



PRODUCT SPECIFICATIONS

**RAIDER®**

Value Without Compromise®

Bulletin No. 210724

June 2016

Supersedes November 2015



**MSAV™**  
MULTI-STAGE AIR VOLUME



**ASHRAE 90.1  
COMPLIANT**

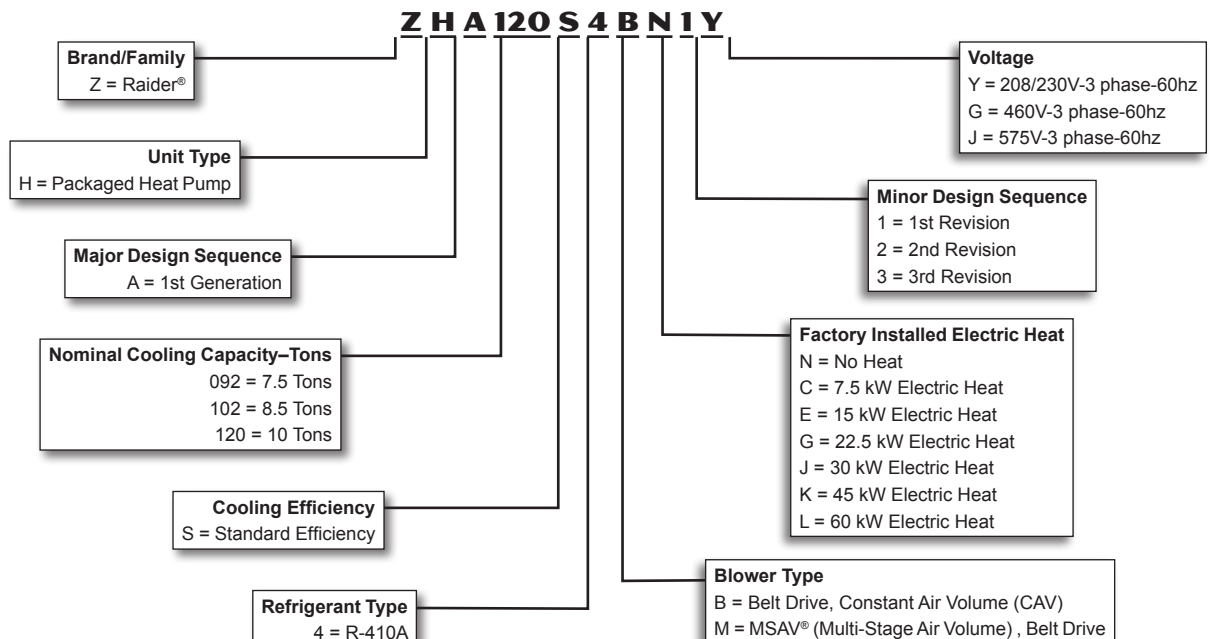
**7.5 to 10 Tons**

**Net Cooling Capacity – 87,000 to 118,000 Btuh**

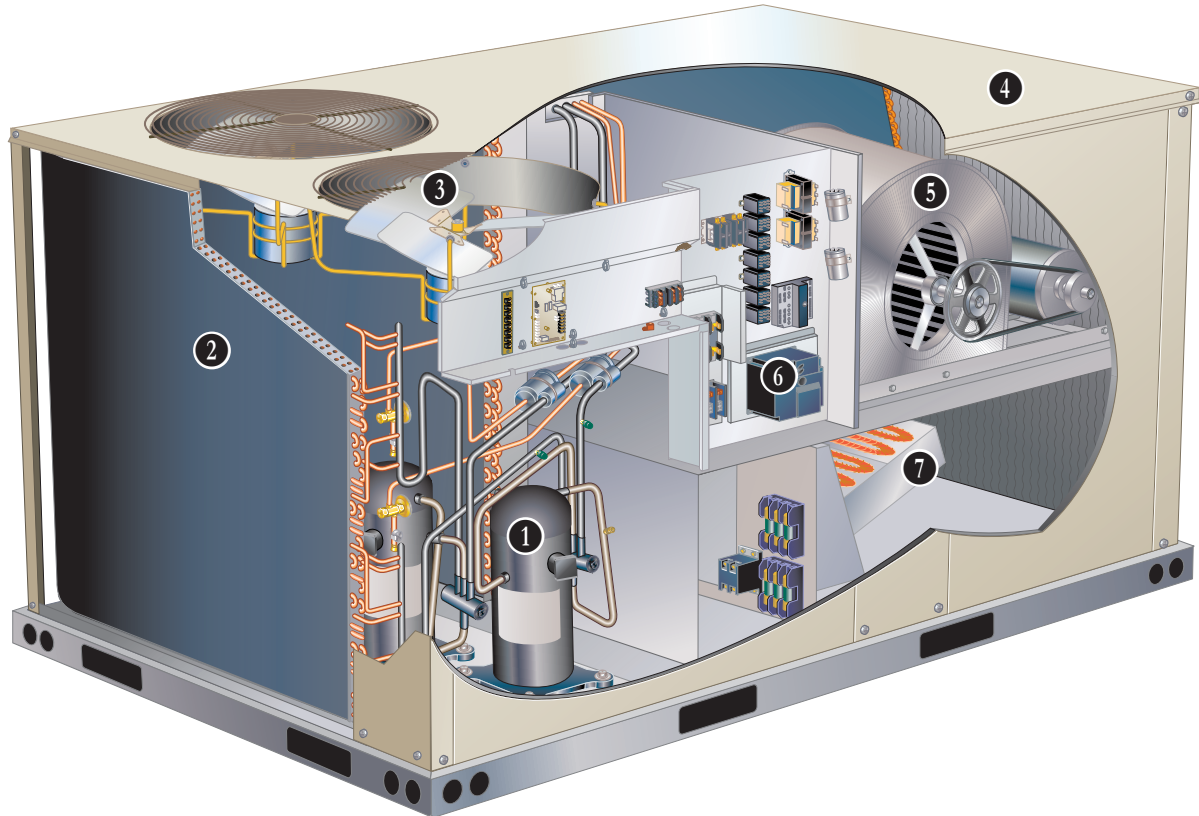
**Net Heating Capacity–89,000 to 116,000 Btuh**

**Optional Electric Heat–7.5 to 60 kW**

MODEL NUMBER IDENTIFICATION



## FEATURES AND BENEFITS



Raider® rooftop units from Lennox Commercial are the new standard for reliable, efficient rooftop units built for long-lasting performance that can significantly improve indoor environments.

Raider® Rooftop Units Feature:

- **Quick and Easy Retrofit**—Fast installation for replacement of many existing rooftop units—fits high volume competitor's roof curbs
- **R-410A Refrigerant**—Environmentally friendly
- **Scroll Compressors**—Single speed scroll compressors are furnished on all models.
- **High Pressure Switches**—Protect compressor.
- **Independent Outdoor Fan Motor Mounts**—Allows for easy and efficient service access without removing the top panel.
- **Constant Air Volume (CAV) or MSAV® (Multi-Stage Air Volume) Supply Air Blower Option**—Allows constant or multi-staged air delivery.
- **Downflow or Horizontal Airflow**—Easy field conversion.
- **Two Fork Lift Slots on Three Sides**—Easy to pick up and transport units from almost any angle.
- **Corrosion-Resistant Drain Pan**—Provides durability and improved serviceability and meets ASHRAE 62.1 requirements for drain pan slope..
- **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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and vice versa.

### 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 and temperature switches terminate defrost cycle.

### High Pressure Switches

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

## 2 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 tubing optimizes both sensible and latent cooling capacity.

### Condensate Drain Pan

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

Side drain connections.

### Outdoor Coil Fan Motors

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

## 3 Outdoor Coil Fans

PVC coated fan guard furnished.

## COOLING SYSTEM (continued)

### Required Selections

## APPROVALS

AHRI Certified to AHRI Standard 340/360-2007.

ETL Intertek listed.

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

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

Models equipped with the MSAV option 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 on Optional High Performance Economizers.

Limited one year all other covered components.

## COOLING 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.

### Refrigerant Metering Orifice

Accurately meters refrigerant in system.

Refrigerant control is accomplished by exact sizing of refrigerant metering orifice.

### Filter/Driers

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

### Reversing Valve

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

## FEATURES AND BENEFITS

### 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

### 4 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 shipped in downflow (vertical) configuration, can be field converted to horizontal airflow.

#### **Duct Flanges**

Provided for horizontal duct attachment.

#### **Power Entry**

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

Optional Bottom Power Entry Kit is available.

#### **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.

#### **Access Panels**

Access panels are provided for the filter section, heating/blower section, and the compressor/controls section. Recessed handles allow easy access for servicing.

## 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

Outdoor Corrosion Protection:

- Coated coil

### 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.

## FEATURES AND BENEFITS

### 5 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.

#### Required Selections

##### Select Constant Air Volume (CAV) or MSAV® (Multi-Stage Air Volume) Supply Air Blower Option

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

#### CAV Operation

On units ordered with the Constant Air volume (CAV) option, the supply air blower will provide a constant volume of air.

### 6 MSAV Operation

Units ordered with the MSAV 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 67% 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 MSAV 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.

#### MSAV Sequence of Operation

Blower operates in low speed for mechanical cooling mode (Y1), ventilation mode (G), or free cooling mode.

Blower operates in high speed for any other mode—mechanical cooling (Y1+Y2), free cooling + Y2 or heating (W1 and W1+W2).

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 economizer control.

*Note—Two-minimum fresh-air settings are only available on MSAV with the High Performance Economizer option.*

## CONTROLS

### 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.**

### Smoke Detectors

*NOTE—Smoke detectors are not available and must be field provided by installer.*

#### Options/Accessories

##### Field Installed

##### Commercial Control Systems

##### L Connection® Network

Complete building automation control system for single or multi-zone applications. Options include local interface, software for local or remote communication, and hardware for networking other control functions.

See L Connection Network Product Specifications Bulletin for details.

### Thermostats

Control system and thermostat options, see page 28.

Aftermarket unit controller options, see Options/Accessories table.

### ELECTRICAL

#### 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.

## FEATURES AND BENEFITS

### Options/Accessories

#### Field Installed

#### 7 Electric Heat

Helix wound nichrome elements, individual element limit controls, wiring harness. See Options / Accessories tables for ordering information.

**NOTE**—Unit Fuse Block is required and must be ordered separately. See Electrical / Electric Heat tables for ordering information.

#### Bottom Power Entry Kit

Kit reduces the number of penetrations in the roof.

Kit includes bulkhead connectors to provides power and control wiring routing through the roof curb.

### INDOOR AIR QUALITY

#### Air Filters

Disposable 2 inch filters furnished as standard.

### Options/Accessories

#### Field Installed

#### Healthy Climate® High Efficiency Air Filters

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

#### Replacement Filter Media Kit With Frame

Replaces existing pleated filter media. Includes washable metal mesh screen and metal frame with clip for holding replaceable non-pleated filter.

#### 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.

### ECONOMIZER OPTIONS

#### Factory or Field Installed

**NOTE**—Downflow Economizer is factory or field installed. Horizontal Economizer is field installed only.

#### Economizer

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

Downflow or Horizontal models

with Barometric Relief Dampers and Hoods.

Barometric Relief Dampers allow relief of excess air, aluminum blade dampers prevent blow back and outdoor air infiltration during off cycle, Exhaust hood with bird screen furnished.

**NOTE**—Outdoor Air and Barometric Relief Exhaust Hoods are included when economizer is factory installed and are furnished with economizer when ordered for field installation.

Occupied/Unoccupied mode with field furnished setback thermostat.

Demand Control Ventilation (DCV) ready using optional CO<sub>2</sub> sensors.

Single temperature control is furnished with Economizer.

Outdoor air temperature sensor enables economizer if the outdoor temperature is less than the setpoint of the control.

#### 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.

ASHRAE 90.1-2010 compliant.

Parallel 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.



## OPTIONS / ACCESSORIES

- 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.

## **ECONOMIZER OPTIONS** **(continued)**

### **Field Installed**

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

Outdoor air enthalpy sensor enables economizer if the outdoor enthalpy is less than the setpoint of the control.

#### **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**

### **Field Installed**

### **Horizontal Low Profile**

#### **Barometric Relief Dampers**

For use when unit is configured for horizontal applications in a reduced space 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 furnished.

#### **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 Barometric Relief Dampers. Fan is 20 in. diameter with 5 blades (K1PWRE10B) WITH 1/3 hp motor.

## **OUTDOOR AIR OPTIONS**

### **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 a slide damper.

Maximum mixed air temperature in cooling mode: 100°F.

## **ROOF CURBS**

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

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

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.

