refer to the Figure 5 on page 23 and Figure 6 on page 23 for proper lifting.

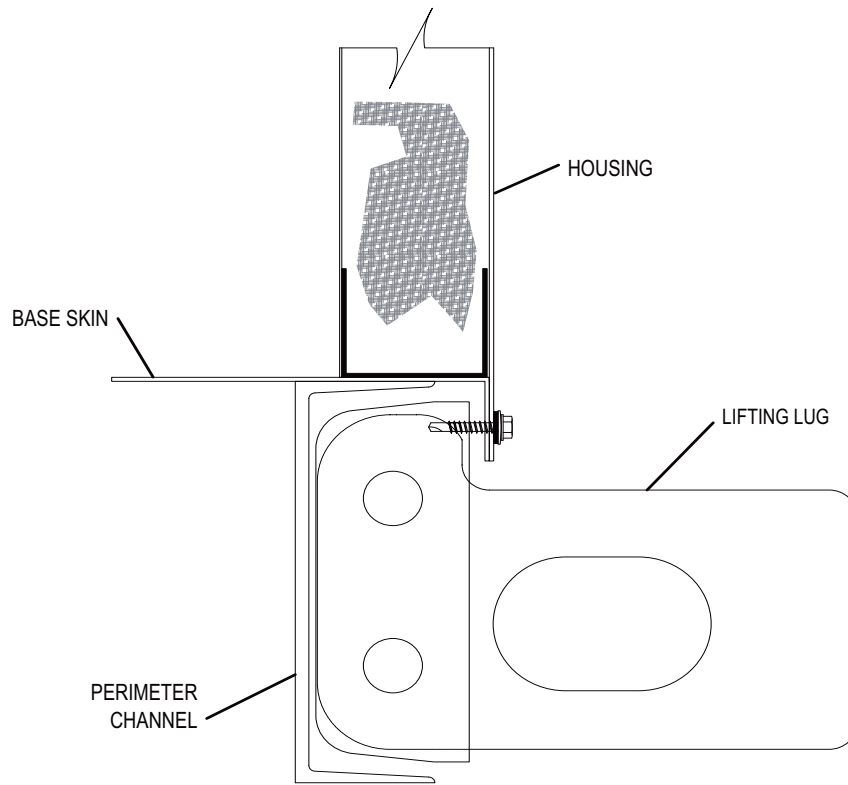


FIGURE 5 - LIFTING LUGS



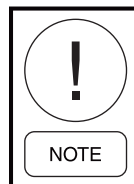
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FIGURE 6 - PROPER LIFTING WITH BASE RAIL

PREPARING THE SITE



Do not weld or use torches on the exterior or interior of the AHU housing. The housing contains polyurethane insulation, which, under combustion, will produce harmful, toxic gases resulting in personal injury or death.



Never use silicone caulk/sealant in or on any AHU.



If the AHU has HEPA filters, the filter frames, bulkheads, and segment panels are factory sealed, and must remain sealed to prevent air bypass.

Clearance and Mounting for Indoor AHUs

It is recommended that the AHU is located in an air-conditioned space. Some suggested installations are shown in *Figure 9 on page 26*. Make sure the floor and housekeeping pads are flat and level.

Allow sufficient space around the AHU to remove the access panels and various parts. A minimum clearance equal to the width of the AHU plus 6 in. must be provided on one side of the AHU to remove the coil or fan assembly.

Concrete pads may not be as flat as they should be. Shimmed and/or grouting may be necessary. Whether under the AHU base or curb, the AHU base needs to be on a flat plane.

Mounting Indoor AHU

Install the AHUs to provide enough elevation for properly designed condensation traps.

