


**COMMERCIAL  
PRODUCT SPECIFICATIONS**

Bulletin No. 211001

September 2024

Supersedes all previous versions



# **RAIDER**



**ASHRAE 90.1  
COMPLIANT**

**7.5 to 12.5 Tons**

**Net Cooling Capacity - 88,000 to 136,000 Btuh  
Gas Input Heat Capacity - 130,000 to 240,000 Btuh**

**MODEL NUMBER IDENTIFICATION**

**Z G C 120 S 4 B S 1 Y**

**Brand/Family**  
Z = Raider®

**Unit Type**  
G = Packaged Gas Heat w/ Electric Cooling

**Major Design Sequence**  
C = 3rd Generation

**Nominal Cooling Capacity - Tons**  
092 = 7.5 Tons  
102 = 8.5 Tons  
120 = 10 Tons  
150 = 12.5 Tons

**Cooling Efficiency**  
S = Standard Efficiency

**Voltage**  
Y = 208/230V-3 phase-60hz  
G = 460V-3 phase-60hz  
J = 575V-3 phase-60hz

**Minor Design Sequence**  
1 = 1st Revision

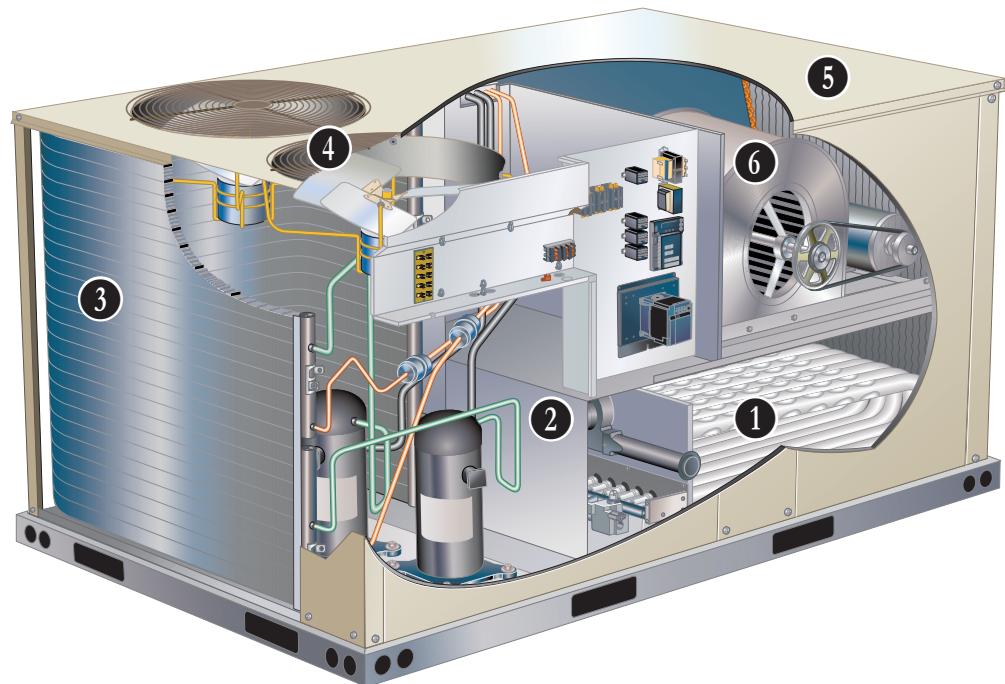
**Heating Type**  
S = Standard Gas Heat, 2 Stage  
M = Medium Gas Heat, 2 Stage  
H = High Gas Heat, 2 Stage

**Blower Type**  
M = MSAV® Multi-Stage Air Volume, Belt Drive

**Refrigerant Type**  
4 = R-410A

## 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. Aluminized Steel Heat Exchanger
2. Scroll Compressors
3. Environ™ Coil System
4. Outdoor Coil Fans
5. Heavy Gauge Steel Cabinet
6. MSAV® Multi-Stage Air Volume Blower

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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 meet DOE 2023 energy efficiency standards
- All models are ASHRAE 90.1 energy efficiency compliant and meet or exceed requirements of Section 6.8.
- All models meet California Code of Regulations, Title 24 and ASHRAE 90.1 Section 6.4.3.10 requirements for staged airflow
- ISO 9001 Registered Manufacturing Quality System

### WARRANTY

- Aluminized Heat Exchanger - Limited ten years
- Stainless Steel Heat Exchanger (optional) - Limited fifteen years
- Compressors - Limited five years
- Environ™ Coil System - Limited three years
- Variable-Frequency Drive (VFD) - Limited five years
- High Performance Economizers (optional) - Limited five years
- All other covered components - Limited one year

## FEATURES AND BENEFITS

### HEATING SYSTEM

- Aluminized steel inshot burners
- Direct spark ignition
- Electronic flame sensor
- Combustion air inducer
- Redundant automatic dual stage gas valve with manual shut-off

