



NO EXCEPTIONS TAKEN

MAKE CORRECTIONS NOTED

AMEND & RE-SUBMIT

SUBMIT SPECIFIED ITEM

REJECTED-SEE REMARKS

SEE COMMENTS BELOW

CHECKING IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. ANY ACTION SHOWN IS SUBJECT TO THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR DIMENSIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE, FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION, COORDINATION OF THE WORK WITH THAT OF OTHER TRADES AND THE SATISFACTORY PERFORMANCE OF THE WORK.

Stephen P. Doel
SIGNATURE

9/20/13
REVIEW DATE

Project: Marriott Hotel - Portland, Maine

Submittal: 230000/2.10 HVAC-5,6,7

Comments: NONE

Project Name: Marriott Courtyard
321 commercial Street
Portland, Maine 04101

Architect:

Contractor: Opechee Construction Corporation
11 Corporate Drive
Belmont, NH 03220

Subcontractor: Warren Mechanical, Inc.
P.O. Box 149
Westbrook, Maine 04098-0149

Supplier: Briggs Equipment Sales, Inc.
P.O. Box 1375
Gray, Maine 04039

Manufacturer: Daikin

Section: 230000/2.10 Heating, Ventilating and Air Conditioning Equipment (HVAC)

Contractor Review

Architect's Review

SUBMITTAL DATA

Project: Marriott Hotel

Mechanical Engineer: Bennett Engineering

Mechanical Contractor: Warren Mechanical

Date: September 17, 2013

Product: Rebel Rooftop Units

Specification Section: 230000

Revision: 02

Tag	Qty	Model / Description	Manufacturer
HVAC-5, 6, 7	3	DPS-007/ Applied RTUs	Daikin McQuay

Comments / Notes



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Technical Data Sheet for HVAC-5 Rebel



Job Information		Technical Data Sheet
Job Name	Marriott Hotel	
Date	9/17/2013	
Submitted By	AnnMarie Juliano	
Software Version	02.41	
Unit Tag	HVAC-5 Rebel	

Unit Overview					
Model Number	Voltage V/Hz/Phase	Design Cooling Capacity Btu/hr	AHRI 360 Standard Efficiency		ASHRAE 90.1
			EER	IEER	
DPS007A	208/60/3	96227	12.4	17.6	2010 Compliant

Unit	
Model Number:	DPS007A
Model Type:	Cooling
Heat Type:	Gas
Application:	Constant Volume
Outside Air:	100% Outside Air
Altitude:	0 ft
Approval	cETLus

Physical			
Dimensions and Weight			
Length	Height	Width	Weight
91.0 in	55.8 in	96.5 in	2054 lb
Corner Weights			
L1	L2	L3	L4
330 lb	336 lb	700 lb	688 lb
Construction			
Exterior	Insulation and Liners	Air Opening Location	
		Return	Supply
Painted Galvanized Steel	1" Injected Foam, R-7, Galvanized Steel Liner	None	Bottom

Electrical		
MCA	MROPD	SCCR
34.6 A	45 A	5 kAIC

Return/Outside/Exhaust Air		
Outside Air Option		
Type	Damper Pressure Drop	Exhaust Air Type
None	0.12 inH ₂ O	None

Filter Section				
Physical				
Type	Quantity / Size	Face Area	Face Velocity	Air Pressure Drop
Combo 2"/4" rack with 2" Merv 7	6 / 18 in x 24 in x 2 in	18.0 ft ²	177.8 ft/min	0.06

DX Cooling Coil

Physical							
Coil Type	Fins per Inch	Rows	Face Area	Face Velocity	Air Pressure drop	Drain Pan Material	
Cu Tube/ Al Fin	15	3	14.0 ft ²	228.2 ft/min	0.16 inH ₂ O	Stainless Steel	
Cooling Performance							
Capacity		Refrigerant Type	Indoor Air Temperature				Ambient Air Temperature °F
Total Btu/hr	Sensible Btu/hr		Entering		Leaving		
			Dry Bulb °F	Wet Bulb °F	Dry Bulb °F	Wet Bulb °F	
96227	78153	R410A	80.0	67.0	57.7	57.5	95.0

Fan Section

Fan				
Type			Fan Wheel Diameter	
SWSI AF			14 in	
Performance				
Airflow	Total Static Pressure	Fan Speed	Brake Horsepower	Altitude
3200 CFM	1.2 inH ₂ O	2491 rpm	1.45 HP	0 ft
Motor				Drive
Type	Horsepower	Efficiency	FLA	Type
ECM Motor	2.3	Premium	5.0 A	Direct Drive

Gas Heat Section

Physical		Performance					
Size	Capacity Btu/hr	Air Temperature Dry Bulb		Air Pressure Drop inH ₂ O	Gas Pressure		Modulation
		Entering °F	Leaving °F		Minimum inH ₂ O	Maximum inH ₂ O	
300 MBH	240000	-5.0	64.1	0.15	7	14	Modulating 5:1 Turndown
Heat Exchanger Material:		Stainless Steel					

Condensing Section

Compressor				
Type	Quantity	Total Power	Capacity Control	Compressor Isolation
Inverter Scroll + Fixed Scroll	2	5.6 kW	Mod Control with Inverter Compressors	Rubber in Shear
Compressor Amps:				
Compressor 1			11.9 A	
Compressor 2			8.6 A	
Condenser Coil				
Type	Fins per Inch		Fin Material	
Aluminum Micro channel	19		Aluminum	
Condenser Fan Motors				
Number of Motors			Full Load Current	
2			4.0 A	
AHRI 360 Certified Data at AHRI 360 Standard Conditions				
Net Capacity	EER	IEER	ASHRAE 90.1	
89000 Btu/hr	12.4	17.6	2010 Compliant	

Internal Pressure Drop Calculation

External Static Pressure:	0.75 inH ₂ O
Filter:	0.06 inH ₂ O
Outside Air:	0.12 inH ₂ O
DX Coil:	0.16 inH ₂ O
Gas Heat:	0.15 inH ₂ O
Total Static Pressure:	1.25 inH ₂ O

Sound

Sound Power (db)							
Frequency	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Inlet	75	83	78	80	79	74	69
Discharge	78	86	83	86	85	82	77
Radiated	85	81	78	76	71	64	57

Options

Electrical	
Field Connection:	Non-Fused Disconnect Switch

Warranty

Parts:	Standard One Year
Compressor:	Additional Four Year, Five Year Total
Gas Heat Exchanger:	Extended Nine Year, Ten Year Total

AHRI Certification

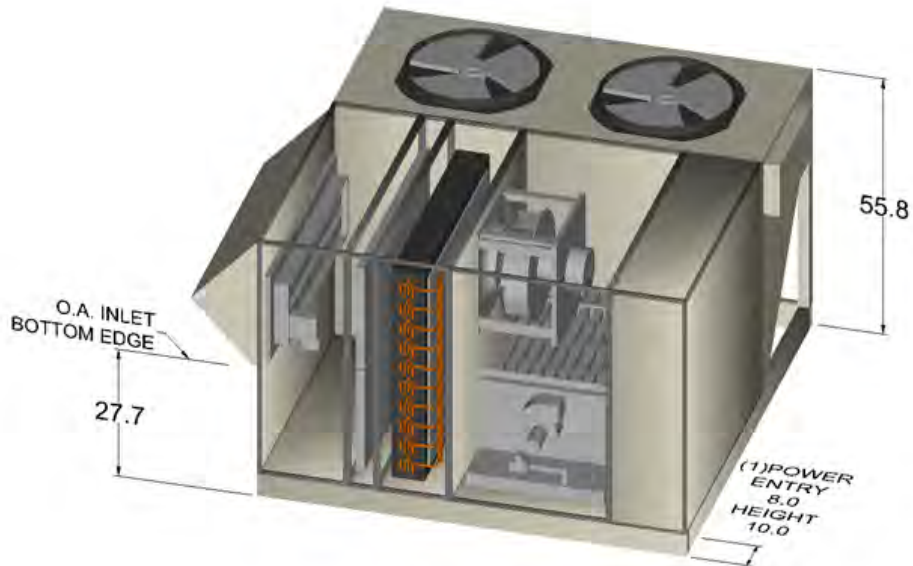


All equipment is rated and certified in accordance with AHRI 360.

