




## Submittal #237413-3.2 - Make up Air Units (MAU) 237413 - Commercial Packaged Rooftop Units

<b>Revision</b>	2	<b>Submittal Manager</b>	Michael Huntsman (Suffolk Construction Company, Inc.)
<b>Status</b>	Open	<b>Date Created</b>	Oct 9, 2024
		<b>Spec Section</b>	237413 - Commercial Packaged Rooftop Units
<b>Responsible Contractor</b>	Gutridge - Mechanical		
		<b>Submit By</b>	
<b>Final Due Date</b>	Oct 23, 2024	<b>Lead Time</b>	
		<b>Type</b>	Product Data
<b>Approvers</b>	Delaine Novak (Swanson Rink), Keeley Randell (Swanson Rink)		
<b>Ball in Court</b>	Delaine Novak (Swanson Rink), Keeley Randell (Swanson Rink)		
<b>Distribution</b>	Brandon Jones (Suffolk Construction Company, Inc.), Delaine Novak (Swanson Rink), Ethan VanDyke (Gutridge - Mechanical), Evan Vandyke (Gutridge - Mechanical), James Leadingham (AWS Infrastructure), Jordan Herring (Gutridge - Mechanical), Kevin Bourgo (Suffolk Construction Company, Inc.), Leon Roberts (Suffolk Construction Company, Inc.), Lisa Kore (Swanson Rink), Michael Huntsman (Suffolk Construction Company, Inc.), Michael James (Suffolk Construction Company, Inc.), Michael Steinemann (DLB Associates), Rodney Brockelman (Swanson Rink), Steve Sanford (Gutridge - Mechanical), Thana Taliep (Gensler)		
<b>Description</b>			
<b>Variation from Drawings/Specifications</b>		<b>Procurement Owner</b>	GC
<b>Responsible Discipline(s)</b>	Mechanical	<b>FBN Build ID(s)</b>	LCK062SHLP01.001
<b>Design Type</b>		<b>PAC FBN</b>	
<b>PAC Region(s)</b>		<b>Comments for Reviewers</b>	
<b>PAC Category(s)</b>		<b>PAC Submittals Only - Previous Status</b>	
<b>Additional Reporting Requirements for Embodied Carbon</b>	<ul style="list-style-type: none"><li>• <b>AMER</b> - For concrete, steel, deck, joists, rebar, roofing, drywall, refer to the <a href="#">Carbon Quantity &amp; EPD Reporting (AMER) SOP</a></li><li>• <b>EMEA/APJC</b> - For concrete, refer to the <a href="#">Carbon Quantity &amp; EPD Reporting (EMEA &amp; APAC) SOP</a></li></ul>		

**Submittal Workflow**

Name	Sent Date	Due Date	Returned Date	Response	Attachments
General Information Attachments					<a href="#">SHLP01-237413-03.2 Make up Air Units.pdf</a>
Delaine Novak	Oct 9, 2024	Oct 23, 2024		Pending	
Keeley Randell	Oct 9, 2024	Oct 23, 2024		Pending	



**SUBMITTAL/SHOP DRAWING REVIEW**

NO EXCEPTIONS TAKEN

REJECTED

NOT REVIEWED

ADDRESS COMMENTS NOTED

REVISE AND RESUBMIT

SEE SEPARATE DISCIPLINE REVIEW MATRIX


Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner. This submittal/shop drawing is in electronic format. As such, Swanson Rink is not liable for alterations to the content of this electronic document after it has been forwarded to other parties.

Reviewed By: **Thomas A. O'Rourke**

Date: **10/15/2024**

Reviewed By: **Shawn Plunkert**

Date: **10/09/24**



**SUBMITTAL/SHOP DRAWING DISCIPLINE REVIEW MATRIX**

	NXT	MCN	R&R	REJ	NR
MECHANICAL	✓				
PLUMBING/FIRE PROT.	✓				
ELECTRICAL	X				
LIGHTING					✓
FIRE ALARM					✓
TELECOM					✓
SECURITY					✓
AUDIO/VIDEO					✓
AVIATION					✓
CONTROLS					✓

NXT = NO EXCEPTIONS TAKEN  
 MCN = MAKE CORRECTIONS NOTED  
 R&R = REVISE AND RESUBMIT  
 REJ = REJECTED  
 NR = NOT REVIEWED

**Suffolk**  
65 Allerton St.  
Boston, MA 02119  
617-445-3500



THE REVIEW OF THIS SUBMITTAL BY SUFFOLK DOES NOT RELIEVE THE SUBCONTRACTOR OR SUPPLIER OF HIS RESPONSIBILITY FOR THE QUANTITY, OR ACCURACY OF THIS WORK HEREIN REPRESENTED, OR ANY DEVIATION FROM THE PLANS, SPECIFICATIONS, AND CONTRACT.

