SUBMITTAL

4701 MIKE COLALILLO DRIVE | DULUTH, MN 55807 | PHONE 218.628.1027 | FAX 218.628.1174

Project: DTA HVAC Upgardes

Date: September 19,2022

Location: 2402 West Michigan Street

Prepared by: Jim Mathews

Engineer: LHB Steward Crain

Submittal No.: 1

Spec Section: 23 HVAC

Project Manager: Jim Mathews

Tagging: ERV-1 , RH-1, AHU-2, RTU-2 and CU-1

Approval Stamps:

THE JAMAR COMPANY

PROJECT_____

SECTION NO._____

APPROVED ☐

APPROVED AS NOTED ☐

REVISE AND RESUBMIT ☐

DATE_____

BY_____

LHB SUBMITTAL REVIEW

☑ Reviewed (Note any Comments)	☐ Rejected (Submit Specified Item)
☐ Resubmit (Make Corrections)	☐ Returned (No Review Required)

This review is only for general conformance with the design concept and the information in the Construction Documents. Comments do not relieve the contractor from compliance with the requirements of the plans and specifications. The Contractor is responsible for dimensions, fabrication, means, methods, sequences and procedures of construction including coordination of the Work.

By: SDC Date: 10/03/2022

ERV-1 REQUIRES EXHAUST BYPASS. SHOWN ON DRAWING BUT NOT CALLED OUT AS AN OPTION ON THE MODEL BREAKDOWN. VERIFY PROVIDED.

AHU-1 & RTU-2 APPEAR TO BE EQUIVALENT TO EXISTING SYSTEM. RTU-1 SHALL BE CONTROLLED TO ACCOMMODATE EXISTING VAV SYSTEM.

If above space is filled, please stamp on reverse side.

Submittal approval dates are the basis for determining manufacturing lead times. Manufacturing will not begin and shipping dates will not be issued until we receive approved, stamped submittal drawings. Performance, openings and dimensions may vary from contract documents. Return of approved drawings constitutes acceptance of these variances.

SUBMITTAL DATA

ENERGY RECOVERY UNIT

(1) Renewaire HE1.5XINV ERV with: **Tag: ERV-1**

- Static plate, heat and humidity transfer
- Non fused disconnect
- Enthalpic bypass
- MERV-8 filters (2 sets)
- Single wall construction and standard galvanized cabinet
- Direct drive EC fan motors and motorized dampers
- Terminal strip; for controls by others

Date:	9/12/2022
Project Number:	O-099220
Project Name:	Duluth Transit Authority
Unit Tag:	ERV-1
Model:	HE1.5JINV-S11EE--6GNT---L
Qty:	1

HE1.5XINH shown

Specifications

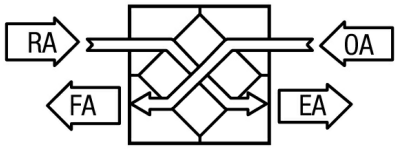
Ventilation Type:	Static plate, heat and humidity transfer
Typical Airflow Range:	375-1,575 CFM
AHRI 1060 Certified Core:	One L62-G5, One L125-G5
OA Filters:	Total Qty. 2, MERV 8: 14" x 20" x 2" and 16" x 20" x 2"
RA Filters:	Total Qty. 2, MERV 8: 14" x 20" x 2" and 16" x 20" x 2"
Unit Weight:	337-504 lbs. (varies by option)

Configuration

Unit Tag	ERV-1
Model	[HE1.5] HE1.5
Core Type	[J] G5
Installation Location	[IN] Indoor Unit
Airflow Orientation	[V] Orientation V
Wall	[S] Single (Standard)
Electrical Service	[11] 120V / 1 Phase / 60 HZ
Fresh Air Motor	[E] ECM - Direct Drive Motorized Impeller
Exhaust Air Motor	[E] ECM - Direct Drive Motorized Impeller
Flow Control	[6] Enthalpic, Motorized Dampers All Airstreams
Unit Control	[G] Terminal Strip For EC Motors
Disconnect	[N] Non Fused (Standard)
Control Option	[T] Transformer with Isolation Relay (Standard)
Filter Monitor	[-] None
Paint	[-] None
Safety Listing	[L] Listed

Airflow Orientation

REQUIRES EXHAUST BYPASS



Unit Accessories and Service Parts

Type	Part Number	Description	Quantity
Service Part	990080	RPART FILTER MERV 8 14X20X2	4
Service Part	990229	RPART FILTER MERV 8 16X20X2	2

Unit ships with MERV-8 filters, all other accessory filters are shipped loose for field installation post startup.

AHRI CERTIFIED®
www.ahridirectory.org
Air-to-Air ERV
AHRI Standard 1060
Energy Recovery COMPONENT is certified. Actual performance in packaged equipment may vary.

	SUMMER			WINTER		
	Outdoor Air	**Return Air**	**Fresh Air**	**Outdoor Air**	**Return Air**	**Fresh Air**
Standard Flow Rate **SCFM**	711*	660	700	711*	660	700
Actual Flow Rate **ACFM**	779*	710	757	619*	694	704
Dry Bulb **°F**	87.0	77.0	79.6	-22.0	68.0	44.8
Wet Bulb **°F**	70.0	67.0	67.8	-22.0	46.9	33.8
Enthalpy (H) **BTU/lb**	34.8	32.3	33.0	-5.0	18.9	12.7
Moisture Ratio (MR) **grains/lb**	88.6	88.4	88.5	1.7	16.7	12.8
Fresh Air - External Static Pressure **in w.g.**		0.38			0.38	
Exhaust Air - External Static Pressure **in w.g.**		0.75			0.75	
Sensible effectiveness **%**		78.7			78.7	
Total effectiveness **%**		78.4			78.6	
Load savings ratio **%**		73.9			74.1	
Moisture removed **grains/lb**		0.1			-11.1	
	Sen	**Lat**	**Tot**	**Sen**	**Lat**	**Tot**
Original load **BTUH [Tons]**	7560 [0.6]	284 [0.0]	7844 [0.7]	68044	7364	75408
Load with RenewAire **BTUH [Tons]**	1952 [0.2]	95 [0.0]	2046 [0.2]	17564	1952	19517
Total energy saved **BTUH [Tons]**	5609 [0.5]	189 [0.0]	5798 [0.5]	50480	5412	55891

*Note: OA Flow Rate values are gross airflow, all others are net airflow.
Note: For full certified ERV performance, please see AHRI 1060 Report.
Note: Sensible cooling design conditions were used for the summer performance results.

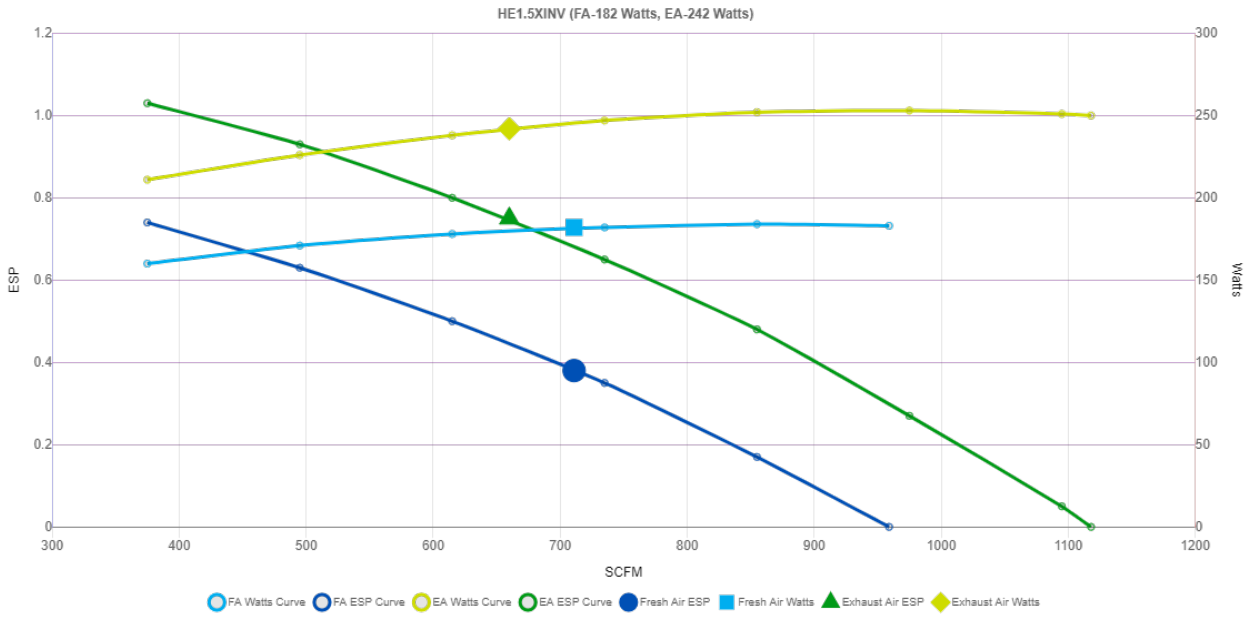
Fans

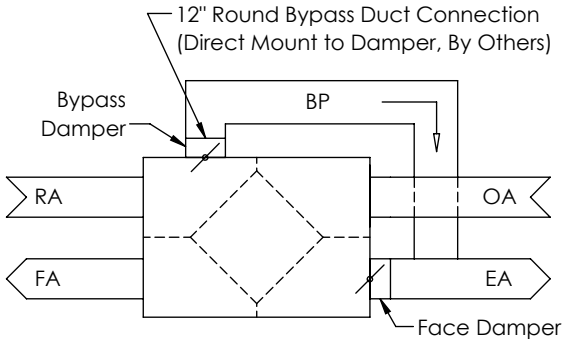
	Gross CFM	**ESP**	**Filters**	**Fan Signal (VDC)**	**Watts**	**Elevation**	**Motors Protected by Motor Starters**		**Motors Protected by VFDs**	
							Qty @ HP	**FLA**	**Qty @ HP**	**FLA**
OA	711	0.38	2" MERV-8	4.6	182	1417	2@1.0	8	None	-
RA	660	0.75	2" MERV-8	6	242					

