



ZHC

Raider® Rooftop Units

60 Hz

COMMERCIAL
PRODUCT SPECIFICATIONS

Bulletin No. 211003
March 2023
Supersedes May 2023



RAIDER

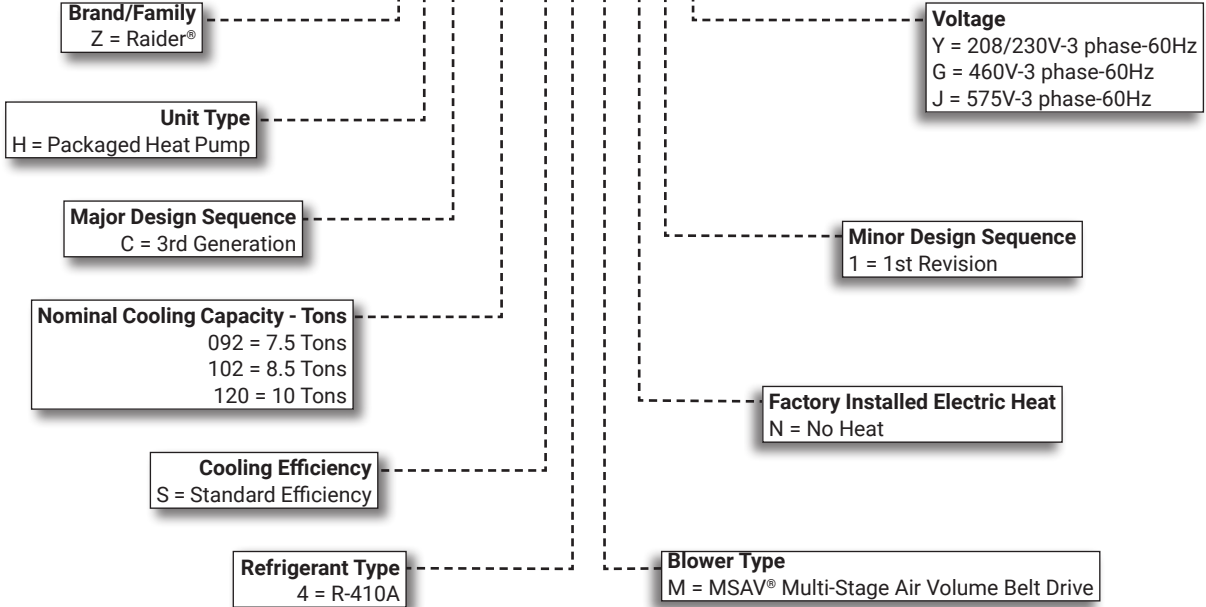


**ASHRAE 90.1
COMPLIANT**

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

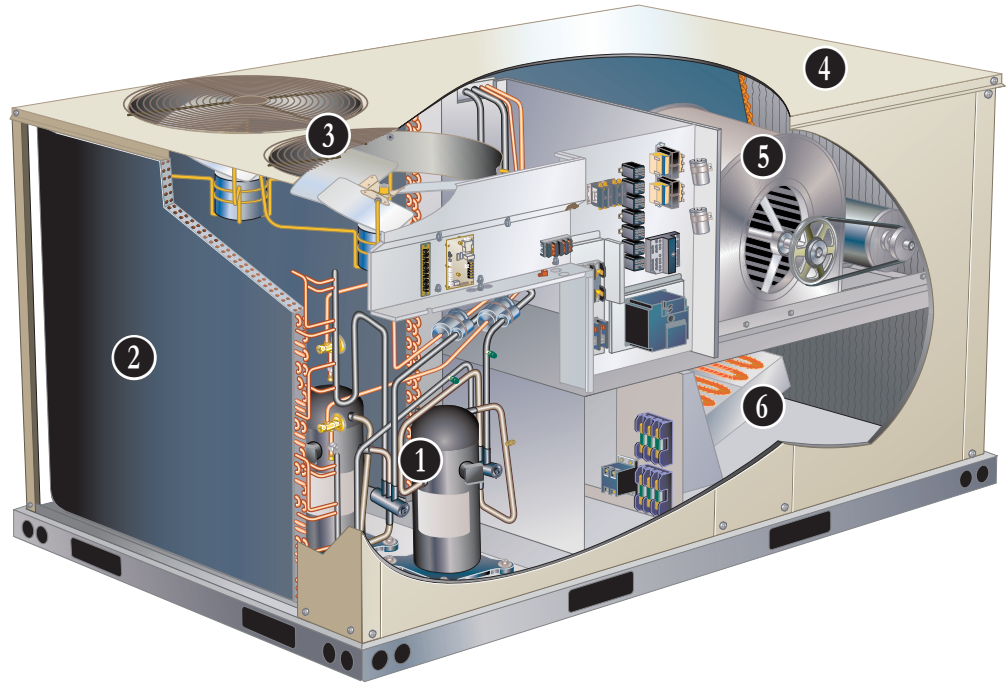
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FEATURE HIGHLIGHTS

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

1. Scroll Compressors
2. Copper Tube Coil Construction
3. Outdoor Coil Fans
4. Heavy Gauge Steel Cabinet
5. MSAV® Multi-Stage Air Volume Blower
6. Electric Heat (option)



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APPROVALS AND WARRANTY

APPROVALS

- AHRI Standard 340/360 certified
- ETL Intertek listed
- Unit and components are ETL, NEC, and CEC bonded for grounding to meet safety standards for servicing
- All models are ASHRAE 90.1 energy efficiency compliant and meet or exceed requirements of Section 6.8
- All models meet DOE 2023 energy efficiency standards
- All models meet California Code of Regulations, Title 24 and ASHRAE 90.1 Section 6.4.3.10 requirements for staged airflow
- ISO 9001 Registered Manufacturing Quality System

WARRANTY

- Compressors - Limited five years
- Variable-Frequency Drive (VFD) (optional) - Limited five years
- High Performance Economizers (optional) - Limited five years
- All other covered components - Limited one year

FEATURES AND BENEFITS

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

1 Scroll Compressors

- System consists of one two-stage scroll compressor and one single-stage scroll compressor
- Resiliently mounted on rubber grommets for quiet operation

Thermal Expansion Valves

- Ensures optimal performance throughout the application range
- Removeable power element

Filter/Driers

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

Reversing Valve

- 4-way interchange reversing valve rapidly changes the direction of refrigerant flow resulting in quick changeover from cooling to heating 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 outdoor coils, blocked refrigerant flow or loss of outdoor fan operation

Coil Construction

- 2 • Copper tube construction
- Enhanced rippled-edge aluminum fins
- Flared shoulder tubing connections
- Silver soldered construction
- Factory leak tested

Indoor Coil

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

Antimicrobial Condensate Drain Pan

- Composite pan, sloped to meet drainage requirements of ASHRAE 62.1
- Antimicrobial additive resists growth of mold and mildew on drain pan, which improves indoor air quality and reduces drain line blockage
- 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

FEATURES AND BENEFITS

COOLING/HEATING SYSTEM (continued)

Required Selections

Cooling Capacity

- Specify nominal cooling capacity

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

Options/Accessories (continued)

Field Installed (continued)

Low Ambient Kit (0°F)

- Cycles the outdoor fan while allowing compressor operation in the cooling cycle
- 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

Construction

- 4 • Heavy-gauge steel panels
- Full perimeter heavy-gauge galvanized steel base rail
- 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 for water protection

Airflow Choice

- Units are shipped in downflow (vertical) return air flow configuration

Duct Flanges

- Provided for horizontal duct attachment.

Power Entry

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

NOTE - Optional Bottom Power Entry Kit is available.

Exterior Panels

- Constructed of heavy-gauge, galvanized steel
- Textured pre-paint with polyurethane finish
- Cyclic salt fog and UV exposure up to 1,680 hours per ASTM D5894

Insulation

- Fully insulated with non-hygroscopic fiberglass insulation (conditioned areas)

Access Panels

- Filter section
- Blower/heating section
- Compressor/controls section
- Recessed handles for easy service access

Options/Accessories

Factory Installed

Corrosion Protection

- Completely flexible immersed coating
- Electrodeposited dry film process (AST ElectroFin E-Coat)
- ASTM B117 / DIN 53167 Salt Spray - 15,000+ hours
- ASTM G85 Annex A3 SWAAT Modified Salt Spray - 3000 hours
- VA Master Construction Specification Division 23 for High Humidity Installations
- CID AA-52474A (GSA)
- Indoor Corrosion Protection:
 - Coated coil
- Outdoor Corrosion Protection:
 - Coated coil

Field Installed

Combination Coil/Hail Guards

- Heavy gauge steel frame
- Painted to match cabinet
- Expanded metal mesh protects outdoor coil

FEATURES AND BENEFITS

BLOWER

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

5 Blower Motor

- Overload protected
- Ball bearings
- Available in several different sizes to maximize air performance

Supply Air Blower

- Forward curved blades
- Double inlet
- Blower wheel statically and dynamically balanced
- Ball bearings
- Adjustable pulley (allows speed change).
- Blower assembly slides out of unit for servicing

MSAV® Multi-Stage Air Volume Operation

- MSAV® Multi-Stage Air Volume stages the amount of airflow according to compressor stages, heating demand and ventilation demand
- Units utilize a Variable Frequency Drive (VFD) to stage the supply air blower airflow
- VFD alters the frequency and voltage of the power supply to the blower to control blower speed
- The supply air blower has three speeds:
 1. Low Speed - 1st Stage Cooling
 2. Medium Speed - 2nd Stage Cooling
 3. High Speed - Full load cooling and all heat modes
- Full speed blower operation is set by adjusting the motor pulley to deliver the desired air volume
- Ventilation speed is same as low speed for improved energy savings

NOTE - Part load airflow in cooling mode should not be set below 220 cfm/nominal full load ton to reduce the risk of evaporator coil freeze-up.