**Proj #**

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**REVIEWED**



**REVIEWED AS  
NOTED**



**REVISE &  
RESUBMIT**



**REJECTED**

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**BY**

**DATE**

**SUBM #**

**COMMENTS**



# Submittal Transmittal

88 S. Second Street  
Newark, OH 43055  
Phone: (740) 349-9411  
Fax: (740) 345-6020

**PROJECT NAME:** Suffolk - LCK062  
**PROJECT ADDRESS:** 2890 Beech Rd NW  
New Albany, OH 43031

**DATE:** 9/19/2024

**CONTRACT ID:** 24087

**MECHANICAL CONTRACTOR:**

KE Gutridge  
88 South 2<sup>ND</sup> Street  
Newark, Ohio 43055

**ENGINEER:**

Swanson Rink, Inc.  
1120 Lincoln Street #1200  
Denver, CO 80203

**GENERAL CONTRACTOR:**

Suffolk Construction Company  
65 Allerton Street  
Boston, MA 02119

**SPECIFICATION NAME & NUMBER:**

237413

**PRODUCT DESCRIPTION:**

Make Up Air Units (Rev 1):Product Data

**PRODUCT MANUFACTURER:**

Trane

**PRODUCT SUPPLIER:**

Trane Technologies

**RETURN BY:** 9/26/2024

I CERTIFY THAT GUTRIDGE HAS CHECKED THIS SUBMITTAL FOR CONFORMANCE WITH PLANS AND SPECIFICATIONS.

SIGNED: \_\_\_\_\_

**\*\*\* PLEASE DO NOT MARK ABOVE THIS AREA. SPACE BELOW PROVIDED FOR NOTES AND STAMPS \*\*\***



# National Account MAU Rev3 Submittal

**Prepared For:**  
All Bidders

**Date:** September 18, 2024

**Job Name:**  
Web Services LCK062 Bldg B Shell

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Trane U.S. Inc. is pleased to provide the following submittal for your review and approval.

## Product Summary

**Qty Product**  
2 MAU

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### Notes:

- *These units use R-454B compared to the R-410A scheduled*
- *Please mark curb slope on drawings if required*
- *Factory Installed Smoke Detectors are for unit shut down only. Not intended to provide fire and life safety*
- *Extra filters are NOT included*

### Revisions:

- ***Revision 1 (09/09/24):*** *Curb height noted to be 18" on drawings*
- ***Revision 2 (09/12/24):*** *Spec items added*
  - *Low leak dampers*
  - *65kA SCCR*
  - *GFCI*
  - *5 Year parts warranty*
- ***Revision 3 (09/18/24):*** *Changes made per comments on 9/17/24*
  - *Remove economizer*
  - *Change OA CFM amount; confirmed DP did not change*

**Jeffrey K Jenson/ DJG**  
Trane U.S. Inc.  
2333 158th Court NE  
Bellevue, WA 98008  
Office Phone: (425) 643-4310

The attached information describes the equipment we propose to furnish for this project and is submitted for your approval.

***Submittal acceptance and return is a critical step, so please ensure submittals are returned with approval to release to production within 14 days of submittal date.***

Product performance and submittal data is valid for a period of 6 months from the date of submittal generation. If six months or more has elapsed between submittal generation and equipment release, the product performance and submittal data will need to be verified. It is the customer's responsibility to obtain such verification.

**Tag Data - MAU (Qty: 2)**

Item	Tag(s)	Qty	Description	Model Number
E1	MAU-1 and MAU-2	2	8 Ton Packaged Make Up Air Unit	OABD096A4

**All Units**

- 8 Ton
- ✓ 460V/ 3phase/ 60Hz
- DX cooling/ SCR electric heat
- R-454B
- Direct drive supply fan with VFD
- Digital scroll compressor
- Modulating hot gas reheat
- Double wall insulation
- Hail guard
- Stainless steel drain pan
- Modulating OA/RA dampers - class 1A
- 2" MERV 8 filter/ 4" MERV 13 filters- 1 set
- ✓ 65kA Non fused disconnect, GFCI
- Supply air discharge sensor (Field Installed)
- 18" Roof **FLAT** curb (Field Installed)
- 5 Year parts and compressor warranty



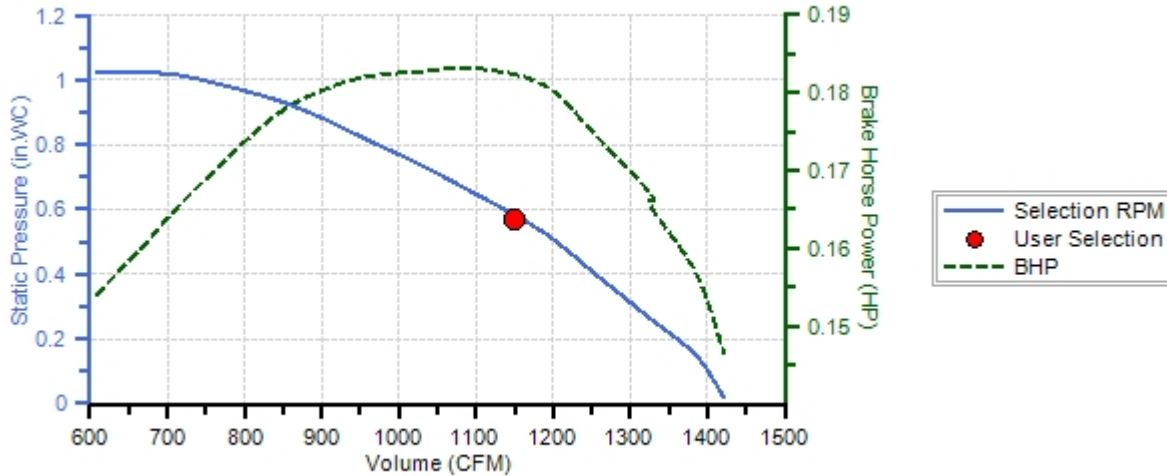
Project Name: Amazon Web Services LCK062 Bldg B Shell

