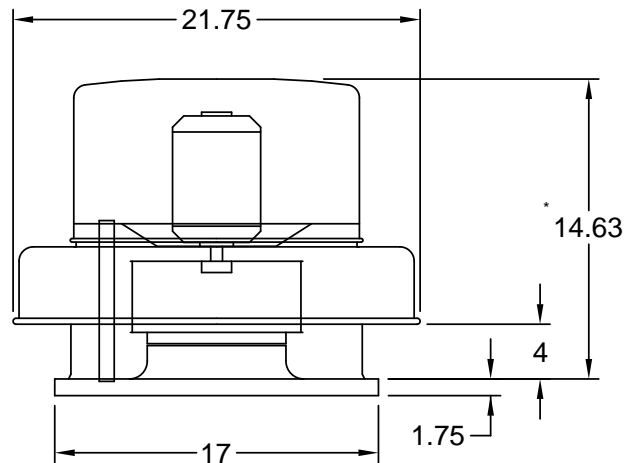


## Model: G-090-VG

### Direct Drive Centrifugal Roof Exhaust Fan

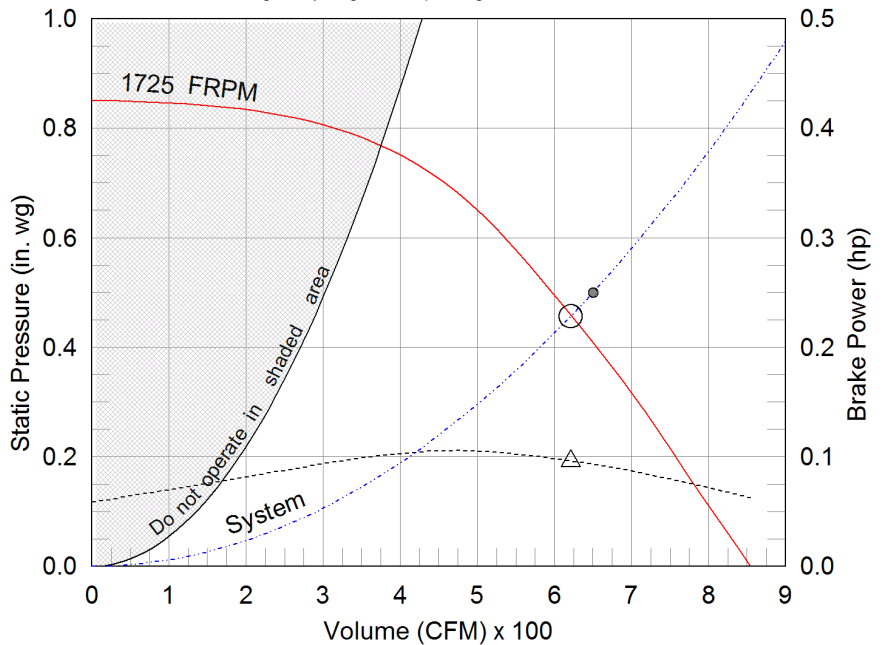
| Dimensional           |             |
|-----------------------|-------------|
| Quantity              | 1           |
| Weight w/o Acc's (lb) | 24          |
| Weight w/ Acc's (lb)  | 26          |
| Roof Opening (in.)    | 12.5 x 12.5 |



Reference assembly view drawings for actual dimensions with mounted accessories

\*Overall height may be greater depending on motor

| Performance            |       |
|------------------------|-------|
| Requested Volume (CFM) | 650   |
| Actual Volume (CFM)    | 621   |
| External SP (in. wg)   | 0.5   |
| Total SP (in. wg)      | 0.457 |
| Fan RPM                | 1725  |
| Operating Power (hp)   | 0.1   |
| Elevation (ft)         | 325   |
| Airstream Temp.(F)     | 70    |
| Air Density (lb/ft3)   | 0.074 |
| Tip Speed (ft/min)     | 4,911 |
| Static Eff. (%)        | 47    |



|                                  |                             |               |
|----------------------------------|-----------------------------|---------------|
| △ Operating Bhp point            | External SP                 | 0.5 in. wg    |
| ○ Operating point at Total SP    | Direct Drive RPM Adjustment | -0.043 in. wg |
| ● Operating point at External SP | Total SP                    | 0.457 in. wg  |
| — Fan curve                      |                             |               |
| - - - System curve               |                             |               |
| ..... Brake horsepower curve     |                             |               |

| Motor               |          |
|---------------------|----------|
| Motor Mounted       | Yes      |
| Size (hp)           | 1/6      |
| Voltage/Cycle/Phase | 115/60/1 |
| Enclosure           | TENV     |
| Motor RPM           | 1725     |
| Windings            | 1        |
| NEC FLA* (Amps)     | 4.4      |
| FLA (Amps)          | 3.4      |

### Sound Power by Octave Band

| Sound Data | 62.5 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | LwA | dBA | Sones |
|------------|------|-----|-----|-----|------|------|------|------|-----|-----|-------|
| Inlet      | 74   | 74  | 72  | 65  | 60   | 58   | 56   | 48   | 68  | 57  | 8.8   |

### Notes:

All dimensions shown are in units of in.  
\*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.  
LwA - A weighted sound power level, based on ANSI S1.4  
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per Octave band at 5 ft - dBA levels are not licensed by AMCA International  
Sones - calculated using AMCA 301 at 5 ft



## Model: G-090-VG

### Direct Drive Centrifugal Roof Exhaust Fan

#### **Standard Construction Features:**

- Aluminum housing - Backward inclined wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 100-180), sleeve bearing motors (sizes 60-95) - Motor isolated on shock mounts - Corrosion resistant fasteners

#### **Selected Options & Accessories:**

Motor - Vari-Green EC motor w/Mounted Potentiometer Dial  
Switch, NEMA-1, Toggle, Shipped Separate  
Unit Warranty: 1 Yr (Standard)

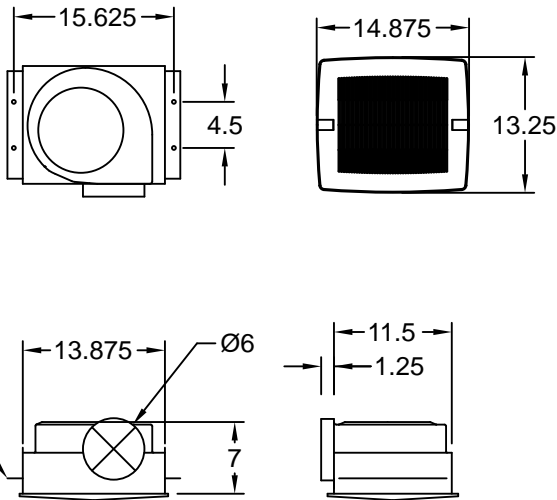
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## AMCA



AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) does not include transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type A: Free inlet, Free outlet. Power rating (BHP/kW) does not include transmission losses. Performance ratings include the effects of birdscreen. The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per AMCA Standard 301. Values shown are for installation type A: free inlet hemispherical sone levels. dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal applies to sone ratings only.



## Model: SP-B150

### Ceiling Exhaust Fan

#### Standard Construction Features:

- Corrosion resistant galvanized steel scroll and housing - White designer non-yellowing grille - Round outlet duct collar with integral backdraft damper - Single inlet forward curved wheel - Plug type disconnect - Adjustable mounting brackets

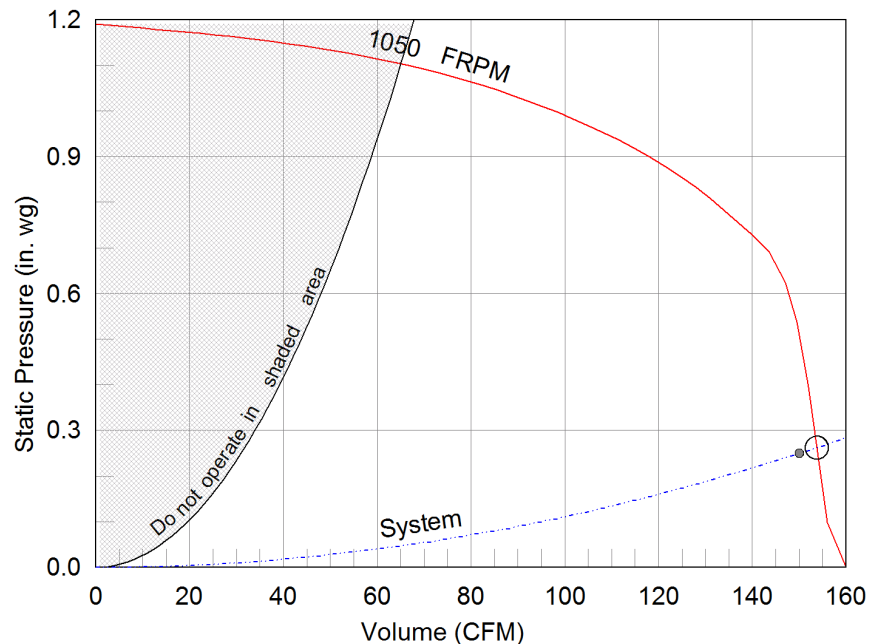
#### Selected Options & Accessories:

Motor with Thermal Overload  
Motor with 40 Degree C Ambient Temperature  
UL/cUL 507 Listed - Electric Fan  
Designer Grille  
Round Duct Connection  
Polypropylene Wheel Material

| Dimensional           |    |
|-----------------------|----|
| Quantity              | 1  |
| Weight w/o Acc's (lb) | 10 |
| Weight w/ Acc's (lb)  | 10 |

| Performance            |       |
|------------------------|-------|
| Requested Volume (CFM) | 150   |
| Actual Volume (CFM)    | 154   |
| External SP (in. wg)   | 0.25  |
| Total SP (in. wg)      | 0.263 |
| Fan RPM                | 1050  |
| Amps (A)               | 1.7   |
| Elevation (ft)         | 325   |
| Airstream Temp.(F)     | 70    |
| Air Density (lb/ft3)   | 0.074 |
| Sones                  | 3.0   |

| Motor               |          |
|---------------------|----------|
| Motor Mounted       | Yes      |
| Input Watts (W)     | 128      |
| Voltage/Cycle/Phase | 115/60/1 |
| Enclosure           | ODP      |



- △ Operating Bhp point
- Operating point at Total SP
- Operating point at External SP
- Fan curve
- - - System curve
- Brake horsepower curve

#### Notes:

All dimensions shown are in units of in.  
\*FLA is approximate and will vary slightly with the motor.  
LwA - A weighted sound power level, based on ANSI S1.4  
dBA - A weighted sound pressure level, based on 11.5 dB  
attenuation per Octave band at 5 ft  
Sones - calculated using AMCA 301 at 5 ft  
AMCA certified ratings seal applies to some ratings only.  
Wattage is shown at free air.  
Wattage is approximate and may vary between motors.



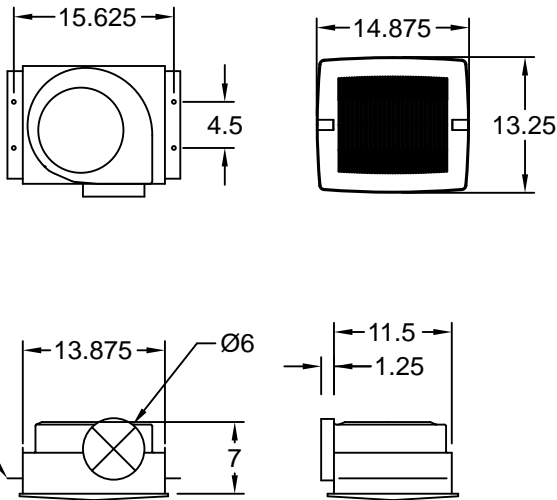
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## AMCA



AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) does not include transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type B: Free inlet, Ducted outlet. Performance ratings include the effects of an inlet grille and backdraft damper. Speed (RPM) shown is nominal. Performance is based on actual speed of test. The watt ratings shown are at free air. The sound ratings shown are for loudness values in spherical sones at 5 ft. (1.5m) in a spherical free field calculated per Annex B of AMCA 311. Values shown are for installation type B: free inlet spherical sone levels. The AMCA Certified Ratings Seal applies to sone ratings only.



## Model: SP-B150

### Ceiling Exhaust Fan

#### Standard Construction Features:

- Corrosion resistant galvanized steel scroll and housing - White designer non-yellowing grille - Round outlet duct collar with integral backdraft damper - Single inlet forward curved wheel - Plug type disconnect - Adjustable mounting brackets

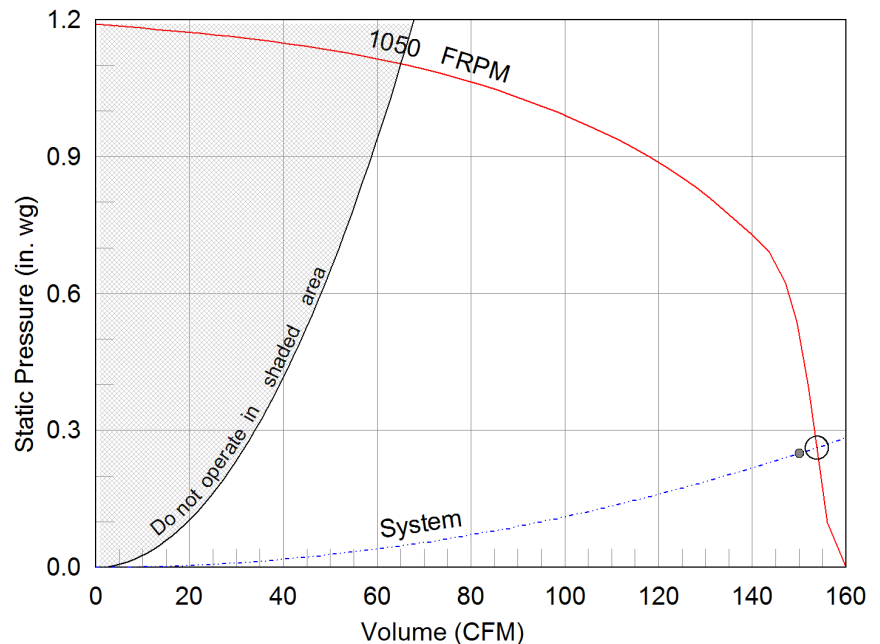
#### Selected Options & Accessories:

Motor with Thermal Overload  
Motor with 40 Degree C Ambient Temperature  
UL/cUL 507 Listed - Electric Fan  
Designer Grille  
Round Duct Connection  
Polypropylene Wheel Material

| Dimensional           |    |
|-----------------------|----|
| Quantity              | 1  |
| Weight w/o Acc's (lb) | 10 |
| Weight w/ Acc's (lb)  | 10 |

| Performance            |       |
|------------------------|-------|
| Requested Volume (CFM) | 150   |
| Actual Volume (CFM)    | 154   |
| External SP (in. wg)   | 0.25  |
| Total SP (in. wg)      | 0.263 |
| Fan RPM                | 1050  |
| Amps (A)               | 1.7   |
| Elevation (ft)         | 325   |
| Airstream Temp.(F)     | 70    |
| Air Density (lb/ft3)   | 0.074 |
| Sones                  | 3.0   |

| Motor               |          |
|---------------------|----------|
| Motor Mounted       | Yes      |
| Input Watts (W)     | 128      |
| Voltage/Cycle/Phase | 115/60/1 |
| Enclosure           | ODP      |



- △ Operating Bhp point
- Operating point at Total SP
- Operating point at External SP
- Fan curve
- - - System curve
- - - Brake horsepower curve

#### Notes:

All dimensions shown are in units of in.  
\*FLA is approximate and will vary slightly with the motor.  
LwA - A weighted sound power level, based on ANSI S1.4  
dBA - A weighted sound pressure level, based on 11.5 dB  
attenuation per Octave band at 5 ft  
Sones - calculated using AMCA 301 at 5 ft  
AMCA certified ratings seal applies to some ratings only.  
Wattage is shown at free air.  
Wattage is approximate and may vary between motors.



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## AMCA



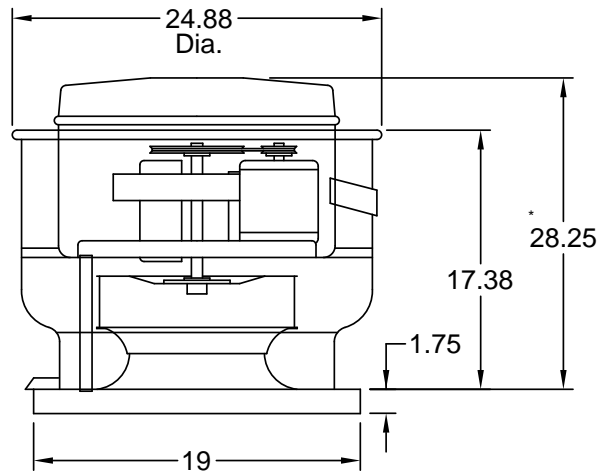
AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) does not include transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type B: Free inlet, Ducted outlet. Performance ratings include the effects of an inlet grille and backdraft damper. Speed (RPM) shown is nominal. Performance is based on actual speed of test. The watt ratings shown are at free air. The sound ratings shown are for loudness values in spherical sones at 5 ft. (1.5m) in a spherical free field calculated per Annex B of AMCA 311. Values shown are for installation type B: free inlet spherical sone levels. The AMCA Certified Ratings Seal applies to sone ratings only.

## Model: CUBE-121-4

### Belt Drive Upblast Centrifugal Roof Exhaust Fan

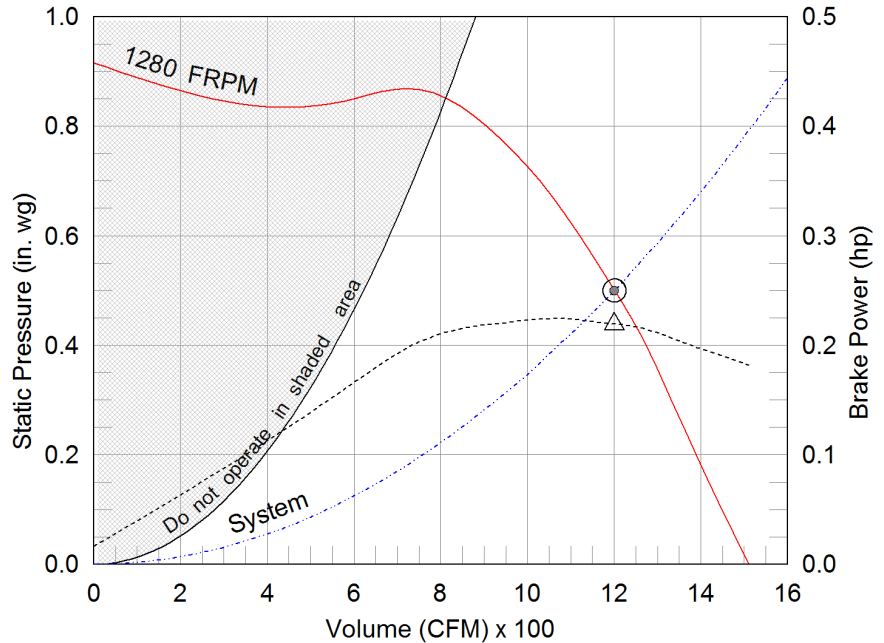
| Dimensional            |             |
|------------------------|-------------|
| Quantity               | 1           |
| Weight w/o Acc's (lb)  | 63          |
| Weight w/ Acc's (lb)   | 65          |
| Max T Motor Frame Size | 56          |
| Roof Opening (in.)     | 14.5 x 14.5 |



Reference assembly view drawings for actual dimensions with mounted accessories

\*Overall height may be greater depending on motor

| Performance            |       |
|------------------------|-------|
| Requested Volume (CFM) | 1,200 |
| Actual Volume (CFM)    | 1,200 |
| External SP (in. wg)   | 0.5   |
| Total SP (in. wg)      | 0.5   |
| Fan RPM                | 1280  |
| Operating Power (hp)   | 0.22  |
| Elevation (ft)         | 325   |
| Airstream Temp.(F)     | 70    |
| Air Density (lb/ft3)   | 0.074 |
| Drive Loss (%)         | 13.4  |
| Tip Speed (ft/min)     | 4,376 |
| Static Eff. (%)        | 50    |



- △ Operating Bhp point
- Operating point at Total SP
- Operating point at External SP
- Fan curve
- - - System curve
- ..... Brake horsepower curve

| Motor               |          |
|---------------------|----------|
| Motor Mounted       | Yes      |
| Size (hp)           | 1/4      |
| Voltage/Cycle/Phase | 115/60/1 |
| Enclosure           | ODP      |
| Motor RPM           | 1725     |
| Windings            | 1        |
| NEC FLA* (Amps)     | 5.8      |

### Sound Power by Octave Band

| Sound Data | 62.5 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | LwA | dBA | Sones |
|------------|------|-----|-----|-----|------|------|------|------|-----|-----|-------|
| Inlet      | 74   | 75  | 78  | 66  | 61   | 63   | 54   | 46   | 72  | 61  | 10.5  |

### Notes:

All dimensions shown are in units of in.  
\*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.  
LwA - A weighted sound power level, based on ANSI S1.4  
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per Octave band at 5 ft - dBA levels are not licensed by AMCA International  
Sones - calculated using AMCA 301 at 5 ft





## Model: CUBE-121-4

### Belt Drive Upblast Centrifugal Roof Exhaust Fan

#### Standard Construction Features:

- Aluminum housing - Backward inclined aluminum wheel - Curb cap with prepunched mounting holes - Motor and drives isolated on shock mounts - Drain trough - Ball bearing motors - Adjustable motor pulley - Adjustable motor plate - Fan shaft mounted in ball bearing pillow blocks - Bearings meet or exceed temperature rating of fan - Static resistant belts - Corrosion resistant fasteners - Internal lifting lugs

#### Selected Options & Accessories:

Switch, NEMA-1, Toggle, Shipped with Unit  
Junction Box Mounted & Wired  
Unit Warranty: 1 Yr (Standard)

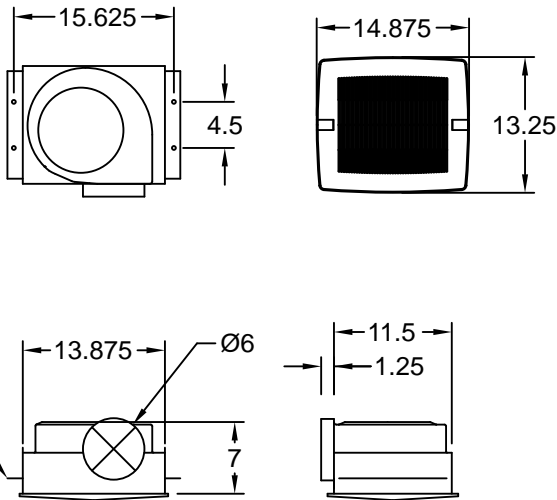
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## AMCA



AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) includes transmission losses.

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## Model: SP-B110

### Ceiling Exhaust Fan

#### Standard Construction Features:

- Corrosion resistant galvanized steel scroll and housing - White designer non-yellowing grille - Round outlet duct collar with integral backdraft damper - Single inlet forward curved wheel - Plug type disconnect - Adjustable mounting brackets

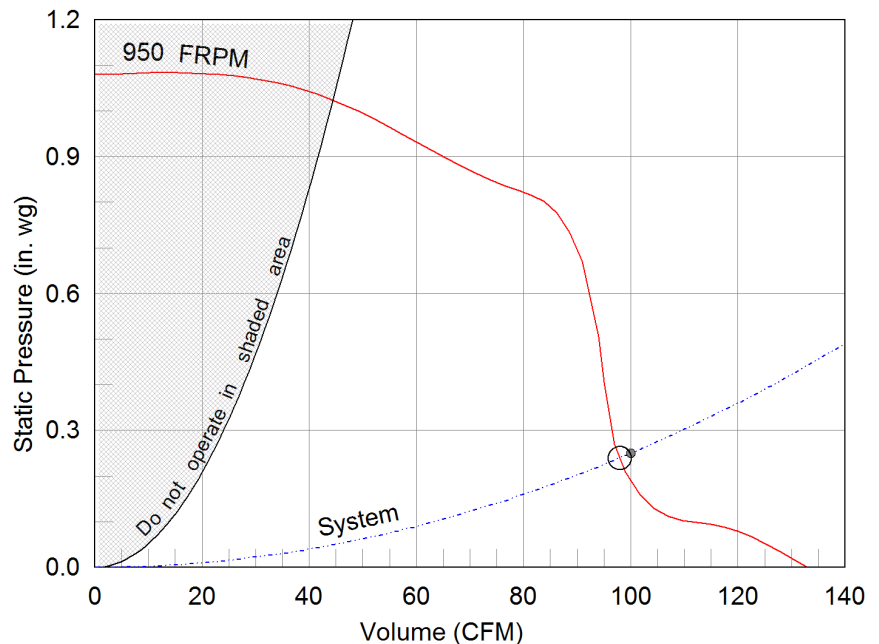
#### Selected Options & Accessories:

Motor with Thermal Overload  
Motor with 40 Degree C Ambient Temperature  
UL/cUL 507 Listed - Electric Fan  
Designer Grille  
Round Duct Connection  
Polypropylene Wheel Material

| Dimensional           |    |
|-----------------------|----|
| Quantity              | 1  |
| Weight w/o Acc's (lb) | 10 |
| Weight w/ Acc's (lb)  | 10 |

| Performance            |       |
|------------------------|-------|
| Requested Volume (CFM) | 100   |
| Actual Volume (CFM)    | 98    |
| External SP (in. wg)   | 0.25  |
| Total SP (in. wg)      | 0.24  |
| Fan RPM                | 950   |
| Amps (A)               | 1.14  |
| Elevation (ft)         | 325   |
| Airstream Temp.(F)     | 70    |
| Air Density (lb/ft3)   | 0.074 |
| Sones                  | 1.5   |

| Motor               |          |
|---------------------|----------|
| Motor Mounted       | Yes      |
| Input Watts (W)     | 80.2     |
| Voltage/Cycle/Phase | 115/60/1 |
| Enclosure           | ODP      |



- △ Operating Bhp point
- Operating point at Total SP
- Operating point at External SP
- Fan curve
- - - System curve
- ..... Brake horsepower curve

#### Notes:

All dimensions shown are in units of in.  
\*FLA is approximate and will vary slightly with the motor.  
LwA - A weighted sound power level, based on ANSI S1.4  
dBA - A weighted sound pressure level, based on 11.5 dB  
attenuation per Octave band at 5 ft  
Sones - calculated using AMCA 301 at 5 ft  
AMCA certified ratings seal applies to some ratings only.  
Wattage is shown at free air.  
Wattage is approximate and may vary between motors.



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## AMCA



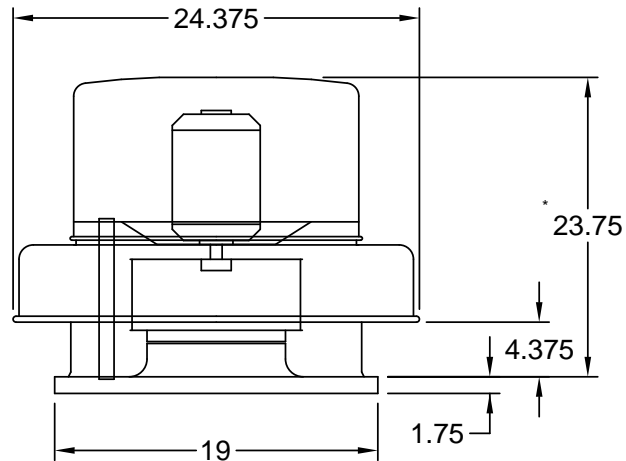
AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) does not include transmission losses.

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## Model: G-098-VG

### Direct Drive Centrifugal Roof Exhaust Fan

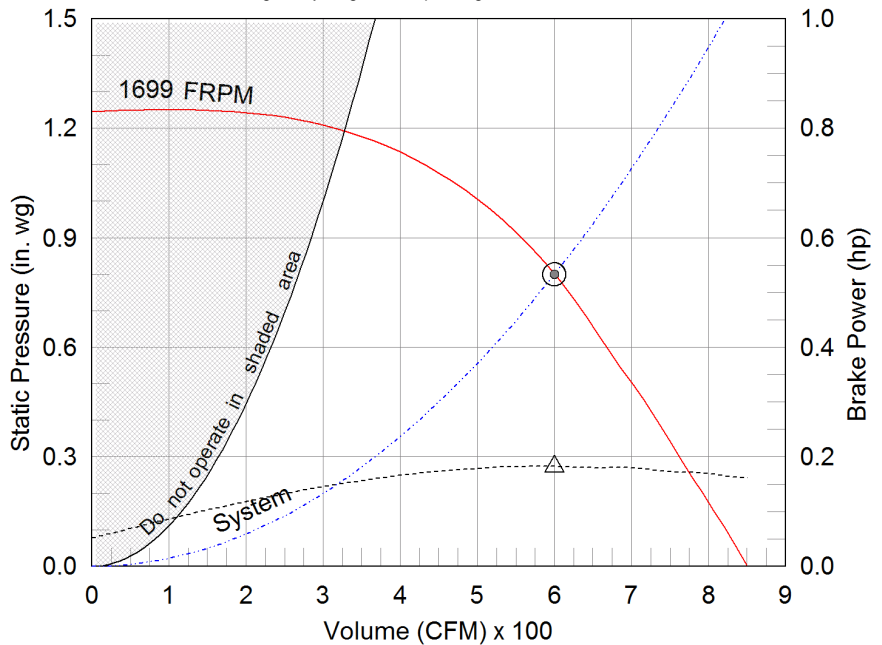
| Dimensional           |             |
|-----------------------|-------------|
| Quantity              | 1           |
| Weight w/o Acc's (lb) | 35          |
| Weight w/ Acc's (lb)  | 37          |
| Roof Opening (in.)    | 14.5 x 14.5 |



Reference assembly view drawings for actual dimensions with mounted accessories

\*Overall height may be greater depending on motor

| Performance            |       |
|------------------------|-------|
| Requested Volume (CFM) | 600   |
| Actual Volume (CFM)    | 600   |
| External SP (in. wg)   | 0.8   |
| Total SP (in. wg)      | 0.8   |
| Fan RPM                | 1699  |
| Operating Power (hp)   | 0.18  |
| Elevation (ft)         | 325   |
| Airstream Temp.(F)     | 70    |
| Air Density (lb/ft3)   | 0.074 |
| Tip Speed (ft/min)     | 4,975 |
| Static Eff. (%)        | 41    |



- △ Operating Bhp point
- Operating point at Total SP
- Operating point at External SP
- Fan curve
- - - System curve
- ..... Brake horsepower curve

| Motor               |          |
|---------------------|----------|
| Motor Mounted       | Yes      |
| Size (hp)           | 1/4      |
| Voltage/Cycle/Phase | 115/60/1 |
| Enclosure           | ODP      |
| Motor RPM           | 1725     |
| Windings            | 1        |
| NEC FLA* (Amps)     | 5.8      |
| FLA (Amps)          | 3.7      |

### Sound Power by Octave Band

| Sound Data | 62.5 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | LwA | dBA | Sones |
|------------|------|-----|-----|-----|------|------|------|------|-----|-----|-------|
| Inlet      | 79   | 77  | 76  | 68  | 64   | 60   | 55   | 51   | 72  | 60  | 10.7  |

### Notes:

All dimensions shown are in units of in.  
\*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.  
LwA - A weighted sound power level, based on ANSI S1.4  
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per Octave band at 5 ft - dBA levels are not licensed by AMCA International  
Sones - calculated using AMCA 301 at 5 ft



## Model: G-098-VG

### Direct Drive Centrifugal Roof Exhaust Fan

#### **Standard Construction Features:**

- Aluminum housing - Backward inclined wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 100-180), sleeve bearing motors (sizes 60-95) - Motor isolated on shock mounts - Corrosion resistant fasteners

#### **Selected Options & Accessories:**

Motor - Vari-Green EC motor w/Mounted Potentiometer Dial  
Switch, NEMA-1, Toggle, Shipped Separate  
Unit Warranty: 1 Yr (Standard)

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## AMCA



AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) does not include transmission losses.

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**40MAQ / 38MAQ  
High- Wall Ductless Split System  
Sizes 09 to 30**



## Product Data



### **INDUSTRY LEADING FEATURES / BENEFITS**

#### **A PERFECT BALANCE BETWEEN BUDGET LIMITS, ENERGY SAVINGS AND COMFORT.**

The 38/40MAQ series ductless split systems are a matched combination of an outdoor condensing unit and an indoor fan coil unit connected only by refrigerant tubing and wires.

The fan coil is mounted on the wall, near the ceiling. This selection of fan coils permits creative solutions to design problems such as:

- Add-ons to current space (an office or family room addition)
- Special space requirements
- When changes in the load cannot be handled by the existing system.
- When adding air conditioning to spaces that are heated by hydronic or electric heat and have no ductwork.
- Historical renovations or any application where preserving the look of the original structure is essential.

The ideal compliment to your ducted system when it is impractical or prohibitively expensive to use ductwork.

These compact indoor fan coil units take up very little space in the room and do not obstruct windows. The fan coils are attractively styled to blend with most room decors. Advanced system components incorporate innovative technology to provide reliable cooling performance at low sound levels.



## **LOW SOUND LEVELS**

When noise is a concern, the ductless split systems are the answer. The indoor units are whisper quiet. There are no compressors indoors, either in the conditioned space or directly over it, and there is none of the noise usually generated by air being forced through ductwork.

When sound ordinances and proximity to neighbors demand quiet operation, the 38MAQ unit is the right choice: The advanced, horizontal airflow design distributes air more evenly over the coil.

## **SECURE OPERATION**

If security is an issue, outdoor and indoor units are connected only by refrigerant piping and wiring to prevent intruders from crawling through ductwork. In addition, since 38MAQ units can be installed close to an outside wall, coils are protected from vandals and severe weather.

## **FAST INSTALLATION**

This compact ductless split system is simple to install. A mounting bracket is standard with the indoor units and only wire and piping need to be run between indoor and outdoor units. These units are fast and easy to install ensuring minimal disruption to customers in the home or workplace. This makes the 38/40MAQ ductless split systems the equipment of choice, especially in retrofit situations.

## **SIMPLE SERVICING AND MAINTENANCE**

Removing the top panel on outdoor units provides immediate access to the control compartment, providing a service technician access to check unit operation. In addition, the draw-thru design of the outdoor section means that dirt accumulates on the outside surface of the coil. Coils can be cleaned quickly from the inside using a pressure hose and detergent.

On all indoor units, service and maintenance expense is reduced due to easy-to-use cleanable filters. In addition, these high wall systems have extensive self-diagnostics to assist in troubleshooting.

## **BUILT-IN RELIABILITY**

Ductless split system indoor and outdoor units are designed to provide years of trouble-free operation.

The high wall indoor units include protection against freeze-up and high evaporator temperatures on heat pumps.

The condensing units on heat pumps are protected by a three minute time delay before the compressor will start the over-current protection and the high temperature protection.

## **INDIVIDUAL ROOM COMFORT**

Maximum comfort is provided because each space can be controlled individually based on usage pattern. The air sweep feature provided permits optimal room air mixing to eliminate hot and cold spots for occupant comfort. In addition, year-round comfort can be provided with heat pumps.

## **ECONOMICAL OPERATION**

The ductless split system design allows individual room heating or cooling when required. There is no need to run large supply-air fans or chilled water pumps to handle a few spaces with unique load patterns. In addition, because air is moved only in the space required, no energy is wasted moving air through ducts.

## **EASY-TO-USE CONTROLS**

The high-wall units have microprocessor-based controls to provide the ultimate in comfort and efficiency. The user friendly wireless remote control provides the interface between user and the unit.

## **ACCESSORIES**

Customizing these ductless split systems to your application is easily accomplished.

Adding a condensate pump accessory to the high wall fan coil provides installation flexibility.

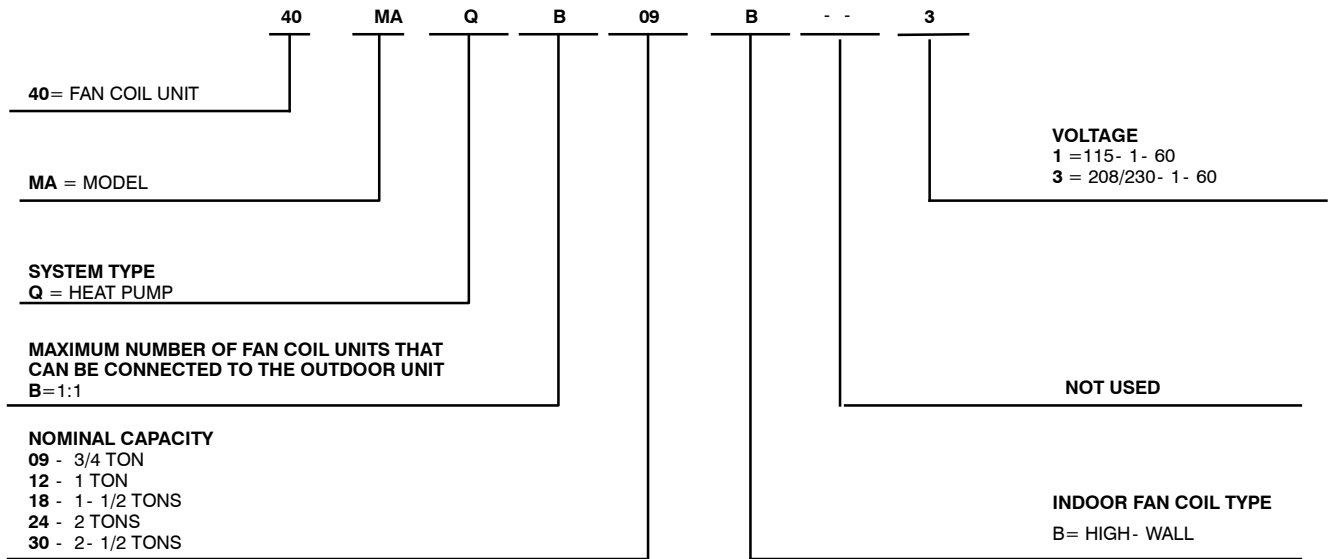
## **OPTIONAL WIRED CONTROLLER**

## **AGENCY LISTINGS**

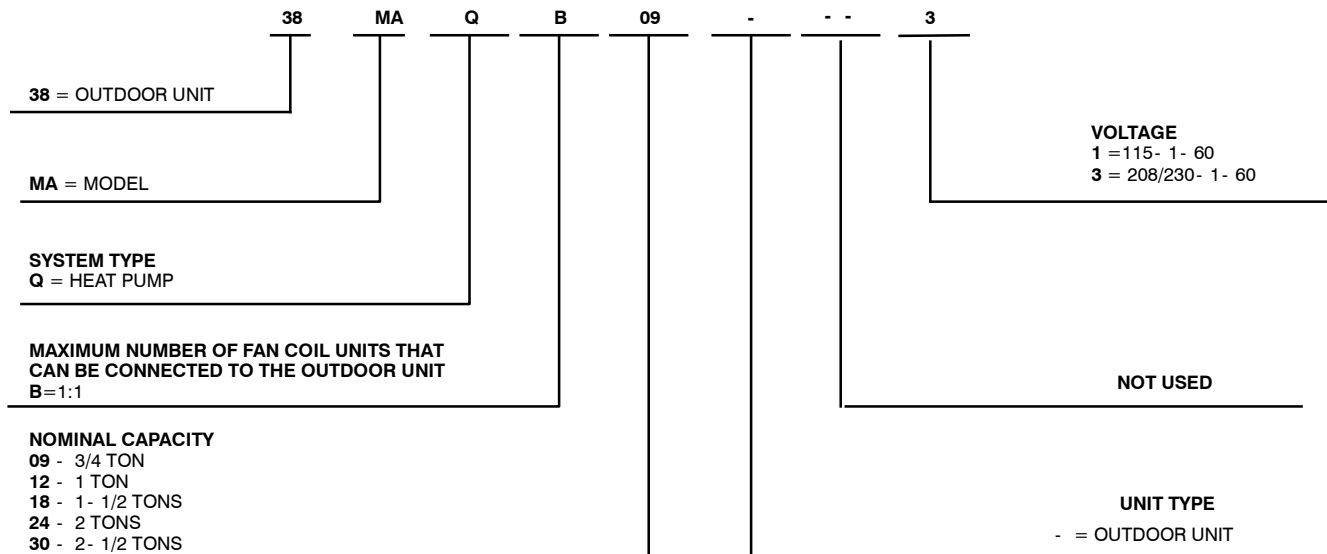
All systems are listed with AHRI (Air Conditioning, Heating & Refrigeration Institute), and ETL.

# MODEL NUMBER NOMENCLATURE

## INDOOR UNIT



## OUTDOOR UNIT



Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program. For verification of certification for individual products, go to [www.ahridirectory.org](http://www.ahridirectory.org).