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

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

MSAV® Multi-Stage Air Volume Sequence of Operation

- Blower operates in low speed with (G) demand
- Blower operates in low speed for mechanical cooling (Y1)
- Blower operates in medium speed for any other mode (mechanical cooling (Y1+Y2)
- Blower operates in high speed for any other mode (mechanical cooling Y1+Y2+Y3, and heating)
- Economizer damper minimum position is fully closed in unoccupied mode
- In occupied mode, the economizer damper minimum position is determined by the economizer minimum position of the potentiometer

NOTE - Variable Frequency Drive (VFD) is designed to operate on balanced, three-phase power. Operating units on unbalanced three-phase power will reduce the reliability of all electrical components in the unit. Unbalanced power is a result of the power delivery system supplied by the local utility company. Factory-installed inverters are sized to drive blower motors with an equivalent current rating using balanced three-phase power. If unbalanced three-phase power is supplied the installer must replace the existing factory-installed inverter with an inverter that has a higher current rating to allow for the imbalance. Refer to the installation instructions for additional information and replacement information.
Required Selections

Required Selections

- Order blower motor horsepower and drive kit number required when base unit is ordered
- See Drive Kit Specifications Table

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 / 3 cool staging with a third party DDC control system or thermostat
- **Low Voltage Terminal Block** - Provides screw terminal connections for thermostat or controller wiring

Options/Accessories

Field Installed

Smoke Detectors

NOTE - Smoke detectors are not furnished and must be field supplied.

Thermostats

- Control system and thermostat options, see page 10

FEATURES AND BENEFITS

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

Options/Accessories

Field Installed

6

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

- Reduces the number of penetrations in the roof
- Includes bulkhead connectors to provide power and control wiring routing through the roof curb

INDOOR AIR QUALITY

Air Filters

- Disposable 2 inch MERV 4 filters furnished as standard

Options/Accessories

Field Installed

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 (CO₂) Sensors

- Reports to the economizer control to adjust the dampers as needed

OPTIONS / ACCESSORIES

ECONOMIZER

Economizer

(Standard and High Performance Common Features)

- Downflow or Horizontal models with Barometric Relief Dampers and Hood
- 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
- Occupied/Unoccupied mode with field furnished setback thermostat
- Demand Control Ventilation (DCV) ready using optional CO₂ 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

Field Installed

Standard Economizer Features (Not for Title 24)

- 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 CO₂ is higher than the CO₂ 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

NOTE - 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.

Factory or Field Installed

NOTE - Downflow Economizer is factory or field installed.
Horizontal Economizer is field installed only.

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 thermoplastic vulcanizate (TPV) seals
- Flexible stainless steel jamb seals minimize air leakage

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

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

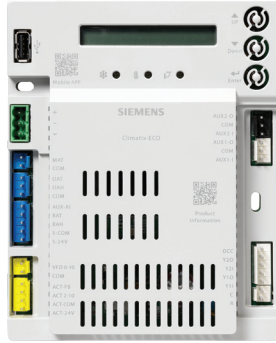
NOTE - The Free Cooling setpoint for Title 24 applications must be set based on the Climate Zone where the system is installed. See Section 140.4 "Prescriptive Requirements for Space Conditioning Systems" of the California Energy Commission's 2013 Building Energy Efficiency Standards. Refer to Installation Instructions for complete setup information and menu parameters available.

OPTIONS / ACCESSORIES

ECONOMIZER (continued)

High Performance Economizer Control Module

- Provides inputs and outputs to control economizer based on parameter settings
- Free cooling based on single dry bulb temperature, or combination temperature + humidity sensors
- Automatic switchover for different control modes
- Parameter settings based on climate zone, using GPS functionality in the Climatix Mobile application
- LED indication for free cooling operation, sensor operation and damper operation
- Quick installation and easy commissioning with the **Climatix Mobile App** on a mobile device



NOTE - WLAN Stick is required for App connection to module(s).

- Module displays any alarm messages (fault detection and diagnostics) as an aid in troubleshooting
- RS485 port for BACnet MSTP or Modbus RTU communication
- USB port for firmware updates and WLAN connection for setup and commissioning
- QR codes on module for quick access to download Climatix Mobile App and user documentation
- User Interface for normal operation, parameter setup and, alarm notifications with an LCD display and three operation buttons:
 1. **Up Button** - Move to the previous value, step or category
 2. **Down Button** - Move to the next value, step or category
 3. **Enter Button** -
 - Press to edit the current value or option
 - Press to confirm a newly selected value or option
 - Press Enter + Up to jump up one category
 - Press Enter + Down to jump down one category

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.

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

Field Installed

Single Enthalpy Temperature Control

- 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 one for factory installed economizer
- Order two for field installed economizer
 - One is field installed in the return air section
 - One in the outdoor air section
- Allows the economizer control board to select between outdoor air or return air, whichever has lower enthalpy

WLAN Stick

- Required for Climatix Mobile App usage
- Plugs into USB port on Module to provide a temporary WLAN connection for setup, commissioning, and servicing

NOTE - Only one WLAN Stick is required and can be used on multiple modules.

EXHAUST

Field Installed

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
- Fan is 20 in. diameter
- Five blades
- One 1/3 hp motor

NOTE - Requires Economizer with Outdoor Air Hood and Barometric Relief Dampers.

OPTIONS / ACCESSORIES

OUTDOOR AIR

Field Installed

Outdoor Air Damper

- Downflow or Horizontal
- Linked mechanical dampers
- 0 to 25% (fixed) outdoor air adjustable
- Installs in unit
- Includes outdoor air hood
- Motorized model features fully modulating spring return damper motor with plug-in connection
- Manual model features a slide damper

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

ROOF CURBS

Field Installed

Hybrid Roof Curbs, Downflow

- Nailer strip furnished; mates to unit
- US National Roofing Contractors approved
- Shipped knocked down
- Interlocking tabs fasten corners together
- No tools required for assembly
- Can also be fastened together with furnished hardware
- Available in 8, 14, 18, and 24 inch heights

CEILING DIFFUSERS

Field Installed

(Flush or Step-Down)

- White powder coat finish on diffuser face and grilles
- Insulated UL listed duct liner
- Diffuser box has collars for duct connection
- Step-down diffusers have double deflection blades
- Flush diffusers have fixed blades
- Provisions for suspending
- Internally sealed to prevent 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.

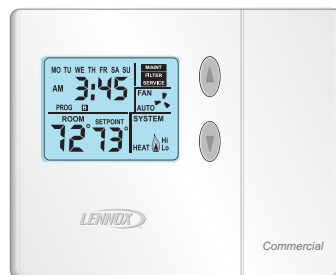
OPTIONAL CONVENTIONAL TEMPERATURE CONTROL SYSTEMS

CS7500 Commercial 7-Day Programmable Thermostat



- Premium Universal Thermostat
- Full Color Touchscreen Interface
- Up To 4 Heat / 3 Cool
- Built-In Sensors For Temperature and Humidity
- Remote Sensors Options For Temperature, Discharge Air, Outdoor Air
- 5-2 or 7-Day Scheduling
- Smooth Setback Recovery
- Heat/Cool Auto-Changeover
- FDD, ASHRAE, IECC Compliant

CS3000 Commercial 5-2 Day Programmable Thermostat



- Conventional Multi-Stage Thermostat
- Intuitive Display
- Push-Button Operation
- Up To 2 Heat / 2 Cool
- Built-In Temperature Sensor
- Remote Temperature Sensing
- Up to 5-2 Day Scheduling
- Smooth Setback Recovery
- Heat/Cool Auto-changeover

Optional Accessories

Cooling Stage-Up Timer Relay

- Allows the unit to attain an additional stage of cooling without the need for extra thermostat connections
- Adjustable - 1 to 1023 seconds
- Mounts internal to unit

OPTIONAL CONVENTIONAL TEMPERATURE CONTROL SYSTEMS

BACnet Compatible Thermostat With Reheat



- 7-Day Programmable
- For units with or without Humiditrol®
- BTL listed MS/TP ensures compatibility with any BACnet system
- Built-in control programs for conventional and heat pump applications
- Conventional systems up to 3-stage heat and 3-stage cool
- Heat pumps with 1 or 2 compressors and up to 2-stage auxiliary heat
- On-board temperature and humidity sensor
- Multiple configurable inputs and outputs enable advanced control strategies
- Set-up Wizard enables rapid system configuration
- No special tools required for installation or commissioning
- Seven-day (2, 4 or 6 event) occupancy scheduling per day
- Backlit 5-inch LCD touchscreen

Description	Catalog No.	
CS7500 Commercial 7-Day Programmable Thermostat		
CS7500 7-Day Thermostat	24K41	
Sensors/Accessories	¹ Remote non-adjustable wall-mount 20k	47W36
	¹ Remote non-adjustable wall-mount 10k	47W37
	Remote non-adjustable discharge air (duct mount)	19L22
	Outdoor temperature sensor	X2658
CS3000 5-2 Day Programmable Thermostat		
CS3000 5-2 Day Thermostat	11Y05	
Sensor/Accessories	Remote non-adjustable wall mount 10k averaging	47W37
	Thermostat wall mounting plate	X2659
Optional Accessory		
	Cooling Stage-Up Timer Relay	24G40
BACnet 7-Day Programmable Thermostat		
BACnet Controls	² 7-Day BACnet Thermostat	24C57
	³ BACnet Module (factory or field)	16X71
⁴ BACnet Room Sensors	With Display	97W23
	Without Display	97W24
Universal Thermostat Guard with Lock (clear)		
	Inside Dimensions (H x W x D) 5-7/8 x 8-3/8 x 3 in.	39P21

¹ Remote wall-mount 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

² BACnet Thermostat (24C57) 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 suitable.