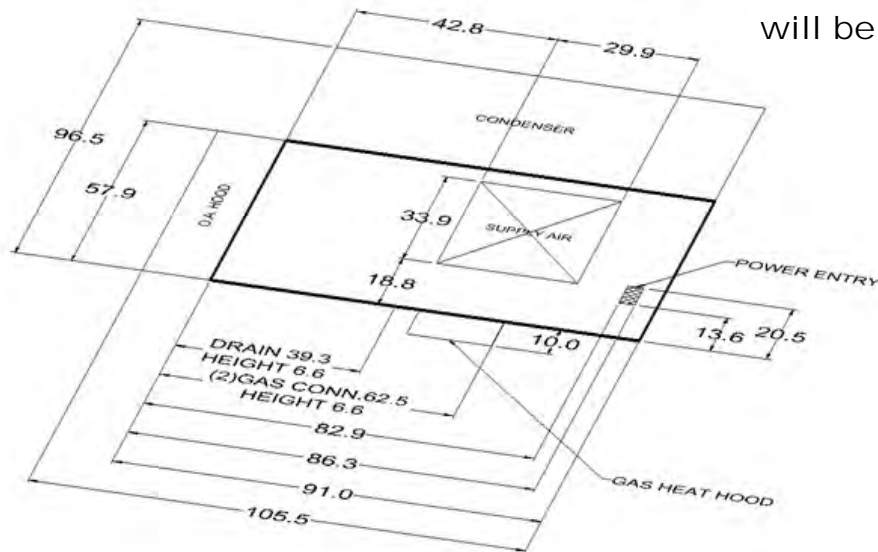
Notes

Drawings for HVAC-5 Rebel

	Rebel Rooftop Unit Certified Drawing	
	<small>McQuay International certifies that its equipment will conform to this drawing and McQuay's published specifications, subject to its published warranty. Purchaser must determine that the equipment is fit and sufficient for the job specifications. No change to this drawing may be made unless approved in writing by McQuay www.DaikinMcQuay.com © 2013 McQuay International</small>	<small>Model: DPS007A</small>
	<small>Unit Tag: HVAC-5 Rebel</small>	<small>Date: 9/17/2013</small>
	<small>Units: in</small>	<small>Sheet: 1 of 3</small>




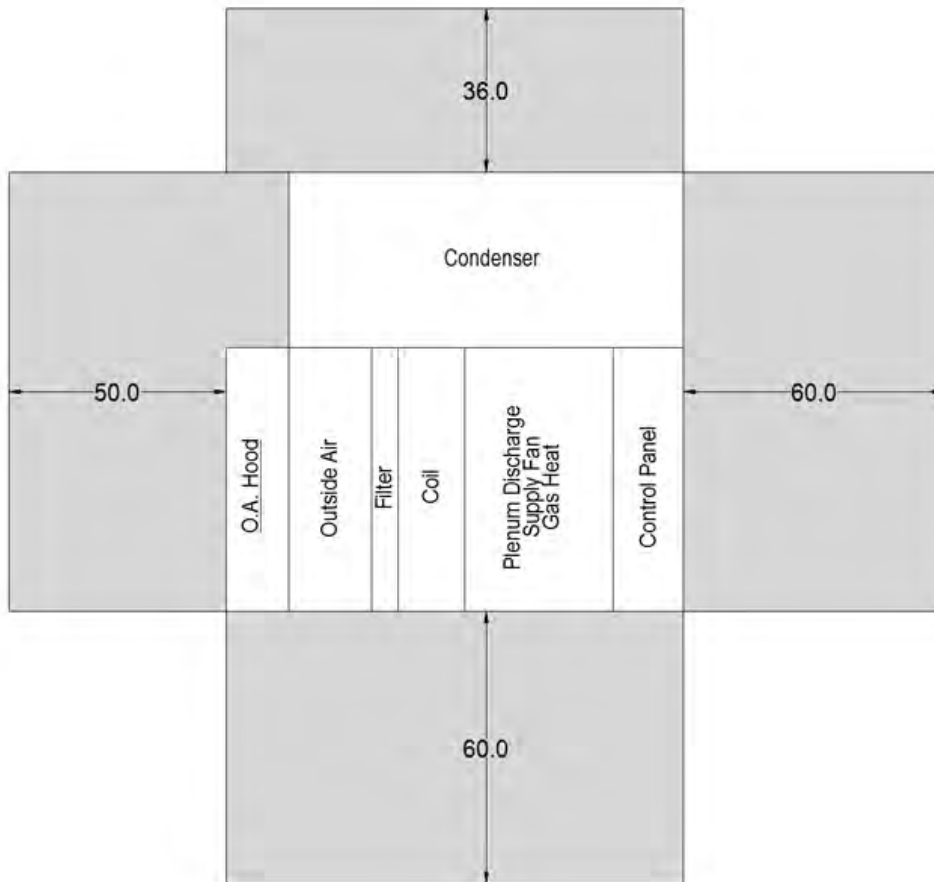
Horizontal discharge curb will be provided



- Notes:
- (1) Recommended location for optional field cut side power connection.
 - (2) Horizontal gas connection only. Gas pipe routing within the roofcurb is not available.

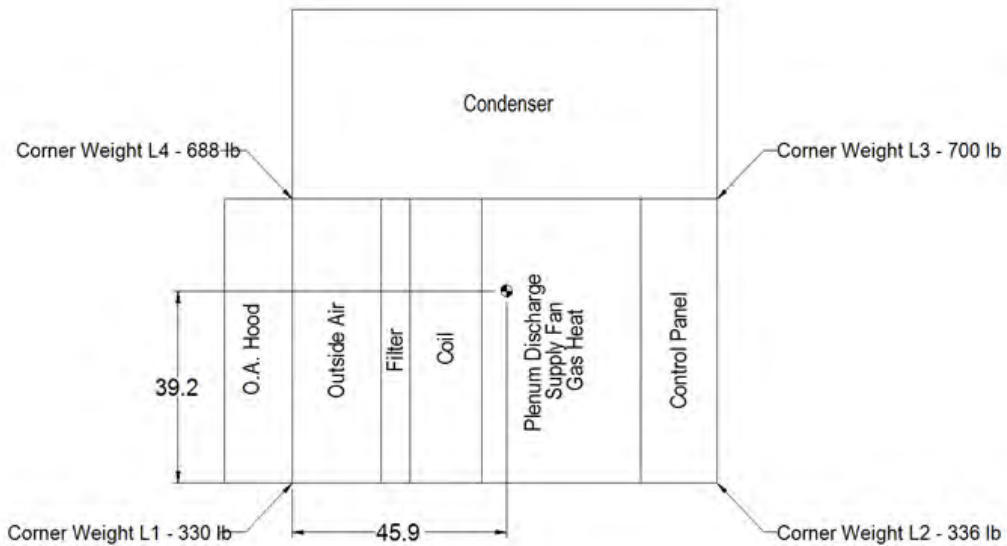
Drawings for HVAC-5 Rebel

	Unit Service Clearance Area	
	<small>McQuay International certifies that its equipment will conform to this drawing and McQuay's published specifications, subject to its published warranty. Purchaser must determine that the equipment is fit and sufficient for the job specifications. No change to this drawing may be made unless approved in writing by McQuay. www.DaikinMcQuay.com ©2013 McQuay International</small>	
	Model: DPS007A Date: 9/17/2013	Units: In Sheet: 2 of 3
Unit Tag: HVAC-5 Rebel		



