

## PRODUCT SPECIFICATIONS

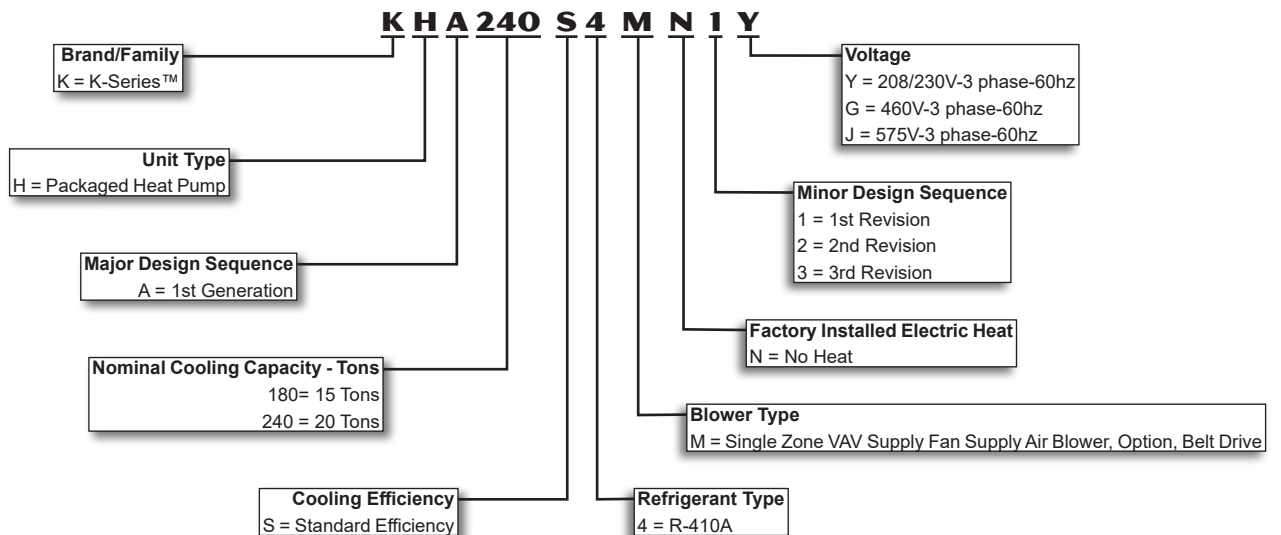
Bulletin No. KHA-180-240 (04/2019)



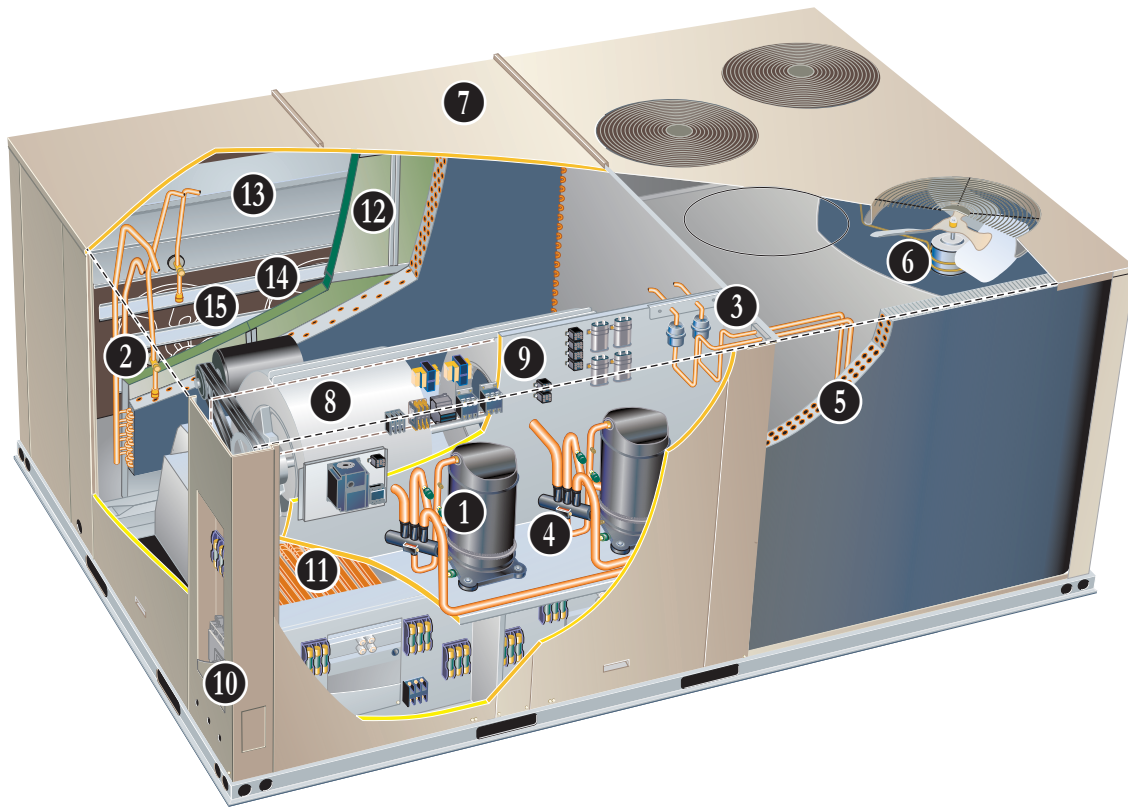
**ASHRAE 90.1  
COMPLIANT**

**15 and 20 Tons  
Net Cooling Capacity – 174,000 to 218,000 Btuh  
Optional Electric Heat - 15 to 90 kW**

## MODEL NUMBER IDENTIFICATION



## FEATURES AND BENEFITS



K-Series™ rooftop units from Allied are the new standard for reliable, efficient rooftop units built for long-lasting performance that can significantly improve indoor environments. K-Series™ rooftop units feature:

- **R-410A Refrigerant** - Environmentally friendly.
- **Scroll Compressors** - Single speed scroll compressors are furnished on all models.
- **Crankcase Heaters** - Protect compressors from refrigerant liquid migration in the off cycle improving product reliability.
- **High Pressure Switches** - Protect compressor.
- **Isolated Compressor Compartment** - Allows performance check during normal compressor operation without disrupting airflow.
- **Independent Outdoor Fan Motor Mounts** - Allows for easy and efficient service access without removing the top panel.
- **Single Zone VAV Supply Fan Blower Option** - Allows multi-staged air delivery.
- **Downflow Airflow** - Horizontal airflow with optional horizontal curb.
- **Two Fork Lift Slots on Three Sides** - Easy to pick up and transport units from almost any angle.
- **Corrosion-Resistant Removable, Drain Pan** - Provides application flexibility, durability and improved serviceability.
- **Thermostatic Check/Expansion Valves** - Provide peak cooling performance across the entire application range.
- **MERV 8 or MERV 13 Filters** - Available as field installed option, provide an enhanced level of indoor air quality, and can help the building qualify for additional LEED credits.
- **Common Components** - Many maintenance items are standard throughout the entire product line, reducing the need to carry different parts to the job or maintain in inventory.

## FEATURES AND BENEFITS

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### APPROVALS

Units are ETL listed.

Components bonded for grounding to meet safety standards for servicing required by UL, ULC and National and Canadian Electrical Codes.

All models are certified in accordance with the ULE certification program, which is based on AHRI Standard 340/360-2007.

All models are ASHRAE 90.1-2010 energy efficiency compliant and meet or exceed requirements of Section 6.8.

All models meet California Code of Regulations, Title 24 and ASHRAE 90.1-2010 Section 6.4.3.10 requirements for staged airflow.

ISO 9001 Registered Manufacturing Quality System.

### WARRANTY

Limited five years on compressors.

Limited five years Optional High Performance Economizers.

Limited one year all other covered components.

### COOLING / HEATING SYSTEM

Designed to maximize sensible and latent cooling performance at design conditions.

System can operate from 30°F to 125°F without any additional controls.

#### R-410A Refrigerant

Non-chlorine based, ozone friendly, R-410A.

#### 1 Scroll Compressors

Scroll compressors on all models for high performance, reliability and quiet operation.

Resiliently mounted on rubber grommets for quiet operation.

#### Compressor Crankcase Heaters

Protects against refrigerant migration that can occur during low ambient operation.

#### 2 Check/Thermal Expansion Valves

Assures optimal performance throughout the application range.

Removable element head.

#### 3 Filter/Driers

High capacity bi-flow filter/drier protects the system from dirt and moisture.

#### High Pressure Switches

Protects the compressor from overload conditions such as dirty condenser coils, blocked refrigerant flow, or loss of outdoor fan operation.

#### Defrost Control

Provides a defrost cycle, if needed, every 30 or 60 or 90 minutes (adjustable) of compressor “on” time at outdoor coil temperature below 35°F.

Pressure switch mounted on outdoor coil vapor line terminates defrost cycle.

#### 4 Reversing Valves

4-way interchange reversing valve effects a rapid change in direction of refrigerant flow resulting in quick changeover from cooling to heating and vice versa.

#### Freezestats

Protects the indoor coil from damaging ice build-up due to conditions such as low/no airflow, or low refrigerant charge.

#### 5 Coil Construction

Copper tube construction, enhanced rippled-edge aluminum fins, flared shoulder tubing connections, silver soldered construction for improved heat transfer. Factory leak tested.

#### Indoor Coil

Cross row circuiting with rifled copper tubing optimizes both sensible and latent cooling capacity.

#### Outdoor Coil

Two independent formed coils allows separation for cleaning.

#### Condensate Drain Pan

Plastic pan, sloped to meet drainage requirements of ASHRAE 62.1.

Side or bottom drain connections.

#### 6 Outdoor Coil Fan Motors

Thermal overload protected, totally enclosed, permanently lubricated ball bearings, shaft up, wire basket mount.

#### Outdoor Coil Fans

PVC coated fan guard furnished.

## FEATURES AND BENEFITS

### **COOLING / HEATING SYSTEM (continued)**

#### **Required Selections**

##### **Cooling Capacity**

Specify nominal cooling capacity of the unit.

#### **Options/Accessories**

##### **Field Installed**

##### **Condensate Drain Trap**

Available in copper or PVC.

##### **Drain Pan Overflow Switch**

Monitors condensate level in drain pan, shuts down unit if drain becomes clogged.

##### **Low Ambient Kit**

Cycles the outdoor fan while allowing compressor operation in the cooling cycle. This intermittent fan operation allows the system to operate without icing the indoor coil and losing capacity. Designed for use in ambient temperatures no lower than 0°F.

### **CABINET**

#### **7 Construction**

Heavy-gauge steel panels and full perimeter heavy-gauge galvanized steel base rail provides structural integrity for transportation, handling, and installation.

Base rails have rigging holes.

Three sides of the base rail have forklift slots.

Raised edges around duct and power entry openings in the bottom of the unit provide additional protection against water entering the building.

##### **Airflow Choice**

Units are available in downflow (vertical) or horizontal return air flow configuration.

Horizontal air flow requires Horizontal Roof Curb.

Horizontal Return Air Panel Kit is also required if converting a downflow configured unit to horizontal air flow.

##### **Power Entry**

Electrical lines can be brought through the unit base or through horizontal access knock-outs

##### **Exterior Panels**

Constructed of heavy-gauge, galvanized steel with a two-layer enamel paint finish.

##### **Insulation**

All panels adjacent to conditioned air are fully insulated with non-hygroscopic fiberglass insulation.

Unit base is fully insulated. The insulation also serves as an air seal to the roof curb, eliminating the need to add a seal during installation.

##### **Access Panels**

Access panels are provided for the economizer/filter section, heating/blower section, and the compressor/controls section.

#### **Options/Accessories**

##### **Factory Installed**

##### **Corrosion Protection**

A completely flexible immersed coating with an electrodeposited dry film process. (AST ElectroFin E-Coat) Meets Mil Spec MIL-P-53084, ASTM B117 Standard Method Salt Spray Testing.

Indoor Corrosion Protection:

- Coated coil
- Painted blower housing
- Painted indoor base

Outdoor Corrosion Protection:

- Coated coil
- Painted outdoor base

##### **Hinged Access Panels**

Hinged access panels for the filter section, the blower section and compressor/controls section.

All hinged panels have seals and quarter-turn latching handles to provide a tight air and water seal.

##### **Field Installed**

##### **Combination Coil/Hail Guards**

Heavy gauge steel frame painted to match cabinet with expanded metal mesh to protect the outdoor coil from damage.

##### **Horizontal Return Air Panel Kit**

Required for horizontal applications with Horizontal Roof Curb, contains panel with return air opening for field replacement of existing unit panel and panel to cover bottom return air opening in unit, see dimension drawings.

#### **8 BLOWER**

A wide selection of supply air blower options are available to meet a variety of airflow requirements.

##### **Motor**

Overload protected, equipped with ball bearings. Belt drive motors are offered on all models and are available in several different sizes to maximize air performance.

##### **Supply Air Blower**

Forward curved blades, double inlet, blower wheel is statically and dynamically balanced. Equipped with ball bearings and adjustable pulley (allows speed change).

Blower assembly slides out of unit for servicing.

## FEATURES AND BENEFITS

### **BLOWER (continued)**

#### **Required Selections**

##### **Select Single Zone VAV Supply Fan Supply Air Blower Option**

Order blower motor horsepower and drive kit number required when base unit is ordered, see Drive Kit Specifications Table.

##### **Single Zone VAV Supply Fan Operation**

Units ordered with the Single Zone VAV Supply Fan option utilize a Variable Frequency Drive (VFD) to stage the supply air blower airflow. The VFD alters the frequency and voltage of the power supply to the blower to control blower speed.

The supply air blower has two speeds:

1. Low speed for part-load cooling operation. Note - Low speed is 66% of high speed.
2. High speed for full load cooling and all heat modes.

Full speed blower operation is set by adjusting the motor pulley to deliver the desired air volume.

The ventilation speed is selectable between high and low speed.

*NOTE - Part load airflow in cooling mode on **Single Zone VAV Supply Fan** units should not be set below 220 cfm/nominal full load ton to reduce the risk of evaporator coil freeze-up.*

The VFD has an operational range of -40 to 125° F outdoor air ambient temperature.

Lower operating costs are obtained when the blower is operated on lower speeds.

##### **Single Zone VAV Supply Fan Sequence of Operation**

Ventilation speed is determined by the VENT SPEED switch setting on VFD control board (LO or HI).

