ESI Consulting Engineers, Inc.
1315 NW 98th Court, Unit 15
Doral, Florida 33172
305.418.9177 phone
305.418.9178 fax
www.esiconsult.com

PRODUCT DATA SUBMITTAL REVIEW

Project:	JHS Scope D – Behavioral Health Intake		
Architect:	Perkins + Will	**ESI Project No.:**	C09111716
ESI Reviewer:	JV	**Date Received:**	07-06-18 (Rev)
Discipline:	Mechanical	**Date Reviewed:**	07-06-18
Submittal Title:	Rooftop Package Unit (Revised)	**Submittal No.:**	SP-59

Reviewer's Comments:

Per our coordination telecom with Controls Trade Partner (DDC) and Carrier, it was agreed that the Carrier Rooftop unit will not provide factory installed controls. The controls will be furnished and field installed by DDC. RTU will run as constant volume and be controlled based on LAT. Note: RTU will come with factory mounted Hot Gas By-pass system (RAWAL) for part-load conditions and safety/alarm board.

1. Confirm RTU is double wall construction (no fibers in the airstream).
2. Field coordinate roof curb height in order for the O/A opening to be 36in A.F.R. as noted on sheet M2-02 (Roof Plan). O/A opening shall be provided with Hood same material as unit (painted) and Aluminum insect screen as per Note #15.
3. Unit manufacturer shall include start-up and commissioning as per Note #17.

☒ **ACCEPTED WITH COMMENTS**

☐ REVISE & RE-SUBMIT

☐ REJECTED

REVIEW IS FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT AND CONTRACT DOCUMENTS.
Markings of comments shall not be construed as relieving the CONTRACTOR from compliance with the project plans and specifications, nor departure therefrom. The CONTRACTOR remains responsible for details and accuracy, for conforming and correlating all quantities, job conditions and dimensions, for selecting fabrication processes, for techniques of assembly and construction, and for performing his work in a safe manner.
Any conflict found in the Contract Documents during the preparation of these Shop Drawings must be brought to the attention of the A/E of Record.
Any deviation from the Contract Documents (or proposed substitution) must be clearly noted and highlighted in these shop Drawings in order to receive specific consideration. Any such item not clearly noted is to be considered rejected.

SUBMITTAL DATA - REV

Date

July 6, 2018

Project

Behavioral Health Hospital New Intake

A		NO EXCEPTIONS
B	X	EXCEPTIONS AS NOTED
C		REVISE AND RESUBMIT
D		REJECTED
E		FOR INFORMATION ONLY
F		NOT REVIEWED

SUBMITTAL REVIEW

Submittals are reviewed for conformance with the design concept expressed in the Contract Documents. Review is not for the purpose of confirming or approving: (a) deviation from the Contract Documents, including but not limited to deviation with reference to material, quantity, location, quality, dimension, or orientation (except as expressly annotated in writing by the Architect herein), (b) means, methods, sequences, or techniques of construction (unless expressly called for in the Contract Documents and herein expressly highlighted for review and approval by the Architect), (c) safety of the contractor(s) work, work plan, procedures, workers or of the site, (d) any clarification of a patent or latent ambiguity or defect in the Contract Documents, or (e) the procurement or request for any labor, materials or other expense of the contractor(s) which is in addition to that previously approved by the Owner. The Contractor shall be and shall remain responsible for: (a) compliance with the Contract Documents, (b) coordination of the Work (including amongst various trades), (c) performing the Work in a safe and satisfactory manner, (d) confirming and correlating quantity and dimensions, and (e) the construction schedule.

Project No. 810444

PERKINS + WILL

By: j

Date: 07-06-2018

Consulting Engineer

ESI Consulting Engineers, Inc

Mechanical Contractor

InTeg Miami LLC

Submitted By

Gilbert Catano

Unit Report For RTU-272A

Project: ~Untitled7 07/06/2018
Prepared By: Gilbert Catano 07:57AM

Unit Parameters

Unit Model: **50HC-D17A3A6-0A2C0**
Unit Size: **17 (15 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **None**
Duct Cfg: **Vertical Supply / Vertical Return**
Two-Stage Compressor Models

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **10' 7.875"**
Unit Width: **7' 2.375"**
Unit Height: **4' 1.375"**
*** Total Operating Weight: **2266** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Condensate Drain Line Size: **3/4**
Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **6**
Return Air Filter Size: **20 x 25 x 2**

Unit Configuration

High Static Option Vertical Models
Al/Cu - Al/Cu, Corrosion Protection Entire Unit
Rawal APR (1st Circuit)
Double Wall Airstream
Base Electromechanical Controls
Powered Convenience Outlet
Non-Fused Disconnect
VFD for airflow adjustment only
Standard Packaging

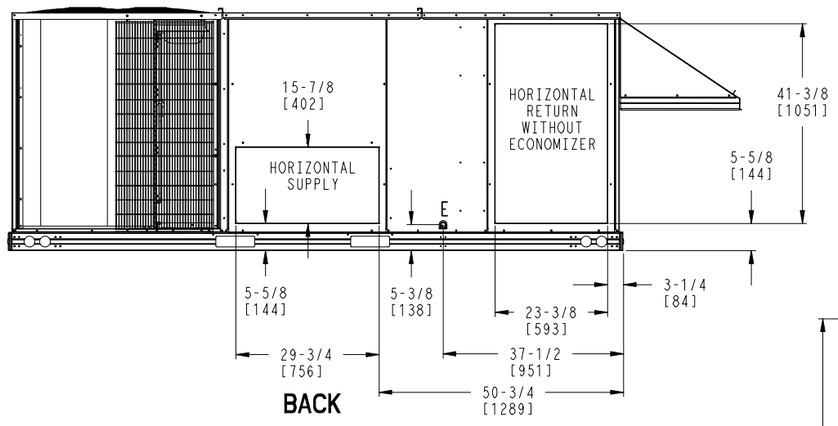
Warranty Information

5-Year compressor parts (STD.)
1-Year parts (STD.)
Start-up, First Unit

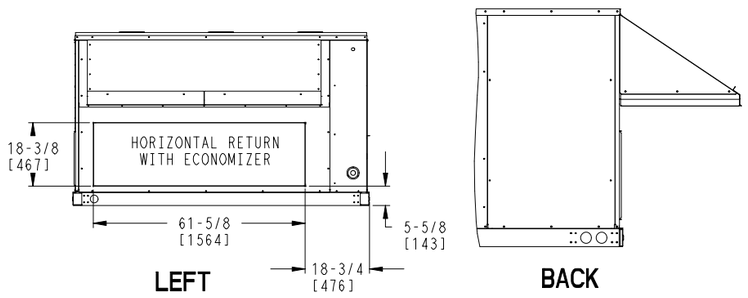
NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

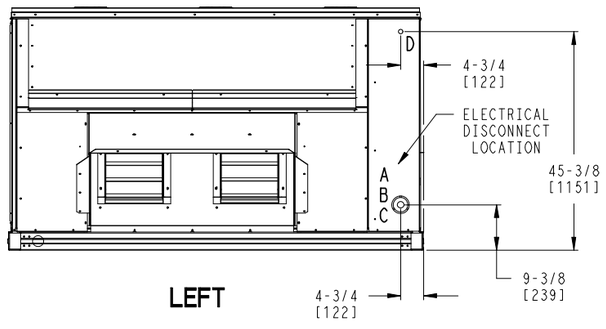
Part Number	Description	Quantity
50HC-D17A3A6-0A2C0	Rooftop Unit	1
	Base Unit	
	High Static Option Vertical Models	
	Powered Convenience Outlet, Corrosion Protection Entire Unit	
	Rawal APR, Double Wall Airstream	
	Non-Fused Disconnect, VFD for airflow adjustment only	
Accessories		
	24-inch Roof Curb	1
	Outdoor Air Damper	1

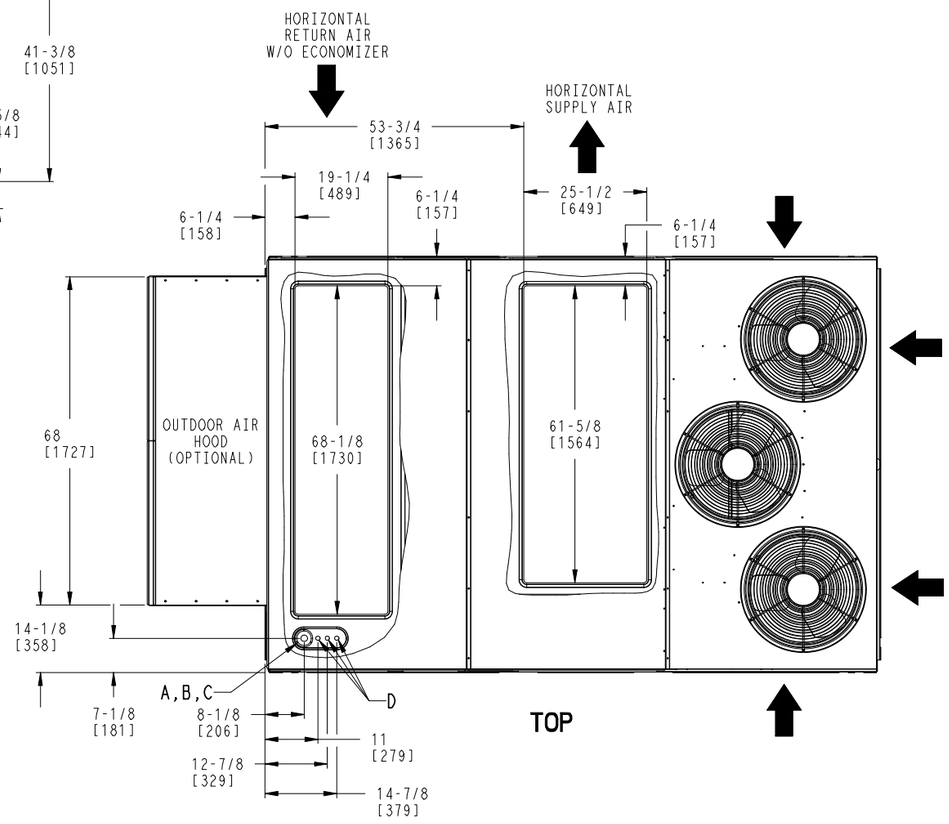


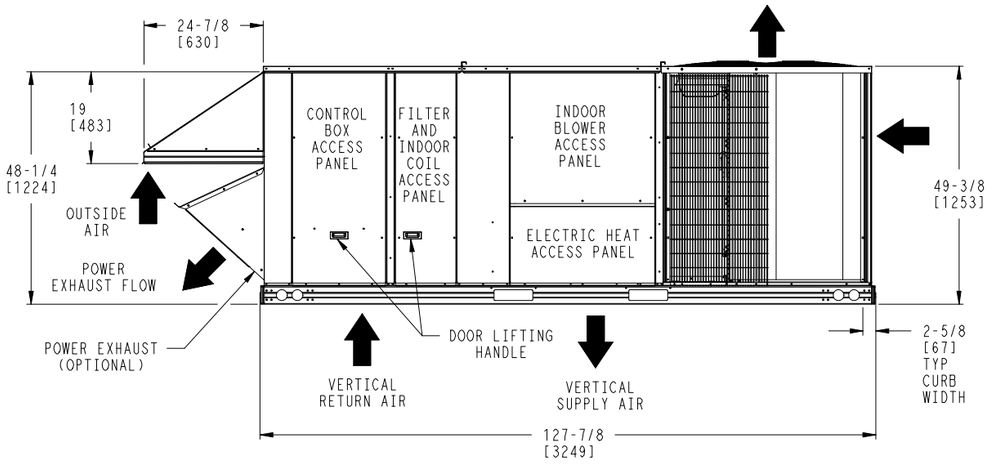
(HORIZONTAL DISCHARGE W/O ECON)
(WHEN ORDERED)

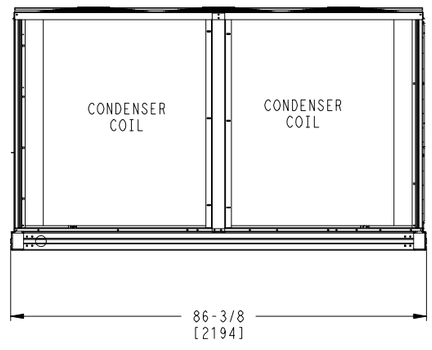


(HORIZONTAL DISCHARGE W/ ECON)
(WHEN ORDERED)









	CONNECTION SIZES
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN

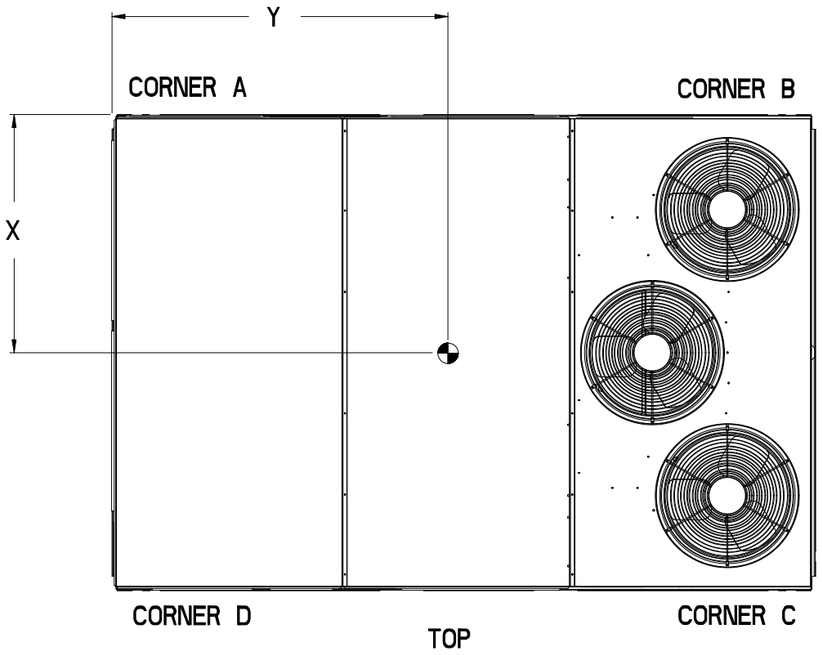
NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. ⊕ CENTER OF GRAVITY
3. ➡ DIRECTION OF AIR FLOW

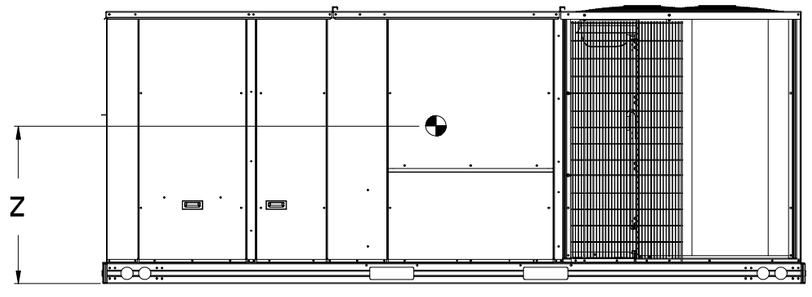
SHEET	DATE	SUPERCEDES			REV
1 OF 2	07/12/10	-	50HC 17 SINGLE ZONE ELECTRICAL COOLING WITH ELECTRIC HEAT	50HE502157	-

UNIT	STD UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50HC17	1793	815	375	170	419	191	528	240	472	214	48 [1219]	67 3/8 [1711]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.