#### 1 Heat Exchanger

- Tubular construction, aluminized steel
- Life-cycle tested

**NOTE** - Optional Stainless Steel Heat Exchanger is required if mixed air temperature is below 45°F.

### Electronic Pilot Ignition

- Electronic spark igniter provides positive direct ignition of burners on each operating cycle
- Permits main gas valve to stay open only when the burners are proven to be lit
- If loss of flame occurs, gas valve closes, shutting off the gas to the burners
- LED indicates status and aids in troubleshooting
- Watchguard circuit on module automatically resets ignition controls after one hour of continuous thermostat demand after unit lockout, eliminating nuisance service calls
- Factory installed in the gas heating compartment

### Safety Switches

- Flame roll-out switch
- Flame sensor
- Combustion air inducer proving switch
- Protects system operation

### Limit Controls

- Redundant limit controls with fixed temperature setting
- Protects heat exchanger and other components from overheating

### Required Selections

#### Gas Input Choice - Order one:

- Standard Gas Heat, 2 Stage (85,000/130,000 Btuh)
- Medium Gas Heat, 2 Stage (117,000/180,000 Btuh)
- High Gas Heat, 2 Stage (156,000/240,000 Btuh)

### Options/Accessories

#### Factory Installed

##### Stainless Steel Heat Exchanger

- Required if mixed air temperature is below 45°F

#### Field Installed

##### LPG/Propane Kits

- Conversion kit to field change over units from Natural Gas to LPG/Propane

##### Combustion Air Intake Extensions

- Recommended for use with existing flue extension kits in areas where high snow areas can block intake air

##### Vertical Vent Extension Kit

- Use to exhaust flue gases vertically above unit
- Required when unit vent is too close to fresh air intakes per building codes
- Also prevents ice formation on intake louvers
- Kit contains vent transition, vent tee, drain cap, and installation hardware

**NOTE** - Straight vent pipes (4 in. B-Vent) and caps are not furnished and must be field supplied. Refer to kit instructions for additional information.



## FEATURES AND BENEFITS

### 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 11.

### CABINET

#### Construction

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- 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

**NOTE** - Units can be field converted to horizontal airflow.

#### Duct Flanges

- Provided for horizontal duct attachment

#### Power/Gas Entry

- Electrical and gas 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

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#### **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

## 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

### Field Installed

#### 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 (CO<sub>2</sub>) 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 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

### 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 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

**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.

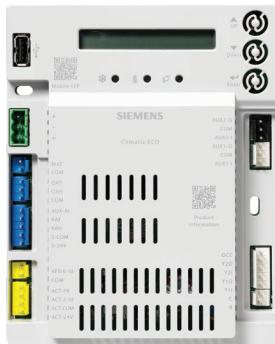
**NOTE** - The Free Cooling setpoint for Title 24 applications must be set based on the Climate Zone where the system is installed. See Section 140.4 "Prescriptive Requirements for Space Conditioning Systems" of the California Energy Commission's 2013 Building Energy Efficiency Standards. Refer to Installation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

#### Horizontal Low Profile Barometric Relief Dampers

#### 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 fan blades
- One 1/3 hp motor

**NOTE** - Requires Economizer and Downflow 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 is 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

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

- Curbs are regionally sourced
- Dimensions will vary based upon the source

**NOTE** - Contact your local sales representative for a detailed cut sheet with applicable dimensions.

### **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-Changover
- 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.
<b>CS7500 Commercial 7-Day Programmable Thermostat</b>	
CS7500 7-Day Thermostat	24K41
Sensors/Accessories	<sup>1</sup> Remote non-adjustable wall-mount 20k <sup>1</sup> Remote non-adjustable wall-mount 10k Remote non-adjustable discharge air (duct mount) Outdoor temperature sensor
	47W36 47W37 19L22 X2658
<b>CS3000 5-2 Day Programmable Thermostat</b>	
CS3000 5-2 Day Thermostat	11Y05
Sensor/Accessories	Remote non-adjustable wall mount 10k averaging Thermostat wall mounting plate
	47W37 X2659
<b>Optional Accessory</b>	
	Cooling Stage-Up Timer Relay
<b>BACnet 7-Day Programmable Thermostat</b>	
BACnet Controls	<sup>2</sup> 7-Day BACnet Thermostat <sup>3</sup> BACnet Module (factory or field)
	24C57 16X71
<sup>4</sup> BACnet Room Sensors	With Display Without Display
	97W23 97W24
<b>Universal Thermostat Guard with Lock (clear)</b>	
	Inside Dimensions (H x W x D) 5-7/8 x 8-3/8 x 3 in.
	39P21

<sup>1</sup> 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

<sup>2</sup> 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.

<sup>3</sup> Not compatible with units equipped with Humiditrol® option.

<sup>4</sup> Only compatible with BACnet Module (16X71).