Blower operates in low speed for mechanical cooling (Y1).

Blower operates in high speed for any other mode (free cooling, mechanical cooling Y1+Y2, and heating).

Economizer damper minimum position is fully closed in unoccupied mode.

In occupied mode, the economizer damper minimum position is determined by the setting of the two potentiometers on VFD control board.

- LO SPD MIN POS potentiometer sets the minimum position when blower is operating at low speed.
- HI SPD MIN POS potentiometer sets the minimum position when blower is operating at high speed.

#### **Options/Accessories**

##### **Field Installed**

##### **VFD Manual Bypass Kit**

VFD Manual Bypass Control is available as a kit for units equipped with the Single Zone VAV Supply Fan option.

The VFD Manual Bypass Control is a manual bypass and is enabled by re-configuring the wiring on the unit.

### **CONTROLS**

#### **9 Unit Control**

All control voltage is provided via a 24V (secondary) transformer with built-in circuit breaker protection.

**Heat/Cool Staging** - Capable of up to 2 heat / 2 cool staging with a third party DDC control system or thermostat.

##### **Low Voltage Terminal Block**

Provides screw terminal connections for thermostat or controller wiring.

**Night Setback Mode** - Saves energy by closing outdoor air dampers and operating supply fan on thermostat demand only.

#### **Options/Accessories**

##### **Field Installed**

##### **Smoke Detector**

Photoelectric type, installed in supply air section, return air section or both sections. Available with power board and single sensor (supply or return) or power board and two sensors (supply and return). Power board located in unit control compartment.

##### **Thermostats**

Control system and thermostat options, see page 21.

## FEATURES AND BENEFITS

### **ELECTRICAL**

All units include terminal block and fuse block in power entry junction box for single power entry application.

#### **Marked & Color-Coded Wiring**

All electrical wiring is color-coded and marked to identify which components it is connecting.

#### **Electrical Plugs**

Positive connection electrical plugs are used to connect common accessories or maintenance parts for easy removal or installation.

### **Required Selections**

#### **Voltage Choice**

Specify when ordering base unit.

### **Options/Accessories**

#### **Factory or Field Installed**

#### **10 Disconnect Switch**

Accessible from outside of unit, spring loaded weatherproof cover furnished.

#### **GFI Service Outlets (2)**

115V ground fault circuit interrupter (GFCI) type, non-powered, field-wired.

### **Field Installed**

#### **11 Electric Heat**

Helix wound nichrome elements, individual element limit controls, wiring harness. Unit fuse block is furnished as standard. See Options / Accessories tables for ordering information.

#### **GFI Weatherproof Cover**

Single-gang cover.

Heavy-duty UV-resistant polycarbonate case construction.

Hinged base cover with gasket.

#### **Phase Monitor**

Phase monitor detects the phasing of incoming power. If the incoming power is out of phase or if any of the three phases are lost, an indicator LED on the phase monitor will turn red and the unit will not start. In normal operation with correct incoming power phasing, the LED will be green.

*NOTE - Phase Monitor is factory Installed in the control compartment on all units equipped with the **Single Zone VAV Supply Fan option.***

### **INDOOR AIR QUALITY**

#### **12 Air Filters**

Disposable 2 inch filters furnished as standard.

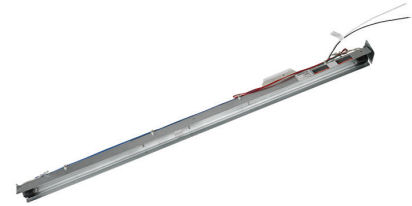
### **Options/Accessories**

#### **Field Installed**

#### **High Efficiency Air Filters**

Disposable MERV 8 or MERV 13 (Minimum Efficiency Reporting Value based on ASHRAE 52.2) efficiency 2 inch pleated filters.

#### **UVC Germicidal Lamps**



Germicidal lamps emit ultra-violet (UV-C) energy, which has been proven to be effective in reducing microbes such as viruses, bacteria, yeasts, and molds. This process either destroys the organism or controls its ability to reproduce.

UV-C energy greatly reduces the growth and proliferation of mold and other bioaerosols (bacteria and viruses) on illuminated surfaces (particularly coil and drain pan).

Lamps are field installed in the blower/indoor coil section.

All necessary hardware for installation is included.

Lamps operate on 208/230V power supply. Step-down transformer must be field supplied when used with 460V and 575V rooftop units.

Magnetic safety interlock terminates power when access panels are removed.

Approved by ETL.

#### **Indoor Air Quality (CO<sub>2</sub>) Sensors**

Monitors CO<sub>2</sub> levels, reports to the Unit Controller which adjusts economizer dampers as needed.

**13 ECONOMIZER OPTIONS**

**Factory or Field Installed**

**Economizer**

**(Standard and High Performance Common Features)**

Outdoor Air Hood with mist elimination filter is furnished.

Mixed Air Sensor is furnished for field installation in the rooftop unit. Sensor is factory installed when Economizers are factory installed.

**Standard Economizer Features (Not for Title 24)**

Parallel, gear-driven action, return air and outdoor air dampers, plug-in connections to unit, nylon bearings, neoprene seals, 24-volt, fully-modulating spring return motor.

**Standard Economizer Control Module**

The Standard Economizer Control Module can be adjusted to operate based on outdoor air temperatures.



**Economizer Controls:**

- Damper Minimum Position - Can be set lower than traditional minimum air requirements resulting in cost savings.
- IAQ Sensor - Signals dampers to modulate and maintain 55°F when CO<sub>2</sub> is higher than the CO<sub>2</sub> setpoint.
- Demand Control Ventilation (DCV) LED - A steady green Demand Control Ventilation LED indicates the IAQ reading is higher than setpoint and requires more fresh air.
- Free Cool LED - A steady green LED indicates outdoor air is suitable for free cooling.

Free Cooling runs when outdoor air temperature is lower than the set temperature on the economizer control.

*NOTE: The Free Cooling default setting for outdoor air temperature sensor is 55°F.*

**High Performance Economizer Features**

Approved for California Title 24 building standards.

Low leakage dampers are Air Movement and Control Association International (AMCA) Class 1A Certified - Maximum 3 CFM per sq. ft. leakage at 1 in. w.g.

ASHRAE 90.1-2010 compliant.

Gear-driven action, high torque 24-volt fully-modulating spring return damper motor, return air and outdoor air dampers, plug-in connections to unit, stainless steel bearings, enhanced neoprene blade edge seals and flexible stainless steel jamb seals to minimize air leakage.

*NOTE - High Performance Economizers are not approved for use with enthalpy controls in Title 24 applications.*

**High Performance Economizer Control Module**

Module provides inputs and outputs to control economizer based on







parameter settings. Module automatically detects sensors by polling to determine which sensors are installed in system.

Module displays any alarm messages (fault detection and diagnostics) as an aid in troubleshooting.

Non-volatile memory retains parameter settings in case of power failure.

Keypad with four navigation buttons and LCD screen is furnished for setting economizer parameters.

- Menu Up/Exit  button returns to the main menu.
- Arrow Up  button moves to the previous or next parameter within the selected menu.
- Arrow Down  button moves to the next parameter within the selected menu.

- Select (enter)  button confirms parameter selection.

**Main Menu Structure:**

- STATUS (economizer and system operation status)
- SETPOINTS (settings for various setpoint parameters)
- SYSTEM SETUP (settings/information about the system)
- ADVANCED SETUP (freeze protection, CO<sub>2</sub> settings, stage 3 delay and additional calibration settings)
- CHECKOUT (damper positions)
- ALARMS (output signal that can be configured for remote alarm monitoring)

*NOTE - The free cooling setpoint for Title 24 applications must be set based on the Climate Zone where the system is installed. See Section 140.4 "Prescriptive Requirements for Space Conditioning Systems" of the California Energy Commission's 2013 Building Energy Efficiency Standards.*

Refer to Installation Instructions for complete setup information and menu parameters available.

**Factory or Field Installed**

**Single Enthalpy Temperature Control (Not for Title 24)**

Enthalpy sensor enables the economizer when the outdoor air enthalpy is below the configured setpoint.

**Field Installed**

**Differential Enthalpy Control (Not for Title 24)**

Order two Single Enthalpy Control Kits. One is field installed in the return air section, the other in the outdoor air section. Allows the economizer control board to select between outdoor air or return air, whichever has lower enthalpy.

### **EXHAUST OPTIONS**

#### **Factory or Field Installed**

#### **14 Downflow Barometric Relief Dampers With Exhaust Hood**

Allow relief of excess air.

Aluminum blade dampers prevent blow back and outdoor air infiltration during off cycle.

Exhaust hood with bird screen is furnished.

#### **Field Installed**

#### **Horizontal Barometric Relief Dampers With Exhaust Hood**

For use when unit is configured for horizontal applications requiring an economizer.

Allows relief of excess air.

Aluminum blade dampers prevent blow back and outdoor air infiltration during off cycle.

Field installed in return air duct.

Exhaust hood with bird screen is furnished.

#### **15 Power Exhaust Fan**

Installs internal to unit for downflow applications only with economizer option. Provides exhaust air pressure relief. Interlocked to run when supply air blower is operating, fan runs when outdoor air dampers are 50% open (adjustable), motor is overload protected. Requires Economizer with Outdoor Air Hood and Downflow Barometric Relief Dampers. Dual fans are 20 in. diameter with 5 blades with (2) 1/3 hp motors.

### **OUTDOOR AIR OPTIONS**

#### **Factory or Field Installed**

#### **Outdoor Air Damper - Downflow or Horizontal With Air Hood**

Linked mechanical dampers, 0 to 25% (fixed) outdoor air adjustable, installs in unit. Includes outdoor air hood.

Automatic model features fully modulating spring return damper motor with plug-in connection.

Manual model features parallel blade, gear-driven dampers with adjustable fixed position.

Outdoor Air Hood is included when damper is factory installed and is furnished with damper when ordered for field installation.

### **ROOF CURBS**

Nailer strip furnished (downflow only), mates to unit, US National Roofing Contractors Approved, shipped knocked down.

#### **Hybrid Roof Curbs, Downflow**

Roof curb can be assembled using interlocking tabs to fasten corners together. No tools required.

Curb can also be fastened together with furnished hardware.

Available in 8, 14, 18, and 24 inch heights.

#### **Adjustable Pitch Curb, Downflow**

Fully adjustable pitch curbs (3/4 in. per foot in any direction) provide a level platform for rooftop units allowing flexible installations on roofs with uneven or sloped angles.

Uses interlocking tabs to fasten corners together. No tools required.

Hardware is furnished to connect upper curb with lower curb.

Available in 14 inch height.

### **Horizontal**

Converts unit from downflow to horizontal (side) air flow, return air is on unit, supply air is on curb, see dimension drawings. Curbs for rooftop applications meet National Roofing Code requirements.

Requires Horizontal Return Air Panel Kit. Available in 26, 30, 37 and 41 inch heights. Optional Insulation Kit is available to help prevent sweating.

#### **Adaptor Curbs (not shown)**

Curbs are regionally sourced. Dimensions will vary based upon the source. Contact your local sales representative for a detailed cut sheet with applicable dimensions.

### **CEILING DIFFUSERS**

#### **Ceiling Diffusers (Flush or Step-Down)**

Diffuser face and grilles with white powder coat finish, insulated (UL listed duct liner), diffuser box with collars for duct connection, fixed blades (flush diffusers) and double deflection blades (step-down diffusers), provisions for suspending, internally sealed (prevents recirculation), removable return air grille, adapts to T-bar ceiling grids or plaster ceilings.

#### **Transitions (Supply and Return)**

Used with diffusers, installs in roof curb, galvanized steel construction, flanges furnished for duct connection to diffusers, fully insulated.



## OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	180	240
<b>COOLING SYSTEM</b>				
Condensate Drain Trap	PVC - C1TRAP20AD2	<b>76W26</b>	X	X
	Copper - C1TRAP10AD2	<b>76W27</b>	X	X
Corrosion Protection		Factory	O	O
Drain Pan Overflow Switch	C1SNSR71FF1-	<b>10C24</b>	X	X
Efficiency		Standard	O	O
Low Ambient Kit	K1SNSR33CS1	<b>55W73</b>	X	X
Refrigerant Type		R-410A	O	O
<b>BLOWER - SUPPLY AIR</b>				
Blower Options	Single Zone VAV Supply Fan	Factory	O	O
Motors - Single Zone VAV Supply Fan	Belt Drive - 3 hp	Factory	O	
	Belt Drive - 5 hp	Factory	O	O
	Belt Drive - 7.5 hp	Factory	O	O
	Belt Drive - 10 hp	Factory		O
VFD Manual Bypass Kit (for Single Zone VAV Supply Fan equipped units)	3 hp, 5 hp (208/230V)	KVFDB11C-1	<b>90W52</b>	X
	7.5 hp, 10 hp (208/230V)	KVFDB10C-1	<b>90W51</b>	X
Drive Kits See Blower Data Tables for usage and selection	Kit #1 535-725 rpm	Factory	O	
	Kit #2 710-965 rpm	Factory	O	
	Kit #3 685-856 rpm	Factory	O	O
	Kit #4 850-1045 rpm	Factory	O	O
	Kit #5 945-1185 rpm	Factory	O	O
	Kit #6 850-1045 rpm	Factory	O	O
	Kit #7 945-1185 rpm	Factory	O	O
	Kit #8 1045-1285 rpm	Factory	O	O
	Kit #10 1045-1285 rpm	Factory		O
	Kit #11 1135-1365 rpm	Factory		O
	<b>CABINET</b>			
Combination Coil/Hail Guards	K1GARD51C-1	<b>13T26</b>	X	X
Hinged Access Panels		Factory	O	O
<b>CONTROLS</b>				
<b>NOTE - Also see Conventional Thermostat Control Systems on page page 21 for Additional Options.</b>				
Smoke Detector - Supply or Return (Power board and one sensor)	C1SNSR44C-1	<b>83W40</b>	X	X
Smoke Detector - Supply and Return (Power board and two sensors)	C1SNSR43C-1	<b>83W41</b>	X	X

NOTE - Catalog and model numbers shown are for ordering field installed accessories.