## **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)**

*NOTE—Ceiling Diffuser Transitions are not furnished and must be field fabricated.*



## OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	Unit Model No		
			092	102	120
COOLING SYSTEM					
Condensate Drain Trap	PVC—C1TRAP20AD2	76W26	X	X	X
	Copper—C1TRAP10AD2	76W27	X	X	X
Corrosion Protection		Factory	O	O	O
Drain Pan Overflow Switch	Z1SNSR90A1	99W59	X	X	X
Low Ambient Kit	Z1SNSR33B-1	10Z34	X	X	X
Refrigerant Type		R-410A	O	O	O
BLOWER—SUPPLY AIR					
Blower Option	CAV (Constant Air Volume)	Factory	O	O	O
	MSAV (Multi-Stage Air Volume)	Factory	O	O	O
Blower Motors	Belt Drive—2 hp	Factory	O	O	O
	Belt Drive—3 hp	Factory	O	O	O
	Belt Drive—5 hp	Factory	O	O	O
Drive Kits	Kit #1 590-890 rpm	Factory	O	O	O
See Blower Data Tables for selection	Kit #2 800-1105 rpm	Factory	O	O	O
	Kit #3 795-1195 rpm	Factory	O	O	O
	Kit #4 730-970 rpm	Factory	O	O	O
	Kit #5 940-1200 rpm	Factory	O	O	O
	Kit #6 1015-1300 rpm	Factory	O	O	O
	Kit #10 900-1135 rpm	Factory	O	O	O
	Kit #11 1040-1315 rpm	Factory	O	O	O
	Kit #12 1125-1425 rpm	Factory	O	O	O
CABINET					
Combination Coil/Hail Guards	Z1GARD52B-1	12X21	X	X	X
CONTROLS					
	L Connection® Building Automation System	—	X	X	X
BACnet®	K0CTRL31B-1	96W15	OX	OX	OX
BACnet® Thermostat with Display	K0SNSR01FF1	97W23	X	X	X
BACnet® Thermostat without Display	K0SNSR00FF1	97W24	X	X	X
Novar® 2051	K0CTRL30B-1	96W12	OX	OX	OX
Plenum Cable (75 ft.)	K0MISC00FF1	97W25	X	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	Unit Model No		
			092	102	120
INDOOR AIR QUALITY					
Air Filters					
Healthy Climate® High Efficiency Air Filters 20 x 24 x 2 in. (Order 4 per unit)	MERV 8–Z1FLTR15B-1	14C35	X	X	X
	MERV 13–Z1FLTR40B-1	14C36	X	X	X
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)	C1FLTR30B-1-	Y3063	X	X	X
Indoor Air Quality (CO <sub>2</sub> ) Sensors					
Sensor–Wall-mount, off-white plastic cover with LCD display	C0SNSR50AE1L	77N39	X	X	X
Sensor–Wall-mount, off-white plastic cover, no display	C0SNSR52AE1L	87N53	X	X	X
Sensor–Black plastic case with LCD display, rated for plenum mounting	C0SNSR51AE1L	87N52	X	X	X
Sensor–Wall-mount, black plastic case, no display, rated for plenum mounting	C0MISC19AE1	87N54	X	X	X
CO <sub>2</sub> Sensor Duct Mounting Kit—for downflow applications	C0MISC19AE1-	85L43	X	X	X
Aspiration Box—for duct mounting non-plenum rated CO <sub>2</sub> sensors (87N53 or 77N39)	C0MISC16AE1-	90N43	X	X	X
ELECTRICAL					
Voltage 60 hz	208/230V–3 phase	Factory	O	O	O
	460V–3 phase	Factory	O	O	O
	575V–3 phase	Factory	O	O	O
Bottom Power Entry Kit	Z1PEKT01B-1	11H66	X	X	X
ELECTRIC HEAT					
7.5 kW	208/230V-3ph–Z1EH0075B-1Y	10Y97	X	X	
	460V-3ph–Z1EH0075B-1G	10Y98	X	X	
	575V-3ph–Z1EH0075B-1J	10Y99	X	X	
15 kW	208/230V-3ph–Z1EH0150B-1Y	10Z01	X	X	X
	460V-3ph–Z1EH0150B-1G	10Z03	X	X	X
	575V-3ph–Z1EH0150B-1J	10Z04	X	X	X
22.5 kW	208/230V-3ph–Z1EH0225B-1Y	10Z05	X	X	X
	460V-3ph–Z1EH0225B-1G	10Z06	X	X	X
	575V-3ph–Z1EH0225B-1J	10Z07	X	X	X
30 kW	208/230V-3ph–Z1EH0300B-1Y	10Z08	X	X	X
	460V-3ph–Z1EH0300B-1G	10Z09	X	X	X
	575V-3ph–Z1EH0300B-1J	10Z10	X	X	X
45 kW	208/230V-3ph–Z1EH0450B-1Y	10Z11	X	X	X
	460V-3ph–Z1EH0450B-1G	10Z12	X	X	X
	575V-3ph–Z1EH0450B-1J	10Z13	X	X	X
60 kW	208/230V-3ph–Z1EH0600B-1Y	10Z14			X
	460V-3ph–Z1EH0600B-1G	10Z15			X
	575V-3ph–Z1EH0600B-1J	10Z16			X
ELECTRIC HEAT ACCESSORIES					
Unit Fuse Block (required)—See Electrical/Electric Heat Tables for Selection			X	X	X

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## OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	Unit Model No		
			092	102	120
ECONOMIZER					
Standard Economizer (Not for Title 24)					
Standard Downflow Economizer with Single Temperature Control–With Barometric Relief Dampers and Air Hoods	Z1ECON30B-1	10Z29	OX	OX	OX
Standard Horizontal Economizer with Single Temperature Control–With Barometric Relief Dampers and Air Hoods	Z1ECON16B-1	11G98	X	X	X
Standard Economizer Controls (Not for Title 24)					
Single Enthalpy Control	C1SNSR64FF1	53W64	X	X	X
Differential Enthalpy Control (order 2)	C1SNSR64FF1	53W64	X	X	X
High Performance Economizer (Approved for California Title 24 Building Standards)					
High Performance Downflow Economizer with Single Temperature Control–With Barometric Relief Dampers and Air Hoods	Z1ECON32B-1	12B44	OX	OX	OX
High Performance Horizontal Economizer with Single Temperature Control–With Barometric Relief Dampers and Air Hoods	Z1ECON33B-1	12B46	X	X	X
High Performance Economizer Controls (Not for Title 24)					
Single Enthalpy Control	C1SNSR61FF1	11G21	X	X	X
Differential Enthalpy Control (order 2)	C1SNSR61FF1	11G21	X	X	X
Horizontal Low Profile Barometric Relief Dampers With Exhaust Hood					
Horizontal Low Profile Barometric Relief Dampers With Exhaust Hood	LAGEDH03/15	53K04	X	X	X
OUTDOOR AIR					
Outdoor Air Dampers					
Motorized Dampers with outdoor air hood	Z1DAMP20B-2	14G36	X	X	X
Manual Dampers with outdoor air hood	Z1DAMP10B-2	14G37	X	X	X
POWER EXHAUST					
Standard Static (Downflow)	208/230V-3ph–Z1PWRE10B-1Y	10Z70	X	X	X
	460V-3ph–Z1PWRE10B-1G	10Z71	X	X	X
Standard Static (Horizontal)	208/230V-3ph–Z1PWRE15A-1P	24E01	X	X	X
	460V-3ph–Z1PWRE15A-1G	28E01	X	X	X
575V Transformer Kit	575V-3ph–Z1TRFM20A-1J	59E02	X	X	X
NOTE–Order 575V Transformer Kit with 208/230V Power Exhaust Fan for 575V applications. Order two kits for downflow models, order one kit for horizontal models.					
ROOF CURBS					
Hybrid Roof Curbs, Downflow					
8 in. height	Z1CURB40B-1	10Z25	X	X	X
14 in. height	Z1CURB41B-1	10Z26	X	X	X
18 in. height	Z1CURB42B-1	10Z27	X	X	X
24 in. height	Z1CURB43B-1	10Z28	X	X	X
CEILING DIFFUSERS					
Step-Down–Order one	RTD11-95S	13K61	X		
	RTD11-135S	13K62		X	X
Flush–Order one	FD11-95S	13K56	X		
	FD11-135S	13K57		X	X

NOTE–Ceiling Diffuser Transitions are not furnished and must be field fabricated.

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

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SPECIFICATIONS			7.5–8.5 TON			
General Data		Nominal Tonnage	7.5 Ton	7.5 Ton	8.5 Ton	8.5 Ton
		Model Number	ZHA092S4B	ZHA092S4M	ZHA102S4B	ZHA102S4M
		Efficiency Type	Standard	Standard	Standard	Standard
		Blower Type	Constant Air Volume (CAV)	MSAV (Multi-Stage Air Volume)	Constant Air Volume (CAV)	MSAV (Multi-Stage Air Volume)
Cooling Performance	Gross Cooling Capacity–Btuh	89,400	89,400	103,200	103,200	
	<sup>1</sup> Net Cooling Capacity–Btuh	87,000	87,000	100,000	100,000	
	AHRI Rated Air Flow–cfm	2800	2800	3150	3150	
	Total Unit Power–kW	7.9	7.9	9.1	9.1	
	<sup>1</sup> EER (Btuh/Watt)	11.0	11.0	11.0	11.0	
	<sup>1</sup> IEER (Btuh/Watt)	12.2	12.5	12.2	12.5	
	Refrigerant Type	R-410A	R-410A	R-410A	R-410A	
	Refrigerant Charge Furnished	Circuit 1	11 lbs. 12 oz.	11 lbs. 12 oz.	11 lbs. 10 oz.	11 lbs. 10 oz.
	Circuit 2	10 lbs. 8 oz.	10 lbs. 8 oz.	9 lbs. 14 oz.	9 lbs. 14 oz.	
Heating Performance	<sup>1</sup> Total High Heat Capacity–Btuh	89,000	89,000	100,000	100,000	
	Total Unit Power–kW	7.9	7.9	8.9	8.9	
	<sup>1</sup> C.O.P.	3.3	3.3	3.3	3.3	
	<sup>1</sup> Total Low Heat Capacity–Btuh	53,000	53,000	55,000	55000	
	Total Unit Power (kW)	6.9	6.9	7.2	7.2	
	<sup>1</sup> C.O.P.	2.25	2.25	2.25	2.25	
Electric Heat Available–See page 10		7.5, 15, 22.5, 30 & 45 kW				
Compressor Type (number)		Scroll (2)	Scroll (2)	Scroll (2)	Scroll (2)	
Outdoor Coils	Net face area (total)–sq. ft.	26.2	26.2	26.2	26.2	
	Tube diameter–in.	3/8	3/8	3/8	3/8	
	Number of rows	2	2	2	2	
	Fins per inch	20	20	20	20	
	Expansion device type	Balance port TXV, removable head				
Outdoor Coil Fans	Motor–(No.) hp	(2) 1/3	(2) 1/3	(2) 1/3	(2) 1/3	
	Motor rpm	1075	1075	1075	1075	
	Total Motor watts	650	650	650	650	
	Diameter–(No.) in.	(2) 24	(2) 24	(2) 24	(2) 24	
	Number of blades	3	3	3	3	
	Total Air volume–cfm	8800	8800	8800	8800	
Indoor Coils	Net face area (total)–sq. ft.	12.8	12.8	12.8	12.8	
	Tube diameter–in.	3/8	3/8	3/8	3/8	
	Number of rows	3	3	4	4	
	Fins per inch	14	14	14	14	
	Drain connection–Number and size	(1) 1 in. NPT coupling				
	Expansion device type	Refrigerant Metering Orifice (RFC)				
<sup>2</sup> Indoor Blower and Drive Selection	Nominal motor output	2 hp, 3 hp, 5 hp				
	Maximum usable motor output (US Only)	2.3 hp, 3.45 hp, 5.75 hp				
	Motor–Drive kit number	2 hp Kit 1 590-890 rpm Kit 2 800-1105 rpm Kit 3 795-1195 rpm				
		3 hp Kit 4 730-970 rpm Kit 5 940-1200 rpm Kit 6 1015-1300 rpm				
		5 hp Kit 10 900-1135 rpm Kit 11 1040-1315 rpm Kit 12 1125-1425 rpm				
Blower wheel nominal diameter x width–in.		(1) 15 X 15	(1) 15 X 15	(1) 15 X 15	(1) 15 X 15	
Filters	Type of filter	Disposable				
	Number and size–in.	(4) 20 x 24 x 2				
Electrical characteristics		208/230V, 460V or 575V–60 hertz–3 phase				

NOTE—Net capacity includes evaporator blower motor heat deduction. Gross 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> 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 — Units equipped with MSAV® (Multi-Stage Air Volume) option are limited to a motor service factor of 1.0.