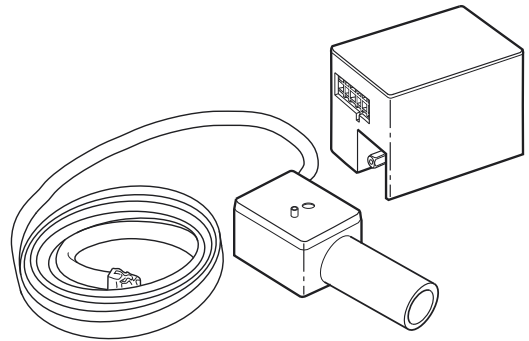
## STANDARD FEATURES AND ACCESSORIES

|  |   |
|--|---|
| <b>Ease Of Installation</b>                      |   |
| Mounting Brackets                                | S |
| Low Voltage Controls                             | S |
| <b>Comfort Features</b>                          |   |
| Microprocessor Controls                          | S |
| Wired Remote Control                             | A |
| Wireless Remote Control                          | S |
| Automatic Horizontal Air Sweep                   | S |
| Air Direction Control                            | S |
| Auto Restart Function                            | S |
| Cold Blow Protection On Heat Pumps               | S |
| Freeze Protection Mode On Heat Pumps             | S |
| Turbo Mode                                       | S |
| Silence Mode                                     | S |
| Auto Changeover On Heat Pumps                    | S |
| Follow Me  | S |
| <b>Energy Saving Features</b>                    |   |
| Sleep Mode                                       | S |
| Stop/Start Timer                                 | S |
| 46° F Heating Mode (Heating Setback)             | S |
| <b>Safety And Reliability</b>                    |   |
| 3 Minute Time Delay For Compressor               | S |
| Over Current Protection For Compressor           | S |
| Indoor Coil Freeze Protection                    | S |
| Indoor Coil High Temp Protection in Heating Mode | S |
| Condenser High Temp Protection in Cooling Mode   | S |
| <b>Ease Of Service And Maintenance</b>           |   |
| Cleanable Filters                                | S |
| Diagnostics                                      | S |
| Liquid Line Pressure Taps                        | S |
| <b>Application Flexibility</b>                   |   |
| Condensate Pumps                                 | A |
| Crankcase Heater                                 | S |

### Legend

S Standard  
A Accessory

## INDOOR UNITS



**Fig. 1 – Condensate Pump Accessory**

On high wall fan coils, the condensate pump has a lift capability of 12 ft (3.6 m) on the discharge side with the pump mounted in the fan coil or 6 ft (1.8 m) on the suction side if the pump is remote mounted. The pump is recommended when adequate drain line pitch cannot be provided, or when the condensate must move up to exit.

**NOTE:** An external 115v power source will be required to run the pump on unit sizes 9k and 12k.

## OUTDOOR UNITS

### Crankcase Heater

Standard on all unit sizes. Heater clamps around compressor oil stump.

## DIMENSIONS - INDOOR

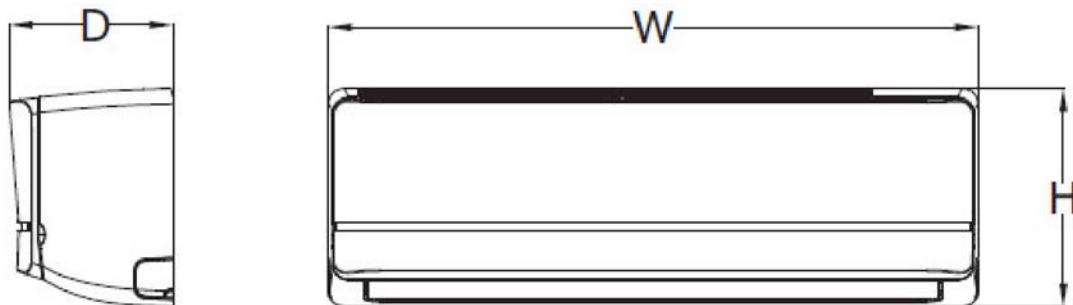


Fig. 2 – Indoor unit

| Unit Size | W in (mm)   | D in (mm)  | H in (mm)  | Operating Weight lb (kg) |
|-----------|-------------|------------|------------|--------------------------|
| 9K/12K    | 32.9 (835)  | 7.8 (198)  | 11.0 (280) | 19.2 (8.7)               |
| 18K       | 39.0 (990)  | 8.6 (218)  | 12.4 (315) | 26.5 (12.0)              |
| 24K/30K   | 46.7 (1186) | 10.2 (258) | 13.4 (343) | 40.8 (18.5)              |

## DIMENSIONS - OUTDOOR

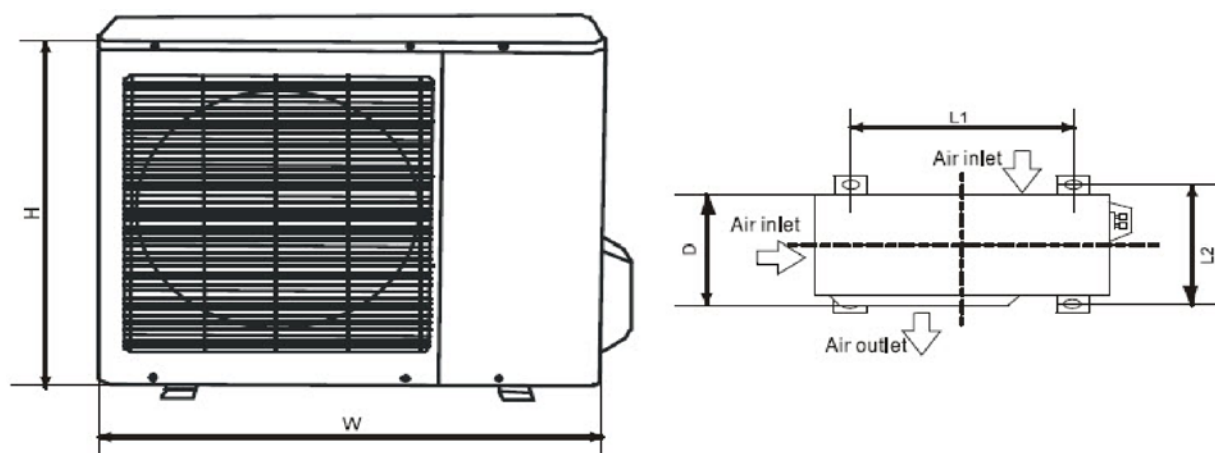
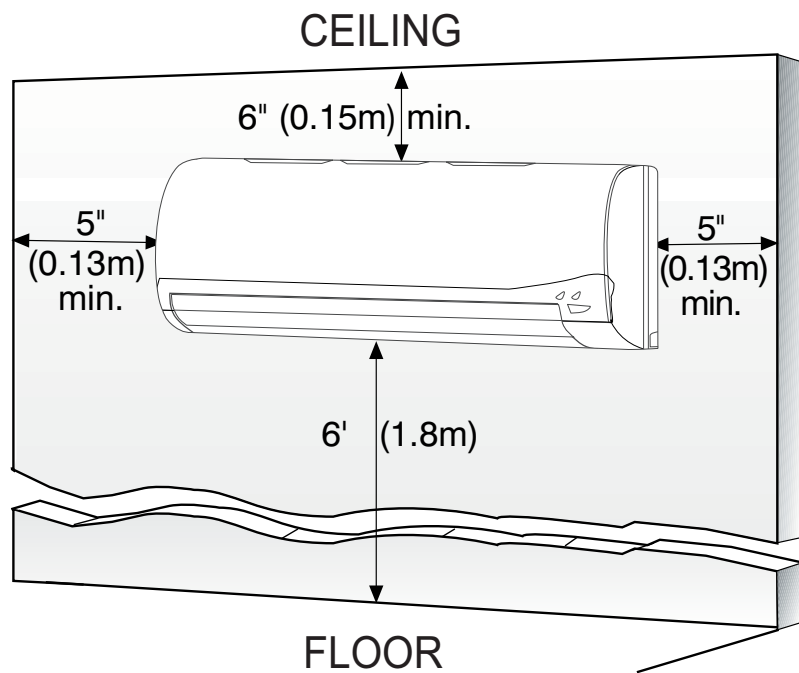


Fig. 3 – Outdoor unit

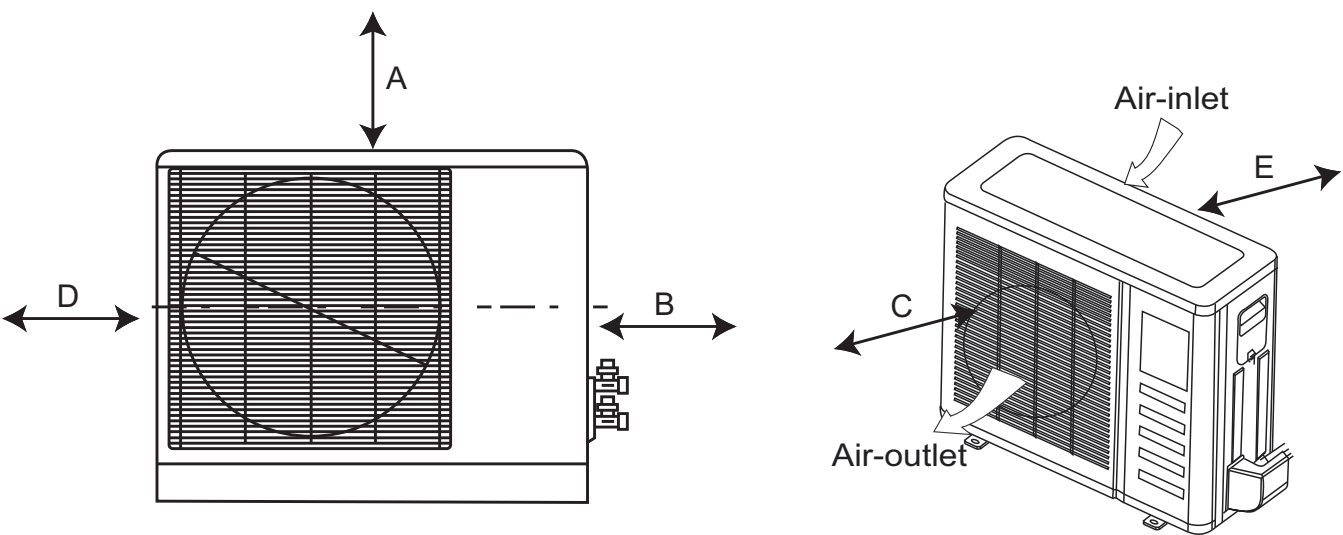
| Model  | W in (mm)  | D in (mm)  | H in (mm)  | L1 in (mm) | L2 in (mm) | Operating Weight lb (kg) |
|--------|------------|------------|------------|------------|------------|--------------------------|
| 9K/12K | 32.0 (810) | 12.2 (310) | 22.0 (558) | 20.9 (530) | 11.4 (290) | 82.5 (37.4)              |
| 18K    | 32.3 (845) | 12.6 (320) | 27.6 (700) | 22.1 (560) | 13.2 (335) | 102.5 (46.5)             |
| 24K    | 37.2 (945) | 15.6 (395) | 31.9 (810) | 25.1 (640) | 15.9 (405) | 137.6 (62.4)             |
| 30K    | 37.2 (945) | 15.6 (395) | 31.9 (810) | 25.1 (640) | 15.9 (405) | 157.6 (71.5)             |

**CLEARANCES - INDOOR**



**Fig. 4 – Indoor Unit Clearance**

**CLEARANCES - OUTDOOR**



**Fig. 5 – Clearances Outdoor**

| UNIT | Minimum Value<br>in. (mm) |
|------|---------------------------|
| A    | 24 (609)                  |
| B    | 24 (609)                  |
| C    | 24 (609)                  |
| D    | 4 (101)                   |
| E    | 4 (101)                   |

## SPECIFICATIONS - HEAT PUMP UNITS (MAQ SERIES)

| System          | Size   |         | 9                                      | 12              | 9               | 12              | 18              | 24              | 30              |
|-----------------|--|---------|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | Outdoor Model                                  |         | 38MAQB09--1                            | 38MAQB12---1    | 38MAQB09---3    | 38MAQB12---3    | 38MAQB18---3    | 38MAQB24---3    | 38MAQB30---3    |
| Performance     | Indoor Model                                   |         | 40MAQB09B--1                           | 40MAQB12B--1    | 40MAQB09B--3    | 40MAQB12B--3    | 40MAQB18B--3    | 40MAQB24B--3    | 40MAQB30B--3    |
|                 | Energy Star                                    |         | YES                                    | YES             | YES             | YES             | YES             | YES             | NO              |
| Performance     | Cooling Rated Capacity                         | Btu/h   | 9,000                                  | 12,000          | 9,000           | 12,000          | 17,500          | 23,000          | 30,000          |
|                 | Cooling Cap. Range Min - Max                   | Btu/h   | 3500~11000                             | 4000~13000      | 3500~11000      | 4000~13000      | 4500~18000      | 5500~23500      | 8000~30500      |
|                 | SEER   |         | 23.5                                   | 21.5            | 23.5            | 21.5            | 19.5            | 20.0            | 16.5            |
|                 | EER  |         | 14.5                                   | 13              | 14.5            | 13              | 12.5            | 12.5            | 9.5             |
|                 | Heating Rated Capacity                         | Btu/h   | 10,000                                 | 12,000          | 10,000          | 12,000          | 18,000          | 25,000          | 32,000          |
|                 | Heating Cap. Range Min - Max                   | Btu/h   | 4,500~11,500                           | 5,000~13,500    | 4,500~11,500    | 5,000~13,500    | 5,500~19,000    | 6,000~26,000    | 9,000~34,000    |
|                 | HSPF   |         | 10.0                                   | 10.0            | 10.0            | 10.0            | 9.6             | 10.0            | 9.6             |
| Controls        | COP  | W/W     | 3.36                                   | 3.22            | 3.66            | 3.36            | 3.36            | 3.22            | 2.92            |
|                 | Wireless Remote Controller (°F/°C Convertible) |         | Standard                               |                 |                 |                 |                 |                 |                 |
| Operating Range | Wired Remote Controller (°F/°C Convertible)    |         | Optional                               |                 |                 |                 |                 |                 |                 |
|                 | Cooling Outdoor DB Min - Max                   | °F      | 4~122                                  | 4~122           | 4~122           | 4~122           | 4~122           | 4~122           | 4~122           |
|                 | Heating Outdoor DB Min - Max                   | °F      | 4~86                                   | 4~86            | 4~86            | 4~86            | 4~86            | 4~86            | 4~86            |
|                 | Cooling Indoor DB Min -Max                     | °F      | 63~90                                  | 63~90           | 63~90           | 63~90           | 63~90           | 63~90           | 63~90           |
|                 | Heating Indoor DB Min -Max                     | °F      | 32~86                                  | 32~86           | 32~86           | 32~86           | 32~86           | 32~86           | 32~86           |
| Piping          | Total Piping Length                            | Ft.     | 82                                     | 82              | 82              | 82              | 98              | 98              | 164             |
|                 | Piping Lift                                    | Ft.     | 32                                     | 32              | 32              | 32              | 65              | 65              | 82              |
|                 | Pipe Connection Size - Liquid                  | In.     | 1/4                                    | 1/4             | 1/4             | 1/4             | 1/4             | 3/8             | 3/8             |
|                 | Pipe Connection Size - Suction                 | In.     | 3/8                                    | 1/2             | 3/8             | 1/2             | 1/2             | 5/8             | 5/8             |
| Refrigerant     | Type   |         | R410A                                  |                 |                 |                 |                 |                 |                 |
|                 | Design Pressure                                | PSIG    | 550                                    | 550             | 550             | 550             | 550             | 550             | 550             |
| Refrigerant     | Metering Device                                |         | Electronic Expansion Valve             |                 |                 |                 |                 | Capillary Tube  |                 |
|                 | Charge   | Lb.     | 2.76                                   | 2.76            | 2.76            | 2.76            | 4.19            | 5.18            | 6.62            |
| Outdoor Coil    | Face Area                                      | Sq. Ft. | 9.2                                    | 9.2             | 9.2             | 9.2             | 16.0            | 21.1            | 17.2            |
|                 | No. Rows                                       |         | 2                                      | 2               | 2               | 2               | 2               | 3               | 3               |
|                 | Fins per inch                                  |         | 21                                     | 21              | 21              | 21              | 18              | 18              | 17              |
|                 | Circuits                                       |         | 4                                      | 4               | 4               | 4               | 6               | 8               | 6               |
| Indoor Coil     | Face Area (sq. ft.)                            | Sq. Ft. | 2.2                                    | 2.2             | 2.2             | 2.2             | 2.6             | 3.7             | 3.7             |
|                 | No. Rows                                       |         | 2                                      | 2               | 2               | 2               | 2               | 3               | 3               |
|                 | Fins per inch                                  |         | 20                                     | 20              | 20              | 20              | 20              | 18              | 18              |
|                 | Circuits                                       |         | 3                                      | 3               | 3               | 3               | 4               | 7               | 7               |
| Compressor      | Type   |         | Hermetic Rotary DC Inverter Compressor |                 |                 |                 |                 |                 |                 |
|                 | Model  |         | ASM98D1UFZA                            | ASM108D1UFZA    | ASM98D1UFZA     | ASM108D1UFZA    | ASM135D23UFZ    | DA250S2C-30MT   | TNB306FPGMC-L   |
|                 | Oil Type                                       |         | VG74                                   | VG74            | VG74            | VG74            | VG74            | VG74            | FV50S           |
|                 | Oil Charge                                     | Fl. Oz. | 12.5                                   | 12.5            | 12.5            | 12.5            | 15.2            | 27.7            | 36.2            |
|                 | Rated Current                                  | RLA     | 5.3                                    | 5.7             | 5.3             | 5.7             | 7.3             | 8.8             | 13.5            |
| Electrical      | Voltage, Phase, Cycle                          | V/Ph/Hz | 115-1-60                               | 115-1-60        | 208/230-1-60    | 208/230-1-60    | 208/230-1-60    | 208/230-1-60    | 208/230-1-60    |
|                 | Power Supply                                   |         | Indoor unit powered from outdoor unit  |                 |                 |                 |                 |                 |                 |
|                 | MCA  | A.      | 15                                     | 15              | 15              | 15              | 13              | 15              | 20              |
| Outdoor         | MOCP - Fuse Rating                             | A.      | 20                                     | 20              | 15              | 15              | 20              | 25              | 30              |
|                 | Unit Width                                     | In.     | 31.9                                   | 31.9            | .9              | 31.9            | 33.3            | 37.2            | 37.2            |
|                 | Unit Height                                    | In.     | 22.0                                   | 22.0            | .0              | 22.0            | .6              | 31.9            | 31.9            |
|                 | Unit Depth                                     | In.     | 12.2                                   | 12.2            | .2              | 12.2            | .6              | 15.6            | 15.6            |
|                 | Net Weight                                     | Lbs.    | 82.5                                   | 82.5            | 82.5            | 82.5            | 102.5           | 137.6           | 157.6           |
|                 | Airflow  | CFM     | 1200                                   | 1200            | 1200            | 1200            | 1390            | 2130            | 2130            |
|                 | Sound Pressure                                 | dB(A)   | 56                                     | 56              | 56              | 56              | 59              | 60              | 63              |
| Indoor          | Unit Width                                     | In.     | 32.9                                   | 32.9            | 32.9            | 32.9            | 39.0            | 46.7            | 46.7            |
|                 | Unit Height                                    | In.     | 11.0                                   | 11.0            | 11.0            | 11.0            | 12.4            | 13.4            | 13.4            |
|                 | Unit Depth                                     | In.     | 7.8                                    | 7.8             | 7.8             | 7.8             | 8.6             | 10.2            | 10.2            |
|                 | Net Weight                                     | Lbs.    | 19.2                                   | 19.2            | 19.2            | 19.2            | 26.5            | 40.1            | 40.1            |
|                 | Number of Fan Speeds                           |         | 4                                      | 4               | 4               | 4               | 4               | 4               | 4               |
|                 | Airflow (lowest to highest)                    | CFM     | 210/290/360/380                        | 210/300/360/380 | 210/290/360/380 | 210/300/360/380 | 310/450/650/680 | 520/620/780/870 | 520/620/780/870 |
|                 | Sound Pressure (lowest to highest)             | dB(A)   | 27/34/42                               | 27/34/42        | 27/34/42        | 27/34/42        | 33/40/46        | 39/45/50        | 39/45/50        |
| Air throw Data  | Air throw Data                                 | Ft.     | 23                                     | 23              | 23              | 23              | 30              | 36              | 36              |

Condensing unit above or below indoor unit

## COOLING PERFORMANCE DATA - 38/40MAQ (HEAT PUMP)

| Model            | Cooling              |                      |       | Outdoor conditions (DB) |          |          |           |           |           |
|------------------|----------------------|----------------------|-------|-------------------------|----------|----------|-----------|-----------|-----------|
|                  | Indoor Conditions DB | Indoor Conditions WB |       | 77F(25C)                | 86F(30C) | 95F(35C) | 104F(40C) | 113F(45C) | 122F(50C) |
| 09<br>(115V)     | 69.8F(21C)           | 59F(15C)             | TC    | 7.43                    | 7.83     | 9.74     | 8.38      | 6.11      | 5.11      |
|                  |                      |                      | SC    | 6.68                    | 6.69     | 8.18     | 7.37      | 4.36      | 3.74      |
|                  |                      |                      | Input | 0.35                    | 0.54     | 0.81     | 0.8       | 0.75      | 0.75      |
|                  | 75.2F(24C)           | 62.6F(17C)           | TC    | 7.78                    | 9.14     | 9.89     | 8.65      | 6.92      | 5.83      |
|                  |                      |                      | SC    | 3.58                    | 8.11     | 6.27     | 5.52      | 4.85      | 4.29      |
|                  |                      |                      | Input | 0.35                    | 0.54     | 0.81     | 0.8       | 0.75      | 0.75      |
|                  | 80.6F(27C)           | 66.2F(19C)           | TC    | 8.21                    | 9.22     | 10.41    | 9.27      | 7.32      | 6         |
|                  |                      |                      | SC    | 7.39                    | 5.88     | 8.22     | 7.79      | 5.11      | 4.37      |
|                  |                      |                      | Input | 0.35                    | 0.75     | 0.82     | 0.81      | 0.75      | 0.75      |
|                  | 89.6F(32C)           | 73.4F(23C)           | TC    | 8.41                    | 9.72     | 11.59    | 10.22     | 8.82      | 7.51      |
|                  |                      |                      | SC    | 3.68                    | 5.76     | 6.9      | 6.2       | 5.55      | 5         |
|                  |                      |                      | Input | 0.36                    | 0.56     | 0.83     | 0.82      | 0.76      | 0.77      |
| 12<br>(115V)     | 69.8F(21C)           | 59F(15C)             | TC    | 8.21                    | 11.75    | 11.42    | 9         | 7.85      | 6.68      |
|                  |                      |                      | SC    | 7.06                    | 9.05     | 8.68     | 7.38      | 6.42      | 5.58      |
|                  |                      |                      | Input | 0.38                    | 0.8      | 1.04     | 0.87      | 0.82      | 0.81      |
|                  | 75.2F(24C)           | 62.6F(17C)           | TC    | 8.42                    | 11.84    | 12.01    | 9.35      | 8.32      | 7.34      |
|                  |                      |                      | SC    | 7.28                    | 8.69     | 8.66     | 7.62      | 6.53      | 5.81      |
|                  |                      |                      | Input | 0.57                    | 0.94     | 1.25     | 1.27      | 0.98      | 0.94      |
|                  | 80.6F(27C)           | 66.2F(19C)           | TC    | 8.81                    | 11.95    | 12.23    | 9.69      | 8.87      | 7.95      |
|                  |                      |                      | SC    | 7.49                    | 8.32     | 8.63     | 7.85      | 6.64      | 6.04      |
|                  |                      |                      | Input | 0.39                    | 0.75     | 1.06     | 0.89      | 0.85      | 0.82      |
|                  | 89.6F(32C)           | 73.4F(23C)           | TC    | 9.01                    | 12.15    | 12.43    | 9.89      | 9.07      | 8.15      |
|                  |                      |                      | SC    | 7.7                     | 8.53     | 8.84     | 8.06      | 6.85      | 6.25      |
|                  |                      |                      | Input | 0.4                     | 0.97     | 1.3      | 1.34      | 0.92      | 0.85      |
| 09<br>(208-230V) | 69.8F(21C)           | 59F(15C)             | TC    | 7.41                    | 7.82     | 9.73     | 8.34      | 6.12      | 5.1       |
|                  |                      |                      | SC    | 6.64                    | 6.69     | 8.18     | 7.37      | 4.36      | 3.74      |
|                  |                      |                      | Input | 0.35                    | 0.54     | 0.81     | 0.8       | 0.75      | 0.75      |
|                  | 75.2F(24C)           | 62.6F(17C)           | TC    | 7.76                    | 9.16     | 9.89     | 8.62      | 6.92      | 5.83      |
|                  |                      |                      | SC    | 3.58                    | 8.11     | 6.27     | 5.52      | 4.85      | 4.29      |
|                  |                      |                      | Input | 0.35                    | 0.54     | 0.81     | 0.8       | 0.75      | 0.75      |
|                  | 80.6F(27C)           | 66.2F(19C)           | TC    | 8.21                    | 9.22     | 10.41    | 9.27      | 7.32      | 6         |
|                  |                      |                      | SC    | 7.39                    | 5.88     | 8.22     | 7.79      | 5.11      | 4.37      |
|                  |                      |                      | Input | 0.35                    | 0.75     | 0.82     | 0.81      | 0.75      | 0.75      |
|                  | 89.6F(32C)           | 73.4F(23C)           | TC    | 8.41                    | 9.72     | 11.59    | 10.22     | 8.82      | 7.51      |
|                  |                      |                      | SC    | 3.68                    | 5.76     | 6.9      | 6.2       | 5.55      | 5         |
|                  |                      |                      | Input | 0.36                    | 0.56     | 0.83     | 0.82      | 0.76      | 0.77      |
| 12<br>(208-230V) | 69.8F(21C)           | 59F(15C)             | TC    | 8.21                    | 11.75    | 11.42    | 9         | 7.85      | 6.68      |
|                  |                      |                      | SC    | 7.06                    | 9.05     | 8.68     | 7.38      | 6.42      | 5.58      |
|                  |                      |                      | Input | 0.38                    | 0.8      | 1.04     | 0.87      | 0.82      | 0.81      |
|                  | 75.2F(24C)           | 62.6F(17C)           | TC    | 8.42                    | 11.84    | 12.01    | 9.35      | 8.32      | 7.34      |
|                  |                      |                      | SC    | 7.28                    | 8.69     | 8.66     | 7.62      | 6.53      | 5.81      |
|                  |                      |                      | Input | 0.57                    | 0.94     | 1.25     | 1.27      | 0.98      | 0.94      |
|                  | 80.6F(27C)           | 66.2F(19C)           | TC    | 8.81                    | 11.95    | 12.23    | 9.69      | 8.87      | 7.95      |
|                  |                      |                      | SC    | 7.49                    | 8.32     | 8.63     | 7.85      | 6.64      | 6.04      |
|                  |                      |                      | Input | 0.39                    | 0.75     | 1.06     | 0.89      | 0.85      | 0.82      |
|                  | 89.6F(32C)           | 73.4F(23C)           | TC    | 9.01                    | 12.15    | 12.43    | 9.89      | 9.07      | 8.15      |
|                  |                      |                      | SC    | 7.7                     | 8.53     | 8.84     | 8.06      | 6.85      | 6.25      |
|                  |                      |                      | Input | 0.4                     | 0.97     | 1.3      | 1.34      | 0.92      | 0.85      |
| 18<br>(208-230V) | 69.8F(21C)           | 59F(15C)             | TC    | 12.58                   | 15.24    | 16.25    | 11.04     | 8.32      | 6.78      |
|                  |                      |                      | SC    | 8.34                    | 10.3     | 10.6     | 7.93      | 6.18      | 5.16      |
|                  |                      |                      | Input | 0.58                    | 0.93     | 1.53     | 1.2       | 1.42      | 1.32      |
|                  | 75.2F(24C)           | 62.6F(17C)           | TC    | 13.48                   | 16.41    | 16.66    | 12.3      | 9.43      | 7.74      |
|                  |                      |                      | SC    | 8.85                    | 10.94    | 11.35    | 8.62      | 6.87      | 5.91      |
|                  |                      |                      | Input | 0.57                    | 0.93     | 1.56     | 1.22      | 1.45      | 1.35      |
|                  | 80.6F(27C)           | 66.2F(19C)           | TC    | 14.43                   | 18.04    | 18.37    | 13.35     | 9.97      | 7.96      |
|                  |                      |                      | SC    | 9.59                    | 11.95    | 12.37    | 9.28      | 7.23      | 6.02      |
|                  |                      |                      | Input | 0.57                    | 0.94     | 1.59     | 1.24      | 1.48      | 1.38      |
|                  | 89.6F(32C)           | 73.4F(23C)           | TC    | 14.7                    | 19.03    | 20.18    | 15.36     | 12.02     | 9.97      |
|                  |                      |                      | SC    | 9.08                    | 11.72    | 12.5     | 9.69      | 7.85      | 6.89      |
|                  |                      |                      | Input | 0.6                     | 0.97     | 1.62     | 1.27      | 1.51      | 1.41      |
| 24<br>(208-230V) | 69.8F(21C)           | 59F(15C)             | TC    | 19.5                    | 20.69    | 21.43    | 18.05     | 14.27     | 13.32     |
|                  |                      |                      | SC    | 15.15                   | 15.61    | 15.49    | 14.23     | 10.03     | 8.78      |
|                  |                      |                      | Input | 1.2                     | 1.88     | 2.29     | 2.14      | 1.9       | 1.86      |
|                  | 75.2F(24C)           | 62.6F(17C)           | TC    | 20.01                   | 21.21    | 22.31    | 18.51     | 15.08     | 13.3      |
|                  |                      |                      | SC    | 15.25                   | 15.71    | 15.59    | 14.33     | 10.13     | 8.88      |
|                  |                      |                      | Input | 1.2                     | 1.87     | 2.3      | 2.21      | 2.14      | 1.92      |
|                  | 80.6F(27C)           | 66.2F(19C)           | TC    | 20.54                   | 21.75    | 23.21    | 18.98     | 15.91     | 13.3      |
|                  |                      |                      | SC    | 15.35                   | 15.81    | 15.69    | 14.43     | 10.23     | 8.98      |
|                  |                      |                      | Input | 1.21                    | 1.86     | 2.31     | 2.26      | 2.16      | 1.93      |
|                  | 89.6F(32C)           | 73.4F(23C)           | TC    | 20.61                   | 22.94    | 24.4     | 21.84     | 19.17     | 16.66     |
|                  |                      |                      | SC    | 15.58                   | 16.04    | 15.92    | 14.66     | 10.46     | 9.21      |
|                  |                      |                      | Input | 1.22                    | 1.87     | 2.34     | 2.33      | 2.32      | 1.96      |
| 30<br>(208-230V) | 69.8F(21C)           | 59F(15C)             | TC    | 27.33                   | 27.43    | 27.51    | 22.77     | 18.29     | 17.32     |
|                  |                      |                      | SC    | 19.4                    | 19.48    | 19.56    | 17.21     | 16.32     | 15.28     |
|                  |                      |                      | Input | 2.28                    | 3.29     | 3.63     | 3.11      | 2.35      | 2.25      |
|                  | 75.2F(24C)           | 62.6F(17C)           | TC    | 29.41                   | 30.01    | 29.82    | 24.53     | 20.71     | 18.24     |
|                  |                      |                      | SC    | 19.95                   | 20.47    | 20.07    | 17.73     | 17.24     | 16.29     |
|                  |                      |                      | Input | 2.31                    | 3.32     | 3.68     | 3.17      | 2.41      | 2.31      |
|                  | 80.6F(27C)           | 66.2F(19C)           | TC    | 31.57                   | 32.68    | 32.21    | 26.37     | 23.2      | 19.21     |
|                  |                      |                      | SC    | 20.55                   | 21.52    | 20.65    | 18.3      | 18.21     | 17.35     |
|                  |                      |                      | Input | 2.35                    | 3.35     | 3.74     | 3.23      | 2.47      | 2.38      |
|                  | 89.6F(32C)           | 73.4F(23C)           | TC    | 32.6                    | 33.71    | 33.24    | 27.4      | 24.23     | 20.24     |
|                  |                      |                      | SC    | 20.9                    | 21.87    | 21       | 18.65     | 18.56     | 17.7      |
|                  |                      |                      | Input | 2.42                    | 3.42     | 3.81     | 3.3       | 2.54      | 2.45      |

### LEGEND

DB - Dry Bulb

WB - Wet Bulb

TC - Total Net Cooling Capacity (1000 Btu/hour)

SC - Sensible Capacity (1000 Btu/hour)

Input - Total Power (kW)

# HEATING PERFORMANCE DATA - - 38/40MAQ (HEAT PUMP)

| Model<br>38-40MAQ | Heating              |       | Outdoor conditions (DB) |           |           |         |            |            |          |          |
|-------------------|----------------------|-------|-------------------------|-----------|-----------|---------|------------|------------|----------|----------|
|                   | Indoor Conditions DB |       | 53.6F(12C)              | 44.6F(7C) | 39.2F(4C) | 32F(0C) | 24.8F(-4C) | 19.4F(-7C) | 17F(-8C) | 5F(-15C) |
| 09(115V)          | 59F(15C)             | TH    | 11.2                    | 11.1      | 10.89     | 10.65   | 9.87       | 9.11       | 8.27     | 6.71     |
|                   |                      | Input | 0.73                    | 0.79      | 1.04      | 1.01    | 0.96       | 0.9        | 0.84     | 0.8      |
|                   | 64.4F(18C)           | TH    | 11.1                    | 10.8      | 10.65     | 10.54   | 9.63       | 8.84       | 8.01     | 5.46     |
|                   |                      | Input | 0.78                    | 0.8       | 1.08      | 1.03    | 0.98       | 0.94       | 0.9      | 0.82     |
|                   | 69F(20.5C)           | TH    | 10.8                    | 10.6      | 10.48     | 10.32   | 9.43       | 8.55       | 7.95     | 4.29     |
|                   |                      | Input | 0.8                     | 0.81      | 1.11      | 1.05    | 1          | 0.98       | 0.96     | 0.84     |
| 12(115V)          | 71.6F(22C)           | TH    | 10.6                    | 10.3      | 10.21     | 10.11   | 9.23       | 8.41       | 7.89     | 4.11     |
|                   |                      | Input | 0.82                    | 0.83      | 1.15      | 1.07    | 1.02       | 1.02       | 0.92     | 0.86     |
|                   | 59F(15C)             | TH    | 11.8                    | 12.7      | 12.42     | 11.32   | 10.4       | 9.54       | 8.9      | 5.75     |
|                   |                      | Input | 0.79                    | 1.01      | 1.05      | 1.1     | 1.02       | 1          | 0.98     | 0.83     |
|                   | 64.4F(18C)           | TH    | 12.1                    | 12.7      | 12.32     | 11.34   | 10.32      | 9.32       | 8.81     | 6.14     |
|                   |                      | Input | 0.83                    | 1.37      | 1.4       | 1.26    | 1.22       | 1.27       | 1.01     | 0.91     |
| 09<br>(208-230V)  | 69F(20.5C)           | TH    | 12.3                    | 12.6      | 12.12     | 11.32   | 10.21      | 9.12       | 8.43     | 6.49     |
|                   |                      | Input | 0.83                    | 1.1       | 1.12      | 1.19    | 1.19       | 1.25       | 1.03     | 0.98     |
|                   | 71.6F(22C)           | TH    | 11.1                    | 12.4      | 12.01     | 11.21   | 10.01      | 9.02       | 8.21     | 6.01     |
|                   |                      | Input | 0.85                    | 1.15      | 1.16      | 1.21    | 1.23       | 1.31       | 1.05     | 1        |
|                   | 59F(15C)             | TH    | 11.2                    | 11.1      | 10.89     | 10.65   | 9.87       | 9.11       | 8.27     | 6.71     |
|                   |                      | Input | 0.73                    | 0.79      | 1.04      | 1.01    | 0.96       | 0.9        | 0.84     | 0.8      |
| 12<br>(208-230V)  | 64.4F(18C)           | TH    | 11.1                    | 10.8      | 10.65     | 10.54   | 9.63       | 8.84       | 8.01     | 5.46     |
|                   |                      | Input | 0.78                    | 0.8       | 1.08      | 1.03    | 0.98       | 0.94       | 0.9      | 0.82     |
|                   | 69F(20.5C)           | TH    | 10.8                    | 10.6      | 10.48     | 10.32   | 9.43       | 8.55       | 7.95     | 4.29     |
|                   |                      | Input | 0.8                     | 0.81      | 1.11      | 1.05    | 1          | 0.98       | 0.96     | 0.84     |
|                   | 71.6F(22C)           | TH    | 10.6                    | 10.3      | 10.21     | 10.11   | 9.23       | 8.41       | 7.89     | 4.11     |
|                   |                      | Input | 0.82                    | 0.83      | 1.15      | 1.07    | 1.02       | 1.02       | 0.92     | 0.86     |
| 18<br>(208-230V)  | 59F(15C)             | TH    | 11.8                    | 12.7      | 12.42     | 11.32   | 10.4       | 9.54       | 8.9      | 5.75     |
|                   |                      | Input | 0.79                    | 1.01      | 1.05      | 1.1     | 1.02       | 1          | 0.98     | 0.83     |
|                   | 64.4F(18C)           | TH    | 12.1                    | 12.7      | 12.32     | 11.34   | 10.32      | 9.32       | 8.81     | 6.14     |
|                   |                      | Input | 0.83                    | 1.37      | 1.4       | 1.26    | 1.22       | 1.27       | 1.01     | 0.91     |
|                   | 69F(20.5C)           | TH    | 12.3                    | 12.6      | 12.12     | 11.32   | 10.21      | 9.12       | 8.43     | 6.49     |
|                   |                      | Input | 0.83                    | 1.1       | 1.12      | 1.19    | 1.19       | 1.25       | 1.03     | 0.98     |
| 24<br>(208-230V)  | 71.6F(22C)           | TH    | 11.1                    | 12.4      | 12.01     | 11.21   | 10.01      | 9.02       | 8.21     | 6.01     |
|                   |                      | Input | 0.85                    | 1.15      | 1.16      | 1.21    | 1.23       | 1.31       | 1.05     | 1        |
|                   | 59F(15C)             | TH    | 23.2                    | 20.5      | 19.42     | 17.56   | 16.52      | 14.28      | 12.08    | 9.39     |
|                   |                      | Input | 1.58                    | 1.49      | 1.48      | 1.58    | 1.46       | 1.4        | 1.35     | 1.21     |
|                   | 64.4F(18C)           | TH    | 22.4                    | 20.1      | 18.66     | 16.89   | 16.05      | 13.94      | 12.06    | 9.16     |
|                   |                      | Input | 1.62                    | 1.55      | 1.55      | 1.61    | 1.52       | 1.45       | 1.4      | 1.29     |
| 30<br>(208-230V)  | 69F(20.5C)           | TH    | 21.7                    | 19.7      | 17.93     | 16.26   | 15.62      | 13.62      | 12.07    | 8.95     |
|                   |                      | Input | 1.67                    | 1.62      | 1.63      | 1.65    | 1.58       | 1.5        | 1.45     | 1.38     |
|                   | 71.6F(22C)           | TH    | 21                      | 19        | 17.23     | 15.56   | 14.92      | 12.92      | 11.37    | 8.25     |
|                   |                      | Input | 1.72                    | 1.67      | 1.68      | 1.7     | 1.63       | 1.55       | 1.5      | 1.43     |
|                   | 59F(15C)             | TH    | 28.6                    | 27.8      | 25.85     | 23.56   | 23.42      | 23.22      | 23.16    | 18.93    |
|                   |                      | Input | 2                       | 2.25      | 2.24      | 2.21    | 2.2        | 2.23       | 2.24     | 2.17     |
| 30<br>(208-230V)  | 64.4F(18C)           | TH    | 27.6                    | 27.6      | 24.52     | 23.54   | 23.4       | 22.52      | 20.45    | 17.45    |
|                   |                      | Input | 2.24                    | 2.45      | 2.35      | 2.35    | 2.32       | 2.23       | 2.21     | 2.16     |
|                   | 69F(20.5C)           | TH    | 29.1                    | 29.3      | 26.75     | 24.63   | 22.98      | 21.85      | 19.61    | 16.38    |
|                   |                      | Input | 2.39                    | 2.74      | 2.64      | 2.58    | 2.42       | 2.25       | 2.2      | 2.18     |
|                   | 71.6F(22C)           | TH    | 26.9                    | 27.5      | 24.21     | 23.41   | 22.54      | 21.67      | 19.54    | 16.24    |
|                   |                      | Input | 2                       | 2.25      | 2.24      | 2.21    | 2.2        | 2.23       | 2.24     | 2.17     |
| 30<br>(208-230V)  | 59F(15C)             | TH    | 43                      | 41.2      | 37.52     | 34.65   | 32.32      | 30.65      | 28.84    | 20.51    |
|                   |                      | Input | 3.79                    | 3.99      | 3.69      | 3.43    | 3.2        | 2.96       | 2.82     | 2.61     |
|                   | 64.4F(18C)           | TH    | 39.6                    | 39.9      | 36.55     | 33.84   | 30.95      | 28.58      | 26.47    | 19.96    |
|                   |                      | Input | 3.35                    | 4.23      | 3.85      | 3.65    | 3.24       | 3.11       | 3.04     | 2.76     |
|                   | 69F(20.5C)           | TH    | 36.3                    | 38.6      | 35.62     | 33.07   | 29.62      | 26.54      | 24.13    | 19.43    |
|                   |                      | Input | 3.45                    | 4.46      | 4.01      | 3.9     | 3.31       | 3.2        | 3.16     | 2.89     |
| 30<br>(208-230V)  | 71.6F(22C)           | TH    | 32.9                    | 35.2      | 32.22     | 29.67   | 26.22      | 23.14      | 20.73    | 16.03    |
|                   |                      | Input | 3.68                    | 4.69      | 4.24      | 4.13    | 3.54       | 3.43       | 3.39     | 3.12     |

## LEGEND

DB - Dry Bulb

WB - Wet Bulb

TH - Total Net Heating Capacity (1000 Btu/hour)

Input - Total Power (kW)



## APPLICATION DATA

### UNIT SELECTION

Select equipment to either match or be slightly less than anticipated peak load. This provides better humidity control, fewer unit cycles, and less part-load operation.