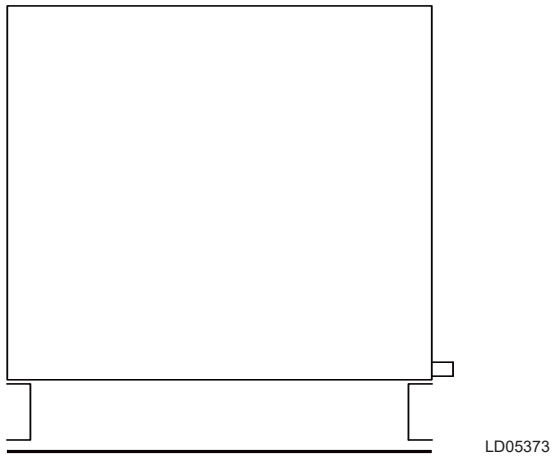


FIGURE 9 - NO HOUSEKEEPING PAD - BASE REQUIRED TO ACCOMMODATE TRAP HEIGHT

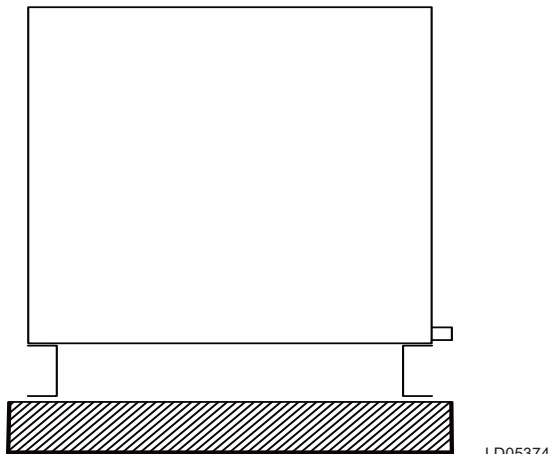


FIGURE 10 - WITH BASE AND HOUSEKEEPING PAD

Installing Ceiling Suspended AHUs



It is recommended that support is structurally engineered to prevent flexing, sagging or twisting of the AHUs.

Use the following instructions to prepare the site for ceiling suspended AHUs. Refer to *Figure 11 on page 27* for proper support in the direction of airflow and/or if the AHU is positioned perpendicular to the direction of the air flow.

Structure Positioned in Direction of Airflow

The AHU base must be supported continuously on both sides.

Structure Positioned Perpendicular to Airflow

The AHUs must be supported (at a minimum) at the following locations:

- Both ends
- At each shipping split, if applicable
- Upstream and downstream of each cooling coil segment
- Under heavy components like fans, attenuators, and heating segment.
- As a general rule, cross members should be placed every 96 in., in addition to each shipping split.



DO NOT obstruct the door operation, filter access, piping, electrical or control connections with suspension members.



Equipment Sales Office: 9685 Cincinnati Dayton Rd, West Chester Township, OH 45069

Equipment Release Approval Form

Product Type: Custom Air Handlers Units

Unit Tags:

The following table must be completed prior to releasing the equipment for fabrication. Please initial the column indicating the information contained in this submittals has been verified, or indicate to refer to a marked-up page.

SUBMITTAL VERIFICATION	
	Purchaser Initials
Unit tag designations are correct.	
Equipment dimensions (length, width, and height) and weights have been verified to comply with jobsite conditions and rigging requirements. Please indicate approval by your initials on all included drawings.	
Equipment dimensions (length, width, and height) and weights have been verified to comply with jobsite conditions and rigging requirements. Please indicate approval by your initials on all included drawings.	
Verify "Unit Hand" of any Air Handling Equipment per the definition provided on the " Equipment Release / Configuration Process " form.	



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Important Notes:

- 1) Actual fabrication release cannot commence until this form is signed by the customer and returned to JCI along with a release notification want date and ship to address.
- 2) Equipment "lead-time" does not start until confirmed release documentation is received, and the order is actually released to the factory.
- 3) Modifications to equipment configurations after fabrication release may impact cost and lead-time
- 4) Attached configurations are as shown in the approved equipment submittals or as defined in superseding customer correspondence.
- 5) Note that once this document is confirmed, the equipment configurations defined by this document take precedence over all other documents.
- 6) "Want date" and/or "ship to address" changes made after this document is confirmed may impact cost and lead-time.



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Please fill out the following table and refer to the receiving/rigging instructions in this submittal to help ensure a smooth delivery and installation of the equipment.