OX - Configure To Order (Factory Installed) or Field Installed

O = Configure To Order (Factory Installed)

X = Field Installed

## OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	180	240	
<b>INDOOR AIR QUALITY</b>					
<b>Air Filters</b>					
High Efficiency Air Filters 24 x 24 x 2 (Order 6 per unit)	MERV 8 - C1FLTR15C-1-	<b>54W67</b>	X	X	
	MERV 13 - C1FLTR40C-1-	<b>52W40</b>	X	X	
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)	C1FLTR30C-1-	<b>44N61</b>	X	X	
<b>Indoor Air Quality (CO<sub>2</sub>) Sensors</b>					
Sensor - Wall-mount, off-white plastic cover with LCD display	C0SNSR50AE1L	<b>77N39</b>	X	X	
Sensor - Wall-mount, off-white plastic cover, no display	C0SNSR52AE1L	<b>87N53</b>	X	X	
Sensor - Black plastic case with LCD display, rated for plenum mounting	C0SNSR51AE1L	<b>87N52</b>	X	X	
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting	C0MISC19AE1	<b>87N54</b>	X	X	
CO <sub>2</sub> Sensor Duct Mounting Kit - for downflow applications	C0MISC19AE1-	<b>85L43</b>	X	X	
Aspiration Box - for duct mounting non-plenum rated CO <sub>2</sub> sensors ( <b>87N53</b> or <b>77N39</b> )	C0MISC16AE1-	<b>90N43</b>	X	X	
<b>UVC Germicidal Light Kit</b>					
<sup>1</sup> UVC Light Kit (110/230v-1ph)	C1UVCL10C-1	<b>54W65</b>	X	X	
<b>ELECTRICAL</b>					
Voltage 60 hz	208/230V - 3 phase	Factory	O	O	
	460V - 3 phase	Factory	O	O	
	575V - 3 phase	Factory	O	O	
Disconnect Switch (see Electric Heat Tables for usage)	80 amp - C1DISC080C-1	<b>54W85</b>	OX	OX	
	150 amp - C1DISC150C-1	<b>54W86</b>	OX	OX	
	250 amp - C1DISC250C-1	<b>54W87</b>	OX	OX	
GFI Service Outlets	15 amp non-powered, field-wired (208/230V, 460V only)	LTAGFIK10/15	<b>74M70</b>	OX	OX
	20 amp non-powered, field-wired (575V only)		<b>67E01</b>	X	X
Weatherproof Cover for GFI	C1GFCI99FF1	<b>10C89</b>	X	X	
<b>ELECTRIC HEAT</b>					
15 kW	208/230V-3ph - C1EH0150C-1Y	<b>53W84</b>	X	X	
	460V-3ph - C1EH0150C-1G	<b>53W86</b>	X	X	
	575V-3ph - C1EH0150C-1J	<b>53W87</b>	X	X	
30 kW	208/230V-3ph - C1EH0300C21Y	<b>53W92</b>	X	X	
	460V-3ph - C1EH0300C21G	<b>53W94</b>	X	X	
	575V-3ph - C1EH0300C21J	<b>53W95</b>	X	X	
45 kW	208/230V-3ph - C1EH0450C21Y	<b>54W00</b>	X	X	
	460V-3ph - C1EH0450C21G	<b>54W02</b>	X	X	
	575V-3ph - C1EH0450C21J	<b>54W03</b>	X	X	
60 kW	208/230V-3ph - C1EH0600C21Y	<b>54W08</b>	X	X	
	460V-3ph - C1EH0600C21G	<b>54W10</b>	X	X	
	575V-3ph - C1EH0600C21J	<b>54W11</b>	X	X	
90 kW	208/230V-3ph - C1EH0900C-1Y	<b>54W12</b>		X	
	460V-3ph - C1EH0900C-1G	<b>54W14</b>		X	
	575V-3ph - C1EH0900C-1J	<b>54W15</b>		X	

<sup>1</sup> Lamps operate on 110-230V single-phase power supply. Step-down transformer must be field supplied for field installation in 460V and 575V rooftop units (transformer is furnished for factory installed light kits). Alternately, a separate 110V power supply may be used to directly power the UVC ballast(s).

NOTE - Catalog and model numbers shown are for ordering field installed accessories.

OX - Configure To Order (Factory Installed) or Field Installed

O = Configure To Order (Factory Installed)

X = Field Installed

## OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	180	240
<b>ECONOMIZER</b>				
<b>Standard Economizer With Outdoor Air Hood (Not for Title 24)</b>				
Standard Economizer Downflow or Horizontal Applications - Includes Outdoor Air Hood, order Downflow or Horizontal Barometric Relief Dampers separately	K1ECON20C-2	54W77	OX	OX
<b>Standard Economizer Controls (Not for Title 24)</b>				
Single Enthalpy Control	C1SNSR64FF1	53W64	OX	OX
Differential Enthalpy Control (order 2)	C1SNSR64FF1	53W64	X	X
<b>High Performance Economizer With Outdoor Air Hood (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)</b>				
High Performance Economizer Downflow or Horizontal Applications - Includes Outdoor Air Hood, order Downflow or Horizontal Barometric Relief Dampers separately	K1ECON22C-2	16X77	OX	OX
<b>High Performance Economizer Controls (Not for Title 24)</b>				
Single Enthalpy Control	C1SNSR60FF1	10Z75	OX	OX
Differential Enthalpy Control (order 2)	C1SNSR60FF1	10Z75	X	X
<b>Barometric Relief Dampers With Exhaust Hood</b>				
Downflow Barometric Relief Dampers	C1DAMP50C	54W78	OX	OX
Horizontal Barometric Relief Dampers	LAGEDH18/24	16K99	X	X
<b>OUTDOOR AIR</b>				
<b>Outdoor Air Dampers With Outdoor Air Hood</b>				
Motorized	C1DAMP20C-1	13U04	OX	OX
Manual	C1DAMP10C-2	13U05	OX	OX
<b>POWER EXHAUST (DOWNFLOW APPLICATIONS ONLY)</b>				
Standard Static	208/230V - C1PWRE11C-1Y	75W90	X	X
	460V - C1PWRE11C-1G	75W91	X	X
	575V - C1PWRE11C-1J	75W92	X	X
<b>ROOF CURBS</b>				
<b>Hybrid Roof Curbs, Downflow</b>				
8 in. height	C1CURB70C-1	11F58	X	X
14 in. height	C1CURB71C-1	11F59	X	X
18 in. height	C1CURB72C-1	11F60	X	X
24 in. height	C1CURB73C-1	11F61	X	X
<b>Adjustable Pitch Curb</b>				
14 in. height	L1CURB55C	43W26	X	X
<b>Standard Roof Curbs, Horizontal - Requires Horizontal Return Air Panel Kit</b>				
26 in. height - slab applications	C1CURB14C-1	11T89	X	X
37 in. height - rooftop applications	C1CURB16C-1	11T96	X	X
<b>Insulation Kit For Standard Horizontal Curbs</b>				
for C1CURB14C-1	C1INSU11C-1-	73K32	X	X
for C1CURB16C-1	C1INSU13C-1-	73K34	X	X
<b>Horizontal Return Air Panel Kit</b>				
Required for Horizontal Applications with Roof Curb	C1HRAP10C-1-	87M00	X	X
<b>CEILING DIFFUSERS</b>				
Step-Down - Order one	RTD11-185S	13K63	X	
	RTD11-275S	13K64		X
Flush - Order one	FD11-185S	13K58	X	
	FD11-275S	13K59		X
Transitions (Supply and Return) - Order one	C1DIFF33C-1	12X68	X	
	C1DIFF34C-1	12X70		X

NOTE - Catalog and model numbers shown are for ordering field installed accessories.

OX - Configure To Order (Factory Installed) or Field Installed

O = Configure To Order (Factory Installed)

X = Field Installed

## SPECIFICATIONS

General Data		Nominal Tonnage	15 Ton	20 Ton
		Model Number	KHA180S4M	KHA240S4M
		Efficiency Type	Standard	Standard
		Blower Type	Single Zone VAV Supply Fan	Single Zone VAV Supply Fan
<b>Cooling Performance</b>	Gross Cooling Capacity - Btuh		179,000	226,000
	<sup>1</sup> Net Cooling Capacity - Btuh		174,000	214,000
	AHRI Rated Air Flow - cfm		6000	7500
	Total Unit Power - kW		16.4	20.5
	<sup>1</sup> EER (Btuh/Watt)		10.6	10.6
	<sup>2</sup> IEER (Btuh/Watt)		13.2	13.0
	Refrigerant Type		R-410A	R-410A
Refrigerant Charge Furnished	Circuit 1		21 lbs. 0 oz.	26 lbs. 0 oz.
	Circuit 2		21 lbs. 0 oz.	26 lbs. 0 oz.
<b>Heating Performance</b>	<sup>1</sup> Total High Heat Capacity - Btuh		178,000	220,000
	Total Unit Power - kW		16.1	19.9
	<sup>1</sup> C.O.P.		3.2	3.2
	<sup>1</sup> Total Low Heat Capacity - Btuh		100,000	124,000
	Total Unit Power (kW)		14.9	18.3
	<sup>1</sup> C.O.P.		2.05	2.05
<b>Electric Heat Available - See page 10</b>			15-30-45-60 kW	15-30-45-60-90 kW
<b>Compressor Type (number)</b>			Scroll (2)	Scroll (2)
<b>Outdoor Coils</b>	Net face area (total) - sq. ft.		57.0	57.0
	Tube diameter - in.		3/8	3/8
	Fins per inch		20	20
<b>Outdoor Coil Fans</b>	Motor - (No.) horsepower		(4) 1/3	(4) 1/3
	Motor rpm		1075	1075
	Total Motor watts		1500	1500
	Diameter - (No.) in.		(4) 24	(4) 24
	Number of blades		3	3
	Total Air volume - cfm		15,450	15,450
<b>Indoor Coils</b>	Net face area (total) - sq. ft.		21.4	21.4
	Tube diameter - in.		3/8	3/8
	Number of rows		3	4
	Fins per inch		14	14
	Drain connection - No. and size		(1) 1 in. FPT	(1) 1in. FPT
	Expansion device type		Balance port TXV, removable head	
<sup>3</sup> <b>Indoor Blower and Drive Selection</b>	Nominal motor output		3 hp, 5 hp, 7.5 hp	5 hp, 7.5 hp, 10 hp
	Maximum usable motor output (US Only)		3.45 hp, 5.75 hp, 8.63 hp	5.75 hp, 8.63 hp, 11.5 hp
	Motor - Drive kit number		<b>3 hp</b> Kit 1 535-725 rpm Kit 2 710-965 rpm	<b>5 hp</b> Kit 3 685-856 rpm Kit 4 850-1045 rpm Kit 5 945-1185 rpm
			<b>5 hp</b> Kit 3 685-856 rpm Kit 4 850-1045 rpm Kit 5 945-1185 rpm	<b>7.5 hp</b> Kit 6 850-1045 rpm Kit 7 945-1185 rpm Kit 8 1045-1285 rpm
		<b>7.5 hp</b> Kit 6 850-1045 rpm Kit 7 945-1185 rpm Kit 8 1045-1285 rpm	<b>10 hp</b> Kit 7 945-1185 rpm Kit 10 1045-1285 rpm Kit 11 1135-1365 rpm	
	Blower wheel nominal diameter x width - in.		(2) 15 x 15	(2) 15 x 15
<b>Filters</b>	Type of filter		Fiberglass, disposable	
	Number and size - in.		(6) 24 x 24 x 2	
<b>Electrical characteristics</b>			208/230V, 460V or 575V - 60 hertz - 3 phase	

NOTE - Gross cooling capacity includes evaporator blower motor heat deduction. Net cooling capacity does not include evaporator blower motor heat deduction.

<sup>1</sup> AHRI Certified to AHRI Standard 340/360:

**Cooling Ratings** - 95°F outdoor air temperature and 80°F db/67°F wb entering indoor coil air.

**High Temperature Heating Ratings** - 47°F db/43°F wb outdoor air temperature and 70°F entering indoor coil air.

**Low Temperature Heating Ratings** - 17°F db/15°F wb outdoor air temperature and 70°F entering indoor coil air.

<sup>2</sup> Integrated Energy Efficiency Ratio tested according to AHRI Standard 340/360.

<sup>3</sup> Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished are shown. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE - All models are limited to a motor service factor of 1.0.

# RATINGS

NOTE – For Temperatures and Capacities not shown in tables, see bulletin – Cooling Unit Rating Table Correction Factor Data in Miscellaneous Engineering Data section.