TOP



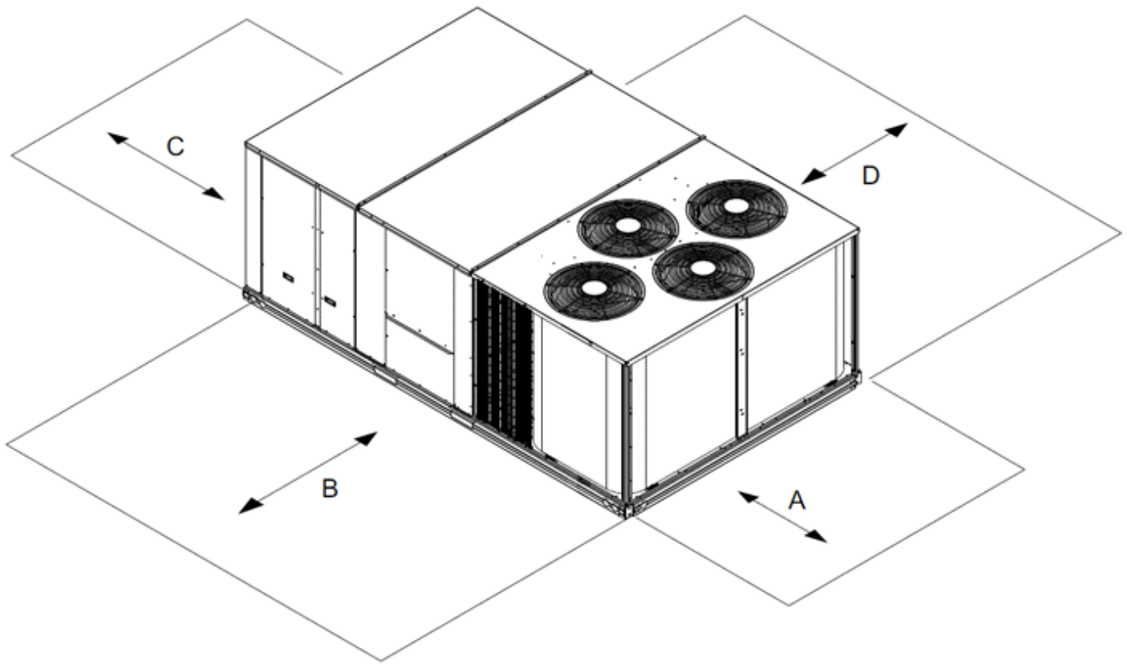
FRONT

UNITED TECHNOLOGIES CARRIER P.O. BOX 4808 SYRACUSE, NY 13221

SHEET	DATE	SUPERCEDES			REV
2 OF 2	07/12/10	-	50HC 17 SINGLE ZONE ELECTRICAL COOLING WITH ELECTRIC HEAT	50HE502157	-

Certified Drawing for RTU-272A

Service Clearance

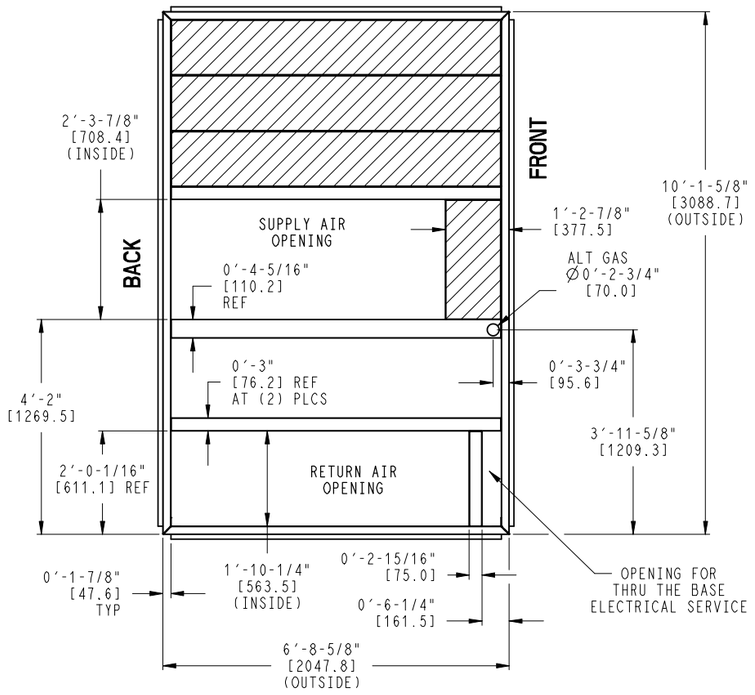


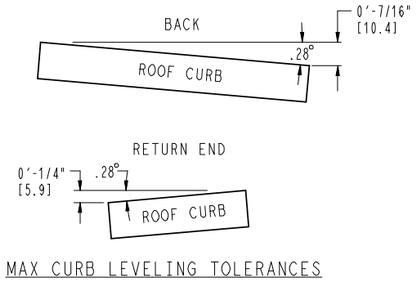
C12392

LOCATION	DIMENSION	CONDITION
A	36---in (914 mm)	• Recommended clearance for air flow and service
B	42---in (1067 mm)	• Recommended clearance for air flow and service
C	18---in (457 mm)	• No Convenience Outlet • No Economizer • No field installed disconnect on economizer hood side (Factory--- installed disconnect installed)
	36---in (914 mm)	• Convenience Outlet installed • Vertical surface behind servicer is electrically non---conductive (e.g.: wood, fiberglass)
	42---in (1067 mm)	• Convenience Outlet installed • Vertical surface behind servicer is electrically conductive (e.g.: metal, masonry)
	96---in (2438 mm)	• Economizer and/or Power Exhaust installed • Check for sources of flue products with 10 feet (3 meters) of economizer fresh air intake
D	42---in (1067 mm)	• Recommended clearance for service

NOTE: Unit not designed to have overhead obstruction. Contact Application Engineering for guidance on any application planning overhead obstruction or vertical clearances.

Chassis 6-9





MAX CURB LEVELING TOLERANCES

UNIT SIZE	"A"	ROOF CURB ACCESSORY
48TC/50TC 17,20	1′-2" [356.0] 2′-0" [610.0]	CRRFCURB045A00 CRRFCURB046A00
50TCQ 17		
48HC/50HC 17		
48LC/50LC 14		

NOTES:

1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.

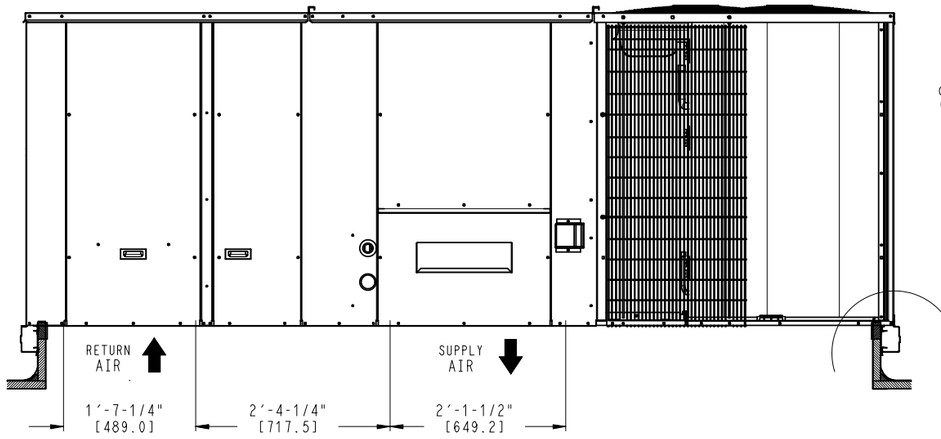
2 DIMENSIONS IN [ ] ARE IN MILLIMETERS.

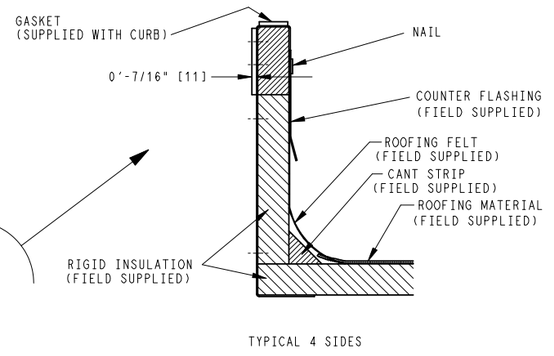
3 ROOF CURB GALVANIZED STEEL.

4 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)

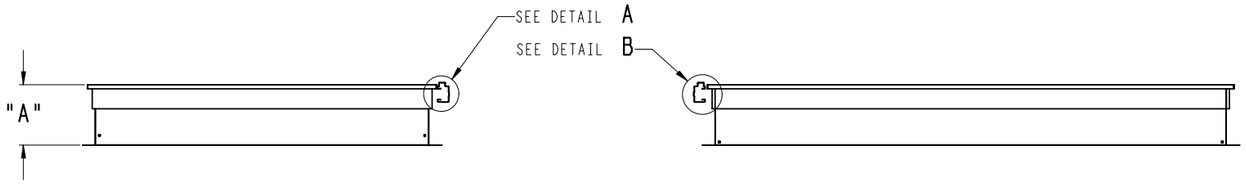
5 SERVICE CLEARANCE 4 ft ON EACH SIDE

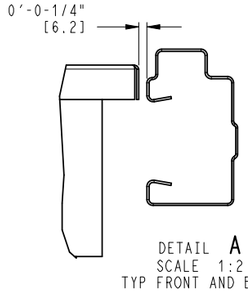
➡ DIRECTION OF AIR FLOW



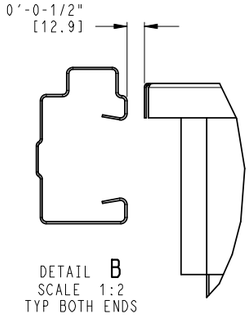


TYPICAL 4 SIDES

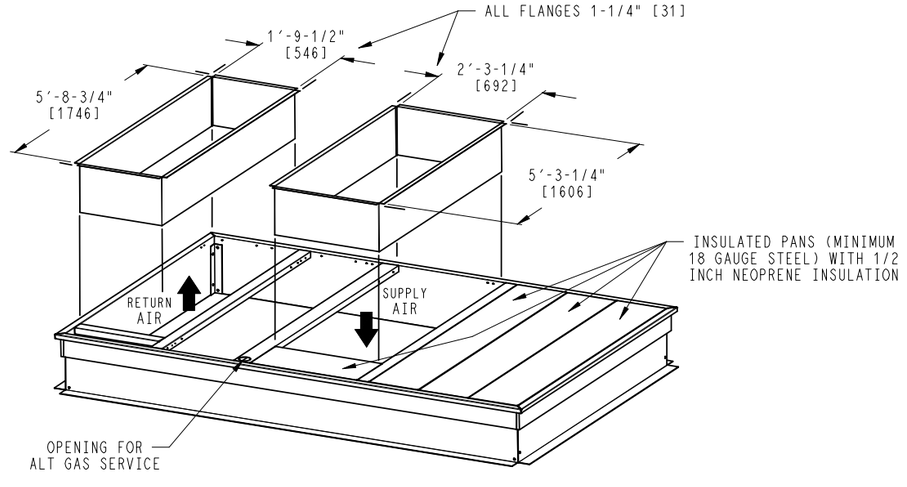




DETAIL A
SCALE 1:2
TYP FRONT AND BACK



DETAIL B
SCALE 1:2
TYP BOTH ENDS



DATE	SUPERCEDES			REV
02/18/13	08/24/10	48TC/50TC 17,20 50TCQ 17 48HC/50HC 17 48LC/50LC 14 ROOF CURB	50HE501127	D

Performance Summary For RTU-272A

Project: ~Untitled7 — 07/06/2018
Prepared By: Gilbert Catano — 07:57AM

Part Number:50HC-D17A3A6-0A2C0

ARI EER: **12.20**
IEER: **13.2**

Base Unit Dimensions

Unit Length:	**127.9**	in
Unit Width:	**86.4**	in
Unit Height:	**49.4**	in

Operating Weight

Base Unit Weight:	**1793**	lb
High Static Option Vertical Models:	**11**	lb
Powered Convenience Outlet:	**35**	lb
Non-Fused Disconnect:	**15**	lb

Accessories

24-inch Roof Curb:	**340**	lb
Outdoor Air Damper:	**50**	lb
4" Field Conversion Kit:	**22**	lb

Total Operating Weight: **2266** lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Belt**	
Actual Airflow:	**3835**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**91.0**	F
Evaporator Entering Air DB:	**77.6**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.46**	BTU/lb
Evaporator Leaving Air DB:	**52.6**	F
Evaporator Leaving Air WB:	**52.2**	F
Evaporator Leaving Air Enthalpy:	**21.48**	BTU/lb
Gross Cooling Capacity:	**172.17**	MBH
Gross Sensible Capacity:	**103.54**	MBH
Compressor Power Input:	**11.67**	kW
Coil Bypass Factor:	**0.137**	

Supply Fan

External Static Pressure:	**1.90**	in wg
Fan RPM:	**993**	
Fan Power:	**3.51**	BHP
NOTE:	**Selected IFM RPM Range: 826 - 1009**	

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**12.8**
Compressor #1 LRA:	**100**
Compressor #2 RLA:	**12.8**
Compressor #2 LRA:	**100**
Indoor Fan Motor Type:	**HIGH**
Indoor Fan Motor FLA:	**6.4**
Power Supply MCA:	**40.1**
Power Supply MOCP (Fuse or HACR):	**50**
Disconnect Size FLA:	**42**
Disconnect Size LRA:	**252**
Electrical Convenience Outlet FLA (based on unit line voltage):	**2.2**
Outdoor Fan [Qty / FLA (ea)]:	**3 / 0.9**

NOTE: Convenience outlet must be field connected to the line/load side of the unit disconnect per local code.