³ Not compatible with units equipped with Humiditrol® option.

⁴ Only compatible with BACnet Module (16X71).

OPTIONS / ACCESSORIES

Item Description	Catalog Number	Unit Model No			
		092	102	120	
COOLING/HEATING SYSTEM					
Condensate Drain Trap	PVC	22H54	X	X	X
	Copper	76W27	X	X	X
Corrosion Protection	Factory		O	O	O
Drain Pan Overflow Switch		99W59	X	X	X
Low Ambient Kit		10Z34	X	X	X
Refrigerant Type		R-410A	O	O	O
BLOWER - SUPPLY AIR					
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 See Blower Data Tables for selection	Kit #1 590-890 rpm	Factory	O	O	O
	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		12X21	X	X	X
CONTROLS					

NOTE - See Conventional Thermostat Control Systems on page 10 for Additional Options.

NOTE - Catalog 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	Catalog Number	Unit Model No			
		092	102	120	
INDOOR AIR QUALITY					
Air Filters					
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)	Y3063	X	X	X	
Indoor Air Quality (CO₂) Sensors					
Sensor - Wall-mount, off-white plastic cover with LCD display	77N39	X	X	X	
Sensor - Wall-mount, off-white plastic cover, no display	23V86	X	X	X	
Sensor - Black plastic case with LCD display, rated for plenum mounting	87N52	X	X	X	
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting	87N54	X	X	X	
CO ₂ Sensor Duct Mounting Kit - for downflow applications	85L43	X	X	X	
Aspiration Box - For duct mounting non-plenum rated CO ₂ sensors (77N39)	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	11H66		X	X	X
ELECTRIC HEAT					
7.5 kW	208/240V-3ph	10Y97	X	X	
	460V-3ph	10Y98	X	X	
	575V-3ph	10Y99	X	X	
15 kW	208/240V-3ph	10Z01	X	X	X
	460V-3ph	10Z03	X	X	X
	575V-3ph	10Z04	X	X	X
22.5 kW	208/240V-3ph	10Z05	X	X	X
	460V-3ph	10Z06	X	X	X
	575V-3ph	10Z07	X	X	X
30 kW	208/240V-3ph	10Z08	X	X	X
	460V-3ph	10Z09	X	X	X
	575V-3ph	10Z10	X	X	X
45 kW	208/240V-3ph	10Z11	X	X	X
	460V-3ph	10Z12	X	X	X
	575V-3ph	10Z13	X	X	X
60 kW	208/240V-3ph	10Z14			X
	460V-3ph	10Z15			X
	575V-3ph	10Z16			X
ELECTRIC HEAT ACCESSORIES					
Unit Fuse Block (required) - See Electrical/Electric Heat Tables for Selection			X	X	X
NOTE - Catalog numbers shown are for ordering field installed accessories.					
OX - Configure To Order (Factory Installed) or Field Installed					
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OPTIONS / ACCESSORIES

Item Description	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	24K57	X	X	X	
Standard Horizontal Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods	24K58	X	X	X	
Standard Economizer Controls (Not for Title 24)					
Single Enthalpy Control	21Z09	X	X	X	
Differential Enthalpy Control (order 2)	21Z09	X	X	X	
High Performance Economizer (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)					
High Performance Downflow Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods	24F99	OX	OX	OX	
High Performance Horizontal Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods	24G01	X	X	X	
High Performance Economizer Controls					
Single Enthalpy Control	24G11	X	X	X	
Differential Enthalpy Control (order 2) (Not for Title 24)	24G11	X	X	X	
Economizer Accessories					
WLAN Stick (For High Performance Economizer only)	23K58	X	X	X	
OUTDOOR AIR					
Outdoor Air Dampers					
Motorized Dampers with outdoor air hood	14G36	X	X	X	
Manual Dampers with outdoor air hood	14G37	X	X	X	
POWER EXHAUST					
Standard Static (Downflow)	208/230V-3ph	10Z70	X	X	X
	460V-3ph	10Z71	X	X	X
Standard Static (Horizontal)	208/230V-3ph	24E01	X	X	X
	460V-3ph	28E01	X	X	X
575V Transformer Kit		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		10Z25	X	X	X
14 in. height		10Z26	X	X	X
18 in. height		10Z27	X	X	X
24 in. height		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 numbers shown are for ordering field installed accessories.

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

O = Configure To Order (Factory Installed)

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SPECIFICATIONS

General Data		Nominal Tonnage	7.5 Ton	8.5 Ton	10 Ton
		Model Number	ZHC092S4M	ZHC102S4M	ZHC120S4M
		Efficiency Type	Standard	Standard	Standard
		Blower Type	MSAV	MSAV	MSAV
			Multi-Stage Air Volume	Multi-Stage Air Volume	Multi-Stage Air Volume
Cooling Performance	Gross Cooling Capacity - Btuh		89,400	103,200	121,900
	¹ Net Cooling Capacity - Btuh		87,000	100,000	118,000
	AHRI Rated Air Flow - cfm		3000	3200	3400
	Total Unit Power - kW		7.9	9.1	10.7
	¹ EER (Btuh/Watt)		11.0	11.0	11.0
	¹ IEER (Btuh/Watt)		14.1	14.1	14.1
Refrigerant Charge Furnished	Refrigerant Type		R-410A	R-410A	R-410A
	Circuit 1		11 lbs. 12 oz.	11 lbs. 10 oz.	15 lbs. 0 oz.
	Circuit 2		10 lbs. 8 oz.	9 lbs. 14 oz.	14 lbs. 0 oz.
Heating Performance	¹ Total High Heat Capacity - Btuh		83,000	100,000	116,000
	Total Unit Power - kW		7.1	8.6	10.0
	¹ C.O.P.		3.4	3.4	3.4
	¹ Total Low Heat Capacity - Btuh		50,000	55,000	70,000
	Total Unit Power (kW)		6.6	7.2	9.1
	¹ C.O.P.		2.25	2.25	2.25
Electric Heat Available - See page 13			7.5, 15, 22.5, 30 & 45 kW		15, 22.5, 30, 45 and 60 KW
Compressor Type (number)			(1) Two-Stage Scroll, (1) Single-Stage Scroll		
Outdoor Coils	Net face area (total) - sq. ft.		26.2	26.2	26.2
	Tube diameter - in.		3/8	3/8	3/8
	Number of rows		2	3	3
	Fins per inch		20	20	20
	Expansion device type		Balance port TXV, removable head		
Outdoor Coil Fans	Motor - (No.) hp		(2) 1/3	(2) 1/3	(2) 1/2
	Motor rpm		1075	1075	1075
	Total Motor watts		650	960	960
	Diameter - (No.) in.		(2) 24	(2) 24	(2) 24
	Number of blades		3	3	3
	Total Air volume - cfm		8800	8800	9000
Indoor Coils	Net face area (total) - sq. ft.		13.54	13.54	13.54
	Tube diameter - in.		3/8	3/8	3/8
	Number of rows		4	4	4
	Fins per inch		14	14	14
	Drain connection - Number and size		(1) 1 in. NPT coupling		
	Expansion device type		Balanced Port Thermostatic Expansion Valve (removable power element)		
² Indoor Blower and Drive Selection	Nominal motor output		2 hp, 3 hp, 5 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		
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.

¹ 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.

² 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. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE - Motor service factor limit - 1.0.

COOLING/HEATING 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 - ZHC092S4M (1 COMPRESSOR - PART LOAD)

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) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) 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	1600	37.4	1280	0.8	1	1	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59
	1980	39.8	1270	0.88	1	1	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59
	2360	42.7	1260	1	1	1	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59
67°F	1600	39.8	1270	0.56	0.77	0.97	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59
	1980	41.2	1270	0.6	0.85	1	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59
	2360	42.8	1260	1	1	1	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59
71°F	1600	42.5	1270	0.36	0.55	0.74	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59
	1980	43.9	1260	0.37	0.59	0.59	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59
	2360	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59	43.9	1260	0.59	0.59	0.59

7.5 TON COOLING - ZHC092S4M (2 COMPRESSORS - PART LOAD / FULL LOAD)

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) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) 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	1800	70	4860	0.66	0.8	0.92	64	5600	0.67	0.82	0.93	57.5	6440	0.68	0.84	0.95	51.1	7400	0.69	0.86	0.97
	2250	75.2	4860	0.72	0.87	0.97	69	5600	0.73	0.89	0.99	62.7	6430	0.75	0.9	1	55.8	7390	0.77	0.93	1
	2700	79.6	4860	0.77	0.92	1	73.3	5590	0.79	0.94	1	66.6	6430	0.81	0.96	1	59.4	7370	0.84	0.99	1
67°F	1800	76	4860	0.51	0.64	0.77	69.7	5600	0.51	0.64	0.78	63.1	6440	0.5	0.65	0.8	56	7380	0.5	0.67	0.83
	2250	81.3	4870	0.55	0.69	0.84	74.6	5600	0.54	0.7	0.86	67.5	6440	0.54	0.72	0.88	59.9	7380	0.55	0.74	0.9
	2700	85	4870	0.58	0.75	0.9	78.1	5600	0.58	0.76	0.91	70.7	6440	0.59	0.79	0.93	62.8	7380	0.6	0.82	0.96
71°F	1800	82.1	4860	0.38	0.5	0.62	75.7	5600	0.37	0.5	0.62	68.9	6430	0.35	0.49	0.63	61.5	7370	0.33	0.49	0.64
	2250	87.5	4860	0.4	0.54	0.67	80.7	5610	0.39	0.54	0.68	73.3	6440	0.38	0.54	0.7	65.5	7370	0.36	0.54	0.72
	2700	91.5	4880	0.41	0.57	0.72	84.3	5610	0.41	0.57	0.74	76.7	6440	0.4	0.58	0.76	68.4	7380	0.38	0.59	0.79