Drawings for HVAC-5 Rebel

DAIKIN McQUAY®	Center-of-Gravity and Corner Weights	
	<small>McQuay International certifies that its equipment will conform to this drawing and McQuay's published specifications, subject to its published warranty. Purchaser must determine that the equipment is fit and sufficient for the job specifications. No change to this drawing may be made unless approved in writing by McQuay. www.DaikinMcQuay.com © 2013 McQuay International</small>	
	<small>Model: DPS007A</small> <small>Date: 9/17/2013</small>	<small>Unit Tag: HVAC-5 Rebel</small>
	<small>Units: in</small>	<small>Sheet: 3 of 3</small>



Notes:
 (1) Center of Gravity Height = 27.2
 (2) Total Weight = 2054 lb

Technical Data Sheet for HVAC-6 Rebel



Job Information		Technical Data Sheet
Job Name	Marriott Hotel	
Date	9/17/2013	
Submitted By	AnnMarie Juliano	
Software Version	02.41	
Unit Tag	HVAC-6 Rebel	

Unit Overview					
Model Number	Voltage V/Hz/Phase	Design Cooling Capacity Btu/hr	AHRI 360 Standard Efficiency		ASHRAE 90.1
			EER	IEER	
DPS007A	208/60/3	94264	12.4	17.6	2010 Compliant

Unit	
Model Number:	DPS007A
Model Type:	Cooling
Heat Type:	Gas
Application:	Constant Volume
Outside Air:	100% Outside Air
Altitude:	0 ft
Approval	cETLus

Physical			
Dimensions and Weight			
Length	Height	Width	Weight
91.0 in	55.8 in	96.5 in	2079 lb
Corner Weights			
L1	L2	L3	L4
335 lb	343 lb	709 lb	692 lb
Construction			
Exterior	Insulation and Liners	Air Opening Location	
		Return	Supply
Painted Galvanized Steel	1" Injected Foam, R-7, Galvanized Steel Liner	None	Bottom

Electrical		
MCA	MROPD	SCCR
38.4 A	50 A	5 kAIC

Return/Outside/Exhaust Air		
Outside Air Option		
Type	Damper Pressure Drop	Exhaust Air Type
None	0.09 inH ₂ O	None

Filter Section				
Physical				
Type	Quantity / Size	Face Area	Face Velocity	Air Pressure Drop
Combo 2"/4" rack with 2" Merv 7	6 / 18 in x 24 in x 2 in	18.0 ft ²	152.8 ft/min	0.05

DX Cooling Coil

Physical							
Coil Type	Fins per Inch	Rows	Face Area	Face Velocity	Air Pressure drop	Drain Pan Material	
Cu Tube/ Al Fin	15	3	14.0 ft ²	196.1 ft/min	0.13 inH ₂ O	Stainless Steel	
Cooling Performance							
Capacity		Refrigerant Type	Indoor Air Temperature				Ambient Air Temperature °F
Total Btu/hr	Sensible Btu/hr		Entering		Leaving		
			Dry Bulb °F	Wet Bulb °F	Dry Bulb °F	Wet Bulb °F	
94264	71716	R410A	80.0	67.0	56.2	56.1	95.0

Fan Section

Fan				
Type			Fan Wheel Diameter	
SWSI AF			16 in	
Performance				
Airflow	Total Static Pressure	Fan Speed	Brake Horsepower	Altitude
2750 CFM	1.1 inH ₂ O	1645 rpm	0.83 HP	0 ft
Motor				Drive
Type	Horsepower	Efficiency	FLA	Type
ECM Motor	4.0	Premium	8.8 A	Direct Drive

Gas Heat Section

Physical		Performance					
Size	Capacity Btu/hr	Air Temperature Dry Bulb		Air Pressure Drop inH ₂ O	Gas Pressure		Modulation
		Entering °F	Leaving °F		Minimum inH ₂ O	Maximum inH ₂ O	
300 MBH	240000	-5.0	75.4	0.12	7	14	Modulating 5:1 Turndown
Heat Exchanger Material:		Stainless Steel					

Condensing Section

Compressor				
Type	Quantity	Total Power	Capacity Control	Compressor Isolation
Inverter Scroll + Fixed Scroll	2	5.6 kW	Mod Control with Inverter Compressors	Rubber in Shear
Compressor Amps:				
Compressor 1			11.9 A	
Compressor 2			8.6 A	
Condenser Coil				
Type	Fins per Inch	Fin Material		
Aluminum Micro channel	19	Aluminum		
Condenser Fan Motors				
Number of Motors		Full Load Current		
2		4.0 A		
AHRI 360 Certified Data at AHRI 360 Standard Conditions				
Net Capacity	EER	IEER	ASHRAE 90.1	
89000 Btu/hr	12.4	17.6	2010 Compliant	

Internal Pressure Drop Calculation

External Static Pressure:	0.75 inH ₂ O
Filter:	0.05 inH ₂ O
Outside Air:	0.09 inH ₂ O
DX Coil:	0.13 inH ₂ O
Gas Heat:	0.12 inH ₂ O
Total Static Pressure:	1.13 inH ₂ O

Sound

Sound Power (db)							
Frequency	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Inlet	68	76	71	73	67	62	56
Discharge	71	79	76	79	73	70	64
Radiated	85	81	78	76	71	64	57

Options

Electrical	
Field Connection:	Non-Fused Disconnect Switch

Warranty

Parts:	Standard One Year
Compressor:	Additional Four Year, Five Year Total
Gas Heat Exchanger:	Extended Nine Year, Ten Year Total

AHRI Certification

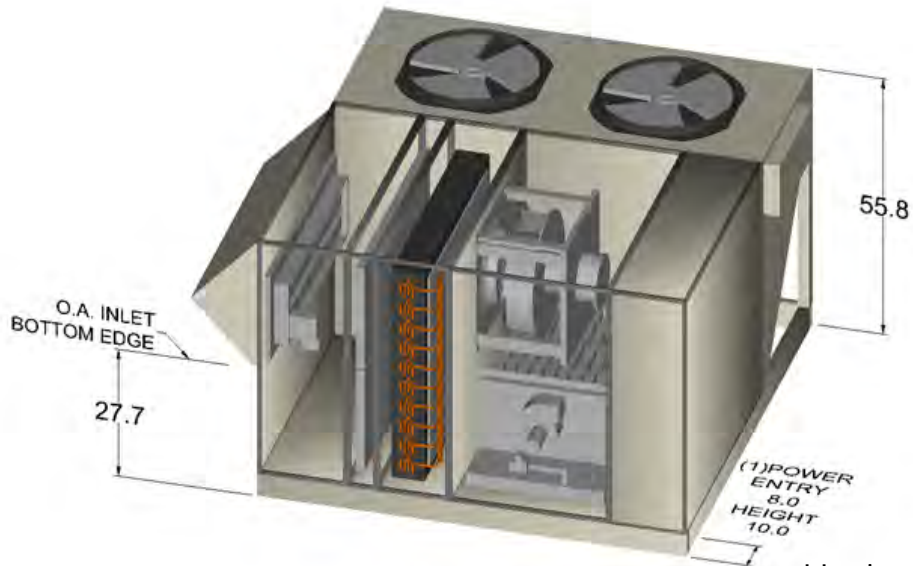


All equipment is rated and certified in accordance with AHRI 360.