Unit Electrical Data

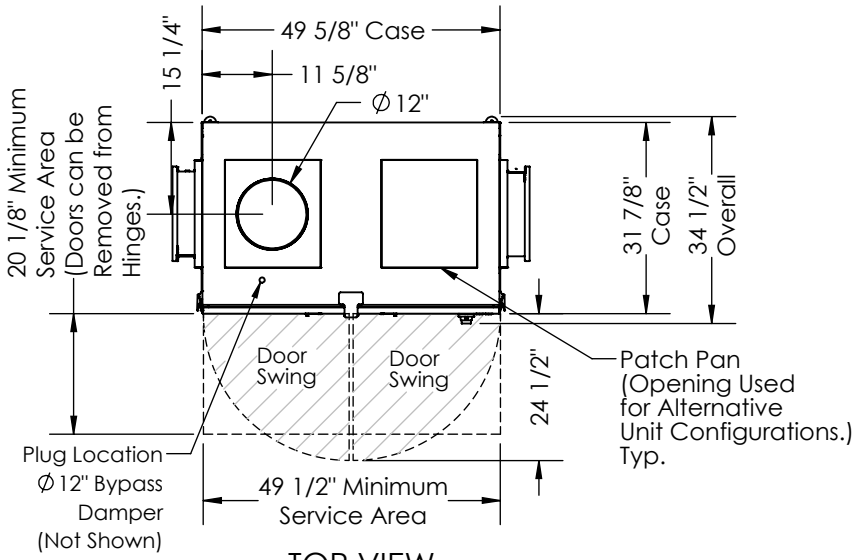
Volts	**Hertz**	**Phase**	**MCA**	**MOP**
120	60	1	18	20

Fan Curve





BYPASS AIRFLOW SCHEMATIC
FRONT VIEW



TOP VIEW

ABBREVIATIONS
EA: Exhaust Air to outside
OA: Outside Air intake
RA: Room Air to be exhausted
FA: Fresh Air to inside
BP: Bypass Air outlet

INSTALLATION ORIENTATION
Unit may be installed in any orientation.

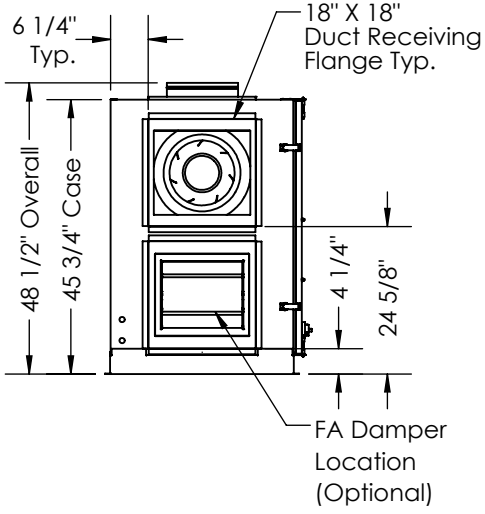
NOTE
1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE ROUNDED TO THE NEAREST EIGHTH OF AN INCH.

2. SPECIFICATIONS MAY BE SUBJECT TO CHANGE WITHOUT NOTICE.

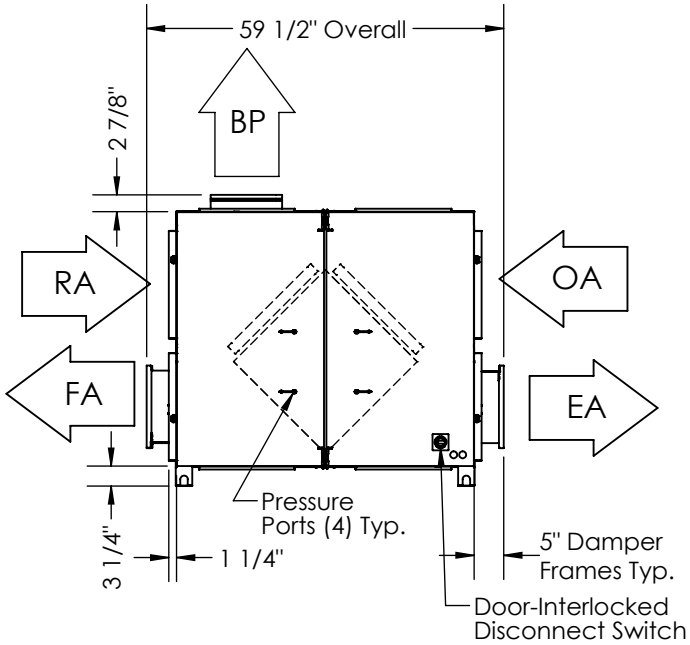
3. MIN. DUCT CLEARANCE FROM DAMPER BLADE WHEN FULLY OPENED TO BE 2". SMACNA RULES APPLY.

4. UNITS WITH BYPASS WILL REQUIRE ADDITIONAL SPACE FOR THE CONNECTION OF THE BYPASS DUCT (BY OTHERS).

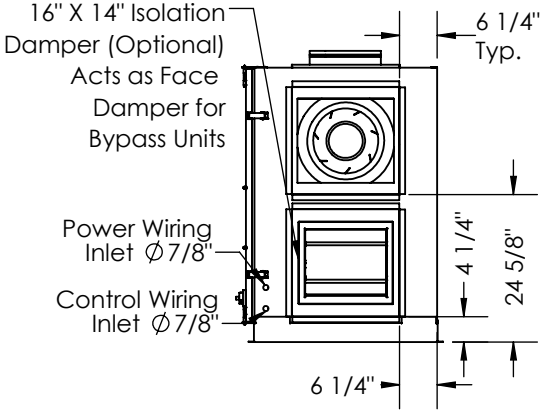
5. FOR INSTALLATION DETAILS, REFER TO I&O MANUAL SUPPLEMENT FOR BYPASS.



LEFT VIEW



FRONT VIEW



RIGHT VIEW

Model: HE1.5XINV [Bypass]
Drawing Type: Unit Dimension
Version: MAY18

RenewAire®
Energy Recovery Ventilation

SUBMITTAL DATA

ROOF HOOD

(1) Cook PR Relief Roof Hood with: **Tag: RH-1**

- Birdscreen, and roof curb adapter

Clarifications:

- **Contractor to field verify existing curb dimensions**

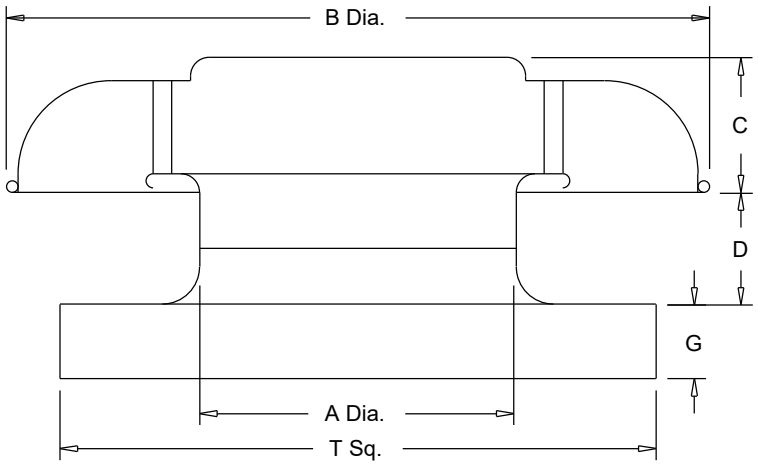
COOK

MARK: RH-1
PROJECT: DULUTH TRANSIT AUTHORITY
DATE: 9/7/2022

PR

Spun Aluminum Intake/Relief Ventilator

STANDARD CONSTRUCTION FEATURES:
All aluminum construction - Anti-backdraft flange - Five year warranty.



Performance

Qty	Catalog Number	Flow (CFM)	SP (inwc)
1	16 PR	778	.050

Altitude (ft): 837 Temperature (F): 70

Accessories:
ALUM BIRDSCREEN
CURB CAP ADPTR(T-SQ) - 30" *sizing to be verified*

Dimensions (inches)

A Dia.	16-1/2
B Dia.	27-3/4
C	5-1/16
D	5-1/2
G	2
T Sq.	28
Roof Open.	23-1/2

NOTE: Accessories may affect dimensions shown.

Weight(lbs)* **	**Shipping**	26	**Unit**	20

***Includes accessories.

SUBMITTAL DATA

ROOFTOP AND CONDENSING UNITS

(1) Aaon RQ-04 Packaged Rooftop Unit with: **Tag: AHU-2**

- 2" R-13 double wall construction with foam insulation and hinged access doors
- 460/60/3 voltage with non-fused disconnect, 5kA SCCR rating, 115v outlet (fld powered)
- Low Leak OSA and RA damper with modulating actuators
- Two-Step scroll compressor in **heat pump configuration**
- Air source heat pump with no auxiliary heat
- ECM Fan cycling for refrigeration control
- Terminal Strip provided for DDC controls by others
- 2" MERV 8 pre-filters
- Direct drive backward curved plenum supply fan with EC motor
- 1-year parts, 5 year compressor parts

Clarifications:

- **Temperature Controls and angle iron stand provided by others**

(1) Aaon RN 30-ton Packaged Rooftop Unit with: **Tag: RTU-1**

- 2" R-13 double wall construction with foam insulation and hinged access doors
- 460/60/3 voltage with non-fused disconnect and 5kA SCCR rating
- Enthalpy economizer + power exhaust
  - Backward curved plenum exhaust fan with factory mounted VFD
- Non-compressorized unit R-410A evaporator coil
- Hot Water Coil
- Terminal Strip provided for DDC controls by others
- 2" MERV 8 pre-filters
- Direct drive backward curved plenum supply fan with factory mounted VFD
- 115V convenience outlet (field powered by others)
- Curb adapter
- 1 year parts warranty

Clarifications:

- **Temperature controls by others**
- **Curb adapter to include field measurement**