7.5 TON COOLING - ZHC092S4M (2 COMPRESSOR - FULL LOAD)

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) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) 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	88.8	5760	0.69	0.84	0.97	82.1	6520	0.7	0.85	0.99	75.2	7380	0.71	0.88	1	67.6	8390	0.73	0.92	1
	3000	94.2	5790	0.75	0.92	1	87.2	6540	0.76	0.94	1	79.9	7410	0.78	0.97	1	72.4	8410	0.81	1	1
	3600	98.5	5820	0.81	0.98	1	91.7	6580	0.83	1	1	84.7	7440	0.85	1	1	77.4	8440	0.89	1	1
67°F	2400	95.7	5810	0.53	0.67	0.8	88.8	6550	0.53	0.68	0.82	81.5	7420	0.53	0.69	0.84	73.6	8410	0.53	0.7	0.88
	3000	101.1	5850	0.57	0.73	0.88	93.8	6590	0.57	0.74	0.91	86	7450	0.58	0.76	0.94	77.6	8440	0.58	0.79	0.98
	3600	104.9	5880	0.61	0.79	0.96	97.3	6620	0.61	0.81	0.98	89.2	7460	0.62	0.83	1	80.5	8470	0.63	0.87	1
71°F	2400	102.6	5850	0.4	0.52	0.65	95.4	6600	0.39	0.52	0.65	87.9	7450	0.38	0.52	0.67	79.7	8450	0.36	0.52	0.68
	3000	108.1	5900	0.41	0.56	0.71	100.6	6650	0.41	0.56	0.72	92.6	7500	0.4	0.57	0.74	83.9	8490	0.39	0.58	0.76
	3600	112.3	5940	0.43	0.6	0.76	104.3	6670	0.42	0.61	0.78	95.9	7510	0.42	0.61	0.81	86.8	8520	0.41	0.63	0.84

7.5 TON HEATING - ZHC092S4M

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	113.4	7.04	83.1	6.30	59.4	5.74	40.3	5.26	26.7	4.91
3000	116.0	6.42	84.3	5.86	59.9	5.45	40.5	5.07	26.8	4.83
2600	117.8	6.05	85.1	5.58	60.3	5.28	40.7	4.97	26.8	4.78

COOLING/HEATING 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 - ZHC102S4M (1 COMPRESSOR - PART LOAD)

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) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) 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				kBtuh	kW				kBtuh	kW				kBtuh	kW								
63°F	1920	47.7	1640	0.77	0.97	1	45.1	1980	0.79	0.99	1	42.3	2320	0.81	1	1	39.2	2680	0.84	1	1				
	2400	50.6	1620	0.84	1	1	48.1	1960	0.86	1	1	45.1	2300	0.89	1	1	41.8	2660	0.94	1	1				
	2880	53	1600	0.9	1	1	50.3	1940	0.94	1	1	47.1	2270	0.97	1	1	43.7	2640	1	1	1				
67°F	1920	50.7	1620	0.55	0.74	0.93	47.8	1960	0.56	0.76	0.96	44.5	2300	0.56	0.78	0.99	40.8	2660	0.57	0.81	1				
	2400	52.7	1600	0.59	0.82	1	49.6	1950	0.6	0.84	1	46.2	2280	0.62	0.87	1	42.5	2650	0.63	0.9	1				
	2880	54.2	1600	0.63	0.88	1	51.1	1930	0.65	0.91	1	47.6	2270	0.66	0.95	1	43.9	2640	0.69	0.98	1				
71°F	1920	54.1	1590	0.35	0.53	0.71	51.2	1930	0.34	0.54	0.73	47.8	2270	0.34	0.55	0.75	44	2640	0.33	0.56	0.78				
	2400	56.1	1580	0.36	0.58	0.79	52.9	1920	0.35	0.59	0.81	49.3	2260	0.35	0.6	0.84	45.5	2630	0.35	0.62	0.87				
	2880	57.5	1570	0.37	0.62	0.85	54.1	1900	0.37	0.64	0.88	50.5	2240	0.37	0.66	0.91	46.5	2610	0.38	0.68	0.96				

8.5 TON COOLING - ZHC102S4M (2 COMPRESSORS - PART LOAD / FULL LOAD)

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) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) 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				kBtuh	kW				kBtuh	kW				kBtuh	kW								
63°F	2040	79.6	5020	0.67	0.81	0.94	73.3	5760	0.68	0.82	0.95	66.5	6590	0.69	0.85	0.97	59.2	7540	0.7	0.88	0.99				
	2550	85.1	5010	0.72	0.88	0.99	78.4	5740	0.74	0.9	1	71.3	6570	0.75	0.93	1	64.1	7510	0.78	0.96	1				
	3060	89.5	5010	0.77	0.94	1	82.8	5730	0.79	0.96	1	75.8	6550	0.82	0.98	1	68.2	7480	0.85	1	1				
67°F	2040	86.2	5010	0.52	0.65	0.77	79.7	5740	0.52	0.65	0.79	72.6	6560	0.51	0.66	0.81	65	7510	0.51	0.67	0.84				
	2550	91.9	5000	0.55	0.7	0.84	84.9	5730	0.55	0.71	0.87	77.3	6550	0.55	0.73	0.9	69.3	7490	0.56	0.75	0.93				
	3060	96	4990	0.58	0.75	0.91	88.7	5720	0.59	0.77	0.94	80.9	6540	0.6	0.79	0.96	72.3	7480	0.61	0.83	0.98				
71°F	2040	93	5000	0.39	0.51	0.62	86.1	5720	0.38	0.51	0.63	78.8	6550	0.37	0.5	0.64	71	7480	0.35	0.5	0.65				
	2550	98.8	4980	0.41	0.54	0.68	91.6	5710	0.4	0.54	0.69	83.8	6530	0.39	0.55	0.7	75.4	7460	0.37	0.55	0.73				
	3060	103.1	4970	0.42	0.58	0.73	95.6	5700	0.41	0.58	0.74	87.4	6520	0.41	0.59	0.77	78.6	7440	0.4	0.6	0.8				

8.5 TON COOLING - ZHC102S4M (2 COMPRESSORS - FULL LOAD)

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) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) 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				kBtuh	kW				kBtuh	kW				kBtuh	kW								
63°F	2720	100.2	6070	0.7	0.84	0.98	93.1	6870	0.71	0.86	1	85.5	7760	0.72	0.89	1	77.5	8800	0.74	0.92	1				
	3400	106.1	6100	0.76	0.92	1	98.5	6900	0.77	0.95	1	90.7	7800	0.79	0.98	1	82.6	8840	0.82	1	1				
	4080	110.8	6130	0.81	0.99	1	103.3	6920	0.83	1	1	96.1	7820	0.86	1	1	88.2	8860	0.9	1	1				
67°F	2720	107.7	6110	0.54	0.67	0.81	100.3	6910	0.54	0.69	0.83	92.6	7800	0.54	0.7	0.85	84.1	8840	0.54	0.71	0.88				
	3400	113.6	6130	0.58	0.73	0.89	105.8	6940	0.58	0.75	0.91	97.4	7830	0.59	0.77	0.94	88.5	8860	0.59	0.79	0.98				
	4080	117.9	6160	0.61	0.79	0.96	109.6	6950	0.62	0.81	0.99	100.9	7850	0.63	0.84	1	91.6	8880	0.64	0.87	1				
71°F	2720	115.2	6150	0.41	0.53	0.65	107.6	6940	0.4	0.53	0.66	99.5	7840	0.39	0.53	0.67	90.8	8870	0.38	0.54	0.69				
	3400	121.6	6170	0.42	0.57	0.71	113.3	6970	0.41	0.57	0.73	104.7	7870	0.41	0.58	0.75	95.4	8890	0.4	0.59	0.77				
	4080	125.7	6190	0.44	0.61	0.77	117.2	6990	0.43	0.61	0.79	108.3	7890	0.43	0.62	0.82	98.6	8910	0.42	0.64	0.85				

8.5 TON HEATING - ZHC102S4M

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
2720	126.6	7.48	92.5	6.69	66.8	6.09	45.3	5.68	29.0	5.48
3400	129.1	6.82	94.0	6.24	67.4	5.81	45.5	5.53	29.1	5.40
4080	130.6	6.42	94.8	5.97	67.5	5.64	45.4	5.46	29.1	5.36

COOLING/HEATING 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 - ZHC120S4M (1 COMPRESSOR - PART LOAD)