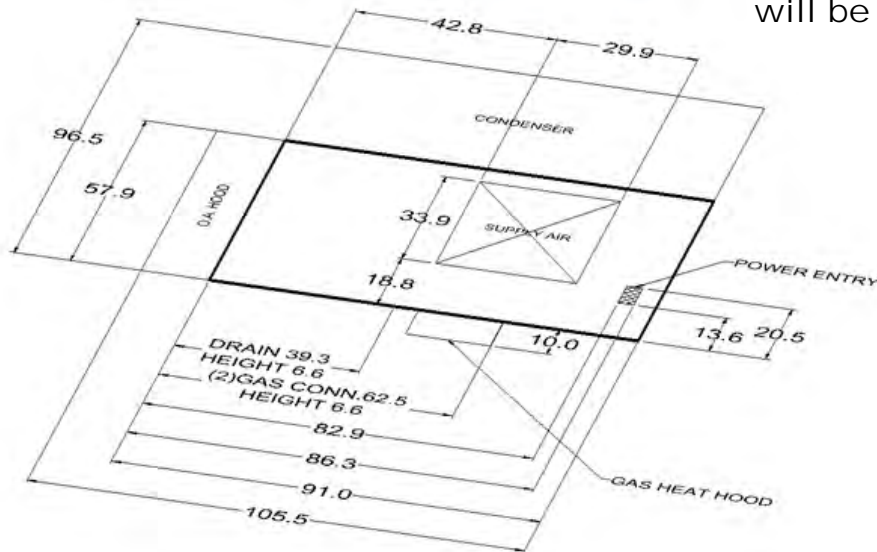
Notes

Drawings for HVAC-6 Rebel

DAIKIN McQUAY®	Rebel Rooftop Unit Certified Drawing		
	McQuay International certifies that its equipment will conform to this drawing and McQuay's published specifications, subject to its published warranty. Purchaser must determine that the equipment is fit and sufficient for the job specifications. No change to this drawing may be made unless approved in writing by McQuay www.DaikinMcQuay.com © 2013 McQuay International		Model: DPS007A
	Unit Tag: HVAC-6 Rebel		Date: 9/17/2013
	Units: in	Sheet: 1 of 3	



Horizontal discharge curb will be provided

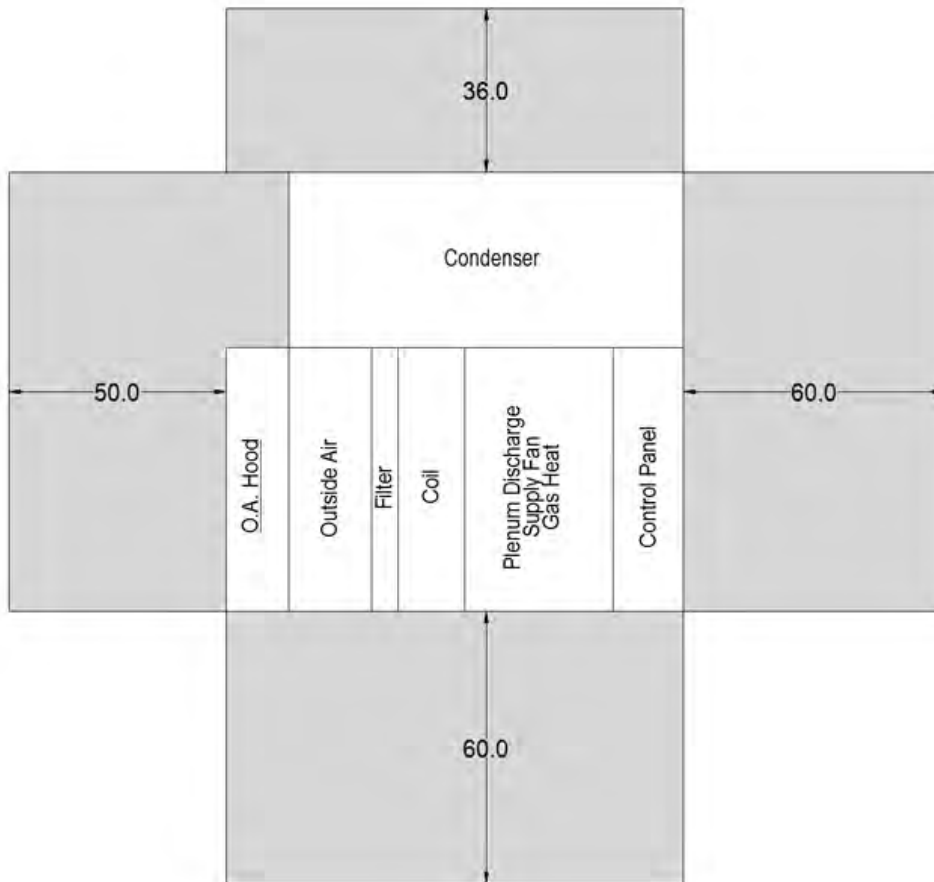


Notes:

- (1) Recommended location for optional field cut side power connection.
- (2) Horizontal gas connection only. Gas pipe routing within the roofcurb is not available.

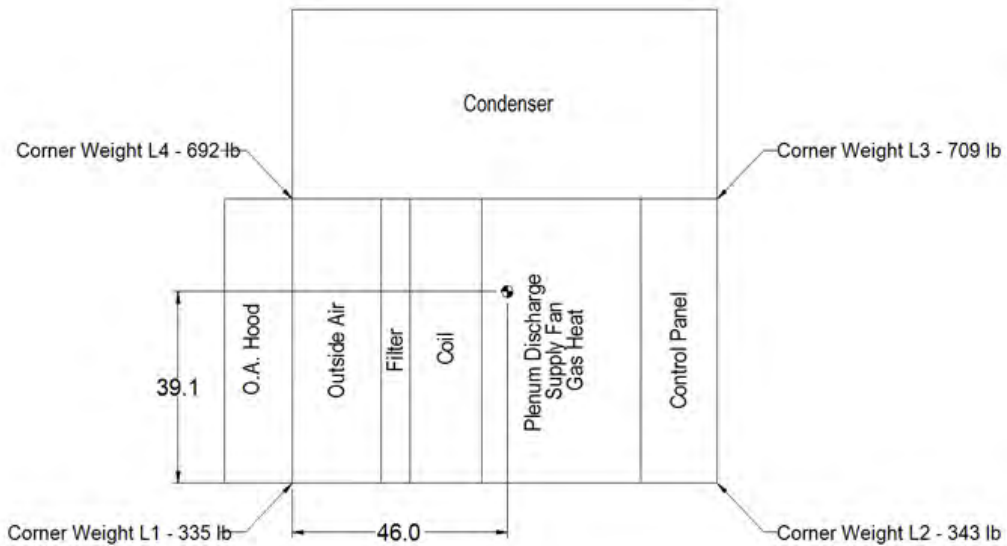
Drawings for HVAC-6 Rebel

DAIKIN McQUAY®	Unit Service Clearance Area	
	<small>McQuay International certifies that its equipment will conform to this drawing and McQuay's published specifications, subject to its published warranty. Purchaser must determine that the equipment is fit and sufficient for the job specifications. No change to this drawing may be made unless approved in writing by McQuay. www.DaikinMcQuay.com ©2013 McQuay International</small>	
	Model: DPS007A Date: 9/17/2013	Unit Tag: HVAC-6 Rebel Units: In
		Sheet: 2 of 3



Drawings for HVAC-6 Rebel

DAIKIN McQUAY®	Center-of-Gravity and Corner Weights	
	<small>McQuay International certifies that its equipment will conform to this drawing and McQuay's published specifications, subject to its published warranty. Purchaser must determine that the equipment is fit and sufficient for the job specifications. No change to this drawing may be made unless approved in writing by McQuay. www.DaikinMcQuay.com © 2013 McQuay International</small>	
	Model: DPS007A Date: 9/17/2013	Units: in Sheet: 3 of 3