SPECIFICATIONS			10 TON
General Data	Nominal Tonnage	10 Ton	10 Ton
	Model Number	ZHA120S4B	ZHA120S4M
	Efficiency Type	Standard	Standard
	Blower Type	Constant Air Volume (CAV)	MSAV (Multi-Stage Air Volume)
Cooling Performance	Gross Cooling Capacity—Btuh	121,900	121,900
	<sup>1</sup> Net Cooling Capacity—Btuh	118,000	118,000
	AHRI Rated Air Flow—cfm	3600	3600
	Total Unit Power—kW	10.7	10.7
	<sup>1</sup> EER (Btuh/Watt)	11.0	11.0
	<sup>1</sup> IEER (Btuh/Watt)	11.3	12.5
	Refrigerant Type	R-410A	R-410A
	Refrigerant Charge Furnished		
	Circuit 1	16 lbs. 0 oz.	16 lbs. 0 oz.
	Circuit 2	14 lbs. 12 oz.	14 lbs. 12 oz.
Heating Performance	<sup>1</sup> Total High Heat Capacity—Btuh	116,000	116,000
	Total Unit Power—kW	10.3	10.3
	<sup>1</sup> C.O.P.	3.3	3.3
	<sup>1</sup> Total Low Heat Capacity—Btuh	70,000	70,000
	Total Unit Power (kW)	9.1	9.1
	<sup>1</sup> C.O.P.	2.25	2.25
Electric Heat Available—See page 10		15, 22.5, 30, 45 and 60 KW	
Compressor Type (number)		Scroll (2)	Scroll (2)
Outdoor Coils	Net face area (total)—sq. ft.	26.2	26.2
	Tube diameter—in.	3/8	3/8
	Number of rows	3	3
	Fins per inch	20	20
	Expansion device type	Balance port TXV, removable head	
Outdoor Coil Fans	Motor—(No.) hp	(2) 1/2	(2) 1/2
	Motor rpm	1075	1075
	Total Motor watts	960	960
	Diameter—(No.) in.	(2) 24	(2) 24
	Number of blades	3	3
	Total Air volume—cfm	9000	9000
Indoor Coils	Net face area (total)—sq. ft.	13.54	13.54
	Tube diameter—in.	3/8	3/8
	Number of rows	4	4
	Fins per inch	14	14
	Drain connection—Number and size	(1) 1 in. NPT coupling	
<sup>2</sup> Indoor Blower and Drive Selection	Nominal motor output	2 hp, 3 hp, 5 hp	
	Maximum usable motor output (US Only)	2.3 hp, 3.45 hp, 5.75 hp	
	Motor—Drive kit number	2 hp <b>Kit 1</b> 590-890 rpm <b>Kit 2</b> 800-1105 rpm <b>Kit 3</b> 795-1195 rpm 3 hp <b>Kit 4</b> 730-970 rpm <b>Kit 5</b> 940-1200 rpm <b>Kit 6</b> 1015-1300 rpm 5 hp <b>Kit 10</b> 900-1135 rpm <b>Kit 11</b> 1040-1315 rpm <b>Kit 12</b> 1125-1425 rpm	
	Blower wheel nominal diameter x width—in.	(1) 15 X 15	(1) 15 X 15
	Filters	Disposable	
Electrical characteristics	Type of filter	(4) 20 x 24 x 2	
	Number and size—in.		
Electrical characteristics		208/230V, 460V or 575V—60 hertz—3 phase	

NOTE—Net capacity includes evaporator blower motor heat deduction. Gross 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> 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 — Units equipped with MSAV® (Multi-Stage Air Volume) option 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.

### 7.5 TON COOLING STANDARD EFFICIENCY ZHA092S4 (1ST STAGE)–CONSTANT AIR VOLUME

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			
				75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F	
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	2400	52.4	2.75	0.57	0.85	1	49.6	3.17	0.58	0.92	1	46.7	3.63	0.59	0.99	1	43.9	4.14	0.61	1	1	
	3000	54.9	2.76	0.61	1	1	52.4	3.18	0.63	1	1	49.5	3.64	0.64	1	1	46.6	4.15	0.74	1	1	
	3600	57.5	2.76	0.71	1	1	54.7	3.19	0.79	1	1	51.8	3.65	0.87	1	1	48.7	4.16	0.96	1	1	
67°F	2400	55.6	2.76	0.44	0.55	0.73	52.6	3.18	0.44	0.56	0.8	49.6	3.64	0.45	0.57	0.89	46.3	4.15	0.45	0.59	0.97	
	3000	57.9	2.76	0.47	0.6	0.99	54.7	3.19	0.47	0.61	1	51.4	3.65	0.48	0.63	1	48.1	4.16	0.49	0.64	1	
	3600	59.5	2.76	0.5	0.64	1	56.2	3.19	0.5	0.71	1	52.8	3.65	0.51	0.8	1	49.4	4.16	0.53	0.89	1	
71°F	2400	59	2.76	0.32	0.43	0.54	56	3.19	0.32	0.44	0.55	52.7	3.65	0.32	0.44	0.56	49.3	4.16	0.32	0.45	0.57	
	3000	61.3	2.76	0.34	0.46	0.58	58.1	3.19	0.34	0.47	0.6	54.7	3.65	0.34	0.48	0.61	51.2	4.17	0.34	0.49	0.63	
	3600	63.1	2.76	0.35	0.49	0.63	59.6	3.19	0.35	0.5	0.64	56.2	3.66	0.35	0.51	0.72	52.6	4.17	0.35	0.52	0.81	

### 7.5 TON COOLING STANDARD EFFICIENCY ZHA092S4 (2ND STAGE)–CONSTANT AIR VOLUME

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		
				75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F
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	2400	84.6	5.72	0.71	0.85	0.95	79	6.54	0.72	0.87	0.96	73.1	7.45	0.73	0.89	0.98	66.7	8.45	0.75	0.91	0.99
	3000	89.8	5.74	0.76	0.91	0.99	84.2	6.57	0.78	0.93	1	78.1	7.48	0.8	0.94	1	71.6	8.49	0.83	0.96	1
	3600	94.4	5.76	0.82	0.95	1	88.4	6.59	0.84	0.96	1	82.1	7.51	0.86	0.98	1	75.4	8.51	0.89	1	1
67°F	2400	90.4	5.74	0.56	0.69	0.82	84.6	6.56	0.56	0.7	0.84	78.4	7.49	0.56	0.71	0.86	71.7	8.49	0.56	0.73	0.89
	3000	95.6	5.77	0.59	0.74	0.89	89.4	6.59	0.59	0.76	0.91	82.9	7.52	0.6	0.77	0.92	75.6	8.52	0.61	0.8	0.94
	3600	99.4	5.79	0.62	0.79	0.93	93	6.61	0.63	0.81	0.94	86.1	7.53	0.64	0.84	0.96	78.6	8.54	0.65	0.87	0.98
71°F	2400	96	5.77	0.42	0.54	0.66	90.2	6.6	0.41	0.54	0.67	84	7.52	0.4	0.55	0.69	77	8.53	0.4	0.55	0.7
	3000	101.7	5.79	0.43	0.58	0.72	95.5	6.62	0.43	0.58	0.73	88.7	7.54	0.42	0.59	0.75	81.2	8.54	0.42	0.6	0.78
	3600	105.7	5.8	0.45	0.61	0.77	99.2	6.63	0.44	0.62	0.79	92.2	7.55	0.44	0.63	0.81	84.4	8.56	0.44	0.64	0.84

### 7.5 TON HEATING STANDARD EFFICIENCY ZHA092S4–CONSTANT AIR VOLUME

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
	kBtuh	kW	kBtuh	kW	kBtuh	kW	kBtuh	kW	kBtuh	kW
2400	119.7	7.82	90.9	7.27	61.7	6.72	37.4	5.98	18.9	4.51
3000	121.6	7.26	92.8	6.71	63.6	6.16	39.3	5.41	20.8	3.95
3600	123	6.92	94.2	6.37	65	5.82	40.7	5.08	22.2	3.61

## RATINGS

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

### 8.5 TON COOLING STANDARD EFFICIENCY ZHA102S4 (1ST STAGE)–CONSTANT AIR VOLUME

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		
				75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F
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	2720	59.4	2.7	0.63	1	1	56.5	3.12	0.65	1	1	53.5	3.57	0.66	1	1	50.3	4.07	0.68	1	1
	3400	63.2	2.7	0.69	1	1	60	3.12	0.71	1	1	56.8	3.58	0.72	1	1	53.5	4.08	0.92	1	1
	4080	66	2.7	0.83	1	1	62.8	3.12	0.99	1	1	59.4	3.58	1	1	1	55.8	4.08	1	1	1
67°F	2720	62.7	2.7	0.48	0.62	0.83	59.4	3.12	0.49	0.63	1	55.7	3.58	0.5	0.65	1	52	4.07	0.5	0.66	1
	3400	65	2.7	0.52	0.67	1	61.4	3.12	0.53	0.69	1	57.8	3.58	0.54	0.71	1	53.9	4.08	0.55	0.73	1
	4080	66.9	2.7	0.56	0.72	1	63.2	3.12	0.57	0.87	1	59.4	3.58	0.58	1	1	55.8	4.08	0.6	1	1
71°F	2720	66.9	2.7	0.35	0.48	0.6	63.5	3.12	0.35	0.48	0.61	59.8	3.58	0.35	0.49	0.63	55.9	4.08	0.35	0.5	0.65
	3400	69.2	2.69	0.37	0.52	0.66	65.7	3.11	0.37	0.53	0.67	61.7	3.58	0.37	0.54	0.69	57.7	4.08	0.37	0.55	0.71
	4080	71.1	2.69	0.38	0.55	0.71	67.1	3.11	0.39	0.56	0.72	63.1	3.57	0.39	0.58	0.91	58.9	4.08	0.39	0.6	1

### 8.5 TON COOLING STANDARD EFFICIENCY ZHA102S4 (2ND STAGE)–CONSTANT AIR VOLUME

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)							
				Dry Bulb					Dry Bulb					Dry Bulb							
				75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F					
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						
63°F	2720	99.6	6.85	0.68	0.83	0.97	92	7.8	0.68	0.86	0.99	83.9	8.85	0.69	0.89	1	75.3	10.04	0.71	0.93	1
	3400	106	6.89	0.73	0.92	1	97.9	7.83	0.75	0.95	1	89.8	8.9	0.77	0.97	1	81.3	10.1	0.81	0.99	1
	4080	111.4	6.91	0.8	0.98	1	103.5	7.87	0.82	0.99	1	95.2	8.94	0.86	1	1	86.7	10.13	0.9	1	1
67°F	2720	107.6	6.89	0.52	0.66	0.79	99.5	7.84	0.52	0.66	0.82	91.4	8.91	0.52	0.67	0.84	82.2	10.1	0.52	0.69	0.88
	3400	113.7	6.92	0.56	0.71	0.89	105.2	7.88	0.56	0.73	0.92	96.3	8.94	0.57	0.74	0.94	86.7	10.13	0.57	0.78	0.97
	4080	118.2	6.94	0.6	0.77	0.96	109.4	7.89	0.6	0.8	0.97	100.1	8.97	0.61	0.83	0.99	90	10.15	0.62	0.87	1
71°F	2720	115.5	6.93	0.39	0.51	0.63	107.4	7.89	0.38	0.51	0.64	98.9	8.96	0.37	0.51	0.65	89.3	10.15	0.35	0.51	0.67
	3400	122.1	6.95	0.41	0.55	0.69	113.3	7.91	0.4	0.55	0.7	104	8.98	0.39	0.56	0.72	94.1	10.18	0.38	0.57	0.75
	4080	126.5	6.96	0.42	0.58	0.75	117.6	7.93	0.41	0.59	0.77	108	9.01	0.41	0.6	0.8	97.5	10.2	0.4	0.62	0.85

### 8.5 TON HEATING STANDARD EFFICIENCY ZHA102S4–CONSTANT AIR VOLUME

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
2720	127.2	7.97	95.8	7.33	63.7	6.67	38.8	5.97	19.6	4.5
3400	129.4	7.45	98	6.81	65.9	6.15	41	5.44	21.7	3.98
4080	131.1	7.12	99.7	6.48	67.6	5.82	42.7	5.11	23.4	3.65

## RATINGS

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

### 10 TON COOLING STANDARD EFFICIENCY ZHA120S4 (1ST STAGE)–CONSTANT AIR VOLUME

Entering Wet Bulb Temper- ature	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		
				75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F
63°F	3200	67.1	2.84	1	0.93	0.94	62.9	3.22	1	0.93	0.93	58.6	3.65	1	0.92	0.93	54	4.12	1	0.92	0.92
	4000	71	2.88	1	0.92	0.93	66.6	3.26	1	0.91	0.92	61.9	3.68	1	0.91	0.91	57.3	4.16	0.91	0.91	0.91
	4800	73.9	2.91	0.91	0.91	0.91	69.2	3.29	0.91	0.91	0.91	64.5	3.71	0.91	0.91	0.91	59.6	4.19	0.91	0.91	0.91
67°F	3200	69.8	2.87	1	1	0.96	65.1	3.24	1	1	0.93	60.1	3.66	1	1	0.93	55.1	4.13	1	1	0.92
	4000	72.3	2.89	1	1	0.93	67.3	3.27	1	1	0.92	62.3	3.69	1	1	0.91	57.3	4.16	1	0.91	0.91
	4800	74.1	2.9	1	1	0.91	69.3	3.29	1	0.95	0.91	64.6	3.72	1	0.91	0.91	59.5	4.19	1	0.91	0.91
71°F	3200	74.3	2.91	1	1	1	69.3	3.29	1	1	1	64.2	3.71	1	1	1	58.9	4.18	1	1	1
	4000	76.4	2.94	1	1	1	71.4	3.32	1	1	1	66.1	3.73	1	1	1	60.5	4.2	1	1	0.93
	4800	77.9	2.95	1	1	1	72.7	3.33	1	1	1	67.4	3.75	1	1	0.92	61.7	4.22	1	1	0.91