Tag: MAU-1

		<div style="border: 1px solid green; padding: 2px; display: inline-block;">Scheduled weight is 1220 lbs. Structural to review.</div>		Comments: MAU-1, 2	
<b>Unit Information</b>					
Model:	<b>Horizon™ (OAB Rev5)</b>	Unit Length:	<b>119</b> in	Weight Operating:	<b>1468</b> lb*
Size:	<b>B084</b>	Unit Width:	<b>52</b> in	<i>Note: Weight does not include CURB weight. See CURB submittal for actual</i>	
Quantity:	<b>2</b>	Unit Height:	<b>55</b> in	<b>Refrigerant Charge - R-454B</b>	
Supply Airflow:	<b>1,150</b> CFM	Elevation:	<b>0</b> ft	Circuit 1:	<b>14.9</b> lbs
Outside Airflow:	<b>450</b> CFM	Ambient Air DB:	<b>99.3</b> F		
Minimum Airflow:	<b>786</b> CFM				
<b>Cooling Performance</b>					
Gross Total Capacity:	<b>69.9</b> MBh	<b>72.8</b>	Evaporator Face Area:	<b>6.37</b> sq ft	
Gross Sensible Capacity:	<b>42.2</b> MBh	<b>43.4</b>	Evaporator Rows / FPI:	<b>4 / 14</b>	
Net Total Capacity:	<b>69.4</b> MBh		Condenser Face Area:	<b>12.96</b> sq ft	
Net Sensible Capacity:	<b>41.7</b> MBh		Condenser Rows / FPI:	<b>3 / 12</b>	
Entering Air DB / WB (Coil):	<b>79.6 / 66.7</b> F		Air Velocity:	<b>180</b> fpm	
Leaving Air DB / WB (Coil):	<b>45.5 / 44.5</b> F	<b>42.7/42.4</b>	Coil Air PD:	<b>0.12</b> in H2O	
Leaving Air DB / WB (Reheat):	<b>82.5 / 60.2</b> F		EER:	<b>10.6</b>	
Leaving Air DB / WB (Unit):	<b>82.9 / 60.4</b> F		Watts:	<b>6523</b>	
Leaving DP:	<b>43.3</b> F		MRE:	<b>3.98</b> lb/kWh	
MRC:	<b>25.95</b> lb/h				
<b>Heating Performance</b>					
Heat Type:	<b>Electric Heat</b>				
Capacity:	<b>20</b> kW	Voltage-Ph-Hz:	<b>460-3-60</b>		
Entering Air DB:	<b>35.1</b> F	Coil Air PD:	<b>0.01</b> in H2O		
Leaving Air DB:	<b>90</b> F	<b>91.9</b>			

Scheduled values shown in green for reference.

**Supply Fan CF140.6**



**Supply Pressure Drop Summary**

**Supply Fan Conditions**

External Static Pressure:	<b>0.25</b> in H2O
Cooling Coil:	<b>0.12</b> in H2O
Filter:	<b>0.17</b> in H2O
Primary Heat:	<b>0.01</b> in H2O
HGRH:	<b>0.02</b> in H2O
<b>Total Static Pressure:</b>	<b>0.57</b> in H2O

Fan Motor BHP:	<b>0.18</b> BHP
Operating RPM:	<b>1250</b> RPM
Minimum RPM:	RPM

**Standard Radiated Sound Power Level (dBA)**

<u>63</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1000</u>	<u>2000</u>	<u>4000</u>	<u>8000</u>	<u>Total dBA</u>
50.4	75.1	84.6	87.3	86.5	83	76.5	68.5	91.9

Sound power levels are listed for informational purposes only and are not guaranteed.