(1) Aaon CFA-030 Air Cooled Condensing Unit (paired with RTU-1) with: **Tag: CU-1**

- 460/3 electrical, 5kA SCCR Rating, non-fused disconnect, and 115V GFI (factory wired)
- Modulating digital scroll compressor and one on/off scroll compressor
- Condenser Coil guards and 5-year compressor parts warranty
- ECM Condenser fan cycling for head pressure control

Clarifications:

- **MCA rating matches currently installed unit**
- **Temperature controls by others, mounting pads not provided**
- **Refrigerant piping and specialties to be provided by the Piping Contractor**

AHU-2

Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.326 (SN: 7661808-JQJ5U0ZF)

1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
R	Q	-	0	0	4	-	3	-	V	-	G	6	0	2	-	0	0	0	:	A	0	0	0	-	E	0	A	-	P	J	C

0	0	0	-	C	0	D	A	0	0	4	-	0	0	-	0	0	0	0	0	0	0	B

Tag: AHU-2

Job Information

Job Name:	*DTA Transit Authority*
Job Number:	*LHB*
Site Altitude:	*0 ft*
Refrigerant	*R-410A*

Unit Information

Approx. Op./Ship Weights:	*830 / 830 lbs. (±5%)*
Supply CFM/ESP:	*1605 / 1 in. wg.*
Final Filter FV / Qty:	*288.90 fpm / 2*
Outside CFM:	*700*
Ambient Temperature:	*80 ºF DB / 70 ºF WB*
Return Temperature:	*77 ºF DB / 67 ºF WB*

Static Pressure

External:	*1.00 in. wg.*
Evaporator:	*0.26 in. wg.*
Filters Clean:	*0.11 in. wg.*
Dirt Allowance	*0 in. wg.*

Economizer:	*0.03 in. wg.*
Heating:	*0.00 in. wg.*
Cabinet:	*0.03 in. wg.*
Total:	*1.43 in. wg.*

Cooling Section

	Gross	Net
Total Capacity:	*56.04*	*54.01 MBH*
Sensible Capacity:	*35.62*	*33.58 MBH*
Latent Capacity:	*20.42 MBH*	
Mixed Air Temp:	*77.90 ºF DB*	*67.92 ºF WB*
Entering Air Temp:	*78.31 ºF DB*	*68.33 ºF WB*
Lv Air Temp (Coil):	*57.41 ºF DB*	*57.06 ºF WB*
Lv Air Temp (Unit)	*58.56 ºF DB*	*57.51 ºF WB*

Reduced Compressor Capacity:

Total CFM:	*1400*	
Outside Air CFM:	*420*	
Cooling Coil CFM:	*1400*	
Total Capacity:	*41.34*	*39.99 MBH*
Sensible Capacity:	*28.45*	*27.10 MBH*
Latent Capacity:	*12.89 MBH*	
Entering Air Temp:	*77.90 ºF DB*	*67.92 ºF WB*
Lv Air Temp (Coil):	*58.78 ºF DB*	*58.37 ºF WB*
Lv Air Temp (Unit)	*59.66 ºF DB*	*58.70 ºF WB*

Supply Air Fan:	*1 x RQ185-ECM @ 0.68 BHP*
SA Fan RPM / Width:	*1333 / 3.000"*
Evaporator Coil:	*5.3 ft² / 4 Rows / 14 FPI*
Evaporator Face Velocity:	*305.7 fpm*

Heating Section(**)

Primary Heat Type:	*Heat Pump*
Total Capacity:	*43.8 MBH*
Integrated Heat Capacity:	*43.8 MBH*
OA Temp:	*44.9 DB / 33.7ºF WB*
RA Temp:	*68.0 ºF DB / 46.9 ºF WB*
Entering Air Temp:	*57.9 DB / 41.5 ºF WB*
Leaving Air Temp:	*82.6 DB / 52.9ºF WB*
Auxiliary Heat Type:	*No Heat*
Heating CFM:	*1605*
Fan Temp Rise:	*1.2 ºF*

Rating Information

Application EER @ Op. Conditions: *15.2*

Application COP $_H$ @ Op. Conditions: *3.98*

Electrical Data

Rating:	*460/3/60*	Minimum Circuit Amp:	*13*
Unit FLA:	*12*	Maximum Overcurrent:	*15*
SCCR:	*5 KAIC*		

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		460	3			6.4
Condenser Fans:	1	0.333	460	1	1110	1.6	
Supply Fan:	1	1.00	460	1	1750	3.5	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW(dB):	79	79	80	73	68	66	62	56
Return LW(dB):	75	75	70	61	60	58	52	44

**Sound power levels are given for informational purposes only. The sound levels are not guaranteed.*

(**)Fan motor temperature rise is not included in the heat capacity and temps.

Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.326 (SN: 7661808-JQJ5U0ZF)

1A	1B	1C	1D		2	3	4		5A	5B	5C		6A	6B	6C		7	8	9	10	11	12	13		14A	14B		15	16	17	18	19	20	21	22	23
R	Q	-	0	0	4	-	3	-	V	-	G	6	0	2	-	0	0	0	:	A	0	0	0	-	E	0	A	-	P	J	C	-	0	0	0	-	C	0	D	A	0	0	4	-	0	0	-	0	0	0	0	0	0	0	B

Tag: AHU-2

Job Information

Job Name:	DTA Transit Authority	Job Number:	LHB
OA CFM:	700	SA CFM:	1605

Performance Data Table

Outside Air		Mixed Air		Leaving Air		Heat Pump Capacity	Heat Pump Integrated Capacity	Heating COP
DB ºF	WB ºF	DB ºF	WB ºF	DB ºF	WB ºF	MBH	MBH	
62.0	56.2	65.4	51.2	98.9	64.0	58.6	58.6	4.63
57.0	51.6	63.2	49.0	94.2	61.4	54.4	54.4	4.48
52.0	47.1	61.0	47.0	90.2	59.1	51.4	51.4	4.38
47.0	42.6	58.8	45.1	85.8	56.8	47.7	47.7	4.22
42.0	38.0	56.7	43.2	81.7	54.4	44.4	44.4	4.07
37.0	33.5	54.5	41.4	74.4	50.8	41.3	35.5	3.40
32.0	28.8	52.3	39.6	71.0	48.7	38.3	33.4	3.31
27.0	24.3	50.1	37.9	*	*	*	*	*
22.0	19.7	47.9	36.2	*	*	*	*	*
17.0	15.0	45.8	34.6	*	*	*	*	*
12.0	10.4	43.6	33.0	*	*	*	*	*
7.0	5.7	41.4	31.5	*	*	*	*	*
2.0	0.1	39.2	29.8	*	*	*	*	*

*Invalid operating point - Compressor operating outside of operating envelope.

Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.326 (SN: 7661808-JQJ5U0ZF)

1A	1B	1C	1D		2	3	4		5A	5B	5C		6A	6B	6C		7	8	9	10	11	12	13		14A	14B		15	16	17	18	19	20	21	22	23
R	Q	0	0	4	-	3	-	V	-	G	6	0	2	-	0	0	0	:	A	0	0	-	E	0	A	-	P	J	C	-	0	0	0	-	C	0	D	A	0	0	4	-	0	0	-	0	0	0	0	0	0	0	B

Tag: AHU-2

Job Name: *DTA Transit Authority*
Job Number: *LHB*
Unit Submittal For:
Unit Submittal Date: *September 12, 2022*

	Base Option	Description
R	Series	Roof Top Unit
Q	Generation	Tenth Generation
004	Unit Size	Four
3	Voltage	460V/3Ø/60Hz
V	Interior Protection	Vertical Discharge and Return
G	Refrigerant Style	R-410A Two-Step Compressor - High Efficiency
6	Unit Configuration	Air-Source Heat Pump
0	Coil Coating	Standard
2	Cooling/Heat Pump Staging	2 Stage Heat Pump + No Auxiliary Heat
0	Heating Type	No Heating
0	Heating Designation	No Heating
0	Heating Staging	No Heating

	Feature Option	Description
A	**1A.** RA/OA Section	Economizer
0	**1B.** RA/EA Blower Configuration	Standard - None
0	**1C.** RA/EA Blower	Standard - None
0	**1D.** RA/EA Blower Motor	Standard - None
E	**2.** OA Control	DDC Actuator
0	**3.** Heat Options	Standard
A	**4.** Maintenance Options	115V Convenience Outlet - Field Wired
P	**5A.** SA Blower Configuration	1 Blower + High Efficiency EC Motor
J	**5B.** SA Blower	19" Direct Drive Backward Curved Plenum
C	**5C.** SA Motor	1 HP 1750 rpm
0	**6A.** Pre Filter Type	Standard - None
0	**6B.** Unit Filter Type	2" Pleated - MERV 8
0	**6C.** Filter Options	Standard
C	**7.** Refrigeration Control	Adjustable Fan Cycling
0	**8.** Refrigeration Options	Standard
D	**9.** Refrigeration Accessories	ECM Condenser Fan - Multiple Speed
A	**10.** Power Options	Non-fused Disconnect Power Switch - 100 Amps
0	**11.** Safety Options	Standard
0	**12.** Controls	Standard
4	**13.** Special Controls	Field Installed DDC Controls by Others
0	**14A.** Outside Air Configuration	Standard - None
0	**14B.** Preheat Sizing	Standard - None
0	**15.** Glycol Percent	Water or No WSHP
0	**16.** Interior Cabinet Options	Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan
0	**17.** Exterior Cabinet Options	Standard
0	**18.** Electrical Rating	Standard - 5 KAIC
0	**19.** Code Options	Standard - ETL U.S.A. Listing
0	**20.** Crating	Standard
0	**21.** Water-Cooled Cond.	Standard - None
0	**22.** Control Vendors	Standard
B	**23.** Type	Standard - Includes AAON Gray Paint

Control Terminals

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.326 (SN: 7661808-JQJ5U0ZF)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RQ-004-3-V-G602-000:A000-E0A-PJC-000-C0DA004-00-00000000B