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) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) 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				kBtuh	kW				kBtuh	kW				kBtuh	kW								
63°F	2110	48.2	1620	0.8	1	1	45.7	1960	0.82	1	1	42.9	2300	0.85	1	1	39.8	2660	0.88	1	1				
	2640	51.3	1600	0.88	1	1	48.6	1940	0.9	1	1	45.6	2270	0.93	1	1	42.2	2630	0.97	1	1				
	3170	53.5	1590	0.94	1	1	50.7	1920	0.97	1	1	47.6	2260	1	1	1	44.1	2610	1	1	1				
67°F	2110	50.9	1610	0.57	0.78	0.96	47.9	1940	0.58	0.79	0.99	44.6	2280	0.59	0.82	1	40.9	2640	0.6	0.85	1				
	2640	52.8	1590	0.61	0.85	1	49.8	1930	0.63	0.88	1	46.3	2270	0.65	0.9	1	42.5	2630	0.66	0.94	1				
	3170	54.2	1580	0.66	0.92	1	51.1	1910	0.68	0.94	1	47.7	2260	0.7	0.98	1	44.1	2620	0.73	1	1				
71°F	2110	54.3	1580	0.35	0.56	0.75	51.3	1920	0.35	0.56	0.77	47.8	2260	0.34	0.57	0.79	43.9	2620	0.33	0.59	0.82				
	2640	56.1	1570	0.37	0.6	0.83	52.9	1900	0.36	0.61	0.85	49.6	2250	0.36	0.63	0.88	45.3	2600	0.36	0.66	0.92				
	3170	57.4	1560	0.39	0.65	0.89	54	1890	0.38	0.67	0.92	50.3	2230	0.38	0.69	0.95	46.4	2600	0.39	0.72	0.99				

10 TON COOLING - ZHC120S4M (2 COMPRESSORS - PART LOAD / FULL LOAD)

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) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) 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				kBtuh	kW				kBtuh	kW				kBtuh	kW								
63°F	2400	97.8	6530	0.67	0.81	0.91	90.8	7450	0.68	0.82	0.92	82.9	8480	0.69	0.84	0.94	74.8	9680	0.71	0.86	0.96				
	3000	104.8	6560	0.72	0.87	0.96	97.4	7470	0.74	0.88	0.98	89.4	8490	0.75	0.9	1	81	9700	0.78	0.92	1				
	3600	109.8	6580	0.77	0.93	1	102.9	7480	0.79	0.93	1	94.5	8510	0.81	0.95	1	85.4	9690	0.84	0.97	1				
67°F	2400	105.6	6550	0.53	0.65	0.77	98	7470	0.53	0.66	0.79	90	8510	0.52	0.67	0.81	81.1	9690	0.52	0.68	0.83				
	3000	112.3	6570	0.56	0.7	0.84	104.3	7490	0.56	0.71	0.86	95.6	8520	0.56	0.73	0.87	86.2	9710	0.57	0.75	0.89				
	3600	117.3	6600	0.59	0.75	0.89	108.7	7510	0.59	0.77	0.9	99.7	8540	0.6	0.79	0.92	89.8	9720	0.61	0.82	0.95				
71°F	2400	113.3	6570	0.4	0.51	0.63	105.5	7470	0.39	0.51	0.63	97.2	8520	0.38	0.51	0.64	88	9690	0.37	0.51	0.66				
	3000	120.2	6600	0.41	0.55	0.68	111.9	7510	0.41	0.55	0.69	102.9	8540	0.4	0.55	0.71	93.1	9710	0.39	0.56	0.73				
	3600	125.5	6620	0.43	0.58	0.73	116.7	7530	0.44	0.58	0.74	107.2	8560	0.42	0.59	0.77	96.9	9740	0.41	0.6	0.8				

10 TON COOLING - ZHC120S4M (2 COMPRESSORS - FULL LOAD)

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) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cool Cap.	Comp. Motor Input	Sensible To Total Ratio (S/T) 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				kBtuh	kW				kBtuh	kW				kBtuh	kW								
63°F	3200	118.6	7450	0.7	0.85	0.97	110.4	8400	0.71	0.87	0.98	102.1	9480	0.73	0.89	1	92.7	10720	0.74	0.92	1				
	4000	125.2	7510	0.76	0.92	1	116.8	8460	0.78	0.95	1	107.9	9540	0.79	0.97	1	98.7	10780	0.82	0.99	1				
	4800	130.7	7550	0.81	0.97	1	122.2	8500	0.84	0.99	1	113.6	9590	0.86	1	1	104.4	10840	0.9	1	1				
67°F	3200	126.9	7520	0.55	0.68	0.81	118.6	8470	0.55	0.69	0.83	109.6	9560	0.55	0.7	0.85	100.1	10800	0.55	0.72	0.89				
	4000	133.6	7580	0.58	0.74	0.89	124.7	8530	0.59	0.75	0.91	115.2	9610	0.59	0.77	0.94	104.8	10850	0.6	0.8	0.97				
	4800	138.5	7620	0.62	0.79	0.95	129	8570	0.62	0.81	0.97	119.1	9660	0.64	0.84	0.99	108.5	10890	0.65	0.88	1				
71°F	3200	135.5	7590	0.41	0.53	0.66	126.7	8540	0.4	0.54	0.67	117.5	9640	0.4	0.54	0.68	107.5	10880	0.39	0.54	0.7				
	4000	142.4	7650	0.43	0.57	0.71	133.1	8610	0.42	0.58	0.73	123.2	9690	0.42	0.58	0.75	112.5	10930	0.41	0.6	0.78				
	4800	147.3	7700	0.44	0.61	0.77	137.7	8660	0.44	0.62	0.79	127.1	9730	0.44	0.63	0.82	116.2	10980	0.43	0.65	0.85				

10 TON HEATING - ZHC120S4M

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	149.1	9.16	109.4	8.15	78.4	7.39	53.3	6.87	34.5	6.52
4000	152.2	8.36	110.7	7.59	79.0	7.05	53.6	6.67	34.6	6.43
4800	153.7	7.87	111.4	7.25	79.3	6.83	53.7	6.57	34.6	6.39

ZHC092S4M, ZHC102S4M, ZHC120S4M – 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 20 for blower motors and drives and air resistance for wet coil and options/accessories.

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	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	Drive Kit Number	RPM Range
2	1	590 - 890
2	2	800 - 1105
2	3	795 - 1195
3	4	730 - 970
3	5	940 - 1200
3	6	1015 - 1300
5	10	900 - 1135
5	11	1040 - 1315
5	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. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE - Motor service factor limit - 1.0.

POWER EXHAUST FAN PERFORMANCE

Return Air System Static Pressure in. w.g.	Air Volume Exhausted 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	
				MERV 8	MERV 13
1750	0.04	0.03	0.03	0.01	0.03
2000	0.05	0.03	0.05	0.01	0.03
2250	0.06	0.04	0.06	0.01	0.04
2500	0.07	0.04	0.08	0.01	0.05
2750	0.08	0.05	0.09	0.02	0.05
3000	0.09	0.06	0.11	0.02	0.06
3250	0.10	0.06	0.13	0.02	0.06
3500	0.11	0.09	0.15	0.03	0.07
3750	0.13	0.09	0.17	0.03	0.08
4000	0.14	0.09	0.19	0.04	0.08
4250	0.15	0.13	0.21	0.04	0.09
4500	0.17	0.14	0.24	0.04	0.09
4750	0.18	0.17	0.26	0.05	0.10
5000	0.20	0.20	0.29	0.06	0.10
5250	0.22	0.22	0.32	0.06	0.11
5500	0.23	0.25	0.34	0.07	0.12
5750	0.25	0.31	0.37	0.07	0.12
6000	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	¹ 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

¹ 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

Model No.		ZHC092S4M								
¹ Voltage - 60Hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	12.9			7.1			4.6		
	Locked Rotor Amps	105			62			39		
Compressor 2	Rated Load Amps	13.7			6.1			4.8		
	Locked Rotor Amps	83.1			43			33		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)	2.4			1.3			1		
	Total	4.8			2.6			2		
Power Exhaust (2) 0.5 HP	Full Load Amps	4.4			1.7			1.7		
	Total	8.8			3.4			3.4		
Service Outlet 115V GFI (amps)		15			15			20		
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
² Maximum Overcurrent Protection	Unit Only	50	50	60	25	25	30	20	20	25
	With (2) 0.5 HP Power Exhaust	60	60	70	30	30	35	20	20	25
³ Minimum Circuit Ampacity	Unit Only	43	46	53	21	23	26	16	17	20
	With (2) 0.5 HP Power Exhaust	52	55	62	25	26	29	19	20	23

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
² Maximum Overcurrent Protection	Unit+ Electric Heat	7.5 kW	70	70	70	70	80	80	35	35	40	25	30	30
		15 kW	90	90	90	100	100	100	45	45	50	35	35	40
		22.5 kW	110	110	110	125	125	125	60	60	60	45	45	50
		30 kW	125	150	125	150	150	150	70	70	80	60	60	60
		45 kW	175	200	175	200	175	200	90	100	100	70	80	80
³ Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	62	65	65	68	72	75	33	34	37	25	26	29
		15 kW	82	88	85	91	92	98	44	45	48	34	35	38
		22.5 kW	101	110	105	114	111	120	55	57	60	43	44	47
		30 kW	121	133	124	136	131	143	67	68	71	52	53	56
		45 kW	160	178	163	181	170	188	89	91	93	70	71	74
² Maximum Overcurrent Protection	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	80	80	80	80	90	90	40	40	45	30	30	35
		15 kW	100	100	100	100	110	110	50	50	60	40	40	45
		22.5 kW	110	125	125	125	125	150	60	60	70	50	50	50
		30 kW	150	150	150	150	150	175	70	80	80	60	60	60
		45 kW	175	200	175	200	200	200	100	100	100	80	80	80
³ Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	71	74	74	77	81	84	36	38	40	28	29	32
		15 kW	91	97	94	100	101	107	47	49	52	37	38	41
		22.5 kW	110	119	113	122	120	129	59	60	63	46	47	50
		30 kW	130	142	133	145	140	152	70	71	74	55	56	59
		45 kW	169	187	172	190	179	197	93	94	97	73	75	77

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	Unit Only	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	11M10

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

¹ Extremes of operating range are plus and minus 10% of line voltage.