## 15 TON COOLING STANDARD EFFICIENCY KHA180S4 (1ST STAGE) - SINGLE ZONE VAV SUPPLY FAN SUPPLY AIR BLOWER

Entering Wet Bulb Temperature	Total Air Volume	Outdoor Air Temperature Entering Outdoor Coil																			
		65°F					75°F					85°F					95°F				
		Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)		
				Dry Bulb					Dry Bulb					Dry Bulb					Dry Bulb		
cfm	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	
63°F	3500	87	4.68	0.67	0.76	0.86	83.2	5.22	0.67	0.77	0.87	79.2	5.83	0.67	0.78	0.88	74.8	6.52	0.68	0.79	0.9
	4000	90.8	4.74	0.68	0.79	0.89	86.8	5.28	0.69	0.8	0.9	82.4	5.88	0.69	0.81	0.92	77.8	6.57	0.7	0.82	0.94
	4500	93.6	4.79	0.7	0.81	0.92	89.5	5.32	0.7	0.82	0.93	85.1	5.92	0.71	0.83	0.95	80.3	6.61	0.72	0.85	0.97
67°F	3500	91.9	4.76	0.54	0.64	0.73	88.1	5.29	0.54	0.64	0.74	83.8	5.9	0.54	0.65	0.75	79.5	6.59	0.54	0.65	0.76
	4000	95.8	4.81	0.55	0.66	0.76	91.8	5.35	0.55	0.66	0.76	87.4	5.96	0.55	0.67	0.77	82.5	6.64	0.56	0.68	0.79
	4500	99	4.86	0.56	0.68	0.78	94.7	5.4	0.56	0.68	0.79	90	6	0.57	0.69	0.8	85	6.67	0.57	0.7	0.82
71°F	3500	96.9	4.83	0.43	0.53	0.62	92.9	5.37	0.43	0.52	0.62	88.7	5.97	0.42	0.52	0.62	84	6.66	0.42	0.53	0.63
	4000	100.9	4.89	0.43	0.54	0.63	96.6	5.42	0.43	0.54	0.64	92.2	6.03	0.43	0.54	0.64	87.1	6.72	0.43	0.54	0.65
	4500	104.1	4.94	0.44	0.55	0.65	99.9	5.48	0.44	0.55	0.66	94.9	6.08	0.43	0.55	0.67	89.8	6.76	0.43	0.55	0.68

## 15 TON COOLING STANDARD EFFICIENCY KHA180S4 (2ND STAGE) - SINGLE ZONE VAV SUPPLY FAN SUPPLY AIR BLOWER

Entering Wet Bulb Temperature	Total Air Volume	Outdoor Air Temperature Entering Outdoor Coil																			
		85°F					95°F					105°F					115°F				
		Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)		
				Dry Bulb					Dry Bulb					Dry Bulb					Dry Bulb		
cfm	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	
63°F	4800	170.3	11.79	0.71	0.84	0.96	160.7	13.14	0.72	0.86	0.98	150.1	14.67	0.74	0.88	0.99	138.9	16.45	0.76	0.91	1
	6000	179.1	11.92	0.76	0.91	1	168.7	13.27	0.78	0.93	1	157.8	14.81	0.8	0.96	1	145.8	16.57	0.82	0.98	1
	7200	185.7	12.04	0.81	0.96	1	175	13.37	0.83	0.98	1	164.2	14.91	0.85	0.99	1	152.7	16.7	0.88	1	1
67°F	4800	180.3	11.94	0.57	0.69	0.81	170.2	13.29	0.57	0.7	0.83	159.8	14.84	0.57	0.72	0.85	147.9	16.62	0.58	0.73	0.88
	6000	189.7	12.09	0.6	0.74	0.88	178.8	13.44	0.6	0.76	0.9	167.4	14.97	0.61	0.77	0.93	154.8	16.74	0.62	0.8	0.96
	7200	196.4	12.21	0.63	0.79	0.94	185.1	13.55	0.63	0.81	0.96	173.1	15.08	0.65	0.83	0.98	159.9	16.84	0.66	0.86	0.99
71°F	4800	190.1	12.1	0.43	0.55	0.67	179.8	13.46	0.43	0.56	0.68	168.7	14.99	0.43	0.56	0.69	156.3	16.77	0.42	0.57	0.71
	6000	200	12.27	0.44	0.58	0.72	188.6	13.61	0.44	0.59	0.73	176.9	15.14	0.44	0.6	0.75	163.9	16.91	0.44	0.61	0.78
	7200	206.8	12.38	0.46	0.62	0.77	195.3	13.73	0.46	0.63	0.79	183	15.26	0.46	0.64	0.81	169.2	17.02	0.46	0.65	0.84

## 15 TON HEATING STANDARD EFFICIENCY KHA180S4 - SINGLE ZONE VAV SUPPLY FAN SUPPLY AIR BLOWER

Indoor Coil Air Volume 70°F Dry Bulb cfm	Air Temperature Entering Outdoor Coil									
	65°F		45°F		25°F		5°F		-15°F	
	Total Heating Capacity	Comp. Motor Input	Total Heating Capacity	Comp. Motor Input	Total Heating Capacity	Comp. Motor Input	Total Heating Capacity	Comp. Motor Input	Total Heating Capacity	Comp. Motor Input
4800	207.5	13.75	170.7	12.84	111.4	11.83	81.1	10.32	39.6	7695
6000	210.9	13.03	174.1	12.12	113.8	11.11	83.0	9.60	41.6	6980
7200	213.3	12.56	176.5	11.65	116.3	10.66	85.4	9.18	44.0	6560

## RATINGS

NOTE – For Temperatures and Capacities not shown in tables, see bulletin – Cooling Unit Rating Table Correction Factor Data in Miscellaneous Engineering Data section.

### 20 TON COOLING STANDARD EFFICIENCY KHA240S4 (1ST STAGE) - SINGLE ZONE VAV SUPPLY FAN SUPPLY AIR BLOWER

Entering Wet Bulb Temperature	Total Air Volume	Outdoor Air Temperature Entering Outdoor Coil																			
		65°F					75°F					85°F					95°F				
		Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)		
				Dry Bulb					Dry Bulb					Dry Bulb					Dry Bulb		
cfm	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	
63°F	4500	110.9	5.6	0.66	0.75	0.84	105.9	6.3	0.66	0.76	0.85	100.8	7.09	0.66	0.77	0.87	95.3	7.98	0.67	0.78	0.88
	5500	118.3	5.69	0.68	0.79	0.89	112.9	6.39	0.69	0.8	0.91	107.4	7.17	0.69	0.81	0.92	101.4	8.06	0.7	0.82	0.94
	6500	124	5.77	0.71	0.82	0.94	118.4	6.46	0.71	0.84	0.95	112.1	7.24	0.72	0.85	0.97	105.8	8.13	0.73	0.87	0.99
67°F	4500	118.3	5.69	0.54	0.63	0.72	113.3	6.4	0.54	0.63	0.73	107.7	7.17	0.54	0.64	0.73	102	8.07	0.53	0.64	0.74
	5500	126	5.79	0.55	0.66	0.76	120.4	6.49	0.55	0.66	0.77	114.7	7.28	0.55	0.67	0.78	108.3	8.16	0.56	0.67	0.79
	6500	131.9	5.87	0.57	0.68	0.79	125.7	6.56	0.57	0.69	0.8	119.7	7.34	0.57	0.7	0.82	112.8	8.21	0.57	0.71	0.84
71°F	4500	125.8	5.79	0.43	0.52	0.6	120.4	6.48	0.42	0.52	0.61	114.8	7.27	0.42	0.52	0.61	108.7	8.16	0.41	0.52	0.61
	5500	133.7	5.89	0.43	0.53	0.63	128	6.6	0.43	0.54	0.64	121.6	7.37	0.43	0.53	0.64	115.3	8.26	0.42	0.54	0.65
	6500	139.7	5.98	0.44	0.55	0.66	133.6	6.68	0.44	0.55	0.67	126.6	7.44	0.43	0.55	0.67	119.9	8.33	0.43	0.56	0.69

### 20 TON COOLING STANDARD EFFICIENCY KHA240S4 (2ND STAGE) - SINGLE ZONE VAV SUPPLY FAN SUPPLY AIR BLOWER

Entering Wet Bulb Temperature	Total Air Volume	Outdoor Air Temperature Entering Outdoor Coil																			
		85°F					95°F					105°F					115°F				
		Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T)		
				Dry Bulb					Dry Bulb					Dry Bulb					Dry Bulb		
cfm	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	
63°F	6400	217.2	14.54	0.73	0.86	0.98	204.3	16.3	0.74	0.88	0.99	191.1	18.32	0.76	0.9	1	176.2	20.62	0.78	0.93	1
	8000	228.1	14.7	0.78	0.93	1	214.9	16.46	0.8	0.95	1	200.6	18.46	0.82	0.98	1	185.6	20.76	0.84	1	1
	9600	236.9	14.84	0.83	0.99	1	223.5	16.59	0.85	1	1	209.8	18.61	0.88	1	1	195	20.91	0.91	1	1
67°F	6400	231.5	14.73	0.57	0.71	0.83	217.9	16.51	0.58	0.72	0.85	204.1	18.53	0.58	0.73	0.87	188.1	20.81	0.59	0.75	0.9
	8000	242.6	14.93	0.61	0.76	0.9	228.5	16.67	0.61	0.78	0.92	213.5	18.68	0.62	0.8	0.95	196.4	20.93	0.64	0.82	0.98
	9600	251	15.07	0.64	0.82	0.96	236.1	16.79	0.65	0.83	0.98	219.7	18.78	0.67	0.86	1	202.2	21.04	0.68	0.89	1
71°F	6400	245.5	14.97	0.44	0.56	0.68	231.7	16.72	0.43	0.56	0.69	216.8	18.73	0.43	0.57	0.71	200.2	21.02	0.43	0.58	0.73
	8000	257.1	15.17	0.45	0.6	0.74	242.3	16.9	0.45	0.6	0.75	226.2	18.89	0.45	0.61	0.78	208.8	21.15	0.45	0.63	0.8
	9600	265.7	15.31	0.46	0.63	0.79	249.9	17.03	0.46	0.64	0.81	233.2	19.01	0.47	0.66	0.84	215	21.27	0.47	0.67	0.87

### 20 TON HEATING STANDARD EFFICIENCY KHA240S4 - SINGLE ZONE VAV SUPPLY FAN SUPPLY AIR BLOWER

Indoor Coil Air Volume 70°F Dry Bulb cfm	Air Temperature Entering Outdoor Coil									
	65°F		45°F		25°F		5°F		-15°F	
	Total Heating Capacity	Comp. Motor Input	Total Heating Capacity	Comp. Motor Input	Total Heating Capacity	Comp. Motor Input	Total Heating Capacity	Comp. Motor Input	Total Heating Capacity	Comp. Motor Input
6400	256.9	16.68	209.9	15.53	135.3	14.39	96.7	12.59	46.3	9450
8000	262.3	15.67	215.3	14.52	140.3	13.38	101.3	11.59	51.0	8450
9600	267.6	15.04	220.6	13.89	145.3	12.76	106.1	10.98	55.8	7840

## BLOWER DATA

### BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL & AIR FILTERS IN PLACE

FOR ALL UNITS ADD:

- 1 - Wet indoor coil air resistance of selected unit.
- 2 - Any factory installed options air resistance (electric heat, economizer, etc.)
- 3 - Any field installed accessories air resistance (electric heat, duct resistance, diffuser, etc.)

Then determine from blower table blower motor output and drive required.

See page 16 for wet coil and option/accessory air resistance data.

See page 16 for factory installed drive kit specifications.

### MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT

All units require 6000 cfm minimum air with electric heat.

Air Volume cfm	TOTAL STATIC PRESSURE - Inches Water Gauge (Pa)																									
	0.20		0.40		0.60		0.80		1.00		1.20		1.40		1.60		1.80		2.00		2.20		2.40		2.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3250	405	0.40	520	0.60	615	0.85	695	1.10	765	1.30	830	1.60	890	1.85	950	2.10	1005	2.35	1060	2.60	1110	2.85	1160	3.10	1210	3.35
3500	415	0.45	530	0.70	620	0.95	700	1.20	775	1.45	840	1.70	900	2.00	955	2.25	1010	2.50	1065	2.75	1115	3.00	1165	3.25	1215	3.50
3750	425	0.50	540	0.75	630	1.05	710	1.30	780	1.60	845	1.85	905	2.15	960	2.40	1015	2.65	1070	2.90	1120	3.15	1170	3.40	1220	3.65
4000	435	0.55	545	0.85	635	1.10	715	1.40	785	1.70	850	2.00	910	2.30	965	2.55	1020	2.80	1075	3.05	1125	3.30	1175	3.55	1225	3.80
4250	445	0.60	555	0.90	645	1.25	725	1.55	795	1.85	855	2.15	915	2.45	970	2.70	1025	2.95	1080	3.20	1130	3.45	1180	3.70	1230	3.95
4500	455	0.70	565	1.00	655	1.35	730	1.65	800	2.00	865	2.35	925	2.65	980	2.90	1035	3.15	1090	3.40	1140	3.65	1190	3.90	1240	4.15
4750	470	0.75	575	1.10	660	1.45	740	1.80	810	2.15	875	2.45	935	2.75	995	3.05	1050	3.30	1105	3.55	1155	3.80	1205	4.05	1255	4.30
5000	480	0.85	585	1.25	670	1.60	750	1.95	815	2.30	880	2.70	940	3.05	995	3.30	1045	3.55	1100	3.80	1150	4.05	1200	4.30	1250	4.55
5250	495	0.95	595	1.35	680	1.70	755	2.10	825	2.50	890	2.90	945	3.25	1000	3.55	1055	3.80	1110	4.05	1160	4.30	1210	4.55	1260	4.80
5500	505	1.05	605	1.45	690	1.85	765	2.25	835	2.65	895	3.05	955	3.45	1010	3.85	1065	4.10	1115	4.35	1165	4.60	1215	4.85	1265	5.10
5750	520	1.15	615	1.60	700	2.00	775	2.45	840	2.85	905	3.25	960	3.65	1015	4.05	1070	4.40	1120	4.75	1170	5.05	1220	5.35	1270	5.65
6000	530	1.30	630	1.75	710	2.15	785	2.60	850	3.05	910	3.45	970	3.90	1025	4.35	1080	4.70	1130	5.05	1180	5.40	1230	5.70	1280	6.00
6250	545	1.40	640	1.90	720	2.35	795	2.80	860	3.25	920	3.70	975	4.15	1030	4.60	1085	5.00	1135	5.35	1185	5.70	1235	6.00	1285	6.30
6500	560	1.55	650	2.05	730	2.50	805	3.00	870	3.45	930	3.95	985	4.40	1040	4.85	1095	5.20	1145	5.55	1195	5.90	1245	6.20	1295	6.50
6750	570	1.70	665	2.20	745	2.70	815	3.20	880	3.70	940	4.20	995	4.65	1045	5.10	1100	5.45	1150	5.80	1200	6.15	1250	6.45	1300	6.75
7000	585	1.85	675	2.35	755	2.90	825	3.40	890	3.95	950	4.45	1005	4.90	1055	5.30	1110	5.65	1160	6.00	1210	6.35	1260	6.65	1310	6.95
7250	600	2.00	690	2.60	765	3.10	835	3.65	900	4.15	955	4.65	1010	5.05	1065	5.45	1115	5.80	1165	6.15	1215	6.45	1265	6.75	1315	7.05
7500	615	2.20	700	2.75	775	3.30	845	3.85	910	4.45	965	4.95	1020	5.35	1075	5.75	1125	6.05	1175	6.35	1225	6.65	1275	6.95	1325	7.25
7750	630	2.40	715	3.00	790	3.55	855	4.10	920	4.70	975	5.25	1030	5.65	1080	6.05	1130	6.35	1180	6.65	1230	6.95	1280	7.25	1330	7.55
8000	640	2.55	725	3.20	800	3.80	865	4.35	930	4.95	985	5.50	1040	5.90	1090	6.30	1140	6.60	1190	6.90	1240	7.20	1290	7.50	1340	7.80
8250	655	2.80	740	3.40	810	4.00	880	4.65	940	5.25	995	5.85	1050	6.25	1100	6.65	1150	6.95	1200	7.25	1250	7.55	1300	7.85	1350	8.15
8500	670	3.00	750	3.65	825	4.30	890	4.90	950	5.55	1005	6.15	1060	6.55	1110	6.95	1160	7.25	1210	7.55	1260	7.85	1310	8.15	1360	8.45
8750	685	3.25	765	3.90	835	4.55	900	5.20	960	5.85	1015	6.45	1070	6.85	1120	7.25	1170	7.55	1220	7.85	1270	8.15	1320	8.45	1370	8.75
9000	700	3.50	780	4.20	850	4.85	910	5.50	970	6.15	1025	6.80	1080	7.20	1130	7.55	1180	7.85	1230	8.15	1280	8.45	1330	8.75	1380	9.05
9250	715	3.75	790	4.45	860	5.15	925	5.85	985	6.55	1040	7.20	1090	7.55	1140	7.85	1190	8.15	1240	8.45	1290	8.75	1340	9.05	1390	9.35
9500	730	4.00	805	4.75	875	5.45	935	6.15	995	6.90	1050	7.60	1100	7.95	1150	8.25	1200	8.55	1250	8.85	1300	9.15	1350	9.45	1400	9.75
9750	745	4.30	820	5.05	885	5.75	950	6.55	1005	7.20	1060	7.95	1110	8.25	1160	8.55	1210	8.85	1260	9.15	1310	9.45	1360	9.75	1410	10.05
10,000	760	4.60	835	5.40	900	6.15	960	6.85	1015	7.60	1070	8.35	1120	8.65	1170	8.95	1220	9.25	1270	9.55	1320	9.85	1370	10.15	1420	10.45
10,250	775	4.90	845	5.65	910	6.45	970	7.20	1030	8.00	1080	8.75	1135	9.05	1180	9.35	1230	9.65	1280	9.95	1330	10.25	1380	10.55	1430	10.85
10,500	790	5.20	860	6.00	925	6.85	985	7.65	1040	8.40	1095	9.20	1145	9.50	1190	9.80	1240	10.10	1290	10.40	1340	10.70	1390	11.00	1440	11.30
10,750	805	5.55	875	6.40	940	7.25	1000	8.05	1055	8.85	1105	9.65	1155	10.45	1200	11.20	1250	11.50	1300	11.80	1350	12.10	1400	12.40	1450	12.70
11,000	820	5.90	890	6.80	950	7.60	1010	8.45	1065	9.30	1115	10.05	1165	10.90	1210	11.60	1260	11.90	1310	12.20	1360	12.50	1410	12.80	1460	13.10