Scheduled FLA is 26 A. Electrical to review.  
This is an acceptable discrepancy, and has been propagated. -TAO

**Unit Electrical Data**

Unit Voltage-Ph-Hz:	✓460-3-60	Min Circuit Ampacity - MCA:	34.6 Amps ✓
Unit Amps - FLA:	✓27.7 Amps	Maximum Fuse Size - MFS:	35.0 Amps ✓

**Electrical Summary**

Component	Fan Service	Qty	HP (ea.)	FLA (ea.)	RLA (ea.)	LRA (ea.)
<b>Digital Scroll</b>		1			10.9	75
	<b>Supply</b>	1	1	1.6		
	<b>Condenser</b>	1	1	2.1		
<b>Controls</b>		1		1		
<b>Electric Heat</b>		1		25.1		

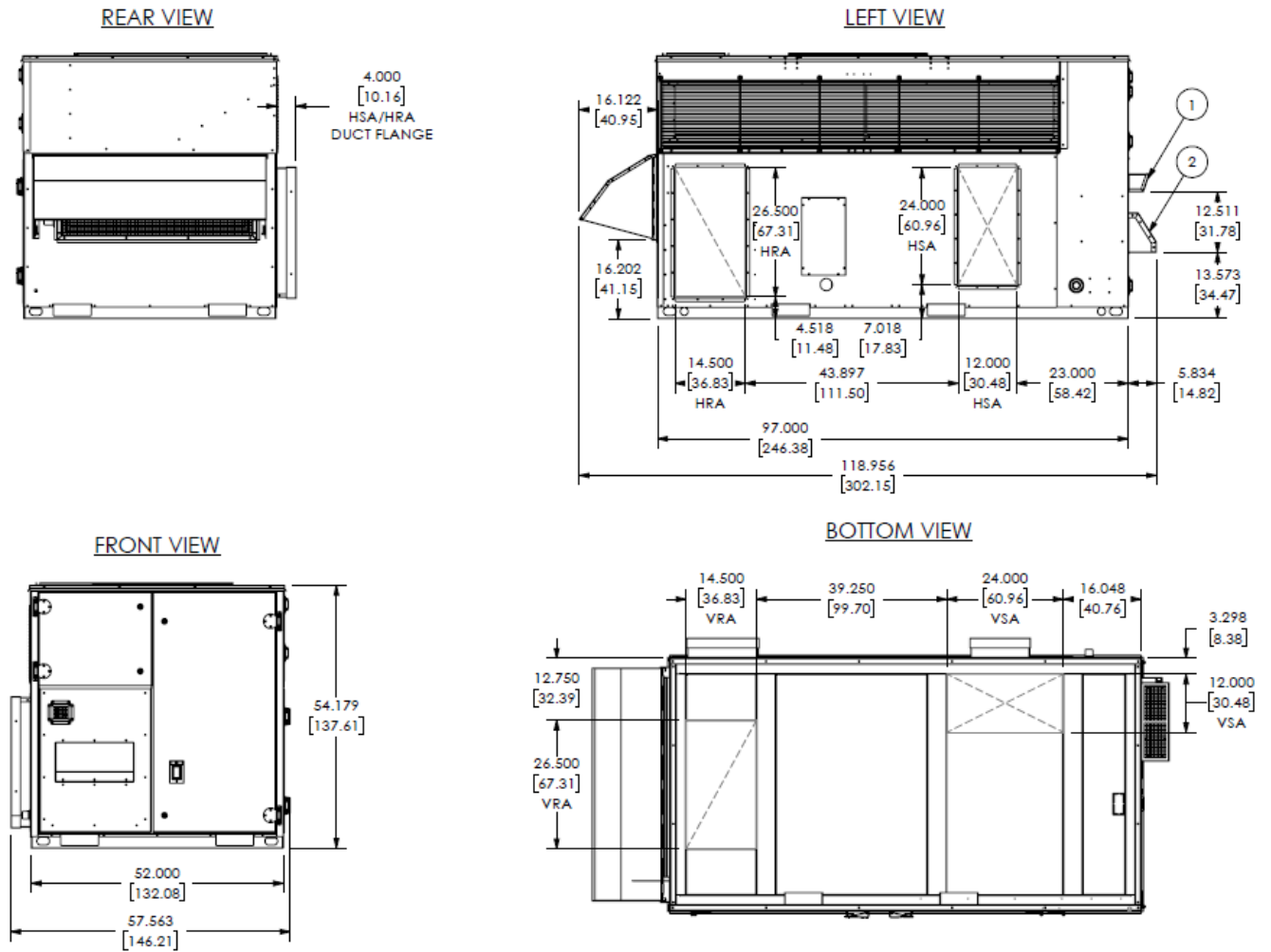
Scheduled MCA is 33 A. Electrical to review.  
This is an acceptable discrepancy, and has been propagated. -TAO

**Notes**

- Unit Electrical amps include the greater of compressor or electrical heat amps.
- Unit's electrical as shown above are for single point power.