Electrical Data (Unit produced on or after June 1, 2015)

Power Supply MOCP (Fuse or HACR):	**50**
Disconnect Size FLA:	**42**
Disconnect Size LRA:	**252**

June 1st and beyond units can be identified by serial number 2315XXXXXXXXX and higher

Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

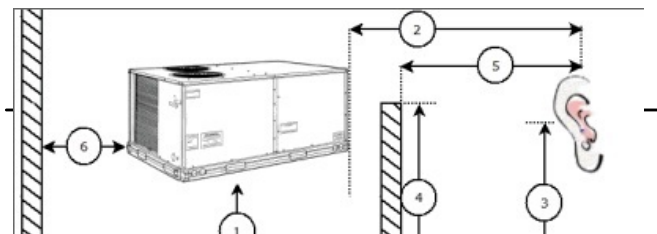
Acoustics

Sound Rating: **84.0** db

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	86.4	83.2	92.2
125 Hz	83.6	77.8	83.9
250 Hz	76.1	69.6	80.4
500 Hz	71.3	61.5	81.8
1000 Hz	69.1	58.7	78.7
2000 Hz	68.0	53.1	76.5
4000 Hz	69.1	50.4	72.2
8000 Hz	59.7	44.7	65.4
A-Weighted	76.6	67.1	84.1

Advanced Acoustics



Performance Summary For RTU-272A

Project: ~Untitled7 07/06/2018
Prepared By: Gilbert Catano 07:57AM

Advanced Accoustics Parameters

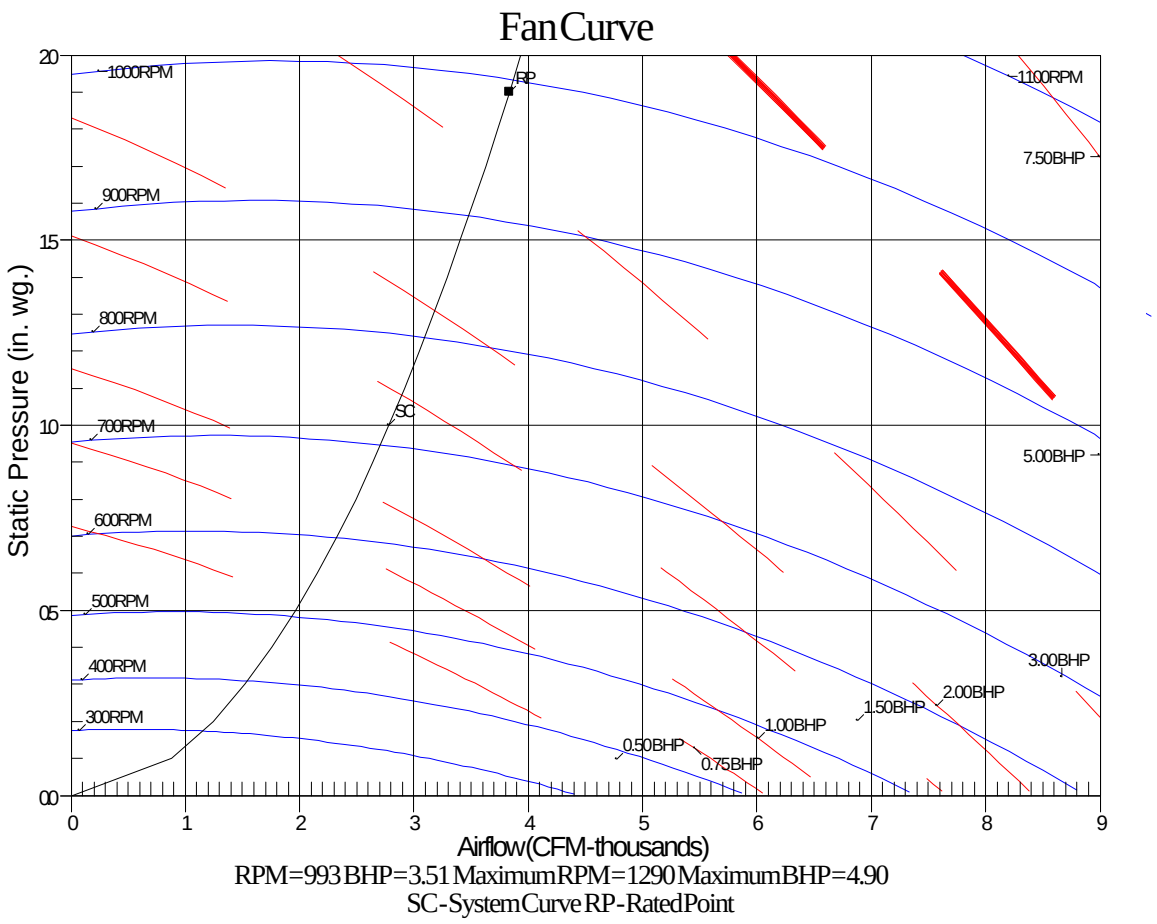
1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

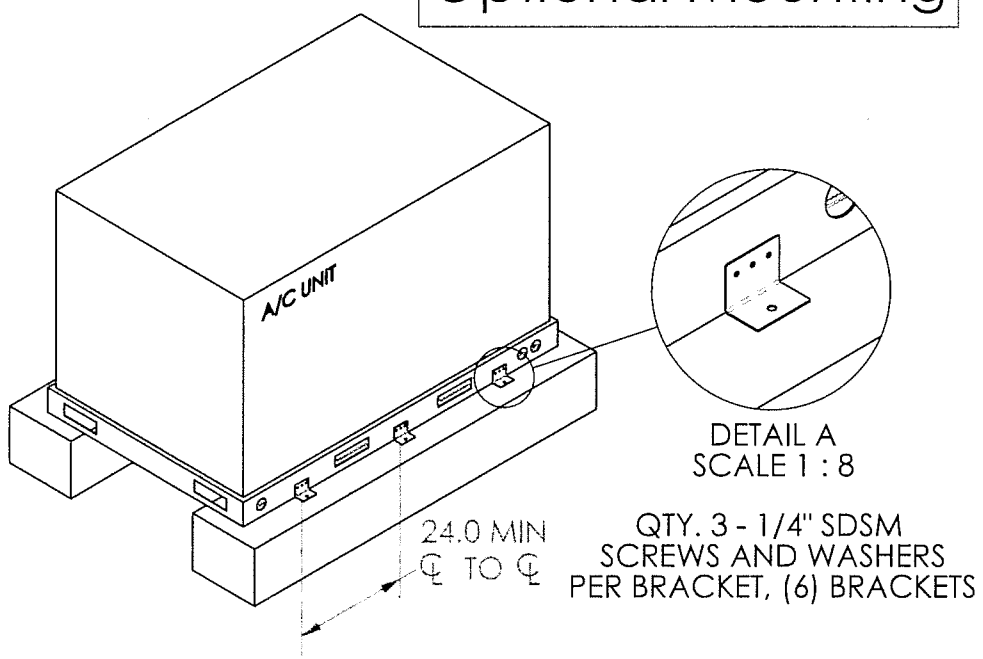
Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	92.2	83.9	80.4	81.8	78.7	76.5	72.2	65.4	93.6 Lw
B	66.0	67.8	71.8	78.6	78.7	77.7	73.2	64.3	84.1 LwA
C	59.8	51.5	48.0	49.4	46.3	44.1	39.8	33.0	61.2 Lp
D	33.6	35.4	39.4	46.2	46.3	45.3	40.8	31.9	51.7 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

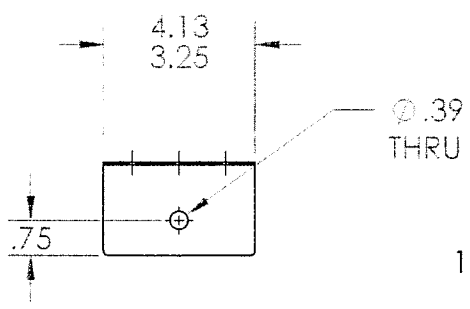
Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

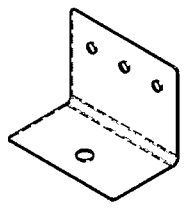


Optional Mounting

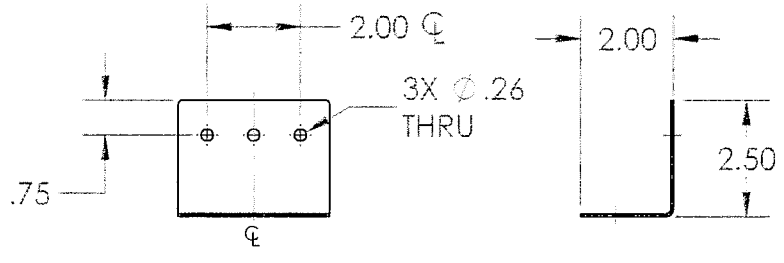


QTY. 1 - 3/8" SAE GR5 BOLT, NUT AND WASHER
PER BRACKET INTO PROPERLY DESIGNED METAL
STAND (BY OTHERS)
OR
QTY. 1 - 3/8" POWERS WEDGE-BOLT+ ANCHOR
PER BRACKET INTO MINIMUM 2000 PSI CONCRETE
(BY OTHERS), AS FOLLOWS:
- 2-1/8" MIN EMBED
- 2-3/4" EDGE DISTANCE
- 2-1/2" MIN SPACING





GALVANIZED STEEL
16 GA., 90 DEG. BRACKET



CARRIER Chassis 1 & 2:

Models: 48/50TC and 50TCQ - size 04 (min) through 07 (max)
48/50KC, 50KCQ, 48/50HC, 50HCQ and 48/50LC - size 04 (min) through 06 (max)

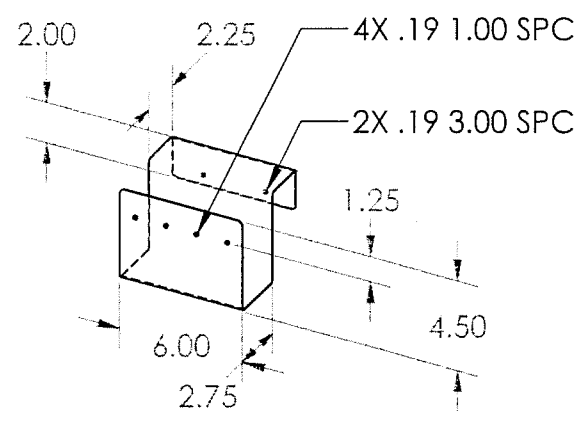
Each condenser unit listed above conforms to the Florida Building Code 5th Edition (2014) requirements for installation including High Velocity Hurricane Zone (HVHZ), Risk Category III/IV (V =186 MPH), exposure category "D", and installation height up to and including 65 feet above grade.

Worst Case is -07 (Chassis 2) 74-3/8" x 46-3/4" x 41-3/8"

ALLOWABLE DESIGN PRESSURES FOR THE UNIT ITSELF:

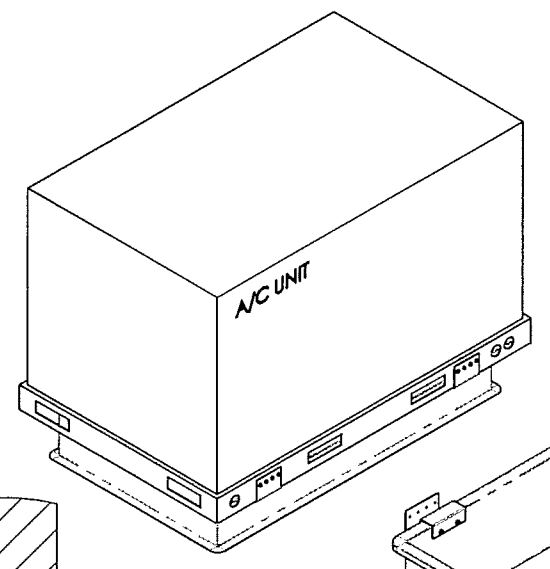
Design Lateral Pressure = 197.2 psf
Design Uplift Pressure = 95.4 psf

Unit itself will withstand wind loads imposed by 197.2 psf lateral and 95.4 psf uplift design pressures, provided the 16 GA. galvanized base rails are fastened to a properly designed concrete slab, metal stand, curb, curb adapter, or other suitable mounting arrangement and all factory supplied assembly fasteners are in place.