Notes:
 (1) Center of Gravity Height = 27.3
 (2) Total Weight = 2079 lb

Technical Data Sheet for HVAC-7 Rebel



Job Information		Technical Data Sheet
Job Name	Marriott Hotel	
Date	9/17/2013	
Submitted By	AnnMarie Juliano	
Software Version	02.41	
Unit Tag	HVAC-7 Rebel	

Unit Overview					
Model Number	Voltage V/Hz/Phase	Design Cooling Capacity Btu/hr	AHRI 360 Standard Efficiency		ASHRAE 90.1
			EER	IEER	
DPS007A	208/60/3	99067	12.4	17.6	2010 Compliant

Unit	
Model Number:	DPS007A
Model Type:	Cooling
Heat Type:	Gas
Application:	Constant Volume
Outside Air:	100% Outside Air
Altitude:	0 ft
Approval	cETLus

Physical				
Dimensions and Weight				
Length	Height	Width	Weight	
91.0 in	55.8 in	96.5 in	2079 lb	
Corner Weights				
L1	L2	L3	L4	
335 lb	343 lb	709 lb	692 lb	
Construction				
Exterior	Insulation and Liners	Air Opening Location		
		Return	Supply	
Painted Galvanized Steel	1" Injected Foam, R-7, Galvanized Steel Liner	None	Bottom	

Electrical		
MCA	MROPD	SCCR
38.4 A	50 A	5 kAIC

Return/Outside/Exhaust Air		
Outside Air Option		
Type	Damper Pressure Drop	Exhaust Air Type
None	0.20 inH ₂ O	None

Filter Section				
Physical				
Type	Quantity / Size	Face Area	Face Velocity	Air Pressure Drop
Combo 2"/4" rack with 2" Merv 7	6 / 18 in x 24 in x 2 in	18.0 ft ²	227.8 ft/min	0.10

DX Cooling Coil

Physical							
Coil Type	Fins per Inch	Rows	Face Area	Face Velocity	Air Pressure drop	Drain Pan Material	
Cu Tube/ Al Fin	15	3	14.0 ft ²	292.4 ft/min	0.21 inH ₂ O	Stainless Steel	
Cooling Performance							
Capacity		Refrigerant Type	Indoor Air Temperature				Ambient Air Temperature °F
Total Btu/hr	Sensible Btu/hr		Entering		Leaving		
			Dry Bulb °F	Wet Bulb °F	Dry Bulb °F	Wet Bulb °F	
99067	90484	R410A	80.0	67.0	59.8	59.5	95.0

Fan Section

Fan				
Type			Fan Wheel Diameter	
SWSI AF			16 in	
Performance				
Airflow	Total Static Pressure	Fan Speed	Brake Horsepower	Altitude
4100 CFM	1.5 inH ₂ O	2254 rpm	1.99 HP	0 ft
Motor				Drive
Type	Horsepower	Efficiency	FLA	Type
ECM Motor	4.0	Premium	8.8 A	Direct Drive

Gas Heat Section

Physical		Performance					
Size	Capacity Btu/hr	Air Temperature Dry Bulb		Air Pressure Drop inH ₂ O	Gas Pressure		Modulation
		Entering °F	Leaving °F		Minimum inH ₂ O	Maximum inH ₂ O	
400 MBH	320000	-5.0	66.9	0.24	7	14	Modulating 5:1 Turndown
Heat Exchanger Material:		Stainless Steel					

Condensing Section

Compressor				
Type	Quantity	Total Power	Capacity Control	Compressor Isolation
Inverter Scroll + Fixed Scroll	2	5.6 kW	Mod Control with Inverter Compressors	Rubber in Shear
Compressor Amps:				
Compressor 1			11.9 A	
Compressor 2			8.6 A	
Condenser Coil				
Type	Fins per Inch	Fin Material		
Aluminum Micro channel	19	Aluminum		
Condenser Fan Motors				
Number of Motors		Full Load Current		
2		4.0 A		
AHRI 360 Certified Data at AHRI 360 Standard Conditions				
Net Capacity	EER	IEER	ASHRAE 90.1	
89000 Btu/hr	12.4	17.6	2010 Compliant	

Internal Pressure Drop Calculation

External Static Pressure:	0.75 inH ₂ O
Filter:	0.10 inH ₂ O
Outside Air:	0.20 inH ₂ O
DX Coil:	0.21 inH ₂ O
Gas Heat:	0.24 inH ₂ O
Total Static Pressure:	1.51 inH ₂ O

Sound

Sound Power (db)							
Frequency	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Inlet	78	86	81	83	77	72	66
Discharge	81	89	86	89	83	80	74
Radiated	85	81	78	76	71	64	57

Options

Electrical	
Field Connection:	Non-Fused Disconnect Switch

Warranty

Parts:	Standard One Year
Compressor:	Additional Four Year, Five Year Total
Gas Heat Exchanger:	Extended Nine Year, Ten Year Total

AHRI Certification

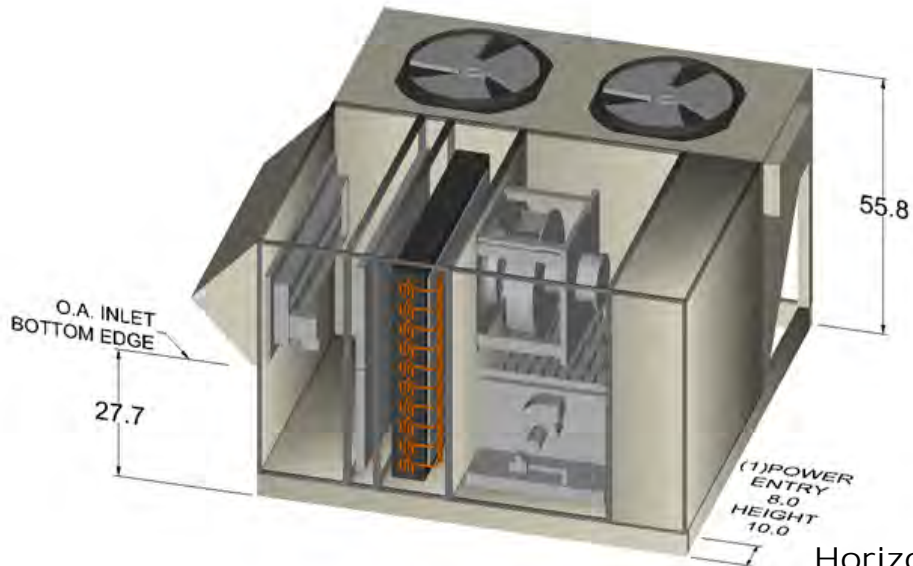


All equipment is rated and certified in accordance with AHRI 360.