## BLOWER DATA

### FACTORY INSTALLED BELT DRIVE KIT SPECIFICATIONS

Nominal hp	Maximum hp	Drive Kit Number	RPM Range
3	3.45	1	535 - 725
3	3.45	2	710 - 965
5	5.75	3	685 - 856
5	5.75	4	850 - 1045
5	5.75	5	945 - 1185
7.5	8.63	6	850 - 1045
7.5	8.63	7	945 - 1185
7.5	8.63	8	1045 - 1285
10	11.50	7	945 - 1185
10	11.50	10	1045 - 1285
10	11.50	11	1135 - 1365

NOTE - Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished are shown. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE - All models are limited to a motor service factor of 1.0.

### FACTORY INSTALLED OPTIONS/FIELD INSTALLED ACCESSORY AIR RESISTANCE - in. w.g.

Air Volume cfm	Wet Indoor Coil		Electric Heat	Economizer	Filters		Horizontal Roof Curb
	180S	240S			MERV 8	MERV 13	
3250	0.02	0.03	---	---	0.01	0.04	0.04
3500	0.02	0.03	---	---	0.01	0.04	0.05
3750	0.02	0.03	---	---	0.01	0.04	0.05
4000	0.02	0.04	---	---	0.01	0.04	0.06
4250	0.02	0.04	---	---	0.01	0.05	0.07
4500	0.02	0.05	---	---	0.01	0.05	0.07
4750	0.02	0.05	---	---	0.02	0.05	0.08
5000	0.03	0.05	---	---	0.02	0.06	0.08
5250	0.03	0.06	---	---	0.02	0.06	0.09
5500	0.03	0.07	---	---	0.02	0.06	0.10
5750	0.03	0.07	---	---	0.02	0.07	0.11
6000	0.04	0.08	0.01	---	0.03	0.07	0.11
6250	0.04	0.08	0.01	0.01	0.03	0.07	0.12
6500	0.04	0.09	0.01	0.02	0.03	0.08	0.13
6750	0.05	0.10	0.01	0.03	0.03	0.08	0.14
7000	0.05	0.10	0.01	0.04	0.04	0.08	0.15
7250	0.06	0.11	0.01	0.05	0.04	0.09	0.16
7500	0.06	0.12	0.01	0.06	0.04	0.09	0.17
8000	0.07	0.13	0.02	0.09	0.05	0.10	0.19
8500	0.08	0.15	0.02	0.11	0.05	0.10	0.21
9000	0.09	0.16	0.04	0.14	0.06	0.11	0.24
9500	0.10	0.18	0.05	0.16	0.07	0.12	0.26
10,000	0.11	0.20	0.06	0.19	0.07	0.12	0.29
10,500	0.12	0.22	0.09	0.22	0.08	0.13	0.31
11,000	0.14	0.24	0.11	0.25	0.09	0.14	0.34



## BLOWER DATA

### CEILING DIFFUSER AIR RESISTANCE - in. w.g.

Air Volume cfm	Step-Down Diffuser						Flush Diffuser	
	RTD11-185S			RTD11-275			FD11-185S	FD11-275
	2 Ends Open	1 Side/2 Ends Open	All Ends & Sides Open	2 Ends Open	1 Side/2 Ends Open	All Ends & Sides Open		
5000	.51	.44	.39	---	---	---	.27	---
5200	.56	.48	.42	---	---	---	.30	---
5400	.61	.52	.45	---	---	---	.33	---
5600	.66	.56	.48	---	---	---	.36	---
5800	.71	.59	.51	---	---	---	.39	---
6000	.76	.63	.55	.36	.31	.27	.42	.29
6200	.80	.68	.59	---	---	---	.46	---
6400	.86	.72	.63	---	---	---	.50	---
6500	---	---	---	.42	.36	.31	---	.34
6600	.92	.77	.67	---	---	---	.54	---
6800	.99	.83	.72	---	---	---	.58	---
7000	1.03	.87	.76	.49	.41	.36	.62	.40
7200	1.09	.92	.80	---	---	---	.66	---
7400	1.15	.97	.84	---	---	---	.70	---
7500	---	---	---	.51	.46	.41	---	.45
7600	1.20	1.02	.88	---	---	---	.74	---
8000	---	---	---	.59	.49	.43	---	.50
8500	---	---	---	.69	.58	.50	---	.57
9000	---	---	---	.79	.67	.58	---	.66
9500	---	---	---	.89	.75	.65	---	.74
10,000	---	---	---	1.00	.84	.73	---	.81
10,500	---	---	---	1.10	.92	.80	---	.89
11,000	---	---	---	1.21	1.01	.88	---	.96

### CEILING DIFFUSER AIR THROW DATA

Model No.	Air Volume cfm	<sup>1</sup> Effective Throw Range - ft.		Model No.	Air Volume cfm	<sup>1</sup> Effective Throw Range - ft.	
		RTD11-185S Step-Down	FD11-185S Flush			RTD11-275 Step-Down	FD11-275 Flush
180	5600	39 - 49	28 - 37	240	7200	33 - 38	26 - 35
	5800	42 - 51	29 - 38		7400	35 - 40	28 - 37
	6000	44 - 54	40 - 50		7600	36 - 41	29 - 38
	6200	45 - 55	42 - 51		7800	38 - 43	40 - 50
	6400	46 - 55	43 - 52		8000	39 - 44	42 - 51
	6600	47 - 56	45 - 56		8200	41 - 46	43 - 52
					8400	43 - 49	44 - 54
					8600	44 - 50	46 - 57
					8800	47 - 55	48 - 59

<sup>1</sup> Throw is the horizontal or vertical distance an airstream travels on leaving the outletor diffuser before the maximum velocity is reduced to 50 ft. per minute. Four sides open.

### POWER EXHAUST FAN PERFORMANCE

Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm
0.00	8630
0.05	8210
0.10	7725
0.15	7110
0.20	6470
0.25	5790
0.30	5060
0.35	4300
0.40	3510
0.45	2690
0.50	1840

**ELECTRICAL/ELECTRIC HEAT DATA**

**15 TON**

**15 TON STANDARD EFFICIENCY**

**KHA180S4**

<sup>1</sup> Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	25			12.2			9		
	Locked Rotor Amps	164			100			78		
Compressor 2	Rated Load Amps	25			12.2			9		
	Locked Rotor Amps	164			100			78		
Outdoor Fan Motors (4)	Full Load Amps	2.4			1.3			1		
	(total)	(9.6)			(5.2)			(4)		
Power Exhaust (2) 0.33 HP	Full Load Amps	2.4			1.3			1		
	(total)	(4.8)			(2.6)			(2)		
Service Outlet 115V GFI (amps)		15			15			20		
Indoor Blower Motor	Horsepower	3	5	7.5	3	5	7.5	3	5	7.5
	Full Load Amps	10.6	16.7	24.2	4.8	7.6	11	3.9	6.1	9
<sup>2</sup> Maximum Overcurrent Protection	Unit Only	100	100	110	45	50	50	35	35	40
	With (2) 0.33 HP Power Exhaust	100	110	110	50	50	50	35	40	40
<sup>3</sup> Minimum Circuit Ampacity	Unit Only	77	83	91	38	41	44	29	31	34
	With (2) 0.33 HP Power Exhaust	82	88	95	41	43	47	31	33	36

**ELECTRIC HEAT DATA**

Electric Heat Voltage		208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
<sup>2</sup> Maximum Overcurrent Protection	Unit+ Electric Heat <b>15 kW</b>	125	125	125	150	150	150	70	70	70	50	50	60
	<b>30 kW</b>	175	175	175	175	175	200	90	90	90	70	70	70
	<b>45 kW</b>	200	225	200	225	225	250	110	110	125	90	90	90
	<b>60 kW</b>	225	225	225	250	225	250	110	125	125	90	90	100
<sup>3</sup> Minimum Circuit Ampacity	Unit+ Electric Heat <b>15 kW</b>	116	122	122	128	130	136	61	63	67	47	49	52
	<b>30 kW</b>	155	167	161	173	169	181	83	86	89	65	67	70
	<b>45 kW</b>	194	212	200	218	208	226	106	108	112	83	85	88
	<b>60 kW</b>	202	221	208	227	216	235	110	113	116	86	89	91
<sup>2</sup> Maximum Overcurrent Protection	Unit+ Electric Heat and (2) 0.33 HP Power Exhaust <b>15 kW</b>	125	150	150	150	150	150	70	70	70	50	60	60
	<b>30 kW</b>	175	175	175	200	175	200	90	90	100	70	70	80
	<b>45 kW</b>	200	225	225	225	225	250	110	125	125	90	90	90
	<b>60 kW</b>	225	250	225	250	225	250	125	125	125	90	100	100
<sup>3</sup> Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.33 HP Power Exhaust <b>15 kW</b>	121	127	127	133	134	140	63	66	69	49	51	54
	<b>30 kW</b>	160	172	166	178	174	186	86	88	92	67	69	72
	<b>45 kW</b>	199	217	205	223	213	231	108	111	114	85	87	90
	<b>60 kW</b>	207	226	213	232	220	240	113	116	119	88	91	93

**ELECTRICAL ACCESSORIES**

Disconnect	Unit Only	54W86	54W86	54W86	54W86	54W86	54W86	54W86	54W85	54W85	54W85	54W85	54W85	54W85
	Unit + Power Exhaust	54W86	54W86	54W86	54W86	54W86	54W86	54W86	54W85	54W85	54W85	54W85	54W85	54W85
	Unit + Electric Heat <b>15 kW</b>	54W86	54W86	54W86	54W86	54W86	54W86	54W86	54W85	54W85	54W85	54W85	54W85	54W85
	Unit + Electric Heat <b>30 kW</b>	54W87	54W87	54W87	54W87	54W87	54W87	54W87	54W85	54W85	54W86	54W85	54W85	54W85
	Unit + Electric Heat <b>45 kW</b>	54W87	54W87	54W87	54W87	54W87	54W87	54W87	54W86	54W86	54W86	54W85	54W85	54W86
	Unit + Electric Heat <b>60 kW</b>	54W87	54W87	54W87	54W87	4 N/A	4 N/A	54W86	54W86	54W86	54W86	54W86	54W86	54W86
	Unit + Power Exhaust + Elec. Heat <b>15 kW</b>	54W86	54W86	54W86	54W86	54W86	54W86	54W86	54W85	54W85	54W85	54W85	54W85	54W85
Unit + Power Exhaust + Elec. Heat <b>30 kW</b>	54W87	54W87	54W87	54W87	54W87	54W87	54W87	54W85	54W86	54W86	54W85	54W85	54W85	
Unit + Power Exhaust + Elec. Heat <b>45 kW</b>	54W87	54W87	54W87	54W87	54W87	54W87	54W87	54W86	54W86	54W86	54W85	54W85	54W86	
Unit + Power Exhaust + Elec. Heat <b>60 kW</b>	54W87	54W87	54W87	54W87	4 N/A	4 N/A	54W86	54W86	54W86	54W86	54W86	54W86	54W86	

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

<sup>1</sup> Extremes of operating range are plus and minus 10% of line voltage.

<sup>2</sup> HACR type breaker or fuse.

<sup>3</sup> Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

<sup>4</sup> Disconnect must be field furnished.