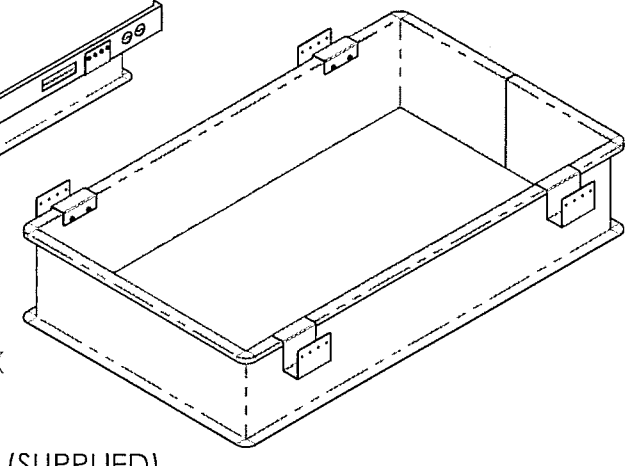


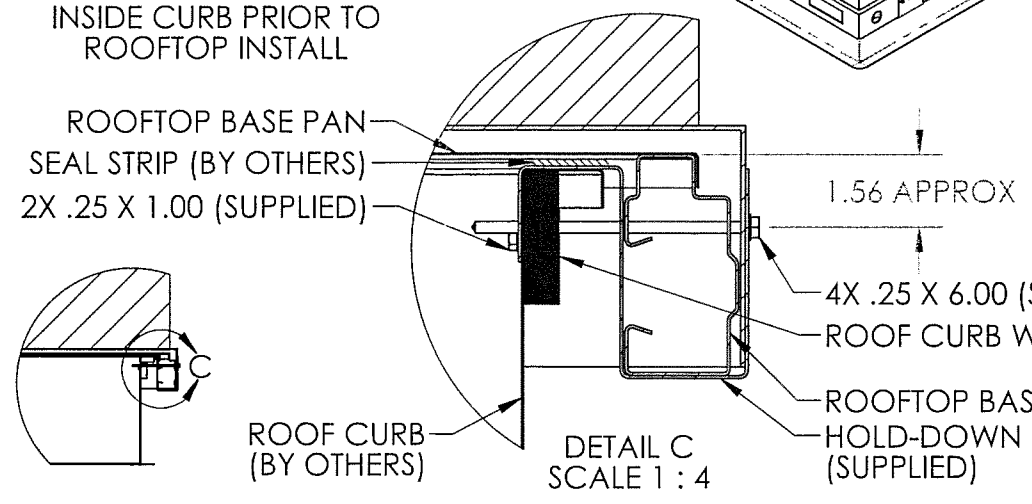
GALVANIZED STEEL, 16 GA.
SECURE Z-BRACKET TO
INSIDE CURB PRIOR TO
ROOFTOP INSTALL

Curb Mounting



QTY. 4 - TEK .25-6.00
GALVANIZED SHEETMETAL
S.D. SCREWS AND WASHERS
PER Z-BRACKET, (4) BRACKETS





QTY. 2 - TEK .25-1.00
GALVANIZED SHEETMETAL
S.D. SCREWS AND WASHERS
PER Z-BRACKET, (4) BRACKETS
PRIOR TO SEAL STRIP INSTALL

MAR 29 2016

John D. Buerosse
Florida P.E. 0050867
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Pompano Beach, Fl 33064
954-633-4692

Job No: Carrier RTUs
Title: Model List and Details

Job No: Chassis 1 & 2
Date: 2-11-16
Created by: CORE

Rational Analysis: Worst case is -07 (Chassis 2) 74-3/8" x 46-3/4" x 41-3/8" tall

Design Pressures complying to FBC Building 1620.6 (HVHZ):
V = 186 mph (Risk Cat. III/IV), For Exp.Cat. "D" and Z = 65 ft, Kz = 1.33, Kzt = 1.0, Kd = 0.90
qz = .00256KzKztKdV2 = 106.01 lb/ft2
Using 1620.6,
Lateral Wind Pressure = WL = qz(3.1) = 328.64 lb/ft2
Uplift Wind Pressure = UL = qz(1.5) = 159.02 lb/ft2
Factoring in the required Load Combination factor (0.6):

Design Lateral Pressure = WL(0.6) = 197.18 lb/ft2
Design Uplift Pressure = UL(0.6) = 95.41 lb/ft2

Since positive pressure acts toward the surface being considered and negative pressure acts away, only the uplift pressure will remove a panel from the machine. The design lateral pressure which is considered to act toward the windward surface is recognized to be a combination of the pressures acting on the windward and leeward surfaces. Wall pressure coefficients from ASCE7-10, Chapter 27, Figure 27.4-1 may be used to distribute the Design Lateral Pressure into positive and negative componenets acting on the windward and leeward surfaces, respectively.

L/B = 46.75/74.375 = 0.63 for wind on long (74-3/8") side
L/B = 74.375/46.75 = 1.59 for wind on short (46-3/4") side

Worst case positive pressure coefficient is 0.8 for windward wall which has a corresponding negative pressure coefficient of 0.5 on the leeward wall. The worst case negative pressure coefficient is 0.7 for the sidewall (side parallel to wind). Since the windward and leeward wall pressures act in the same direction, the distibuted pressures are computed as follows:

Lateral Positive Design Pressure = 197.18 (0.8) / (0.8 + 0.5) = 121.34 lb/ft2 (Worst Case Positve)
Lateral Negative Design Pressure = 197.18 (0.5) / (0.8 + 0.5) = 75.84 lb/ft2
Sidewall Negative Design Pressure = 197.18 (0.7) / (0.8 + 0.5) = 106.17 lb/ft2 (Worst Case Negative)

22 ga. panels and columns are fastened together and to 16 ga. base rails using #10 serrated washer head self piercing screws having 0.425" head diameter, 0.19" nominal diameter, and 0.14 minor diameter. These screws are expected to exhibit the following properties based upon ICC-ES Report ESR-2196:

Pullout Strength in 22 ga. = 306 lbs (ultimate)
Pullover strength of 22 ga. = 828 lbs (ultimate)
Shear Strength in 22 ga. = 684 lbs (ultimate)

Pullout Strength in 16 ga. = 450 lbs (ultimate – based upon 18 ga.)
Shear Strength in 16 ga. = 927 lbs (ultimate – based upon 18 ga.)

For Top Panel (48TC500235):
73.6" x 45" draw formed panel anchored at edges and through top to center panel and control box. Worst case portion is over air handler section since condenser section has a large hole in the top causing internal and external pressure to be equal. For portion tributary to air handling section:

A = 45(38.6)/12(12) = 12.06 ft2
Load = 12.06 (95.41) = 1150.9 lbs
For outside edge (7 screws, all in shear), screw load = 1150.9/2(7) = 82.2 lbs
Safety Factor = 684/82.2 = 8.3 OK
For inside edge (8 screws, 4 in tension), screw load = 1150.9/2(8) = 71.9 lbs
Safety Factor = 306/71.9 = 4.3 OK Sheet 5

For Inside Panel (50HJ540465):
44.84" x 37.53" draw formed panel anchored at edges with 5 screws through face at top and bottom and 5 screws each vertical edge through flange perpendicular to face (10 screws in tension, 10 screws in shear).

A = 44.84(37.53)/ 12(12) = 11.69 sqft
Load = 11.69(106.17) = 1240.7 lbs
Screw Load = 1240.7/20 = 62.04 lbs
Safety Factor = 306/62.04 = 4.9 OK

For Access Door (48TM500284):
33.5" x 36.5" draw formed panel anchored with 2 screws through face each vertical side, 3 screws through face at bottom edge and top edge fits inside top panel (trapped).

A = 33.5(36.5)/12(12) = 8.49 sqft
Load = 8.49(106.17) = 901.5 lbs
Screw Load = 901.5/2(5) = 90.15 lbs
Safety Factor = 306/90.15 = 3.4 OK for Components and Cladding

For Access Panel (48TM500345):
12.13" x 37.3" draw formed panel anchored with 1 screw through face each vertical side, 1 screw through face at bottom edge and top edge fits inside top panel (trapped).

A = 12.13(37.3)/12(12) = 3.14 sqft
Load = 3.14(106.17) = 333.6 lbs
Screw Load = 333.6/2(3) = 55.60 lbs
Safety Factor = 306/55.60 = 5.5 OK for Components and Cladding

Remaining panels are trivial cases of the above due to greater fastener quantity or having openings that limit negative pressure effects.

For connection of upper frame and panels to base rails:
12 screws each long side fasten frame columns and panels to the long base rails. 5 screws fasten inside panel to short base rail at air handler end. Opposite end is louvered and has a large opening in the top and mesh over cooling coils. Screws fasten 22 ga. panels and columns to 16 ga. base rails.

Lateral Wind Area = AL = 73.6(37.53)/12(12) = 19.18 sqft
Lateral Design Load = 19.18(197.18) = 3782 lbs
Overturning Moment = 3782(37.53)/2 = 70975 in-lb

Uplift Wind Area = AU = 73.6(45)/12(12) = 23.0 sqft
Uplift Design Load = 23.0(95.41) = 2194 lbs
Uplift Moment = 2194(45)/2 = 49375 in-lb

Screw Load = (70975 + 49375)/12(45) = 222.9 lbs (shear)
Safety Factor = 927/222.9 = 4.2 OK

Unit itself will withstand wind loads imposed by 197.18 psf lateral and 95.41 psf uplift design pressures provided the 16 gage galvanized base rails are properly fastened to a suitable slab, stand, curb, curb adapter, or other suitable mounting arrangement and all factory supplied assembly fasteners are in place.

For connection of unit base rails to properly designed curb, metal stand, or structural concrete (by others):
Lateral Wind Area = AL = 74.375(41.375)/12(12) = 21.37 sqft
Lateral Design Load = 21.37(197.18) = 4214 lbs
Overturning Moment = 4214(41.375)/2 = 87,172 in-lb
Uplift Wind Area = AU = 74.375(46.75)/12(12) = 24.15 sqft
Uplift Design Load = 24.15(95.41) – 0.6(607) = 1940 lbs
Uplift Moment = 1940(46.75)/2 = 45,348 in-lb

For connection of 16 ga. (min) straps, clips, or brackets spaced 48" min apart to unit base rails on long sides using 1/4" (#14) self-drilling screws:

These screws are expected to exhibit the following properties based upon ICC – ES Report ESR - 1976
Pullout Strength in 16 ga. = 573 lbs (ultimate)
Shear Strength in 16 ga. = 1389 lbs (ultimate)

Using (3) screws per strap, clip, or bracket, with (3) straps, clips, or brackets each long side:
Screw Load = (87,172 + 45,348)/3(3)(46.75) = 315.0 lbs (shear) at base rail outer surface
Safety Factor = 1389/315.0 = 4.4 OK for Components and Cladding

For Z-brackets similar to Micrometl design but modified to eliminate hidden structural fasteners anchored to 18 ga. (min) curb (by others):

Shear Strength in 18 ga. = 1218 lbs (ultimate)
Screw Load = (87172 + 45348)/2(4)(42.69) = 388.0 lbs (shear) at curb inside surface
Safety Factor = 1218/388.0 = 3.1 OK for Components and Cladding

For Brackets 3.25-4.13" wide x 2" x 2-1/2", 16 ga. (min), spaced 24.0" (min) on-center into base rails, Using (3) screws per bracket, (3) brackets each long side:

Anchor Load = (87172 + 45348)/3(47.5) = 930.0 lbs (tension)
Anchor Load = 4214/6 = 702.3 lbs (shear) at 3/4" beyond baserail outer surface

For 3/8" SAE Gr. 5 bolts with nuts and washers to steel (by others):
Safety Factor = 3720/930.0 = 4.0 (tension) OK
Safety Factor = 1937/702.3 = 2.8 (shear) OK

For 3/8" Powers Wedge-Bolt + anchors with 2-1/8" (min) embedment into 2000 psi (min) concrete (by others), 4" (min) thick, 2-3/4" (min) edge distance, and 2-1/2" (min) spacing:
Safety Factor = 3000/930.0 = 3.2 (tension) OK
Safety Factor = 3100/702.3 = 4.4 (shear) OK

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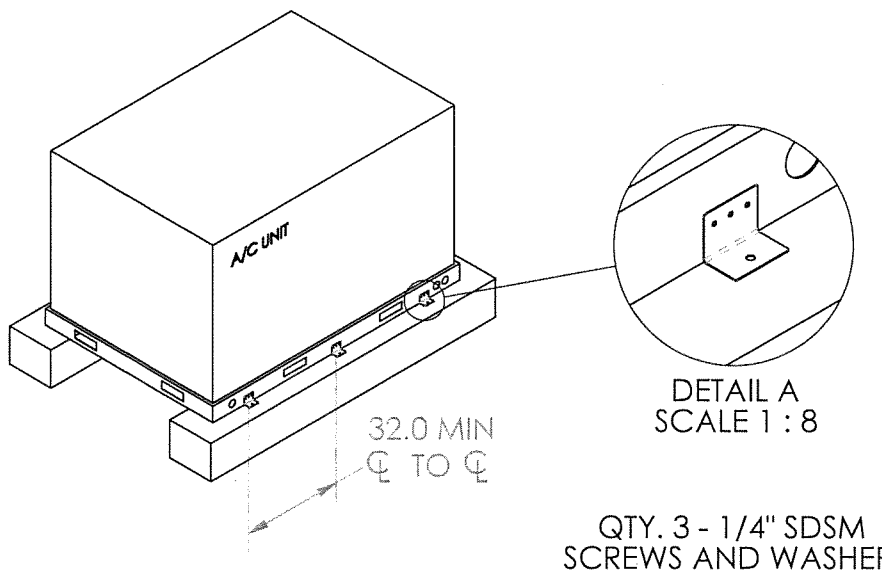
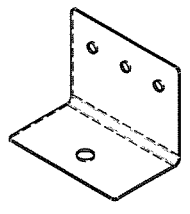
Job No: Carrier RTUs
Title: Model List and Details
Job No: Chassis 1 & 2
Date: 1-08-16
Created by: CORE