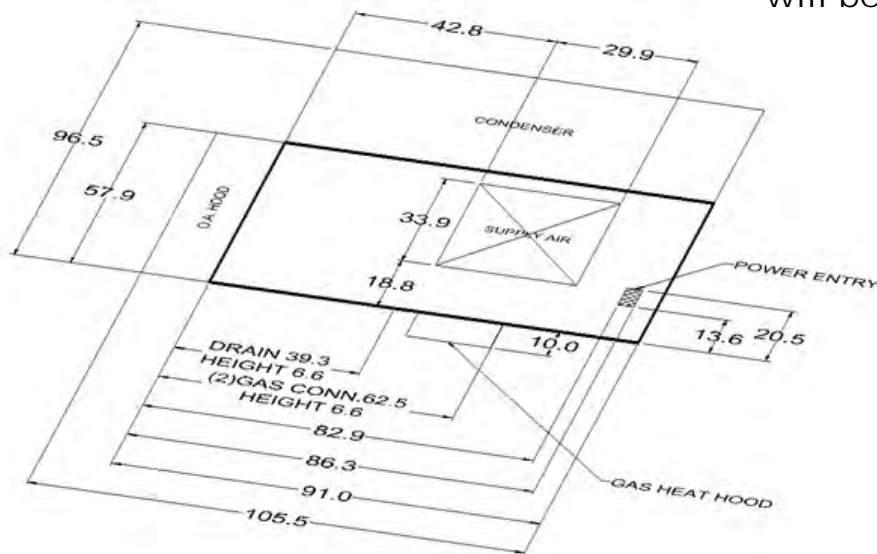
Notes

Drawings for HVAC-7 Rebel

	Rebel Rooftop Unit Certified Drawing	
	<small>McQuay International certifies that its equipment will conform to this drawing and McQuay's published specifications, subject to its published warranty. Purchaser must determine that the equipment is fit and sufficient for the job specifications. No change to this drawing may be made unless approved in writing by McQuay www.DaikinMcQuay.com © 2013 McQuay International</small>	<small>Model: DPS007A</small> <small>Date: 9/17/2013</small>
	Unit Tag: HVAC-7 Rebel	<small>Units: in</small> <small>Sheet: 1 of 3</small>




Horizontal discharge curb will be provided

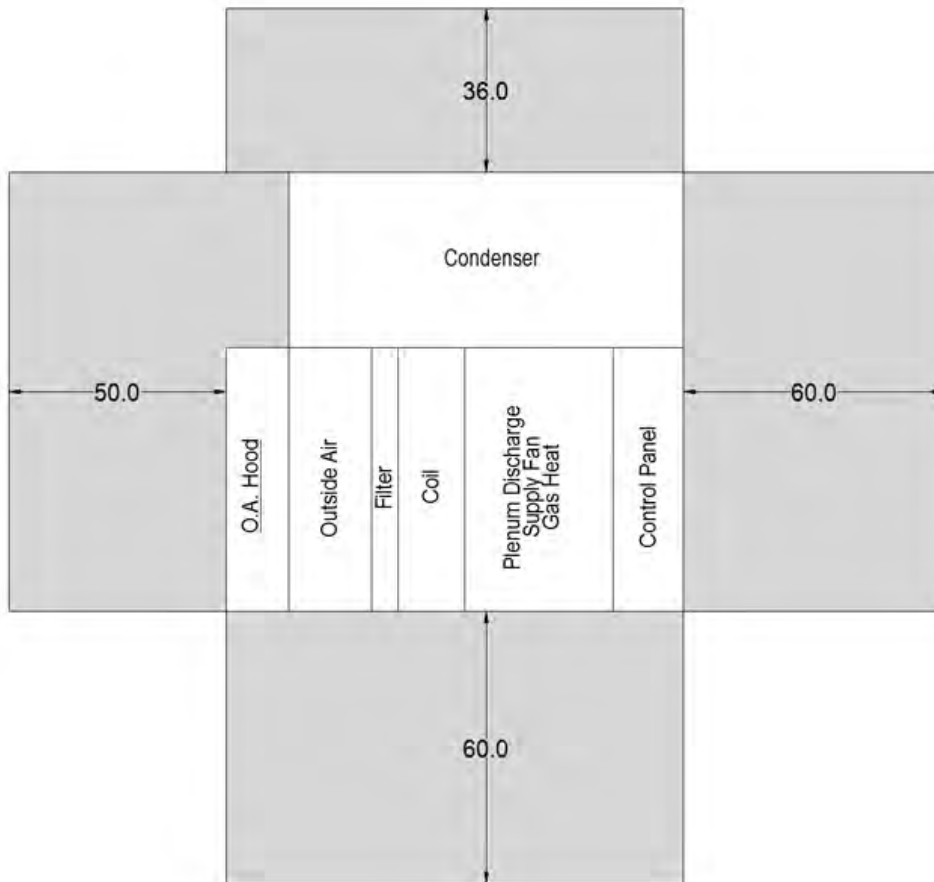


Notes:

- (1) Recommended location for optional field cut side power connection.
- (2) Horizontal gas connection only. Gas pipe routing within the roofcurb is not available.

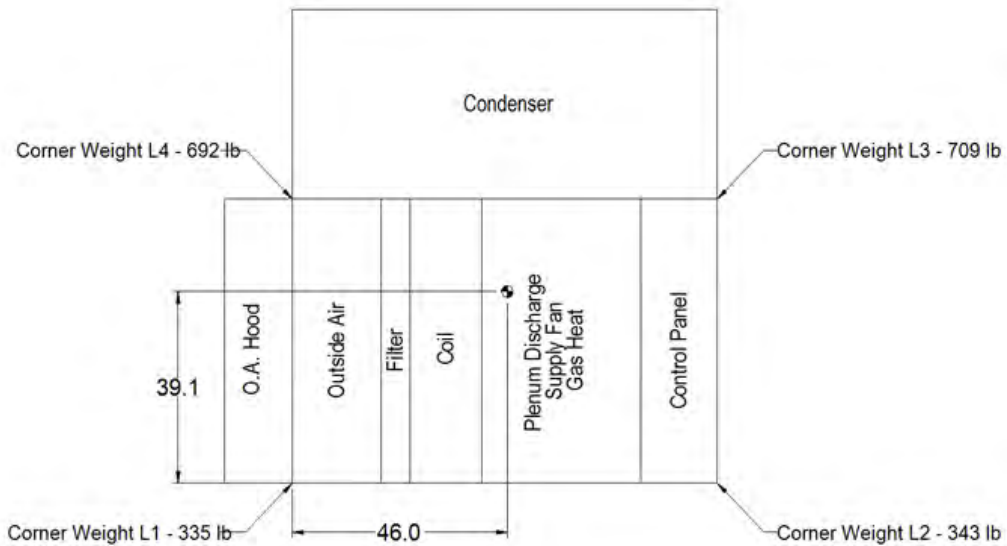
Drawings for HVAC-7 Rebel

	Unit Service Clearance Area	
	<small>McQuay International certifies that its equipment will conform to this drawing and McQuay's published specifications, subject to its published warranty. Purchaser must determine that the equipment is fit and sufficient for the job specifications. No change to this drawing may be made unless approved in writing by McQuay. www.DaikinMcQuay.com ©2013 McQuay International</small>	
	Model: DPS007A Date: 9/17/2013	Units: In Sheet: 2 of 3
Unit Tag: HVAC-7 Rebel		



Drawings for HVAC-7 Rebel

DAIKIN McQUAY®	Center-of-Gravity and Corner Weights	
	<small>McQuay International certifies that its equipment will conform to this drawing and McQuay's published specifications, subject to its published warranty. Purchaser must determine that the equipment is fit and sufficient for the job specifications. No change to this drawing may be made unless approved in writing by McQuay. www.DaikinMcQuay.com © 2013 McQuay International</small>	
	Model: DPS007A Date: 9/17/2013	Units: in Sheet: 3 of 3



Notes:
 (1) Center of Gravity Height = 27.3
 (2) Total Weight = 2079 lb

Specification for MST DPS ALL

PART 1: GENERAL

1.01 SECTION INCLUDES

- A. Packaged Rooftop air conditioners

1.02 REFERENCES

- A. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
- B. AMCA 99—Standards Handbook
- C. AMCA 210—Laboratory Methods of Testing Fans for Rating Purposes
- D. AMCA 500—Test Methods for Louver, Dampers, and Shutters.
- E. AHRI 340/360 - Unitary Large Equipment
- F. NEMA MG1—Motors and Generators
- G. National Electrical Code.
- H. NFPA 70—National Fire Protection Agency.
- I. SMACNA—HVAC Duct Construction Standards—Metal and Flexible.
- J. UL 900—Test Performance of Air Filter Units.