### 10 TON COOLING STANDARD EFFICIENCY ZHA120S4 (2ND STAGE)–CONSTANT AIR VOLUME

Entering Wet Bulb Temper- ature	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		
				75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F
63°F	3200	118	7.62	0.68	0.84	0.99	108.4	8.63	0.69	0.86	1	98.3	9.77	0.7	0.89	1	87.3	11.08	0.72	0.94	1
	4000	125.3	7.68	0.75	0.93	1	115.3	8.69	0.76	0.96	1	104.8	9.83	0.79	0.99	1	94.1	11.14	0.81	1	1
	4800	131.2	7.74	0.81	1	1	121.4	8.75	0.83	1	1	111.7	9.9	0.86	1	1	101.1	11.23	0.9	1	1
67°F	3200	127.3	7.71	0.53	0.66	0.81	117.4	8.71	0.53	0.67	0.83	106.7	9.86	0.52	0.69	0.85	95.4	11.16	0.52	0.7	0.89
	4000	134.4	7.77	0.57	0.72	0.89	123.9	8.78	0.57	0.74	0.92	112.6	9.91	0.57	0.76	0.96	100.5	11.21	0.57	0.79	1
	4800	139.7	7.82	0.6	0.79	0.97	128.4	8.82	0.61	0.81	1	116.9	9.96	0.62	0.84	1	104.4	11.25	0.63	0.88	1
71°F	3200	136.7	7.79	0.39	0.52	0.64	126.4	8.8	0.38	0.52	0.65	115.4	9.94	0.36	0.52	0.66	103.7	11.24	0.34	0.52	0.68
	4000	143.9	7.86	0.41	0.56	0.7	133.1	8.86	0.4	0.56	0.72	121.5	10.01	0.39	0.57	0.74	109	11.29	0.37	0.58	0.77
	4800	149.1	7.92	0.43	0.6	0.77	137.8	8.92	0.42	0.6	0.79	125.4	10.05	0.41	0.61	0.82	112.4	11.35	0.4	0.63	0.86

### 10 TON HEATING STANDARD EFFICIENCY ZH120S4–CONSTANT AIR VOLUME

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
	kBtuh	kW	kBtuh	kW	kBtuh	kW	kBtuh	kW	kBtuh	kW
3200	145.4	9.22	112.8	8.29	79.6	7.31	51.1	6.44	25.3	4.9
4000	147.9	8.64	115.2	7.7	82.1	6.73	53.6	5.85	27.8	4.31
4800	149.8	8.28	117.1	7.34	84	6.37	55.5	5.49	29.7	3.95

## RATINGS

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

### 7.5 TON COOLING STANDARD EFFICIENCY ZHA092S4 (1ST STAGE)–MSAV (Multi-Stage Air Volume) 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)							
				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
63°F	1680	47.6	2.68	0.57	0.73	0.96	45	3.09	0.58	0.76	0.99	42.3	3.54	0.58	0.8	1	39.5	4.03	0.59	0.83	1
	2100	50	2.69	0.61	0.86	1	47.3	3.11	0.62	0.89	1	44.5	3.56	0.63	0.93	1	41.5	4.05	0.66	0.97	1
	2520	51.9	2.7	0.67	0.96	1	49.2	3.12	0.69	0.99	1	46.4	3.57	0.73	1	1	43.6	4.07	0.77	1	1
67°F	1680	50.5	2.7	0.45	0.55	0.68	48	3.11	0.45	0.56	0.7	45.1	3.56	0.45	0.57	0.73	42.2	4.06	0.46	0.58	0.77
	2100	53.2	2.71	0.48	0.59	0.8	50.4	3.12	0.48	0.6	0.83	47.5	3.58	0.48	0.61	0.87	44.3	4.07	0.49	0.63	0.92
	2520	55.1	2.71	0.5	0.63	0.91	52.2	3.12	0.5	0.66	0.94	49.1	3.59	0.51	0.69	0.97	45.8	4.08	0.52	0.73	1
71°F	1680	53.6	2.71	0.35	0.44	0.53	50.8	3.12	0.34	0.44	0.54	48	3.58	0.34	0.44	0.55	45.1	4.08	0.33	0.45	0.56
	2100	56.4	2.71	0.36	0.47	0.57	53.4	3.13	0.35	0.47	0.58	50.4	3.59	0.35	0.47	0.59	47.2	4.09	0.35	0.48	0.61
	2520	58.4	2.71	0.37	0.49	0.61	55.4	3.13	0.36	0.5	0.62	52.1	3.59	0.36	0.5	0.65	48.8	4.09	0.36	0.51	0.69

### 7.5 TON COOLING STANDARD EFFICIENCY ZHA092S4 (2ND STAGE)–MSAV (Multi-Stage Air Volume) 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		
				75°F	80°F	85°F			kBtuh	kW	75°F			80°F	85°F	kBtuh			kW	75°F	80°F
63°F	2400	84.6	5.72	0.71	0.85	0.95	79	6.54	0.72	0.87	0.96	73.1	7.45	0.73	0.89	0.98	66.7	8.45	0.75	0.91	0.99
	3000	89.8	5.74	0.76	0.91	0.99	84.2	6.57	0.78	0.93	1	78.1	7.48	0.8	0.94	1	71.6	8.49	0.83	0.96	1
	3600	94.4	5.76	0.82	0.95	1	88.4	6.59	0.84	0.96	1	82.1	7.51	0.86	0.98	1	75.4	8.51	0.89	1	1
67°F	2400	90.4	5.74	0.56	0.69	0.82	84.6	6.56	0.56	0.7	0.84	78.4	7.49	0.56	0.71	0.86	71.7	8.49	0.56	0.73	0.89
	3000	95.6	5.77	0.59	0.74	0.89	89.4	6.59	0.59	0.76	0.91	82.9	7.52	0.6	0.77	0.92	75.6	8.52	0.61	0.8	0.94
	3600	99.4	5.79	0.62	0.79	0.93	93	6.61	0.63	0.81	0.94	86.1	7.53	0.64	0.84	0.96	78.6	8.54	0.65	0.87	0.98
71°F	2400	96	5.77	0.42	0.54	0.66	90.2	6.6	0.41	0.54	0.67	84	7.52	0.4	0.55	0.69	77	8.53	0.4	0.55	0.7
	3000	101.7	5.79	0.43	0.58	0.72	95.5	6.62	0.43	0.58	0.73	88.7	7.54	0.42	0.59	0.75	81.2	8.54	0.42	0.6	0.78
	3600	105.7	5.8	0.45	0.61	0.77	99.2	6.63	0.44	0.62	0.79	92.2	7.55	0.44	0.63	0.81	84.4	8.56	0.44	0.64	0.84

### 7.5 TON HEATING STANDARD EFFICIENCY ZHA092S4–MSAV (Multi-Stage Air Volume) 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
	kBtuh	kW	kBtuh	kW	kBtuh	kW	kBtuh	kW	kBtuh	kW
2400	119.7	7.82	90.9	7.27	61.7	6.72	37.4	5.98	18.9	4.51
3000	121.6	7.26	92.8	6.71	63.6	6.16	39.3	5.41	20.8	3.95
3600	123	6.92	94.2	6.37	65	5.82	40.7	5.08	22.2	3.61

## RATINGS

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

### 8.5 TON COOLING STANDARD EFFICIENCY ZHA102S4 (1ST STAGE)–MSAV (Multi-Stage Air Volume) 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			
				75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F			75°F	80°F	85°F	
cfm	kBtu/h	kW	75°F	80°F	85°F	kBtu/h	kW	75°F	80°F	85°F	kBtu/h	kW	75°F	80°F	85°F	kBtu/h	kW	75°F	80°F	85°F		
63°F	1920	56.1	2.69	0.6	0.79	1	53.1	3.1	0.61	0.83	1	49.9	3.55	0.62	0.87	1	46.6	4.04	0.64	0.93	1	
	2400	59	2.69	0.65	0.95	1	55.9	3.11	0.67	0.99	1	52.7	3.57	0.69	1	1	49.7	4.06	0.73	1	1	
	2880	61.7	2.7	0.73	1	1	58.8	3.12	0.77	1	1	55.7	3.57	0.81	1	1	52.4	4.07	0.87	1	1	
67°F	1920	60	2.7	0.47	0.59	0.72	56.9	3.11	0.47	0.59	0.75	53.5	3.57	0.48	0.61	0.8	49.9	4.06	0.48	0.62	0.85	
	2400	62.7	2.7	0.5	0.63	0.88	59.4	3.12	0.51	0.65	0.93	55.9	3.58	0.51	0.66	0.97	52.1	4.07	0.52	0.68	1	
	2880	64.8	2.7	0.53	0.69	1	61.3	3.12	0.54	0.72	1	57.6	3.58	0.55	0.77	1	53.8	4.08	0.56	0.82	1	
71°F	1920	64	2.7	0.35	0.46	0.57	60.7	3.12	0.35	0.47	0.58	57.3	3.58	0.35	0.47	0.59	53.6	4.07	0.34	0.47	0.6	
	2400	67	2.7	0.37	0.49	0.62	63.5	3.12	0.37	0.5	0.62	59.9	3.58	0.37	0.51	0.64	56	4.08	0.36	0.51	0.66	
	2880	69.2	2.7	0.38	0.53	0.66	65.5	3.12	0.38	0.53	0.68	61.6	3.58	0.38	0.54	0.72	57.7	4.08	0.38	0.55	0.77	

### 8.5 TON COOLING STANDARD EFFICIENCY ZHA102S4 (2ND STAGE)–MSAV (Multi-Stage Air Volume) 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						
				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
63°F	2720	99.6	6.85	0.68	0.83	0.97	92	7.8	0.68	0.86	0.99	83.9	8.85	0.69	0.89	1	75.3	10.04	0.71	0.93	1				
	3400	106	6.89	0.73	0.92	1	97.9	7.83	0.75	0.95	1	89.8	8.9	0.77	0.97	1	81.3	10.1	0.81	0.99	1				
	4080	111.4	6.91	0.8	0.98	1	103.5	7.87	0.82	0.99	1	95.2	8.94	0.86	1	1	86.7	10.13	0.9	1	1				
67°F	2720	107.6	6.89	0.52	0.66	0.79	99.5	7.84	0.52	0.66	0.82	91.4	8.91	0.52	0.67	0.84	82.2	10.1	0.52	0.69	0.88				
	3400	113.7	6.92	0.56	0.71	0.89	105.2	7.88	0.56	0.73	0.92	96.3	8.94	0.57	0.74	0.94	86.7	10.13	0.57	0.78	0.97				
	4080	118.2	6.94	0.6	0.77	0.96	109.4	7.89	0.6	0.8	0.97	100.1	8.97	0.61	0.83	0.99	90	10.15	0.62	0.87	1				
71°F	2720	115.5	6.93	0.39	0.51	0.63	107.4	7.89	0.38	0.51	0.64	98.9	8.96	0.37	0.51	0.65	89.3	10.15	0.35	0.51	0.67				
	3400	122.1	6.95	0.41	0.55	0.69	113.3	7.91	0.4	0.55	0.7	104	8.98	0.39	0.56	0.72	94.1	10.18	0.38	0.57	0.75				
	4080	126.5	6.96	0.42	0.58	0.75	117.6	7.93	0.41	0.59	0.77	108	9.01	0.41	0.6	0.8	97.5	10.2	0.4	0.62	0.85				

### 8.5 TON HEATING STANDARD EFFICIENCY ZHA102S4–MSAV (Multi-Stage Air Volume) 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
2720	127.2	7.97	95.8	7.33	63.7	6.67	38.8	5.97	19.6	4.5
3400	129.4	7.45	98	6.81	65.9	6.15	41	5.44	21.7	3.98
4080	131.1	7.12	99.7	6.48	67.6	5.82	42.7	5.11	23.4	3.65