Drawing Accurate for OAB DX and OAB ASHP

Qty: 2 Tag(s): MAU-1

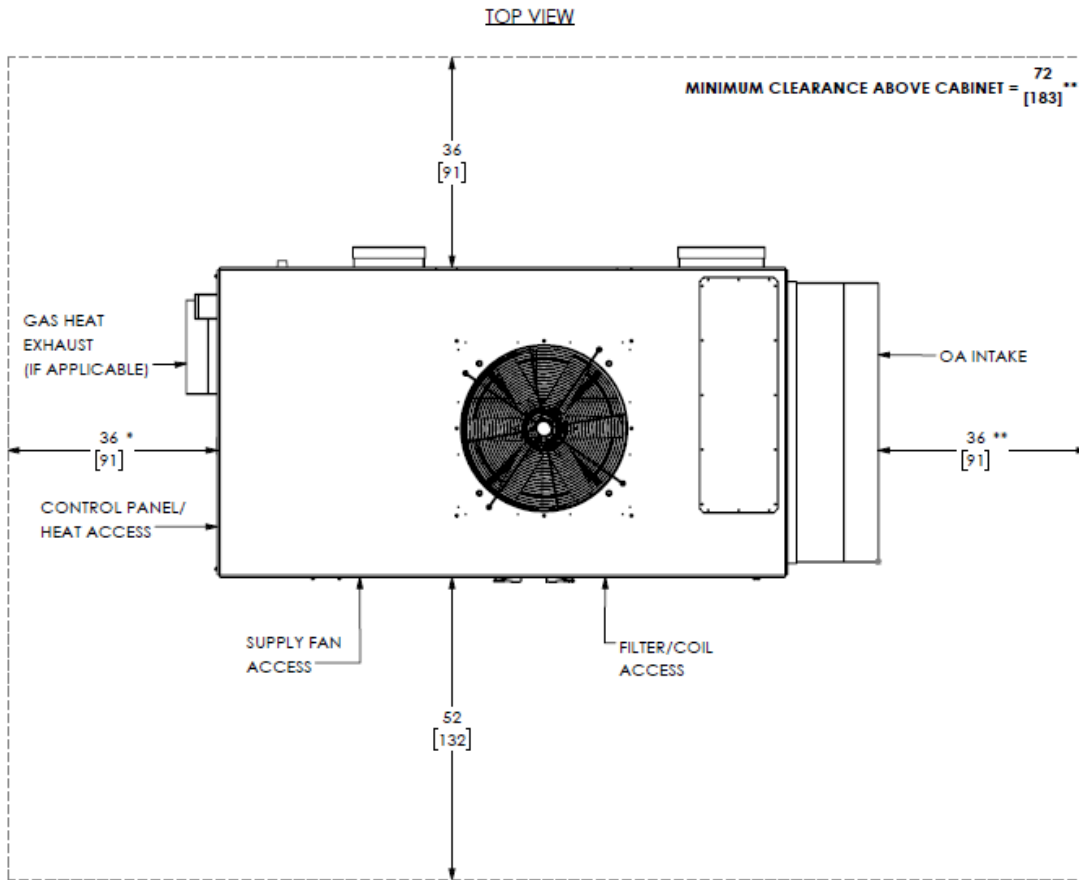


**GENERAL NOTES:**  
 IN.  
 A. DUAL DIMENSIONS: [CM.]  
 B. UNIT SHOWN REPRESENTS MULTIPLE AIRFLOW CONFIGURATIONS.

**CONFIGURATION SPECIFIC NOTES:**  
 1. FLUE HOOD: INCLUDED WITH GAS HEAT  
 2. COMBUSTION AIR INTAKE: INCLUDED WITH GAS HEAT