**ELECTRICAL/ELECTRIC HEAT DATA**

**20 TON**

**20 TON STANDARD EFFICIENCY**

**KHA240S4**

<sup>1</sup> Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	30.1			16.7			12.2		
	Locked Rotor Amps	225			114			80		
Compressor 2	Rated Load Amps	30.1			16.7			12.2		
	Locked Rotor Amps	225			114			80		
Outdoor Fan Motors (4)	Full Load Amps	2.4			1.3			1		
	(total)	(9.6)			(5.2)			(4)		
Power Exhaust (2) 0.33 HP	Full Load Amps	2.4			1.3			1		
	(total)	(4.8)			(2.6)			(2)		
Service Outlet 115V GFI (amps)		15			15			20		
Indoor Blower Motor	Horsepower	5	7.5	10	5	7.5	10	5	7.5	10
	Full Load Amps	16.7	24.2	30.8	7.6	11	14	6.1	9	11
<sup>2</sup> Maximum Overcurrent Protection	Unit Only	110	125	125	60	70	70	45	50	50
	With (2) 0.33 HP Power Exhaust	125	125	125	60	70	70	50	50	50
<sup>3</sup> Minimum Circuit Ampacity	Unit Only	95	102	109	51	54	57	38	41	43
	With (2) 0.33 HP Power Exhaust	99	107	114	53	57	60	40	43	45

**ELECTRIC HEAT DATA**

Electric Heat Voltage		208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
<sup>2</sup> Maximum Overcurrent Protection	Unit+ Electric Heat <b>15 kW</b>	150	150	150	150	150	175	80	80	90	60	60	70
	<b>30 kW</b>	175	200	200	200	200	200	100	100	110	80	80	80
	<b>45 kW</b>	225	250	225	250	250	250	125	125	125	100	100	100
	<b>60 kW</b>	225	250	250	250	250	300	125	150	150	100	110	110
	<b>90 kW</b>	300	350	300	350	300	350	175	175	175	125	150	150
<sup>3</sup> Minimum Circuit Ampacity	Unit+ Electric Heat <b>15 kW</b>	134	140	141	147	148	154	73	77	80	56	59	61
	<b>30 kW</b>	173	185	180	192	187	199	96	99	102	74	77	79
	<b>45 kW</b>	212	230	219	237	226	244	119	122	125	92	95	97
	<b>60 kW</b>	220	239	227	246	234	253	123	126	129	96	99	101
	<b>90 kW</b>	282	311	290	319	296	325	159	163	166	125	128	130
<sup>2</sup> Maximum Overcurrent Protection	Unit+ Electric Heat and (2) 0.33 HP Power Exhaust <b>15 kW</b>	150	150	150	175	175	175	80	90	90	60	70	70
	<b>30 kW</b>	200	200	200	200	200	225	100	110	110	80	80	90
	<b>45 kW</b>	225	250	225	250	250	250	125	125	150	100	100	100
	<b>60 kW</b>	250	250	250	300	250	300	150	150	150	100	110	110
	<b>90 kW</b>	300	350	300	350	350	350	175	175	175	150	150	150
<sup>3</sup> Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.33 HP Power Exhaust <b>15 kW</b>	138	144	146	152	153	159	76	79	82	58	61	63
	<b>30 kW</b>	178	190	185	197	192	204	99	102	105	76	79	81
	<b>45 kW</b>	217	235	224	242	231	249	121	125	128	94	97	99
	<b>60 kW</b>	224	244	232	251	239	258	126	129	132	98	101	103
	<b>90 kW</b>	287	316	294	323	301	330	162	165	168	127	130	132

**ELECTRICAL ACCESSORIES**

Disconnect	Unit Only	54W86	54W86	54W86	54W86	54W86	54W86	54W86	54W85	54W85	54W85	54W85	54W85	54W85
	Unit + Power Exhaust	54W86	54W86	54W86	54W86	54W86	54W86	54W86	54W85	54W85	54W85	54W85	54W85	54W85
	Unit + Electric Heat <b>15 kW</b>	54W86	54W86	54W86	54W86	54W86	54W86	54W86	54W85	54W85	54W85	54W85	54W85	54W85
	Unit + Electric Heat <b>30 kW</b>	54W87	54W87	54W87	54W87	54W87	54W87	54W87	54W86	54W86	54W86	54W85	54W85	54W85
	Unit + Electric Heat <b>45 kW</b>	54W87	54W87	54W87	54W87	54W87	54W87	54W87	54W86	54W86	54W86	54W86	54W86	54W86
	Unit + Electric Heat <b>60 kW</b>	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	54W86	54W86	54W86	54W86	54W86	54W86
	Unit + Electric Heat <b>90 kW</b>	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	54W87	54W87	54W87	54W86	54W86	54W86
	Unit + Power Exhaust + Elec. Heat <b>15 kW</b>	54W86	54W86	54W86	54W86	54W87	54W87	54W87	54W85	54W85	54W85	54W85	54W85	54W85
	Unit + Power Exhaust + Elec. Heat <b>30 kW</b>	54W87	54W87	54W87	54W87	54W87	54W87	54W87	54W86	54W86	54W86	54W85	54W85	54W85
	Unit + Power Exhaust + Elec. Heat <b>45 kW</b>	54W87	54W87	54W87	54W87	54W87	54W87	54W87	54W86	54W86	54W86	54W86	54W86	54W86
	Unit + Power Exhaust + Elec. Heat <b>60 kW</b>	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	54W86	54W86	54W86	54W86	54W86	54W86
Unit + Power Exhaust + Elec. Heat <b>90 kW</b>	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	<sup>4</sup> N/A	54W87	54W87	54W87	54W86	54W86	54W86	

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

<sup>1</sup> Extremes of operating range are plus and minus 10% of line voltage.

<sup>2</sup> HACR type breaker or fuse.

<sup>3</sup> Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

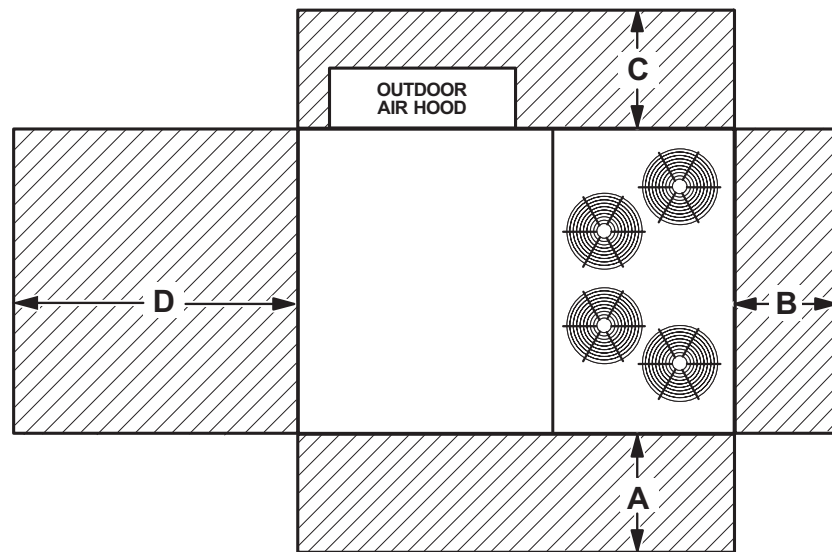
<sup>4</sup> Disconnect must be field furnished.

## ELECTRIC HEAT CAPACITIES

Volts Input	15 kW			30 kW			45 kW			60 kW			90 kW		
	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages
208	11.3	38,600	1	22.5	76,800	1	33.8	115,300	2	45.0	153,600	2	67.6	230,700	2
220	12.6	43,000	1	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
230	13.8	47,100	1	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
240	15.0	51,200	1	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2
440	12.6	43,000	1	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
460	13.8	47,100	1	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
480	15.0	51,200	1	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2
550	12.6	43,000	1	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
575	13.8	47,100	1	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
600	15.0	51,200	1	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2

## UNIT CLEARANCES

### Unit With Economizer



<sup>1</sup> Unit Clearance	A		B		C		D		Top Clearance
	in.	mm	in.	mm	in.	mm	in.	mm	
Service Clearance	60	1524	36	914	36	914	66	1676	Unobstructed
Minimum Operation Clearance	45	1143	36	914	36	914	41	1041	

NOTE - Entire perimeter of unit base requires support when elevated above the mounting surface.

<sup>1</sup> Service Clearance - Required for removal of serviceable parts.

Minimum Operation Clearance - Required clearance for proper unit operation.


## OUTDOOR SOUND DATA

Unit Model Number	Octave Band Sound Power Levels dBA, re 10 <sup>-12</sup> Watts - Center Frequency - Hz							<sup>1</sup> Sound Rating Number (dBA)
	125	250	500	1000	2000	4000	8000	
KHA180 Cooling	75	81	87	89	86	81	69	93
KHA180 Heating	76	81	87	89	87	81	70	93
KHA240 Cooling	77	81	87	89	86	80	67	93
KHA240 Heating	78	81	88	89	87	81	67	93

NOTE - The octave sound power data does not include tonal corrections.

<sup>1</sup> Sound Rating Number according to AHRI Standard 370-2001 (includes pure tone penalty). Sound Rating Number is the overall A-Weighted Sound Power Level, (LWA), dB (100 Hz to 10,000 Hz).

## OPTIONAL CONVENTIONAL TEMPERATURE CONTROL SYSTEMS

Item	Model No.	Catalog No.	
<p><b>7-DAY PROGRAMMABLE THERMOSTAT - BACNET COMPATIBLE WITH REHEAT FUNCTION</b></p>  <ul style="list-style-type: none"> <li>• For units with or without <sup>1</sup> Humiditrol®</li> <li>• BTL listed MS/TP ensures compatibility with any BACnet system</li> <li>• Built-in control programs for conventional and heat pump applications</li> <li>• Conventional systems up to 3-stage heat and 3-stage cool</li> <li>• Heat pumps with 1 or 2 compressors and up to 2-stage auxiliary heat</li> <li>• On-board temperature and humidity sensor</li> <li>• Multiple configurable inputs and outputs enable advanced control strategies</li> <li>• Set-up Wizard enables rapid system configuration</li> <li>• No special tools required for installation or commissioning</li> <li>• Seven-day (2, 4 or 6 event) occupancy scheduling per day</li> <li>• Backlit 5-inch LCD touchscreen</li> </ul>	---	<b>Y8241</b>	
<p><sup>1</sup> BACnet Thermostat (Y8241) will control units with and without the Humiditrol® option. If there is a mix of units equipped with and without Humiditrol on the same site, this thermostat can be used for all units if desired.</p>			
<b>BACnet Controls (no reheat capability)</b>	BACnet® Module (factory or field installed) BACnet® Room Sensor with Display (field installed) BACnet® Room Sensor without Display (field installed)	K0CTRL31B-2 K0SNSR01FF1 K0SNSR00FF1	<b>16X71</b> <b>97W23</b> <b>97W24</b>
<b>Optional Accessories</b>	Plenum Cable (RJ45/CAT5 75 ft.)	K0MISC00FF1	<b>97W25</b>

**WEIGHT DATA**

Model Number	Net		Shipping	
	lbs.	kg	lbs.	kg
180 Base Unit	1950	885	2150	975
180 Max. Unit	2270	1030	2470	1120
240 Base Unit	2150	975	2350	1066
240 Max. Unit	2480	1125	2680	1216

Max. Unit - The unit with ALL INTERNAL OPTIONS Installed. (Economizer, Standard Static Power Exhaust Fans, Controls, etc.). Does not include accessories external to unit.

**OPTIONS / ACCESSORIES**

Description	Shipping Weight	
	lbs.	kg
<b>ECONOMIZER / OUTDOOR AIR / EXHAUST</b>		
<b>Economizer</b>		
Economizer Dampers	102	46
Barometric Relief Dampers (downflow)	30	14
Barometric Relief Dampers (horizontal)	20	9
Outdoor Air Damper Hood (downflow)	65	29
<b>Outdoor Air Dampers</b>		
Outdoor Air Damper Section (downflow) - Automatic (including Hood)	18	39
Outdoor Air Damper Section (downflow) - Manual (including Hood)	10	22
<b>Power Exhaust</b>	62	28
<b>ELECTRIC HEAT</b>		
15 kW	59	27
30 kW	59	27
45 kW	76	34
60 kW	76	34
90 kW	84	38
<b>SINGLE ZONE VAV SUPPLY FAN SUPPLY AIR BLOWER OPTION</b>		
Variable Frequency Drive (VFD) and associated components	10	5
<b>ROOF CURBS</b>		
<b>Hybrid Roof Curbs, Downflow</b>		
8 in. height	75	34
14 in. height	105	48
18 in. height	125	57
24 in. height	155	70
<b>Adjustable Pitch Curb, Downflow</b>		
14 in. height	262	119
<b>Horizontal Roof Curbs, Standard</b>		
26 in. height	420	191
37 in. height	580	263
<b>CEILING DIFFUSERS</b>		
<b>Step-Down</b>		
RTD11-185S	168	76
RTD11-275S	238	108
<b>Flush</b>		
FD11-185S	168	76
FD11-275S	238	108
<b>Transitions</b>		
C1DIFF33C-1	80	36
C1DIFF34C-1	75	34
<b>PACKAGING</b>		
LTL Packaging (less than truck load)	310	141