Optional Mounting

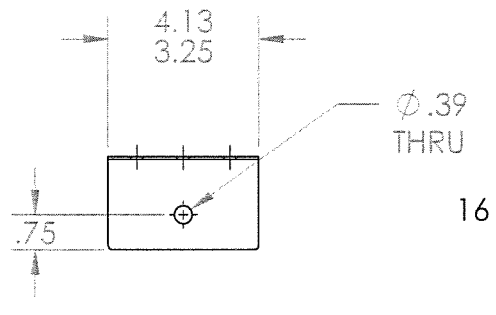


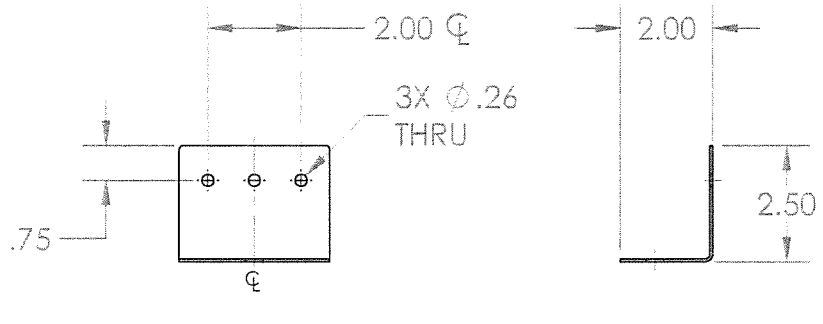
QTY. 3 - 1/4" SDSM
SCREWS AND WASHERS
PER BRACKET, (6) BRACKETS

QTY. 1 - 3/8" SAE GR5 BOLT, NUT AND WASHER
PER BRACKET INTO PROPERLY DESIGNED METAL
STAND (BY OTHERS)
OR
QTY. 1 - 3/8" POWERS WEDGE-BOLT+ ANCHOR
PER BRACKET INTO MINIMUM 2000 PSI CONCRETE
(BY OTHERS), AS FOLLOWS:
2-1/8" MIN EMBED
2-3/4" EDGE DISTANCE
2-1/2" MIN SPACING



GALVANIZED STEEL
16 GA., 90 DEG. BRACKET





CARRIER Chassis 3 & 4:
Models:
48/50TC - size 08 (min) through 14 (max), 50TCQ - size 08 (min) through 12 (max)
48/50HC - size 07 (min) through 12 (max), 50HCQ - size 07 (min) through 09 (max)
48/50LC - size 07

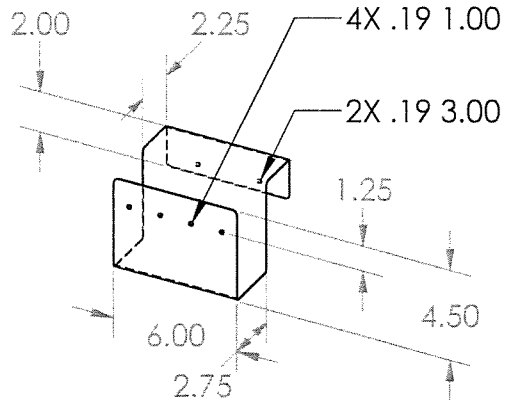
Each condenser unit listed above conforms to the Florida Building Code 5th Edition (2014) requirements for installation including High Velocity Hurricane Zone (HVHZ), Risk Category III/IV (V =186 MPH), exposure category "D", and installation height up to and including 65 feet above grade.

Worst Case is -09 (Chassis 4a) 88-1/8" x 59-1/2" x 49-3/4"

ALLOWABLE DESIGN PRESSURES FOR THE UNIT ITSELF:

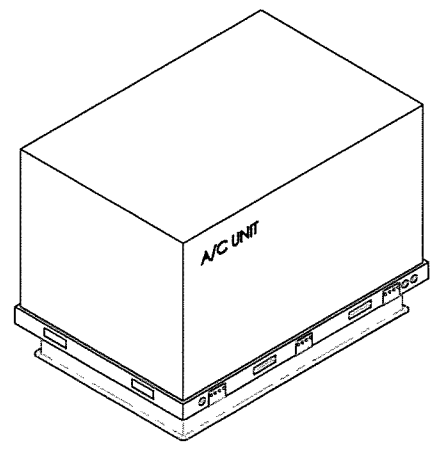
Design Lateral Pressure = 197.2 psf
Design Uplift Pressure = 95.4 psf

Unit itself will withstand wind loads imposed by 197.2 psf lateral and 95.4 psf uplift design pressures, provided the 16 GA. galvanized base rails are fastened to a properly designed concrete slab, metal stand, curb, curb adapter, or other suitable mounting arrangement and all factory supplied assembly fasteners are in place.

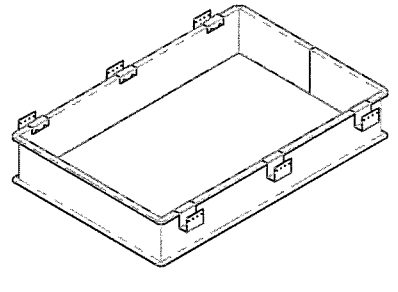


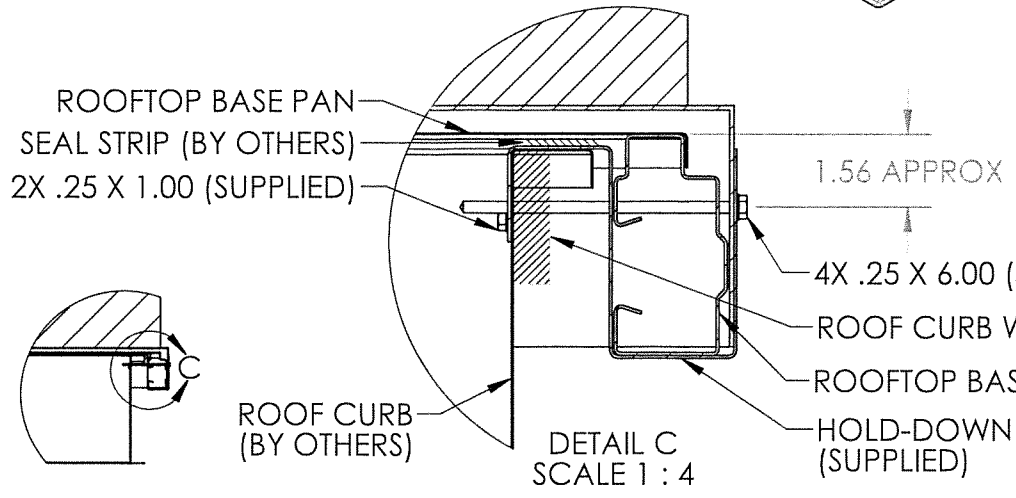
GALVANIZED STEEL, 16 GA.

Curb Mounting



QTY. 4 - TEK .25-6.00
GALVANIZED SHEETMETAL
S.D. SCREWS AND WASHERS
PER Z-BRACKET, (6) BRACKETS





DETAIL C
SCALE 1 : 4

QTY. 2 - TEK .25-1.00
GALVANIZED SHEETMETAL
S.D. SCREWS AND WASHERS
PER Z-BRACKET, (6) BRACKETS
PRIOR TO SEAL STRIP INSTALL

MAR 2 9 2016
John D. Buerosse
Florida P.E. 0050867
7567 E. Sample Rd.
Bldg. 3, Suite 220
Pompano Beach, Fl 33064
954-633-4692

Job No: Carrier RTUs
Title: Model List and Details
Job No: Chassis 3 & 4
Date: 2-11-16
Created by: CORE

Rational Analysis: Worst case is -09 (Chassis 4a) 88-1/8" x 59-1/2" x 49-3/8"

Design Pressures complying to FBC Building 1620.6 (HVHZ):
V = 186 mph (Risk Cat. III/IV), For Exp.Cat. "D" and Z = 65 ft, Kz = 1.33, Kzt = 1.0, Kd = 0.90
Qz = .00256KzKztKdV2 = 106.0 psf
Lateral Wind Pressure = WL = qz(3.1) = 328.64 lb/ft2
Uplift Wind Pressure = UL = qz(1.5) = 159.02 lb/ft2
Factoring in the required Load Combination factor (0.6):

Design Lateral Pressure = WL(0.6) = 197.2 psf
Design Uplift Pressure = UL(0.6) = 95.4 psf

Since positive pressure acts toward the surface being considered and negative pressure acts away, only the uplift pressure will remove a panel from the machine. The design lateral pressure which is considered to act toward the windward surface is recognized to be a combination of the pressures acting on the windward and leeward surfaces. Wall pressure coefficients from ASCE7-10, Chapter 27, Figure 27.4-1 may be used to distribute the Design Lateral Pressure into positive and negative componenets acting on the windward and leeward surfaces, respectively.

L/B = 59.5/88.125 = 0.68 for wind on long (88-1/8") side
L/B = 88.125/59.5 = 1.48 for wind on short (59-1/2") side

Worst case positive pressure coefficient is 0.8 for windward wall which has a corresponding negative pressure coefficient of 0.5 on the leeward wall. The worst case negative pressure coefficient is 0.7 for the sidewall (side parallel to wind). Since the windward and leeward wall pressures act in the same direction, the distibuted pressures are computed as follows:

Lateral Positive Design Pressure = 197.18 (0.8) / (0.8 + 0.5) = 121.3 psf (Worst Case Positve)
Lateral Negative Design Pressure = 197.18 (0.5) / (0.8 + 0.5) = 75.8 psf
Sidewall Negative Design Pressure = 197.18 (0.7) / (0.8 + 0.5) = 106.2 psf (Worst Case Negative)

22, 20, and 18 ga. panels and columns are fastened together and to 16 ga. base rails using #10 serrated washer head self tapping screws having 0.425" head diameter, 0.19" nominal diameter, and 0.14 minor diameter. These screws are expected to exhibit the following properties based upon ICC-ES Report ESR-2196:

Pullout Strength in 22 ga. = 306 lbs (ultimate) Pullout Strength in 20 ga. = 351 lbs (ultimate)
Pullover Strength of 22 ga. = 828 lbs (ultimate) Pullover Strength of 20 ga. = 993 lbs (ultimate)
Shear Strength in 22 ga. = 684 lbs (ultimate) Shear Strength in 20 ga. = 684 lbs (ultimate)
Pullout Strength in 18 ga. = 450 lbs (ultimate)
Shear Strength in 16 ga. = 927 lbs (ultimate)

For Top Panel (50HJ501228):
87.32" x 57.68" draw formed 20 ga. panel anchored at edges and through top to 18 ga. center panel and 20 ga. control box. Worst case portion is over air handler section since condenser section has two large holes in the top causing internal and external pressure to be equal. For portion tributary to air handling section:
A = 42.86(57.68)/12(12) = 17.17 sqft
Load = 17.17 (95.41) = 1638.0 lbs
For outside edge (8) screws, all in shear through 20 ga. top panel into 22 ga. indoor panel and corner posts:
Screw Load = 1638.0/2(8) = 102.4 lbs
Safety Factor = 684/102.4 = 6.7 OK for Components and Cladding
For inside edge (5) screws in tension through 20 ga. top panel into 18 ga. center panel and 4 screws in shear through top panel into 22 ga. center posts:
Screw Load = 1638.0/2(9) = 91.0 lbs
Safety Factor = 684/91.0 = 7.5 OK for Components and Cladding

For Inside Panel (50DK500689):
57.56" x 45.49" draw formed 22 ga. panel anchored at edges with 6 screws through top panel into face at top, 5 screws each vertical edge through flange perpendicular to face, and 6 screws at one inch above bottom edge through panel into base rail, and 4 screws between supply and return openings into stiffener (50DK502637) fastened to condensing coil.

A = 57.56(45.49)/ 12(12) = 18.18 ft2
Load = 18.18(106.17) = 1930.5 lbs
Screw Load = 1930.5/2(5+6) = 87.75 lbs
Safety Factor = 450/87.75 = 5.1 OK for Components and Cladding

For Access Panel (48TM500388):
45.33" x 42.95" draw formed 22 ga. panel anchored with 2 screws through face each vertical side, 3 screws through face at bottom edge into 16 ga. base rail, and top edge fits inside top panel (trapped).

A = 45.33(42.95)/12(12) = 13.52 sqft
Load = 13.52(106.17) = 1435.4 lbs
Screw Load = 1435.4/2(2 + 3) = 143.54 lbs
Safety Factor = 684/143.54 = 4.8 OK for Components and Cladding

For Filter Panel (50DK506970):
40.40" x 21.62" draw formed 20 ga. panel anchored with 3 screws through face at bottom edge and top edge fits inside top panel (trapped).

A = 40.40(21.62)/12(12) = 6.12 sqft
Load = 6.12(106.17) = 649.8 lbs
Screw Load = 649.8/2(3) = 108.32 lbs
Safety Factor = 684/108.32 = 6.3 OK for Components and Cladding

Remaining panels are trivial cases of the above due to greater fastener quantity or having openings that limit negative pressure effects.

For connection of upper frame and panels to base rails:
12 screws each long side fasten frame columns and panels to the long base rails. 6 screws fasten inside panel to short base rail at air handler end. Opposite end is louvered and has a large opening in the top and mesh over cooling coils. Screws fasten 22 ga. (min) panels and columns to 16 ga. base rails.

Lateral Wind Area = AL = 87.32(45.63)/12(12) = 27.67 sqft
Lateral Design Load = 27.67(197.18) = 5455 lbs
Overturning Moment = 5455(45.63)/2 = 124443 in-lb
Uplift Wind Area = AU = 87.32(57.68)/12(12) = 34.98 sqft
Uplift Design Load = 34.98(95.41) = 3337 lbs
Uplift Moment = 3337(57.68)/2 = 96242 in-lb

Screw Load = (124443 + 96242)/12(57.68) = 318.8 lbs (shear)
Safety Factor = 927/318.8 = 2.9 OK for Components and Cladding

Unit itself will withstand wind loads imposed by 197.18 psf lateral and 95.41 psf uplift design pressures provided the 16 gage galvanized base rails are properly fastened to a suitable slab, stand, curb, curb adapter, or other suitable mounting arrangement and all factory supplied assembly fasteners are in place.