## RATINGS

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

### 10 TON COOLING STANDARD EFFICIENCY ZHA120S4 (1ST STAGE)–MSAV (Multi-Stage Air Volume) 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
63°F	2240	61.6	2.77	0.62	0.82	1	57.3	3.14	0.62	0.87	1	52.9	3.56	0.64	0.94	1	48.4	4.03	0.65	1	1
	2800	64.8	2.8	0.67	1	1	60.8	3.18	0.68	1	1	56.5	3.6	0.7	1	1	52.2	4.07	0.75	1	1
	3360	68.2	2.83	0.75	1	1	63.9	3.21	0.8	1	1	59.5	3.63	0.87	1	1	54.9	4.1	0.95	1	1
67°F	2240	65.8	2.81	0.48	0.6	0.74	61.3	3.19	0.48	0.61	0.8	56.7	3.6	0.48	0.62	0.86	51.8	4.07	0.48	0.63	0.94
	2800	68.4	2.83	0.51	0.65	0.96	63.8	3.21	0.52	0.67	1	58.9	3.63	0.52	0.69	1	53.9	4.09	0.53	0.71	1
	3360	70.4	2.86	0.55	0.71	1	65.7	3.23	0.55	0.76	1	60.8	3.65	0.56	0.82	1	55.6	4.11	0.57	0.91	1
71°F	2240	70.1	2.85	0.36	0.47	0.58	65.5	3.23	0.35	0.47	0.59	60.8	3.65	0.34	0.47	0.6	55.7	4.11	0.33	0.48	0.62
	2800	72.9	2.88	0.37	0.51	0.64	68.2	3.26	0.37	0.51	0.65	63.2	3.68	0.36	0.52	0.67	57.9	4.14	0.35	0.53	0.69
	3360	74.8	2.9	0.39	0.54	0.69	70	3.28	0.38	0.55	0.71	64.8	3.69	0.38	0.56	0.78	59.5	4.16	0.37	0.57	0.86

### 10 TON COOLING STANDARD EFFICIENCY ZHA120S4 (2ND STAGE)–MSAV (Multi-Stage Air Volume) 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
63°F	3200	118	7.62	0.68	0.84	0.99	108.4	8.63	0.69	0.86	1	98.3	9.77	0.7	0.89	1	87.3	11.08	0.72	0.94	1
	4000	125.3	7.68	0.75	0.93	1	115.3	8.69	0.76	0.96	1	104.8	9.83	0.79	0.99	1	94.1	11.14	0.81	1	1
	4800	131.2	7.74	0.81	1	1	121.4	8.75	0.83	1	1	111.7	9.9	0.86	1	1	101.1	11.23	0.9	1	1
67°F	3200	127.3	7.71	0.53	0.66	0.81	117.4	8.71	0.53	0.67	0.83	106.7	9.86	0.52	0.69	0.85	95.4	11.16	0.52	0.7	0.89
	4000	134.4	7.77	0.57	0.72	0.89	123.9	8.78	0.57	0.74	0.92	112.6	9.91	0.57	0.76	0.96	100.5	11.21	0.57	0.79	1
	4800	139.7	7.82	0.6	0.79	0.97	128.4	8.82	0.61	0.81	1	116.9	9.96	0.62	0.84	1	104.4	11.25	0.63	0.88	1
71°F	3200	136.7	7.79	0.39	0.52	0.64	126.4	8.8	0.38	0.52	0.65	115.4	9.94	0.36	0.52	0.66	103.7	11.24	0.34	0.52	0.68
	4000	143.9	7.86	0.41	0.56	0.7	133.1	8.86	0.4	0.56	0.72	121.5	10.01	0.39	0.57	0.74	109	11.29	0.37	0.58	0.77
	4800	149.1	7.92	0.43	0.6	0.77	137.8	8.92	0.42	0.6	0.79	125.4	10.05	0.41	0.61	0.82	112.4	11.35	0.4	0.63	0.86

### 10 TON HEATING STANDARD EFFICIENCY ZHA120S4–MSAV (Multi-Stage Air Volume) 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
	kBtuh	kW	kBtuh	kW	kBtuh	kW	kBtuh	kW	kBtuh	kW
3200	145.4	9.22	112.8	8.29	79.6	7.31	51.1	6.44	25.3	4.9
4000	147.9	8.64	115.2	7.7	82.1	6.73	53.6	5.85	27.8	4.31
4800	149.8	8.28	117.1	7.34	84	6.37	55.5	5.49	29.7	3.95

## BLOWER DATA

### 092S STANDARD EFFICIENCY BELT DRIVE BLOWER – BASE UNIT

**BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY (NO HEAT SECTION) WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE. FOR ALL UNITS ADD:**

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

Then determine from blower table blower motor output required.

See page 22 for blower motors and drives.

See page 22 for wet coil and option/accessory air resistance data.

**MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT (Maximum Static Pressure–2.0 in. w.g.):**

7.5 kW, 15 kW, 22.5 kW–2065 cfm

30 kW–2250 cfm

45 kW–3000 cfm

Total Air Volume cfm	Total Static Pressure – in. w.g.																											
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0		2.2		2.4		2.6			
	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		
1750	494	0.11	562	0.34	632	0.56	702	0.74	771	0.85	838	0.96	902	1.07	961	1.19	---	---	---	---	---	---	---	---	---	---		
2000	514	0.26	581	0.49	650	0.70	719	0.87	786	0.98	852	1.09	915	1.20	972	1.32	1026	1.47	1076	1.65	---	---	---	---	---	---		
2250	533	0.41	599	0.62	667	0.82	735	0.99	802	1.10	866	1.21	928	1.33	984	1.46	1037	1.63	1085	1.81	1132	2.01	1178	2.21	1226	2.43		
2500	553	0.55	619	0.76	685	0.95	753	1.10	818	1.22	881	1.34	942	1.47	997	1.62	1048	1.80	1096	1.99	1142	2.20	1188	2.41	1237	2.64		
2750	573	0.70	638	0.90	705	1.08	771	1.22	835	1.35	897	1.49	957	1.63	1011	1.80	1061	1.99	1108	2.19	1154	2.41	1200	2.63	1249	2.87		
3000	594	0.85	659	1.05	725	1.22	791	1.36	853	1.50	915	1.65	973	1.81	1026	1.99	1075	2.20	1121	2.42	1167	2.64	1213	2.87	1262	3.12		
3250	617	1.01	682	1.20	747	1.37	812	1.52	873	1.67	934	1.83	990	2.01	1042	2.21	1089	2.43	1135	2.66	1181	2.90	1228	3.13	1277	3.38		
3500	640	1.17	706	1.36	771	1.53	834	1.70	895	1.86	954	2.03	1008	2.23	1058	2.46	1105	2.69	1150	2.93	1196	3.17	1243	3.41	1293	3.65		
3750	665	1.34	731	1.54	796	1.72	857	1.89	917	2.07	975	2.26	1027	2.48	1076	2.72	1121	2.97	1166	3.22	1212	3.46	1261	3.71	1311	3.96		
4000	692	1.54	758	1.75	822	1.93	882	2.11	940	2.30	996	2.51	1047	2.76	1094	3.02	1139	3.27	1184	3.52	1230	3.77	1280	4.03	1330	4.29		
4250	722	1.76	787	1.97	849	2.15	908	2.35	965	2.56	1018	2.79	1067	3.06	1113	3.33	1157	3.59	1202	3.85	1250	4.11	1300	4.38	1352	4.65		

## BLOWER DATA

### 102 AND 120S STANDARD EFFICIENCY BELT DRIVE BLOWER – BASE UNIT

**BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY (NO HEAT SECTION) WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE. FOR ALL UNITS ADD:**

1 – Wet indoor coil air resistance of selected unit.

2 – Any factory installed options air resistance (heat section, economizer, etc.)

3 – Any field installed accessories air resistance (duct resistance, diffuser, etc.)

Then determine from blower table blower motor output required.

See page 22 for blower motors and drives.

See page 22 for wet coil and option/accessory air resistance data.

**MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT (Maximum Static Pressure–2.0 in. w.g.)**

15 kW, 22.5 kW- 2065 cfm

30 kW–2250 cfm

45 kW–3000 cfm

60 kW–4000 cfm

Total Air Volume cfm	Total Static Pressure – in. w.g.																											
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2		2.2		2.4		2.6			
	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		
2000	542	0.43	602	0.60	664	0.75	732	0.89	802	1.02	869	1.15	927	1.27	979	1.41	1029	1.57	1079	1.75	1129	1.95	1179	2.15	1230	2.37		
2250	560	0.55	619	0.71	681	0.86	748	1.00	817	1.14	882	1.27	939	1.41	991	1.57	1041	1.74	1090	1.93	1140	2.13	1190	2.35	1241	2.57		
2500	579	0.68	637	0.83	699	0.98	766	1.12	834	1.26	897	1.41	953	1.57	1005	1.74	1054	1.92	1103	2.12	1152	2.33	1202	2.55	1254	2.79		
2750	599	0.81	657	0.97	719	1.11	785	1.25	851	1.41	913	1.57	968	1.74	1020	1.93	1068	2.13	1116	2.34	1165	2.56	1215	2.78	1268	3.01		
3000	620	0.95	678	1.11	741	1.25	806	1.40	870	1.58	930	1.75	985	1.94	1036	2.14	1084	2.36	1131	2.58	1180	2.80	1230	3.02	1283	3.26		
3250	643	1.10	701	1.26	764	1.41	828	1.57	891	1.76	950	1.95	1003	2.16	1053	2.38	1100	2.61	1148	2.83	1196	3.06	1246	3.29	1299	3.52		
3500	667	1.26	726	1.43	788	1.58	851	1.77	913	1.97	970	2.17	1023	2.41	1071	2.65	1118	2.88	1165	3.11	1213	3.33	1264	3.57	1317	3.81		
3750	693	1.44	752	1.61	813	1.78	876	1.98	936	2.20	992	2.43	1043	2.68	1091	2.93	1137	3.17	1183	3.40	1232	3.64	1284	3.88	1338	4.13		
4000	720	1.65	779	1.82	840	2.00	902	2.22	961	2.46	1015	2.71	1064	2.98	1111	3.24	1156	3.48	1203	3.72	1253	3.96	1305	4.22	1359	4.48		
4250	748	1.86	807	2.04	868	2.24	929	2.48	986	2.75	1038	3.02	1086	3.30	1132	3.57	1177	3.81	1224	4.05	1274	4.31	1327	4.57	1382	4.85		
4500	778	2.09	837	2.28	898	2.51	957	2.78	1012	3.07	1062	3.37	1108	3.65	1154	3.92	1199	4.17	1247	4.41	1297	4.67	1350	4.94	1405	5.22		
4750	809	2.34	868	2.56	929	2.82	986	3.12	1038	3.43	1087	3.74	1132	4.03	1177	4.29	1223	4.54	1270	4.79	1321	5.04	1374	5.31	1428	5.58		
5000	841	2.62	901	2.87	960	3.17	1015	3.50	1065	3.83	1112	4.14	1157	4.43	1201	4.69	1247	4.94	1295	5.18	1345	5.42	1398	5.68	—	—		
5250	875	2.93	935	3.23	992	3.56	1044	3.91	1092	4.26	1138	4.57	1182	4.85	1226	5.10	1272	5.34	1320	5.57	—	—	—	—	—	—		
5500	911	3.30	969	3.63	1024	4.00	1074	4.37	1120	4.71	1165	5.02	1208	5.29	1253	5.53	—	—	—	—	—	—	—	—	—	—		
5750	948	3.71	1004	4.08	1056	4.48	1104	4.85	1148	5.19	1192	5.49	1235	5.74	—	—	—	—	—	—	—	—	—	—	—	—		
6000	985	4.18	1039	4.59	1088	5.00	1134	5.37	1177	5.69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
6250	1022	4.70	1073	5.14	1120	5.54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		

## BLOWER DATA

### FACTORY INSTALLED BELT DRIVE KIT SPECIFICATIONS

Nominal hp	Maximum hp	Drive Kit Number	RPM Range
2	2.3	1	590–890
2	2.3	2	800–1105
2	2.3	3	795–1195
3	3.45	4	730–970
3	3.45	5	940–1200
3	3.45	6	1015–1300
5	5.75	10	900–1135
5	5.75	11	1040–1315
5	5.75	12	1125–1425

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 – Units equipped with MSAV® (Multi-Stage Air Volume) option are limited to a motor service factor of 1.0.