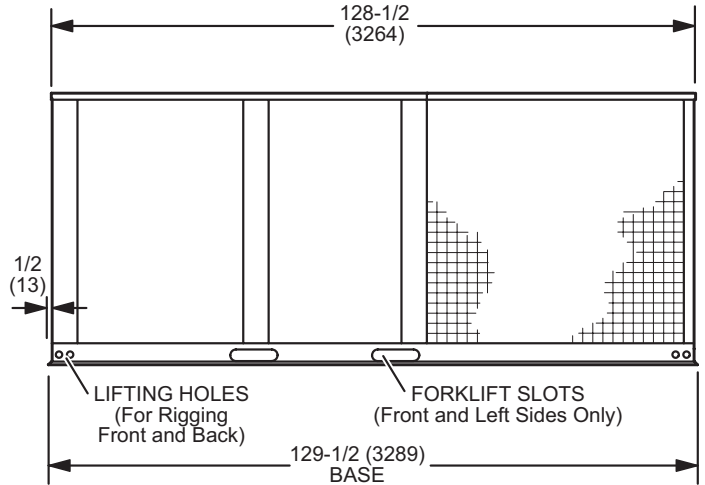
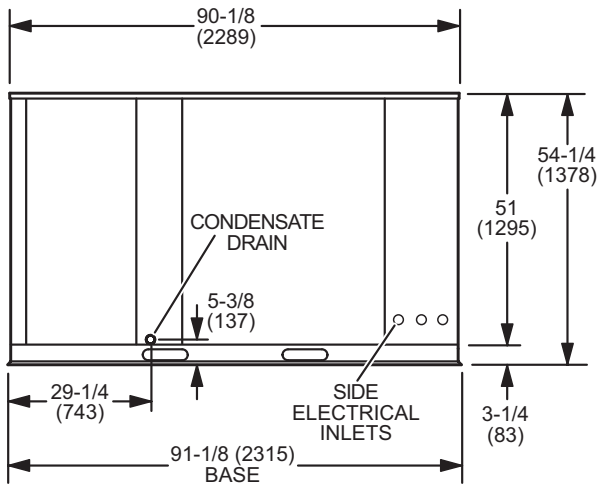
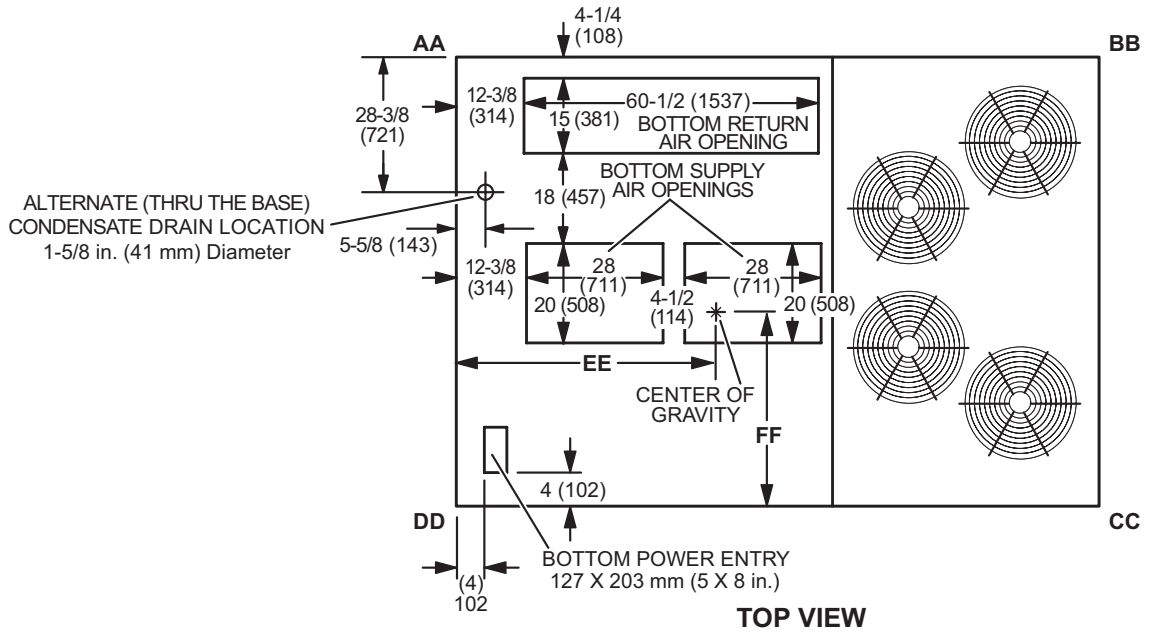
# DIMENSIONS - UNIT

## CORNER WEIGHTS

Model No.	AA		BB		CC		DD		CENTER OF GRAVITY		FF	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	in.	mm	in.	mm
KHA180 Std. Unit	385	182	466	220	602	284	497	235	59	1499	39-3/4	1010
KHA180 Max. Unit	492	232	548	258	648	306	582	275	56-3/4	1441	41-3/4	1060
KHA240 Std. Unit	423	199	497	235	665	314	565	267	58-1/4	1480	39	991
KHA240 Max. Unit	536	253	580	274	709	335	655	309	56	1422	41	1041

Std. Unit - The unit with NO INTERNAL OPTIONS.

Max. Unit - The unit with ALL INTERNAL OPTIONS Installed. (Economizer, Standard Static Power Exhaust Fans, Controls, etc.). Does not include accessories external to unit.

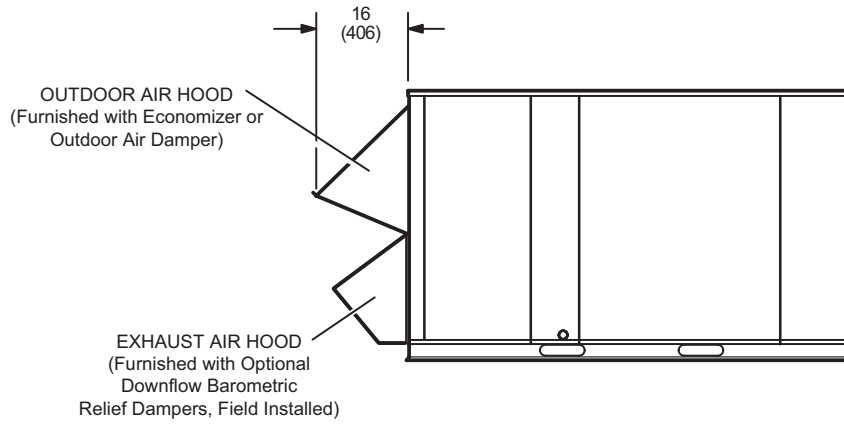


**END VIEW**

**SIDE VIEW**

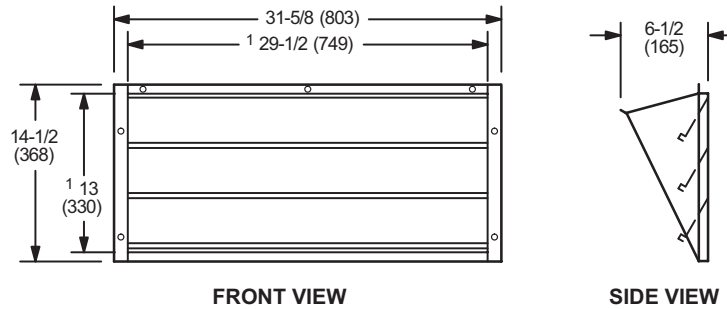
## DIMENSIONS - ACCESSORIES

### OUTDOOR AIR HOOD DETAIL



### OPTIONAL HORIZONTAL BAROMETRIC RELIEF DAMPERS WITH HOOD

(Field installed in horizontal return air duct adjacent to unit)



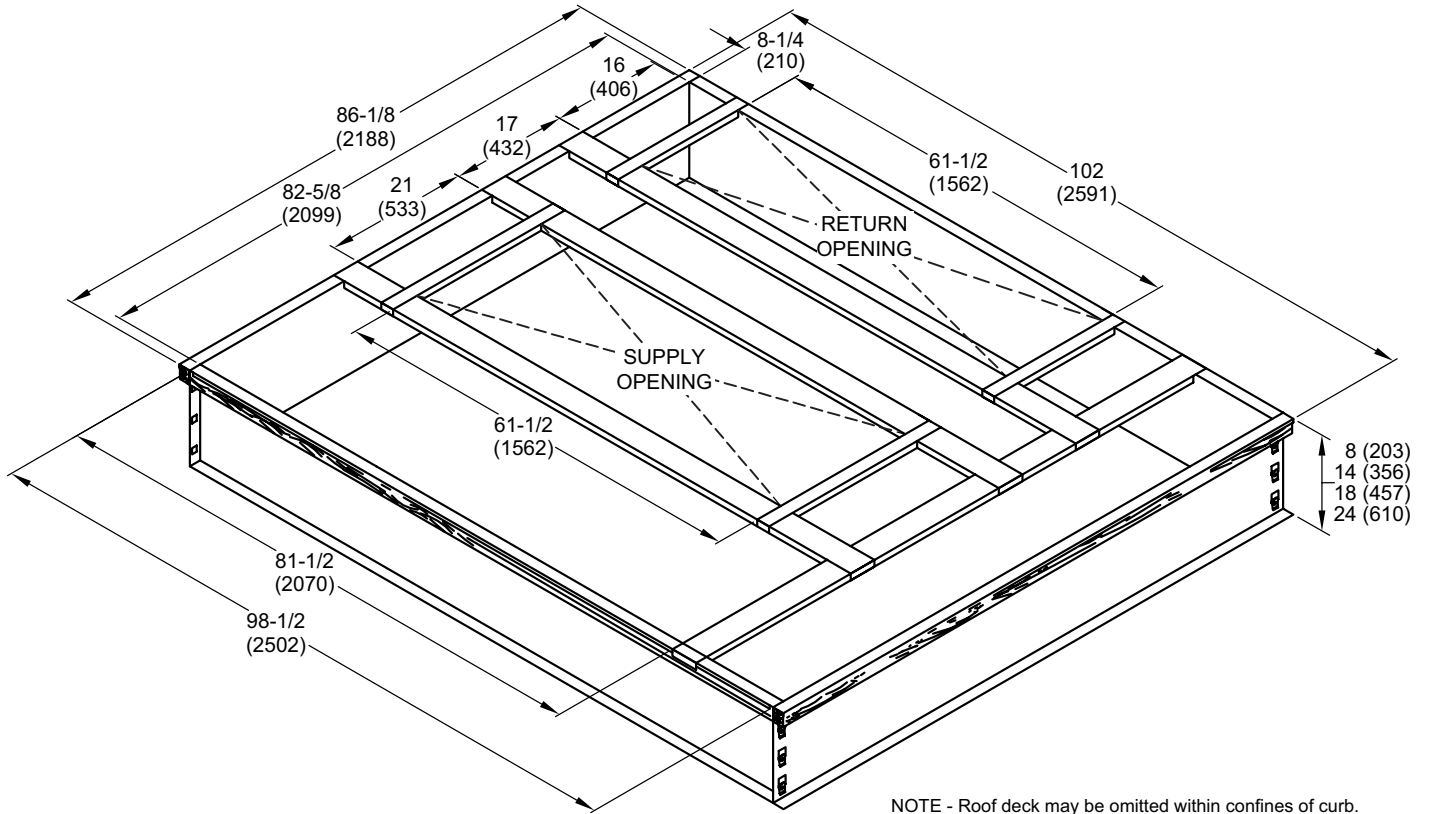
NOTE - Two furnished per order no.

<sup>1</sup> NOTE - Opening size required in return air duct.

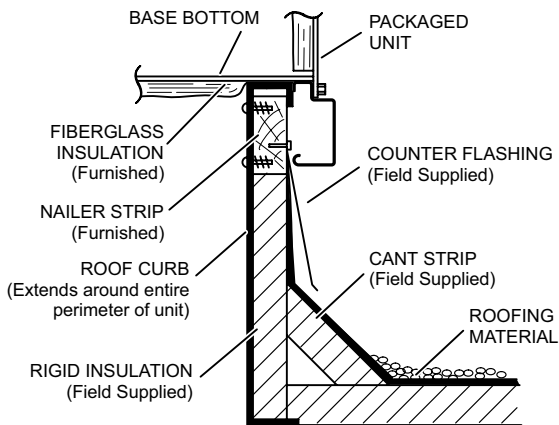


# DIMENSIONS - ACCESSORIES

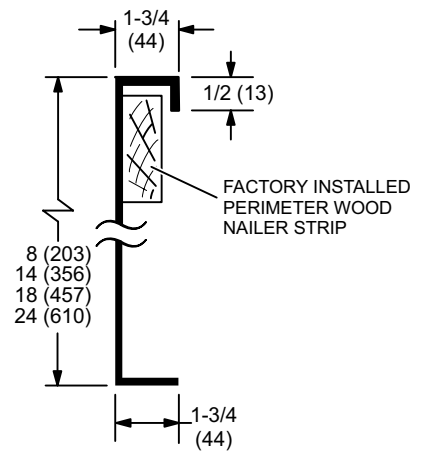
## HYBRID ROOF CURBS - DOUBLE DUCT OPENING