² HACR type breaker or fuse.

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

ELECTRICAL/ELECTRIC HEAT DATA

8.5 TON

Model No.		ZHC102S4M								
1 Voltage - 60Hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	16.7			7.1			5.7		
	Locked Rotor Amps	110			54.7			47.8		
Compressor 2	Rated Load Amps	13.7			6.1			4.8		
	Locked Rotor Amps	83.1			43			33		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)	2.4			1.3			1		
	Total	4.8			2.6			2		
Power Exhaust (2) 0.5 HP	Full Load Amps	4.4			1.7			1.7		
	Total	8.8			3.4			3.4		
Service Outlet 115V GFI (amps)		15			15			20		
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
2 Maximum Overcurrent Protection	Unit Only	60	60	70	25	25	30	20	20	25
	With (2) 0.5 HP Power Exhaust	70	70	80	30	30	35	25	25	25
3 Minimum Circuit Ampacity	Unit Only	47	50	57	21	23	26	17	18	21
	With (2) 0.5 HP Power Exhaust	56	59	65	25	26	29	21	22	24

ELECTRIC HEAT DATA

Electric Heat Voltage				208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
2 Maximum Overcurrent Protection	Unit+ Electric Heat	7.5 kW	7.5 kW	70	80	80	80	80	90	35	35	40	30	30	30
		15 kW	15 kW	90	100	90	100	100	110	45	45	50	35	40	40
		22.5 kW	22.5 kW	110	125	110	125	125	125	60	60	60	45	45	50
		30 kW	30 kW	150	150	150	150	150	150	70	70	80	60	60	60
		45 kW	45 kW	175	200	175	200	175	200	90	100	100	80	80	80
3 Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	7.5 kW	67	70	70	73	76	79	33	34	37	26	27	30
		15 kW	15 kW	86	92	90	96	96	102	44	45	48	35	36	39
		22.5 kW	22.5 kW	106	115	109	118	115	124	55	57	60	44	45	48
		30 kW	30 kW	126	138	129	141	135	147	67	68	71	53	54	57
		45 kW	45 kW	165	183	168	186	174	192	89	91	93	71	72	75
2 Maximum Overcurrent Protection	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	7.5 kW	80	90	90	90	90	90	40	40	45	30	35	35
		15 kW	15 kW	100	110	100	110	110	110	50	50	60	40	40	45
		22.5 kW	22.5 kW	125	125	125	150	125	150	60	60	70	50	50	60
		30 kW	30 kW	150	150	150	150	150	175	70	80	80	60	60	60
		45 kW	45 kW	175	200	200	200	200	225	100	100	100	80	80	80
3 Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	7.5 kW	76	79	79	82	85	88	36	38	40	30	31	33
		15 kW	15 kW	95	101	98	104	104	110	47	49	52	39	40	42
		22.5 kW	22.5 kW	115	124	118	127	124	133	59	60	63	48	49	51
		30 kW	30 kW	134	146	137	149	144	156	70	71	74	57	58	60
		45 kW	45 kW	173	191	177	195	183	201	93	94	97	75	76	78

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.

¹ Extremes of operating range are plus and minus 10% of line voltage.

² HACR type breaker or fuse.

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

ELECTRICAL/ELECTRIC HEAT DATA

10 TON

Model No.		ZHC120S4M								
¹ Voltage - 60Hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	16.7			7.1			5.7		
	Locked Rotor Amps	110			54.7			47.8		
Compressor 2	Rated Load Amps	19.6			8.2			6.6		
	Locked Rotor Amps	136			66.1			55.3		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)	3			1.5			1.2		
	Total	6			3			2.4		
Power Exhaust (2) 0.5 HP	Full Load Amps	4.4			1.7			1.7		
	Total	8.8			3.4			3.4		
Service Outlet 115V GFI (amps)		15			15			20		
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
² Maximum Overcurrent Protection	Unit Only	70	70	80	30	30	35	25	25	25
	With (2) 0.5 HP Power Exhaust	80	80	90	35	35	35	25	30	30
³ Minimum Circuit Ampacity	Unit Only	55	58	64	24	26	28	20	21	23
	With (2) 0.5 HP Power Exhaust	64	67	73	28	29	32	23	24	26

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
² Maximum Overcurrent Protection	Unit+ Electric Heat	15 kW	100	110	100	110	110	110	50	50	60	40	40	45
		22.5 kW	125	125	125	150	125	150	60	60	70	50	50	50
		30 kW	150	150	150	150	150	175	70	80	80	60	60	60
		45 kW	175	200	200	200	200	200	100	100	100	80	80	80
		60 kW	200	200	200	225	200	225	100	100	110	80	80	90
³ Minimum Circuit Ampacity	Unit+ Electric Heat	15 kW	94	100	97	103	103	110	47	48	51	38	39	41
		22.5 kW	114	123	117	126	123	132	58	59	62	47	48	50
		30 kW	133	145	136	149	143	155	69	71	74	56	57	59
		45 kW	172	191	176	194	182	200	92	93	96	74	75	77
		60 kW	180	200	183	203	189	209	96	98	101	77	78	81
² Maximum Overcurrent Protection	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	110	110	110	125	125	125	50	60	60	45	45	45
		22.5 kW	125	150	150	150	150	150	70	70	70	50	60	60
		30 kW	150	175	150	175	175	175	80	80	80	60	60	70
		45 kW	200	200	200	225	200	225	100	100	100	80	80	80
		60 kW	200	225	200	225	200	225	100	110	110	90	90	90
³ Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	103	109	106	112	112	118	50	52	54	41	42	44
		22.5 kW	123	132	126	135	132	141	61	63	66	50	51	53
		30 kW	142	154	145	157	151	163	73	74	77	59	60	62
		45 kW	181	199	184	202	190	209	95	97	100	77	78	80
		60 kW	189	208	192	211	198	218	100	101	104	81	82	84

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	Unit Only	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	11M10

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

¹ Extremes of operating range are plus and minus 10% of line voltage.

² HACR type breaker or fuse.

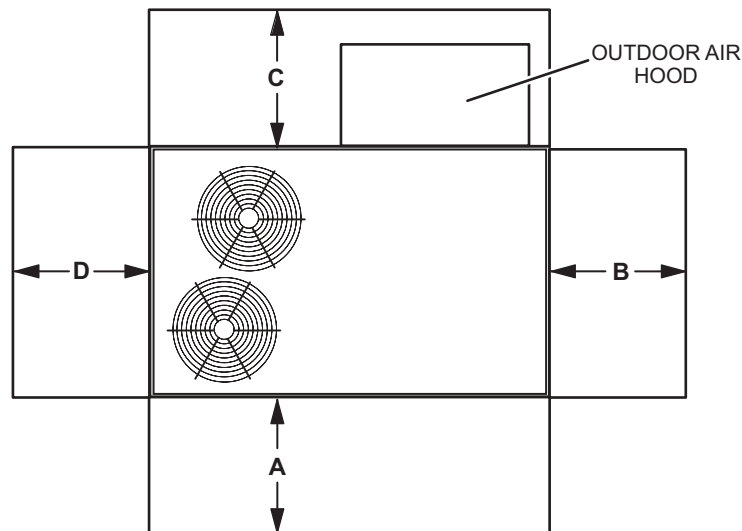
³ Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

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

UNIT WITH ECONOMIZER



¹ 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.

¹ 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 ⁻¹² Watts - Center Frequency - Hz							¹ Sound Rating Number (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

¹ Sound Rating Number according to AHRI Standard 270-2008. Sound Rating Number is the overall A-Weighted Sound Power Level, (LWA), dB (100 Hz to 10,000 Hz).

WEIGHT DATA

Model Number	Net		Shipping	
	lbs.	kg	lbs.	kg
092S Base Unit	1068	484	1153	523
092S Max. Unit	1225	556	1310	594
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

	Shipping Weight	
	lbs.	kg

ECONOMIZER / OUTDOOR AIR / POWER EXHAUST**Economizer - With Barometric Relief Dampers and Hoods**

Downflow	90	41
Horizontal	95	43
Horizontal Low Profile Barometric Relief Dampers with Hood	8	4

Outdoor Air Dampers With Hood

Morotized	44	20
Manual	27	12

Power Exhaust

Downflow	60	27
Horizontal	41	19

ELECTRIC HEAT

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

COIL/HAIL GUARDS

All models	50	23
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ROOF CURBS**Hybrid Roof Curbs, Downflow**

8 in. height	79	36
14 in. height	104	47
18 in. height	120	54
24 in. height	145	66

CEILING DIFFUSERS

Step-Down	RTD11-95S	118	54
	RTD11-135S	135	61
Flush	FD11-95S	118	54
	FD11-135S	135	61

DIMENSIONS

UNIT

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	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
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.