Tag: AHU-2

Job Name: ***DTA Transit Authority*** **For:**

Job Number: ***LHB*** **Date:** ***September 12, 2022***

Terminals Available/Required for Controlling the Unit

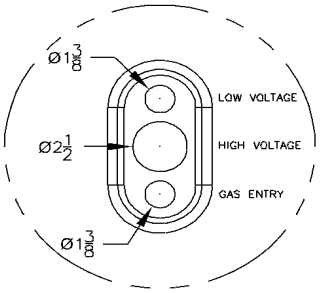
Terminal	Description
[R]	24VAC Control Voltage
[E]	Common
[G]	Supply Fan Enable
[Y1]	Cooling Stage 1 Enable
[Y2]	Cooling Stage 2 Enable
[Y1]	Cooling Stage 1 Enable/ Heat Pump - Heating Stage 1 Enable
[Y2]	Cooling Stage 2 Enable/ Heat Pump - Heating Stage 2 Enable
[O]	Reversing Valve (Cooling) Enable
[EC1-] & [EC2+]	Economizer Signal (2-10VDC)
[S1-] & [S2+]	Supply Fan ECM Motor Signal (0-10VDC)

RQ CABINET
ECONOMIZER VERTICAL ~ 1–6 TON

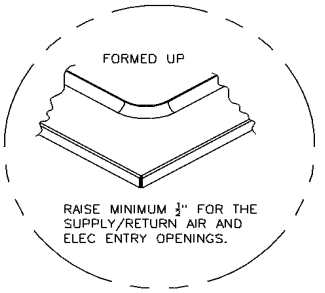
CLEARANCES

LOCATION	• UNIT SIZE • 1 - 6 TON
OUTSIDE AIR (BACK)	36*
HXC (FRONT)	36
LEFT SIDE	24
RIGHT SIDE	48
TOP	UNOBSTRUCTED

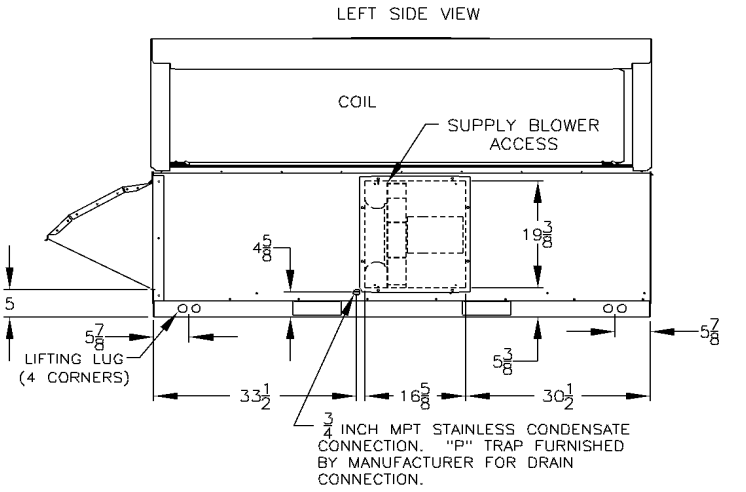
*CLEARANCE IS MEASURED FROM THE END OF THE OUTSIDE AIR RAIN HOOD

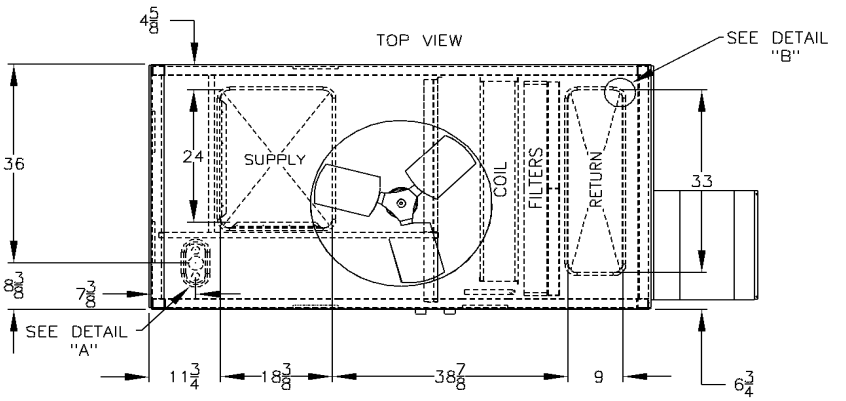


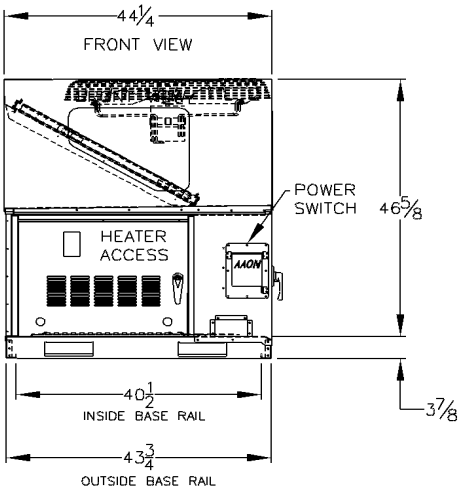
DETAIL A

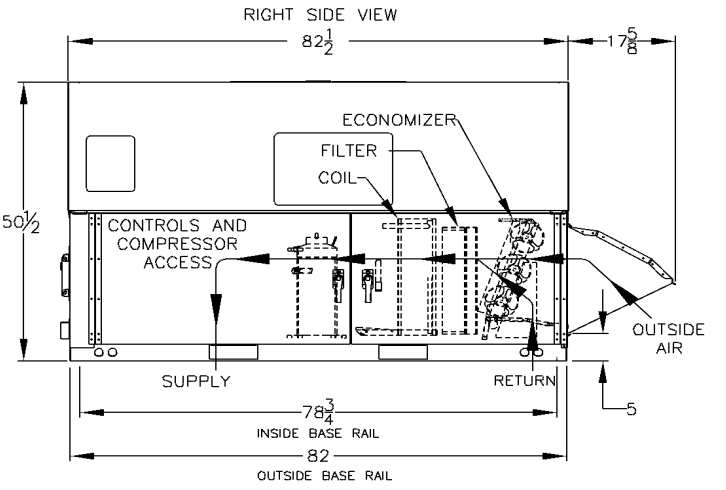


DETAIL B





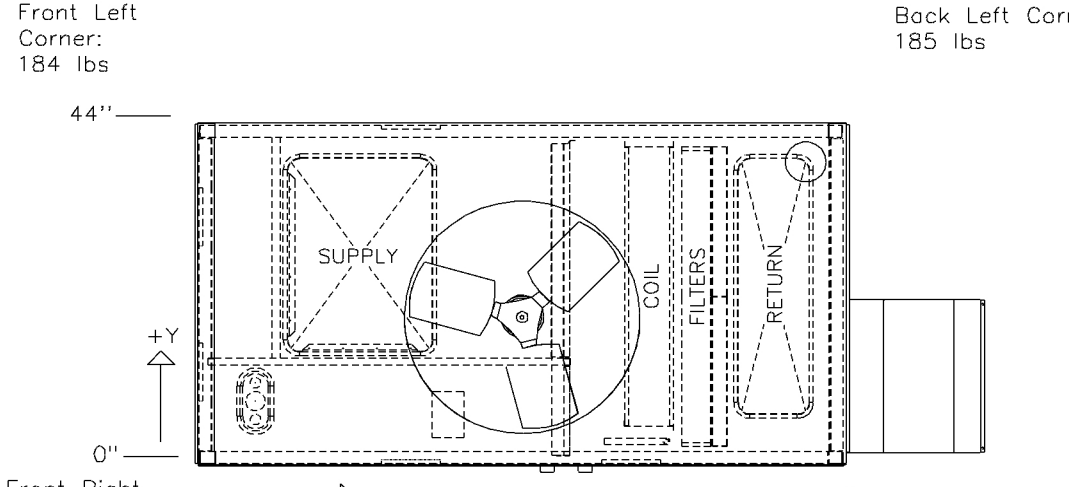




RQ–00007 REV:E 04/12/16 AAS
NOTE: ALL DIMENSIONS ARE IN INCHES

RQ CABINET
VERTICAL AIR COOLED CONDENSING UNIT

RQ-004-3-V-G602-000:A000-E0A-PJC-000-C0DA004-00-00000000B



Disclaimer:
This weight estimate does not account for any SPAs.

RTU-1

Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.326 (SN: 7661808-JQJ5U0ZF)

1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
R	N	-	0	3	0	-	3	-	0	-	B	4	0	2	-	E	J	K	:	B	E	D	G	-	E	0	A	-	D	E

L	-	0	0	0	-	0	0	0	A	0	0	4	-	0	0	-	0	0	0	0	0	0	0	B

Tag: RTU# 1

Job Information

Job Name:	*DTA Transit Authority*
Job Number:	*LHB*
Site Altitude:	*0 ft*
Refrigerant	*R-410A*

Unit Information

Approx. Op./Ship Weights:	*2174 / 2174 lbs. (±5%)*
Supply CFM/ESP:	*10600 / 1.5 in. wg.*
Final Filter FV / Qty:	*508.80 fpm / 6*
Exhaust CFM/ESP/TSP:	*9000 / 0.10 / 0.97 in. wg.*
Outside CFM:	*2000*
Ambient Temperature:	*95 ºF DB / 75 ºF WB*
Return Temperature:	*75 ºF DB / 62 ºF WB*

Static Pressure

External:	*1.50 in. wg.*
Coil:	*0.89 in. wg.*
Filters Clean:	*0.27 in. wg.*
Dirt Allowance	*0 in. wg.*
Economizer:	*0.23 in. wg.*
Heating:	*1.05 in. wg.*
Cabinet:	*0.18 in. wg.*
Total:	*4.11 in. wg.*