1.03 SUBMITTALS

- A. Shop Drawings: Indicate assembly, unit dimensions, weight loading, required clearances, construction details, field connection details, electrical characteristics and connection requirements.
- B. Product Data:
 - 1. Provide literature that indicates dimensions, weights, capacities, ratings, fan performance, and electrical characteristics and connection requirements.
 - 2. Provide computer generated fan curves with specified operating point clearly plotted.
 - 3. Manufacturer's Installation Instructions.

1.04 OPERATION AND MAINTANENCE DATA

- A. Maintenance Data: Provide instructions for installation, maintenance and service

1.05 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience, who issues complete catalog data on total product.
- B. Startup must be done by trained personnel experienced with rooftop equipment.
- C. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters and remote controls are in place, bearings lubricated, and manufacturers' installation instructions have been followed.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site.
- B. Accept products on site and inspect for damage.
- C. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

PART 2: PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: McQuay International
 - 1. No equal exists. [Deducts for alternative equipment will be considered.]

2.02 GENERAL DESCRIPTION

- A. Furnish as shown on plans, Daikin McQuay Rebel Single zone Heating and Cooling Unit(s) model DPS. Unit performance and electrical characteristics shall be per the job schedule.
- B. Configuration: Fabricate as detailed on prints and drawings:
 - 1. 100% OA
 - 2. Filter section
 - 3. Cooling coil section
 - 4. Supply fan section
 - 5. Gas heating section.
 - 6. Condensing unit section
- C. The complete unit shall be cETLus listed.
- D. Each unit shall be specifically designed for outdoor rooftop application and include a weatherproof cabinet. Each unit shall be completely factory assembled and shipped in one piece. Packaged units shall be shipped fully charged with R-410 Refrigerant and oil.
- E. The unit shall undergo a complete factory run test prior to shipment. The factory test shall include a refrigeration circuit run test, a unit control system operations checkout, a unit refrigerant leak test and a final unit inspection.
- F. All units shall have decals and tags to indicate caution areas and aid unit service. Unit nameplates shall be fixed to the main control panel door. Electrical wiring diagrams shall be attached to the control panels. Installation, operating and maintenance bulletins and start-up forms shall be supplied with each unit.
- G. Performance: All scheduled EER, IEER, capacities and face areas are minimum accepted values. All scheduled amps, kW, and HP are maximum accepted values that allow scheduled capacity to be met.
- H. Warranty: The manufacturer shall provide 12-month parts only warranty. Defective parts shall be repaired or replaced during the warranty period at no charge. The warranty period shall commence at startup or six months after shipment, whichever occurs first.

2.03 CABINET, CASING, AND FRAME

- A. Panel construction shall be double-wall construction for all panels. All floor panels shall have a solid galvanized steel inner liner on the air stream side of the unit to protect insulation during service and maintenance. Insulation shall be a minimum of 1" thick with an R-value of 7.0, and shall be 2 part injected foam. Panel design shall include no exposed insulation edges. Unit cabinet shall be designed to operate at total static pressures up to 5.0 inches w.g.
- B. Exterior surfaces shall be constructed of pre-painted galvanized steel for aesthetics and long term durability. Paint finish to include a base primer with a high quality, polyester resin topcoat of a neutral beige color. Finished panel surfaces to withstand a minimum 750-hour salt spray test in accordance with ASTM B117 standard for salt spray resistance.
- C. Service doors shall be provided on the fan section, filter section, control panel section, and heating vestibule in order to provide user access to unit components. All service access doors shall be mounted on multiple, stainless steel hinges and shall be secured by a latch system. Removable service panels secured by multiple mechanical fasteners are not acceptable.

- D. The unit base shall overhang the roof curb for positive water runoff and shall seat on the roof curb gasket to provide a positive, weathertight seal. Lifting brackets shall be provided on the unit base to accept cable or chain hooks for rigging the equipment.

2.04 FILTERS

- A. Unit shall be provided with a draw-through filter section. The filter rack shall be designed to accept a 2" prefilter and a 4" final filter. The unit design shall have a hinged access door for the filter section. The manufacturer shall ship the rooftop unit with 2" construction filters. The contractor shall furnish and install, at building occupancy, the final set of filters per the contract documents.

2.05 COOLING COIL

- A. The indoor coil section shall be installed in a draw through configuration, upstream of the supply air fan. The coil section shall be complete with a factory piped cooling coil and an ASHRAE 62.1 compliant double sloped drain pan.
- B. The direct expansion (DX) cooling coils shall be fabricated of seamless high efficiency copper tubing that is mechanically expanded into high efficiency aluminum plate fins. Coils shall be a multi-row, staggered tube design with a minimum of 3 rows. All cooling coils shall have an interlaced coil circuiting that keeps the full coil face active at all load conditions. All coils shall be factory leak tested with high pressure air under water.
- C. The cooling coil shall have an electronic controlled expansion valve. The unit controller shall control the expansion valve to maintain liquid subcooling and the superheat of the refrigerant system.
- D. The refrigerant suction lines shall be fully insulated from the expansion valve to the compressors.
- E. The drain pan shall be stainless steel and positively sloped. The slope of the drain pan shall be in two directions and comply with ASHRAE Standard 62.1. The drain pan shall have a minimum slope of 1/8" per foot to provide positive draining. The drain pan shall extend beyond the leaving side of the coil. The drain pan shall have a threaded drain connection extending through the unit base.

2.06 SUPPLY FAN

- A. Supply fan shall be a single width, single inlet (SWSI) airfoil centrifugal fan. The fan wheel shall be Class II construction with aluminum fan blades that are continuously welded to the hub plate and end rim. The supply fan shall be a direct drive fan mounted to the motor shaft.
- B. Fan assembly shall be a slide out assembly for servicing and maintenance
- C. All fan assemblies shall be statically and dynamically balanced at the factory, including a final trim balance, prior to shipment.
- D. The fan motor shall be a totally enclosed EC motor that is speed controlled by the rooftop unit controller. The motor shall include thermal overload protection and protect the motor in the case of excessive motor temperatures. The motor shall have phase failure protection and prevent the motor from operation in the event of a loss of phase. Motors shall be premium efficiency.
- E. The supply fan shall be capable of airflow modulation from 30% to 100% of the scheduled designed airflow. The fan shall not operate in a state of surge at any point within the modulation range.

2.07 HEATING SECTION

- A. The rooftop unit shall include a natural gas heating section. The gas furnace design shall be one natural gas fired heating module factory installed downstream of the supply air fan in the heat section. The heating module shall be a tubular design with in-shot gas burners.
- B. Each module shall have two stages of heating control. The module shall be complete with furnace controller and control valve capable of 5:1 modulating operation.
- C. The heat exchanger tubes shall be constructed of stainless steel.
- D. The module shall have an induced draft fan that will maintain a negative pressure in the heat exchanger tubes for the removal of the flue gases.

- E. Each burner module shall have two flame roll-out safety protection switches and a high temperature limit switch that will shut the gas valve off upon detection of improper burner manifold operation. The induced draft fan shall have an airflow safety switch that will prevent the heating module from turning on in the event of no airflow in the flue chamber.
- F. The factory-installed DDC unit control system shall control the gas heat module. Field installed heating modules shall require a field ETL certification. The manufacturer's rooftop unit ETL certification shall cover the complete unit including the gas heating modules.