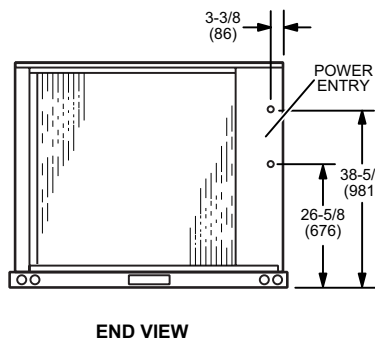
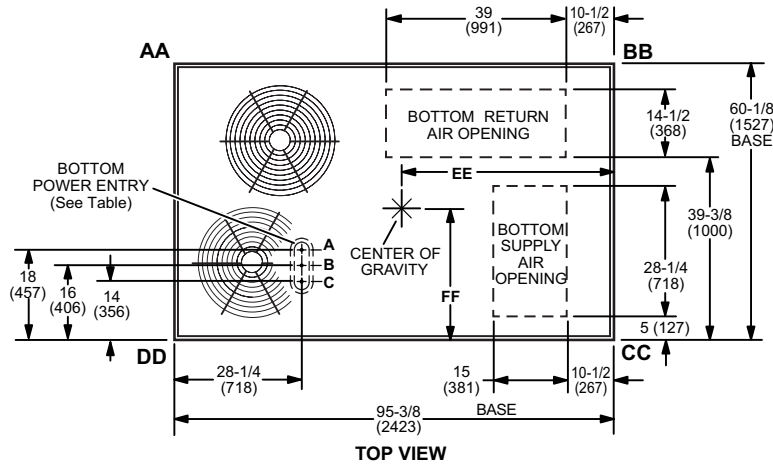
Max. Unit - The unit with ALL OPTIONS Installed. (Economizer, etc.)

BOTTOM POWER ENTRY

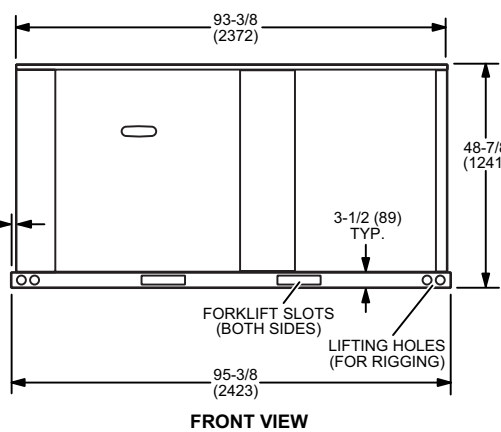
Holes required for Optional Bottom Power Entry Kit

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

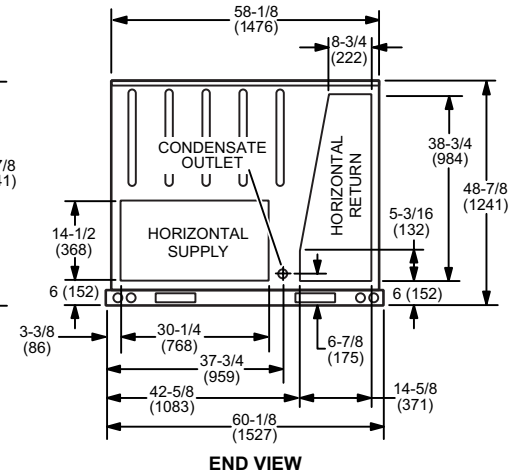
¹ Field provided.



END VIEW

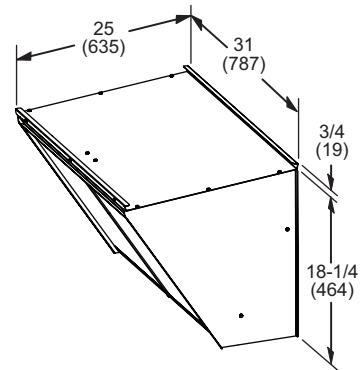
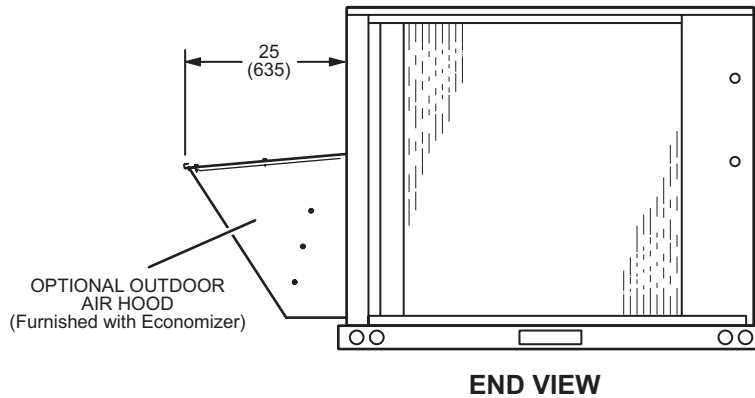


FRONT VIEW

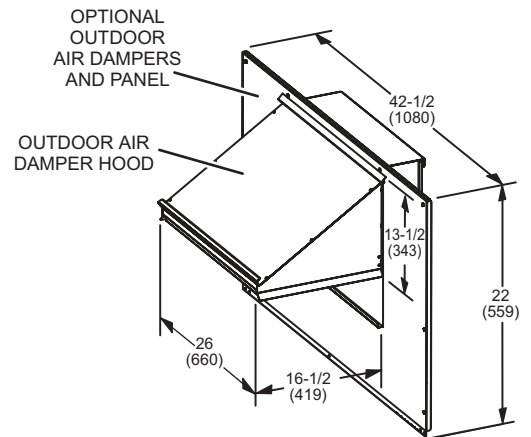
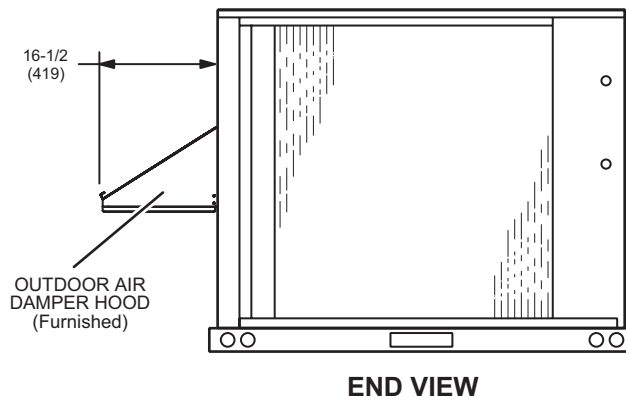


END VIEW

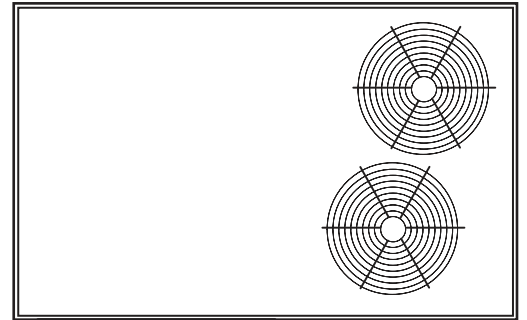
**OUTDOOR AIR HOOD DETAIL FOR OPTIONAL DOWNFLOW ECONOMIZER
(Downflow Applications)**



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



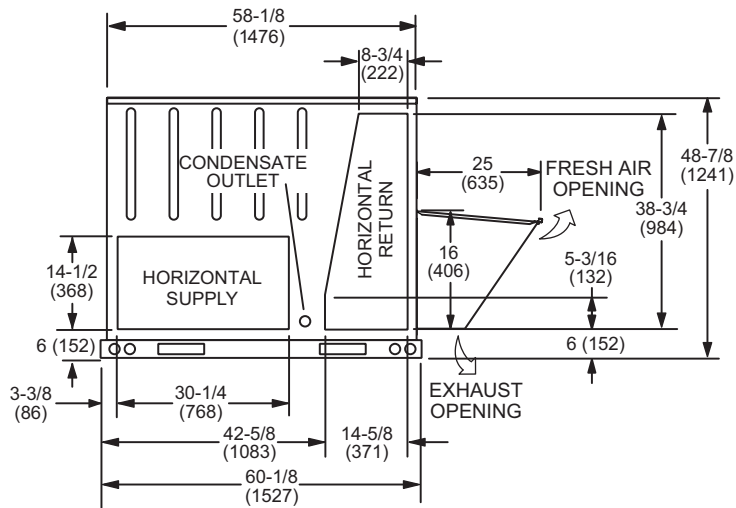
**OUTDOOR AIR HOOD DETAIL WITH OPTIONAL HORIZONTAL ECONOMIZER AND BAROMETRIC RELIEF DAMPERS
(Horizontal Applications)**



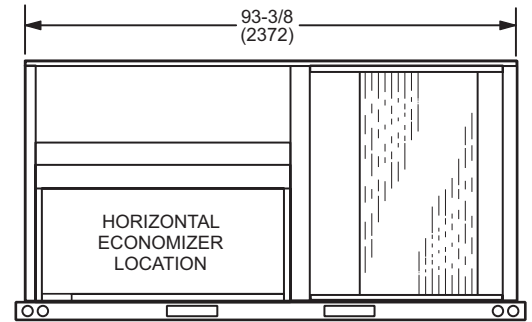
OUTDOOR AIR/
BAROMETRIC
RELIEF HOOD
(Furnished with
Economizer)

31
(787)