Drawing Accurate for OAB DX and OAB ASHP

Qty: 2 Tag(s): MAU-1



**GENERAL NOTES:**

I. DUAL DIMENSIONS:	IN.
	[CM.]

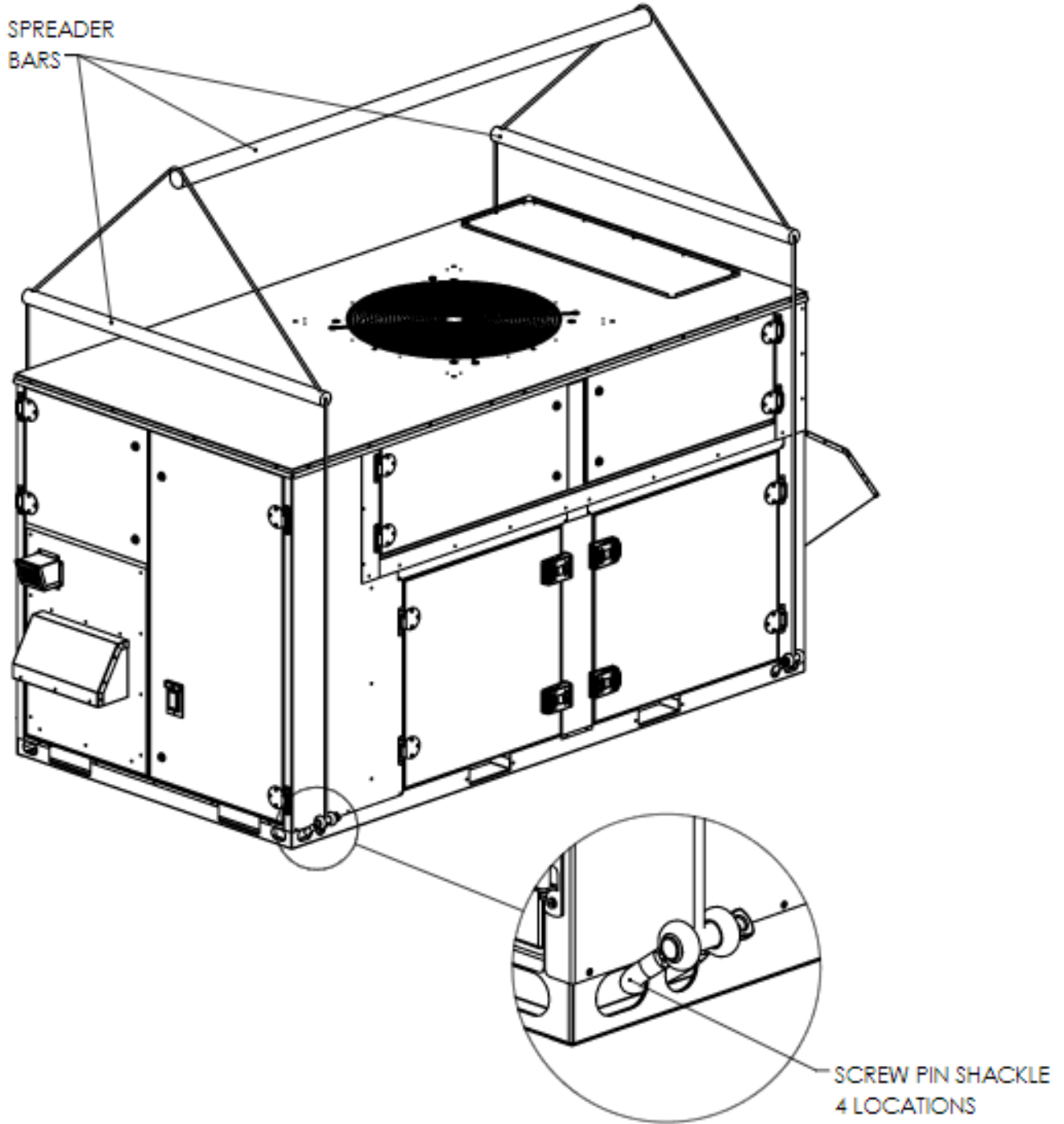
DIMENSIONS DISPLAYED ARE REQUIRED FOR BASIC UNIT SERVICEABILITY UNLESS OTHERWISE NOTED

\*MINIMUM REQUIRED CLEARANCE TO ENSURE UNIT PERFORMANCE FOR GAS HEAT OPTION  
\*\*MINIMUM REQUIRED CLEARANCE TO ENSURE UNIT PERFORMANCE

REFER TO LOCAL BUILDING CODES TO ENSURE INSTALLATION MEETS ALL NECESSARY REQUIREMENTS

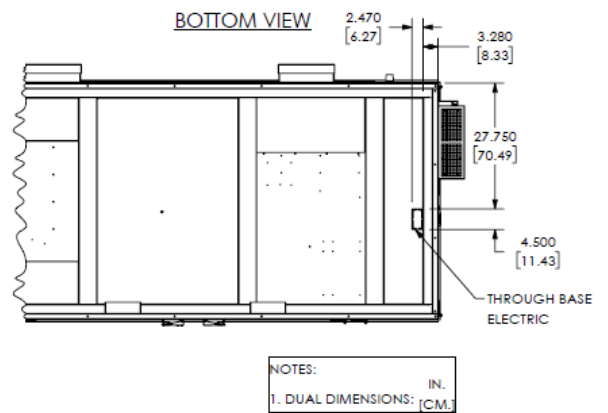
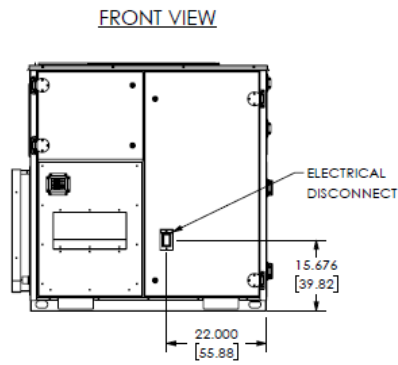
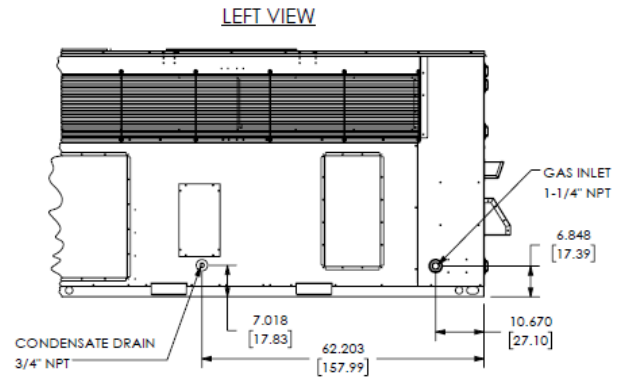
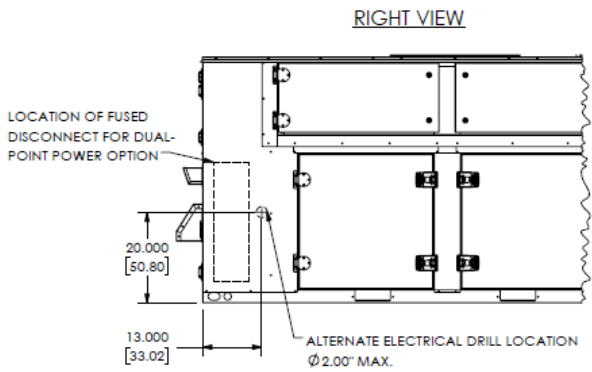
Drawing Accurate for OAB DX and OAB ASHP