For units used in spaces with high sensible loads, base equipment selection on unit sensible load, not on total anticipated load. Adjust for anticipated room wet bulb temperature to avoid undersizing equipment.

### UNIT MOUNTING (INDOOR)

**Refer to unit Installation Instructions for further details.**

**Unit leveling** - For reliable operation, units should be level in all planes.

**Clearance** - Provide adequate clearance for airflow (see Fig. 2.)

**Unit location** - Select a location which will provide the best air circulation for the room. These units should be positioned as high as possible on the wall for best air circulation. The unit return and discharge should not be obstructed by furniture, curtains, or anything which may cause unit short cycling or air recirculation. Place the unit in the middle of the selected wall (if possible). Use an outside wall, if available, to make piping easier, and place the unit so it faces the normal location of room occupants.

### UNIT MOUNTING (OUTDOOR)

**Refer to unit Installation Instructions for further details.**

**Unit leveling** - For reliable operation, units should be level in all planes.

**Clearance** - Minimum clearance (see Fig. 5) must be provided for airflow. The condensing units are designed for free-flow application. Air inlets and outlets should not be restricted.

**Unit location** - A location which is convenient to installation and not exposed to strong wind. A location that can bear the weight of outdoor unit and where the outdoor unit can be mounted in a level position.

Do not install the indoor or outdoor units in a location with special environmental conditions. For those applications, contact your Carrier representative.

### MOUNTING TEMPLATE

**Refer to unit Installation Instructions for further details.**

The fan coil units are furnished with mounting to mark the location of the wiring, and refrigeration line hole locations.

### SUPPORT

Adequate support must be provided to support the weight of all fan coils. Refer to the Physical Data section for fan coil weights, and the base unit dimensional drawings for the location of mounting brackets.

### SYSTEM OPERATING CONDITIONS

| Operating Range<br>Min / Max °F (°C) |                    |                   |
|--------------------------------------|--------------------|-------------------|
|                                      | Cooling            | Heating           |
| Outdoor DB                           | 4 / 122 (-20 / 50) | 4 / 86 (-20 / 30) |
| Indoor DB                            | 63 / 90 (17 / 32)  | 32 / 86 (0 / 30)  |
| Indoor WB                            | 59 / 84 (15 / 29)  |                   |

| Non-Operating Temperature Range<br>Min / Max °F (°C) |                  |
|--|------------------|
| Indoor/Outdoor DB                                    | 32 / 86 (0 / 30) |

**NOTE:** Reference the Product Installation Instructions for more information.

### METERING DEVICES

The outdoor unit (Sizes 09 - 18) has an electronic expansion valve to manage the refrigerant flow of the fan coil connected.

Sizes 24 and 30 have capillary tube metering devices in the outdoor unit.

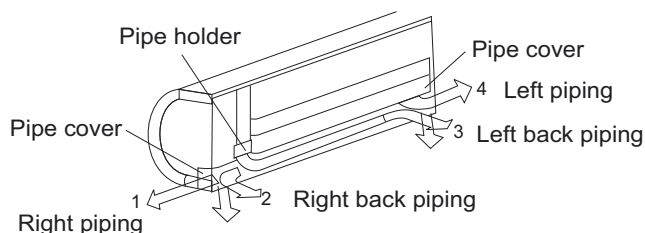
### DRAIN CONNECTIONS

Install drains to meet local sanitation codes. If adequate gravity drainage cannot be provided, unit should be equipped with accessory condensate pump. High wall fan coil unit condensate pumps have a maximum lift of 10' (3.05 m) for 9k and 12k units and 25' (7.62 m) for 18k and 30k units.

See physical dimension tables for drain sizes.

**NOTE: High wall fan coil units have internal condensate traps. A trap is not required.**

Drain connections may be routed through alternate locations on most fan coils (see Fig. 4).



**Fig. 6 – Piping Locations**

### REFRIGERANT LINES

#### General refrigerant line sizing:

1. The 38MAQ units are shipped with a full charge of R410A refrigerant. All charges, line sizing, and capacities are based on runs of 25 ft (7.6 m). For runs over 25 ft (7.6 m), consult long-line section on this page for proper charge adjustments.
2. Refrigerant lines should not be buried in the ground. If it is necessary to bury the lines, not more than 36-in (914 mm) should be buried. Provide a minimum 6-in (152 mm) vertical rise to the service valves to prevent refrigerant migration.
3. Both lines must be insulated. Use a minimum of 1/2-in. (12.7 mm) thick insulation. Closed-cell insulation is recommended in all long-line applications.
4. Special consideration should be given to isolating interconnecting tubing from the building structure. Isolate the tubing so vibration or noise is not transmitted into the structure.

#### Long Line Applications, 38MAQ Units:

1. No change in line sizing is required.
2. Add refrigerant per table below.

#### ADDITIONAL CHARGE TABLE

| Unit Size | Total Line Length ft |     | Additional Charge, oz/ft.<br>ft (m) |                      |                        |
|-----------|----------------------|-----|-------------------------------------|----------------------|------------------------|
|           | Min                  | Max | 10 - 25<br>(3 - 8)                  | >25 - 82<br>(8 - 25) | >82 - 164<br>(25 - 50) |
| 9         | 10                   | 82  | None                                | 0.16                 |                        |
| 12        |                      |     |                                     |                      |                        |
| 18        |                      | 98  |                                     |                      |                        |
| 24        |                      |     |                                     |                      |                        |
| 30        |                      | 164 |                                     | 0.32                 | 0.32                   |

## WIRING

### Recommended Connection Method for Power and Communication Wiring (To minimize communication wiring interference)

#### **Power Wiring:**

The main power is supplied to the outdoor unit. The field supplied connecting cable from the outdoor unit to indoor unit consists of three (3) wires and provides the power for the indoor unit. Two wires are high voltage AC power and one is a ground wire.

Consult your local building codes and the NEC (National Electrical Code) or CEC (Canadian Electrical Code) for special requirements.

All wires must be sized per NEC or CEC and local codes. Use Electrical Data table MCA (minimum circuit amps) and MOCP (maximum over current protection) to correctly size the wires and then disconnect fuse or breakers respectively.

Per caution note, only copper conductors with a minimum 300 volt rating and 2/64-inch thick insulation must be used.

#### **Communication Wiring:**

A separate shielded copper conductor only, with a minimum 300 volt rating and 2/64-inch thick insulation, must be used as the communication wire from the outdoor unit to the indoor unit.

To minimize voltage drop, the factory recommended wire size is 14/3 stranded with a ground. In special cases where there is high electrical interference, please use a separate shielded 16GA stranded control wire.

### Alternate Connection Method for Power and Communication Wiring (May not prevent communication wiring interference)

The main power is supplied to the outdoor unit. The field supplied connecting cable from the outdoor unit to indoor unit consists of four (4) wires and provides the power and communication signals for the indoor unit. Two conductors are for power wiring (L1/L2, or L/N), one is a ground wire, and one is a DC communication wire.

Consult your local building codes and the NEC (National Electrical Code) or CEC (Canadian Electrical Code) for special requirements. All power wires must be sized per NEC or CEC and local codes. Use Electrical Data table MCA (minimum circuit amps) and MOCP (maximum over current protection) to correctly size the wires and the disconnect fuse or breakers respectively.

Per caution note, only copper conductors with a minimum 300 volt rating and 2/64-inch thick insulation must be used.



## CAUTION

### **EQUIPMENT DAMAGE HAZARD**

Failure to follow this caution may result in equipment damage or improper operation.

- Wires should be sized based on NEC and local codes.
- Use copper conductors only with a minimum 300 volt rating and 2/64 inch thick insulation.



## CAUTION

### **EQUIPMENT DAMAGE HAZARD**

Failure to follow this caution may result in equipment damage or improper operation.

- Be sure to comply with local codes while running wire from indoor unit to outdoor unit.
- Every wire must be connected firmly. Loose wiring may cause terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, be sure all wiring is tightly connected.
- No wire should be allowed to touch refrigerant tubing, compressor or any moving parts.
- Disconnecting means must be provided and shall be located within sight and readily accessible from the air conditioner.
- Connecting cable with conduit shall be routed through hole in the conduit panel.

The main power is supplied to the outdoor unit. The field supplied connecting cable from the outdoor unit to indoor unit consists of four wires and provides the power for the indoor unit as well as the communication signal between the outdoor unit and indoor unit. Two wires are high voltage AC power (L1 and L2), one is a ground wire, and one is a DC communication wire.

## CONTROL SYSTEM

The 619P unit is equipped with a microprocessor control to perform two functions:

1. Provide safety for the system
2. Control the system and provide optimum levels of comfort and efficiency

The main microprocessor is located on the control board of the fan coil unit (outdoor units have a microprocessor too) with thermistors located in the fan coil air inlet and on the indoor coil. Heat pump units have a thermistor on the outdoor coil. These thermistors monitor the system operation to maintain the unit within acceptable parameters and control the operating mode.

## WIRELESS REMOTE CONTROL



**Fig. 7 – Wireless remote control**

1. A wireless remote control is supplied for system operation for system operation of all high-wall units.
2. Each battery operated wireless (infrared) remote control may be used to control more than one unit.

## WIRED REMOTE CONTROL (OPTIONAL)

P/N KSACN0101AAA

1. Optional wired remote controller used for system operation of all high-wall units.
2. Kit includes a wired remote controller and a connecting cable.
3. Connect with wire terminal between remote controller and indoor unit.
4. Display in °F or °C and temperature increments every 1°F or every 1°C.



**Fig. 8 – Wired Remote Control**

## AIR FLOW DATA

| SYSTEM SIZE   |        | 9K     | 12K    | 9K         | 12K        | 18K        | 24K        | 30K        |
|---------------|--------|--------|--------|------------|------------|------------|------------|------------|
|               |        | (115V) | (115V) | (208-230V) | (208-230V) | (208-230V) | (208-230V) | (208-230V) |
| Indoor (CFM)  | Turbo  | 380    | 380    | 380        | 380        | 680        | 870        | 870        |
|               | High   | 360    | 360    | 360        | 360        | 650        | 780        | 780        |
|               | Medium | 290    | 300    | 290        | 300        | 450        | 620        | 620        |
|               | Low    | 210    | 210    | 210        | 210        | 310        | 520        | 520        |
| Outdoor (CFM) |        | 1200   | 1200   | 1200       | 1200       | 1390       | 2130       | 2130       |

## AIR THROW DATA

| Unit Capacity | Max Approximate Air Throw ft. (m) | Approximate Air Throw ft. (m) range |
|---------------|-----------------------------------|-------------------------------------|
| 9K, 12K       | 23 (7)                            | 11 (3.5) - 23 (7)                   |
| 18K           | 30 (9)                            | 13 (4) - 30 (9)                     |
| 24K           | 36 (11)                           | 16 (5) - 36 (11)                    |
| 30K           | 36 (11)                           | 16 (5) - 36 (11)                    |

## SOUND PRESSURE

| System Size  |     | 9K       | 12K      | 9K         | 12K        | 18K        | 24K        | 30K        |
|--|-----|----------|----------|------------|------------|------------|------------|------------|
|  |     | (115V)   | (115V)   | (208-230V) | (208-230V) | (208-230V) | (208-230V) | (208-230V) |
| Indoor Sound Pressure cooling mode (at different speeds) | dBa | 42/34/27 | 42/34/27 | 42/34/27   | 42/34/27   | 46.5/40/33 | 50/45/39   | 50/45/39   |
| Indoor Sound Pressure heating mode (at different speeds) | dBa | 40/33/26 | 41/34/27 | 40/33/26   | 41/34/27   | 45/39/32   | 47/44/38   | 47/44/38   |
| Outdoor sound pressure level                             | dBa | 55.5     | 56       | 55.5       | 56         | 59         | 60         | 63         |

## ELECTRICAL DATA

| UNIT SIZE | OPER. VOLTAGE<br>MAX / MIN* | COMPRESSOR   |      | OUTDOOR FAN  |      |       |     | INDOOR FAN   |      |       |    | MCA | MAX FUSE<br>CB AMP |
|-----------|-----------------------------|--------------|------|--------------|------|-------|-----|--------------|------|-------|----|-----|--------------------|
|           |                             | V/PH/HZ      | RLA  | V/PH/HZ      | FLA  | HP    | W   | V/PH/HZ      | FLA  | HP    | W  |     |                    |
| 9K        | 127 / 104                   | 115/1/60     | 5.3  | 115/1/60     | 0.14 | 0.053 | 40  | 115/1/60     | 0.17 | 0.027 | 20 | 15  | 20                 |
| 12K       |                             |              | 5.7  |              |      |       |     |              |      |       |    |     |                    |
| 9K        | 253 / 187                   | 208-230/1/60 | 5.3  | 208-230/1/60 | 0.42 | 0.053 | 40  | 208-230/1/60 | 0.07 | 0.027 | 20 | 15  | 15                 |
| 12K       |                             |              | 5.70 |              | 0.42 | 0.053 | 40  |              | 0.07 | 0.027 | 20 | 15  |                    |
| 18K       |                             |              | 7.3  |              | 0.95 | 0.067 | 50  |              | 0.17 | 0.077 | 58 | 15  | 20                 |
| 24K       |                             |              | 8.8  |              | 0.47 | 0.16  | 120 |              | 0.23 | 0.080 | 60 | 15  | 25                 |
| 30K       |                             |              | 13.5 |              | 1.21 | 0.16  | 120 |              | 0.23 | 0.080 | 60 | 20  | 30                 |

\*Permissible limits of the voltage range at which the unit will operate satisfactorily.

### LEGEND

FLA - Full Load Amps

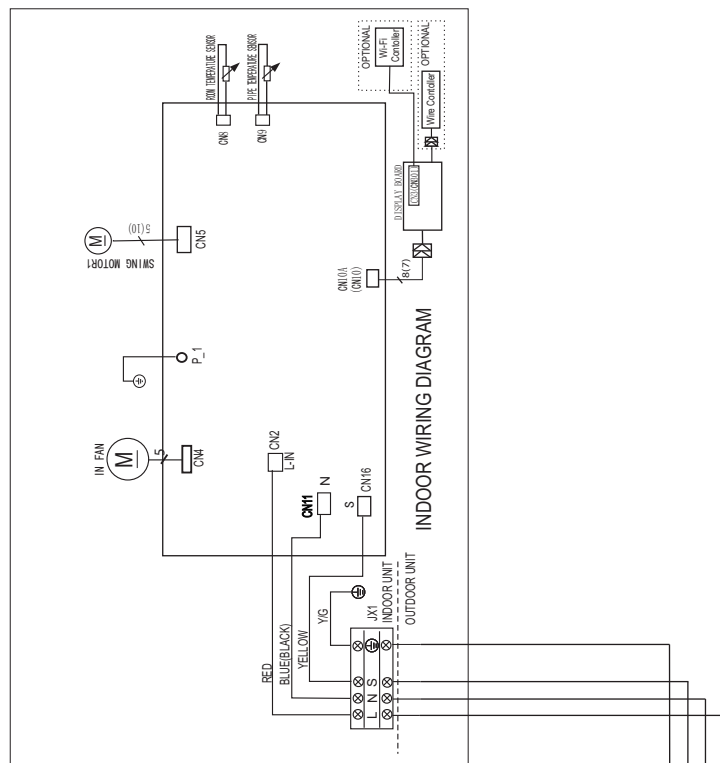
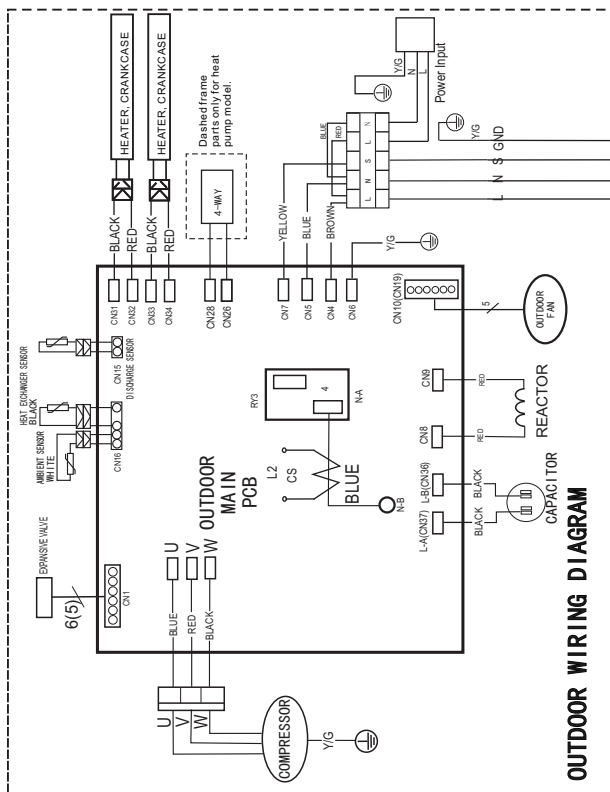
MCA - Minimum Circuit Amps

RLA - Rated Load Amps

## FAN AND MOTOR SPECIFICATIONS

| System size       |                  |         | 9K                | 12K               | 9K                | 12K               | 18K               | 24K                | 30K               |
|-------------------|------------------|---------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|-------------------|
|                   |                  |         | (115V)            | (115V)            | (208-230V)        | (208-230V)        | (208-230V)        | (208-230V)         | (208-230V)        |
| Indoor fan        | material         |         | AS                | AS                | AS                | AS                | AS                | AS                 | AS                |
|                   | Type             |         | GL-98*655-N       | GL-98*655-N       | GL-98*655-N       | GL-98*655-N       | GL-107.5*760-IN   | GL-118*895-IN      | GL-118*895-IN     |
| Indoor fan        | Diameter         | inch    | 3.8               | 3.8               | 3.8               | 3.8               | 4.2               | 4.6                | 4.6               |
|                   | Height           | inch    | 25.8              | 25.8              | 25.8              | 25.8              | 30                | 35.2               | 35.2              |
| Outdoor fan       | material         |         | AS                | AS                | AS                | AS                | AS                | AS                 | AS                |
|                   | Type             |         | ZL-421*117*8-3K   | ZL-421*117*8-3K   | ZL-421*117*8-3K   | ZL-421*117*8-3K   | ZL-460*180*10-3N  | ZL-560*139*12-3KN  | ZL-560*139*12-3KN |
|                   | Diameter         | inch    | 16.5              | 16.5              | 16.5              | 16.5              | 18.1              | 22                 | 22                |
|                   | Height           | inch    | 4.6               | 4.6               | 4.6               | 4.6               | 7                 | 5.5                | 5.5               |
| Indoor fan motor  | Model            |         | WZDK20-38M        | WZDK20-38M        | WZDK20-38G        | WZDK20-38G        | WZDK58-38G        | WZDK60-38G         | WZDK60-38G        |
|                   | Type             |         | DC                | DC                | DC                | DC                | DC                | DC                 | DC                |
|                   | Phase            |         | 3                 | 3                 | 3                 | 3                 | 3                 | 3                  | 3                 |
|                   | FLA              |         | 0.17              | 0.17              | 0.07              | 0.07              | 0.17              | 0.23               | 0.23              |
|                   | Insulation class |         | E                 | E                 | E                 | E                 | E                 | E                  | E                 |
|                   | Safe class       |         | IPX0              | IPX0              | IPX0              | IPX0              | IPX0              | IPX0               | IPX0              |
|                   | Input            | W       | 25                | 25                | 22                | 22                | 52                | 72                 | 72                |
|                   | Output           | W       | 20                | 20                | 20                | 20                | 58                | 60                 | 60                |
|                   | Range of current | Amps    | 0.17±10%          | 0.17±10%          | 0.07±10%          | 0.07±10%          | 0.17±10%          | 0.23±10%           | 0.23±10%          |
|                   | Rated current    | Amps    | 0.17              | 0.17              | 0.07              | 0.07              | 0.17              | 0.23               | 0.23              |
|                   | Rated HP         | HP      | 0.027             | 0.027             | 0.027             | 0.027             | 0.077             | 0.08               | 0.08              |
|                   | Speed            | rev/min | 1300/1170/900/700 | 1300/1170/900/700 | 1300/1170/900/700 | 1300/1170/900/700 | 1300/1170/900/700 | 1250/1200/1100/900 | 250/1200/1100/900 |
|                   | Rated RPM        | rev/min | 1350              | 1350              | 1350              | 1350              | 1350              | 1350               | 1350              |
|                   | Max. input       | W       | 25                | 25                | 22                | 22                | 52                | 72                 | 72                |
| Outdoor fan motor | Model            |         | WZDK40-38G-1      | WZDK40-38G-1      | WZDK40-38G-W-1    | WZDK40-38G-W-1    | ZKFN-50-8-2       | WZDK120-38G-1      | WZDK120-38G-W     |
|                   | Phase            |         | 3                 | 3                 | 3                 | 3                 | 3                 | 3                  | 3                 |
|                   | FLA              |         | 0.14              | 0.14              | 0.42              | 0.42              | 0.95              | 0.47               | 1.21              |
|                   | Type             |         | DC                | DC                | DC                | DC                | DC                | DC                 | DC                |
|                   | Insulation class |         | E                 | E                 | E                 | E                 | E                 | E                  | E                 |
|                   | Safe class       |         | IPX0              | IPX0              | IPX0              | IPX0              | IPX0              | IPX0               | IPX0              |
|                   | Input            | W       | 42                | 42                | 46                | 46                | 116               | 145                | 150               |
|                   | Output           | W       | 40                | 40                | 40                | 40                | 50                | 120                | 120               |
|                   | Range of current | Amps    | 0.14±10%          | 0.14±10%          | 0.42±10%          | 0.42±10%          | 0.95±10%          | 0.47±10%           | 1.21±10%          |
|                   | Rated current    | Amps    | 0.14              | 0.14              | 0.42              | 0.42              | 0.95              | 0.47               | 1.21              |
|                   | Rated HP         | HP      | 0.053             | 0.053             | 0.053             | 0.053             | 0.067             | 0.16               | 0.16              |
|                   | Speed            | rev/min | 800/700/600       | 800/700/600       | 800/700/600       | 800/700/600       | 800/700/600       | 850/750/700        | 850/800/750       |
|                   | Rated RPM        | rev/min | 900               | 900               | 900               | 900               | 900               | 1050               | 1050              |
|                   | Max. input       | W       | 42                | 42                | 46                | 46                | 116               | 145                | 150               |

## WIRING DIAGRAMS



**Fig. 9 – Wiring Diagram Sizes 09-12 (115V)**

# INDOOR UNIT CONTROL BOARD

|       | INPUT or OUTPUT VALUE  |
|-------|--|
| LIN   | Power Voltage : AC 115V  |
| CN1   | Power Voltage : AC115V   |
| CN6   | Relative to the N terminal voltage : DC 24V                        |
| CN15  | Maximum voltage : DC5V   |
| CN4   | Indoor fan interface Maximum voltage : DC310V                      |
| CN5   | Stepper motor interface, Maximum voltage between the lines : DC12V |
| P-1   | Ground   |
| CN8   | Rcom temperature sensor interface, maximum voltage : DC5V          |
| CN9   | Pipe temperature sensor interface, maximum voltage : DC5V          |
| CN10A | Display interface, maximum voltage between the lines : DC5V        |

OUTDOOR UNIT CONTROL BOARD

| CODE      | PART NAME   |
|-----------|---|
| CN1       | Output Pins&8(12V) Pin1-Pin4:Pulse waveform (0-12V) |
| CN15      | Input Pin1_Pln2(0-1.8V)                             |
| CN16      | Input Pin1_Pln3_Pln4_Pln5(0-1.8V)                   |
| CN19      | OutputPin1_Pins(0-115V High voltage)                |
| CN31,CN33 | Output1T5VAC High voltage                           |
| CN32,CN34 | Output1T5 VAC High voltage                          |
| CN26,CN28 | Output1T5 VAC for 4-way control                     |
| CN4       | Output: 1T5 VAC High voltage                        |
| CN5       | Input: 1T5 VAC High voltage                         |
| CN6       | Connection to the earth                             |
| CN7       | Output Connection of the high voltage               |
| CN8,CN9   | Output High voltage                                 |
| CN36,CN37 | Output High voltage                                 |
| N-B       | Output High voltage                                 |
| U V W     | Output Pulse(0-320VDC)                              |

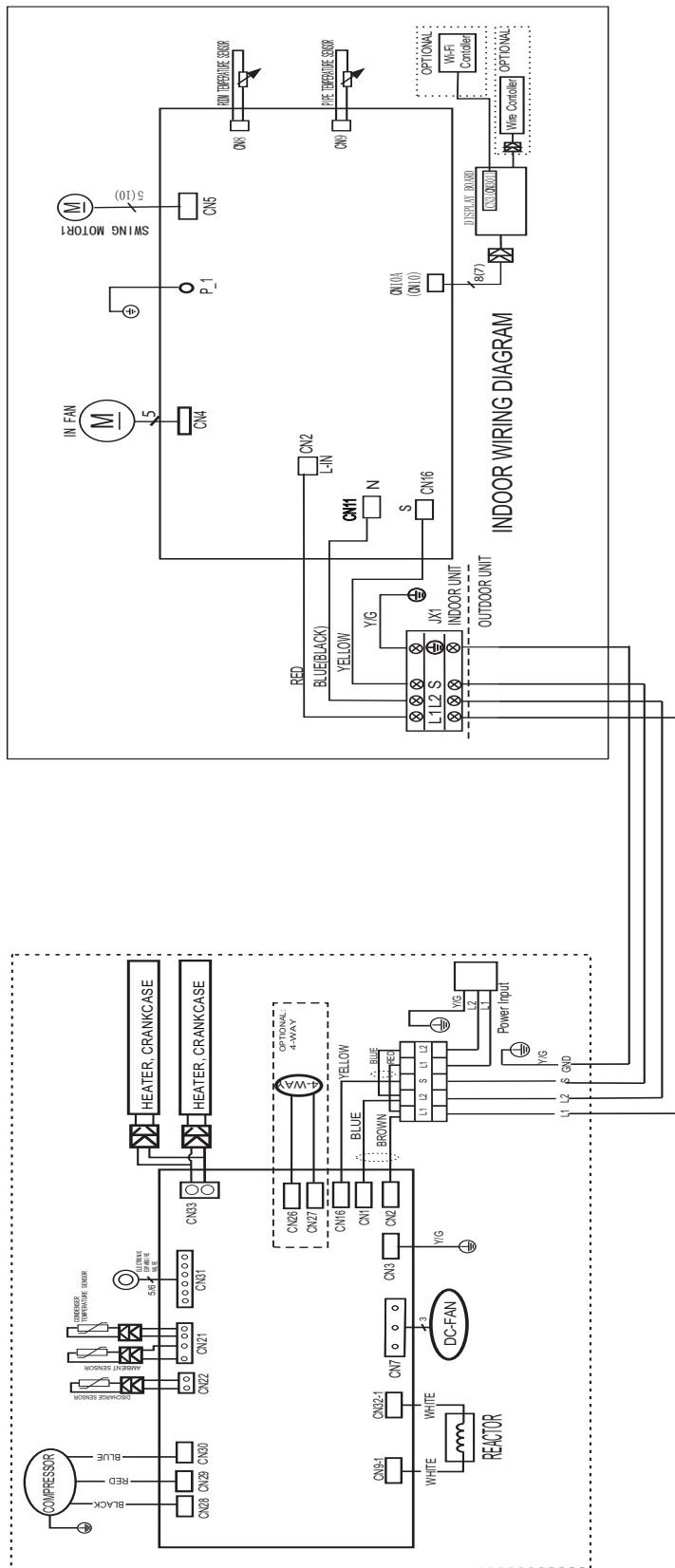


Fig. 10 – Wiring Diagram Sizes 09-12 (208-230V)

#### INDOOR UNIT CONTROL BOARD

|       | INPUT or OUTPUT VALUE   |
|-------|---|
| L IN  | Power Voltage : AC 230V   |
| CN11  | Power Voltage : AC 230V   |
| CN16  | Relative to the N terminal voltage : DC 24V                         |
| CN15  | Maximum voltage : DC 5V   |
| CN4   | Indoor fan interface, Maximum voltage : DC 310V                     |
| CN5   | Stepper motor interface, Maximum voltage between the lines : DC 12V |
| P 1   | Ground  |
| CN8   | Room temperature sensor interface, maximum voltage : DC 5V          |
| CN9   | Pipe temperature sensor interface, maximum voltage : DC 5V          |
| CN10A | Display interface, maximum voltage between the lines : DC 5V        |

#### OUTDOOR UNIT CONTROL BOARD

|               | INPUT or OUTPUT VALUE                                  |
|---------------|--|
| CN31          | Output, Pin5&6 (12V) Pin1-Pin4, Pulse waveform (0-12V) |
| CN21          | Input, Pin3-4 (3.3V) Pin2(0V), Pin1, Pin5(0-3.3V)      |
| CN22          | Input, Pin1 (3.3V) Pin2(0-3.3V)                        |
| CN37          | Output, 230VAC High voltage                            |
| CN9-1, CN32-1 | Output, Connection of the high voltage                 |
| CN1           | Input, 230VAC High voltage                             |
| CN2           | Input, 230 VAC High voltage                            |
| CN3           | Connection to the earth                                |
| CN16          | Output, Connection of the high voltage                 |
| CN26, CN27    | Output, High voltage for 4-way control                 |
| CN7           | Output, Pulse(0-320VDC) for DC FAN                     |
| U V W         | Output, Pulse(0-320VDC) for COMPRESSOR                 |

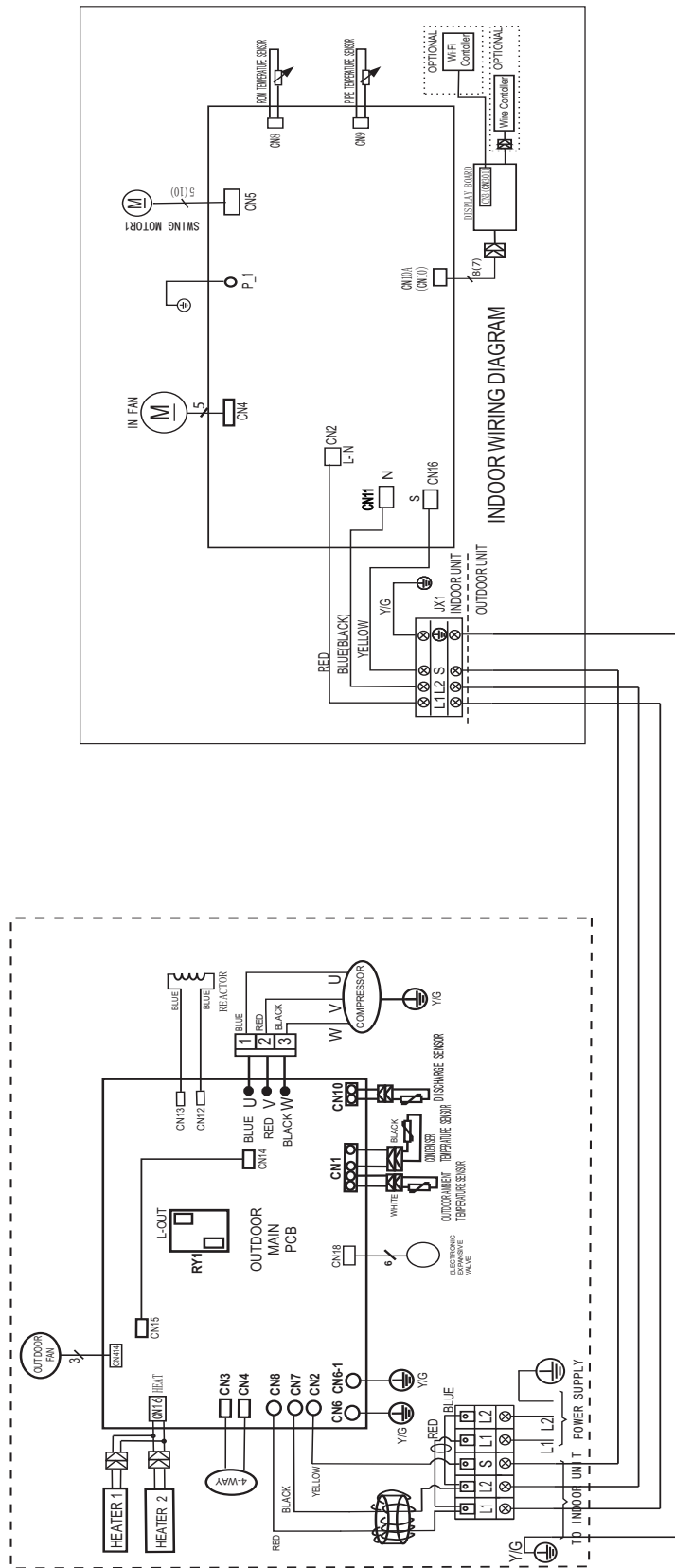


Fig. 11 – Wiring Diagram Size 18 (208-230V)

#### INDOOR UNIT CONTROL BOARD

| INPUT or OUTPUT VALUE |   |
|-----------------------|---|
| L-IN                  | Power Voltage : AC 230V   |
| CN11                  | Power Voltage : AC230V  |
| CN16                  | Relative to the N terminal voltage : DC 24V                       |
| CN15                  | Maximum voltage : DC5V  |
| CN4                   | Indoor fan interface Maximum voltage : DC310V                     |
| CN5                   | Stepper motor interface Maximum voltage between the lines : DC12V |
| P.1                   | Ground  |
| CN8                   | Room temperature sensor interface maximum voltage : DC5V          |
| CN9                   | Pipe temperature sensor interface maximum voltage : DC5V          |
| CN10A                 | Display interface maximum voltage between the lines : DC5V        |

#### OUTDOOR UNIT CONTROL BOARD

| INPUT or OUTPUT VALUE |   |
|-----------------------|---|
| CN7, CN8              | Input: 230V High voltage                            |
| CN2                   | Output: Connection of the high voltage              |
| CN3, CN4              | Output: High voltage for 4-way control              |
| CN11, CN16            | Output: 230V High voltage for HEATER                |
| CN5                   | Output: Pulse(0-320V) for DC FAN                    |
| CN12, CN13            | Output: Connection of the high voltage              |
| U V W                 | Output: Pulse(0-320V) for compressor                |
| CN10                  | Input:Pin3-4 (5V) Pin2(0V),Pin1,Pin5(0-5V)          |
| CN1                   | Input:Pin3-4 (5V) Pin2(0V),Pin1,Pin5(0-5V)          |
| CN18                  | Output:Pin5&6(12V) Pin1-Pin4:Pulse waveform,(0-12V) |

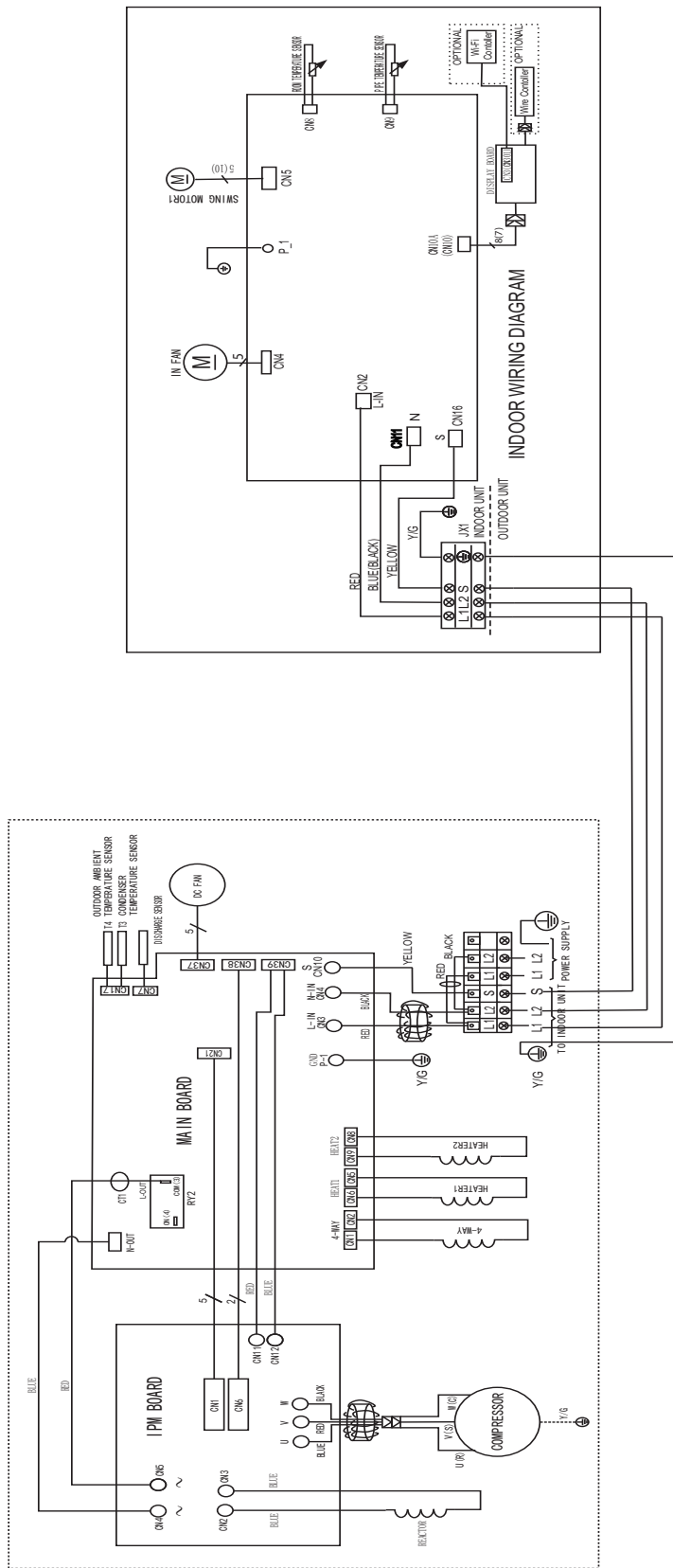


Fig. 12 – Wiring Diagram Size 24 (208-230V)

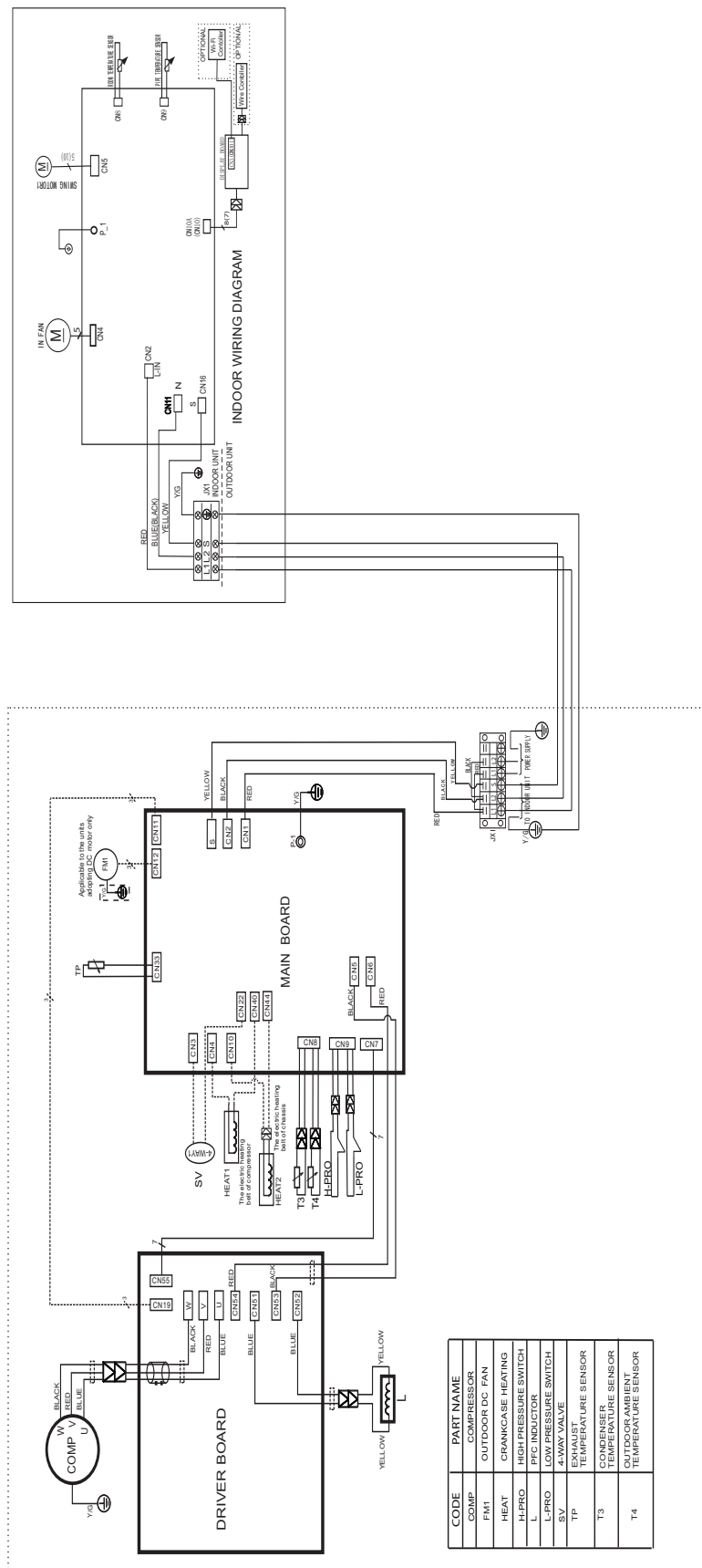
# INDOOR UNIT CONTROL BOARD

| L.IN  | Power Voltage : AC 230V   |
|-------|---|
| CN11  | Power Voltage : AC 230V   |
| CN16  | Relative to the N terminal voltage : DC 24V                       |
| CN15  | Maximum voltage : DC5V  |
| CN4   | Indoor fan interface Maximum voltage : DC310V                     |
| CN5   | Stepper motor interface Maximum voltage between the lines : DC12V |
| P.-1  | Ground  |
| CN8   | Room temperature sensor interface maximum voltage : DC5V          |
| CN9   | Pipe temperature sensor interface maximum voltage : DC5V          |
| CN10A | Display interface maximum voltage between the lines : DC5V        |

# OUTDOOR UNIT CONTROL BOARD

| L.IN  | Power Voltage : AC 230V  |
|-------|--|
| CN11  | Power Voltage : AC 230V  |
| CN16  | Relative to the N terminal voltage : DC 24V                                  |
| CN15  | Maximum voltage : DC5V   |
| CN6   | Maximum output voltage : AC230V  |
| CN4   | Indoor fan interface Maximum voltage : DC310V                                |
| CN5   | Stepper motor interface Maximum voltage between the lines : DC12V            |
| P.-1  | Ground   |
| CN8   | Room temperature sensor interface maximum voltage : DC5V                     |
| CN9   | Pipe temperature sensor interface maximum voltage : DC5V                     |
| CN10A | Display interface maximum voltage between the lines : DC5V                   |
| CN14  | Stepper motor interface (optional) maximum voltage between the lines : DC12V |





**Fig. 13 – Wiring Diagram Size 30 (208-230V)**

## INDOOR UNIT CONTROL BOARD

| INPUT or OUTPUT VALUE |   |
|-----------------------|---|
| L                     | Power Voltage : AC 230V   |
| N                     | Power Voltage : AC230V  |
| LN11                  | Relative to the N terminal voltage : DC 24V                       |
| LN16                  | Maximum voltage : DC5V  |
| LN15                  | Indoor fan interface,Maximum voltage : DC30V                      |
| LN4                   | Stepper motor interface,Maximum voltage between the lines : DC12V |
| LN5                   | P 1   |
| LN1                   | Ground  |
| LN8                   | Room temperature sensor interface,maximum voltage : DC5V          |
| LN9                   | Pipe temperature sensor interface,maximum voltage : DC5V          |
| LN10A                 | Display interface,maximum voltage between the lines : DC5V        |

OUTDOOR UNIT CONTROL BOARD

| INPUT or OUTPUT VALUE |  |
|-----------------------|--|
| CN1, CN2              | Input: 230V High voltage               |
| CN3                   | Output: Connection of the high voltage |
| CN11, CN12            | Output: Pulse(0-320V) for DC FAN       |
| CN3K3                 | Input:Pm1( 5V) Pm2(0-5V)               |
| CN3, CN22             | Output: High voltage for 4-way control |
| CN4, CN40             | Output: 230V High voltage for HEATER1  |
| CN10, CN44            | Output: 230V High voltage for HEATER2  |
| CN10, CN44            | Input:Pm3-4 (5V) Pm2(0V),Pm1,Pm5(0-5V) |
| CN8                   | Input:Pm1-3 (0V) Pm2 -4(0-5V)          |
| CN51, CN52            | Output: Connection of the high voltage |
| CN51, CN52            | Output: Pulse(0-380V) for compressor   |
| U1, V1, W1            |  |

# GUIDE SPECIFICATIONS

## INDOOR WALL-MOUNTED DUCTLESS UNITS

Size Range: 3/4 to 2 1/2 Ton Nominal Cooling and Heating Capacity  
Carrier Model Number: 40MAQ

### PART 1 - GENERAL

#### 1.01 System Description

Indoor, wall-mounted, direct-expansion fan coils are matched with the heat pump outdoor unit.