2.08 CONDENSING SECTION

- A. Outdoor coils shall be cast aluminum, micro-channel coils. Plate fins shall be protected and brazed between adjoining flat tubes such that they shall not extend outside the tubes. A sub-cooling coil shall be an integral part of the main outdoor air coil. Each outdoor air coil shall be factory leak tested with high-pressure air under water.
- B. Fan motors shall be an ECM type motor for proportional control. The unit controller shall proportionally control the speed of the condenser fan motors to maintain the head pressure of the refrigerant circuit from ambient condition of 0~125°F. Mechanical cooling shall be provided to 25° F. The motor shall include thermal overload protection and protect the motor in the case of excessive motor temperatures. The motor shall have phase failure protection and prevent the motor from operation in the event of a loss of phase.
- C. The condenser fan shall be low noise blade design. Fan blade design shall be a dynamic profile for low tip speed. Fan blade shall be of a composite material.
- D. The unit shall have scroll compressors. One of the compressors shall be an inverter compressor providing proportional control. The unit controller shall control the speed of the compressor to maintain the discharge air temperature.
- E. Pressure transducers shall be provided for the suction pressure and head pressure. Temperature sensor shall be provided for the suction temperature and the refrigerant discharge temperature of the compressors. All of the above devices shall be an input to the unit controller and the values be displayed at the unit controller.
- F. Refrigerant circuit shall have a bypass valve between the suction and discharge refrigerant lines for low head pressure compressor starting and increased compressor reliability. When there is a call for mechanical cooling the bypass valve shall open to equalizing the suction and discharge pressures. When pressures are equalized the bypass valve shall close and the compressor shall be allowed to start.
- G. Each circuit shall be dehydrated and factory charged with R-410A Refrigerant and oil.

2.09 ELECTRICAL

- A. Unit wiring shall comply with NEC requirements and with all applicable UL standards. All electrical components shall be UL recognized where applicable. All wiring and electrical components provided with the unit shall be number and color-coded and labeled according to the electrical diagram provided for easy identification. The unit shall be provided with a factory wired weatherproof control panel. Unit shall have a single point power terminal block for main power connection. A terminal board shall be provided for low voltage control wiring. Branch short circuit protection, 115-volt control circuit transformer and fuse, system switches, and a high temperature sensor shall also be provided with the unit. Each compressor and condenser fan motor shall be furnished with contactors and inherent thermal overload protection. Supply fan motors shall have contactors and external overload protection. Knockouts shall be provided in the bottom of the main control panels for field wiring entrance.
- B. A single non-fused disconnect switch shall be provided for disconnecting electrical power at the unit. Disconnect switches shall be mounted internally to the control panel and operated by an externally mounted handle.

2.10 CONTROLS

- A. Provide a complete integrated microprocessor based Direct Digital Control (DDC) system to control all unit functions including temperature control, scheduling, monitoring, unit safety protection, including compressor minimum run and minimum off times, and diagnostics. This system shall consist of all required temperature

sensors, pressure sensors, controller and keypad/display operator interface. All MCBs and sensors shall be factory mounted, wired and tested.

- B. The stand-alone DDC controllers shall not be dependent on communications with any on-site or remote PC or master control panel for proper unit operation. The microprocessor shall maintain existing set points and operate stand alone if the unit loses either direct connect or network communications. The microprocessor memory shall be protected from voltage fluctuations as well as any extended power failures. All factory and user set schedules and control points shall be maintained in nonvolatile memory. No settings shall be lost, even during extended power shutdowns.
- C. The DDC control system shall permit starting and stopping of the unit locally or remotely. The control system shall be capable of providing a remote alarm indication. The unit control system shall provide for outside air damper actuation, emergency shutdown, remote heat enable/disable, remote cool enable/disable, heat indication, cool indication, and fan operation.
- D. All digital inputs and outputs shall be protected against damage from transients or incorrect voltages. All field wiring shall be terminated at a separate, clearly marked terminal strip
- E. The DDC controller shall have a built-in time schedule. The schedule shall be programmable from the unit keypad interface. The schedule shall be maintained in nonvolatile memory to insure that it is not lost during a power failure. There shall be one start/stop per day and a separate holiday schedule. The controller shall accept up to sixteen holidays each with up to a 5-day duration. Each unit shall also have the ability to accept a time schedule via BAS network communications.
- F. The keypad interface shall allow convenient navigation and access to all control functions. The unit keypad/display character format shall be 4 lines x 20 characters. All control settings shall be password protected against unauthorized changes. For ease of service, the display format shall be English language readout. Coded formats with look-up tables will not be accepted. The user interaction with the display shall provide the following information as a minimum:
 - 1. Return air temperature.
 - 2. Discharge air temperature.
 - 3. Outdoor air temperature.
 - 4. Space air temperature.
 - 5. Outdoor enthalpy, high/low.
 - 6. Compressor suction temperature and pressure
 - 7. Compressor head pressure and temperature
 - 8. Expansion valve position
 - 9. Condenser fan speed
 - 10. Inverter compressor speed
 - 11. Dirty filter indication.
 - 12. Airflow verification.
 - 13. Cooling status.
 - 14. Control temperature (Changeover).
 - 15. VAV box output status.
 - 16. Cooling status/capacity.
 - 17. Unit status.
 - 18. All time schedules.
 - 19. Active alarms with time and date.
 - 20. Previous alarms with time and date.
 - 21. Optimal start
 - 22. Supply fan and exhaust fan speed.
 - 23. System operating hours.
 - a. Fan

- b. Exhaust fan
 - c. Cooling
 - d. Individual compressor
 - e. Heating
 - f. Economizer
 - g. Tenant override
- G. The user interaction with the keypad shall provide the following:
1. Controls mode
 - a. Off manual
 - b. Auto
 - c. Heat/Cool
 - d. Cool only
 - e. Heat only
 - f. Fan only
 2. Occupancy mode
 - a. Auto
 - b. Occupied
 - c. Unoccupied
 - d. Tenant override
 3. Unit operation changeover control
 - a. Return air temperature
 - b. Space temperature
 - c. Network signal
 4. Cooling and heating change-over temperature with deadband
 5. Cooling discharge air temperature (DAT)
 6. Supply reset options
 - a. Return air temperature
 - b. Outdoor air temperature
 - c. Space temperature
 - d. Airflow (VAV)
 - e. Network signal
 - f. External (0-10 vdc)
 - g. External (0-20 mA)
 7. Temperature alarm limits
 - a. High supply air temperature
 - b. Low supply air temperature
 - c. High return air temperature
 8. Lockout control for compressors.
 9. Compressor interstage timers
 10. Night setback and setup space temperature.
 11. Building static pressure.
 12. Economizer changeover
 - a. Enthalpy
 - b. Drybulb temperature
 13. Currently time and date
 14. Tenant override time
 15. Occupied/unoccupied time schedule
 16. One event schedule

17. Holiday dates and duration
18. Adjustable set points
19. Service mode
 - a. Timers normal (all time delays normal)
 - b. Timers fast (all time delays 20 sec)
- H. If the unit is to be programmed with a night setback or setup function, an optional space sensor shall be provided. Space sensors shall be available to support field selectable features. Sensor options shall include:
 1. Zone sensor with tenant override switch
 2. Zone sensor with tenant override switch plus heating and cooling set point adjustment. (Space Comfort Control systems only)
- I. To increase the efficiency of the cooling system the DDC controller shall include a discharge air temperature reset program for part load operating conditions. The discharge air temperature shall be controlled between a minimum and a maximum discharge air temperature (DAT) based on one of the following inputs:
 1. Airflow
 2. Outside air temperature
 3. Space temperature
 4. Return air temperature
 5. External signal of 1-5 vdc
 6. External signal of 0-20 mA
 7. Network signal