Qty: 2 Tag(s): MAU-1



Drawing Accurate for OAB DX and OAB ASHP

Qty: 2 Tag(s): MAU-1



**Mechanical Specifications - Tag(s): MAU-1****General**

The unit shall be either field convertible (OAB) or configured at the factory between Down/Horizontal discharge for both Supply and Return Openings. Cooling performance shall be rated in accordance with ARI testing procedures. All units shall be factory assembled, internally wired, and 100 percent run tested to check cooling operation, fan and blower rotation, and control sequence before leaving the factory. Wiring internal to the unit shall be colored and numbered for simplified identification.

**Casing**

Unit casing shall be constructed of zinc coated, heavy gauge, galvanized steel. Exterior surfaces shall be cleaned, phosphatized, and finished with a weather-resistant baked enamel finish. Unit's surface shall be tested 672 hours in a salt spray test in compliance with ASTM B117. Unit shall have 2 inch thick Antimicrobial polyisocyanurate foam insulation, metal encapsulated with no exposed edges. Initial R value of 6.6 per inch of thickness. The unit's base pan shall have no penetrations within the perimeter of the curb other than the raised downflow supply/return openings to provide an added water integrity precaution, if the condensate drain backs up.

**Unit Top**

The top cover shall be one piece construction or, where seams exist, it shall be double-hemmed and gasket-sealed. The ribbed top adds extra strength and enhances water removal from unit top

**Sensors**

A factory installed combination outdoor air sensor located in the outdoor air hood is designed to sense both outdoor air temperature and relative humidity for use by the microprocessor controller to make required ventilation, cooling, dehumidification and heating decisions. Refer to the Sequence of Operations section of the Installation, Operation and Maintenance manual for detailed unit control and operational modes. A factory installed sensing tube is designed to sense the supply air temperature downstream of the indoor fan section.

**Evaporator Coil: DX 4 Row Interlaced**

Internally finned, 5/16 inch copper tubes mechanically bonded to a configured aluminum plate fin shall be standard. Coils shall be leak tested at the factory to ensure the pressure integrity. The evaporator coil shall be leak tested to 500 psig and pressure tested to 500 psig. A Stainless Steel double-sloped condensate drain pan with provision for through the unit wall condensate drain is standard. Evaporator coil will have 4 interlaced rows for superior sensible and latent cooling.

**Hot Gas Reheat: Modulating**

This option shall consist of a modulating hot-gas reheat coil located on the leaving air side of the evaporator coil pre-piped and circuited with a low pressure switch. Refer to the Sequence of Operations section of the Installation, Operation and Maintenance manual for detailed unit control and operational modes.

**Compressor: Digital Scroll Primary Circuit**

All units shall have direct-drive, hermetic, digital scroll type compressors with centrifugal type oil pumps. Motor shall be suction gas-cooled and shall have a voltage utilization range of plus or minus 10 percent of unit nameplate voltage. Internal overloads shall be provided with the scroll compressors. Crankcase heaters shall be included. Compressor shall be able to fully modulate from 20%-100%.

**Condenser: Air Cooled Variable Speed Head Pressure Low Ambient Control**

(Fin and Tube Coil) - Internally finned, 5/16 inch copper tubes mechanically bonded to a configured aluminum plate fin shall be standard. Coils shall be leak tested at the factory to ensure the pressure integrity. The condenser coil shall be leak tested to 500 psig and pressure tested to 500 psig. The condenser coil shall have a fin design with slight gaps for ease of cleaning.

Outdoor Fans: Shall be direct drive vertical discharge design with low-noise corrosion resistant glass reinforced polypropylene props, powder coated wire discharge guards and electro-plated motor mounting brackets. Fans shall be statically and dynamically balanced.

Condenser fans to be controlled via VFD to maintain adjustable pressure to increase reheat capacity where applicable and low ambient control.