### POWER EXHAUST FAN PERFORMANCE

Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm
0	3575
0.05	3405
0.10	3550
0.15	3245
0.20	3115
0.25	3020
0.30	2900
0.35	2785

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

Air Volume cfm	Wet Indoor Coil		Electric Heat	Economizer	Filters	
	092	102, 120			MERV 8	MERV 13
1750	0.03	0.04	0.03	0.03	0.01	0.03
2000	0.04	0.05	0.03	0.05	0.01	0.03
2250	0.05	0.06	0.04	0.06	0.01	0.04
2500	0.05	0.07	0.04	0.08	0.01	0.05
2750	0.06	0.08	0.05	0.09	0.02	0.05
3000	0.07	0.09	0.06	0.11	0.02	0.06
3250	0.08	0.10	0.06	0.13	0.02	0.06
3500	0.09	0.11	0.09	0.15	0.03	0.07
3750	0.10	0.13	0.09	0.17	0.03	0.08
4000	0.11	0.14	0.09	0.19	0.04	0.08
4250	0.13	0.15	0.13	0.21	0.04	0.09
4500	0.14	0.17	0.14	0.24	0.04	0.09
4750	0.15	0.18	0.17	0.26	0.05	0.10
5000	0.16	0.20	0.20	0.29	0.06	0.10
5250	0.17	0.22	0.22	0.32	0.06	0.11
5500	0.19	0.23	0.25	0.34	0.07	0.12
5750	0.20	0.25	0.31	0.37	0.07	0.12
6000	0.22	0.27	0.33	0.40	0.08	0.13

## BLOWER DATA

### CEILING DIFFUSERS AIR RESISTANCE—in. w.g.

Unit Size	RTD11 Step-Down Diffuser				FD11 Flush Diffuser
	Air Volume cfm	2 Ends Open	1 Side, 2 Ends Open	All Ends & Sides Open	
092 Models	2400	0.21	0.18	0.15	0.14
	2600	0.24	0.21	0.18	0.17
	2800	0.27	0.24	0.21	0.20
	3000	0.32	0.29	0.25	0.25
	3200	0.41	0.37	0.32	0.31
	3400	0.50	0.45	0.39	0.37
	3600	0.61	0.54	0.48	0.44
	3800	0.73	0.63	0.57	0.51
102 & 120 Models	3600	0.36	0.28	0.23	0.15
	3800	0.40	0.32	0.26	0.18
	4000	0.44	0.36	0.29	0.21
	4200	0.49	0.40	0.33	0.24
	4400	0.54	0.44	0.37	0.27
	4600	0.60	0.49	0.42	0.31
	4800	0.65	0.53	0.46	0.35
	5000	0.69	0.58	0.50	0.39
	5200	0.75	0.62	0.54	0.43

### CEILING DIFFUSER AIR THROW DATA

Model No.	Air Volume	<sup>1</sup> Effective Throw Range	
		RTD11 Step-Down	FD11 Flush
	cfm	ft.	ft.
092 Models	2600	24–29	19–24
	2800	25–30	20–28
	3000	27–33	21–29
	3200	28–35	22–29
	3400	30–37	22–30
102, 120 Models	3600	25–33	22–29
	3800	27–35	22–30
	4000	29–37	24–33
	4200	32–40	26–35
	4400	34–42	28–37

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

# ELECTRICAL/ELECTRIC HEAT DATA

7.5 TON

## 7.5 TON STANDARD EFFICIENCY

ZHA092S4

<sup>1</sup> Voltage—60hz		208/230V—3 Ph			460V—3 Ph			575V—3 Ph		
Compressor 1	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Compressor 2	Rated Load Amps	8.7			4			3.6		
	Locked Rotor Amps	70			31			27		
Outdoor Fan Motors (2)	Full Load Amps	2.4			1.3			1.0		
	(total)	(4.8)			(2.6)			(2.0)		
Power Exhaust (2) 0.5 HP	Full Load Amps	1.5			0.6			0.6		
	(total)	(3.0)			(1.2)			(1.2)		
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5
	Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
<sup>2</sup> Maximum Overcurrent Protection	Unit Only	50	50	60	25	25	30	15	20	20
	With (2) 0.5 HP Power Exhaust	50	50	60	25	30	30	20	20	25
<sup>3</sup> Minimum Circuit Ampacity	Unit Only	38	41	48	20	22	25	15	16	19
	With (2) 0.5 HP Power Exhaust	41	44	51	22	23	26	16	17	20

## 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	7.5 kW	<sup>4</sup> 60	70	70	70	80	80	35	35	40	25	25	30
		15 kW	<sup>4</sup> 80	90	90	90	<sup>4</sup> 90	100	45	45	50	35	35	40
		22.5 kW	<sup>4</sup> 100	110	<sup>4</sup> 100	110	<sup>4</sup> 110	125	60	60	60	45	45	50
		30 kW	<sup>4</sup> 125	150	<sup>4</sup> 125	150	150	150	70	70	70	60	60	60
		45 kW	175	175	<sup>4</sup> 175	200	<sup>4</sup> 175	200	90	90	100	70	70	80
<sup>3</sup> Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	58	61	61	64	68	71	32	33	36	24	25	28
		15 kW	77	83	81	87	87	93	43	44	47	33	34	37
		22.5 kW	97	106	100	109	107	116	54	56	59	42	43	46
		30 kW	117	129	120	132	127	139	66	67	70	51	52	55
		45 kW	156	174	159	177	166	184	88	90	92	69	70	73
<sup>2</sup> Maximum Overcurrent Protection	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	70	70	70	70	80	80	35	35	40	25	30	30
		15 kW	<sup>4</sup> 80	90	90	90	<sup>4</sup> 90	100	45	50	50	35	35	40
		22.5 kW	<sup>4</sup> 100	110	<sup>4</sup> 110	125	<sup>4</sup> 110	125	60	60	60	45	45	50
		30 kW	<sup>4</sup> 125	150	<sup>4</sup> 125	150	150	150	70	70	80	60	60	60
		45 kW	<sup>4</sup> 175	200	<sup>4</sup> 175	200	<sup>4</sup> 175	200	90	100	100	70	80	80
<sup>3</sup> Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	61	64	64	67	71	74	33	34	37	25	26	29
		15 kW	80	86	84	90	90	96	44	46	48	34	35	38
		22.5 kW	100	109	103	112	110	119	56	57	60	43	45	47
		30 kW	120	132	123	135	130	142	67	68	71	52	54	56
		45 kW	159	177	162	180	169	187	89	91	94	70	72	74

## ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	Unit Only	11M12	11M12	11M12	11M12	11M12	11M12	11M12	11M10	11M10	11M10	11M09	11M09	11M09
	Unit + Power Exhaust	11M12	11M12	11M12	11M12	11M13	11M13	11M10	11M10	11M11	11M09	11M09	11M09	11M10

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> Factory installed circuit breaker not available.

**ELECTRICAL/ELECTRIC HEAT DATA****8.5 TON****8.5 TON STANDARD EFFICIENCY****ZHA102S4**

<sup>1</sup> Voltage—60hz		208/230V—3 Ph			460V—3 Ph			575V—3 Ph		
Compressor 1	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Compressor 2	Rated Load Amps	11			5.5			4.7		
	Locked Rotor Amps	86			37			34		
Outdoor Fan Motors (2)	Full Load Amps	2.4			1.3			1.0		
	(total)	(4.8)			(2.6)			(2.0)		
Power Exhaust (2) 0.5 HP	Full Load Amps	1.5			0.6			0.6		
	(total)	(3.0)			(1.2)			(1.2)		
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5
	Full Load Amps	7.5	10.5	16.7	3.4	4.8	7.6	2.7	3.9	6.1
<sup>2</sup> Maximum Overcurrent Protection	Unit Only	50	50	60	25	30	30	20	20	25
	With (2) 0.5 HP Power Exhaust	50	50	60	30	30	30	20	20	25
<sup>3</sup> Minimum Circuit Ampacity	Unit Only	41	44	51	22	23	26	16	17	20
	With (2) 0.5 HP Power Exhaust	44	47	54	23	25	27	17	19	21

**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	7.5 kW	<sup>4</sup> 60	70	70	70	80	80	35	35	40	25	30	30
		15 kW	<sup>4</sup> 80	90	90	90	<sup>4</sup> 90	100	45	50	50	35	35	40
		22.5 kW	<sup>4</sup> 100	110	<sup>4</sup> 110	125	<sup>4</sup> 110	125	60	60	60	45	45	50
		30 kW	<sup>4</sup> 125	150	<sup>4</sup> 125	150	150	150	70	70	80	60	60	60
		45 kW	<sup>4</sup> 175	200	<sup>4</sup> 175	200	<sup>4</sup> 175	200	90	100	100	70	80	80
<sup>3</sup> Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	60	63	63	66	70	73	33	35	37	25	26	29
		15 kW	80	86	83	89	90	96	45	46	49	34	35	38
		22.5 kW	99	108	102	111	109	118	56	57	60	43	44	47
		30 kW	119	131	122	134	129	141	67	69	71	52	53	56
		45 kW	158	176	161	179	168	186	90	91	94	70	71	74
<sup>2</sup> Maximum Overcurrent Protection	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	70	70	70	70	80	80	35	40	40	30	30	30
		15 kW	90	90	<sup>4</sup> 90	100	100	100	50	50	50	35	40	40
		22.5 kW	<sup>4</sup> 110	125	<sup>4</sup> 110	125	125	125	60	60	70	45	50	50
		30 kW	<sup>4</sup> 125	150	<sup>4</sup> 125	150	150	150	70	70	80	60	60	60
		45 kW	<sup>4</sup> 175	200	<sup>4</sup> 175	200	<sup>4</sup> 175	200	100	100	100	80	80	80
<sup>3</sup> Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	63	66	66	69	73	76	34	36	39	26	28	30
		15 kW	83	89	86	92	93	99	46	47	50	35	37	39
		22.5 kW	102	111	105	114	112	121	57	58	61	44	46	48
		30 kW	122	134	125	137	132	144	68	70	73	53	55	57
		45 kW	161	179	164	182	171	189	91	92	95	71	73	75

**ELECTRIC HEAT ACCESSORIES**

Unit Fuse Block	Unit Only	11M12	11M12	11M12	11M12	11M12	11M12	11M10	11M10	11M10	11M09	11M09	11M10
	Unit + Power Exhaust	11M12	11M12	11M12	11M12	11M13	11M13	11M10	11M10	11M11	11M09	11M10	11M10

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.

# ELECTRICAL/ELECTRIC HEAT DATA

10 TON

## 10 TON STANDARD EFFICIENCY

ZHA120S4

<sup>1</sup> Voltage—60hz		208/230V—3 Ph			460V—3 Ph			575V—3 Ph		
Compressor 1	Rated Load Amps	15.6			7.8			5.8		
	Locked Rotor Amps	110			52			38.9		
Compressor 2	Rated Load Amps	15.6			7.8			5.8		
	Locked Rotor Amps	110			52			38.9		
Outdoor Fan Motors (2)	Full Load Amps	3.0			1.5			1.2		
	(total)	(6.0)			(3.0)			(2.4)		
Power Exhaust (2) 0.5 HP	Full Load Amps	1.5			0.6			0.6		
	(total)	(3.0)			(1.2)			(1.2)		
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5
	Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
<sup>2</sup> Maximum Overcurrent Protection	Unit Only	60	60	70	30	30	35	20	25	25
	With (2) 0.5 HP Power Exhaust	60	70	70	30	30	35	25	25	25
<sup>3</sup> Minimum Circuit Ampacity	Unit Only	49	52	59	24	26	29	19	20	22
	With (2) 0.5 HP Power Exhaust	52	55	62	26	27	30	20	21	23

## 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	15 kW	<sup>4</sup> 90	100	100	100	<sup>4</sup> 100	110	50	50	60	40	40	40
		22.5 kW	<sup>4</sup> 110	125	125	125	<sup>4</sup> 125	150	60	60	70	50	50	50
		30 kW	150	150	150	150	150	150	70	80	80	60	60	60
		45 kW	<sup>4</sup> 175	200	<sup>4</sup> 175	200	200	200	100	100	100	80	80	80
		60 kW	<sup>4</sup> 175	200	200	200	<sup>4</sup> 200	225	100	100	110	80	80	80
<sup>3</sup> Minimum Circuit Ampacity	Unit+ Electric Heat	15 kW	88	94	91	97	98	104	47	48	51	37	38	40
		22.5 kW	108	117	111	120	117	126	58	60	62	46	47	49
		30 kW	127	139	130	142	137	149	70	71	74	55	56	58
		45 kW	166	184	169	188	176	194	92	94	96	73	74	76
		60 kW	174	193	177	197	184	203	97	98	101	76	78	80
<sup>2</sup> Maximum Overcurrent Protection	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	100	100	100	100	110	110	50	50	60	40	40	45
		22.5 kW	125	125	125	125	<sup>4</sup> 125	150	60	70	70	50	50	50
		30 kW	150	150	150	150	<sup>4</sup> 150	175	80	80	80	60	60	60
		45 kW	<sup>4</sup> 175	200	<sup>4</sup> 175	200	200	200	100	100	100	80	80	80
		60 kW	200	200	200	200	<sup>4</sup> 200	225	100	100	110	80	80	90
<sup>3</sup> Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	91	97	94	100	101	107	48	50	52	38	39	41
		22.5 kW	111	120	114	123	120	129	59	61	64	47	48	50
		30 kW	130	142	133	145	140	152	71	72	75	56	57	59
		45 kW	169	187	172	191	179	197	93	95	98	74	75	77
		60 kW	177	196	180	200	187	206	98	99	102	78	79	81

## ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	Unit Only	11M12	11M12	11M12	11M12	11M12	11M12	11M10	11M10	11M11	11M09	11M09	11M10
	Unit + Power Exhaust	11M12	11M12	11M12	11M12	11M13	11M13	11M11	11M11	11M11	11M09	11M10	11M10

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.