#### 1.02 Agency Listings

Unit shall be rated per AHRI Standards 210/240 and listed in the AHRI directory as a matched system.

#### 1.03 Delivery, Storage, And Handling

Units shall be stored and handled per unit manufacturer's recommendations.

#### 1.04 Warranty (For Inclusion By Specifying Engineer)

### PART 2 - PRODUCTS

#### 2.01 Equipment

##### **A. General:**

Indoor, direct-expansion, wall-mounted fan coil. Unit shall be complete with cooling/heating coil, fan, fan motor, piping connectors, electrical controls, microprocessor control system, and integral temperature sensing. Unit shall be furnished with integral wall mounting bracket and mounting hardware.

##### **B. Unit Cabinet:**

Cabinet discharge and inlet grilles shall be attractively styled, high-impact polystyrene. Cabinet shall be fully insulated for improved thermal and acoustic performance.

##### **C. Fans:**

1. Fan shall be tangential direct-drive blower type with air intake at the top of the unit and discharge at the bottom front. Automatic, motor-driven vertical air sweep shall be provided standard.
2. Air sweep operation shall be user selectable. The vertical sweep may be adjusted (using the remote control) and the horizontal air direction may be set manually.

##### **D. Coil:**

Coil shall be copper tube with aluminum fins and galvanized steel tube sheets. Fins shall be bonded to the tubes by mechanical expansion. A drip pan under the coil shall have a drain connection for hose attachment to remove condensate. Condensate pan shall have internal trap.

##### **E. Motors:**

Motors shall be open drip-proof, permanently lubricated ball bearing with inherent overload protection. Fan motors shall be 4-speed.

##### **F. Controls:**

Controls shall consist of a microprocessor-based control system which shall control space temperature, determine optimum fan speed, and run self diagnostics. The temperature control range shall be from 62°F to 86°F (17°C to 30°C) in increments of 1°F or 1°C, and have 46°F Heating Mode (Heating Setback). The wireless remote controller shall have the ability to act as the temperature sensing location for room comfort.

##### **The unit shall have the following functions as a minimum:**

1. An automatic restart after power failure at the same operating conditions as at failure.
2. A timer function to provide a minimum 24-hour timer cycle for system Auto Start/Stop.
3. Temperature-sensing controls shall sense return air temperature.
4. Indoor coil freeze protection.
5. Wireless infrared remote control to enter set points and operating conditions.
6. Automatic air sweep control to provide on or off activation of air sweep louvers.
7. Dehumidification mode shall provide increased latent removal capability by modulating system operation and set point temperature.
8. Fan-only operation to provide room air circulation when no cooling is required.
9. Diagnostics shall provide continuous checks of unit operation and warn of possible malfunctions. Error messages shall be displayed at the unit.
10. Fan speed control shall be user-selectable: turbo, high, medium, low, or microprocessor controlled automatic operation during all operating modes.
11. Automatic heating-to-cooling changeover in heat pump mode. Control shall include deadband to prevent rapid mode cycling between heating and cooling.
12. Indoor coil high temperature protection shall be provided to detect excessive indoor discharge temperature when unit is in heat pump mode.

##### **G. Filters:**

Unit shall have filter track with factory-supplied cleanable filters.

##### **H. Electrical Requirements:**

Indoor fan motor to operate on 115V on model sizes 09-12 and on 208-230V on model sizes 09-30, as specified. Power is supplied from the outdoor unit.

##### **I. Operating Characteristics:**

The 40MA system shall have a minimum SEER (Seasonal Energy Efficiency Ratio) and HSPF at AHRI conditions, as listed on the specifications table.

##### **J. Refrigerant Lines:**

All units should have refrigerant lines that can be oriented to connect from the left, right or back of unit. Both refrigerant lines need to be insulated.

##### **K. Special Features (Field Installed):**

1. Condensate Pump:
  - The condensate pump shall remove condensate from the drain pan when gravity drainage cannot be used. Pump shall be designed for quiet operation. Pump shall consist of two parts: an internal reservoir/sensor assembly, and a remote sound-shielded pump assembly. A liquid level sensor in the reservoir shall stop cooling operation if the liquid level in the reservoir is unacceptable.

# GUIDE SPECIFICATIONS

## HORIZONTAL DISCHARGE OUTDOOR UNITS

Size Range: 3/4 to 2 1/2 Ton Nominal Cooling and Heating Capacity  
Carrier Model Number: 38MAQ

### PART 1 - GENERAL

#### 1.01 System Description

- A. Outdoor air-cooled split system compressor sections suitable for on-the-ground, rooftop, wall hung or balcony mounting. Units shall consist of a rotary compressor, an air-cooled coil, propeller-type draw-through outdoor fan, reversing valve (HP), accumulator (HP units), metering device(s), and control box. Units shall discharge air horizontally as shown on the contract drawings. Units shall function as the outdoor component of an air-to-air heat pump system.
- B. Units shall be used in a refrigeration circuit matched to ductless heat pump fan coil units.

#### 1.02 Agency Listings

- A. Unit construction shall comply with ANSI/ASHRAE 15, latest revision, and with the NEC.
- B. Units shall be evaluated in accordance with UL standard 1995.
- C. Units shall be listed in the CEC directory.
- D. Unit cabinet shall be capable of withstanding 500-hour salt spray test per Federal Test Standard No. 141 (method 6061).
- E. Air-cooled condenser coils shall be leak tested at 550 psig.

#### 1.03 Delivery, Storage, And Handling

Units shall be shipped in one piece and shall be stored and handled per unit manufacturer's recommendations.

#### 1.04 Warranty (For Inclusion By Specifying Engineer)

### PART 2 - PRODUCTS

#### 2.01 Equipment

##### **A. General:**

Factory assembled, single piece, air-cooled outdoor unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and the compressor.

##### **B. Unit Cabinet:**

- 1. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a baked-enamel finish on inside and outside.
- 2. Unit access panels shall be removable with minimal screws and shall provide full access to the compressor, fan, and control components.
- 3. Outdoor compartment shall be isolated and have an acoustic lining to assure quiet operation.

##### **C. Fans:**

- 1. Outdoor fans shall be direct-drive propeller type, and shall discharge air horizontally. Fans shall draw air through the outdoor coil.
- 2. Outdoor fan motors shall be totally-enclosed, single phase motors with class B insulation and permanently-lubricated ball bearings. Motor shall be protected by internal thermal overload protection.

- 3. Shaft shall have inherent corrosion resistance.

- 4. Fan blades shall be non metallic and shall be statically and dynamically balanced.

- 5. Outdoor fan openings shall be equipped with PVC metal/mesh coated protection grille over fan.

##### **D. Compressor:**

- 1. Compressor shall be fully hermetic rotary type.
- 2. Compressor shall be equipped with oil system, operating oil charge, and motor. Internal overloads shall protect the compressor from over-temperature and over-current.
- 3. Motor shall be NEMA rated class F, suitable for operation in a refrigerant atmosphere.
- 4. Compressor assembly shall be installed on rubber vibration isolators.
- 5. Compressors shall be single phase.

##### **E. Outdoor Coil:**

Coil shall be constructed of aluminum fins mechanically bonded to seamless copper tubes, which are cleaned, dehydrated, and sealed.

##### **F. Refrigeration Components:**

Refrigerant circuit components shall include brass external liquid line service valve with service gage port connections, suction line service valve with service gage connection port, service gage port connections on compressor suction and discharge lines with Schrader type fittings with brass caps, accumulator, reversing valve.

##### **G. Controls and Safeties:**

Operating controls and safeties shall be factory selected, assembled, and tested. The minimum control functions shall include the following:

- 1. Controls:
  - a. A time delay control sequence is provided standard through the fan coil board.
  - b. Automatic outdoor-fan motor protection.
- 2. Safeties:
  - a. System diagnostics.
  - b. Compressor motor current and temperature overload protection.
  - c. Outdoor fan failure protection.

##### **H. Electrical Requirements:**

- 1. Unit shall operate on single-phase, 60 Hz power at 115 v for unit sizes 09-12 and 208-230v for unit sizes 09, 12, 18, 24, and 30, as specified.
- 2. Unit electrical power shall be a single point connection.
- 3. Unit Control voltage to the indoor fan coil shall be 0-15V DC.
- 4. All power and control wiring must be installed per NEC and all local electrical codes.
- 5. Unit shall have high- and low-voltage terminal block connections.

## *Carrier*

**SUPER DIGITAL INVERTER**

# ENGINEERING DATABOOK

### Indoor Unit

Model name:

4-way Air Discharge Cassette Type

**RAV-SP180UT-UL**

**RAV-SP240UT-UL**

**RAV-SP300UT-UL**

**RAV-SP360UT-UL**

**RAV-SP420UT-UL**

Ceiling Type

**RAV-SP180CT-UL**

**RAV-SP240CT-UL**

**RAV-SP300CT-UL**

**RAV-SP360CT-UL**

**RAV-SP420CT-UL**

High-wall Type

**RAV-SP180KRT-UL**

**RAV-SP240KRT-UL**

### Outdoor Unit

Model name:

**RAV-SP180AT2-UL**

**RAV-SP240AT2-UL**

**RAV-SP300AT2-UL**

**RAV-SP360AT2-UL**

**RAV-SP420AT2-UL**

## 2. 4-WAY CASSETTE TYPE

### 2-1. Specifications

#### ■ 4-way cassette USA

| System                             | Size   |  | 018  | 024                                  | 030                                  | 036                                  | 042                                  |
|------------------------------------|--|--|--|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|                                    | Outdoor Model  |  | RAV-SP180AT2-UL  | RAV-SP240AT2-UL                      | RAV-SP300AT2-UL                      | RAV-SP360AT2-UL                      | RAV-SP420AT2-UL                      |
| Performance                        | Indoor Model   |  | RAV-SP180UT-UL   | RAV-SP240UT-UL                       | RAV-SP300UT-UL                       | RAV-SP360UT-UL                       | RAV-SP420CT-UL                       |
|                                    | Cooling Rated Capacity (Btu/h)                             |  | 19000  | 25000                                | 32000                                | 36400                                | 40500                                |
| Controls                           | SEER   |  | 20.5   | 20.7                                 | 21.0                                 | 21.0                                 | 19.0                                 |
|                                    | EER  |  | 10.7   | 11.0                                 | 14.0                                 | 13.0                                 | 11.5                                 |
| Operating Range                    | Heating Rated Capacity (Btu/h)                             |  | 18800  | 26000                                | 33400                                | 36000                                | 46000                                |
|                                    | HSPF   |  | 11.5   | 9.5                                  | 11.0                                 | 11.9                                 | 10.3                                 |
| Piping                             | Wireless (°C, °F, Convertible)                             |  | °F   | °F                                   | °F                                   | °F                                   | °F                                   |
|                                    | Wireless Range ft.   |  | 23   | 23                                   | 23                                   | 23                                   | 23                                   |
| Electrical                         | IR or RF   |  | IR   | IR                                   | IR                                   | IR                                   | IR                                   |
|                                    | Wired (°C, °F, Convertible)                                |  | °F   | °F                                   | °F                                   | °F                                   | °F                                   |
| Outdoor                            | Cooling  |  | Outdoor Min - Max DB (°F) *1<br>Indoor Min - Max DB (°F)<br>Indoor Min - Max WB (°F) | 23 to 109<br>70 to 89<br>59 to 75    | 23 to 109<br>70 to 89<br>59 to 75    | 23 to 109<br>70 to 89<br>59 to 75    | 23 to 109<br>70 to 89<br>59 to 75    |
|                                    | Heating  |  | Outdoor WB Min - Max (°F)<br>Indoor DB Min - Max (°F)                                | -4 to 59<br>59 to 86                 | -4 to 59<br>59 to 86                 | -4 to 59<br>59 to 86                 | -4 to 59<br>59 to 86                 |
| Compressor                         | Standard Piping Length (ft.)                               |  | 25   | 25                                   | 25                                   | 25                                   | 25                                   |
|                                    | Min. Piping Length (ft.)                                   |  | 16'5"  | 16'5"                                | 9'8"                                 | 9'8"                                 | 9'8"                                 |
| Indoor                             | Max. Piping Length (ft.)                                   |  | 164'1"   | 164'1"                               | 246'1"                               | 246'1"                               | 246'1"                               |
|                                    | Lift (Outdoor below Indoor) (ft.)                          |  | 98'5"  | 98'5"                                | 98'5"                                | 98'5"                                | 98'5"                                |
| Gille                              | Lift (Outdoor above Indoor) (ft.)                          |  | 98'5"  | 98'5"                                | 98'5"                                | 98'5"                                | 98'5"                                |
|                                    | Gas Pipe (size/connection type)                            |  | 1/2"   | 5/8"                                 | 5/8"                                 | 5/8"                                 | 5/8"                                 |
| Dimensions                         | Liquid Pipe (size/connection type)                         |  | 1/4"   | 3/8"                                 | 3/8"                                 | 3/8"                                 | 3/8"                                 |
|                                    | Additional refrigerant charge under long piping connection |  | 0.22oz/ft<br>(65'7" to 164'1")   | 0.43oz/ft<br>(98'5" to 164'1")       | 0.43oz/ft<br>(98'5" to 246'1")       | 0.43oz/ft<br>(98'5" to 246'1")       | 0.43oz/ft<br>(98'5" to 246'1")       |
| Sound Pressure                     | Outdoor Model Piping Orientation                           |  | Side<br>Back<br>Bottom   | Yes<br>Yes<br>Yes                    | Yes<br>Yes<br>Yes                    | Yes<br>Yes<br>Yes                    | Yes<br>Yes<br>Yes                    |
|                                    | Drain Pump Lift  |  | 33.5<br>(from the bottom of ceiling)   | 33.5<br>(from the bottom of ceiling) | 33.5<br>(from the bottom of ceiling) | 33.5<br>(from the bottom of ceiling) | 33.5<br>(from the bottom of ceiling) |
| Voltage                            | Voltage  |  | 208/230-1-60   | 208/230-1-60                         | 208/230-1-60                         | 208/230-1-60                         | 208/230-1-60                         |
|                                    | Indoor Unit Connected from Outdoor (Yes/No)                |  | Yes  | Yes                                  | Yes                                  | Yes                                  | Yes                                  |
| Number Of Conductors               | Number Of Conductors Between Indoor and Outdoor Units      |  | 4  | 4                                    | 4                                    | 4                                    | 4                                    |
|                                    | Type of Wire (Shielded - yes or no)                        |  | No   | No                                   | No                                   | No                                   | No                                   |
| Cooling Power Consumption          | Cooling Power Consumption (W)                              |  | 1776   | 2273                                 | 2286                                 | 2800                                 | 3522                                 |
|                                    | Heating Power Consumption (W)                              |  | 1430   | 2270                                 | 2240                                 | 2770                                 | 3720                                 |
| Cooling Running Current            | Cooling Running Current (A)                                |  | 7.91   | 10.25                                | 10.30                                | 12.47                                | 15.71                                |
|                                    | Heating Running Current (A)                                |  | 6.36   | 10.20                                | 10.10                                | 12.32                                | 16.56                                |
| Maximum Current Amps               | Maximum Current Amps (A)                                   |  | 17   | 24                                   | 24                                   | 24                                   | 24                                   |
|                                    | Maximum Over Protection Device Amps (A)*2                  |  | 30   | 40                                   | 40                                   | 40                                   | 40                                   |
| Breaker                            | Breaker (A)  |  | 20   | 25                                   | 25                                   | 25                                   | 25                                   |
|                                    | Height (in.)   |  | 21.7   | 35.0                                 | 52.8                                 | 52.8                                 | 52.8                                 |
| Width                              | Width (in.)  |  | 30.7   | 35.4                                 | 35.4                                 | 35.4                                 | 35.4                                 |
|                                    | Length (in.)   |  | 11.4   | 12.6                                 | 12.6                                 | 12.6                                 | 12.6                                 |
| Weight-Net/Gross                   | Weight-Net/Gross (lbs.)                                    |  | 98/105   | 144.5/157                            | 211.5/226                            | 211.5/226                            | 211.5/226                            |
|                                    | Refrigerant charged (lbs.)                                 |  | 3.1  | 4.6                                  | 6.8                                  | 6.8                                  | 6.8                                  |
| Variable Speed Outdoor Motor       | Variable Speed Outdoor Motor (Yes/No)                      |  | Yes  | Yes                                  | Yes                                  | Yes                                  | Yes                                  |
|                                    | Appearance   |  | Silky shade<br>(Muncel 1Y8.5/0.5)  | Silky shade<br>(Muncel 1Y8.5/0.5)    | Silky shade<br>(Muncel 1Y8.5/0.5)    | Silky shade<br>(Muncel 1Y8.5/0.5)    | Silky shade<br>(Muncel 1Y8.5/0.5)    |
| Sound Pressure                     | Sound Pressure (dB (A))                                    |  | 48/49  | 49/50                                | 50/51                                | 52/52                                | 52/52                                |
|                                    | Type   |  | Hermetic compressor  | Hermetic compressor                  | Hermetic compressor                  | Hermetic compressor                  | Hermetic compressor                  |
| Motor                              | Motor (kw)   |  | 1.1  | 2                                    | 3.75                                 | 3.75                                 | 3.75                                 |
|                                    | Width (in.)  |  | 33.1   | 33.1                                 | 33.1                                 | 33.1                                 | 33.1                                 |
| Height                             | Height (in.)   |  | 10.1   | 10.1                                 | 12.6                                 | 12.6                                 | 12.6                                 |
|                                    | Length (in.)   |  | 33.1   | 33.1                                 | 33.1                                 | 33.1                                 | 33.1                                 |
| Weight-Net/Gross                   | Weight-Net/Gross (lbs.)                                    |  | 44/53  | 44/53                                | 53/64                                | 53/64                                | 53/64                                |
|                                    | Number of Fan Speeds                                       |  | 3, Auto  | 3, Auto                              | 3, Auto                              | 3, Auto                              | 3, Auto                              |
| Sound Pressure at Different Speeds | Sound Pressure at Different Speeds (dB (A)) (H/M/L)        |  | 37/35/34   | 39/35/34                             | 46/40/36                             | 47/41/38                             | 47/41/38                             |
|                                    | Air flow DRY (CFM) (H/M/L)                                 |  | 600/500/450  | 700/550/460                          | 1150/820/670                         | 1200/820/700                         | 1200/820/700                         |
| Model name                         | Model name   |  | RBC-U31PG(W)-UL  | RBC-U31PG(W)-UL                      | RBC-U31PG(W)-UL                      | RBC-U31PG(W)-UL                      | RBC-U31PG(W)-UL                      |
|                                    | Width (in.)  |  | 37.4   | 37.4                                 | 37.4                                 | 37.4                                 | 37.4                                 |
| Height                             | Height (in.)   |  | 1.2  | 1.2                                  | 1.2                                  | 1.2                                  | 1.2                                  |
|                                    | Length (in.)   |  | 37.4   | 37.4                                 | 37.4                                 | 37.4                                 | 37.4                                 |
| Weight-Net/Gross                   | Weight-Net/Gross (lbs.)                                    |  | 10/15.5  | 10/15.5                              | 10/15.5                              | 10/15.5                              | 10/15.5                              |
|                                    | Appearance   |  | moon white 2.5GY9.0/0.5  | moon white 2.5GY9.0/0.5              | moon white 2.5GY9.0/0.5              | moon white 2.5GY9.0/0.5              | moon white 2.5GY9.0/0.5              |

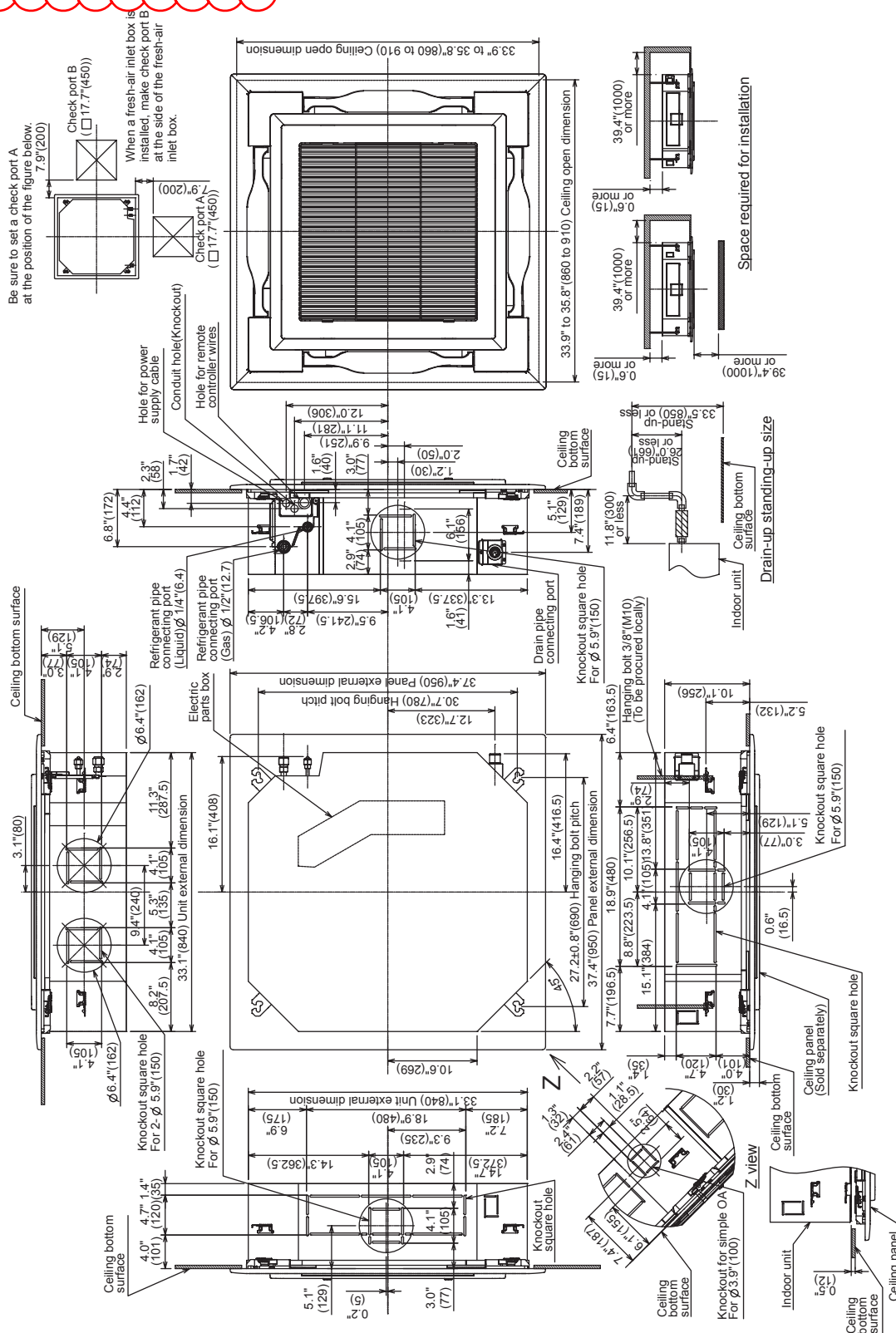
Note : Rated conditions

Cooling : Indoor air temperature 80F(27C) DB / 67 (19C)WB, Outdoor air temperature 95F(35C)DB  
Heating : Indoor air temperature 70F(21C)DB, Outdoor air temperature 47F(8C)DB/43F(6C)WB

## 2-2. Dimension

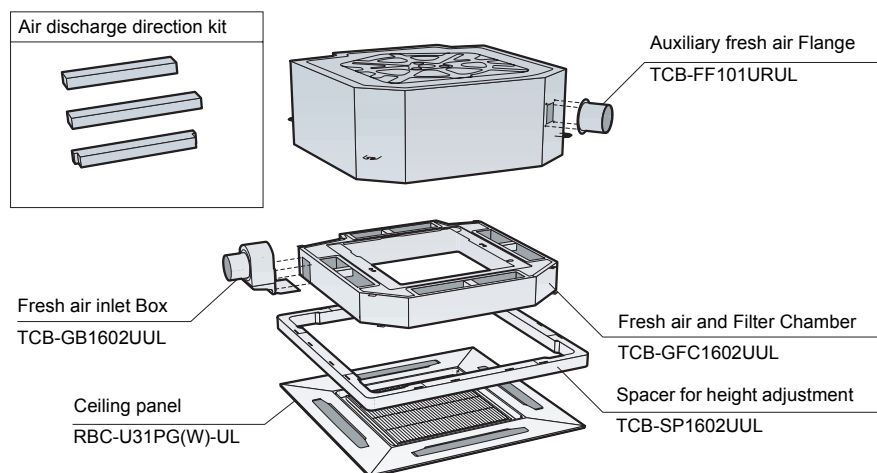
# RAV-SP180UT-UL

Unit:in(mm)



## 2-8. Accessory

### ■ Optional accessories



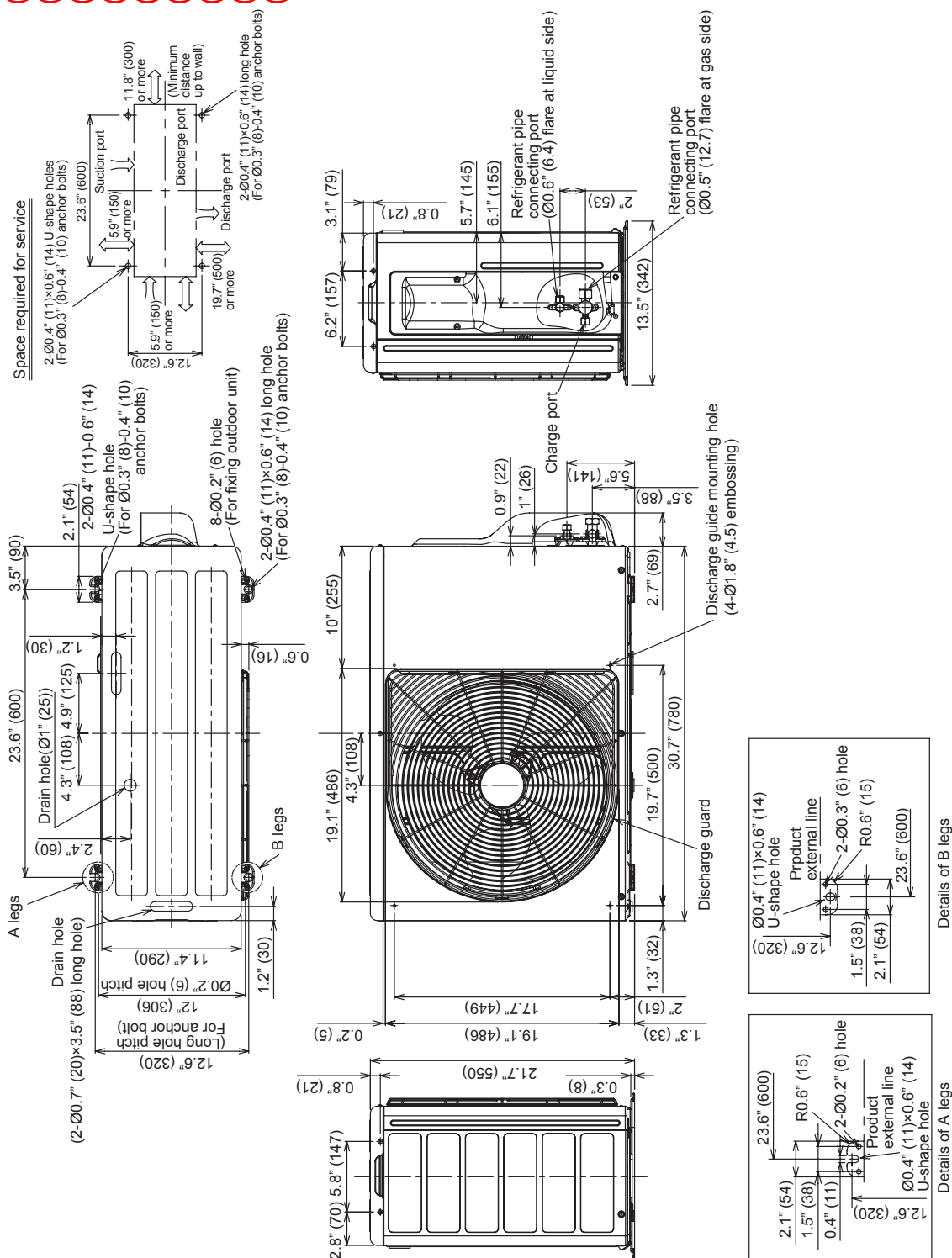
| Name                         | Model name      | Note   |
|------------------------------|-----------------|--|
| Ceiling panel                | RBC-U31PG(W)-UL | Required accessory   |
| Fresh Air Inlet Box          | TCB-GB1602UUL   | For fresh air intake by using the knockout hole of fresh air and filter chamber.<br>(dia=100mm)<br>* Not valid in combination with TCB-FF101UUL<br>Use with TCB-GFC1602UUL |
| Fresh Air and Filter Chamber | TCB-GFC1602UUL  | For fresh air intake and installing high efficiency filter or super long filter  |
| Auxiliary Fresh Air Flange   | TCB-FF101URUL   | For easy fresh air intake by using the knockout hole of indoor unit. (dia=100mm)<br>* Not valid in combination with TCB-GB1602UUL  |
| Spacer for Height Adjustment | TCB-SP1602UUL   | Height=500mm   |
| Air Discharge Direction Kit  | TCB-BC1602UUL   | Air direction change by cutting off air discharge port (3pcs)  |

## 5. OUTDOOR UNIT

## 5-1. Dimension

## RAV-SP180AT2-UL

Unit:in(mm)





## 5-3. Wiring Design

### ■ Connecting power and control cables (Field supplied)

- The main power is supplied to the outdoor unit. The field supplied connecting cables from the outdoor unit to the indoor unit consist for 4 wires and provides the power for the indoor unit as well as the communication signal between the outdoor and Indoor unit.
- Consult local building codes, NEC (National Electrical Code) or CEC (Canadian Electrical Code) for special requirements.
- The following are the electrical requirements.

| Model RAV-                   | SP180             | SP240             | SP300/360/420     |
|------------------------------|-------------------|-------------------|-------------------|
| Power supply                 | 208/230 V~, 60 Hz | 208/230 V~, 60 Hz | 208/230 V~, 60 Hz |
| MCA                          | 17 A              | 24 A              | 24 A              |
| MOCP (MAX Fuse/CB)           | 30 A              | 40 A              | 40 A              |
| System interconnection wires | 4 x AWG14         | AWG14             | AWG14             |

MCA = Minimum Circuit Amps

MOCP = Maximum Over Protection Device Amps.



GlidePack UniTrack 25 shown.

**Single-stage air filter housing that ensures that all of the air moving through the system will be treated by the air filter.**

The Camfil Farr GlidePack UniTrack 13 and UniTrack 25 air filter housings provide a filter holding mechanism to ensure that the system efficiency is the same as the filter efficiency by ensuring that all system air moves through the installed filters.

The base aluminum mounting track includes a ribbed surface to ensure that filters slide easily across the tracks in housing configurations from four high to six filters wide. Each Camfil Farr GlidePack UniTrack includes:

- A 1-inch nominal size filter header track, that will hold short depth bag filters or 6-inch deep box filters in the GlidePack UniTrack 13, or longer bags or 12-inch deep box filters in the GlidePack UniTrack 25.
- A replaceable fin seal polypropylene filter gasket on each filter track to ensure a secure filter to track seal of less than 1% across the filter at 3.0" w.g.
- 16-gauge galvanized steel construction with convenient out-turned standing flanges to mate to existing HVAC equipment. The flanges include moisture weeping paths so that housing are weatherproof without modification for rooftop or exterior installation. Flanges are designed to mate with other Camfil Farr housings for those applications that may require multiple filter housings.
- 16-gauge galvanized steel dual-access doors for filter service from either side of the unit. The doors swing-open and are engineered to be square to the housing flange to maintain a continuous door to housing seal. UV resistant star-style handles assure a tight seal each time the access doors are opened and closed. The seal is remade each time the air filters are changed to ensure leak free integrity throughout the life of the housing.
- High-memory sponge neoprene door edge gaskets prevent contaminants from leaking into or out of the housing. Integrity of housing to ambient leakage is less than 1%.
- Poly sponge door gaskets eliminate filter air bypass between the housing doors and filters so all of the air is treated by the installed filters.
- An integral pneumatic fitting for the installation of an optional static pressure Magnehelic, or preventative maintenance computer system connections to facilitate evaluation of the installed filters.

Additional options include stainless steel or aluminum construction, high-pressure construction (to 8.0" w.g.), double-wall with insulation and transitions to standard HVAC equipment.

### PERFORMANCE DATA

#### Housing Dimensions & Airflow Capacities

| Number of filters high | Height (inches) | Number of filters wide (based upon nominal 24" by 24") |      |       |       |       |       |       |       |       |       |       |       |
|------------------------|-----------------|--|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                        |                 | 1/2  | 1    | 1-1/2 | 2     | 2-1/2 | 3     | 3-1/2 | 4     | 4-1/2 | 5     | 5-1/2 | 6     |
| 1/2                    | 15-¾            | —  | 1000 | —     | 2000  | —     | 3000  | —     | 4000  | —     | 5000  | —     | 6000  |
| 1                      | 27-¾            | 1000   | 2000 | 3000  | 4000  | 5000  | 6000  | 7000  | 8000  | 9000  | 10000 | 11000 | 12000 |
| 1-1/2                  | 39-½            | —  | 3000 | —     | 6000  | —     | 9000  | —     | 12000 | —     | 15000 | —     | 18000 |
| 2                      | 51-½            | 2000   | 4000 | 6000  | 8000  | 10000 | 12000 | 14000 | 16000 | 18000 | 20000 | 22000 | 24000 |
| 2-1/2                  | 63-¾            | —  | 5000 | —     | 10000 | —     | 15000 | —     | 20000 | —     | 25000 | —     | 30000 |
| 3                      | 75-¾            | —  | 6000 | 9000  | 12000 | 15000 | 18000 | 21000 | 24000 | 27000 | 30000 | 33000 | 36000 |
| 3-1/2                  | 88              | —  | 7000 | —     | 14000 | —     | 21000 | —     | 28000 | —     | 35000 | —     | 42000 |
| 4                      | 100             | —  | 8000 | 12000 | 16000 | 20000 | 24000 | 28000 | 32000 | 36000 | 40000 | 44000 | 48000 |
| Width (inches)         |                 | 11-¾   | 23-¾ | 34-¾  | 46-¾  | 51-½  | 70-½  | 81-½  | 93-½  | 104-¾ | 116-¾ | 128-¾ | 140-¾ |

#### DATA NOTES:

Airflow rated at 500 fpm, may be operated to 625 fpm.  
Standard housing operational to ± 6.0" w.g.

#### Available Options:

Stainless steel construction  
Aluminum construction  
High-pressure construction (to 8.0" w.g.)  
Double-wall with insulation  
Transitions to standard HVAC equipment.  
Contact factory for additional information.

### Specifications

#### 1.0 General

**1.1** - Filter housing shall be single-stage air filter housing consisting of 16-gauge galvanized steel enclosure, multi-filter adaptable extruded aluminum filter mounting track, dual-access doors, three static pressure taps, door and filter gaskets and seals. In-line housing depth shall not exceed (13", 25" \*).