Cooling Section

	Gross	Net
Total Capacity:	*455.14*	*422.99 MBH*
Sensible Capacity:	*329.29*	*297.14 MBH*
Latent Capacity:	*125.85 MBH*	
Mixed Air Temp:	*82.55 ºF DB*	*67.34 ºF WB*
Entering Air Temp:	*82.55 ºF DB*	*67.34 ºF WB*
Lv Air Temp (Coil):	*53.05 ºF DB*	*52.47 ºF WB*
Lv Air Temp (Unit)	*55.84 ºF DB*	*53.64 ºF WB*
Supply Air Fan:	*1 x 270 @ 11.75 BHP*	
SA Fan RPM / Width:	*1534 / 6.130"*	
Exhaust Air Fan:	*1 x RM220A @ 7.09 BHP*	
EA Fan RPM / Width:	*1822 / 4.930"*	
DX Coil:	*19.9 ft² / 6 Rows / 12 FPI*	
DX Face Velocity:	*533.7 fpm*	

Heating Section

PreHeat Type:	*Std (No Preheat)*
Heating Type:	*Hot Water Heat*
Heating CFM:	*10500*
Total Capacity:	*309.3 MBH*
OA Temp:	*-15.0 ºF DB / -15.0 ºF WB*
RA Temp:	*75.0 ºF DB / 62.0 ºF WB*
Entering Air Temp:	*40.7 ºF DB / 40.7 ºF WB*
Leaving Air Temp:	*66.5 ºF DB / 52.6 ºF WB*
Entering Glycol:	*180.0 ºF*
Leaving Glycol:	*150.9 ºF*
GPM / Head:	*22.7 / 0.6 ft*
Glycol % / Velocity:	*35 / 1.27 fps*
FA / RD / FPI / FV:	*7.28 ft² / 2 / 10 / 1443.3*

DX Coil:

Suction Temp:	*45 ºF*

Electrical Data

Rating:	*460/3/60*			Minimum Circuit Amp:	*37*		
Unit FLA:	*32*			Maximum Overcurrent:	*50*		
SCCR:	*5 KAIC*						

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Supply Fan:	1	15.00	460	3	1760	21.0	
Exhaust Fan:	1	7.50	460	3	1760	11.0	

Cabinet Sound Power Levels*

Octave Bands:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Discharge LW(dB):	95	93	96	97	93	90	87	84
Return LW(dB):	95	93	92	87	83	82	79	72

**Sound power levels are given for informational purposes only. The sound levels are not guaranteed.*

Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.326 (SN: 7661808-JQJ5U0ZF)

1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
R	N	0	3	0	B	4	0	2	E	J	K	:	B	E	D	G	-	E	0	A	-	D	E	L	-	0	0	0	-	0	0	0	A	0	0	4	-	0	0	-	0	0	0	0	0	0	0	B

Tag: RTU# 1

Job Name: *DTA Transit Authority*
Job Number: *LHB*
Unit Submittal For:
Unit Submittal Date: *September 12, 2022*

	Base Option	Description
R	Series	Roof Top Unit
N	Generation	Ninth Generation
030	Unit Size	Thirty
3	Voltage	460V/3Ø/60Hz
0	Interior Protection	Standard
B	Refrigerant Style	R-410A - High Efficiency
4	Unit Configuration	Non-Compressorized + 6 Row Evap. Coil
0	Coil Coating	Standard
2	Cooling/Heat Pump Staging	2 Stage
E	Heating Type	Hot Water Standard Coil
J	Heating Designation	2 Row Coil
K	Heating Staging	Single Serpentine-10 FPI

	Feature Option	Description
B	**1A.** RA/OA Section	Economizer + Power Exhaust
E	**1B.** RA/EA Blower Configuration	1 Blower + Premium Efficiency Motor + 1 VFD
D	**1C.** RA/EA Blower	22" Backward Curved Plenum
G	**1D.** RA/EA Blower Motor	7.5 hp - 1760 rpm
E	**2.** OA Control	DDC Actuator
0	**3.** Heat Options	Standard
A	**4.** Maintenance Options	115V Convenience Outlet - Field Wired
D	**5A.** SA Blower Configuration	1 Blower + Premium Efficiency Motor + 1 VFD
E	**5B.** SA Blower	27" Direct Drive Backward Curved Plenum
L	**5C.** SA Motor	15 hp - 1760 rpm
0	**6A.** Pre Filter Type	Standard - None
0	**6B.** Unit Filter Type	2" Pleated - 30% Eff
0	**6C.** Filter Options	Standard
0	**7.** Refrigeration Control	Standard - Fixed 55°F Comp. Cooling Lock Out
0	**8.** Refrigeration Options	Standard
0	**9.** Refrigeration Accessories	Standard
A	**10.** Power Options	Non-fused Disconnect Power Switch - 100 Amps
0	**11.** Safety Options	Standard
0	**12.** Controls	Standard
4	**13.** Special Controls	Field Installed DDC Controls by Others
0	**14A.** Outside Air Configuration	Standard - None
0	**14B.** Preheat Sizing	Standard - None
0	**15.** Glycol Percent	Water or No WSHP
0	**16.** Interior Cabinet Options	Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan
0	**17.** Exterior Cabinet Options	Standard
0	**18.** Electrical Rating	Standard - 5 KAIC
0	**19.** Code Options	Standard - ETL U.S.A. Listing
0	**20.** Crating	Standard
0	**21.** Water-Cooled Cond.	Standard - None
0	**22.** Control Vendors	Standard
B	**23.** Type	Standard - Includes AAON Gray Paint

Control Terminals

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.326 (SN: 7661808-JQJ5U0ZF)

1A 1B 1C 1D 2 3 4 5A 5B 5C 6A 6B 6C 7 8 9 10 11 12 13 14A 14B 15 16 17 18 19 20 21 22 23

RN-030-3-0-B402-EJK:BEDG-E0A-DEL-000-000A004-00-00000000B

Tag: RTU# 1

Job Name:	***DTA Transit Authority***	**For:**	
Job Number:	***LHB***	**Date:**	***September 12, 2022***

Terminals Available/Required for Controlling the Unit

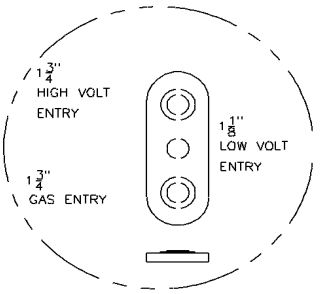
Terminal	Description
[R]	24VAC Control Voltage
[E]	Common
[G]	Supply Fan Enable
[PE]	Power Exhaust Enable
[B1-] & [B2+]	Exhaust Fan 1 - w/1 VFD: Signal (0-10VDC)
	VFD frequency reference signal control point must handle a rated 20k ohm input impedance.
[EC1-] & [EC2+]	Economizer Signal (2-10VDC)
[S1-] & [S2+]	Supply Fan 1 - w/ 1 VFD: Signal (0-10VDC)
	VFD frequency reference signal control point must handle a rated 20k ohm input impedance.
[AFS1] & [AFS2]	Air Flow Switch

Terminations Found On VFD(s)	
Exhaust Fan VFD(s)	V1000: std 7.5-20HP VFD
[P1] & [PC]	Run Status (5-48VDC, 2-50mA)
[AM] & [AC]	Current Feedback (0-10VDC = 0-100%)
[MA] & [MC]	Fault Status (NC, 250VAC/30VDC, 1A)
Supply Fan VFD(s)	V1000: std 7.5-20HP VFD
[P1] & [PC]	Run Status (5-48VDC, 2-50mA)
[AM] & [AC]	Current Feedback (0-10VDC = 0-100%)
[MA] & [MC]	Fault Status (NC, 250VAC/30VDC, 1A)

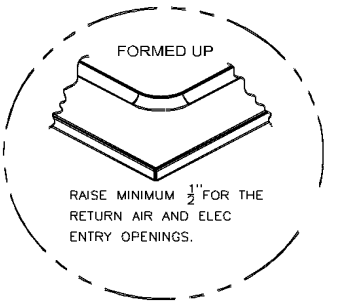
RN SERIES
C - CABINET DX AIR HANDLER OR NO COOLING
WITH ECONOMIZER AND POWER EXHAUST ~ 16 - 30 TON

CLEARANCES

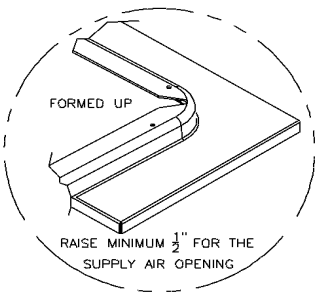
LOCATION	• UNIT SIZE • 16 - 30 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE (FRONT)	48
LEFT SIDE	6
RIGHT SIDE	60
TOP	UNOBSTRUCTED