**Capacity Control: R-454B - Low GWP Refrigerant & No RCC Valve**

All units shall be fully charged with R-454B. Units shall be ETL listed and labeled, classified in accordance to UL 60335-2-40/CSA C22.2 No. 60335-2-40 for Central Cooling Air Conditioners. Canadian units shall be CSA Certified.

### **Indoor Blower Motor: Direct Drive w/VFD**

Supply Fan motor shall be direct drive type with factory installed Variable Frequency Drive (unless no controls option is selected, VFD can be provided by others). All motors shall be thermally protected. All indoor fan motors meet the U.S. Energy Policy Act of 2005 (EPACT). All Fans shall be mounted on rubber vibration isolators, to reduce the transmission of noise.

### **460V Electric Heater: 20**

Primary heat is supplied using Electric Resistance heaters. Heaters shall meet the requirements of the National Electrical Code and shall be listed by Underwriters Laboratories for zero clearance to combustible surfaces and for use with heat pumps and air conditioning equipment. Heating elements shall be open coil, 80% nickel, 20% chromium, Type A resistance wire, Type C alloys containing iron or other alloys are not acceptable. Coils shall be machine crimped into stainless steel terminals extending at least 1" into the air stream and all terminal hardware shall be stainless steel. Coils shall be supported by ceramic bushings staked into supporting brackets. Brackets are not to be spaced more than 4-1/2" apart. Heater frames and terminal boxes shall be corrosion resistant steel. Unless otherwise indicated, the terminal box shall be NEMA 1 construction and shall be provided with a hinged, latching cover. Open coil heaters shall be furnished with an airflow switch, disconnecting contactors, fuses (if over 48 amps), control circuit transformer (with primary fusing on Class I circuits as required), built-in, snap acting, door interlock disconnect switch, and a disk type, automatic reset thermal cutout for primary overtemperature protection. Heaters shall also be furnished with disk type, load-carrying manual reset thermal cutouts, factory wired in series with heater stages for secondary protection. Heat limiters or other fusible overtemperature devices are not acceptable. For modulating heaters, control will be SCR type. For staged heaters, 5kW capacity will be 2 stage and all heaters above 5kW will be 4 stage. Unit shall be suitable for use with Electric Resistance Heat.

### **Unit Controls: Trane UC600 - Discharge Air Control w/BACNET w/Display**

Unit is completely factory wired with necessary controls and contactor pressure lugs for power wiring. Units will provide an external location for mounting fused disconnect device. PLC controls are provided for all 24 volt control functions. The resident control algorithms will make all heating, cooling and/or ventilating decisions in response to electronic signals from sensors measuring outdoor temperature and humidity. The control algorithm maintains accurate temperature control, minimizes drift from set point and provides better building comfort. A centralized PLC (UC600) will provide anti-short cycle timing for a higher level of machine protection. Terminals are provided for a field installed dry contact or switch closure to put the unit in the Occupied or Unoccupied modes.

### **Damper Options: 2-Position Outdoor and Return Air Dampers - Class 1A**

The unit shall have a factory installed and integrated 100% outdoor air hood with Class 1A rated damper controlled by direct coupled actuator and 2 inch permanent and washable aluminum mesh filters accessible through a hinged access panel. The unit is factory equipped with a return air damper controlled by a direct coupled actuator that is electrically interlocked with the outdoor air damper to allow 100% return air recirculation in the Unoccupied cooling mode.

### **Filters: MERV-8 & MERV-13**

Aluminum Mesh Filters (K and N Cabinets) and Galvanized Mesh Bird Screen (B and G Cabinets) shall be installed on the intake of the unit. In addition, one row of 2 inch MERV-8 rated prefilters (30 percent) and 2 inch MERV-13 final filter (80 percent) installed prior to the evaporator coil. Unit shall be equipped with a 6" filter rack upstream of the evaporator. Frame shall be field-adjustable to match any filter combination specified in the attached selection.

### **Electrical Options: 65 KAIC Non-Fused w/ Convenience Outlet**

A 3-pole, molded case, HACR, 65 KAIC circuit breaker with provisions for through the base electrical connections shall be factory installed. Wiring will be provided from the circuit breaker to the unit high voltage terminal block. The switch will be UL/CSA agency recognized. The circuit breaker will be sized per NEC and UL guidelines.

Factory wired Voltage/Phase monitor shall be included as standard. In the event of any of the following, the units will be shut down and upon correction of the fault condition the unit will reset and restart automatically.

1. Phase Unbalance Protection: Factory set 2%
2. Over/Under/Brown Out Voltage Protection: +/-10% of nameplate voltage
3. Phase Loss/Reversal

### **Air Flow Monitoring: IFM Fan Piezo Ring/Tap**

Air flow measurement will be accomplished through the use of Piezo Ring or Tap technology installed in the supply fan wheel area.

**Accessories: Condenser Hailguard**

Hailguards shall be installed on the outside of the condenser coil. The guards shall consist of perforated metal, of the same gauge and color as the unit itself. Airflow through the hail guards shall not be restricted due to location or size of the perforations. Guards shall be removable to accommodate coil cleaning.