**1.2** - Sizes shall be as noted on enclosed drawings or other supporting materials.

#### 2.0 Construction

**2.1** - The housing shall be constructed of 16-gauge galvanized steel (stainless steel or aluminum\*) with standing flanges to facilitate attachment to other HVAC system components. Corner posts of Z-channel construction shall ensure housing stability and rigidity. The housing shall be weatherproof and suitable for rooftop/outdoor installation without modification.

**2.2** - The housing shall incorporate a nominal 1" filter track, of extruded aluminum and shall be an integral component of housing construction.

**2.3** - Dual access swing-open doors shall include high-memory sponge neoprene gasket to facilitate a door-to-filter seal against all individual stages of filtration. Each door shall be equipped with adjustable

and replaceable positive sealing UV-resistant star-style knobs and replaceable door hinges.

**2.5** - The housing shall include a pneumatic fitting to allow the installation of static pressure gauge to evaluate pressure drop across the installed air filter.

#### 3.0 Performance

**3.1** - Leakage at rated airflow, upstream to downstream of filter and slide mechanism shall not exceed 1% at 3.0" w.g. Leakage into or out of the housing shall be less than 1% at 3.0" w.g.

**3.2** - Accuracy of pneumatic pressure fittings, when used to evaluate a single-stage, or multiple filter stages, shall be accurate within ± 3% at 0.6" w.g.

**3.3** - Housing integrity to listed performance values shall be available on request from the housing manufacturer.

**3.3** - Manufacturer shall provide evidence of facility certification to ISO 9001:2008.

Housings shall be Camfil Farr GlidePack (UniTrack 13, UniTrack 25 \*) or approved equal.

\* Items in parentheses may require selection.



For detailed specifications please consult your local Camfil Farr Distributor or Representative or [www.camfilfarr.com](http://www.camfilfarr.com).

Camfil Farr has a policy of uninterrupted research, development and product improvement. We reserve the right to change designs and specifications without notice.

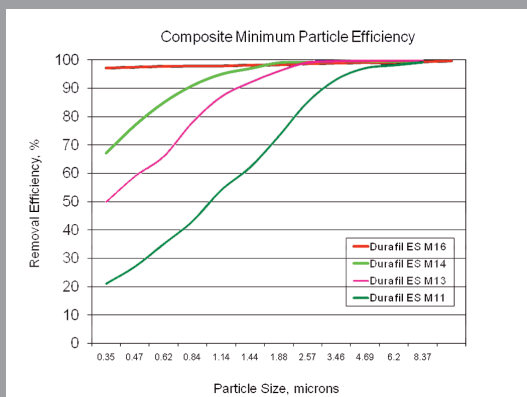


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**Saves 30-35% more  
energy than any other  
V-style filter**



The above chart shows relative efficiency values at various particle sizes when tested in accordance with ASHRAE Standard 52.2-2007. When tested in accordance with Appendix J of that Standard the Durafil ES maintains these efficiency values throughout the life of the filter.

The Camfil Farr Durafil Energy Saver (ES) provides high efficiency ASHRAE air filter performance in a compact energy efficient design. The Durafil ES includes:

- A computer-optimized pleat-to-height ratio creating a radial air exiting and air entering design that offers a 60% larger outlet and 30% larger inlet than any other V-bank style air filter resulting in lower pressure drop and significant energy savings.
- The highest volume of microfine fiber filter media area available for higher dust holding capacity, longer life and lower average pressure drop over the life of the filter to save energy.
- A special grade of energy saving media with engineered characteristics to reduce pressure drop.
- Is available in four standard efficiencies — MERV 11, MERV 13, MERV 14 and MERV 16 per ASHRAE Standard 52.2-2007. The Durafil ES has a MERV-A value of 11, 13, 14 and 16 respectively when tested using the conditioning step as specified in Appendix J of the same Standard.
- Includes an integral prefilter spacer section designed to minimize filtration system static pressure when a prefilter is positioned on the face of the Durafil ES. The lives of the final filter and prefilter are extended and pressure drop is minimized to save energy.
- Includes media separators creating uniform airflow throughout the media pack.
- Incorporates a unique sealant channel ensuring media pack-to-frame bonding to prevent air bypass.
- Includes an impact-resistant plastic enclosing frame with plastic media pack supports ensuring a rigid and durable filter. Bridging supports on each 'V' provide handles for installation and transport and maintains the rigidity of the filter. The frame also has built-in spring fastener attachment locations, prefilter fastener attachment locations and recessed front and back inlet and outlet handles for changing and aligning the filter during installation.
- Includes a one-inch nominal size header as an integral component of the frame for added stability and a secure fit into filter holding mechanism or housing.
- Includes a sealing gasket on one vertical header to eliminate air bypass between headers in multiple filter systems.
- Can be installed in systems with airflow capacities to 3,000 cfm. Maximum pressure drop capability is guaranteed to 2.0" w.g. and filter integrity is guaranteed to 10.0" w.g.
- Is the lightest weight V-bank filter available.
- Has an ECI<sup>1</sup> value of five stars.

The Durafil's superior performance characteristics relating to human and environmental health, energy efficiency, materials selection and indoor environmental quality make it the final filter of choice for those facilities pursuing green building status.

<sup>1</sup> A 5-Star rating indicates that this filter performs in the top 20% of all products of similar construction in the HVAC industry. Factors of consideration include maintained efficiency, energy usage and resistance to air flow. Detailed evaluation information is available from your Camfil Farr sales outlet or on the web at [www.camfilfarr.com](http://www.camfilfarr.com).

### Performance

| ASHRAE Efficiency                              | Part Number             | Nominal Size<br>(H x W)<br>(inches) | Actual Dimensions<br>H x W<br>(inches) | Actual Depth<br>(inches) | Initial Resistance<br>(inches w.g.) | Airflow Capacity<br>(cfm) | Media Area<br>(ft²) |
|--|-------------------------|-------------------------------------|--|--------------------------|-------------------------------------|---------------------------|---------------------|
| MERV 16 <sup>a</sup><br>MERV 16-A <sup>b</sup> | 855080-014              | 24 x 24                             | 23.38 x 23.38                          | 12.38                    | 0.60                                | 2000                      | 200                 |
|  | 855080-030              | 20 x 24                             | 19.38 x 23.38                          | 12.38                    |                                     | 1500                      | 160                 |
|  | 855080-021              | 12 x 24                             | 11.38 x 23.38                          | 12.38                    |                                     | 1000                      | 100                 |
|  | 855080-188 <sup>d</sup> | 20 x 20                             | 19.38 x 19.38                          | 12.38                    | 0.80                                | 1250                      | 125                 |
| MERV 14 <sup>a</sup><br>MERV 14-A <sup>b</sup> | 855080-009              | 24 x 24                             | 23.38 x 23.38                          | 12.38                    | 0.31                                | 2000                      | 200                 |
|  | 855080-006              | 20 x 24                             | 19.38 x 23.38                          | 12.38                    |                                     | 1500                      | 160                 |
|  | 855080-003              | 12 x 24                             | 11.38 x 23.38                          | 12.38                    |                                     | 1000                      | 100                 |
|  | 855080-065 <sup>d</sup> | 20 x 20                             | 19.38 x 19.38                          | 12.38                    | 0.37                                | 1250                      | 125                 |
| MERV 13 <sup>c</sup><br>MERV 13-A <sup>b</sup> | 855080-008              | 24 x 24                             | 23.38 x 23.38                          | 12.38                    | 0.27                                | 2000                      | 200                 |
|  | 855080-005              | 20 x 24                             | 19.38 x 23.38                          | 12.38                    |                                     | 1500                      | 160                 |
|  | 855080-002              | 12 x 24                             | 11.38 x 23.38                          | 12.38                    |                                     | 1000                      | 100                 |
|  | 855080-066 <sup>d</sup> | 20 x 20                             | 19.38 x 19.38                          | 12.38                    | 0.33                                | 1250                      | 125                 |
| MERV 11<br>MERV 11-A <sup>b</sup>              | 855080-007              | 24 x 24                             | 23.38 x 23.38                          | 12.38                    | 0.21                                | 2000                      | 200                 |
|  | 855080-004              | 20 x 24                             | 19.38 x 23.38                          | 12.38                    |                                     | 1500                      | 160                 |
|  | 855080-001              | 12 x 24                             | 11.38 x 23.38                          | 12.38                    |                                     | 1000                      | 100                 |
|  | 855080-063 <sup>d</sup> | 20 x 20                             | 19.38 x 19.38                          | 12.38                    | 0.27                                | 1250                      | 125                 |

#### DATA NOTES

<sup>a</sup> May provide additional LEED credits.

<sup>b</sup> Discharged efficiency per appendix J of ASHRAE Standard 52.2.

<sup>c</sup> Minimum efficiency selection for LEED consideration.

<sup>d</sup> 20" by 20" size does not have spacing plenum for prefilter application, contact factory for prefiltration guidance. 20" by 20" size does not have radial configuration. Airflow may be in either direction.

Schedule air filters for change when initial pressure drop has doubled. Final pressure drop should not exceed 1.50" w.g.

The Durafil ES is listed UL 900 by Underwriters Laboratories.

Maximum continuous operating temperature 175° F. (79° C.), relative humidity 99%.

U.S. Patent No. 6,447,566. Performance tolerance in accordance with ARI Standard 850.

**Options:** Available with gaskets in any location. Available with dual headers as shown to the right. See Product Sheet 1515B.



#### 1.0 General

**1.1** - Air filters shall be V-Bank mini-pleat fiberglass disposable type with pleat separators, polyurethane pack-to-frame sealant, polystyrene enclosing frame and have an ECI value of five stars.

**1.2** - Sizes shall be as noted on drawings or other supporting materials.

#### 2.0 Construction

**2.1** - Filter media shall be of microfine glass fibers formed into uniform pleats with a spacing of 10 pleats per inch and a uniform pleat height of 24mm. Pleats shall be separated at 25mm intervals to ensure pleat separation and uniform airflow through the filter pack.

**2.2** - Pleats media packs shall be assembled into a V-bank configuration with sufficient total media area to meet airflow requirements. The filter outlet shall be radial in shape with a maximum of 60% open area to maintain low-pressure drop and uniform airflow (20" by 20" shall be straight V-style design).

**2.3** - The media packs shall be bonded to the inside periphery of a polystyrene enclosing frame with a polyurethane sealant. The enclosing frame shall include top and bottom molded tracks as in integral part of the frame to ensure a proper seal.

**2.4** - Media packs shall be recessed at least 1" from the air entering side of the enclosing frame to allow uniform airflow when a prefilter is mounted directly to the enclosing frame.

**2.5** - Rigid plastic end caps shall be mechanically fastened to the top and bottom of the media pack enclosing structure to ensure a rigid and durable filter.

**2.6** - Carrying handles shall be an integral part of the filter frame and shall bridge from media pack to media pack providing additional filter support and filter rigidity. Handles shall include fastener connection locations for the application of spring mounting fasteners when the filter is applied in reverse flow applications.

#### 3.0 Performance

**3.1** - The filter shall have a Minimum Efficiency Reporting Value of MERV (11, 13, 14, 16) when evaluated under the guidelines of ASHRAE Standard 52.2. It shall also have a MERV-A rating of (11, 13, 14, 16) when evaluated under ASHRAE Standard 52.2, Appendix J.

**3.2** - Initial resistance to airflow shall not exceed (0.21, 0.27, 0.31, 0.60) inches w.g. at an airflow of 500 fpm for 24 x 24, 24 x 12 and 24 x 20 sizes. On 20" by 20" respective pressure drops shall be (0.27, 0.33, 0.37, 0.80) inches w.g. at an airflow of 500 fpm.

**3.3** - Filter shall be listed UL 900 by Underwriters Laboratories.

**3.4** - The filter shall be capable of withstanding 10.00" w.g. without failure of the media pack.

**3.5** - Manufacturer shall provide evidence of facility certification to ISO 9001:2008.

**3.6** - Filter shall have a 5-Star rating when evaluated per Energy Cost Index (ECI).

**Supporting Data** - Provide product test reports for each listed efficiency including all details as prescribed in ASHRAE Standards 52.2-2007B.

Filters shall be Camfil Farr Durafil ES or equal.

(Items in parentheses ( ) require selection.

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# Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

**RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB**

Tag: HP-1

## Job Information

Job Name: VA Long Beach  
Job Number: Job #16  
Site Altitude: 0 ft  
Refrigerant: R-410A

## Static Pressure

External: 1.10 in. wg.  
Evaporator: 0.10 in. wg.  
Filters Clean: 0.22 in. wg.  
Dirt Allowance: 0.75 in. wg.

## Cooling Section

|                               | Gross                                 | Net         |
|-------------------------------|---------------------------------------|-------------|
| Total Capacity:               | 42.92                                 | 40.14 MBH   |
| Sensible Capacity:            | 34.03                                 | 31.25 MBH   |
| Latent Capacity:              | 8.88 MBH                              |             |
| Mixed Air Temp:               | 88.64 °F DB                           | 71.25 °F WB |
| Entering Air Temp:            | 88.64 °F DB                           | 71.25 °F WB |
| Lv Air Temp (Coil):           | 59.15 °F DB                           | 58.95 °F WB |
| Lv Air Temp (Unit):           | 61.47 °F DB                           | 59.81 °F WB |
| Digital Comp. Capacity Ratio: | 100%                                  |             |
| Supply Air Fan:               | 1 x RQ185D60-VFD @ 0.86 BHP           |             |
| SA Fan RPM / Width:           | 1706 / 1.750"                         |             |
| Evaporator Coil:              | 5.3 ft <sup>2</sup> / 3 Rows / 14 FPI |             |
| Evaporator Face Velocity:     | 209.5 fpm                             |             |

## Rating Information

Application EER @ Op. Conditions: 10.8

## Electrical Data

Rating: 208/1/60  
Unit FLA: 29

|                 | Qty | HP    | VAC |
|-----------------|-----|-------|-----|
| Compressor 1:   | 1   |       | 208 |
| Condenser Fans: | 1   | 0.333 | 208 |
| Supply Fan:     | 1   | 1.00  | 208 |

## Cabinet Sound Power Levels\*

| Octave Bands:     | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|-------------------|----|-----|-----|-----|------|------|------|------|
| Discharge LW(dB): | 83 | 81  | 84  | 80  | 72   | 70   | 68   | 63   |
| Return LW(dB):    | 80 | 78  | 75  | 68  | 65   | 61   | 53   | 46   |

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

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

## Unit Information

Approx. Op./Ship Weights: 764 / 764 lbs. (±5%)  
Supply CFM/ESP: 1100 / 1.1 in. wg.  
Pre-Filter FV / Qty: 198.00 fpm / 2  
Final Filter FV / Qty: 198.00 fpm / 2  
Outside CFM: 750  
Ambient Temperature: 95 °F DB / 75 °F WB  
Return Temperature: 75 °F DB / 62 °F WB

Economizer: 0.24 in. wg.  
Heating: 0.00 in. wg.  
Cabinet: 0.04 in. wg.  
Total: 2.45 in. wg.

## Heating Section(\*\*)

Primary Heat Type: Heat Pump  
Total Capacity: 34.2 MBH  
Integrated Heat Capacity: 29.8 MBH  
OA Temp: 33.0 DB / 26.0 °F WB  
RA Temp: 75.0 °F DB / 62.0 °F WB  
Entering Air Temp: 61.4 DB / 47.3 °F WB  
Leaving Air Temp: 87.2 DB / 58.1 °F WB  
Auxiliary Heat Type: No Heat  
Heating CFM: 1050  
Fan Temp Rise: 2.3 °F

Application COP<sub>H</sub> @ Op. Conditions: 2.86

| Minimum Circuit Amp: | 33   |     |     |
|----------------------|------|-----|-----|
| Maximum Overcurrent: | 50   |     |     |
| Phase                | RPM  | FLA | RLA |
| 1                    |      |     | 18  |
| 1                    | 1110 | 2.8 |     |
| 3                    | 1760 | 4.6 |     |





# Unit Rating

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

RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB  
Tag: HP-1

## Job Information

Job Name: VA Long Beach  
OA CFM: 750

Job Number: Job #16  
SA CFM: 1050

## Performance Data Table

| Outside Air |       | Mixed Air |       | Leaving Air |       | Heat Pump Capacity | Heat Pump Integrated Capacity | Heating COP |
|-------------|-------|-----------|-------|-------------|-------|--------------------|-------------------------------|-------------|
| DB °F       | WB °F | DB °F     | WB °F | DB °F       | WB °F | MBH                | MBH                           |             |
| 62.0        | 56.2  | 65.7      | 57.9  | 108.5       | 72.0  | 48.9               | 48.9                          | 3.93        |
| 57.0        | 51.6  | 62.1      | 54.8  | 102.6       | 68.9  | 46.5               | 46.5                          | 3.96        |
| 52.0        | 47.1  | 58.6      | 51.8  | 96.8        | 66.0  | 44.2               | 44.2                          | 3.97        |
| 47.0        | 42.6  | 55.0      | 48.9  | 90.9        | 63.0  | 41.8               | 41.8                          | 3.96        |
| 42.0        | 38.0  | 51.4      | 46.0  | 85.1        | 60.0  | 39.5               | 39.5                          | 3.94        |
| 37.0        | 33.5  | 47.9      | 43.2  | 75.0        | 55.3  | 37.3               | 32.0                          | 3.40        |
| 32.0        | 28.8  | 44.3      | 40.3  | 69.9        | 52.3  | 34.9               | 30.5                          | 3.41        |
| 27.0        | 24.3  | 40.7      | 37.5  | *           | *     | *                  | *                             | *           |
| 22.0        | 19.7  | 37.1      | 34.8  | *           | *     | *                  | *                             | *           |
| 17.0        | 15.0  | 33.6      | 32.0  | *           | *     | *                  | *                             | *           |
| 12.0        | 10.4  | 30.0      | 29.5  | *           | *     | *                  | *                             | *           |
| 7.0         | 5.7   | 26.4      | 26.4  | *           | *     | *                  | *                             | *           |
| 2.0         | 0.1   | 22.9      | 22.9  | *           | *     | *                  | *                             | *           |

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



# 18.5" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

## JOB INFORMATION:

Job Name: VA Long Beach  
Job Tag: HP-1  
Rep Firm:  
Date: 09/22/2015  
09/22/2015

## WHEEL SPECIFICATION:

Max RPM: 2,200  
Diameter x Qty: 18.5 in. x 1  
CFM: 1100  
Tip Speed: 8,263 FPM  
Inertia: 8,263 FPM

## OPERATING CONDITIONS:

Air Flow: 1,100 CFM  
Static Pressure: 2.45 in. Wg.  
Relief Dampers DP: 0.00 in. Wg.

TSP: 2.45 in. Wg.  
Site Altitude: 0.00 Ft  
TSP @ Sea Level: 2.45 in. Wg.

## MOTOR SELECTION:

Rated HP / Bypass: 1 / No  
Frame Size: 48  
Nominal RPM: 1760  
VAC/PH/HZ: 208/1/60  
Efficiency: Standard / 0.785  
Enclosure Type: ODP  
Max Inertial Load: 15 WR<sup>2</sup>

## FAN PERFORMANCE:

RPM: 1706  
BHP: 0.86  
Efficiency: 49.6%  
In/Out Velocity: / FPM  
Plenum Out Velocity: 18 FPM

## FAN SOUND POWER (Inlet/Outlet):

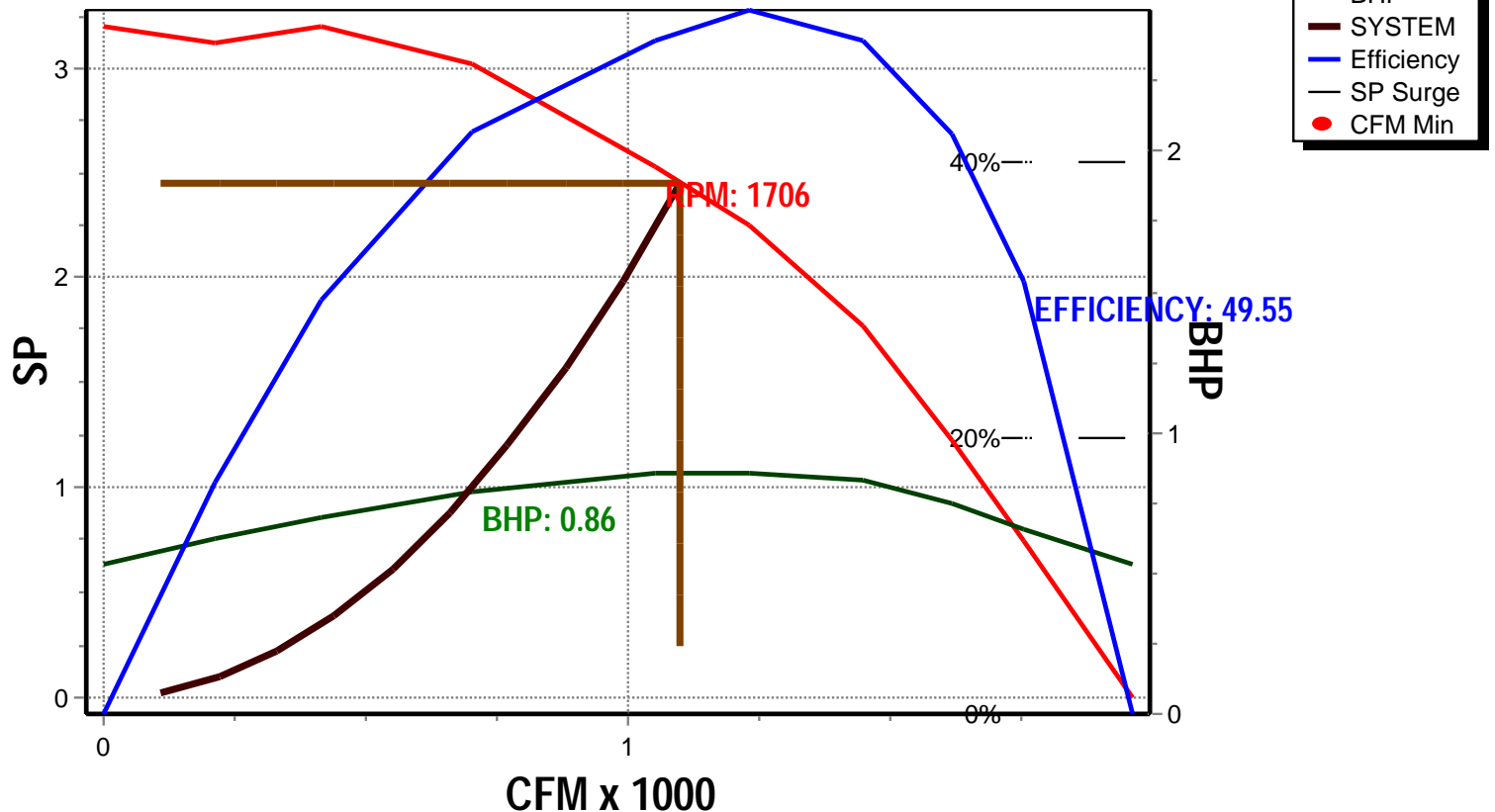
| Octave Band:                 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
|------------------------------|----|----|----|----|----|----|----|----|
| (Re 10 <sup>-12</sup> watts) | 83 | 81 | 84 | 81 | 75 | 73 | 71 | 66 |
|                              | 83 | 81 | 84 | 81 | 75 | 73 | 71 | 66 |

SOUND POWER A-Weighted: 85 / 85 dB

Max Duct SP with Blocked Airway: 3.2 in. Wg. @ 1706 rpm

## Supply Fan Model: RQ185D60-VFD @ 1706 RPM and 100% Width

Design Conditions: 1100 CFM @ 2.45" SP





# Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

**RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB**

Tag: HP-1

Job Name:  
Job Number:

VA Long Beach  
Job #16

Unit Submittal For:  
Unit Submittal Date:

August 20, 2015

|            | Base Option               | Description  |
|------------|---------------------------|--|
| <b>R</b>   | Series                    | Roof Top Unit  |
| <b>Q</b>   | Generation                | Tenth Generation   |
| <b>003</b> | Unit Size                 | Three  |
| <b>9</b>   | Voltage                   | 208V1Ø/60Hz  |
| <b>H</b>   | Interior Protection       | Horizontal Discharge and Return                                    |
| <b>E</b>   | Refrigerant Style         | R-410A Variable Capacity Scroll Compressor (VCC) - High Efficiency |
| <b>6</b>   | Unit Configuration        | Air-Source Heat Pump   |
| <b>1</b>   | Coil Coating              | Polymer E-Coated Evap. and Cond. Coils                             |
| <b>9</b>   | Cooling/Heat Pump Staging | Modulating Heat Pump + No Auxiliary Heat - 1 VCC                   |
| <b>0</b>   | Heating Type              | No Heating   |
| <b>0</b>   | Heating Designation       | No Heating   |
| <b>0</b>   | Heating Staging           | No Heating   |

|          | Feature Option                 | Description  |
|----------|--------------------------------|--|
| <b>A</b> | 1A. RA/OA Section              | Economizer   |
| <b>0</b> | 1B. RA/EA Blower Configuration | Standard - None  |
| <b>0</b> | 1C. RA/EA Blower               | Standard - None  |
| <b>0</b> | 1D. RA/EA Blower Motor         | Standard - None  |
| <b>D</b> | 2. OA Control                  | Fully Modulating Actuator - Enthalpy Limit                                       |
| <b>0</b> | 3. Heat Options                | Standard   |
| <b>0</b> | 4. Maintenance Options         | Standard   |
| <b>Q</b> | 5A. SA Blower Configuration    | 1 Blower + Inverter Rated 3 Phase Motor + VFD                                    |
| <b>K</b> | 5B. SA Blower                  | 19" Direct Drive Backward Curved Plenum - 60% Width                              |
| <b>C</b> | 5C. SA Motor                   | 1 HP 1750 rpm  |
| <b>E</b> | 6A. Pre Filter Type            | 2" Pleated unit Pre Filter and Metal Mesh OA Filters                             |
| <b>H</b> | 6B. Unit Filter Type           | 4" Pleated - 95% Eff - MERV 14   |
| <b>C</b> | 6C. Filter Options             | Clogged Filter Switch + Magnehelic Gauge   |
| <b>0</b> | 7. Refrigeration Control       | Standard - Fixed 55°F Comp. Cooling Lock Out + Adjustable Comp. Heating Lock Out |
| <b>0</b> | 8. Refrigeration Options       | Standard   |
| <b>E</b> | 9. Refrigeration Accessories   | ECM Condenser Fan - Head Pressure Control  |
| <b>0</b> | 10. Power Options              | Standard Power Block   |
| <b>0</b> | 11. Safety Options             | Standard   |
| <b>0</b> | 12. Controls                   | Standard   |
| <b>Z</b> | 13. Special Controls           | Constant Volume (CV) Heat Pump Unit Controller - CV Cool + CV Heat               |
| <b>0</b> | 14A. Preheat Configuration     | Standard - None  |
| <b>0</b> | 14B. Preheat Sizing            | Standard - None  |
| <b>0</b> | 15. Glycol Percent             | Water or No WSHP   |
| <b>0</b> | 16. Interior Cabinet Options   | Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan        |
| <b>0</b> | 17. Exterior Cabinet Options   | Standard   |
| <b>0</b> | 18. Customer Code              | Standard   |
| <b>0</b> | 19. Code Options               | Standard - ETL U.S.A. Listing  |
| <b>0</b> | 20. Crating                    | Standard   |
| <b>0</b> | 21. Water-Cooled Cond.         | Standard - None  |
| <b>A</b> | 22. Control Vendors            | WattMaster VCM-X Controls  |
| <b>B</b> | 23. Type                       | Standard - Includes AAON Gray Paint  |



# VCMX Components

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AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB

Tag: HP-1

Job Name:

VA Long Beach

VCMX For:

Job Number:

Job #16

VCMX Date:

August 20, 2015

## Hardware Included For VCMX Controller

| Part # | Included Parts                           | Assigned Channel         |
|--------|--|--------------------------|
| V07150 | VCMX Controller with EBUS                |                          |
| V38390 | Suction Pressure Transducer              | MainController\AI5       |
| P94320 | Space Temp Sensor - Field Installed      | MainController\AI1       |
| R82890 | Supply Air Temp Sensor - Field Installed | MainController\AI2       |
| R81550 | Outside Air Temp Sensor                  | MainController\AI4       |
| R69190 | VCMX Large Expansion Module              |                          |
| R34700 | Outside Air Humidity Sensor              | LargeExpansionModule\AI1 |
| R62330 | Proof of Flow Sensor                     | LargeExpansionModule\BI3 |
| R64580 | Dirty Filter Sensor                      | LargeExpansionModule\BI2 |
| V20660 | VCMX Head Pressure Module                |                          |
| V38410 | Head Pressure Sensor                     |                          |

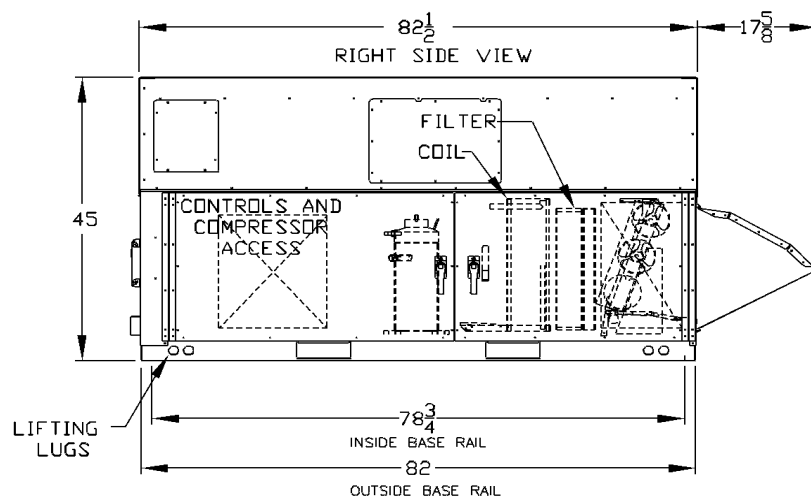
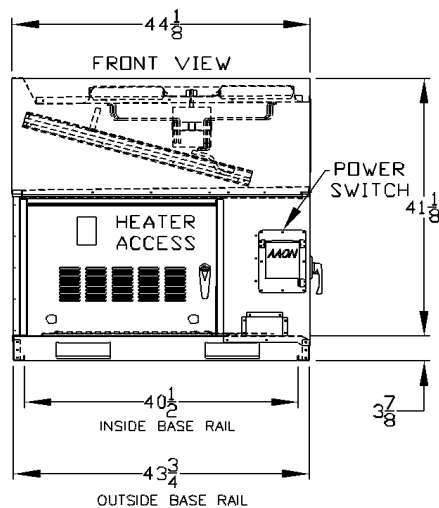
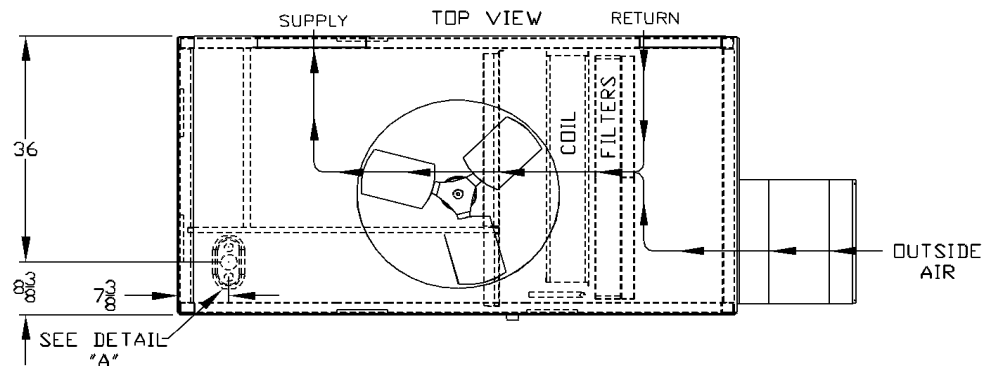
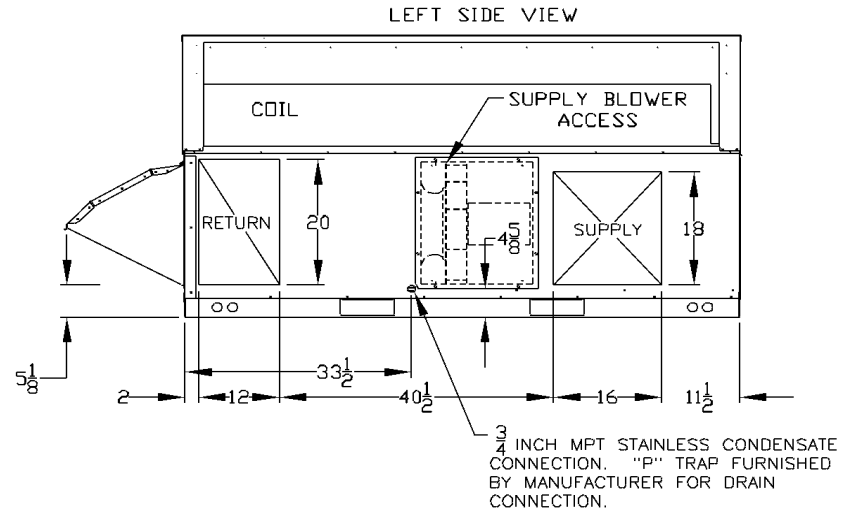
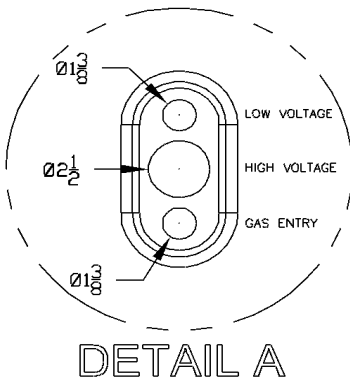
|                           | 1                 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------|-------------------|---|---|---|---|---|---|
| VCMX Controller with EBUS | Analog In         | X | X |   | X | X |   |
|                           | Analog Out        | X | X |   |   |   |   |
|                           | Binary In         |   |   |   |   |   |   |
|                           | Relay Out         | X | X | X | X |   |   |
|                           | Digital Sensor(s) |   |   |   |   |   |   |

|                             | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------------------|------------|---|---|---|---|---|---|---|
| VCMX Large Expansion Module | Analog In  | X |   |   |   |   |   |   |
|                             | Analog Out |   |   | X |   |   |   |   |
|                             | Binary In  |   | X | X |   |   |   |   |
|                             | Relay Out  |   |   |   |   |   |   |   |

# RQ CABINET ECONOMIZER HORIZONTAL ~ 1-6 TON

## CLEARANCES

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

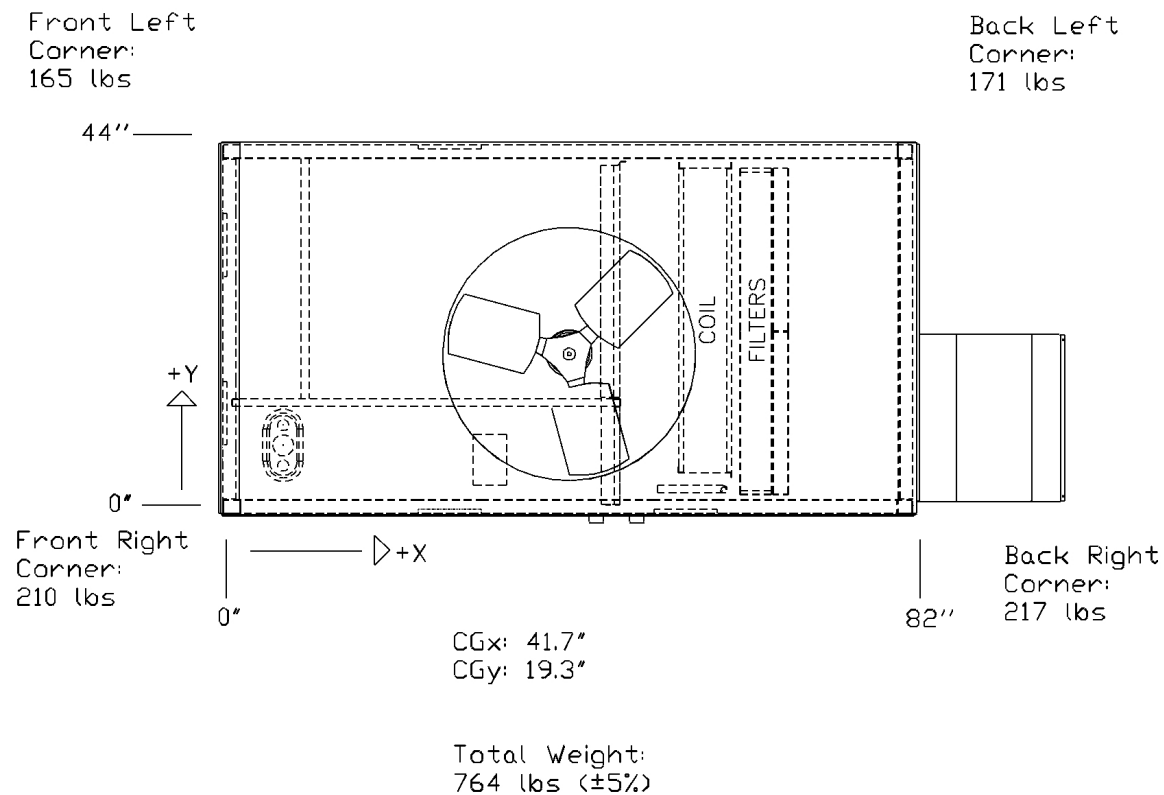


RQ-00011 REV:C 04/05/12 JRL  
NOTE: ALL DIMENSIONS ARE IN INCHES

# RQ CABINET HORIZONTAL AIR COOLED CONDENSING UNIT



RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB



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



# Unit Rating

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AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB

Tag: HP-2

## Job Information

Job Name: VA Long Beach  
Job Number: Job #16  
Site Altitude: 0 ft  
Refrigerant: R-410A

## Static Pressure

External: 1.10 in. wg.  
Evaporator: 0.10 in. wg.  
Filters Clean: 0.22 in. wg.  
Dirt Allowance: 0.75 in. wg.

## Cooling Section

|                               | Gross                                 | Net         |
|-------------------------------|---------------------------------------|-------------|
| Total Capacity:               | 37.95                                 | 35.16 MBH   |
| Sensible Capacity:            | 30.35                                 | 27.56 MBH   |
| Latent Capacity:              | 7.60 MBH                              |             |
| Mixed Air Temp:               | 77.27 °F DB                           | 63.67 °F WB |
| Entering Air Temp:            | 77.27 °F DB                           | 63.67 °F WB |
| Lv Air Temp (Coil):           | 51.53 °F DB                           | 51.33 °F WB |
| Lv Air Temp (Unit)            | 53.86 °F DB                           | 52.32 °F WB |
| Digital Comp. Capacity Ratio: | 100%                                  |             |
| Supply Air Fan:               | 1 x RQ185D60-VFD @ 0.86 BHP           |             |
| SA Fan RPM / Width:           | 1708 / 1.750"                         |             |
| Evaporator Coil:              | 5.3 ft <sup>2</sup> / 3 Rows / 14 FPI |             |
| Evaporator Face Velocity:     | 209.5 fpm                             |             |

## Rating Information

Application EER @ Op. Conditions: 9.5

## Electrical Data

Rating: 208/1/60  
Unit FLA: 29

|                 | Qty | HP    | VAC |
|-----------------|-----|-------|-----|
| Compressor 1:   | 1   |       | 208 |
| Condenser Fans: | 1   | 0.333 | 208 |
| Supply Fan:     | 1   | 1.00  | 208 |

## Cabinet Sound Power Levels\*

| Octave Bands:     | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|-------------------|----|-----|-----|-----|------|------|------|------|
| Discharge LW(dB): | 83 | 81  | 84  | 80  | 72   | 70   | 68   | 63   |
| Return LW(dB):    | 80 | 78  | 75  | 68  | 65   | 61   | 53   | 46   |

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

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

## Unit Information

Approx. Op./Ship Weights: 764 / 764 lbs. (±5%)  
Supply CFM/ESP: 1100 / 1.1 in. wg.  
Pre-Filter FV / Qty: 198.00 fpm / 2  
Final Filter FV / Qty: 198.00 fpm / 2  
Outside CFM: 125  
Ambient Temperature: 95 °F DB / 75 °F WB  
Return Temperature: 75 °F DB / 62 °F WB

Economizer: 0.24 in. wg.  
Heating: 0.00 in. wg.  
Cabinet: 0.04 in. wg.  
Total: 2.46 in. wg.