**TYPICAL FLASHING DETAIL FOR ROOF CURB**

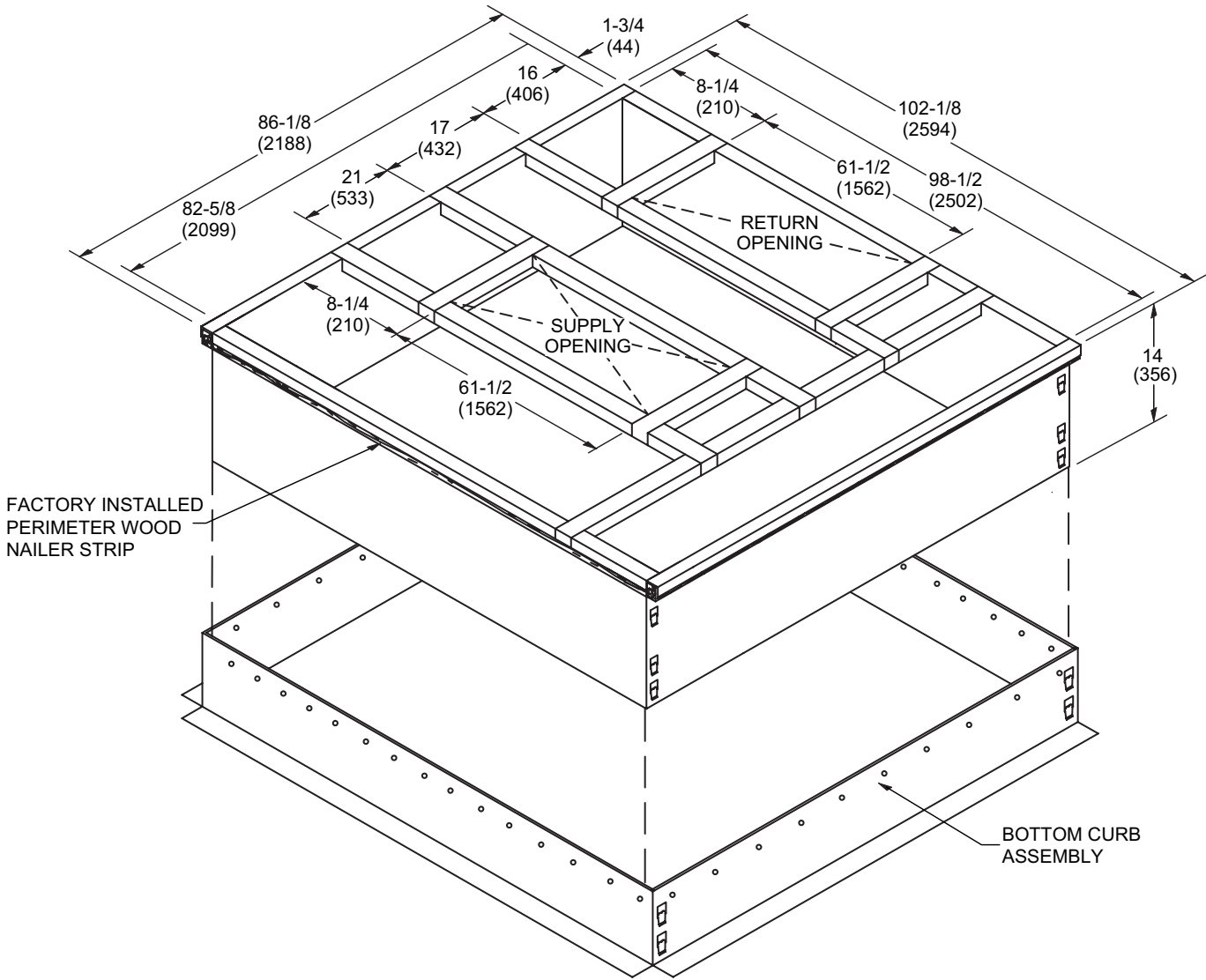


**DETAIL ROOF CURB**



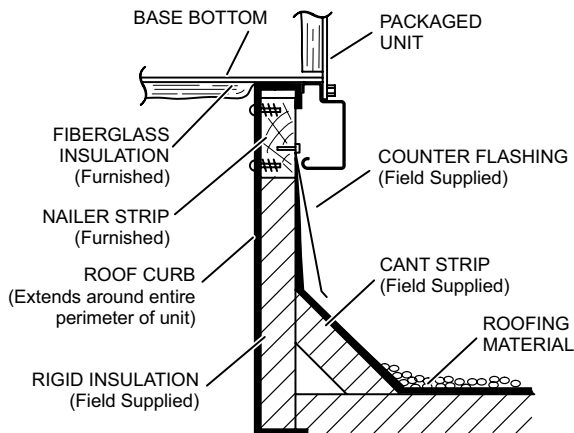
# DIMENSIONS - ACCESSORIES

## ADJUSTABLE PITCH CURB - DOUBLE DUCT OPENING

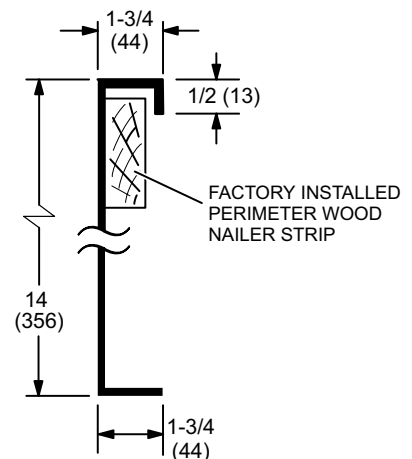


NOTE - Maximum slope pitch is 3/4 in. per 1 foot (19 mm per 305 mm) in any one direction.

### TYPICAL FLASHING DETAIL FOR ROOF CURB

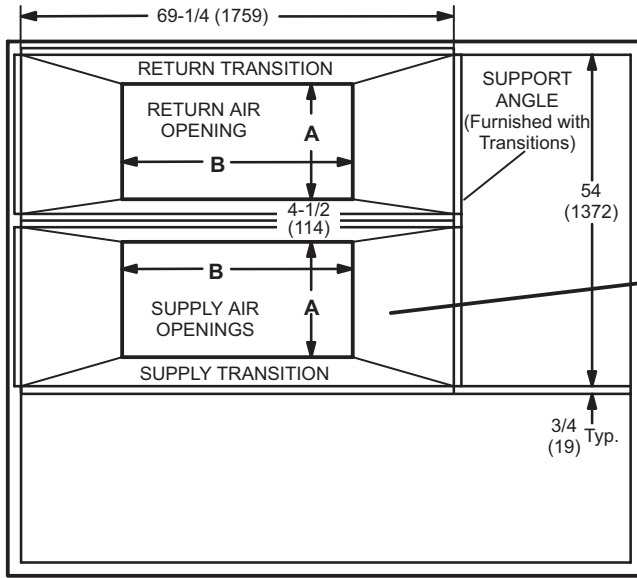


### DETAIL ROOF CURB

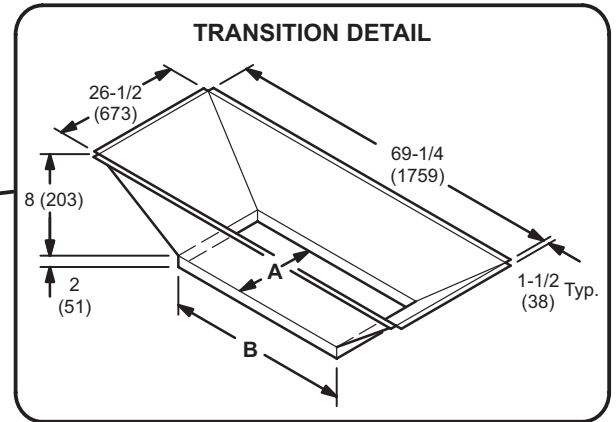


## DIMENSIONS - ACCESSORIES

### ROOF CURBS WITH SUPPLY & RETURN AIR TRANSITIONS FOR CEILING DIFFUSERS



TOP VIEW

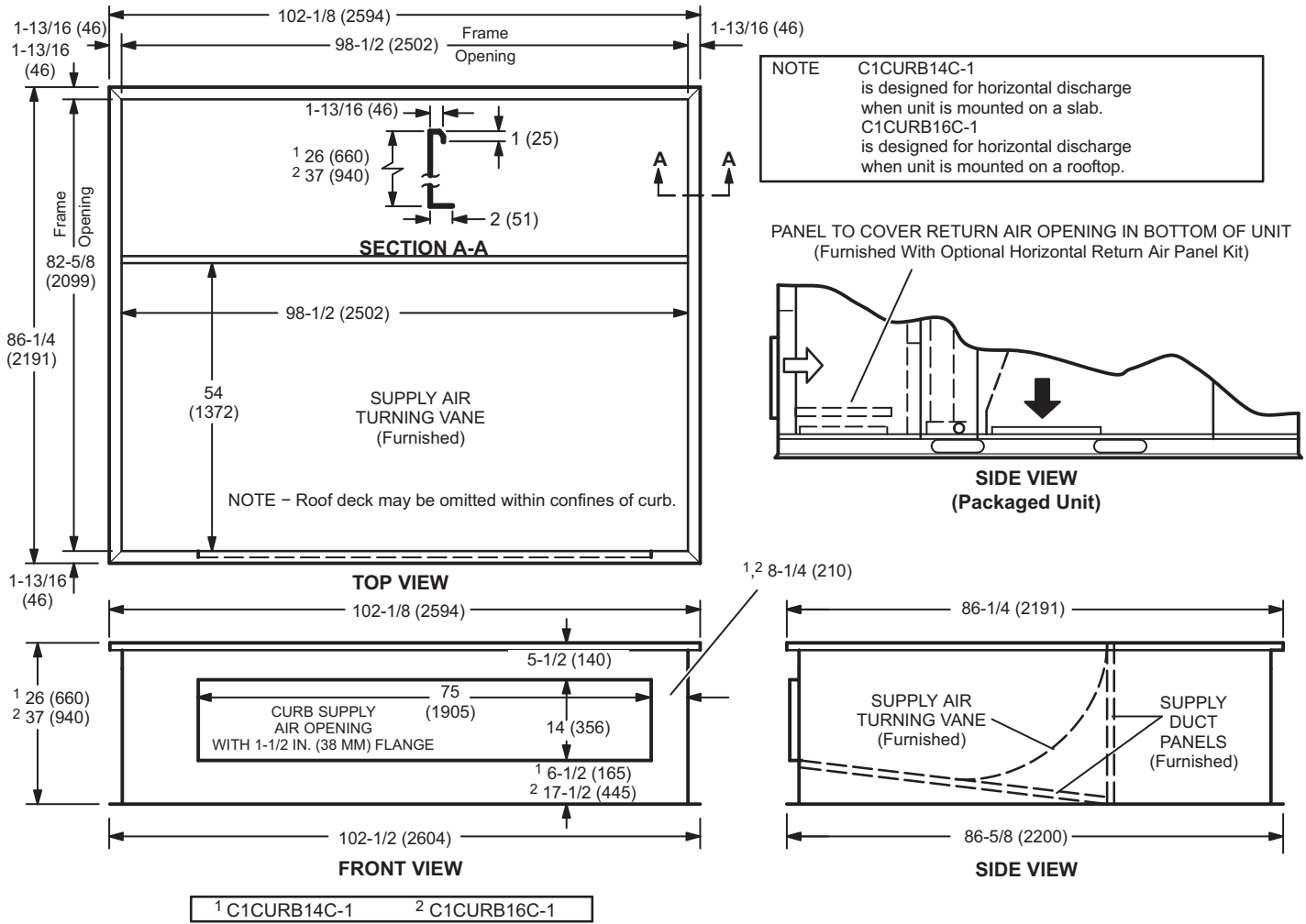


TRANSITION OPENING SIZES

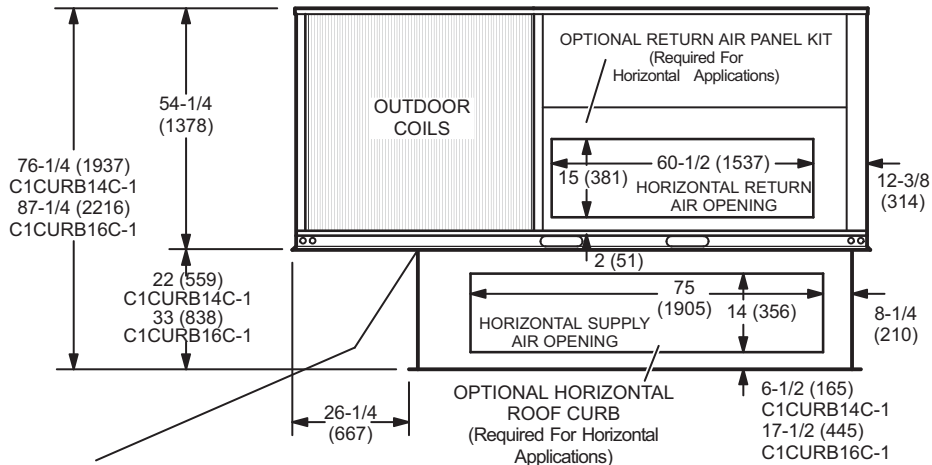
Model Number	A		B	
	inch	mm	inch	mm
C1DIFF33C-1	18	457	36	914
C1DIFF34C-1	24	610	48	1219

# DIMENSIONS - ACCESSORIES

## HORIZONTAL ROOF CURBS – Requires Optional Horizontal Return Air Panel Kit



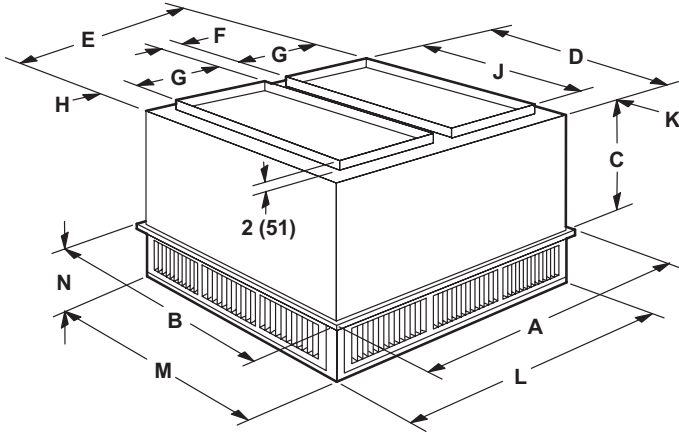
## HORIZONTAL SUPPLY AND RETURN AIR OPENINGS WITH HORIZONTAL ROOF CURB



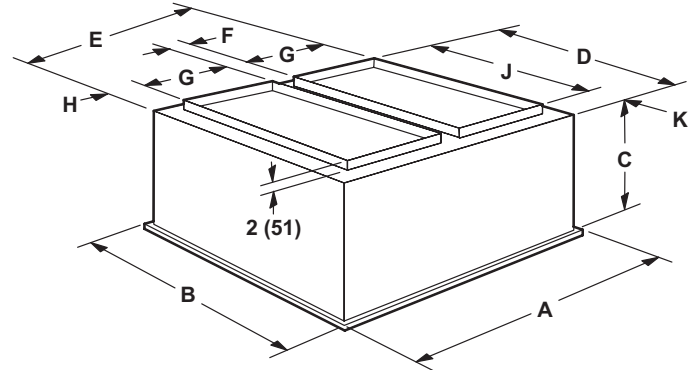
## DIMENSIONS - ACCESSORIES

### COMBINATION CEILING SUPPLY AND RETURN DIFFUSERS

#### STEP-DOWN CEILING DIFFUSER



#### FLUSH CEILING DIFFUSER



Model Number		RTD11-185S	RTD11-275
A	in.	47-5/8	59-5/8
	mm	1210	1514
B	in.	47-5/8	59-5/8
	mm	1210	1514
C	in.	24-5/8	30-5/8
	mm	625	778
D	in.	45-1/2	57-1/2
	mm	1156	1461
E	in.	45-1/2	57-1/2
	mm	1156	1461
F	in.	4-1/2	4-1/2
	mm	114	114
G	in.	18	24
	mm	457	610
H	in.	2-1/2	2-1/2
	mm	64	64
J	in.	36	48
	mm	914	1219
K	in.	4-3/4	4-3/4
	mm	121	121
L	in.	45-1/2	57-1/2
	mm	1156	1461
M	in.	45-1/2	57-1/2
	mm	1156	1461
N	in.	10-1/8	11-1/8
	mm	257	283
Duct Size	in.	18 x 36	24 x 48
	mm	457 x 914	610 x 1219

Model Number		FD11-185S	FD11-275
A	in.	47-5/8	59-5/8
	mm	1210	1514
B	in.	47-5/8	59-5/8
	mm	1210	1514
C	in.	29-1/4	35-1/4
	mm	743	895
D	in.	45	57
	mm	1143	1148
E	in.	45	57
	mm	1143	1448
F	in.	4-1/2	4-1/2
	mm	114	114
G	in.	18	24
	mm	457	610
H	in.	2-1/4	2-1/4
	mm	57	57
J	in.	36	48
	mm	914	1219
K	in.	4-1/2	4-1/2
	mm	114	114
Duct Size	in.	18 x 36	24 x 48
	mm	457 x 914	610 x 1219





## REVISIONS

Section	Description
Options/Accessories	Removed Novar 2051 option.
Optional Conventional Temperature Control Systems	Added BACnet Thermostat, Controls and optional accessories.



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