For connection of unit base rails to properly designed curb, metal stand, or structural concrete (by others):
Lateral Wind Area = AL = 88.125(49.375)/12(12) = 30.22 ft2
Lateral Design Load = 30.22(197.18) = 5958 lbs
Overturning Moment = 5958(49.375)/2 = 147090 in-lb
Uplift Wind Area = AU = 88.125(59.5)/12(12) = 36.41 ft2
Uplift Design Load = 36.41(95.41) – 0.6(845) = 2697 lbs
Uplift Moment = 2697(59.5)/2 = 88272 in-lb

For connection of 16 ga. (min) straps, clips, or brackets spaced 32" min apart to unit base rails on long sides using 1/4" (#14) self-drilling screws:
Pullout Strength in 16 ga. = 573 lbs (ultimate)
Shear Strength in 16 ga. = 1389 lbs (ultimate)

Using (3) screws per strap, clip, or bracket, with (3) straps, clips, or brackets each long side (see sheet 4):
Screw Load = (147090 + 88272)/3(3)(59.5) = 439.5lbs (shear) at base rail outer surface
Safety Factor = 1389/439.5 = 3.2 OK

For Z-brackets similar to Micrometl design but modified to eliminate hidden structural fasteners anchored to 18 ga. (min) curb (by others):

Shear Strength in 18 ga. = 1218 lbs (ultimate)

Screw Load = (147090 + 88272)/3(4)(49.75) = 394.2 lbs (shear) at curb inside surface
Safety Factor = 1218/394.2 = 3.1 OK for Components and Cladding

For Brackets 3.25-4.13" wide x 2" x 2-1/2", 16 ga. (min), spaced 32" (min) on-center each long side, Using (3) screws per bracket, (3) brackets each side:

Anchor Load = (147090 + 88272)/3(60.25) = 1302.2 lbs (tension)
Anchor Load = 5958/6 = 993.0 lbs (shear) at 3/4" beyond base rail outer surface

For 3/8" SAE Gr. 5 bolts with nuts and washers to steel (by others):
Safety Factor = 3720/1302.2 = 2.9 (tension) OK
Safety Factor = 1937/993.0 = 2.0 (shear) OK

For 3/8" Powers Wedge-Bolt + anchors with 2-1/8" (min) embedment into 2000 psi (min) concrete (by others), 4" (min) thick, 2-3/4" (min) edge distance, and 2-1/2" (min) spacing:

Safety Factor = 3000/1302.2 = 2.3 (tension) OK
Safety Factor = 3100/993.0 = 3.1 (shear) OK

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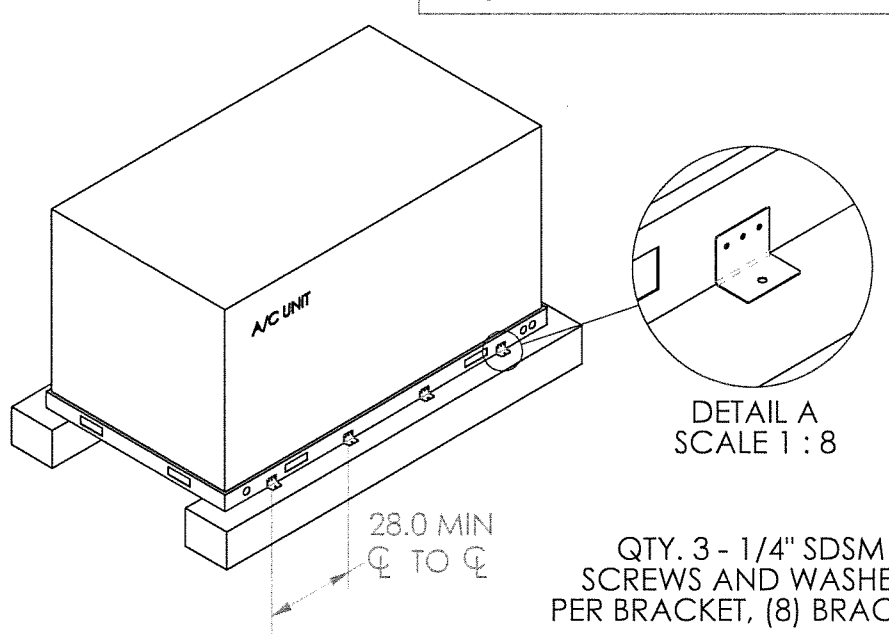
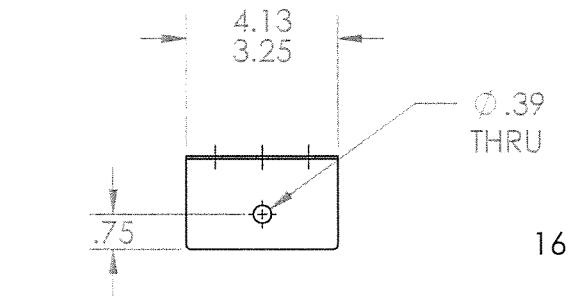
Job No: Carrier RTUs
Title: Model List and Details
Job No: Chassis 3 & 4
Date: 1-08-16
Created by: CORE

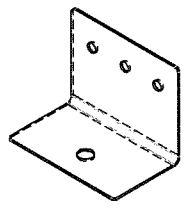
Optional Mounting



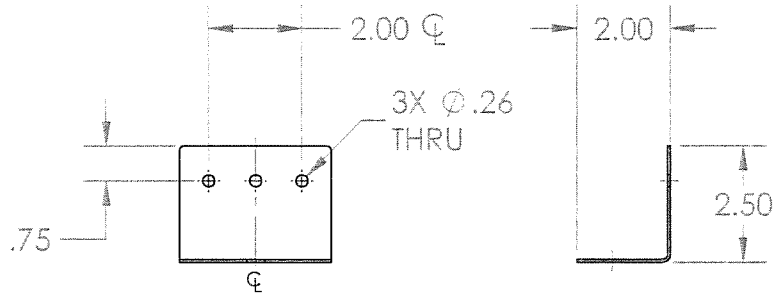
QTY. 3 - 1/4" SDSM
SCREWS AND WASHERS
PER BRACKET, (8) BRACKETS

QTY. 1 - 3/8" SAE GR5 BOLT, NUT AND WASHER
PER BRACKET INTO PROPERLY DESIGNED METAL
STAND (BY OTHERS)
OR
QTY. 1 - 3/8" POWERS WEDGE-BOLT+ ANCHOR
PER BRACKET INTO MINIMUM 2000 PSI CONCRETE
(BY OTHERS), AS FOLLOWS:
2-1/8" MIN EMBED
2-3/4" EDGE DISTANCE
2-1/2" MIN SPACING





GALVANIZED STEEL
16 GA., 90 DEG. BRACKET



CARRIER Chassis 5:
Models:
48/50TC - size 16, 50TCQ and 48/50HC - size 14,
50HCQ - size 12, 48/50LC - size 08(min) through 12 (max)

Each condenser unit listed above conforms to the Florida Building Code 5th Edition (2014) requirements for installation including High Velocity Hurricane Zone (HVHZ), Risk Category III/IV (V =186 MPH), exposure category "D", and installation height up to and including 65 feet above grade.

Worst Case is -16 (Chassis 5) 115-7/8" x 63-3/8" x 57-3/8"

ALLOWABLE DESIGN PRESSURES FOR THE UNIT ITSELF:

Design Lateral Pressure = 197.2 psf
Design Uplift Pressure = 95.4 psf

Unit itself will withstand wind loads imposed by 197.2 psf lateral and 95.4 psf uplift design pressures, provided the 16 GA. galvanized base rails are fastened to a properly designed concrete slab, metal stand, curb, curb adapter, or other suitable mounting arrangement and all factory supplied assembly fasteners are in place.

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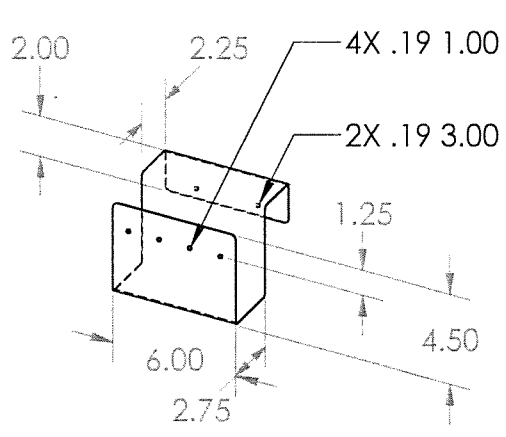
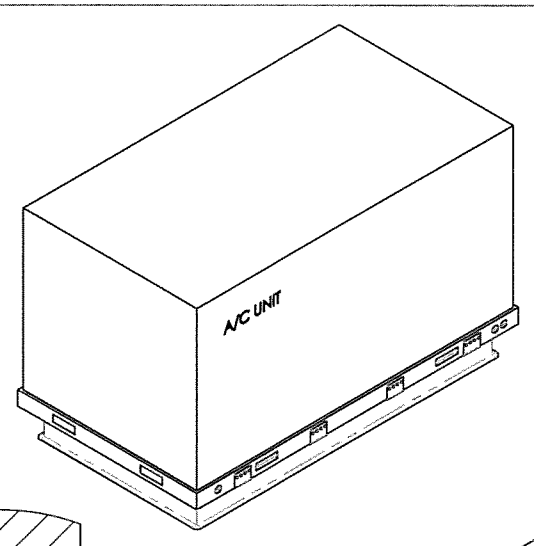
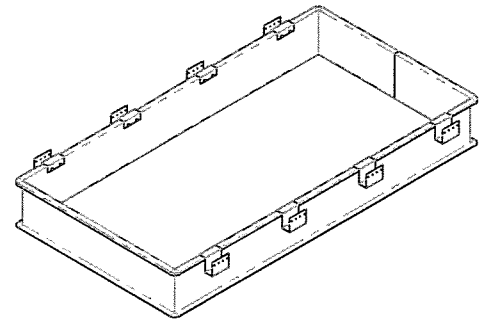
Curb Mounting

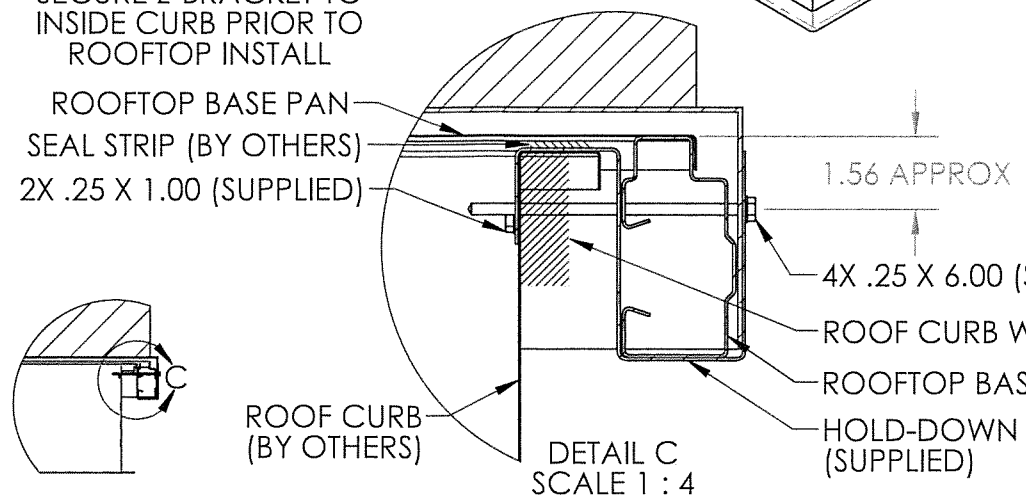


GALVANIZED STEEL, 16 GA.
SECURE Z-BRACKET TO
INSIDE CURB PRIOR TO
ROOFTOP INSTALL



QTY. 4 - TEK .25-6.00
GALVANIZED SHEETMETAL
S.D. SCREWS AND WASHERS
PER Z-BRACKET, (8) BRACKETS





DETAIL C
SCALE 1 : 4

QTY. 2 - TEK .25-1.00
GALVANIZED SHEETMETAL
S.D. SCREWS AND WASHERS
PER Z-BRACKET, (8) BRACKETS
PRIOR TO SEAL STRIP INSTALL

Job No: Carrier RTUs
Title: Model List and Details
Job No: Chassis 5
Data: 2-11-16
Created by: CORE

Rational Analysis: Worst case is - 16 (Chassis 5) 115-7/8" x 63-3/8" x 57-3/8"
Design Pressures complying to FBC Building 1620.6 (HVHZ):
V = 186 mph (Risk Cat. III/IV), For Exp.Cat. "D" and Z = 65 ft, Kz = 1.33, Kzt = 1.0, Kd = 0.90
Qz = .00256KzKztKdV2 = 106.0 psf
Lateral Wind Pressure = WL = Qz(3.1) = 328.64 psf
Uplift Wind Pressure = UL = Qz(1.5) = 159.02 psf
Factoring in the required Load Combination factor (0.6):

Design Lateral Pressure = WL(0.6) = 197.2 psf
Design Uplift Pressure = UL(0.6) = 95.4 psf

Since positive pressure acts toward the surface being considered and negative pressure acts away, only the uplift pressure will remove a panel from the machine. The design lateral pressure which is considered to act toward the windward surface is recognized to be a combination of the pressures acting on the windward and leeward surfaces. Wall pressure coefficients from ASCE7-10, Chapter 27, Figure 27.4-1 may be used to distribute the Design Lateral Pressure into positive and negative componenets acting on the windward and leeward surfaces, respectively.