## Heating Section(\*\*)

Primary Heat Type: Heat Pump  
Total Capacity: 33.9 MBH  
Integrated Heat Capacity: 29.5 MBH  
OA Temp: 33.0 DB / 26.0°F WB  
RA Temp: 75.0 °F DB / 62.0 °F WB  
Entering Air Temp: 70.0 DB / 58.8 °F WB  
Leaving Air Temp: 96.0 DB / 67.6°F WB  
Auxiliary Heat Type: No Heat  
Heating CFM: 1050  
Fan Temp Rise: 2.3 °F

Application COP<sub>H</sub> @ Op. Conditions: 2.62

Minimum Circuit Amp: 33  
Maximum Overcurrent: 50

| Phase | RPM  | FLA | RLA |
|-------|------|-----|-----|
| 1     |      |     | 18  |
| 1     | 1110 | 2.8 |     |
| 3     | 1760 | 4.6 |     |



# Unit Rating

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AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB  
Tag: HP-2

## Job Information

Job Name: VA Long Beach  
OA CFM: 125

Job Number: Job #16  
SA CFM: 1050

## Performance Data Table

| Outside Air |       | Mixed Air |       | Leaving Air |       | Heat Pump Capacity | Heat Pump Integrated Capacity | Heating COP |
|-------------|-------|-----------|-------|-------------|-------|--------------------|-------------------------------|-------------|
| DB °F       | WB °F | DB °F     | WB °F | DB °F       | WB °F | MBH                | MBH                           |             |
| 62.0        | 56.2  | 73.5      | 61.3  | 116.1       | 74.5  | 48.1               | 48.1                          | 3.59        |
| 57.0        | 51.6  | 72.9      | 60.9  | 113.1       | 73.5  | 45.4               | 45.4                          | 3.49        |
| 52.0        | 47.1  | 72.3      | 60.4  | 110.3       | 72.5  | 42.9               | 42.9                          | 3.39        |
| 47.0        | 42.6  | 71.7      | 60.0  | 107.6       | 71.6  | 40.6               | 40.6                          | 3.29        |
| 42.0        | 38.0  | 71.1      | 59.7  | 104.6       | 70.6  | 37.9               | 37.9                          | 3.17        |
| 37.0        | 33.5  | 70.5      | 59.3  | 97.8        | 68.5  | 36.1               | 31.0                          | 2.68        |
| 32.0        | 28.8  | 69.9      | 59.0  | 95.7        | 67.7  | 33.5               | 29.2                          | 2.60        |
| 27.0        | 24.3  | 69.3      | 58.6  | 93.8        | 67.1  | 31.3               | 27.8                          | 2.54        |
| 22.0        | 19.7  | 68.7      | 58.3  | 91.9        | 66.4  | 29.3               | 26.3                          | 2.47        |
| 17.0        | 15.0  | 68.1      | 58.0  | 90.2        | 65.8  | 27.6               | 25.2                          | 2.41        |
| 12.0        | 10.4  | 67.5      | 57.8  | 88.3        | 65.1  | 25.8               | 23.7                          | 2.32        |
| 7.0         | 5.7   | 66.9      | 57.5  | 86.3        | 64.4  | 24.1               | 22.2                          | 2.23        |
| 2.0         | 0.1   | 66.3      | 57.2  | 84.2        | 63.6  | 22.2               | 20.5                          | 2.12        |

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





# 18.5" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

## JOB INFORMATION:

Job Name: VA Long Beach  
Job Tag: HP-2  
Rep Firm:  
Date: 09/22/2015  
09/22/2015

## WHEEL SPECIFICATION:

Max RPM: 2,200  
Diameter x Qty: 18.5 in. x 1  
CFM: 1100  
Tip Speed: 8,272 FPM  
Inertia: 8,272 FPM

## OPERATING CONDITIONS:

Air Flow: 1,100 CFM  
Static Pressure: 2.46 in. Wg.  
Relief Dampers DP: 0.00 in. Wg.

TSP: 2.46 in. Wg.  
Site Altitude: 0.00 Ft  
TSP @ Sea Level: 2.46 in. Wg.

## MOTOR SELECTION:

Rated HP / Bypass: 1 / No  
Frame Size: 48  
Nominal RPM: 1760  
VAC/PH/HZ: 208/1/60  
Efficiency: Standard / 0.785  
Enclosure Type: ODP  
Max Inertial Load: 15 WR<sup>2</sup>

## FAN PERFORMANCE:

RPM: 1708  
BHP: 0.86  
Efficiency: 49.5%  
In/Out Velocity: / FPM  
Plenum Out Velocity: 18 FPM

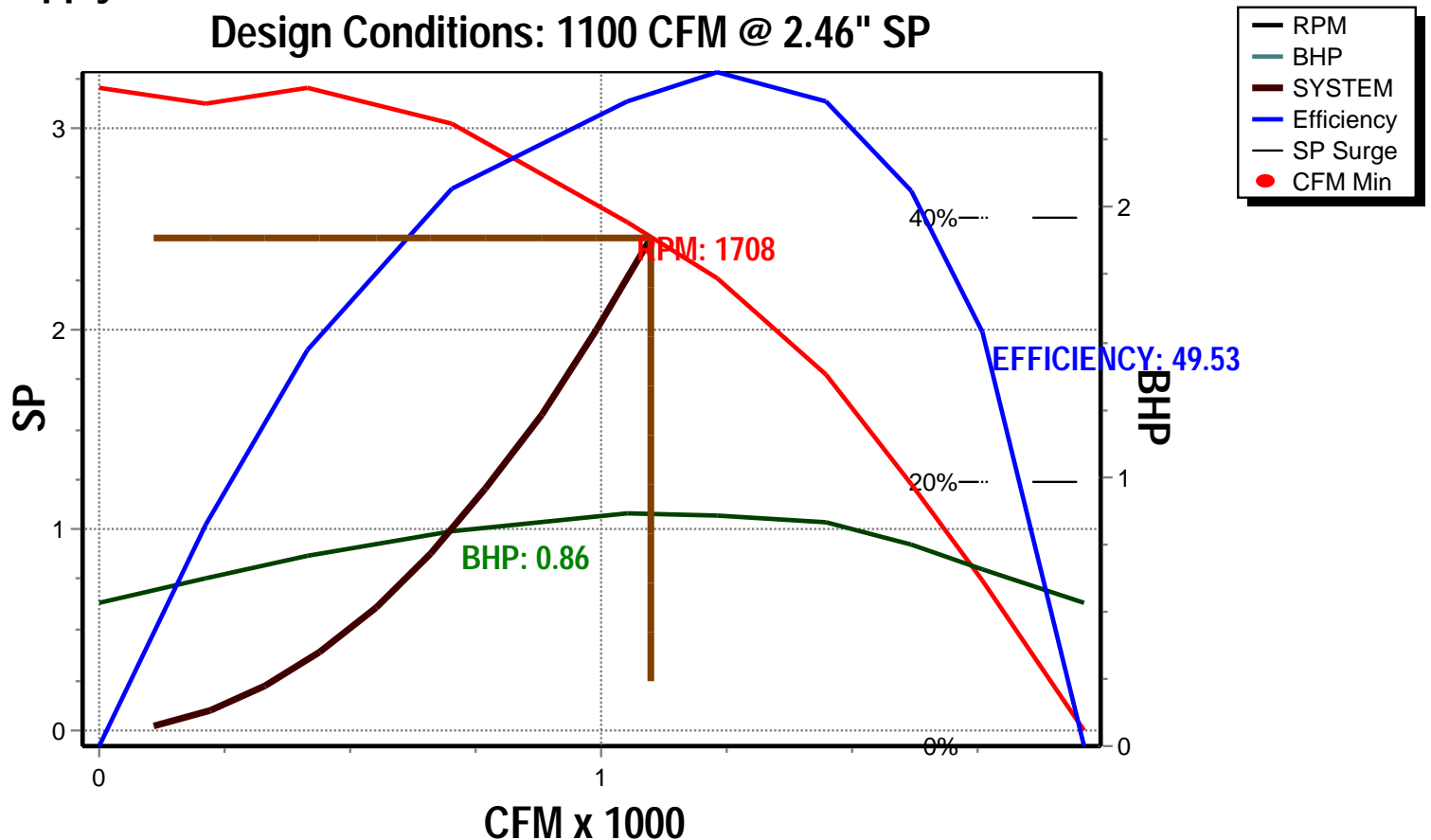
## FAN SOUND POWER (Inlet/Outlet):

| Octave Band:                 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
|------------------------------|----|----|----|----|----|----|----|----|
| (Re 10 <sup>-12</sup> watts) | 83 | 81 | 84 | 81 | 75 | 73 | 71 | 66 |
|                              | 83 | 81 | 84 | 81 | 75 | 73 | 71 | 66 |

SOUND POWER A-Weighted: 85 / 85 dB

Max Duct SP with Blocked Airway: 3.2 in. Wg. @ 1708 rpm

## Supply Fan Model: RQ185D60-VFD @ 1708 RPM and 100% Width Design Conditions: 1100 CFM @ 2.46" SP





# Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

**RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB**  
Tag: HP-2

Job Name:  
Job Number:

VA Long Beach  
Job #16

Unit Submittal For:  
Unit Submittal Date:

August 20, 2015

|            | Base Option               | Description  |
|------------|---------------------------|--|
| <b>R</b>   | Series                    | Roof Top Unit  |
| <b>Q</b>   | Generation                | Tenth Generation   |
| <b>003</b> | Unit Size                 | Three  |
| <b>9</b>   | Voltage                   | 208V1Ø/60Hz  |
| <b>H</b>   | Interior Protection       | Horizontal Discharge and Return                                    |
| <b>E</b>   | Refrigerant Style         | R-410A Variable Capacity Scroll Compressor (VCC) - High Efficiency |
| <b>6</b>   | Unit Configuration        | Air-Source Heat Pump   |
| <b>1</b>   | Coil Coating              | Polymer E-Coated Evap. and Cond. Coils                             |
| <b>9</b>   | Cooling/Heat Pump Staging | Modulating Heat Pump + No Auxiliary Heat - 1 VCC                   |
| <b>0</b>   | Heating Type              | No Heating   |
| <b>0</b>   | Heating Designation       | No Heating   |
| <b>0</b>   | Heating Staging           | No Heating   |

|          | Feature Option                 | Description  |
|----------|--------------------------------|--|
| <b>A</b> | 1A. RA/OA Section              | Economizer   |
| <b>0</b> | 1B. RA/EA Blower Configuration | Standard - None  |
| <b>0</b> | 1C. RA/EA Blower               | Standard - None  |
| <b>0</b> | 1D. RA/EA Blower Motor         | Standard - None  |
| <b>D</b> | 2. OA Control                  | Fully Modulating Actuator - Enthalpy Limit                                       |
| <b>0</b> | 3. Heat Options                | Standard   |
| <b>0</b> | 4. Maintenance Options         | Standard   |
| <b>Q</b> | 5A. SA Blower Configuration    | 1 Blower + Inverter Rated 3 Phase Motor + VFD                                    |
| <b>K</b> | 5B. SA Blower                  | 19" Direct Drive Backward Curved Plenum - 60% Width                              |
| <b>C</b> | 5C. SA Motor                   | 1 HP 1750 rpm  |
| <b>E</b> | 6A. Pre Filter Type            | 2" Pleated unit Pre Filter and Metal Mesh OA Filters                             |
| <b>H</b> | 6B. Unit Filter Type           | 4" Pleated - 95% Eff - MERV 14   |
| <b>C</b> | 6C. Filter Options             | Clogged Filter Switch + Magnehelic Gauge   |
| <b>0</b> | 7. Refrigeration Control       | Standard - Fixed 55°F Comp. Cooling Lock Out + Adjustable Comp. Heating Lock Out |
| <b>0</b> | 8. Refrigeration Options       | Standard   |
| <b>E</b> | 9. Refrigeration Accessories   | ECM Condenser Fan - Head Pressure Control  |
| <b>0</b> | 10. Power Options              | Standard Power Block   |
| <b>0</b> | 11. Safety Options             | Standard   |
| <b>0</b> | 12. Controls                   | Standard   |
| <b>Z</b> | 13. Special Controls           | Constant Volume (CV) Heat Pump Unit Controller - CV Cool + CV Heat               |
| <b>0</b> | 14A. Preheat Configuration     | Standard - None  |
| <b>0</b> | 14B. Preheat Sizing            | Standard - None  |
| <b>0</b> | 15. Glycol Percent             | Water or No WSHP   |
| <b>0</b> | 16. Interior Cabinet Options   | Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan        |
| <b>0</b> | 17. Exterior Cabinet Options   | Standard   |
| <b>0</b> | 18. Customer Code              | Standard   |
| <b>0</b> | 19. Code Options               | Standard - ETL U.S.A. Listing  |
| <b>0</b> | 20. Crating                    | Standard   |
| <b>0</b> | 21. Water-Cooled Cond.         | Standard - None  |
| <b>A</b> | 22. Control Vendors            | WattMaster VCM-X Controls  |
| <b>B</b> | 23. Type                       | Standard - Includes AAON Gray Paint  |



# VCMX Components

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB

Tag: HP-2

Job Name:

VA Long Beach

VCMX For:

Job Number:

Job #16

VCMX Date:

August 20, 2015

## Hardware Included For VCMX Controller

| Part # | Included Parts                           | Assigned Channel         |
|--------|--|--------------------------|
| V07150 | VCMX Controller with EBUS                |                          |
| V38390 | Suction Pressure Transducer              | MainController\AI5       |
| P94320 | Space Temp Sensor - Field Installed      | MainController\AI1       |
| R82890 | Supply Air Temp Sensor - Field Installed | MainController\AI2       |
| R81550 | Outside Air Temp Sensor                  | MainController\AI4       |
| R69190 | VCMX Large Expansion Module              |                          |
| R34700 | Outside Air Humidity Sensor              | LargeExpansionModule\AI1 |
| R62330 | Proof of Flow Sensor                     | LargeExpansionModule\BI3 |
| R64580 | Dirty Filter Sensor                      | LargeExpansionModule\BI2 |
| V20660 | VCMX Head Pressure Module                |                          |
| V38410 | Head Pressure Sensor                     |                          |

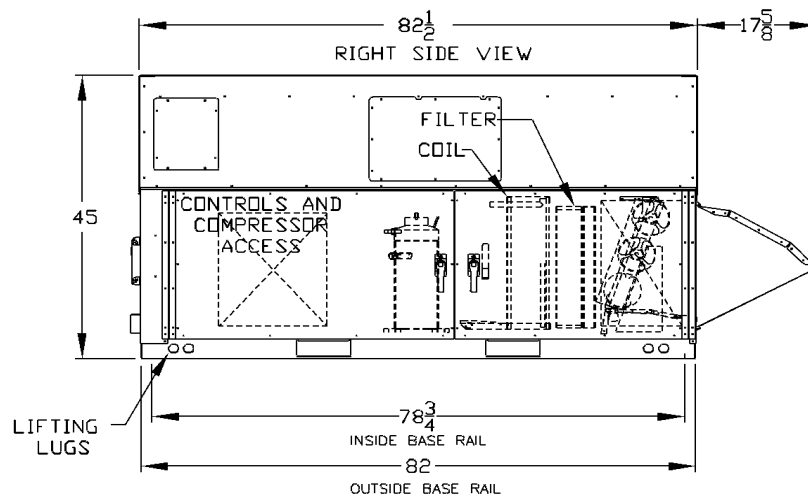
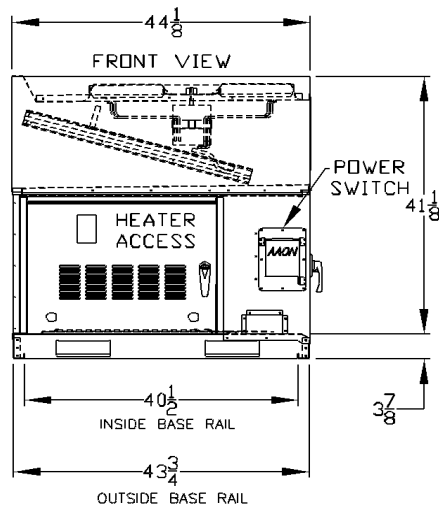
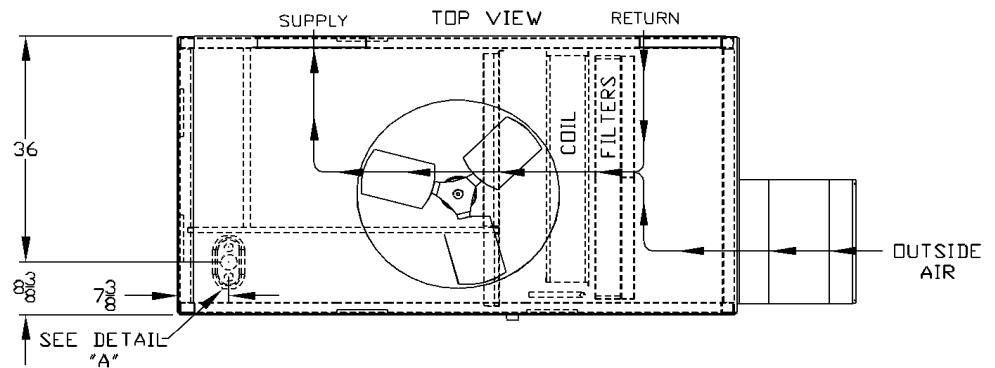
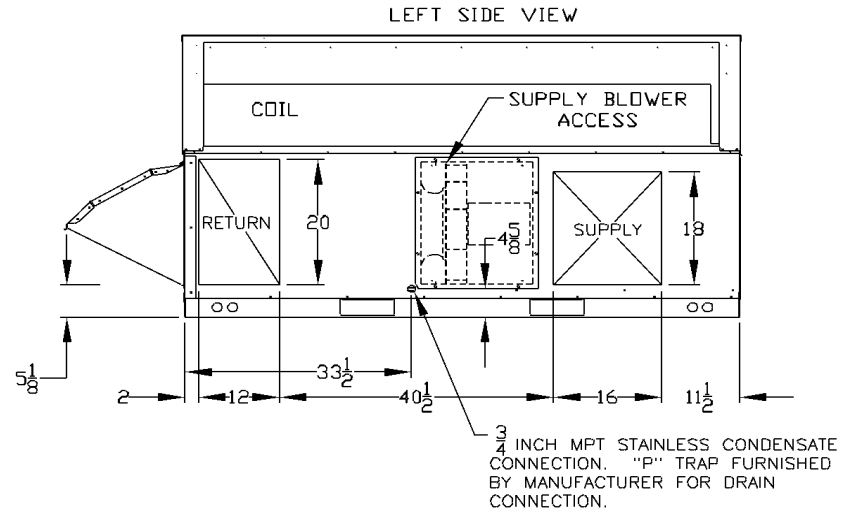
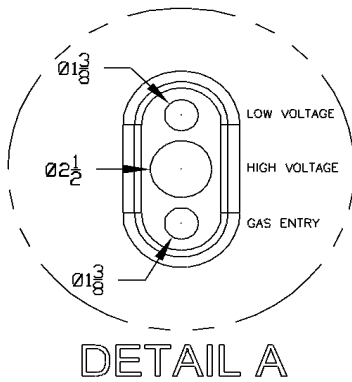
|                           | 1                 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------|-------------------|---|---|---|---|---|---|
| VCMX Controller with EBUS | Analog In         | X | X |   | X | X |   |
|                           | Analog Out        | X | X |   |   |   |   |
|                           | Binary In         |   |   |   |   |   |   |
|                           | Relay Out         | X | X | X | X |   |   |
|                           | Digital Sensor(s) |   |   |   |   |   |   |

|                             | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------------------|------------|---|---|---|---|---|---|---|
| VCMX Large Expansion Module | Analog In  | X |   |   |   |   |   |   |
|                             | Analog Out |   |   | X |   |   |   |   |
|                             | Binary In  |   | X | X |   |   |   |   |
|                             | Relay Out  |   |   |   |   |   |   |   |

# RQ CABINET ECONOMIZER HORIZONTAL ~ 1-6 TON

## CLEARANCES

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

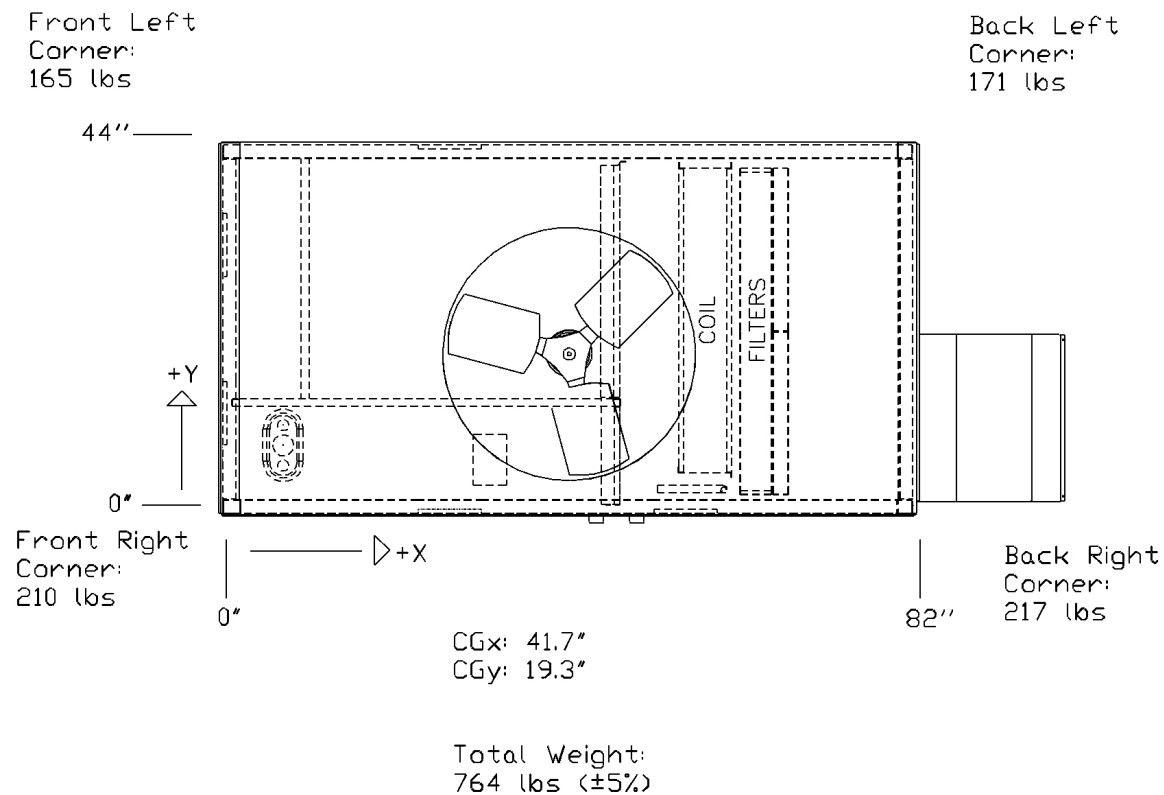


RQ-00011 REV:C 04/05/12 JRL  
NOTE: ALL DIMENSIONS ARE IN INCHES

# RQ CABINET HORIZONTAL AIR COOLED CONDENSING UNIT



RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB



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



# Unit Rating

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AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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RQ-004-9-H-E619-000:A000-D00-QKD-EHC-00E000Z-00-0000000AB

Tag: HP-3

## Job Information

Job Name: VA Long Beach  
Job Number: Job #16  
Site Altitude: 0 ft  
Refrigerant: R-410A

## Static Pressure

External: 1.10 in. wg.  
Evaporator: 0.23 in. wg.  
Filters Clean: 0.35 in. wg.  
Dirt Allowance: 0.75 in. wg.

## Cooling Section

|                               | Gross                                 | Net         |
|-------------------------------|---------------------------------------|-------------|
| Total Capacity:               | 49.67                                 | 45.55 MBH   |
| Sensible Capacity:            | 41.38                                 | 37.26 MBH   |
| Latent Capacity:              | 8.29 MBH                              |             |
| Mixed Air Temp:               | 78.87 °F DB                           | 64.82 °F WB |
| Entering Air Temp:            | 78.87 °F DB                           | 64.82 °F WB |
| Lv Air Temp (Coil):           | 53.91 °F DB                           | 53.71 °F WB |
| Lv Air Temp (Unit)            | 56.35 °F DB                           | 54.71 °F WB |
| Digital Comp. Capacity Ratio: | 100%                                  |             |
| Supply Air Fan:               | 1 x RQ185D60-VFD @ 1.32 BHP           |             |
| SA Fan RPM / Width:           | 1981 / 1.750"                         |             |
| Evaporator Coil:              | 5.3 ft <sup>2</sup> / 4 Rows / 14 FPI |             |
| Evaporator Face Velocity:     | 295.2 fpm                             |             |

## Rating Information

Application EER @ Op. Conditions: 9.8

## Electrical Data

Rating: 208/1/60  
Unit FLA: 37

|                 | Qty | HP    | VAC |
|-----------------|-----|-------|-----|
| Compressor 1:   | 1   |       | 208 |
| Condenser Fans: | 1   | 0.333 | 208 |
| Supply Fan:     | 1   | 2.00  | 208 |

## Cabinet Sound Power Levels\*

| Octave Bands:     | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|-------------------|----|-----|-----|-----|------|------|------|------|
| Discharge LW(dB): | 86 | 85  | 87  | 84  | 77   | 74   | 71   | 66   |
| Return LW(dB):    | 82 | 81  | 77  | 72  | 69   | 64   | 56   | 48   |

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

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

## Unit Information

Approx. Op./Ship Weights: 859 / 859 lbs. (±5%)  
Supply CFM/ESP: 1550 / 1.1 in. wg.  
Pre-Filter FV / Qty: 279.00 fpm / 2  
Final Filter FV / Qty: 279.00 fpm / 2  
Outside CFM: 300  
Ambient Temperature: 95 °F DB / 75 °F WB  
Return Temperature: 75 °F DB / 62 °F WB

Economizer: 0.21 in. wg.  
Heating: 0.00 in. wg.  
Cabinet: 0.09 in. wg.  
Total: 2.72 in. wg.

## Heating Section(\*\*)

Primary Heat Type: Heat Pump  
Total Capacity: 42.4 MBH  
Integrated Heat Capacity: 36.9 MBH  
OA Temp: 33.0 DB / 26.0°F WB  
RA Temp: 75.0 °F DB / 62.0 °F WB  
Entering Air Temp: 66.9 DB / 56.6 °F WB  
Leaving Air Temp: 88.8 DB / 64.5°F WB  
Auxiliary Heat Type: No Heat  
Heating CFM: 1550  
Fan Temp Rise: 2.4 °F

Application COP<sub>H</sub> @ Op. Conditions: 2.87

Minimum Circuit Amp: 42  
Maximum Overcurrent: 60

| Phase | RPM  | FLA | RLA |
|-------|------|-----|-----|
| 1     |      |     | 21  |
| 1     | 1110 | 2.8 |     |
| 3     | 1760 | 7.5 |     |



# Unit Rating

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AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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RQ-004-9-H-E619-000:A000-D00-QKD-EHC-00E000Z-00-0000000AB  
Tag: HP-3

## Job Information

Job Name: VA Long Beach  
OA CFM: 300

Job Number: Job #16  
SA CFM: 1550

## Performance Data Table

| Outside Air |       | Mixed Air |       | Leaving Air |       | Heat Pump Capacity | Heat Pump Integrated Capacity | Heating COP |
|-------------|-------|-----------|-------|-------------|-------|--------------------|-------------------------------|-------------|
| DB °F       | WB °F | DB °F     | WB °F | DB °F       | WB °F | MBH                | MBH                           |             |
| 62.0        | 56.2  | 72.5      | 60.9  | 109.3       | 72.6  | 61.4               | 61.4                          | 3.94        |
| 57.0        | 51.6  | 71.5      | 60.2  | 105.9       | 71.3  | 57.5               | 57.5                          | 3.81        |
| 52.0        | 47.1  | 70.6      | 59.4  | 103.0       | 70.1  | 54.2               | 54.2                          | 3.70        |
| 47.0        | 42.6  | 69.6      | 58.8  | 100.0       | 69.0  | 50.9               | 50.9                          | 3.58        |
| 42.0        | 38.0  | 68.6      | 58.1  | 97.1        | 67.9  | 47.8               | 47.8                          | 3.47        |
| 37.0        | 33.5  | 67.7      | 57.6  | 90.6        | 65.6  | 44.8               | 38.5                          | 2.92        |
| 32.0        | 28.8  | 66.7      | 57.0  | 88.4        | 64.7  | 41.8               | 36.5                          | 2.86        |
| 27.0        | 24.3  | 65.7      | 56.4  | 86.3        | 63.9  | 39.2               | 34.7                          | 2.80        |
| 22.0        | 19.7  | 64.7      | 55.9  | 84.0        | 63.0  | 36.2               | 32.5                          | 2.71        |
| 17.0        | 15.0  | 63.8      | 55.4  | 81.8        | 62.1  | 33.5               | 30.5                          | 2.63        |
| 12.0        | 10.4  | 62.8      | 54.9  | 79.6        | 61.3  | 31.0               | 28.5                          | 2.54        |
| 7.0         | 5.7   | 61.8      | 54.4  | 77.3        | 60.4  | 28.6               | 26.3                          | 2.43        |
| 2.0         | 0.1   | 60.9      | 53.9  | 75.0        | 59.4  | 26.1               | 24.1                          | 2.30        |

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



# 18.5" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

## JOB INFORMATION:

Job Name: VA Long Beach  
Job Tag: HP-3  
Rep Firm:  
Date: 09/22/2015  
09/22/2015

## WHEEL SPECIFICATION:

Max RPM: 2,200  
Diameter x Qty: 18.5 in. x 1  
CFM: 1550  
Tip Speed: 9,595 FPM  
Inertia: 9,595 FPM

## OPERATING CONDITIONS:

Air Flow: 1,550 CFM  
Static Pressure: 2.72 in. Wg.  
Relief Dampers DP: 0.00 in. Wg.

TSP: 2.72 in. Wg.  
Site Altitude: 0.00 Ft  
TSP @ Sea Level: 2.72 in. Wg.

## MOTOR SELECTION:

Rated HP / Bypass: 2 / No  
Frame Size: 48  
Nominal RPM: 1760  
VAC/PH/HZ: 208/1/60  
Efficiency: Standard / 0.815  
Enclosure Type: ODP  
Max Inertial Load: 27 WR<sup>2</sup>

## FAN PERFORMANCE:

RPM: 1981  
BHP: 1.32  
Efficiency: 50.3%  
In/Out Velocity: / FPM  
Plenum Out Velocity: 26 FPM

## FAN SOUND POWER (Inlet/Outlet):

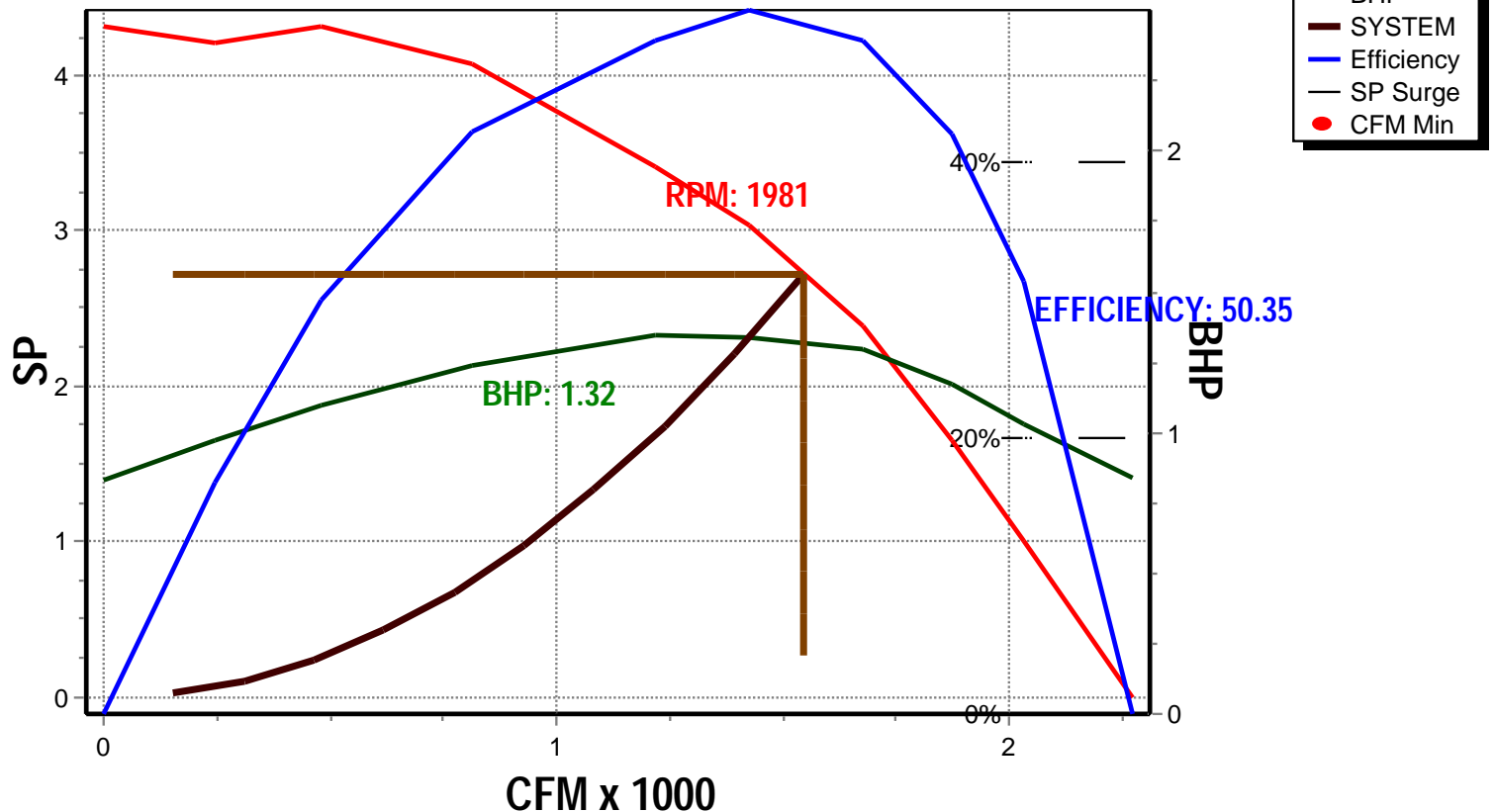
| Octave Band:                 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
|------------------------------|----|----|----|----|----|----|----|----|
| (Re 10 <sup>-12</sup> watts) | 86 | 85 | 87 | 86 | 80 | 77 | 75 | 70 |
|                              | 86 | 85 | 87 | 86 | 80 | 77 | 75 | 70 |

SOUND POWER A-Weighted: 88 / 88 dB

Max Duct SP with Blocked Airway: 4.3 in. Wg. @ 1981 rpm

## Supply Fan Model: RQ185D60-VFD @ 1981 RPM and 100% Width

Design Conditions: 1550 CFM @ 2.72" SP







# Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

**RQ-004-9-H-E619-000:A000-D00-QKD-EHC-00E000Z-00-0000000AB**  
Tag: HP-3

Job Name:  
Job Number:

VA Long Beach  
Job #16

Unit Submittal For:  
Unit Submittal Date:

August 20, 2015

|            | Base Option               | Description  |
|------------|---------------------------|--|
| <b>R</b>   | Series                    | Roof Top Unit  |
| <b>Q</b>   | Generation                | Tenth Generation   |
| <b>004</b> | Unit Size                 | Four   |
| <b>9</b>   | Voltage                   | 208V1Ø/60Hz  |
| <b>H</b>   | Interior Protection       | Horizontal Discharge and Return                                    |
| <b>E</b>   | Refrigerant Style         | R-410A Variable Capacity Scroll Compressor (VCC) - High Efficiency |
| <b>6</b>   | Unit Configuration        | Air-Source Heat Pump   |
| <b>1</b>   | Coil Coating              | Polymer E-Coated Evap. and Cond. Coils                             |
| <b>9</b>   | Cooling/Heat Pump Staging | Modulating Heat Pump + No Auxiliary Heat - 1 VCC                   |
| <b>0</b>   | Heating Type              | No Heating   |
| <b>0</b>   | Heating Designation       | No Heating   |
| <b>0</b>   | Heating Staging           | No Heating   |

|          | Feature Option                 | Description  |
|----------|--------------------------------|--|
| <b>A</b> | 1A. RA/OA Section              | Economizer   |
| <b>0</b> | 1B. RA/EA Blower Configuration | Standard - None  |
| <b>0</b> | 1C. RA/EA Blower               | Standard - None  |
| <b>0</b> | 1D. RA/EA Blower Motor         | Standard - None  |
| <b>D</b> | 2. OA Control                  | Fully Modulating Actuator - Enthalpy Limit                                       |
| <b>0</b> | 3. Heat Options                | Standard   |
| <b>0</b> | 4. Maintenance Options         | Standard   |
| <b>Q</b> | 5A. SA Blower Configuration    | 1 Blower + Inverter Rated 3 Phase Motor + VFD                                    |
| <b>K</b> | 5B. SA Blower                  | 19" Direct Drive Backward Curved Plenum - 60% Width                              |
| <b>D</b> | 5C. SA Motor                   | 2 HP 1760 rpm  |
| <b>E</b> | 6A. Pre Filter Type            | 2" Pleated unit Pre Filter and Metal Mesh OA Filters                             |
| <b>H</b> | 6B. Unit Filter Type           | 4" Pleated - 95% Eff - MERV 14   |
| <b>C</b> | 6C. Filter Options             | Clogged Filter Switch + Magnehelic Gauge   |
| <b>0</b> | 7. Refrigeration Control       | Standard - Fixed 55°F Comp. Cooling Lock Out + Adjustable Comp. Heating Lock Out |
| <b>0</b> | 8. Refrigeration Options       | Standard   |
| <b>E</b> | 9. Refrigeration Accessories   | ECM Condenser Fan - Head Pressure Control  |
| <b>0</b> | 10. Power Options              | Standard Power Block   |
| <b>0</b> | 11. Safety Options             | Standard   |
| <b>0</b> | 12. Controls                   | Standard   |
| <b>Z</b> | 13. Special Controls           | Constant Volume (CV) Heat Pump Unit Controller - CV Cool + CV Heat               |
| <b>0</b> | 14A. Preheat Configuration     | Standard - None  |
| <b>0</b> | 14B. Preheat Sizing            | Standard - None  |
| <b>0</b> | 15. Glycol Percent             | Water or No WSHP   |
| <b>0</b> | 16. Interior Cabinet Options   | Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan        |
| <b>0</b> | 17. Exterior Cabinet Options   | Standard   |
| <b>0</b> | 18. Customer Code              | Standard   |
| <b>0</b> | 19. Code Options               | Standard - ETL U.S.A. Listing  |
| <b>0</b> | 20. Crating                    | Standard   |
| <b>0</b> | 21. Water-Cooled Cond.         | Standard - None  |
| <b>A</b> | 22. Control Vendors            | WattMaster VCM-X Controls  |
| <b>B</b> | 23. Type                       | Standard - Includes AAON Gray Paint  |



# VCMX Components

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AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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RQ-004-9-H-E619-000:A000-D00-QKD-EHC-00E000Z-00-0000000AB

Tag: HP-3

Job Name:

VA Long Beach

VCMX For:

Job Number:

Job #16

VCMX Date:

August 20, 2015

## Hardware Included For VCMX Controller

| Part # | Included Parts                           | Assigned Channel         |
|--------|--|--------------------------|
| V07150 | VCMX Controller with EBUS                |                          |
| V38390 | Suction Pressure Transducer              | MainController\AI5       |
| P94320 | Space Temp Sensor - Field Installed      | MainController\AI1       |
| R82890 | Supply Air Temp Sensor - Field Installed | MainController\AI2       |
| R81550 | Outside Air Temp Sensor                  | MainController\AI4       |
| R69190 | VCMX Large Expansion Module              |                          |
| R34700 | Outside Air Humidity Sensor              | LargeExpansionModule\AI1 |
| R62330 | Proof of Flow Sensor                     | LargeExpansionModule\BI3 |
| R64580 | Dirty Filter Sensor                      | LargeExpansionModule\BI2 |
| V20660 | VCMX Head Pressure Module                |                          |
| V38410 | Head Pressure Sensor                     |                          |