DETAIL A

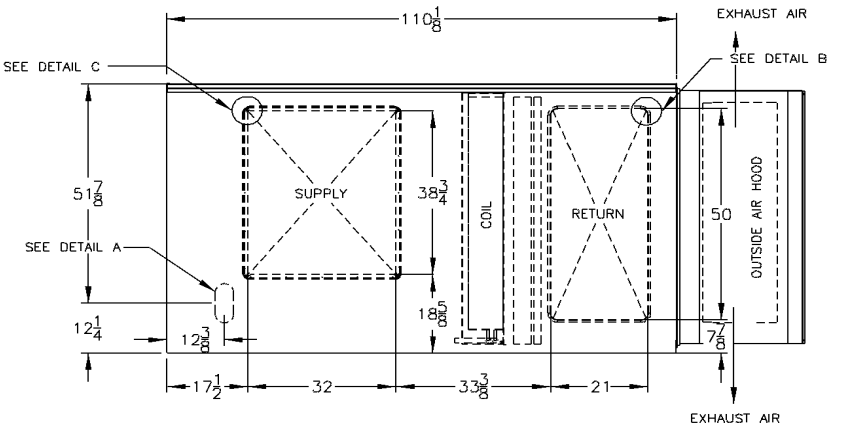


DETAIL B

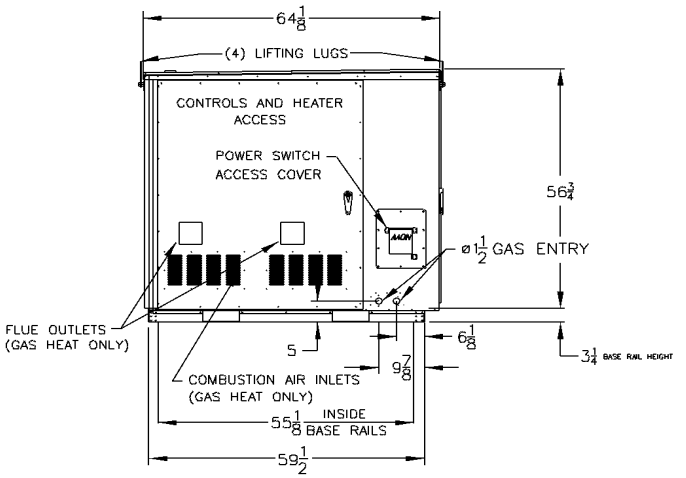


DETAIL C

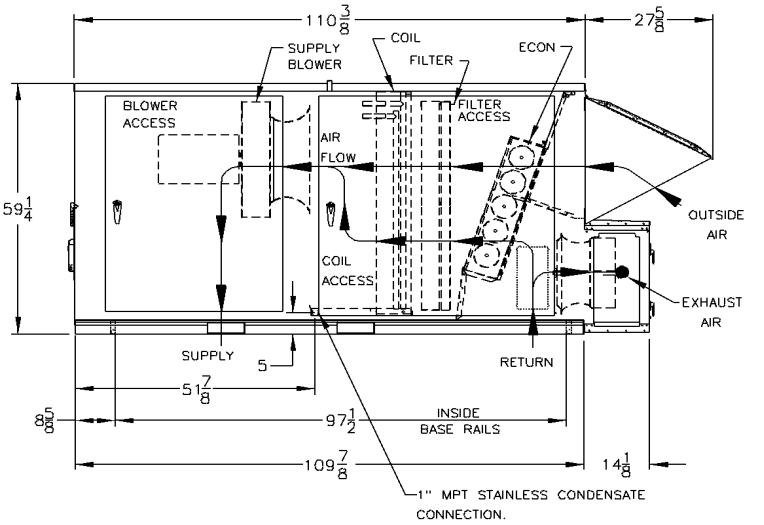
TOP VIEW



FRONT VIEW



RIGHT SIDE VIEW

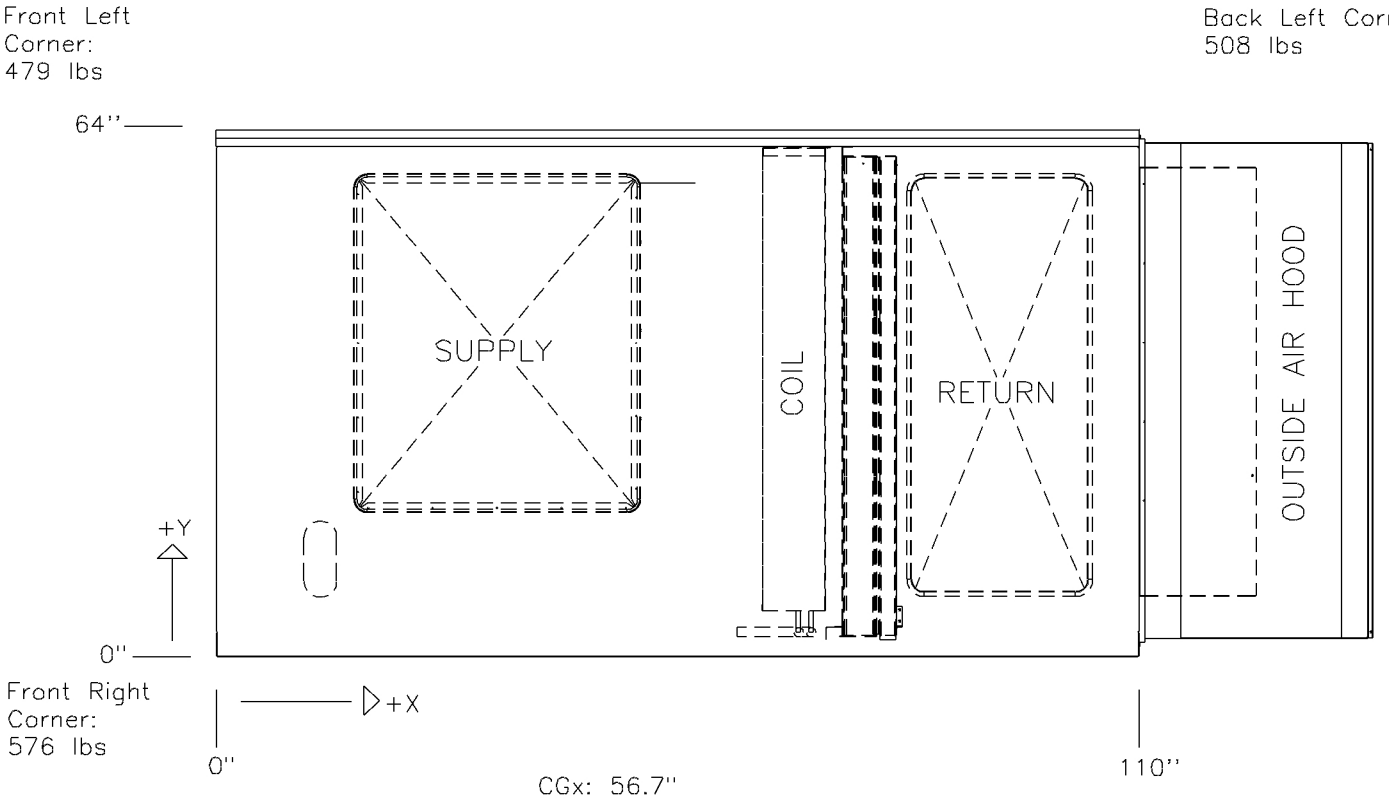


RNC-00043 REV:D 08/22/14 MLW

NOTE: ALL DIMENSIONS ARE IN INCHES

RNC CABINET
NO COOLING WITH POWER EXHAUST

RN-030-3-0-B402-EJK:BEDG-E0A-DEL-000-000A004-00-00000000B

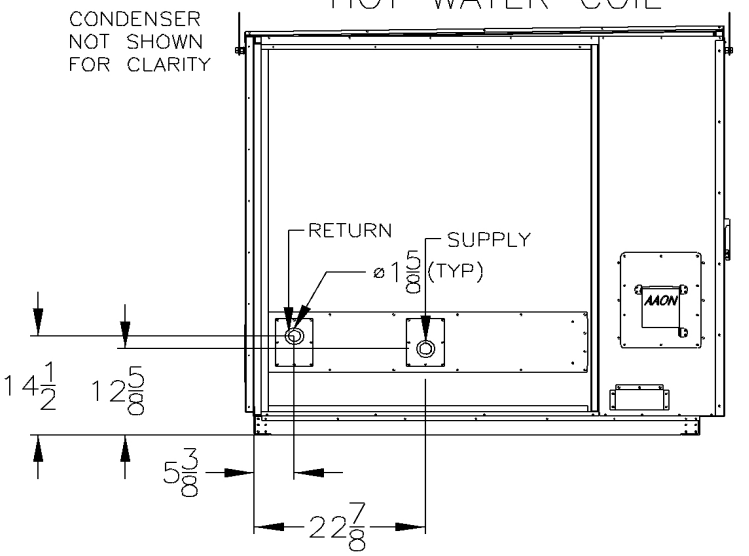


Disclaimer:
This weight estimate does not account for any SPAs.

RN SERIES C–CABINET
HXC STEAM AND HOT WATER COIL PIPING CONNECTIONS AND LOCATIONS 16–30 TON DX–AH, NO COOLING AND AIR COOLED

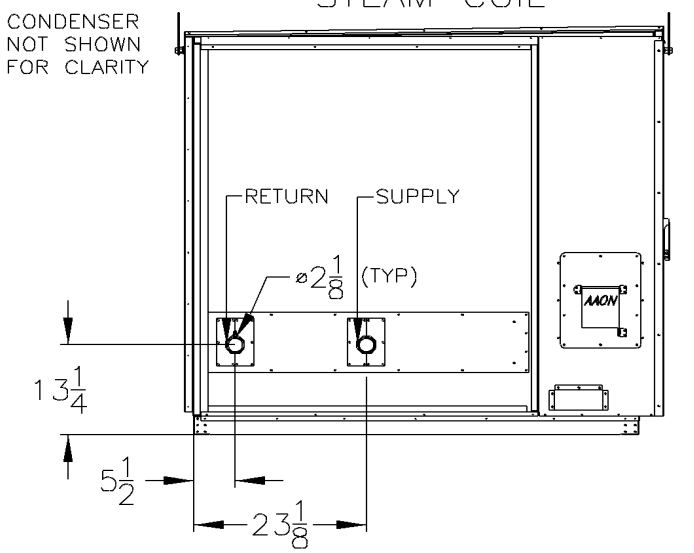
FRONT VIEW

HOT WATER COIL

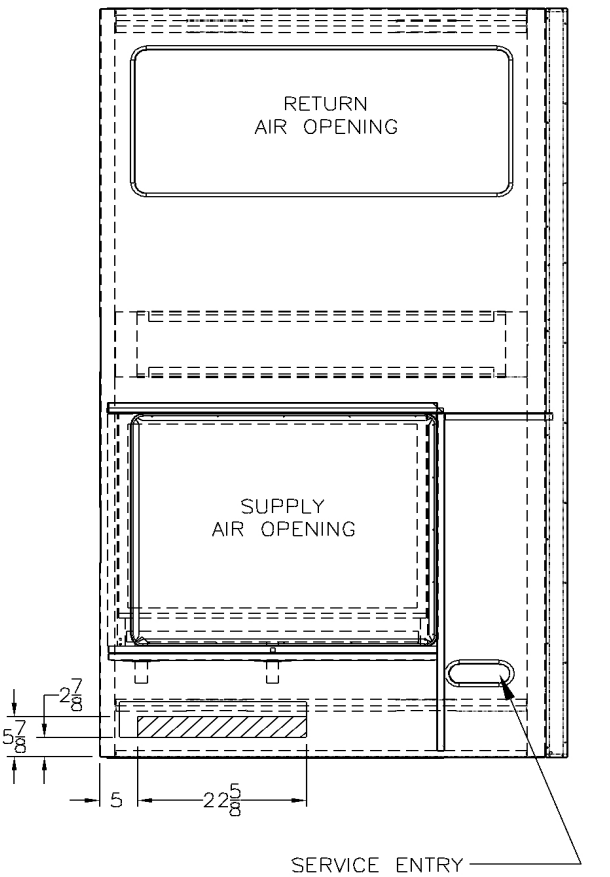


FRONT VIEW

STEAM COIL



TOP VIEW



COIL PIPING CAN BE BROUGHT UP THROUGH SERVICE ENTRY OR THE BASE OF THE UNIT.