L/B = 63.375/115.875 = 0.55 for wind on long (115-7/8") side
L/B = 115.875/63.375 = 1.83 for wind on short (63-3/8") side

Worst case positive pressure coefficient is 0.8 for windward wall which has a corresponding negative pressure coefficient of 0.5 on the leeward wall. The worst case negative pressure coefficient is 0.7 for the sidewall (side parallel to wind). Since the windward and leeward wall pressures act in the same direction, the distibuted pressures are computed as follows:

Lateral Positive Design Pressure = 197.18 (0.8) / (0.8 + 0.5) = 121.34 lb/ft2 (Worst Case Positve)
Lateral Negative Design Pressure = 197.18 (0.5) / (0.8 + 0.5) = 75.84 lb/ft2
Sidewall Negative Design Pressure = 197.18 (0.7) / (0.8 + 0.5) = 106.17 lb/ft2 (Worst Case Negative)

22, 20, and 18 ga. panels and columns are fastened together and to 16 ga. base rails using #10 serrated washer head self tapping screws having 0.425" head diameter, 0.19" nominal diameter, and 0.14 minor diameter. These screws are expected to exhibit the following properties based upon ICC-ES Report ESR-2196:
Pullout Strength in 22 ga. = 306 lbs (ultimate) Pullout Strength in 20 ga. = 351 lbs (ultimate)
Pullover Strength of 22 ga. = 828 lbs (ultimate) Pullover Strength of 20 ga. = 993 lbs (ultimate)
Shear Strength in 22 ga. = 684 lbs (ultimate) Shear Strength in 20 ga. = 684 lbs (ultimate)
Pullout Strength in 18 ga. = 450 lbs (ultimate)
Shear Strength in 16 ga. = 927 lbs (ultimate)

For Top Panel Assembly (50TM500066 and 50TM500065 joined using 50TM500359 and 12 screws):
114.4" x 61.6" draw formed 20 ga. assembly, anchored at edges and through top, to 16 ga. center panel and 18 ga. control box. Worst case portion is over air handler section since condenser section has (3) large holes in the top causing internal and external pressure to be equal. For portion tributary to air handling section:
A = 61.61(55.41)/12(12) = 23.70 sqft
Load = 23.70 (95.41) = 2261.9 lbs
For outside edge (9 screws, all in shear through 20 ga. top panel into 22 ga. indoor panel and corner posts):
Screw Load = 2261.9/2(9) = 125.7 lbs
Safety Factor = 684/125.7 = 5.4 OK
For inside edge (8 screws in tension through 20 ga. top panel into 16 ga. center panel and 4 screws in shear through top panel into 22 ga. center posts):
Screw Load = 2261.9/2(12) = 94.2 lbs
Safety Factor = 684/94.2 = 7.3 OK for Components and Cladding

For Inside Panel (50TM500063):
61.5" x 53.42" draw formed 22 ga. panel anchored at edges with 7 screws through top panel into face at top, 6 screws each vertical edge through flange perpendicular to face, and 6 screws at 7/16 inch above bottom edge through panel into base rail, and 5 screws between supply and return openings into stiffener (50TM500058) fastened to condensing coil.
A = 61.5(53.42)/12(12) = 22.81 sqft
Load = 22.81(106.17) = 2422.2 lbs
Screw Load = 2422.2/2(6+6) = 100.93 lbs
Safety Factor = 450/100.93 = 4.5 OK for Components and Cladding

For Access Panels (50TM500062):
53.30" x 25.61" draw formed 22 ga. panel anchored with 3 screws through face each vertical side, 2 screws through face at bottom edge into 16 ga. base rail, and top edge fits inside top panel (trapped).
A = 53.30(25.61)/12(12) = 9.48 sqft
Load = 9.48(106.17) = 1006.4 lbs
Screw Load = 1006.4/2(2 + 3) = 100.64 lbs
Safety Factor = 306/100.64 = 3.0 OK for Components and Cladding

For Access Panel Assembly(50TM500086 and 50TM500061):
53.0" x 53.30" assembly of draw formed 20 ga. panels anchored with (3) screws through face each vertical side, (5) screws through face at bottom edge intp 16 ga. base rail, and top edge fits inside top panel (trapped).

A = 53.0(53.30)/12(12) = 19.62 sqft
Load = 19.62(106.17) = 2082.8 lbs
Screw Load = 2082.8/2(5+3) = 130.17 lbs
Safety Factor = 306/130.17 = 2.4 OK for Components and Cladding

Remaining panels are trivial cases of the above due to greater fastener quantity or having openings that limit negative pressure effects.

For connection of upper frame and panels to base rails:
16 screws each long side fasten frame posts and 22 ga. (min) panels to the long 16 ga. base rails. 6 screws fasten inside panel to short base rail at air handler end. Opposite end is louvered and has a large opening in the top and mesh over cooling coils.

Lateral Wind Area = AL = 114.35(53.625)/12(12) = 42.58 sqft
Lateral Design Load = 42.58(197.18) = 8296.6 lbs
Overturning Moment = 8396.6(53.625)/2 = 225134 in-lb

Uplift Wind Area = AU = 114.35(61.61)/12(12) = 48.92 sqft
Uplift Design Load = 48.92(95.41) = 4667.9 lbs
Uplift Moment = 4667.9(61.61)/2 = 143794 in-lb

Screw Load = (225134 + 143794)/16(61.61) = 374.3 lbs (shear)
Safety Factor = 927/374.3 = 2.5 OK for Components and Cladding

Unit itself will withstand wind loads imposed by 197.18 psf lateral and 95.41 psf uplift design pressures provided the 16 ga. galvanized base rails are properly fastened to a suitable slab, stand, curb, curb adapter, or other suitable mounting arrangement and all factory supplied assembly fasteners are in place.

For connection of unit base rails to properly designed curb, metal stand, or structural concrete (by others):
Lateral Wind Area = AL = 115.875(57.375)/12(12) = 46.17 sqft
Lateral Design Load = 346.17(197.18) = 9103.6 lbs
Overturning Moment = 9103.6(57.375)/2 = 261159 in-lb
Uplift Wind Area = AU = 115.875(63.375)/12(12) = 51.00 sqft
Uplift Design Load = 51.00(95.41) – 0.6(1305) = 4082.6 lbs
Uplift Moment = 4082.6(63.375)/2 = 129369 in-lb

For connection of 16 ga. (min) straps, clips, or brackets spaced 28" min apart to unit base rails on long sides Using 1/4" (#14) self-drilling screws:
Pullout Strength in 16 ga. = 573 lbs (ultimate)
Shear Strength in 16 ga. = 1389 lbs (ultimate)

Using (3) screws per strap, clip, or bracket, with (4) straps, clips, or brackets each long side:
Screw Load = (261159 + 129369)/3(4)(63.375) = 513.5 lbs (shear) at base rail outer surface
Safety Factor = 1389/513.5 = 2.7 OK for Components and Cladding

For (4) Z-Brackets each long side similar to Micrometl design but modified to eliminate hidden structural fasteners anchored to 18 ga. (min) curb (by others):
Shear Strength in 18 ga. = 1218 lbs (ultimate)
Screw Load = (261159 + 129369)/3(4)(53.81) = 604.8 lbs (shear) at curb inside surface
Safety Factor = 1218/604.8 = 2.0 OK for Components and Cladding

For Brackets 3.25-4.13" wide x 2" x 2-1/2", 16 ga. (min), spaced 28" (min) on-center each long side, Using (3) screws per bracket, (4) brackets per side:
Anchor Load = (261159 + 129369)/4(64.125) = 1522.6 lbs (tension)
Anchor Load = 9103.6/8 = 1138.0 lbs (shear) at 3/4" beyond base rail outer surface

For 3/8" SAE Gr. 5 bolts with nuts and washers to steel (by others):
Safety Factor = 3720/1522.6 = 2.4 (tension) OK
Safety Factor = 1937/1138.0 = 1.7 (shear) OK

For 3/8" Powers Wedge-Bolt + anchors with 2-1/8" (min) embedment into 2000 psi (min) concrete (by others), 4" (min) thick, 2-3/4" (min) edge distance, and 2-1/2" (min) spacing:
Safety Factor = 3000/1522.6 = 2.0 (tension) OK
Safety Factor = 3100/1138.0 = 2.7 (shear) OK

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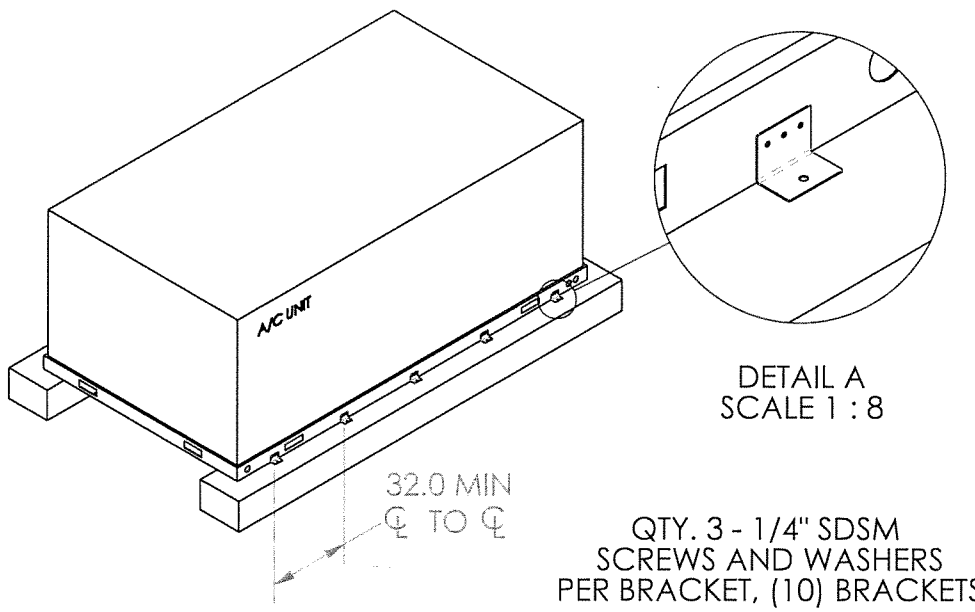
Job No: Carrier RTUs
Title: Model List and Details

Job No: Chassis 5
Date: 1-08-16
Created by: CORE

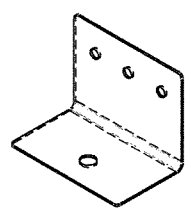
Optional Mounting



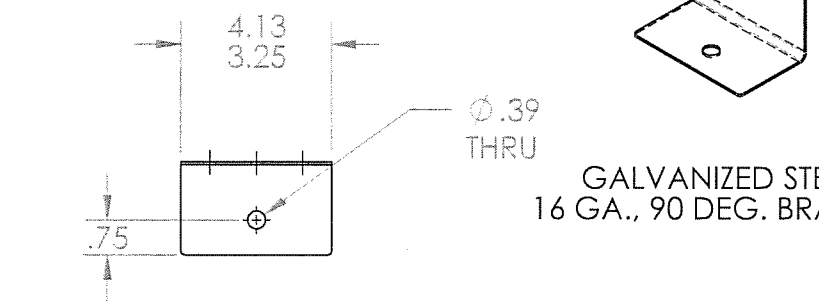
DETAIL A
SCALE 1 : 8

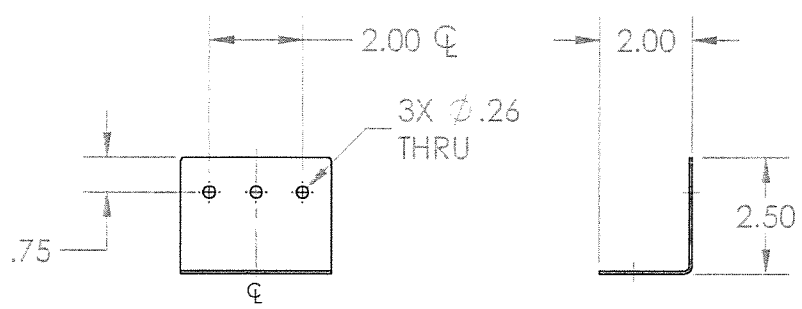
QTY. 3 - 1/4" SDSM
SCREWS AND WASHERS
PER BRACKET, (10) BRACKETS

QTY. 1 - 3/8" SAE GR5 BOLT, NUT AND WASHER
PER BRACKET INTO PROPERLY DESIGNED METAL
STAND (BY OTHERS)
OR
QTY. 1 - 3/8" POWERS WEDGE-BOLT+ ANCHOR
PER BRACKET INTO MINIMUM 2000 PSI CONCRETE
(BY OTHERS), AS FOLLOWS:
2-1/8" MIN EMBED
2-3/4" EDGE DISTANCE
2-1/2" MIN SPACING



GALVANIZED STEEL
16 GA., 90 DEG. BRACKET





CARRIER Chassis 6, 7, 8 & 9:
Models:
48/50TC - size 17 (min) through size 30 (max), 50TCQ - size 17 (min) through size 24 (max)
48/50HC - size 17 (min) through size 28 (max)
45/50LC - size 14 (min) through size 26 (max)

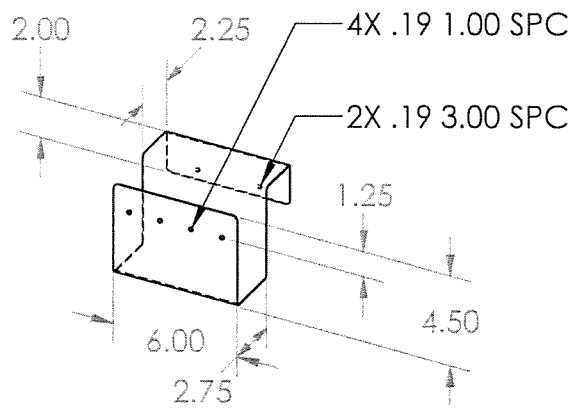
Each condenser unit listed above conforms to the Florida Building Code 5th Edition (2014) requirements for installation including High Velocity Hurricane Zone (HVHZ), Risk Category III/IV (V =186 MPH), exposure category "D", and installation height up to and including 65 feet above grade.