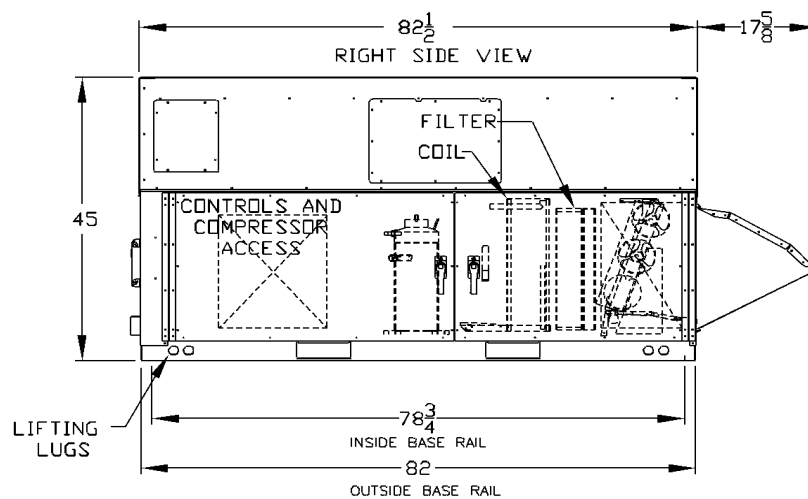
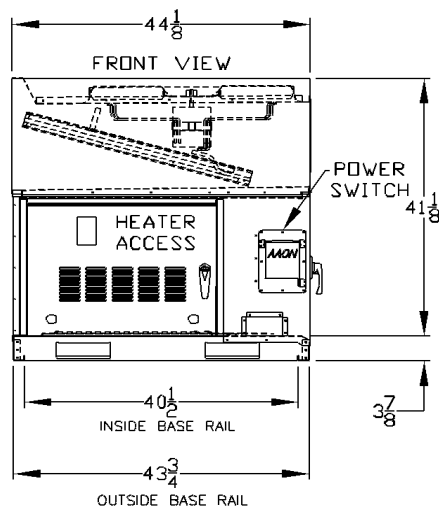
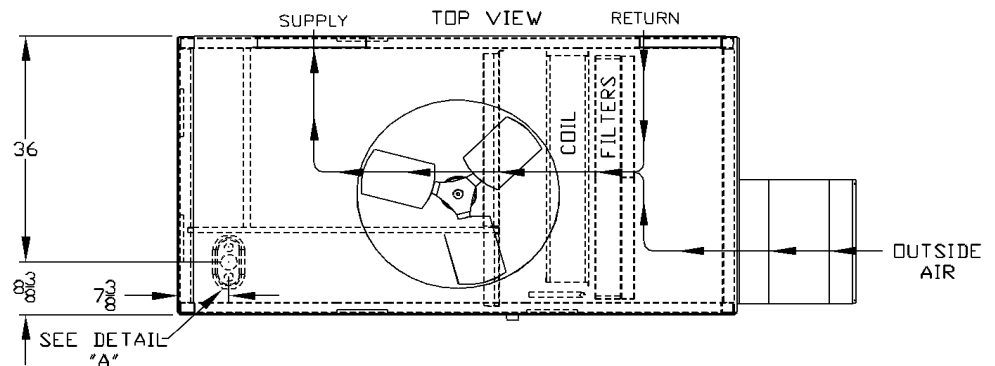
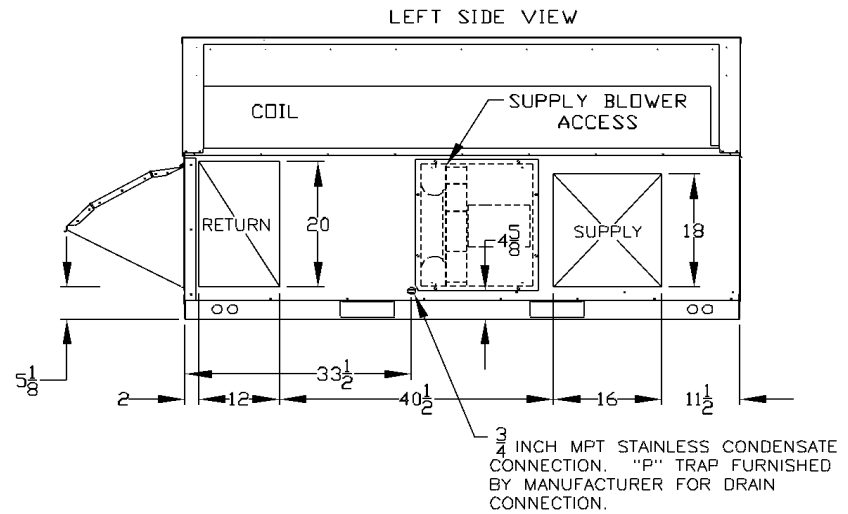
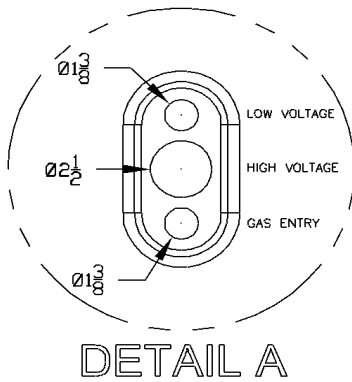
|                           | 1                 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------|-------------------|---|---|---|---|---|---|
| VCMX Controller with EBUS | Analog In         | X | X |   | X | X |   |
|                           | Analog Out        | X | X |   |   |   |   |
|                           | Binary In         |   |   |   |   |   |   |
|                           | Relay Out         | X | X | X | X |   |   |
|                           | Digital Sensor(s) |   |   |   |   |   |   |

|                             | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------------------|------------|---|---|---|---|---|---|---|
| VCMX Large Expansion Module | Analog In  | X |   |   |   |   |   |   |
|                             | Analog Out |   |   | X |   |   |   |   |
|                             | Binary In  |   | X | X |   |   |   |   |
|                             | Relay Out  |   |   |   |   |   |   |   |

# RQ CABINET ECONOMIZER HORIZONTAL ~ 1-6 TON

## CLEARANCES

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



RQ-00011 REV:C 04/05/12 JRL  
NOTE: ALL DIMENSIONS ARE IN INCHES

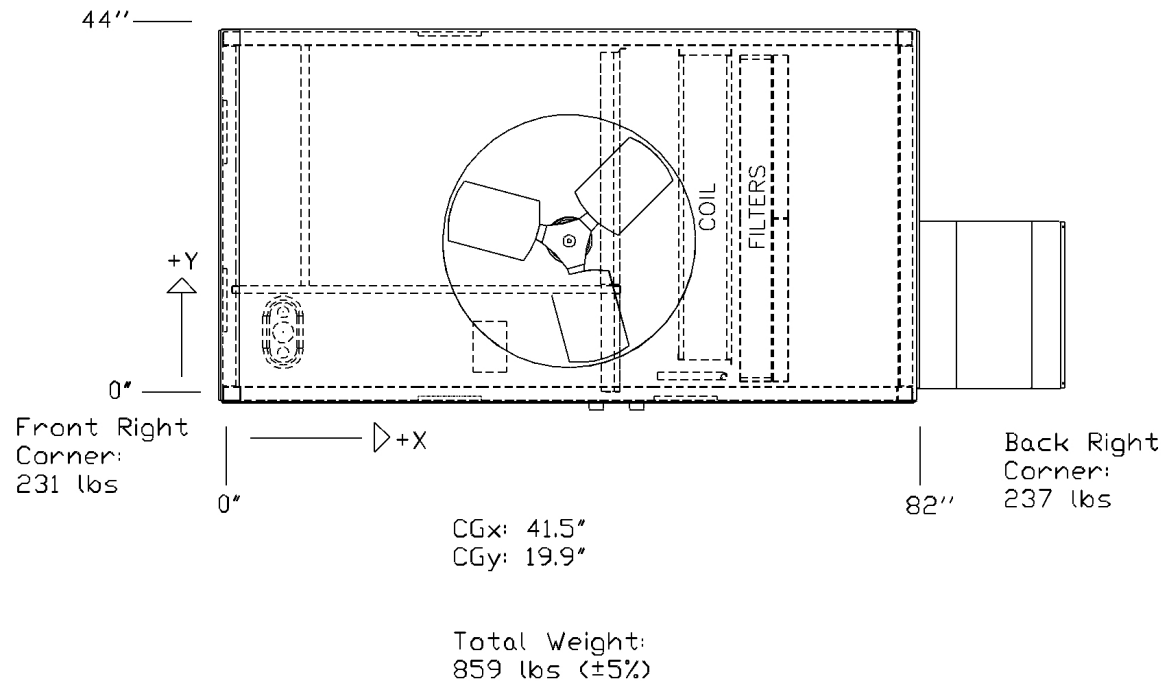
# RQ CABINET HORIZONTAL AIR COOLED CONDENSING UNIT



RQ-004-9-H-E619-000:A000-D00-QKD-EHC-00E000Z-00-0000000AB

Front Left  
Corner:  
193 lbs

Back Left  
Corner:  
198 lbs



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



# Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

RQ-003-9-H-E619-000:A000-D00-QKD-EHC-00E000Z-00-0000000AB

Tag: HP-4

## Job Information

Job Name: VA Long Beach  
Job Number: Job #16  
Site Altitude: 0 ft  
Refrigerant: R-410A

## Static Pressure

External: 1.50 in. wg.  
Evaporator: 0.11 in. wg.  
Filters Clean: 0.25 in. wg.  
Dirt Allowance: 0.75 in. wg.

## Cooling Section

|                               | Gross                                 | Net         |
|-------------------------------|---------------------------------------|-------------|
| Total Capacity:               | 44.25                                 | 40.74 MBH   |
| Sensible Capacity:            | 36.46                                 | 32.95 MBH   |
| Latent Capacity:              | 7.79 MBH                              |             |
| Mixed Air Temp:               | 90.00 °F DB                           | 72.08 °F WB |
| Entering Air Temp:            | 90.00 °F DB                           | 72.08 °F WB |
| Lv Air Temp (Coil):           | 60.80 °F DB                           | 60.78 °F WB |
| Lv Air Temp (Unit)            | 63.48 °F DB                           | 61.73 °F WB |
| Digital Comp. Capacity Ratio: | 100%                                  |             |
| Supply Air Fan:               | 1 x RQ185D60-VFD @ 1.12 BHP           |             |
| SA Fan RPM / Width:           | 1866 / 1.750"                         |             |
| Evaporator Coil:              | 5.3 ft <sup>2</sup> / 3 Rows / 14 FPI |             |
| Evaporator Face Velocity:     | 228.6 fpm                             |             |

## Rating Information

Application EER @ Op. Conditions: 10.3

## Electrical Data

Rating: 208/1/60  
Unit FLA: 34

|                 | Qty | HP    | VAC |
|-----------------|-----|-------|-----|
| Compressor 1:   | 1   |       | 208 |
| Condenser Fans: | 1   | 0.333 | 208 |
| Supply Fan:     | 1   | 2.00  | 208 |


## Cabinet Sound Power Levels\*

| Octave Bands:     | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|-------------------|----|-----|-----|-----|------|------|------|------|
| Discharge LW(dB): | 85 | 83  | 86  | 82  | 75   | 73   | 70   | 65   |
| Return LW(dB):    | 82 | 80  | 77  | 70  | 68   | 64   | 56   | 49   |

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

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

## Unit Information


Approx. Op./Ship Weights: 802 / 802 lbs. (±5%)  
Supply CFM/ESP: 1200 / 1.5 in. wg.   
Pre-Filter FV / Qty: 216.00 fpm / 2  
Final Filter FV / Qty: 216.00 fpm / 2  
Outside CFM: 900  
Ambient Temperature: 95 °F DB / 75 °F WB  
Return Temperature: 75 °F DB / 62 °F WB

Economizer: 0.28 in. wg.  
Heating: 0.00 in. wg.  
Cabinet: 0.05 in. wg.  
Total: 2.94 in. wg.

## Heating Section(\*\*)

Primary Heat Type: Heat Pump  
Total Capacity: 34.3 MBH  
Integrated Heat Capacity: 29.8 MBH  
OA Temp: 33.0 DB / 26.0 °F WB  
RA Temp: 75.0 °F DB / 62.0 °F WB  
Entering Air Temp: 60.0 DB / 45.6 °F WB  
Leaving Air Temp: 85.8 DB / 56.7 °F WB  
Auxiliary Heat Type: No Heat  
Heating CFM: 1050  
Fan Temp Rise: 2.7 °F

Application COP<sub>H</sub> @ Op. Conditions: 2.76

Minimum Circuit Amp: 38   
Maximum Overcurrent: 50

| Phase | RPM  | FLA | RLA |
|-------|------|-----|-----|
| 1     |      |     | 18  |
| 1     | 1110 | 2.8 |     |
| 3     | 1760 | 7.5 |     |



# Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

RQ-003-9-H-E619-000:A000-D00-QKD-EHC-00E000Z-00-0000000AB  
Tag: HP-4

## Job Information

Job Name: VA Long Beach  
OA CFM: 900

Job Number: Job #16  
SA CFM: 1050

## Performance Data Table

| Outside Air |       | Mixed Air |       | Leaving Air |       | Heat Pump Capacity | Heat Pump Integrated Capacity | Heating COP |
|-------------|-------|-----------|-------|-------------|-------|--------------------|-------------------------------|-------------|
| DB °F       | WB °F | DB °F     | WB °F | DB °F       | WB °F | MBH                | MBH                           |             |
| 62.0        | 56.2  | 63.9      | 57.1  | 106.7       | 71.3  | 49.1               | 49.1                          | 3.83        |
| 57.0        | 51.6  | 59.6      | 53.2  | 100.1       | 67.8  | 46.8               | 46.8                          | 3.87        |
| 52.0        | 47.1  | 55.3      | 49.5  | 93.5        | 64.2  | 44.5               | 44.5                          | 3.90        |
| 47.0        | 42.6  | 51.0      | 45.8  | 86.7        | 60.6  | 42.0               | 42.0                          | 3.90        |
| 42.0        | 38.0  | 46.7      | 42.1  | 80.3        | 57.0  | 39.8               | 39.8                          | 3.91        |
| 37.0        | 33.5  | 42.4      | 38.6  | 69.5        | 51.5  | 37.6               | 32.3                          | 3.39        |
| 32.0        | 28.8  | 38.1      | 34.7  | *           | *     | *                  | *                             | *           |
| 27.0        | 24.3  | 33.9      | 31.1  | *           | *     | *                  | *                             | *           |
| 22.0        | 19.7  | 29.6      | 27.6  | *           | *     | *                  | *                             | *           |
| 17.0        | 15.0  | 25.3      | 24.1  | *           | *     | *                  | *                             | *           |
| 12.0        | 10.4  | 21.0      | 20.6  | *           | *     | *                  | *                             | *           |
| 7.0         | 5.7   | 16.7      | 16.7  | *           | *     | *                  | *                             | *           |
| 2.0         | 0.1   | 12.4      | 12.4  | *           | *     | *                  | *                             | *           |

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



# 18.5" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

## JOB INFORMATION:

Job Name: VA Long Beach  
Job Tag: HP-4  
Rep Firm:  
Date: 10/30/2015  
10/30/2015

## WHEEL SPECIFICATION:

Max RPM: 2,200  
Diameter x Qty: 18.5 in. x 1  
CFM: 1200  
Tip Speed: 9,038 FPM  
Inertia: 9,038 FPM

## OPERATING CONDITIONS:

Air Flow: 1,200 CFM  
Static Pressure: 2.94 in. Wg.  
Relief Dampers DP: 0.00 in. Wg.

TSP: 2.94 in. Wg.  
Site Altitude: 0.00 Ft  
TSP @ Sea Level: 2.94 in. Wg.

## MOTOR SELECTION:

Rated HP / Bypass: 2 / No  
Frame Size: 48  
Nominal RPM: 1760  
VAC/PH/Hz: 208/1/60  
Efficiency: Standard / 0.815  
Enclosure Type: ODP  
Max Inertial Load: 27 WR<sup>2</sup>

## FAN PERFORMANCE:

RPM: 1866  
BHP: 1.12  
Efficiency: 49.5%  
In/Out Velocity: / FPM  
Plenum Out Velocity: 20 FPM

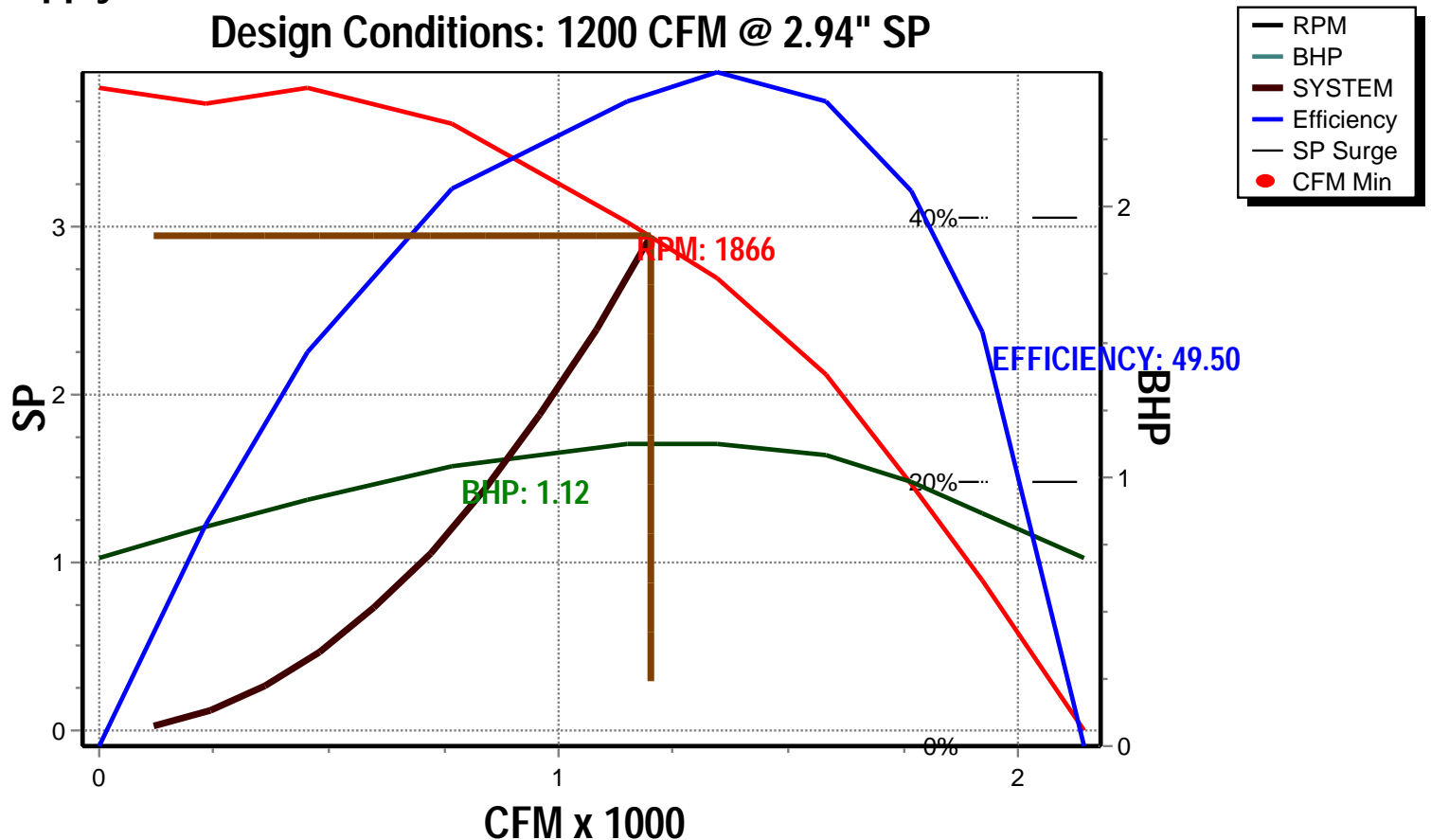
## FAN SOUND POWER (Inlet/Outlet):

| Octave Band:                 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
|------------------------------|----|----|----|----|----|----|----|----|
| (Re 10 <sup>-12</sup> watts) | 85 | 83 | 86 | 84 | 78 | 76 | 74 | 69 |
|                              | 85 | 83 | 86 | 84 | 78 | 76 | 74 | 69 |

SOUND POWER A-Weighted: 87 / 87 dB

Max Duct SP with Blocked Airway: 3.8 in. Wg. @ 1866 rpm

## Supply Fan Model: RQ185D60-VFD @ 1866 RPM and 100% Width Design Conditions: 1200 CFM @ 2.94" SP





# Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

**RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB**

Tag: HP-4

Job Name:  
Job Number:

VA Long Beach  
Job #16

Unit Submittal For:  
Unit Submittal Date:

August 20, 2015

|            | Base Option               | Description  |
|------------|---------------------------|--|
| <b>R</b>   | Series                    | Roof Top Unit  |
| <b>Q</b>   | Generation                | Tenth Generation   |
| <b>003</b> | Unit Size                 | Three  |
| <b>9</b>   | Voltage                   | 208V1Ø/60Hz  |
| <b>H</b>   | Interior Protection       | Horizontal Discharge and Return                                    |
| <b>E</b>   | Refrigerant Style         | R-410A Variable Capacity Scroll Compressor (VCC) - High Efficiency |
| <b>6</b>   | Unit Configuration        | Air-Source Heat Pump   |
| <b>1</b>   | Coil Coating              | Polymer E-Coated Evap. and Cond. Coils                             |
| <b>9</b>   | Cooling/Heat Pump Staging | Modulating Heat Pump + No Auxiliary Heat - 1 VCC                   |
| <b>0</b>   | Heating Type              | No Heating   |
| <b>0</b>   | Heating Designation       | No Heating   |
| <b>0</b>   | Heating Staging           | No Heating   |

|          | Feature Option                 | Description  |
|----------|--------------------------------|--|
| <b>A</b> | 1A. RA/OA Section              | Economizer   |
| <b>0</b> | 1B. RA/EA Blower Configuration | Standard - None  |
| <b>0</b> | 1C. RA/EA Blower               | Standard - None  |
| <b>0</b> | 1D. RA/EA Blower Motor         | Standard - None  |
| <b>D</b> | 2. OA Control                  | Fully Modulating Actuator - Enthalpy Limit                                       |
| <b>0</b> | 3. Heat Options                | Standard   |
| <b>0</b> | 4. Maintenance Options         | Standard   |
| <b>Q</b> | 5A. SA Blower Configuration    | 1 Blower + Inverter Rated 3 Phase Motor + VFD                                    |
| <b>K</b> | 5B. SA Blower                  | 19" Direct Drive Backward Curved Plenum - 60% Width                              |
| <b>C</b> | 5C. SA Motor                   | 1 HP 1750 rpm  |
| <b>E</b> | 6A. Pre Filter Type            | 2" Pleated unit Pre Filter and Metal Mesh OA Filters                             |
| <b>H</b> | 6B. Unit Filter Type           | 4" Pleated - 95% Eff - MERV 14   |
| <b>C</b> | 6C. Filter Options             | Clogged Filter Switch + Magnehelic Gauge   |
| <b>0</b> | 7. Refrigeration Control       | Standard - Fixed 55°F Comp. Cooling Lock Out + Adjustable Comp. Heating Lock Out |
| <b>0</b> | 8. Refrigeration Options       | Standard   |
| <b>E</b> | 9. Refrigeration Accessories   | ECM Condenser Fan - Head Pressure Control  |
| <b>0</b> | 10. Power Options              | Standard Power Block   |
| <b>0</b> | 11. Safety Options             | Standard   |
| <b>0</b> | 12. Controls                   | Standard   |
| <b>Z</b> | 13. Special Controls           | Constant Volume (CV) Heat Pump Unit Controller - CV Cool + CV Heat               |
| <b>0</b> | 14A. Preheat Configuration     | Standard - None  |
| <b>0</b> | 14B. Preheat Sizing            | Standard - None  |
| <b>0</b> | 15. Glycol Percent             | Water or No WSHP   |
| <b>0</b> | 16. Interior Cabinet Options   | Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan        |
| <b>0</b> | 17. Exterior Cabinet Options   | Standard   |
| <b>0</b> | 18. Customer Code              | Standard   |
| <b>0</b> | 19. Code Options               | Standard - ETL U.S.A. Listing  |
| <b>0</b> | 20. Crating                    | Standard   |
| <b>0</b> | 21. Water-Cooled Cond.         | Standard - None  |
| <b>A</b> | 22. Control Vendors            | WattMaster VCM-X Controls  |
| <b>B</b> | 23. Type                       | Standard - Includes AAON Gray Paint  |





# VCMX Components

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB

Tag: HP-4

Job Name:

VA Long Beach

VCMX For:

Job Number:

Job #16

VCMX Date:

August 20, 2015

## Hardware Included For VCMX Controller

| Part # | Included Parts                           | Assigned Channel         |
|--------|--|--------------------------|
| V07150 | VCMX Controller with EBUS                |                          |
| V38390 | Suction Pressure Transducer              | MainController\AI5       |
| P94320 | Space Temp Sensor - Field Installed      | MainController\AI1       |
| R82890 | Supply Air Temp Sensor - Field Installed | MainController\AI2       |
| R81550 | Outside Air Temp Sensor                  | MainController\AI4       |
| R69190 | VCMX Large Expansion Module              |                          |
| R34700 | Outside Air Humidity Sensor              | LargeExpansionModule\AI1 |
| R62330 | Proof of Flow Sensor                     | LargeExpansionModule\BI3 |
| R64580 | Dirty Filter Sensor                      | LargeExpansionModule\BI2 |
| V20660 | VCMX Head Pressure Module                |                          |
| V38410 | Head Pressure Sensor                     |                          |

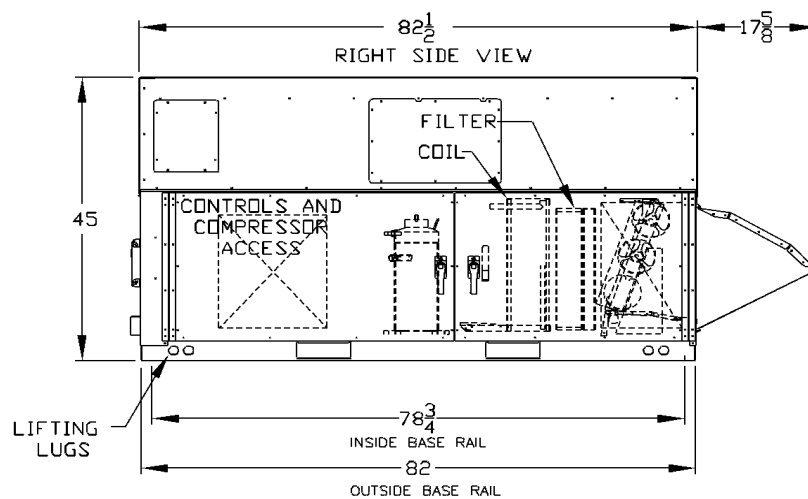
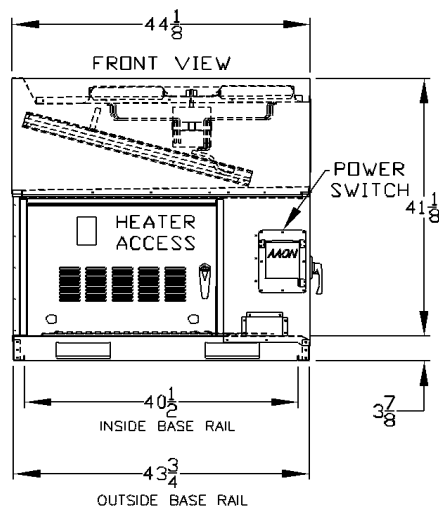
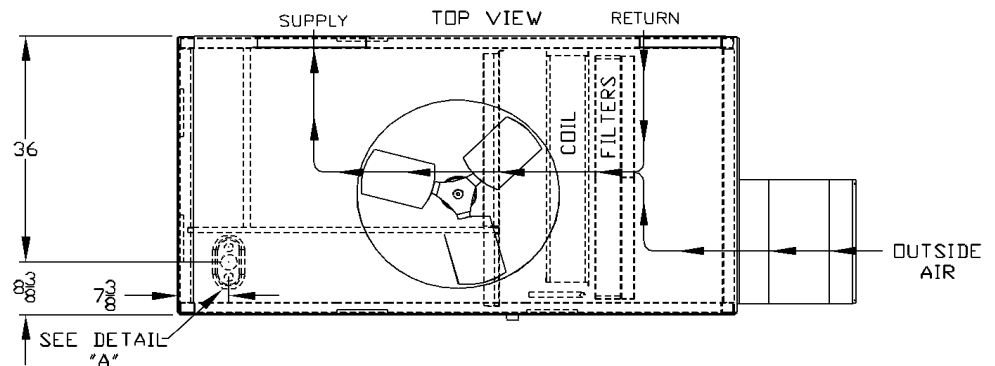
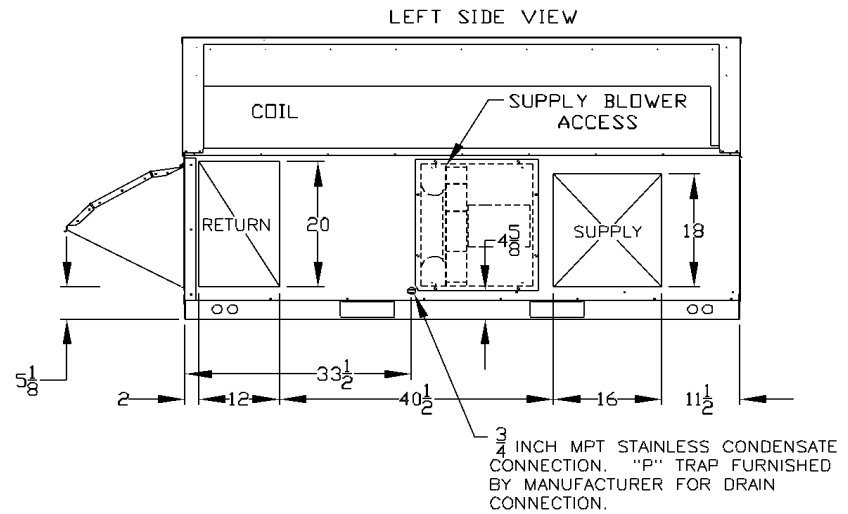
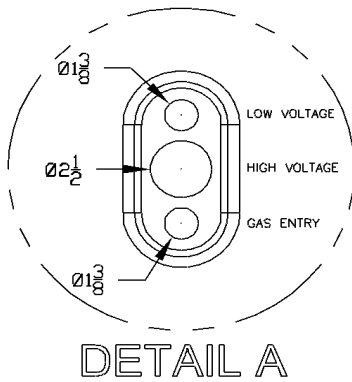
|                           | 1                 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------|-------------------|---|---|---|---|---|---|
| VCMX Controller with EBUS | Analog In         | X | X |   | X | X |   |
|                           | Analog Out        | X | X |   |   |   |   |
|                           | Binary In         |   |   |   |   |   |   |
|                           | Relay Out         | X | X | X | X |   |   |
|                           | Digital Sensor(s) |   |   |   |   |   |   |

|                             | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------------------|------------|---|---|---|---|---|---|---|
| VCMX Large Expansion Module | Analog In  | X |   |   |   |   |   |   |
|                             | Analog Out |   |   | X |   |   |   |   |
|                             | Binary In  |   | X | X |   |   |   |   |
|                             | Relay Out  |   |   |   |   |   |   |   |

# RQ CABINET ECONOMIZER HORIZONTAL ~ 1-6 TON

## CLEARANCES

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

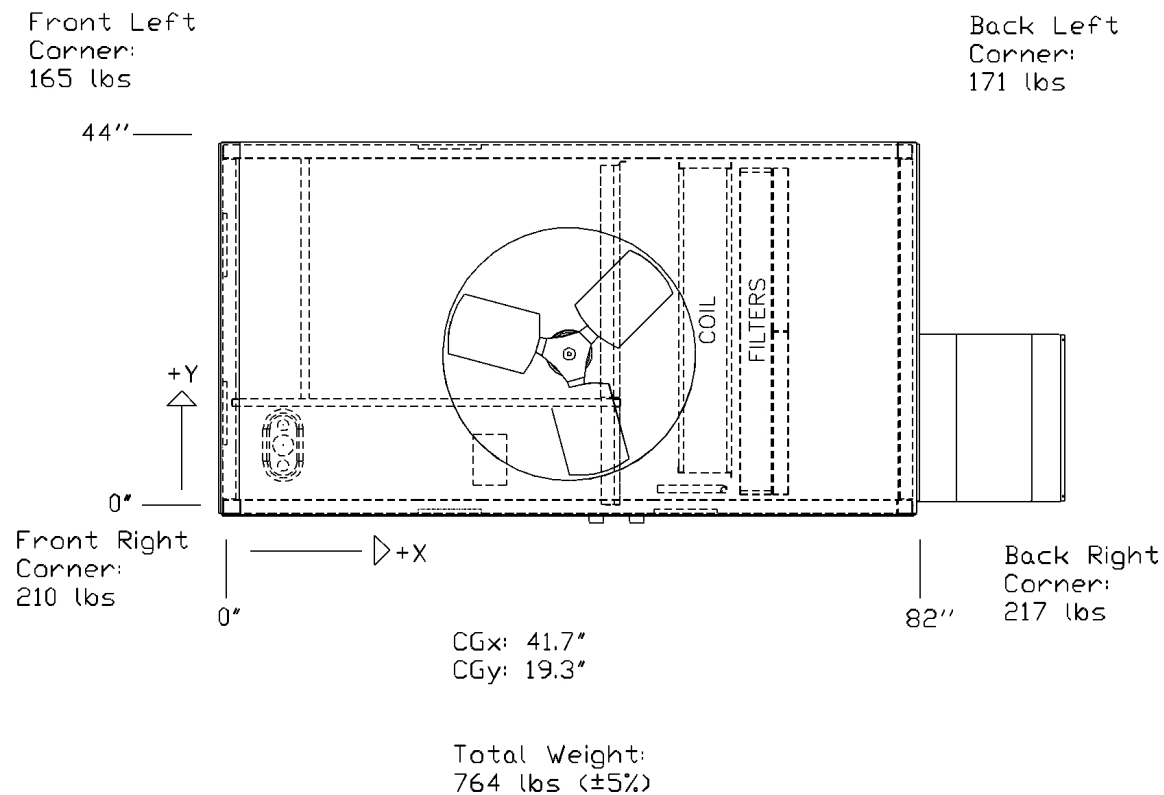


RQ-00011 REV:C 04/05/12 JRL  
NOTE: ALL DIMENSIONS ARE IN INCHES

# RQ CABINET HORIZONTAL AIR COOLED CONDENSING UNIT



RQ-003-9-H-E619-000:A000-D00-QKC-EHC-00E000Z-00-0000000AB



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



# Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

**RQ-005-9-H-E619-000:A000-D00-QKD-EHC-00E000Z-00-0000000AB**

Tag: HP-5

## Job Information

Job Name: VA Long Beach  
Job Number: Job #16  
Site Altitude: 0 ft  
Refrigerant: R-410A

## Static Pressure

External: 1.50 in. wg.  
Evaporator: 0.27 in. wg.  
Filters Clean: 0.38 in. wg.  
Dirt Allowance: 0.75 in. wg.

## Cooling Section

|                               | Gross                                 | Net         |
|-------------------------------|---------------------------------------|-------------|
| Total Capacity:               | 57.36                                 | 52.16 MBH   |
| Sensible Capacity:            | 45.85                                 | 40.64 MBH   |
| Latent Capacity:              | 11.52 MBH                             |             |
| Mixed Air Temp:               | 76.82 °F DB                           | 63.34 °F WB |
| Entering Air Temp:            | 76.82 °F DB                           | 63.34 °F WB |
| Lv Air Temp (Coil):           | 50.93 °F DB                           | 50.73 °F WB |
| Lv Air Temp (Unit):           | 53.81 °F DB                           | 51.97 °F WB |
| Digital Comp. Capacity Ratio: | 100%                                  |             |
| Supply Air Fan:               | 1 x RQ185D60-VFD @ 1.67 BHP           |             |
| SA Fan RPM / Width:           | 2140 / 1.750"                         |             |
| Evaporator Coil:              | 5.3 ft <sup>2</sup> / 4 Rows / 14 FPI |             |
| Evaporator Face Velocity:     | 314.3 fpm                             |             |

## Rating Information

Application EER @ Op. Conditions: 8.6

## Electrical Data

Rating: 208/1/60  
Unit FLA: 41

|                 | Qty | HP    | VAC |
|-----------------|-----|-------|-----|
| Compressor 1:   | 1   |       | 208 |
| Condenser Fans: | 1   | 0.333 | 208 |
| Supply Fan:     | 1   | 2.00  | 208 |

## Cabinet Sound Power Levels\*

| Octave Bands:     | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|-------------------|----|-----|-----|-----|------|------|------|------|
| Discharge LW(dB): | 87 | 87  | 88  | 86  | 79   | 76   | 73   | 69   |
| Return LW(dB):    | 83 | 83  | 78  | 73  | 71   | 66   | 58   | 51   |

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

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

## Unit Information

Approx. Op./Ship Weights: 864 / 864 lbs. (±5%)  
Supply CFM/ESP: 1650 / 1.5 in. wg.  
Pre-Filter FV / Qty: 297.00 fpm / 2  
Final Filter FV / Qty: 297.00 fpm / 2  
Outside CFM: 150  
Ambient Temperature: 95 °F DB / 75 °F WB  
Return Temperature: 75 °F DB / 62 °F WB

Economizer: 0.24 in. wg.  
Heating: 0.00 in. wg.  
Cabinet: 0.10 in. wg.  
Total: 3.24 in. wg.

## Heating Section(\*\*)

Primary Heat Type: Heat Pump  
Total Capacity: 50.8 MBH  
Integrated Heat Capacity: 44.3 MBH  
OA Temp: 33.0 DB / 26.0°F WB  
RA Temp: 75.0 °F DB / 62.0 °F WB  
Entering Air Temp: 71.2 DB / 59.5 °F WB  
Leaving Air Temp: 96.1 DB / 67.9°F WB  
Auxiliary Heat Type: No Heat  
Heating CFM: 1650  
Fan Temp Rise: 2.9 °F

Application COP<sub>H</sub> @ Op. Conditions: 2.59

Minimum Circuit Amp: 48  
Maximum Overcurrent: 70

| Phase | RPM  | FLA | RLA  |
|-------|------|-----|------|
| 1     |      |     | 25.6 |
| 1     | 1110 | 2.8 |      |
| 3     | 1760 | 7.5 |      |



# Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

RQ-005-9-H-E619-000:A000-D00-QKD-EHC-00E000Z-00-0000000AB  
Tag: HP-5

## Job Information

Job Name: VA Long Beach  
OA CFM: 150

Job Number: Job #16  
SA CFM: 1650

## Performance Data Table

| Outside Air |       | Mixed Air |       | Leaving Air |       | Heat Pump Capacity | Heat Pump Integrated Capacity | Heating COP |
|-------------|-------|-----------|-------|-------------|-------|--------------------|-------------------------------|-------------|
| DB °F       | WB °F | DB °F     | WB °F | DB °F       | WB °F | MBH                | MBH                           |             |
| 62.0        | 56.2  | 73.8      | 61.5  | 116.3       | 74.6  | 75.2               | 75.2                          | 3.51        |
| 57.0        | 51.6  | 73.4      | 61.1  | 113.1       | 73.5  | 70.3               | 70.3                          | 3.43        |
| 52.0        | 47.1  | 72.9      | 60.8  | 110.1       | 72.6  | 66.0               | 66.0                          | 3.34        |
| 47.0        | 42.6  | 72.5      | 60.5  | 107.3       | 71.7  | 61.9               | 61.9                          | 3.24        |
| 42.0        | 38.0  | 72.0      | 60.2  | 104.6       | 70.8  | 57.9               | 57.9                          | 3.14        |
| 37.0        | 33.5  | 71.6      | 60.0  | 97.8        | 68.7  | 54.3               | 46.6                          | 2.65        |
| 32.0        | 28.8  | 71.1      | 59.7  | 95.7        | 68.0  | 50.2               | 43.8                          | 2.58        |
| 27.0        | 24.3  | 70.6      | 59.5  | 94.0        | 67.4  | 46.8               | 41.5                          | 2.52        |
| 22.0        | 19.7  | 70.2      | 59.2  | 92.1        | 66.7  | 43.5               | 39.1                          | 2.45        |
| 17.0        | 15.0  | 69.7      | 59.0  | 90.5        | 66.2  | 40.8               | 37.1                          | 2.39        |
| 12.0        | 10.4  | 69.3      | 58.8  | 88.5        | 65.5  | 37.4               | 34.3                          | 2.30        |
| 7.0         | 5.7   | 68.8      | 58.6  | 86.6        | 64.8  | 34.4               | 31.7                          | 2.20        |
| 2.0         | 0.1   | 68.4      | 58.4  | 84.7        | 64.2  | 31.7               | 29.2                          | 2.10        |

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



# 18.5" STAR Plenum

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

## JOB INFORMATION:

Job Name: VA Long Beach  
Job Tag: HP-5  
Rep Firm:  
Date: 10/30/2015  
10/30/2015

## WHEEL SPECIFICATION:

Max RPM: 2,200  
Diameter x Qty: 18.5 in. x 1  
CFM: 1650  
Tip Speed: 10,365 FPM  
Inertia: 10,365 FPM

## OPERATING CONDITIONS:

Air Flow: 1,650 CFM  
Static Pressure: 3.24 in. Wg.  
Relief Dampers DP: 0.00 in. Wg.

TSP: 3.24 in. Wg.  
Site Altitude: 0.00 Ft  
TSP @ Sea Level: 3.24 in. Wg.