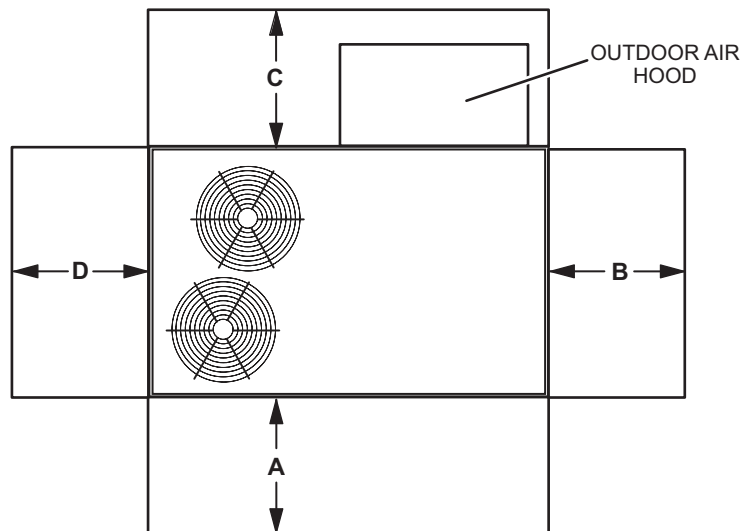
<sup>3</sup> Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

## ELECTRIC HEAT CAPACITIES

Volts Input	7.5 kW			15 kW			22.5 kW			30 kW			45 kW			60 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	kW Input	Btuh Output	No. of Stages
208	5.6	19,100	1	11.3	38,600	1	16.9	57,700	1	22.5	76,800	1	33.8	115,300	1	45.0	153,600	1
220	6.3	21,500	1	12.6	43,000	1	18.9	64,500	1	25.2	86,000	1	37.8	129,000	1	50.4	172,000	1
230	6.9	23,600	1	13.8	47,100	1	20.7	70,700	1	27.5	93,900	1	41.3	141,000	1	55.1	188,000	1
240	7.5	25,600	1	15.0	51,200	1	22.5	76,800	1	30.0	102,400	1	45.0	153,600	1	60.0	204,800	1
440	6.9	21,500	1	12.6	43,000	1	18.9	64,500	1	25.2	86,000	1	37.8	129,000	1	50.4	172,000	1
460	6.9	23,600	1	13.8	47,100	1	20.7	70,700	1	27.5	93,900	1	41.3	141,000	1	55.1	188,000	1
480	7.5	25,600	1	15.0	51,200	1	22.5	76,800	1	30.0	102,400	1	45.0	153,600	1	60.0	204,800	1
550	6.3	21,500	1	12.6	43,000	1	18.9	64,500	1	25.2	86,000	1	37.8	129,000	1	50.4	172,000	1
575	6.9	23,600	1	13.8	47,100	1	20.7	70,700	1	27.5	93,900	1	41.3	141,000	1	55.1	188,000	1
600	7.5	25,600	1	15.0	51,200	1	22.5	76,800	2	30.0	102,400	2	45.0	153,600	2	60.0	204,800	1

## UNIT CLEARANCES—INCHES (MM)

### 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	60	1524	Unobstructed
Minimum Operation Clearance	36	914	36	914	36	914	36	914	

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 Linear Sound Power Levels dB, re 10 <sup>-12</sup> Watts—Center Frequency—Hz							<sup>1</sup> Sound Rating Number (SRN) (dBA)
	125	250	500	1000	2000	4000	8000	
092, 102	76	79	84	83	79	73	66	88
120	77	80	85	84	79	74	66	88

<sup>1</sup> Sound Rating Number according to ARI Standard 270-2008. "SRN" 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.
<b>COMFORTSENSE® 7500 COMMERCIAL 7-DAY PROGRAMMABLE THERMOSTAT</b>		
 <ul style="list-style-type: none"> <li>• Four-Stage Heating / Two-Stage Cooling Universal Multi-Stage</li> <li>• Intuitive Touchscreen Interface</li> <li>• Remote Indoor Temperature Sensing with Averaging</li> <li>• Outside or Discharge Air Temperature Display</li> <li>• Full Seven-Day Programming</li> <li>• Four Time Periods Per Day</li> <li>• Occupancy Scheduling with Economizer Relay Control</li> <li>• Away Mode</li> <li>• Holiday Scheduling</li> <li>• Smooth Setback Recovery (SSR)</li> <li>• Performance Reports</li> <li>• Notifications/Reminders</li> <li>• Dehumidification/Humiditrol® Control for Split Systems and Rooftop Units</li> <li>• Economizer Relay Control</li> <li>• Backlit Display</li> <li>• Wallplate Furnished</li> </ul>	C0STAT06FF1L	13H15
<b>Optional Accessories</b>		
<sup>1</sup> Remote non-adjustable wall mount 20k temperature sensor	C0SNZN01AE2-	47W36
<sup>1</sup> Remote non-adjustable wall mount 10k temperature sensor	C0SNZN73AE1-	47W37
Remote non-adjustable discharge air (duct mount) temperature sensor	C0SNDC00AE1-	19L22
Outdoor temperature sensor	C0SNSR03AE1-	X2658
Locking cover (clear)	C0MISC15AE1-	39P21
<sup>1</sup> Remote sensors can be applied in any of the following combinations: One Sensor—(1) 47W36 Two Sensors—(2) 47W37 Three Sensors—(2) 47W36 and (1) 47W37 Four Sensors—(4) 47W36 Five Sensors—(3) 47W36 and (2) 47W37		
<b>COMFORTSENSE® 3000 COMMERCIAL 5-2 DAY PROGRAMMABLE THERMOSTAT</b>		
 <ul style="list-style-type: none"> <li>• Two-Stage Heating / Two-Stage Cooling Conventional Systems</li> <li>• Intuitive Interface</li> <li>• 5-2 Day Programming</li> <li>• Program Hold</li> <li>• Remote Indoor Temperature Sensing</li> <li>• Smooth Setback Recovery (SSR)</li> <li>• Economizer Relay Control</li> <li>• Maintenance/Filter/Service Reminders</li> <li>• Backlit Display</li> <li>• Wallplate Furnished</li> <li>• Simple Up and Down Temperature Control.</li> </ul>	C0STAT05FF1L	11Y05
<b>Optional Accessories</b>		
Remote non-adjustable wall mount 10k averaging temperature sensor	C0SNZN73AE1-	47W37
Optional wall mounting plate	C0MISC17AE1-	X2659
<b>DIGITAL NON-PROGRAMMABLE THERMOSTAT</b>		
 <ul style="list-style-type: none"> <li>• One-Stage Heating / Cooling Conventional Systems</li> <li>• Intuitive Interface</li> <li>• Automatic Changeover</li> <li>• Backlit Display</li> <li>• Simple Up and Down Temperature Control.</li> </ul>	C0STAT12AE1L	51M32
<b>Optional Accessories</b>		
Outdoor temperature sensor	C0SNSR04AE1-	X2658
Optional wall mounting plate	C0MISC17AE1-	X2659

**WEIGHT DATA**

Model Number	Net		Shipping	
	lbs.	kg	lbs.	kg
092S Base Unit	1036	470	1121	508
092S Max. Unit	1193	541	1278	580
102S Base Unit	1068	484	1153	523
102S Max. Unit	1225	556	1310	594
120S Base Unit	1126	511	1211	549
120S Max. Unit	1290	585	1375	624

**OPTIONS / ACCESSORIES**

Model Number	Shipping Weight	
	lbs.	kg
<b>CABINET</b>		
Coil/Hail Guard	50	23
<b>CEILING DIFFUSERS</b>		
<b>Step-Down</b>		
RTD11-95S	118	54
RTD11-135S	135	61
<b>Flush</b>		
FD11-95S	118	54
FD11-135S	135	61
<b>ECONOMIZER / OUTDOOR AIR / EXHAUST</b>		
<b>Economizer</b>		
Downflow with Barometric Relief Dampers and Hoods	90	41
Horizontal with Barometric Relief Dampers and Hoods	95	43
Horizontal Low Profile Barometric Relief Dampers with Hood	8	4
<b>Outdoor Air Dampers</b>		
Outdoor Air Damper Section with Hood—Automatic	44	20
Outdoor Air Damper Section with Hood—Manual	27	12
<b>Power Exhaust</b>		
Downflow	60	27
Horizontal	41	19
<b>ELECTRIC HEAT</b>		
7.5 kW	90	41
15 kW	90	41
22.5 kW	90	41
30 kW	90	41
45 kW	90	41
60 kW	90	41
<b>MSAV (MULTI-STAGE AIR VOLUME) 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	79	36
14 in. height	104	47
18 in. height	120	54
24 in. height	145	66
<b>PACKAGING</b>		
LTL Packaging (less than truck load)	105	48

# **DIMENSIONS—UNIT—INCHES (MM)**

Model No.	CORNER WEIGHTS																CENTER OF GRAVITY							
	AA				BB				CC				DD				EE				FF			
	Base		Max.		Base		Max.		Base		Max.		Base		Max.		Base		Max.		Base		Max.	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	in.	mm	in.	mm	in.	mm	in.	mm
092S	276	125	315	143	226	103	276	125	240	109	281	127	294	133	321	146	46.25	1174	47.25	1200	27	686	28	711
102S	285	129	324	147	233	106	283	128	248	112	289	131	303	137	330	150	46.25	1174	47.25	1200	27	686	285	711
120S	283	128	322	146	228	103	277	126	274	124	320	145	341	155	372	169	43.25	1099	43.25	1099	26.75	679	27.75	705

Base Unit—The unit with NO OPTIONS.

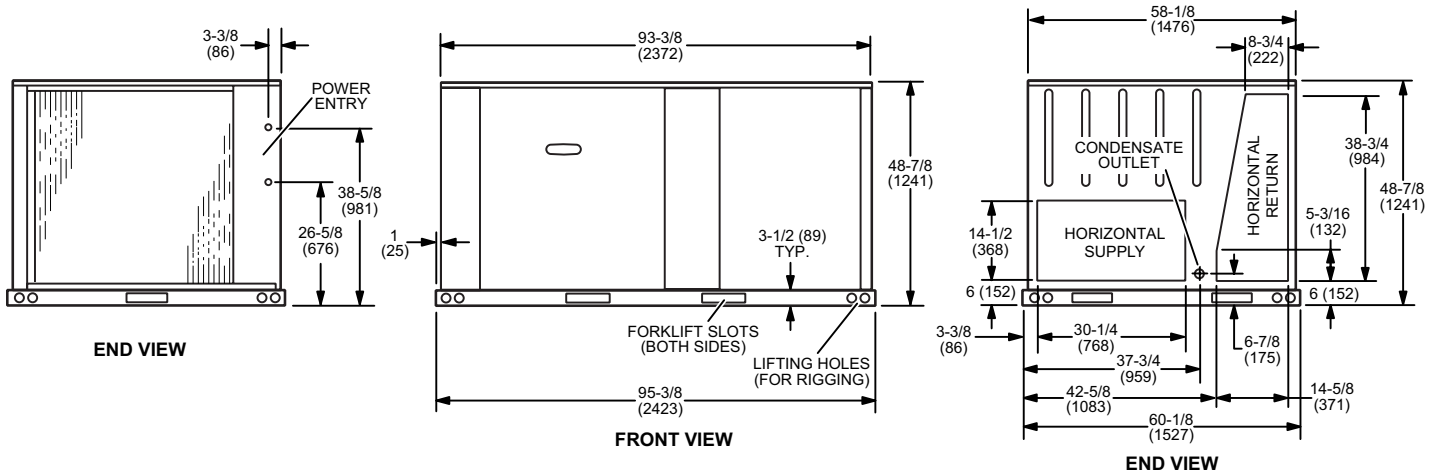
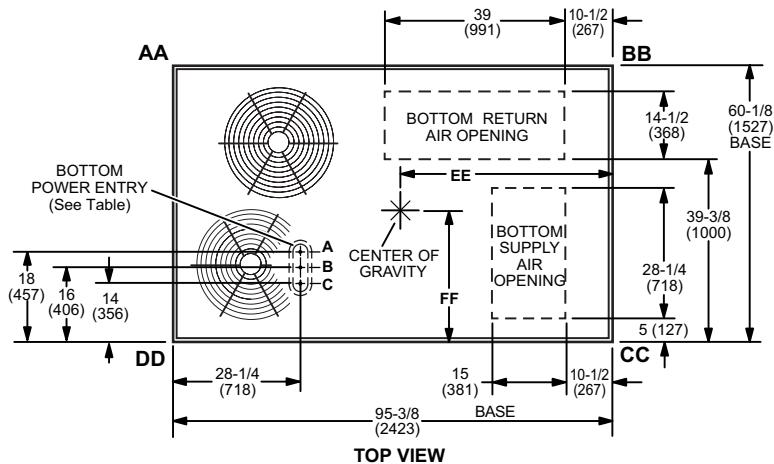
Max. Unit—The unit with ALL OPTIONS Installed. (Economizer, etc.)