COIL PIPING THROUGH THE BASE MUST GO THROUGH THE RAISED COVER IN THE AREA MARKED ON THIS DRAWING.

PIPE PENETRATIONS THROUGH THE COVER MUST BE SEALED.

RNC–00049 REV:D 04/23/12 JRL

NOTE: ALL DIMENSIONS ARE IN INCHES

CU-1

Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.326 (SN: 7661808-JQJ5U0ZF)

A1	A2	A3	A4	A5	1	2A	2B	3A	3B	4	5	6A	6B	6C	7	8A	8B	8C	8D	9	10	11	12	13	14	15	16	17	18	19	20	21	22
C	F	A	-	0	3	0	-	C	-	A	-	3	-	D	A	0	0	K	:	0	-	A	0	-	0	0	-	0	0	-	A	N	0	-	D	-	N	0	0	0	-	0	0	A	0	G	0	0	-	0	0	0	0	0	D	B

Tag: CU# 1

Job Information

Job Name:	*DTA Transit Authority*
Job Number:	*LHB*
Site Altitude:	*0 ft*
Refrigerant:	*R-410A*

Unit Information

Approx. Op./Ship Weights:	*1516 / 1516 lbs. (±5%)*
Suction Temperature:	*45.00 ºF*
Ambient Temperature:	*95 ºF DB / 75 ºF WB*

Cooling Section

Capacity (MBH)

Suction Temp	Total Unit	Circuit 1	Circuit 2
Design (45º)	323.1	161.5	161.5
35º	273.5	136.8	136.8
40º	297.7	148.9	148.9
45º	323.1	161.5	161.5
50º	349.6	174.7	174.9

EER - ARI Listing Information

No ARI Rating Program Exists for Units Over 250 MBH
All AAON Units Are Tested in Accordance With ARI Standards

EER @ AHRI Conditions: *N/A*
Application EER @ Op. Conditions: *11.2*

Electrical Data

Rating:	*460/3/60*	Minimum Circuit Amp:	*66*
Unit FLA:	*61*	Maximum Overcurrent:	*80*

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		460	3			23.1
Compressor 2:	1		460	3			23.1
Condenser Fans:	2	1.00	460	1	1140	3.6	
Condenser Fans:	2	1.00	460	1	1140	3.6	
Control Circuit:	1		120	1			

Connection Sizes

System	Suction Line	Liquid Line
1	1.38"	0.63"
2	1.38"	0.63"

Refrigeration Accessories

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.326 (SN: 7661808-JQJ5U0ZF)

CFA-030-C-A-3-DA00K:0-A0-00-00-AN0-D-N000-00A0G00-00000DB

Condensing Unit Tag:

Job Information

Job Name:	DTA Transit Authority	Job Number:	LHB

Factory Supplied / Factory Installed

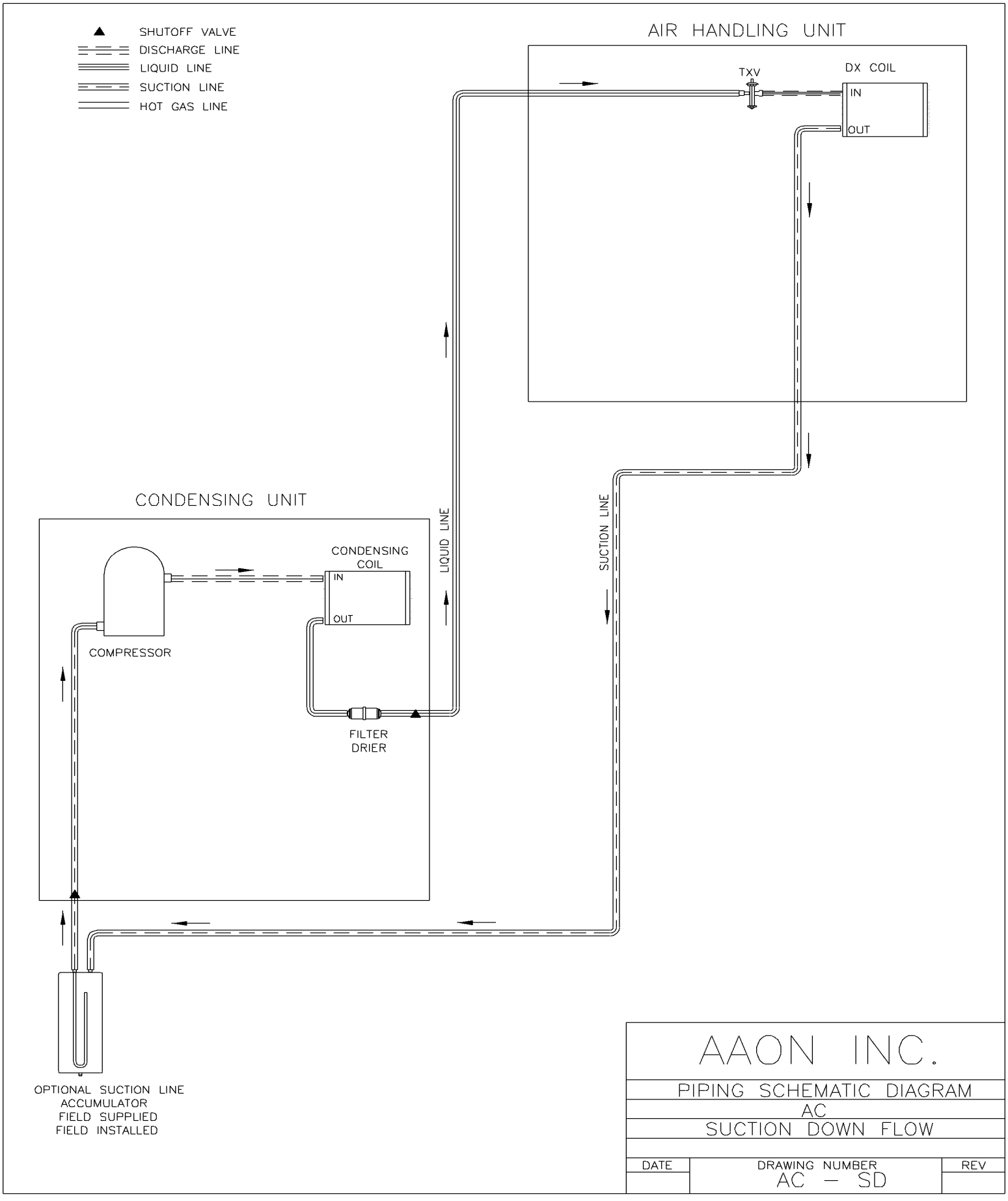
Quantity	Description	Part #:	Location

Factory Supplied / Field Installed

Quantity	Description	Part #:	Location
-	N/A	-	-

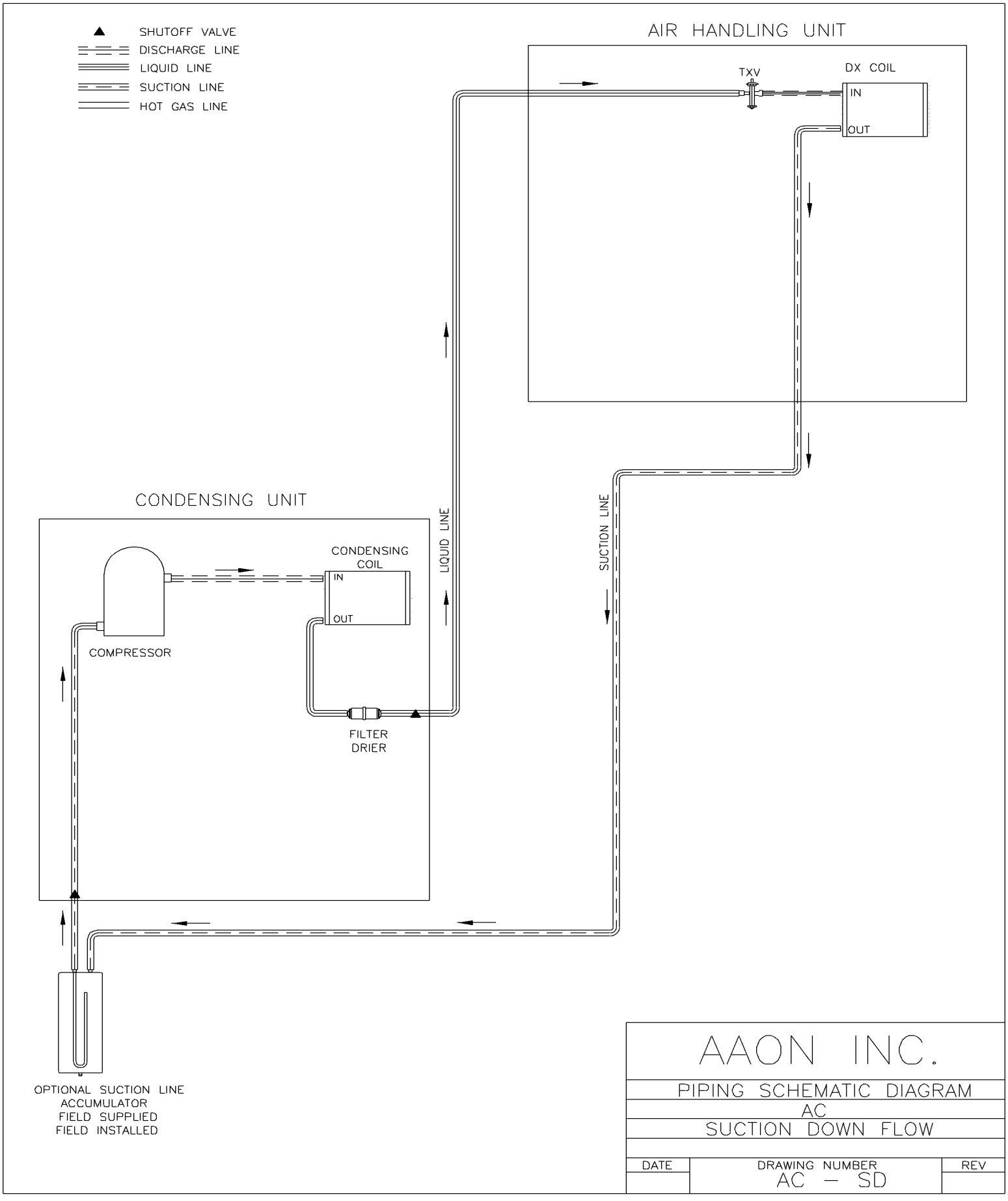
Field Supplied / Field Installed

Quantity	Description	Part #:	Location
-	P-Trap(s)		AHU



AAON INC.		
PIPING SCHEMATIC DIAGRAM		
AC		
SUCTION DOWN FLOW		
DATE	DRAWING NUMBER AC – SD	REV

Circuit #: 1



AAON INC.		
PIPING SCHEMATIC DIAGRAM		
AC		
SUCTION DOWN FLOW		
DATE	DRAWING NUMBER AC – SD	REV

Circuit #: 2

Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.326 (SN: 7661808-JQJ5U0ZF)

A1	A2	A3	A4	A5	1	2A	2B	3A	3B	4	5	6A	6B	6C	7	8A	8B	8C	8D	9	10	11	12	13	14	15	16	17	18	19	20	21	22
C	F	A	-	0	3	0	-	C	-	A	-	3	-	D	A	0	0	K	:	0	-	A	0	-	0	0	-	0	0	-	A	N	0	-	D	-	N	0	0	0	-	0	0	A	0	G	0	0	-	0	0	0	0	D	B

Tag: CU# 1

Job Name: *DTA Transit Authority*
Job Number: *LHB*
Unit Submittal For:
Unit Submittal Date: *September 12, 2022*

	Base Option	Description
CF	Generation	CF - Condensing Unit
A	Major Rev	Major Revision
030	Unit Size	Thirty
C	Series	C Cabinet
A	Revision	Minor Revision
3	Voltage	460V/3Ø/60Hz
D	Compressor Style	R-410A Variable Capacity Scroll Comp
A	Condenser Style	Air-Cooled Microchannel Condenser
0	Configuration	Standard
0	Coating	Standard
K	Staging	1 Variable Refrig System + 1 On/Off Refrig System

	Feature Option	Description
0	**1.** Unit Orientation	Vertical Condenser Discharge with End Control Panel
A	**2A.** Refrigeration Control	5 Minute Compressor Off Timer & 20 Second Compressor Stage Delay
0	**2B.** Blank	Standard
0	**3A.** Refrigeration Options	Standard
0	**3B.** Blank	Standard
0	**4.** Refrigeration Accessories	Standard
0	**5.** Blank	Standard
A	**6A.** Unit Disconnect Type	Single Point Power Non-Fused Disconnect
N	**6B.** Disconnect Size	100 Amps
0	**6C.** Blank	Standard
D	**7.** Accessories	Suction Pressure Transducer on Each Refrigeration System
N	**8A.** Control Sequence	Field Installed DDC Controls Furnished by Others with Isolation Relays
0	**8B.** Control suppliers	Standard Terminal Block
0	**8C.** Control Supplier Options	Standard
0	**8D.** BMS Connection and Diagnostics	Standard
0	**9.** Blank	Standard
0	**10.** Blank	Standard
A	**11.** Maintenance Accessories	115VAC Convenience Outlet - Factory Wired
0	**12.** Code Options	Standard ETL U.S.A. Listing
G	**13.** Air Cooled Condenser Accessories	Condenser Coil Guard + ECM Cond Fan / Head Pressure Control
0	**14.** Blank	Standard
0	**15.** Blank	Standard
0	**16.** Electrical Options	Standard
0	**17.** Shipping Options	Standard
0	**18.** Blank	Standard
0	**19.** Blank	Standard
0	**20.** Cabinet Material	Standard - Galvanized Steel Cabinet
D	**21.** Warranty	Extended Compressor Warranty - Years 2-5
B	**22.** Paint and SPAs	Premium AAON Gray Paint Exterior

Points List

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.326 (SN: 7661808-JQJ5U0ZF)

A1 A2 A3 A4 A5 1 2A 2B 3A 3B 4 5 6A 6B 6C 7 8A 8B 8C 8D 9 10 11 12 13 14 15 16 17 18 19 20 21 22

CFA-030-C-A-3-DA00K:0-A0-00-00-AN0-D-N000-00A0G00-00000DB

Tag: CU# 1

Job Name:	***DTA Transit Authority***	**For:**	
Job Number:	***LHB***	**Date:**	***September 12, 2022***

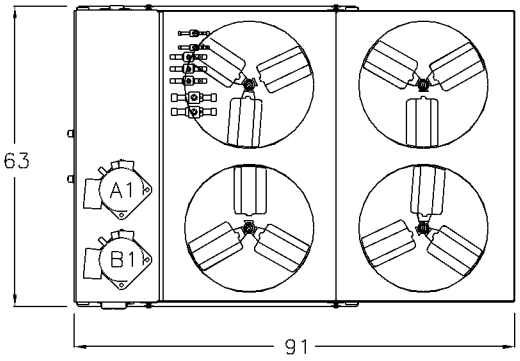
Terminals Available/Required for Controlling the Unit

Terminal	Description
[C]	Common
[R]	24VAC Control Voltage
[Y1]	Cooling Stage Enable + Isolation Relay
[Y2]	Cooling Stage Enable + Isolation Relay
[CC1-] & [CS1+]	Variable Capacity Compressor (0-5 VDC) Signal
[P51-] & [P61+], [P52-] & [P62+],	Suction Pressure Sensor (0-5 VDC)

LEFT

FL 188

BL 187



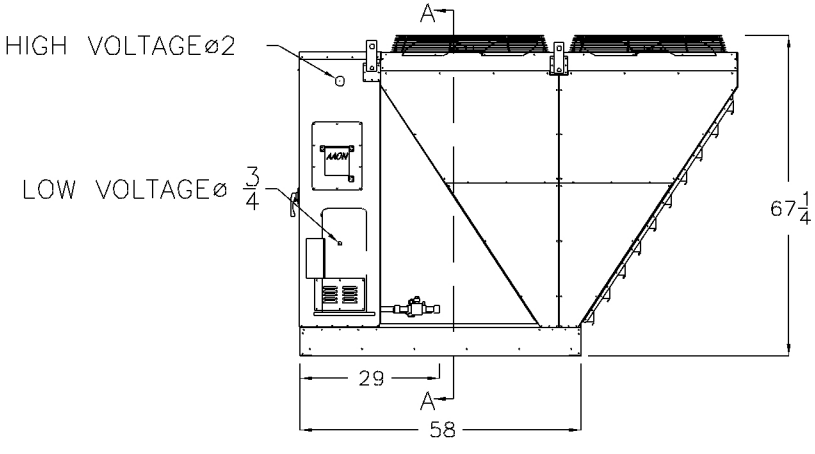
FRONT

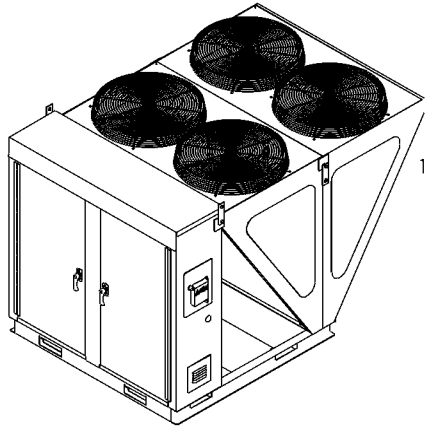
BACK

FR 571

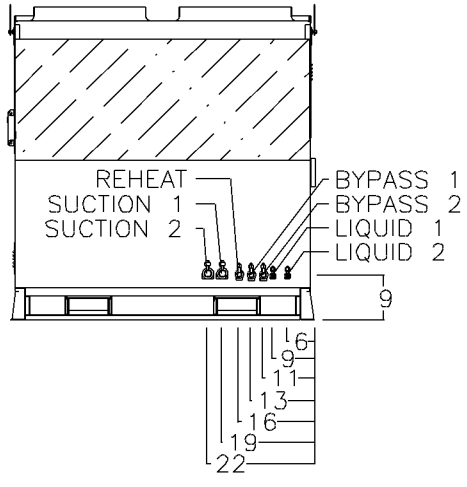
BR 569

RIGHT





SECTION A–A



CONFIGURABLE OPTIONS SHOWN

All dimensions are in units of inches

Job Name:	DTA Transit Authority						Unit Tag:	CU# 1
Configurator:	CFA-030-C-A-3-DA00K:0-A0-00-00-AN0-D-N000-00A0G00-00000DB							
Shipping Weight:	1516 (±5%)			Operating Weight:	1516 (±5%)			
Clearances:	Compressor End:	36	Left:	30	Right:	36	Piping Connection End:	6	Top: OPEN
Date:	9/12/2022						Software Ver.	4.326 v2.6.0.0