## MOTOR SELECTION:

Rated HP / Bypass: 2 / No  
Frame Size: 48  
Nominal RPM: 1760  
VAC/PH/HZ: 208/1/60  
Efficiency: Standard / 0.815  
Enclosure Type: ODP  
Max Inertial Load: 27 WR<sup>2</sup>

## FAN PERFORMANCE:

RPM: 2140  
BHP: 1.67  
Efficiency: 50.5%  
In/Out Velocity: / FPM  
Plenum Out Velocity: 27 FPM

## FAN SOUND POWER (Inlet/Outlet):

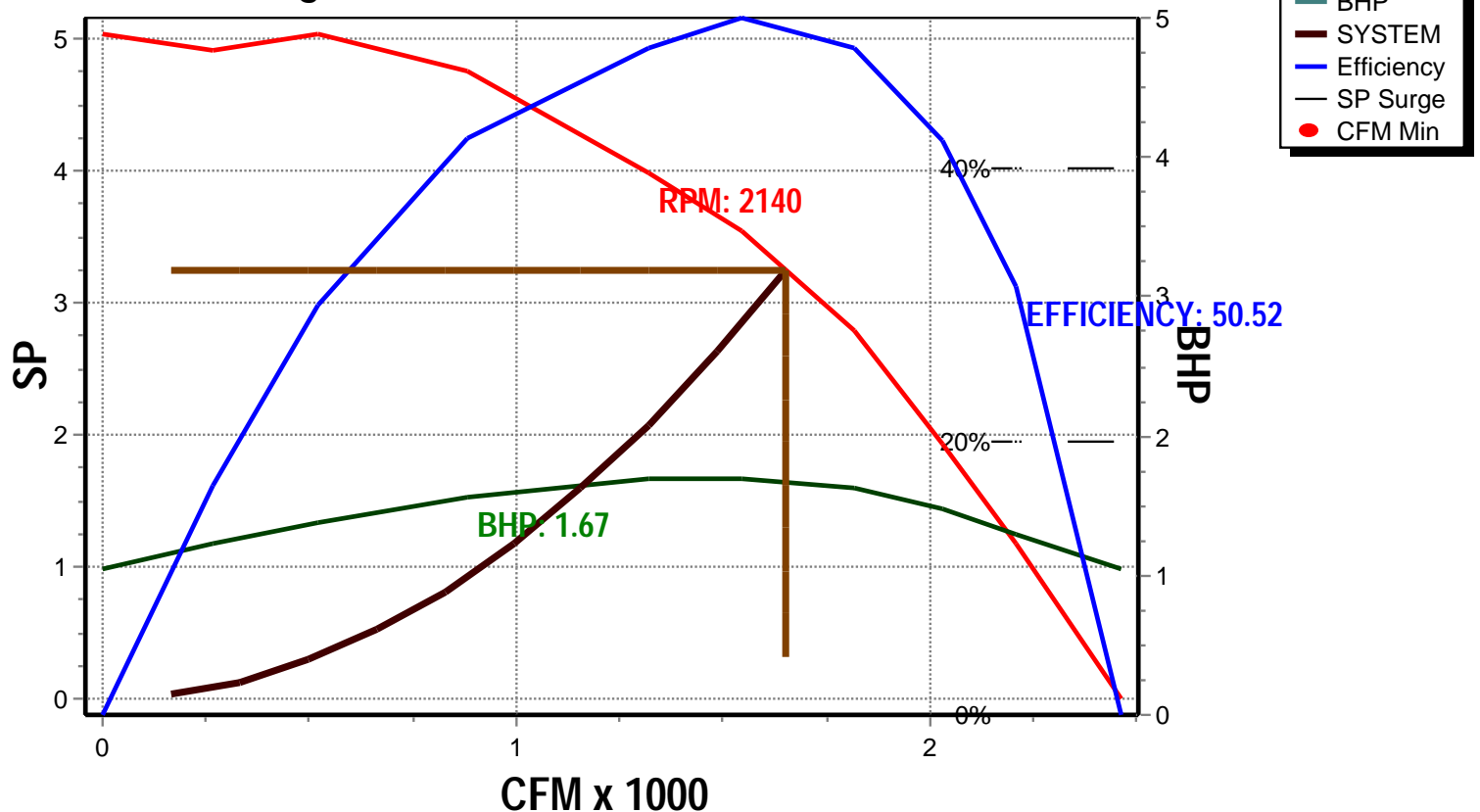
| Octave Band: | (Re 10 <sup>-12</sup> watts) |    |    |    |    |    |    |    |
|--------------|------------------------------|----|----|----|----|----|----|----|
|              | 1                            | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
|              | 87                           | 87 | 88 | 87 | 82 | 79 | 77 | 72 |
|              | 87                           | 87 | 88 | 87 | 82 | 79 | 77 | 72 |

SOUND POWER A-Weighted: 90 / 90 dB

Max Duct SP with Blocked Airway: 5 in. Wg. @ 2140 rpm

## Supply Fan Model: RQ185D60-VFD @ 2140 RPM and 100% Width

Design Conditions: 1650 CFM @ 3.24" SP





# Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

**RQ-005-9-H-E619-000:A000-D00-QJD-EHC-00E000Z-00-0000000AB**

Tag: HP-5

Job Name:  
Job Number:

VA Long Beach  
Job #16

Unit Submittal For:  
Unit Submittal Date:

August 20, 2015

|            | Base Option               | Description  |
|------------|---------------------------|--|
| <b>R</b>   | Series                    | Roof Top Unit  |
| <b>Q</b>   | Generation                | Tenth Generation   |
| <b>005</b> | Unit Size                 | Five   |
| <b>9</b>   | Voltage                   | 208V1Ø/60Hz  |
| <b>H</b>   | Interior Protection       | Horizontal Discharge and Return                                    |
| <b>E</b>   | Refrigerant Style         | R-410A Variable Capacity Scroll Compressor (VCC) - High Efficiency |
| <b>6</b>   | Unit Configuration        | Air-Source Heat Pump   |
| <b>1</b>   | Coil Coating              | Polymer E-Coated Evap. and Cond. Coils                             |
| <b>9</b>   | Cooling/Heat Pump Staging | Modulating Heat Pump + No Auxiliary Heat - 1 VCC                   |
| <b>0</b>   | Heating Type              | No Heating   |
| <b>0</b>   | Heating Designation       | No Heating   |
| <b>0</b>   | Heating Staging           | No Heating   |

|          | Feature Option                 | Description  |
|----------|--------------------------------|--|
| <b>A</b> | 1A. RA/OA Section              | Economizer   |
| <b>0</b> | 1B. RA/EA Blower Configuration | Standard - None  |
| <b>0</b> | 1C. RA/EA Blower               | Standard - None  |
| <b>0</b> | 1D. RA/EA Blower Motor         | Standard - None  |
| <b>D</b> | 2. OA Control                  | Fully Modulating Actuator - Enthalpy Limit                                       |
| <b>0</b> | 3. Heat Options                | Standard   |
| <b>0</b> | 4. Maintenance Options         | Standard   |
| <b>Q</b> | 5A. SA Blower Configuration    | 1 Blower + Inverter Rated 3 Phase Motor + VFD                                    |
| <b>J</b> | 5B. SA Blower                  | 19" Direct Drive Backward Curved Plenum  |
| <b>D</b> | 5C. SA Motor                   | 2 HP 1760 rpm  |
| <b>E</b> | 6A. Pre Filter Type            | 2" Pleated unit Pre Filter and Metal Mesh OA Filters                             |
| <b>H</b> | 6B. Unit Filter Type           | 4" Pleated - 95% Eff - MERV 14   |
| <b>C</b> | 6C. Filter Options             | Clogged Filter Switch + Magnehelic Gauge   |
| <b>0</b> | 7. Refrigeration Control       | Standard - Fixed 55°F Comp. Cooling Lock Out + Adjustable Comp. Heating Lock Out |
| <b>0</b> | 8. Refrigeration Options       | Standard   |
| <b>E</b> | 9. Refrigeration Accessories   | ECM Condenser Fan - Head Pressure Control  |
| <b>0</b> | 10. Power Options              | Standard Power Block   |
| <b>0</b> | 11. Safety Options             | Standard   |
| <b>0</b> | 12. Controls                   | Standard   |
| <b>Z</b> | 13. Special Controls           | Constant Volume (CV) Heat Pump Unit Controller - CV Cool + CV Heat               |
| <b>0</b> | 14A. Preheat Configuration     | Standard - None  |
| <b>0</b> | 14B. Preheat Sizing            | Standard - None  |
| <b>0</b> | 15. Glycol Percent             | Water or No WSHP   |
| <b>0</b> | 16. Interior Cabinet Options   | Standard - Double Wall + R-13 Foam Insulation + Stainless Steel Drain Pan        |
| <b>0</b> | 17. Exterior Cabinet Options   | Standard   |
| <b>0</b> | 18. Customer Code              | Standard   |
| <b>0</b> | 19. Code Options               | Standard - ETL U.S.A. Listing  |
| <b>0</b> | 20. Crating                    | Standard   |
| <b>0</b> | 21. Water-Cooled Cond.         | Standard - None  |
| <b>A</b> | 22. Control Vendors            | WattMaster VCM-X Controls  |
| <b>B</b> | 23. Type                       | Standard - Includes AAON Gray Paint  |



# VCMX Components

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AAONEcat32 Ver. 4.233 (SN: 5624784-W8E0YPW1)

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

RQ-005-9-H-E619-000:A000-D00-QJD-EHC-00E000Z-00-0000000AB

Tag: HP-5

Job Name:

VA Long Beach

VCMX For:

Job Number:

Job #16

VCMX Date:

August 20, 2015

## Hardware Included For VCMX Controller

| Part # | Included Parts                           | Assigned Channel         |
|--------|--|--------------------------|
| V07150 | VCMX Controller with EBUS                |                          |
| V38390 | Suction Pressure Transducer              | MainController\AI5       |
| P94320 | Space Temp Sensor - Field Installed      | MainController\AI1       |
| R82890 | Supply Air Temp Sensor - Field Installed | MainController\AI2       |
| R81550 | Outside Air Temp Sensor                  | MainController\AI4       |
| R69190 | VCMX Large Expansion Module              |                          |
| R34700 | Outside Air Humidity Sensor              | LargeExpansionModule\AI1 |
| R62330 | Proof of Flow Sensor                     | LargeExpansionModule\BI3 |
| R64580 | Dirty Filter Sensor                      | LargeExpansionModule\BI2 |
| V20660 | VCMX Head Pressure Module                |                          |
| V38410 | Head Pressure Sensor                     |                          |

|                           | 1                 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------|-------------------|---|---|---|---|---|---|
| VCMX Controller with EBUS | Analog In         | X | X |   | X | X |   |
|                           | Analog Out        | X | X |   |   |   |   |
|                           | Binary In         |   |   |   |   |   |   |
|                           | Relay Out         | X | X | X | X |   |   |
|                           | Digital Sensor(s) |   |   |   |   |   |   |

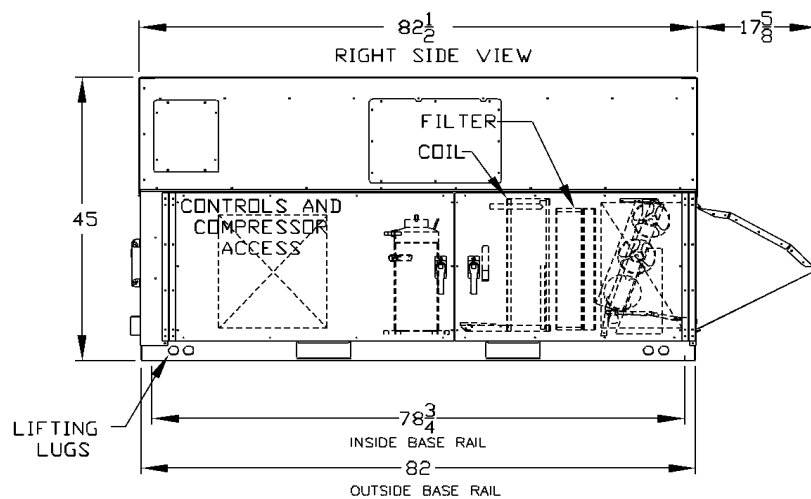
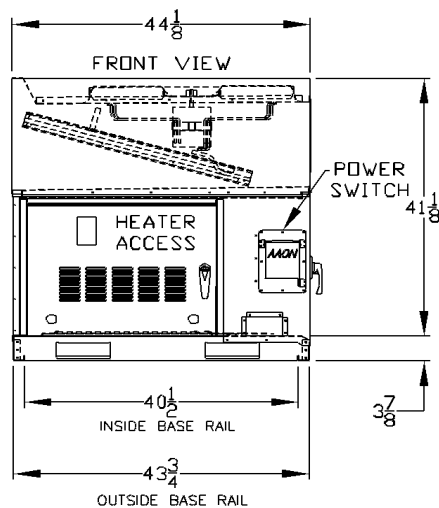
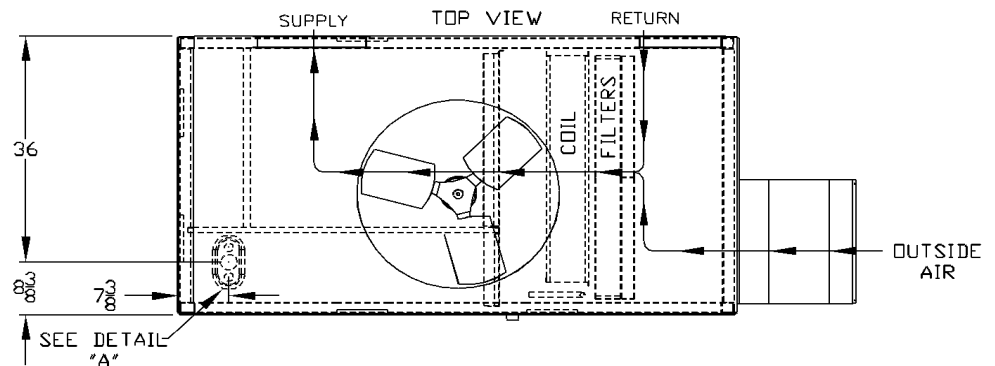
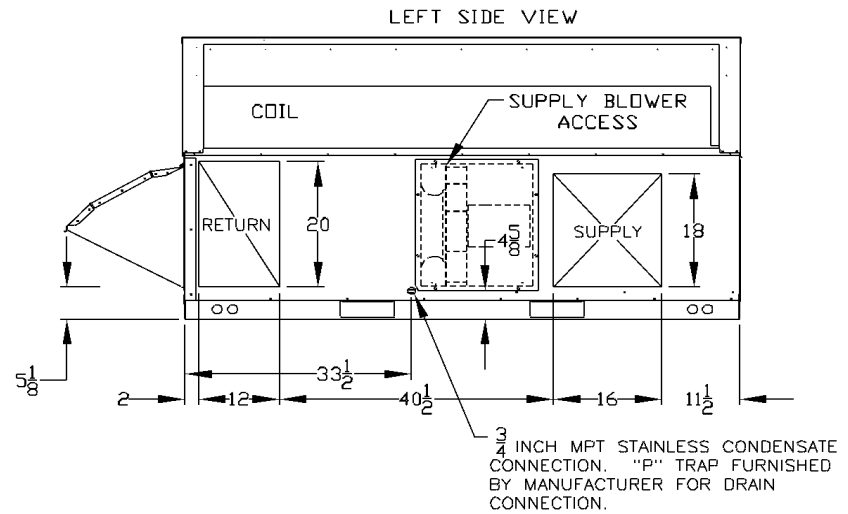
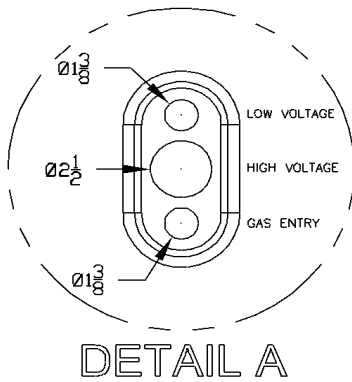
|                             | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------------------|------------|---|---|---|---|---|---|---|
| VCMX Large Expansion Module | Analog In  | X |   |   |   |   |   |   |
|                             | Analog Out |   |   | X |   |   |   |   |
|                             | Binary In  |   | X | X |   |   |   |   |
|                             | Relay Out  |   |   |   |   |   |   |   |



# RQ CABINET ECONOMIZER HORIZONTAL ~ 1-6 TON

## CLEARANCES

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



RQ-00011 REV:C 04/05/12 JRL  
NOTE: ALL DIMENSIONS ARE IN INCHES

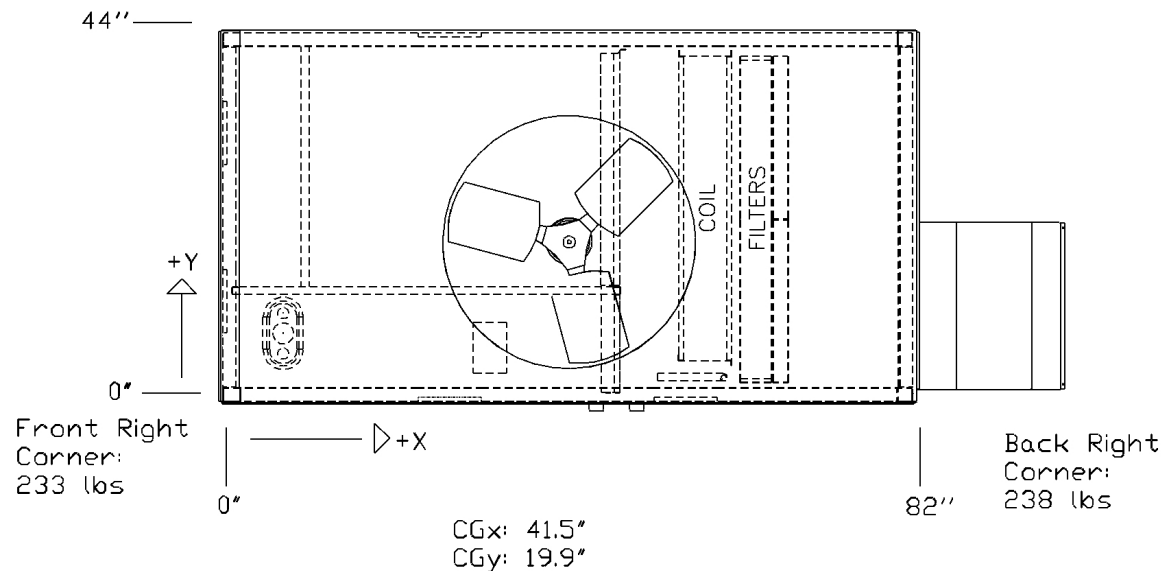
# RQ CABINET HORIZONTAL AIR COOLED CONDENSING UNIT



RQ-005-9-H-E619-000:A000-D00-QJD-EHC-00E000Z-00-0000000AB

Front Left  
Corner:  
194 lbs

Back Left  
Corner:  
198 lbs



Total Weight:  
864 lbs ( $\pm 5\%$ )

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




## Detail Report

| Report information                    |          |
|---------------------------------------|----------|
| Report generated date                 | 10-23-15 |
| Systems/tags included in this report: | H-1, H-2 |

| Project Information |                             |
|---------------------|-----------------------------|
| Project name        | TTG - Pasadena - VA Phoenix |
| Project description | VA Phoenix                  |
| Project status      | Open                        |
| Project phase       | Design                      |
| Project location    |                             |
| Unit of measure     | Inch-pound                  |

### System/tag H-1

#### System images

|   |  |   |
|---|--|---|
| <p>Vapormist humidifier</p>  | <p>Rapid-sorb steam dispersion</p>  | <p>Vapor-logic controller</p>  |
|---|--|---|

#### Steam generator dimensions and clearances

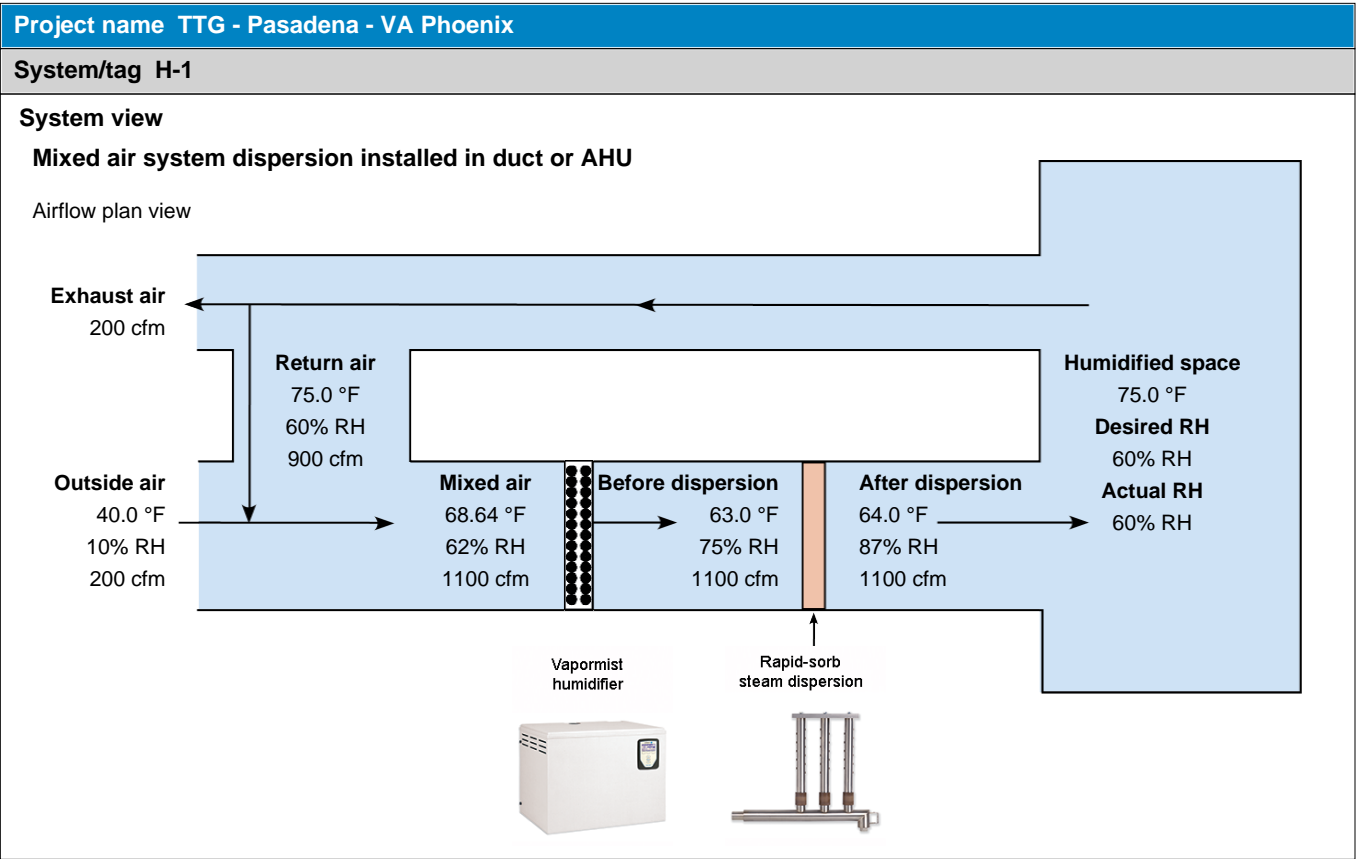
| Dimensions (in.) |      |      | Clearances (in.) |    |    |    |    |
|------------------|------|------|------------------|----|----|----|----|
| A                | B    | C    | D                | E  | F  | H  | I  |
| 18.6             | 16.1 | 24.2 | 36               | 36 | 18 | 12 | 24 |

#### Dispersion dimensions

An isometric line drawing of a laboratory dispersion system. It features a horizontal base plate with a total length dimensioned as 'A'. Five vertical glass tubes are mounted on the base. Each tube has a bulb at the bottom and a long, narrow neck. The necks are connected to a horizontal manifold at the top. The height of the manifold above the base is dimensioned as 'B'. The manifold has five vertical ports, each with a stopcock (tap) at the top. The tubes are positioned at regular intervals along the length of the manifold.

| Dimensions (in.) |      |   |
|------------------|------|---|
| A                | B    | C |
| 19.0             | 21.0 | 2 |

Detail Report



## Detail Report

| System/tag H-1, continued                                 |   |
|---|---|
| Application   |   |
| Elevation at project site (ft)                            | 1106.0  |
| Ventilation system type                                   | Mixed Air System,<br>Dispersion Installed<br>In Duct Or AHU |
| Outside air dry bulb temperature (°F)                     | 40.0  |
| Outside air moisture content (%RH)                        | 10.0  |
| Outside air intake rate                                   | Constant  |
| Outside air intake (%)                                    | 18.181818181818183  |
| Total air volume (cfm)                                    | 1100  |
| Desired air dry bulb temperature (°F) in humidified space | 75.0  |
| Desired air moisture content (% RH) in humidified space   | 60.0  |
| Actual moisture content (% RH) in humidified space        | 60.0  |
| Non-wetting distance (inches)                             | 6   |
| Calculated load   | Calculated  |
| Load (lbs/hr)   | 9.28  |
| Load plus loss (lbs/hr)                                   | 10.42   |
| Interconnecting piping type                               | Insulated Piping  |
| Interconnecting piping distance(ft)                       | 20.0  |
| Dispersion installation location                          | Duct  |
| Airflow direction   | Horizontal  |
| Airflow pressure drop (inches w.c.)                       | 0.012   |
| Duct dry bulb temp before dispersion (°F)                 | 63.0  |
| Duct RH before dispersion (%)                             | 75  |
| Duct dry bulb temp after dispersion (°F)                  | 64.0  |
| Duct RH after dispersion (%)                              | 87  |

| Application, continued                |                               |
|---------------------------------------|-------------------------------|
| Heat gain from steam (°F)             | 0.5                           |
| Heat gain from assembly (°F)          | 0.46                          |
| Steam dispersion                      |                               |
| Dispersion product                    | Rapid-sorb                    |
| Dispersion model                      | 1.5"                          |
| Tube Size                             | 1.5"                          |
| Unit quantity                         | 1                             |
| Header location                       | Outside Duct                  |
| Trap location                         | Outside Duct                  |
| Air movement                          | Through Dispersion<br>Assmbly |
| Face width (inches)                   | 16.0                          |
| Face height (inches)                  | 12                            |
| Header diameter                       | 2                             |
| Overall dimensions W x H x L (inches) | 19 X 21 X 2                   |
| Air velocity (ft/min)                 | 825.0                         |
| Tube diameter (inches)                | 1.5                           |
| Tube spacing on-center (inches)       | 6                             |
| Tube quantity                         | 2                             |
| Header and tube material              | 304 Stainless Steel           |
| Duct plate material                   | Galvanized Steel              |
| Second set of duct plates             | No                            |
| High-Efficiency Insulated Tubes       | Yes                           |
| Steam valve material                  | Bronze                        |
| Ship unassembled                      | Yes                           |

## Detail Report

| System/tag H-1, continued   |                     |
|---|---------------------|
| Steam dispersion, continued   |                     |
| Operating weight (lbs)  | 25                  |
| Shipping weight (lbs)   | 32                  |
| Steam generation  |                     |
| Generation product  | Vapormist           |
| Generation model  | VM-4                |
| Unit quantity   | 1                   |
| System capacity (lbs/hr)  | 12.0                |
| Water type  | Potable             |
| Energy source   | Electricity         |
| Voltage (Vac)   | 480                 |
| Phase   | 3                   |
| Amps per unit(s)  | 7.2                 |
| Overall dimensions W x H x L (inches)   | 24 X 18 X 16        |
| Operating weight (lbs)  | 95                  |
| Shipping weight (lbs)   | 80                  |
| Tank material   | 304 Stainless Steel |
| End-of-season drain   | Yes                 |
| Seismic certified humidifier  | No                  |
| Notes   |                     |
| Minimum water conductivity of 30 uS/cm  |                     |
| Damage caused by chloride corrosion is not covered by your DriSteem warranty. |                     |
| Connections   |                     |
| Steam generator outlet connection type  | NPT                 |
| Steam generator outlet diameter (inches)                                      | 1.5                 |
| Dispersion steam inlet connection type  | NPT                 |
| Dispersion steam inlet diameter (inches)                                      | 1.5                 |




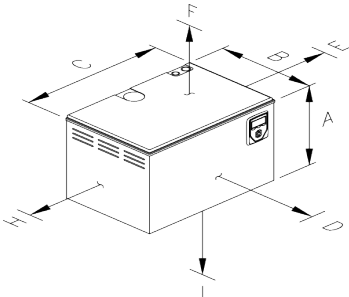
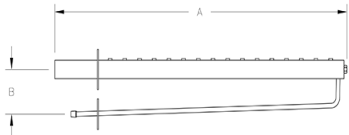
| Connections, continued           |                      |
|----------------------------------|----------------------|
| Dispersion same side piping      | No                   |
| Steam hose length (ft)           | 5                    |
| Hard pipe kit                    | Yes                  |
| Drip-tee kit                     | Yes                  |
| Control                          |                      |
| Humidifier controller            | Vapor-logic          |
| Multiple-tank control            | No                   |
| Operating mode                   | TP Modulation        |
| Interoperability                 | None                 |
| Keypad/display                   | Mounted Permanently  |
| Keypad/display cable (ft)        | 5                    |
| Keypad/display language          | English              |
| Keypad/display unit of measure   | Inch-pound           |
| Input signal type                | Humidity Transmitter |
| Remote temperature sensor        | No                   |
| Accessories                      |                      |
| Generation Condensate Pump       | None                 |
| Dispersion Condensate pump       | None                 |
| Generation Drane-kooler          | Yes                  |
| Generation Drane-kooler mounting | Floor Stand          |
| Dispersion Drane-kooler          | Yes                  |
| Dispersion Drane-kooler mounting | Wall Mount           |
| NEMA-1 safety switch             | No                   |
| High-limit humidistat            | Electric, Modulating |
| Airflow proving switch           | Electric Pressure    |

# Detail Report

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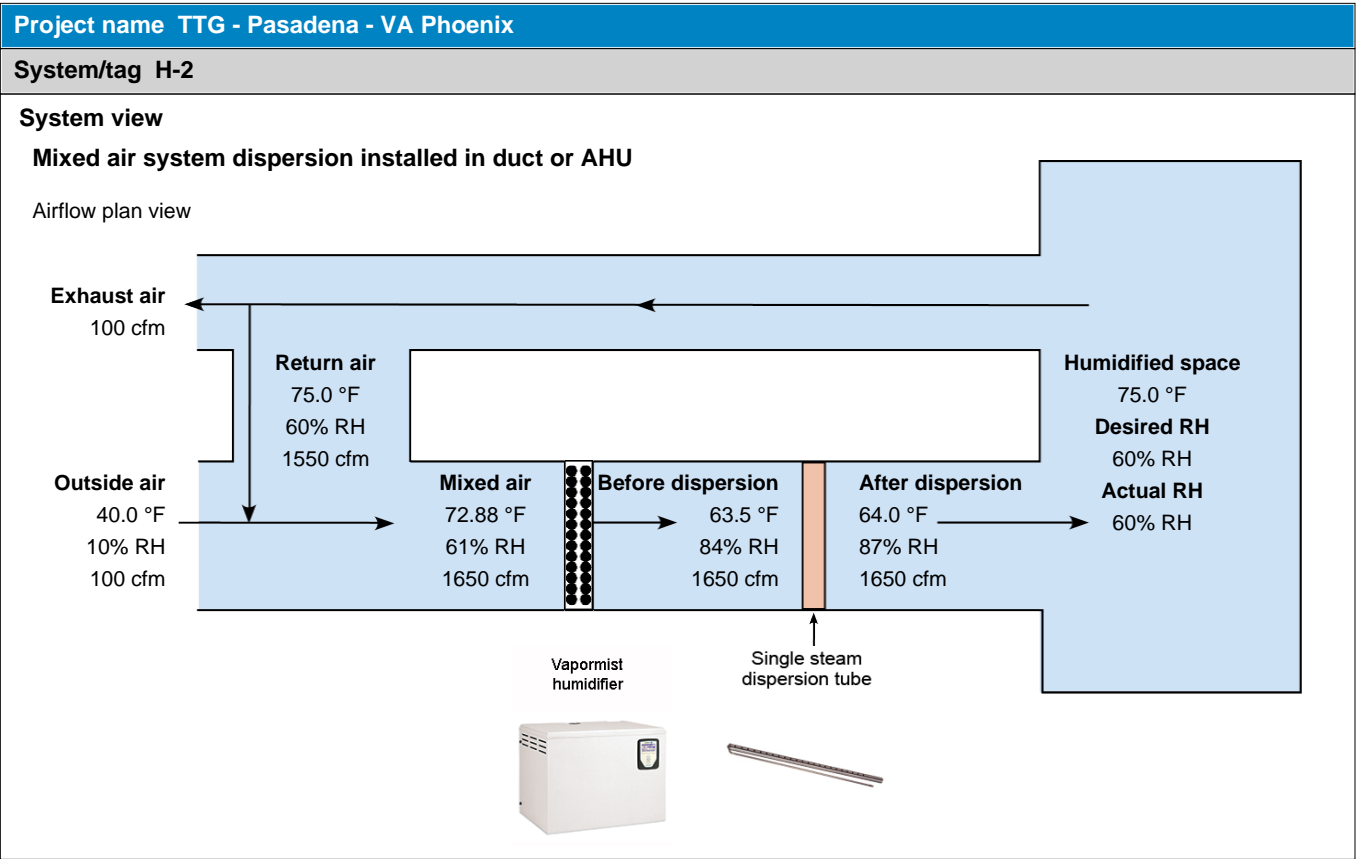
| System/tag H-1, continued |      |
|---------------------------|------|
| Accessories, continued    |      |
| Humidity transmitter      | Room |

# Detail Report

| System/tag H-2  |  |   |                  |    |    |                  |    |   |      |     |    |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |
|---|--|---|------------------|----|----|------------------|----|---|------|-----|----|---|---|---|---|---|---|---|------|------|------|----|----|----|----|----|
| System images   |  |   |                  |    |    |                  |    |   |      |     |    |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |
| <div>Vapormist humidifier</div>  | <div>Single steam dispersion tube</div>   | <div>Vapor-logic controller</div>  |                  |    |    |                  |    |   |      |     |    |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |
| Steam generator dimensions and clearances   |  |   |                  |    |    |                  |    |   |      |     |    |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |
|                                 | <table><tr><th colspan="3">Dimensions (in.)</th><th colspan="5">Clearances (in.)</th></tr><tr><th>A</th><th>B</th><th>C</th><th>D</th><th>E</th><th>F</th><th>H</th><th>I</th></tr><tr><td>18.6</td><td>16.1</td><td>24.2</td><td>36</td><td>36</td><td>18</td><td>12</td><td>24</td></tr></table> |   | Dimensions (in.) |    |    | Clearances (in.) |    |   |      |     | A  | B | C | D | E | F | H | I | 18.6 | 16.1 | 24.2 | 36 | 36 | 18 | 12 | 24 |
| Dimensions (in.)  |  |   | Clearances (in.) |    |    |                  |    |   |      |     |    |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |
| A   | B  | C   | D                | E  | F  | H                | I  |   |      |     |    |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |
| 18.6  | 16.1   | 24.2  | 36               | 36 | 18 | 12               | 24 |   |      |     |    |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |
| Dispersion dimensions   |  |   |                  |    |    |                  |    |   |      |     |    |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |
|                                | <table><tr><th colspan="3">Dimensions (in.)</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>20.0</td><td>5.1</td><td>NA</td></tr></table>  |   | Dimensions (in.) |    |    | A                | B  | C | 20.0 | 5.1 | NA |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |
| Dimensions (in.)  |  |   |                  |    |    |                  |    |   |      |     |    |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |
| A   | B  | C   |                  |    |    |                  |    |   |      |     |    |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |
| 20.0  | 5.1  | NA  |                  |    |    |                  |    |   |      |     |    |   |   |   |   |   |   |   |      |      |      |    |    |    |    |    |



Detail Report



## Detail Report

| System/tag H-2, continued                                 |   |
|---|---|
| Application   |   |
| Elevation at project site (ft)                            | 1106.0  |
| Ventilation system type                                   | Mixed Air System,<br>Dispersion Installed<br>In Duct Or AHU |
| Outside air dry bulb temperature (°F)                     | 40.0  |
| Outside air moisture content (%RH)                        | 10.0  |
| Outside air intake rate                                   | Constant  |
| Outside air intake (%)                                    | 6.0606060606060606  |
| Total air volume (cfm)                                    | 1650  |
| Desired air dry bulb temperature (°F) in humidified space | 75.0  |
| Desired air moisture content (% RH) in humidified space   | 60.0  |
| Actual moisture content (% RH) in humidified space        | 60.0  |
| Non-wetting distance (inches)                             | 6   |
| Calculated load   | Calculated  |
| Load (lbs/hr)   | 4.67  |
| Load plus loss (lbs/hr)                                   | 5.57  |
| Interconnecting piping type                               | Insulated Piping  |
| Interconnecting piping distance(ft)                       | 20.0  |
| Dispersion installation location                          | Duct  |
| Airflow direction   | Horizontal  |
| Airflow pressure drop (inches w.c.)                       | 0.0   |
| Duct dry bulb temp before dispersion (°F)                 | 63.5  |
| Duct RH before dispersion (%)                             | 84  |
| Duct dry bulb temp after dispersion (°F)                  | 64.0  |
| Duct RH after dispersion (%)                              | 87  |

| Application, continued                |                             |
|---------------------------------------|-----------------------------|
| Heat gain from steam (°F)             | 0.19                        |
| Heat gain from assembly (°F)          | 0.34                        |
| Steam dispersion                      |                             |
| Dispersion product                    | Single Dispersion Tube      |
| Dispersion model                      | 1.5"                        |
| Tube Size                             | 1.5"                        |
| Unit quantity                         | 1                           |
| Header location                       | Outside Duct                |
| Trap location                         | Outside Duct                |
| Air movement                          | Through Dispersion Assembly |
| Face width (inches)                   | 16.0                        |
| Face height (inches)                  | 12                          |
| Header diameter                       | NA                          |
| Overall dimensions W x H x L (inches) | 20 X 5 X NA                 |
| Air velocity (ft/min)                 | 825.0                       |
| Tube diameter (inches)                | 1.5                         |
| Tube spacing on-center (inches)       | 12                          |
| Tube quantity                         | 1                           |
| Header and tube material              | 304 Stainless Steel         |
| Duct plate material                   | Galvanized Steel            |
| Second set of duct plates             | No                          |
| High-Efficiency Insulated Tubes       | Yes                         |
| Steam valve material                  | Bronze                      |
| Ship unassembled                      | Yes                         |

## Detail Report

| System/tag H-2, continued   |                     |
|---|---------------------|
| Steam dispersion, continued   |                     |
| Operating weight (lbs)  | 11                  |
| Shipping weight (lbs)   | 14                  |
| Steam generation  |                     |
| Generation product  | Vapormist           |
| Generation model  | VM-4                |
| Unit quantity   | 1                   |
| System capacity (lbs/hr)  | 12.0                |
| Water type  | Potable             |
| Energy source   | Electricity         |
| Voltage (Vac)   | 480                 |
| Phase   | 3                   |
| Amps per unit(s)  | 7.2                 |
| Overall dimensions W x H x L (inches)   | 24 X 18 X 16        |
| Operating weight (lbs)  | 95                  |
| Shipping weight (lbs)   | 80                  |
| Tank material   | 304 Stainless Steel |
| End-of-season drain   | Yes                 |
| Seismic certified humidifier  | No                  |
| Notes   |                     |
| Minimum water conductivity of 30 uS/cm  |                     |
| Damage caused by chloride corrosion is not covered by your DriSteem warranty. |                     |
| Connections   |                     |
| Steam generator outlet connection type  | NPT                 |
| Steam generator outlet diameter (inches)                                      | 1.5                 |
| Dispersion steam inlet connection type  | NPT                 |
| Dispersion steam inlet diameter (inches)                                      | 1.5                 |

| Connections, continued           |                      |
|----------------------------------|----------------------|
| Dispersion same side piping      | No                   |
| Steam hose length (ft)           | 5                    |
| Hard pipe kit                    | Yes                  |
| Drip-tee kit                     | Yes                  |
| Control                          |                      |
| Humidifier controller            | Vapor-logic          |
| Multiple-tank control            | No                   |
| Operating mode                   | TP Modulation        |
| Interoperability                 | None                 |
| Keypad/display                   | Mounted Permanently  |
| Keypad/display cable (ft)        | 5                    |
| Keypad/display language          | English              |
| Keypad/display unit of measure   | Inch-pound           |
| Input signal type                | Humidity Transmitter |
| Remote temperature sensor        | No                   |
| Accessories                      |                      |
| Generation Condensate Pump       | None                 |
| Dispersion Condensate pump       | None                 |
| Generation Drane-kooler          | Yes                  |
| Generation Drane-kooler mounting | Floor Stand          |
| Dispersion Drane-kooler          | Yes                  |
| Dispersion Drane-kooler mounting | Wall Mount           |
| NEMA-1 safety switch             | No                   |
| High-limit humidistat            | Electric, Modulating |
| Airflow proving switch           | Electric Pressure    |

# Detail Report

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| System/tag H-2, continued |      |
|---------------------------|------|
| Accessories, continued    |      |
| Humidity transmitter      | Room |