## **BOTTOM POWER ENTRY**

Holes required for Optional Bottom Power Entry Kit

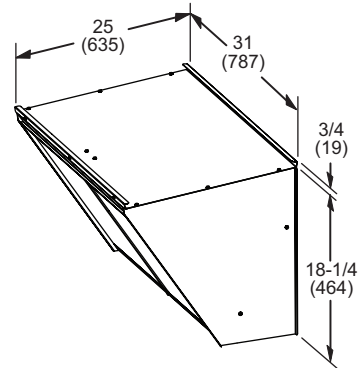
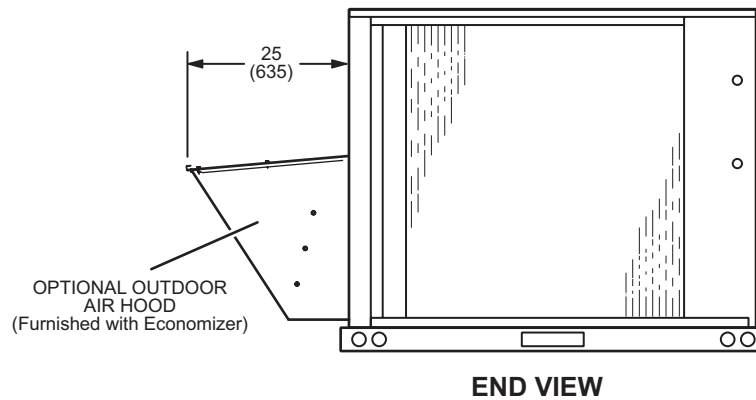
	Threaded Conduit Fittings (Provided in Kit)	Wire Use	Hole Diameter Required in Unit Base (Max.)
<b>A</b>	<sup>1</sup> 1 1/2	ACC	7/8 (23)
<b>B</b>	1/2	24V	7/8 (23)
<b>C</b>	1-1/4	POWER	1-3/4 (44)

<sup>1</sup> Field provided.

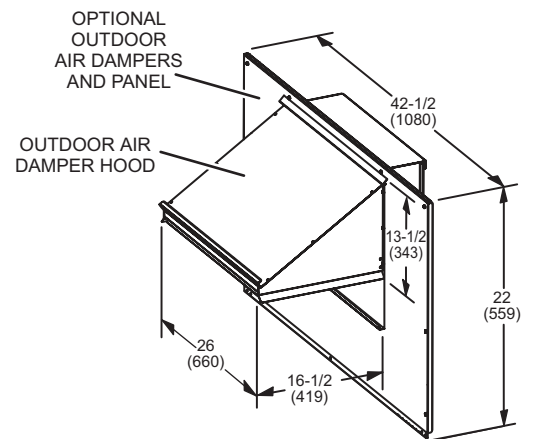
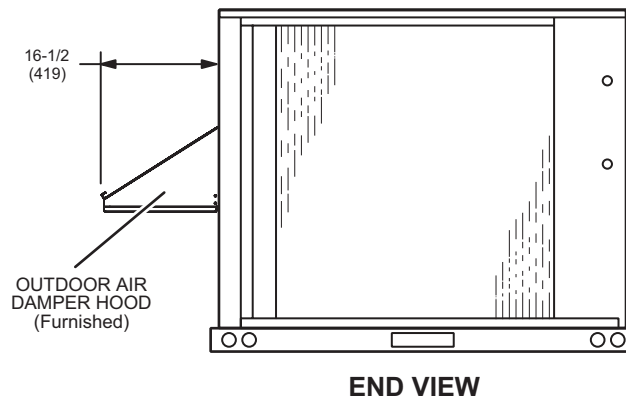


## DIMENSIONS-ACCESSORIES-INCHES (MM)

### OUTDOOR AIR HOOD DETAIL FOR OPTIONAL DOWNFLOW ECONOMIZER (Downflow Applications)

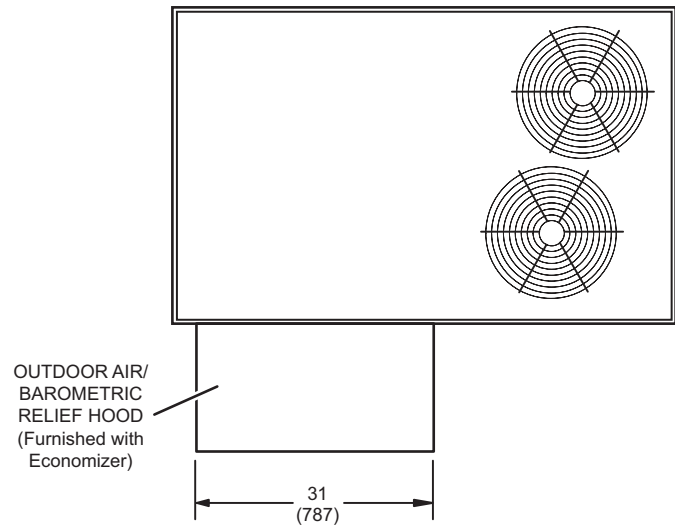


### OUTDOOR AIR DAMPER HOOD DETAIL FOR OPTIONAL MANUAL OR MOTORIZED OUTDOOR AIR DAMPERS (Downflow or Horizontal Applications)

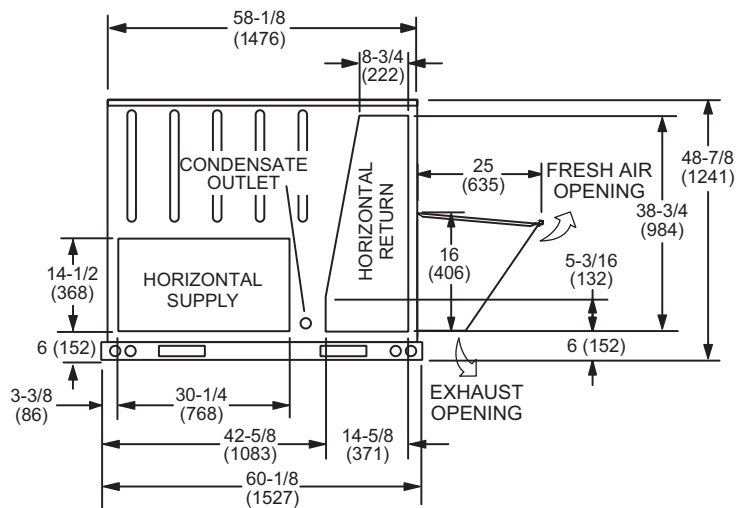


## DIMENSIONS-ACCESSORIES-INCHES (MM)

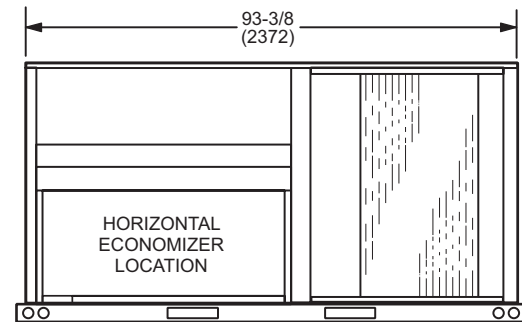
### OUTDOOR AIR HOOD DETAIL WITH OPTIONAL HORIZONTAL ECONOMIZER AND BAROMETRIC RELIEF DAMPERS (Horizontal Applications)



**TOP VIEW**



**END VIEW**



**BACK VIEW**

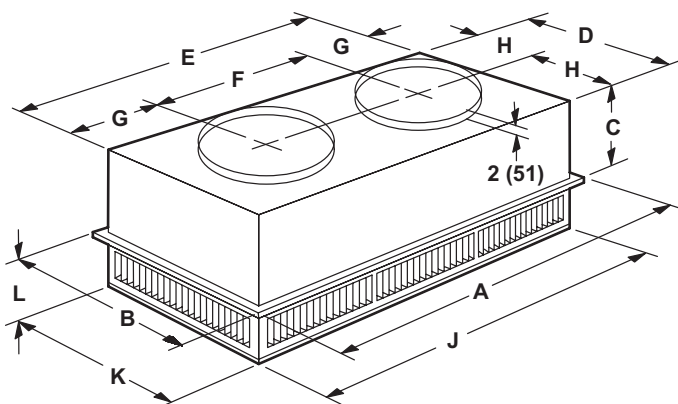
Note - Supply and Return Air Ducts must be supported.



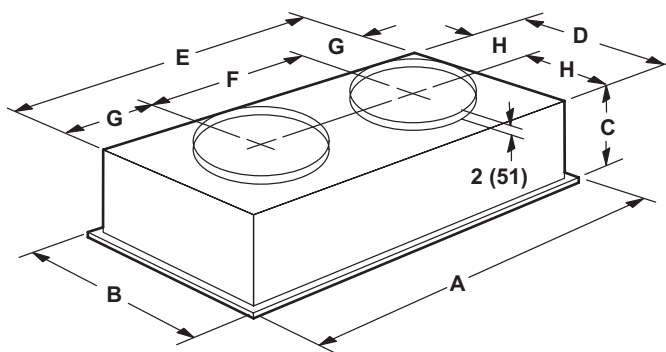
## DIMENSIONS-ACCESSORIES-INCHES (MM)

### COMBINATION CEILING SUPPLY AND RETURN DIFFUSERS

#### STEP-DOWN CEILING DIFFUSER



#### FLUSH CEILING DIFFUSER



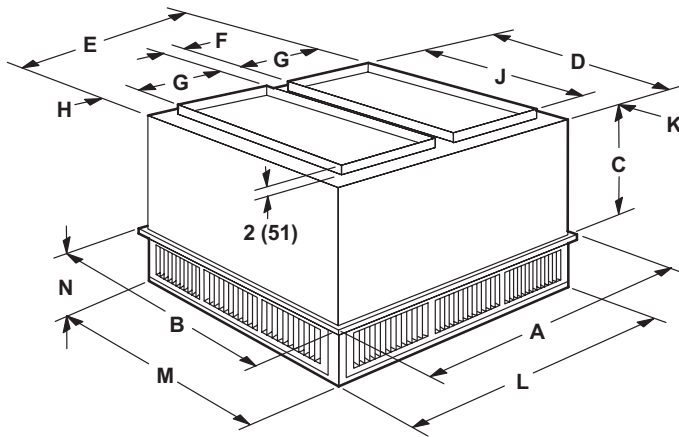
Model Number		RTD11-95S
A	in.	47-5/8
	mm	1159
B	in.	29-5/8
	mm	752
C	in.	14-3/8
	mm	365
D	in.	27-1/2
	mm	699
E	in.	45-1/2
	mm	1158
F	in.	22-1/2
	mm	572
G	in.	11-1/2
	mm	292
H	in.	13-3/4
	mm	349
J	in.	45-1/2
	mm	1156
K	in.	27-1/2
	mm	699
L	in.	8-1/8
	mm	206
Duct Size	in.	20 round
	mm	508 round

Model Number		FD11-95S
A	in.	47-5/8
	mm	1159
B	in.	29-5/8
	mm	752
C	in.	16-5/8
	mm	422
D	in.	27
	mm	686
E	in.	45
	mm	1143
F	in.	22-1/2
	mm	572
G	in.	11-1/4
	mm	286
H	in.	13-1/2
	mm	343
Duct Size	in.	20 round
	mm	508 round

## DIMENSIONS-ACCESSORIES-INCHES (MM)

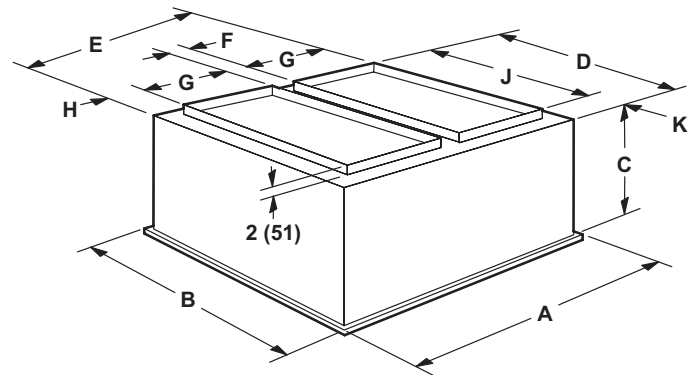
### COMBINATION CEILING SUPPLY AND RETURN DIFFUSERS

#### STEP-DOWN CEILING DIFFUSER



Model Number		RTD11-135S
A	in.	47-5/8
	mm	1210
B	in.	35-5/8
	mm	905
C	in.	20-5/8
	mm	524
D	in.	33-1/2
	mm	851
E	in.	45-1/2
	mm	1156
F	in.	4-1/2
	mm	114
G	in.	18
	mm	457
H	in.	2-1/2
	mm	64
J	in.	28
	mm	711
K	in.	2-3/4
	mm	70
L	in.	45-1/2
	mm	1156
M	in.	33-1/2
	mm	851
N	in.	9-1/8
	mm	232
Duct Size	in.	18 x 28
	mm	457 x 711

#### FLUSH CEILING DIFFUSER



Model Number		FD11-135S
A	in.	47-5/8
	mm	1210
B	in.	35-5/8
	mm	905
C	in.	23-1/4
	mm	591
D	in.	33
	mm	838
E	in.	45
	mm	1143
F	in.	4-1/2
	mm	114
G	in.	18
	mm	457
H	in.	2-1/4
	mm	57
J	in.	28
	mm	711
K	in.	2-1/2
	mm	64
Duct Size	in.	18 x 28
	mm	457 x 711

## REVISIONS

Section	Description
Options / Accessories	New Diffuser model and catalog numbers
Weight Data	New diffuser weights



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NOTE—Due to Lennox' ongoing commitment to quality, Specifications, Ratings and Dimensions subject to change without notice and without incurring liability. Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury. Installation and service must be performed by a qualified installer and servicing agency.

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