TOP VIEW



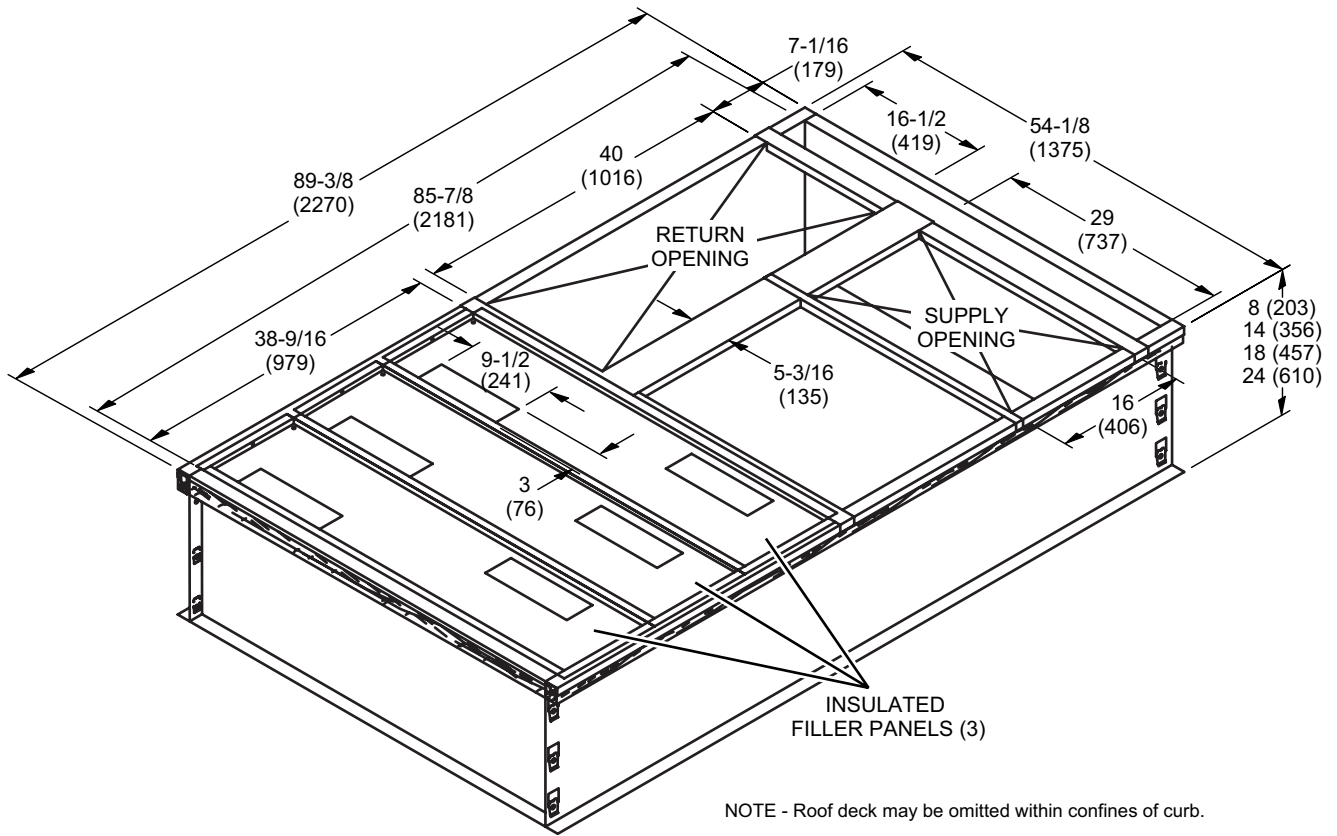
END VIEW



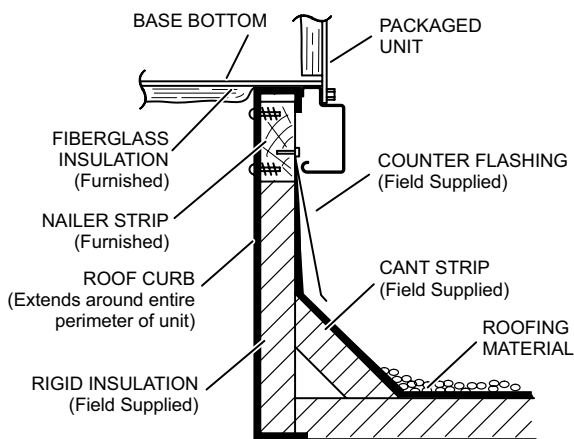
BACK VIEW

Note - Supply and Return Air Ducts must be supported.

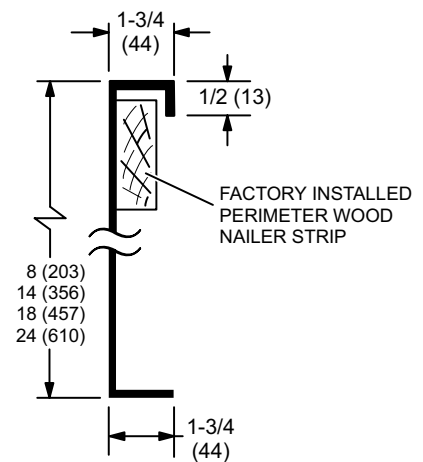
HYBRID CURBS - DOUBLE DUCT OPENING



TYPICAL FLASHING DETAIL FOR ROOF CURB

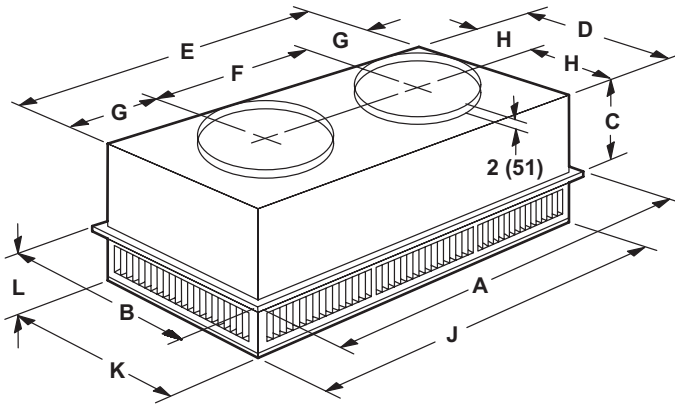


DETAIL ROOF CURB

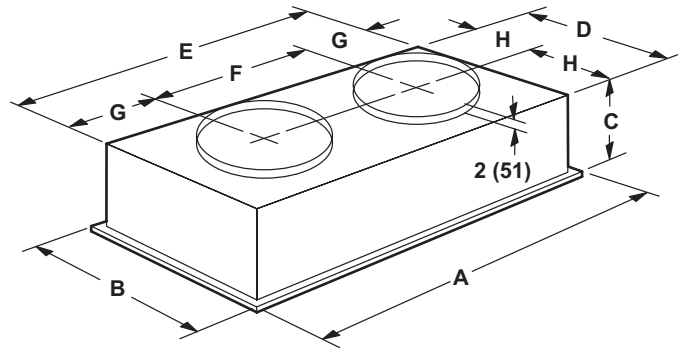


COMBINATION CEILING SUPPLY AND RETURN DIFFUSERS

STEP-DOWN CEILING DIFFUSER



FLUSH CEILING DIFFUSER

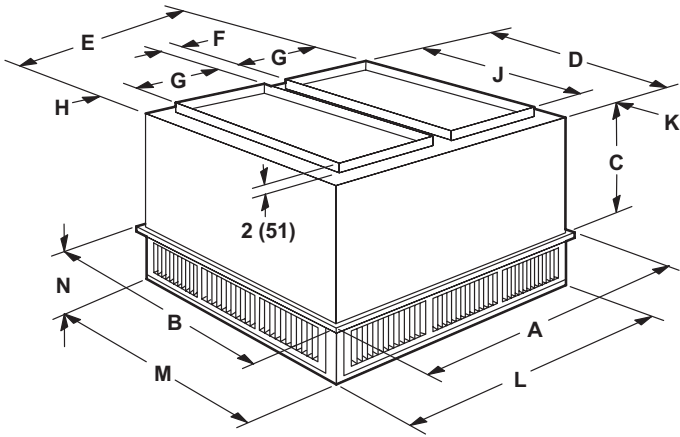


Model Number		RTD11-95S
A	in.	47-5/8
	mm	1159
B	in.	29-5/8
	mm	752
C	in.	14-3/8
	mm	365
D	in.	27-1/2
	mm	699
E	in.	45-1/2
	mm	1158
F	in.	22-1/2
	mm	572
G	in.	11-1/2
	mm	292
H	in.	13-3/4
	mm	349
J	in.	45-1/2
	mm	1156
K	in.	27-1/2
	mm	699
L	in.	8-1/8
	mm	206
Duct Size	in.	20 round
	mm	508 round

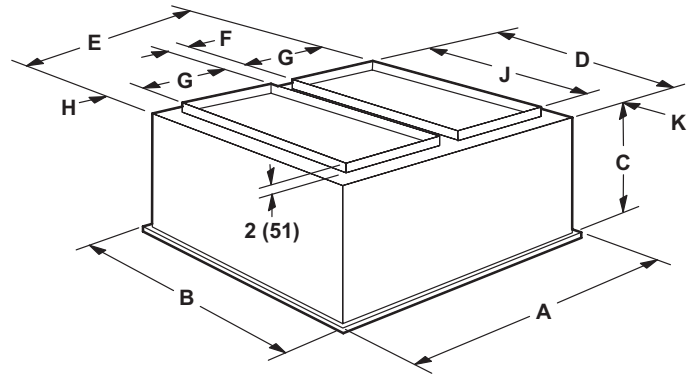
Model Number		FD11-95S
A	in.	47-5/8
	mm	1159
B	in.	29-5/8
	mm	752
C	in.	16-5/8
	mm	422
D	in.	27
	mm	686
E	in.	45
	mm	1143
F	in.	22-1/2
	mm	572
G	in.	11-1/4
	mm	286
H	in.	13-1/2
	mm	343
Duct Size	in.	20 round
	mm	508 round

COMBINATION CEILING SUPPLY AND RETURN DIFFUSERS

STEP-DOWN CEILING DIFFUSER



FLUSH 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

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

Sections	Description of Change
Optional Conventional Temperature Control Systems	Added Cooling Stage-Up Timer Relay Optional Accessory for CS3000 Thermostat



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