DELIVERY INFORMATION	
	Please fill out information below
Contact name for coordinating delivery of equipment with transportation	
Contact phone number	
Advance notice required from transportation company prior to delivering equipment (typically 48 hours)	
Ship to address:	
Other special shipping instructions or requirements	



Equipment Sales Office: 9685 Cincinnati Dayton Rd, West Chester Township, OH 45069

CUSTOMER APPROVAL:

Customer
Name:

Signature (*)

Date:



Equipment Sales Office: 9685 Cincinnati Dayton Rd, West Chester Township, OH 45069

Standard Warranty



STANDARD LIMITED WARRANTY ENGINEERED SYSTEMS EQUIPMENT

23 73 23-001-1

SERVICE POLICY

Supersedes: 50.05-NM2 (812)

Form 50.05-NM2 (1212)

POLICY STATEMENT

Johnson Controls (JCI) warrants all equipment and associated factory supplied materials or start-up services performed by Johnson Controls in connection therewith, against defects in workmanship and material for a period of eighteen (18) months from date of shipment, or twelve (12) months from date of start up, whichever occurs first. Subject to the exclusions listed below, Johnson Controls, at its option, will repair or replace, FOB point of shipment, such products or components as it finds defective.

Except for reciprocating replacement compressors, which Johnson Controls warrants for a period of twelve (12) months from date of shipment, Johnson Controls warrants Johnson Controls reconditioned or replacement materials, or installation or start-up services performed by Johnson Controls in connection therewith, against defects in workmanship and material for a period of (90) days from date of shipment.

The above represents the minimum warranty policy Johnson Controls will extend to customers. Additional product specific coverage is provided as outlined in related warranty policies. No warranty repairs or replacements will be made until payment for all equipment, materials, or components has been received by Johnson Controls.

EXCLUSIONS:

Unless specifically agreed to in the contract documents, this warranty does not include the following costs and expenses:

1. Labor to remove or reinstall any equipment, materials or components.
2. Shipping, handling or transportation charges, including cranes, safety walks or other safety requirements specific to jobsites.
3. Cost of refrigerant.
4. Freight damage.
5. Field applied coatings added to any surface or heat exchanger.
6. Rental Chillers.

ALL WARRANTIES ARE VOID IF:

1. Equipment is used with refrigerants, oil, additives, or antifreeze agents other than those authorized by supplying factory.
2. Equipment is used with any material or any equipment such as evaporators, tubing, other low side equipment or refrigerant controls not approved by supplying factory.
3. Equipment has been damaged by freezing because it was not properly protected during cold weather or damaged by fire or any other conditions not ordinarily encountered.
4. Equipment is not installed, operated, maintained and serviced in accordance with instructions issued by Johnson Controls.
5. Equipment is damaged due to dirt, air, moisture, or other foreign matter entering the refrigerant system. Equipment is not properly stored, protected, or inspected by the customer during the period from date of shipment to date of initial start-up.
6. Field coating of coil has occurred. Equipment is damaged due to acts of god, abuse, including shipping damage, neglect, sabotage, or acts of terrorists.
7. Equipment has modifications carried out that have an effect on the original design of the product without such work being authorized by the factory. Any on site design changes or unit modification/replacement shall be authorized in advance by the factory.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES, EXPRESS OR IMPLIED IN LAW OR IN FACT, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE WARRANTIES CONTAINED HEREIN SET FORTH BUYER'S SOLE AND EXCLUSIVE REMEDY IN THE EVENT OF A DEFECT IN WORKMANSHIP OR MATERIALS. IN NO EVENT SHALL JOHNSON CONTROLS' LIABILITY FOR DIRECT OR COMPENSATORY DAMAGES EXCEED THE PAYMENTS RECEIVED BY JOHNSON CONTROLS FROM BUYER FOR THE MATERIAL OR EQUIPMENT INVOLVED, NOR SHALL JOHNSON CONTROLS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. THESE LIMITATIONS ON LIABILITY AND DAMAGES SHALL APPLY UNDER ALL THEORIES OF LIABILITY OR CAUSES OF ACTION, INCLUDING BUT NOT LIMITED TO, CONTRACT, WARRANTY, TORT, (INCLUDING NEGLIGENCE) OR STRICT LIABILITY. THE ABOVE LIMITATIONS SHALL INURE TO THE BENEFIT OF JOHNSON CONTROLS SUPPLIERS AND SUBCONTRACTORS.