Worst Case is -26 (Chassis 9) 157-3/4" x 86-3/8" x 57-3/8"

ALLOWABLE DESIGN PRESSURES FOR THE UNIT ITSELF:

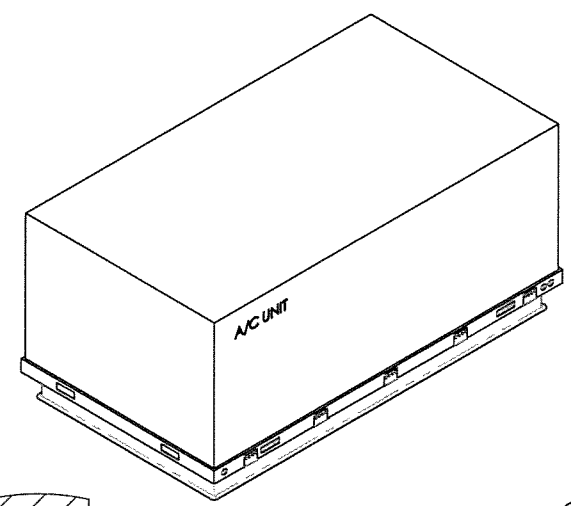
Design Lateral Pressure = 197.2 psf
Design Uplift Pressure = 95.4 psf

Unit itself will withstand wind loads imposed by 197.2 psf lateral and 95.4 psf uplift design pressures, provided the 16 GA. galvanized base rails are fastened to a properly designed concrete slab, metal stand, curb, curb adapter, or other suitable mounting arrangement and all factory supplied assembly fasteners are in place.

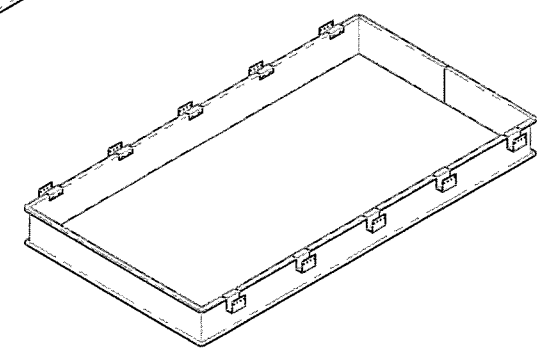


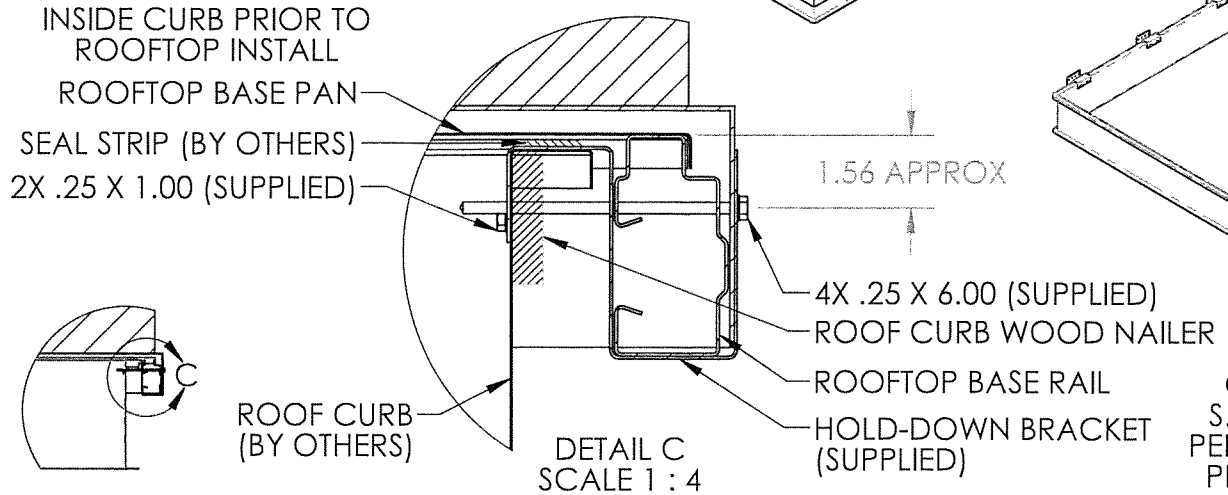
GALVANIZED STEEL, 16 GA.
SECURE Z-BRACKET TO
INSIDE CURB PRIOR TO
ROOFTOP INSTALL

Curb Mounting



QTY. 4 - TEK .25-6.00
GALVANIZED SHEETMETAL
S.D. SCREWS AND WASHERS
PER Z-BRACKET, (10) BRACKETS





DETAIL C
SCALE 1 : 4

QTY. 2 - TEK .25-1.00
GALVANIZED SHEETMETAL
S.D. SCREWS AND WASHERS
PER Z-BRACKET, (10) BRACKETS
PRIOR TO SEAL STRIP INSTALL

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Job No: Carrier RTUs
Title: Model List and Details
Job No: Chassis 6, 7, 8 & 9
Date: 2-11-16
Created by: CORE

Rational Analysis: Worst case is - 24 (Chassis 9) 157-3/4" x 86-3/8" x 57-3/8"

Design Pressures complying to FBC Building 1620.6 (HVHZ):
V = 186 mph (Risk Cat. III/IV), For Exp.Cat. "D" and Z = 65 ft, Kz = 1.33, Kzt = 1.0, Kd = 0.90
Qz = .00256KzKztKdV2 = 106.0 psf
Using 1620.6,
Lateral Wind Pressure = WL = qz(3.1) = 328.6 psf
Uplift Wind Pressure = UL = qz(1.5) = 159.0 psf
Factoring in the required Load Combination factor (0.6):

Design Lateral Pressure = WL(0.6) = 197.2 psf
Design Uplift Pressure = UL(0.6) = 95.4 psf

Since positive pressure acts toward the surface being considered and negative pressure acts away, only the uplift pressure will remove a panel from the machine. The design lateral pressure which is considered to act toward the windward surface is recognized to be a combination of the pressures acting on the windward and leeward surfaces. Wall pressure coefficients from ASCE7-10, Chapter 27, Figure 27.4-1 may be used to distribute the Design Lateral Pressure into positive and negative componenets acting on the windward and leeward surfaces, respectively.

L/B = 86.375/157.75 = 0.55 for wind on long (157-3/4") side
L/B = 157.75/86.375 = 1.83 for wind on short (86-3/8") side

Worst case positive pressure coefficient is 0.8 for windward wall which has a corresponding negative pressure coefficient of 0.5 on the leeward wall. The worst case negative pressure coefficient is 0.7 for the sidewall (side parallel to wind). Since the windward and leeward wall pressures act in the same direction, the distibuted pressures are computed as follows:

Lateral Positive Design Pressure = 197.18 (0.8) / (0.8 + 0.5) = 121.34 lb/ft2 (Worst Case Positve)
Lateral Negative Design Pressure = 197.18 (0.5) / (0.8 + 0.5) = 75.84 lb/ft2
Sidewall Negative Design Pressure = 197.18 (0.7) / (0.8 + 0.5) = 106.17 lb/ft2 (Worst Case Negative)

22, 20, and 18 ga. panels and columns are fastened together and to 16 ga. base rails using #10 serrated washer head self tapping screws having 0.425" head diameter, 0.19" nominal diameter, and 0.14 minor diameter. These screws are expected to exhibit the following properties based upon ICC-ES Report ESR-2196:
Pullout Strength in 22 ga. = 306 lbs (ultimate) Pullout Strength in 20 ga. = 351 lbs (ultimate)
Pullover Strength of 22 ga. = 828 lbs (ultimate) Pullover Strength of 20 ga. = 993 lbs (ultimate)
Shear Strength in 22 ga. = 684 lbs (ultimate) Shear Strength in 20 ga. = 684 lbs (ultimate)
Pullout Strength in 18 ga. = 450 lbs (ultimate)
Shear Strength in 16 ga. = 927 lbs (ultimate)

For Top Panel Assembly (50HE500275 and 50HE500276 joined using 6 screws):
85.0" x 82.5" draw formed 20 ga. assembly anchored at edges and through top to 16 ga. center panel, 18 ga, end panel assembly, 20 ga. side panels, and 18 ga. control box. This portion is over air handler section and is worst case since condenser section has three large holes in the top causing internal and external pressure to be equal.

A = 85.0(82.5)/12(12) = 48.70 sqft
Load = 48.70 (95.41) = 4646.3 lbs
For 8 (min) screws each 85.0" side into 18 ga. (min) panels and 12 screws each 82.5" side into 20 ga. (min) side panels:
Screw Load = 4646.3/2(8 + 12) = 116.2 lbs
Safety Factor = 684/116.2 = 5.9 OK for Components and Cladding

For End Panel Assembly (50HE500719 and 50HE500762 joined together using 7 screws):
73.0" x 53.5" draw formed 18 ga. panel anchored at edges with 5 screws through top panel into face at top, 5 screws each vertical edge face into 22 ga. (min) corner posts, and 5 screws at 3/8" inch above bottom edge through panel into base rail.

A = 73.0(53.5)/12(12) = 27.12 sqft
Load = 27.12(106.17) = 2879.5 lbs
Screw Load = 2879.5/2(5+5) = 143.97 lbs
Safety Factor = 306/143.97 = 2.1 OK for Components and Cladding

For Access Panel (50HE500423):
53.30" x 25.61" draw formed 22 ga. panel anchored with 3 screws through face each vertical side, 2 screws through face at bottom edge into 16 ga. base rail, and top edge fits inside top panel (trapped).

A = 53.5(26.4)/12(12) = 9.81 sqft
Load = 9.81(106.17) = 1041.4 lbs
Screw Load = 1041.4/2(3 + 3) = 86.78 lbs
Safety Factor = 306/86.78 = 3.5 OK for Components and Cladding

Remaining panels are trivial cases of the above due to greater fastener quantity or having openings that limit negative pressure effects.

For connection of upper frame and panels to base rails:
12 screws each long side fasten frame posts and 20 ga. (min) panels to the long 16 ga. base rails. 8 screws fasten inside panel to short base rail at air handler end. Opposite end is louvered and has a large opening in the top and mesh over cooling coils.

Lateral Wind Area = AL = 156.0(53.625)/12(12) = 58.09 sqft
Lateral Design Load = 58.09(197.18) = 11454.9 lbs
Overturning Moment = 11454.9(53.625)/2 = 307135 in-lb

Uplift Wind Area = AU = 156.0(85.0)/12(12) = 92.08 sqft
Uplift Design Load = 92.08(95.41) = 8785.7 lbs
Uplift Moment = 8785.7(85.0)/2 = 373391 in-lb

Screw Load = (307135 + 373391)/(16 + 8)(85.0) = 333.6 lbs (shear)
Safety Factor = 927/333.6 = 2.8 OK for Components and Cladding

Unit itself will withstand wind loads imposed by 197.18 psf lateral and 95.41 psf uplift design pressures provided the 16 gage galvanized base rails are properly fastened to a suitable slab, stand, curb, curb adapter, or other suitable mounting arrangement and all factory supplied assembly fasteners are in place.

For connection of unit base rails to properly designed curb, metal stand, or structural concrete (by others):
Lateral Wind Area = AL = 157.75(57.375)/12(12) = 62.85 sqft
Lateral Design Load = 62.85(197.18) = 12393.5 lbs
Overturning Moment = 12393.5(57.375)/2 = 355537 in-lb
Uplift Wind Area = AU = 157.75(86.375)/12(12) = 94.6 sqft
Uplift Design Load = 94.6(95.41) – 0.6(2248) = 7679.1 lbs
Uplift Moment = 7679.1(76.875)/2 = 295167 in-lb

For connection of 16 ga. (min) straps, clips, or brackets spaced 32" (min) apart to unit base rails Using 1/4" (#14) self-drilling screws:
Pullout Strength in 16 ga. = 573 lbs (ultimate)
Shear Strength in 16 ga. = 1389 lbs (ultimate)

Using (3) screws per strap, clip, or bracket, with 5 straps, clips, or brackets each long side:
Screw Load = (355537 + 295167)/3(5)(86.375) = 502.3 lbs (shear) at base rail outer surface
Safety Factor = 1389/502.3 = 2.8 OK for Components and Cladding

For (5) Z-Brackets each long side similar to Micrometl design but modified to eliminate hidden structural fasteners anchored to 18 ga. (min) curb (by others):

Shear Strength in 18 ga. = 1218 lbs (ultimate)

Screw Load = (355537 + 295167)/3(5)(76.875) = 564.3 lbs (shear) at curb inside surface
Safety Factor = 1218/564.3 = 2.2 OK for Components and Cladding

For brackets 3.25-4.13" wide x 2" x 2-1/2", 16 ga. (min), spaced 32" (min), on-center each long side: Using (3) screws per bracket, (5) brackets per side:

Anchor Load = (355537 + 295167)/5(87.125) = 1493.8 lbs (tension)
Anchor Load = 12393.5/10 = 1239.4 lbs (shear) at 3/4" beyond base rail outer surface

For 3/8" SAE Gr. 5 bolts with nuts and washers to steel (by others):
Safety Factor = 3720/1493.8 = 2.5 (tension) OK
Safety Factor = 1937/1239.4 = 1.6 (shear) OK

For 3/8" Powers Wedge-Bolt + anchors with 2-1/8" (min) embedment into 2000 psi (min) concrete (by others), 4" (min) thick, 2-3/4" (min) edge distance, and 2-1/2" (min) spacing:
Safety Factor = 3000/1493.8 = 2.0 (tension) OK
Safety Factor = 3100/1239.4 = 2.5 (shear) OK

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Title: Model List and Details
Job No: Chassis 6, 7, 8 & 9
Data: 1-08-16
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