## OPTIONS / ACCESSORIES

Item Description	Catalog Number	Unit Model No
		092 102 120 150
<b>ELECTRICAL</b>		
Voltage 60 hz	208/230V - 3 phase	Factory O O O O
	460V - 3 phase	Factory O O O O
	575V - 3 phase	Factory O O O O
Bottom Power Entry Kit	11H66	X X X X
<b>INDOOR AIR QUALITY</b>		
<b>Air Filters</b>		
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)	Y3063	X X X X
<b>Indoor Air Quality (CO<sub>2</sub>) Sensors</b>		
Sensor - Wall-mount, off-white plastic cover with LCD display	77N39	X X X X
Sensor - Wall-mount, off-white plastic cover, no display	23V86	X X X X
Sensor - Black plastic case with LCD display, rated for plenum mounting	87N52	X X X X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting	87N54	X X X X
CO <sub>2</sub> Sensor Duct Mounting Kit - for downflow applications	23Y47	X X X X
Aspiration Box - for duct mounting non-plenum rated CO <sub>2</sub> sensors (77N39)	90N43	X X X X
<b>ECONOMIZER</b>		
<b>Standard Economizer (Not for Title 24)</b>		
Standard Downflow Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods	24K57	X X X X
Standard Horizontal Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods	24K58	X X X X
<b>Standard Economizer Controls (Not for Title 24)</b>		
Single Enthalpy Control	21Z09	X X X X
Differential Enthalpy Control (order 2)	21Z09	X X X X
<b>High Performance Economizer (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)</b>		
High Performance Downflow Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods	24F99	OX OX OX OX
High Performance Horizontal Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods	24G01	X X X X
<b>High Performance Economizer Controls</b>		
Single Enthalpy Control	24G11	X X X X
Differential Enthalpy Control (order 2) (Not for Title 24)	24G11	X X X X
<b>Economizer Accessories</b>		
WLAN Stick (For High Performance Economizer only)	23K58	X X X X
<b>OUTDOOR AIR</b>		
<b>Outdoor Air Dampers</b>		
Motorized Dampers with outdoor air hood	14G36	X X X X
Manual Dampers with outdoor air hood	14G37	X X X X

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	150
<b>POWER EXHAUST</b>					
Standard Static (Downflow)	208/230V-3ph	<b>10Z70</b>	X	X	X
	460V-3ph	<b>10Z71</b>	X	X	X
Standard Static (Horizontal)	208/230V-3ph	<b>24E01</b>	X	X	X
	460V-3ph	<b>28E01</b>	X	X	X
575V Transformer Kit	575V-3ph	<b>59E02</b>	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.					
<b>ROOF CURBS</b>					
<b>Hybrid Roof Curbs, Downflow</b>					
8 in. height		<b>10Z25</b>	X	X	X
			X	X	X
14 in. height		<b>10Z26</b>	X	X	X
			X	X	X
18 in. height		<b>10Z27</b>	X	X	X
			X	X	X
24 in. height		<b>10Z28</b>	X	X	X
			X	X	X
<b>CEILING DIFFUSERS</b>					
Step-Down - Order one	RTD11-95S	<b>13K61</b>	X		
	RTD11-135S	<b>13K62</b>		X	X
	RTD11-185S	<b>13K63</b>			X
Flush - Order one	FD11-95S	<b>13K56</b>	X		
	FD11-135S	<b>13K57</b>		X	X
	FD11-185S	<b>13K58</b>			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

## GAS HEAT

Heat Input Type Number of Gas Heat Stages	Standard	Medium	High
	2	2	2
Input - Btuh	1st Stage	85,000	117,000
	2nd Stage	130,000	180,000
Output - Btuh	2nd Stage	105,000	146,000
Temperature Rise Range - °F		15-45	30-60
Minimum air volume - cfm		2150	2250
¹ Thermal Efficiency		81%	81%
Gas Supply Connections		3/4 in NPT	3/4 in NPT
Recommended Gas Supply Pressure - Nat. / LPG		7 / 11 in. w.g.	
Gas Supply Pressure Range	Min. / Max. (Natural)	4.5 / 10.5 in. w.g.	
	Min. / Max. (LPG)	10.8 / 13.5 in. w.g.	

<sup>1</sup> Thermal Efficiency at full input.

## HIGH ALTITUDE DERATE

**NOTE** - Units may be installed at altitudes up to 2000 feet above sea level without any modifications.

At altitudes above 2000 feet units must be derated to match gas manifold pressures shown in table below.

At altitudes above 4500 feet unit must be derated 4% for each 1000 feet above sea level.

**NOTE** - This is the only permissible derate for these units.

Refer to the Installation Instructions for more detailed information.

Heat Input Type	Altitude Feet	Gas Manifold Pressure in. w.g.		Input Rate (Btuh)
		Natural Gas	LPG/ Propane	
Standard (2 stage)	2001 - 4500	1.6 / 3.1	4.4 / 8.9	85,000 / 120,000
Medium (2 stage)	2001 - 4500	1.6 / 3.1	4.4 / 8.9	117,000 / 166,000
High (2 stage)	2001 - 4500	1.6 / 3.1	4.4 / 8.9	156,000 / 221,000















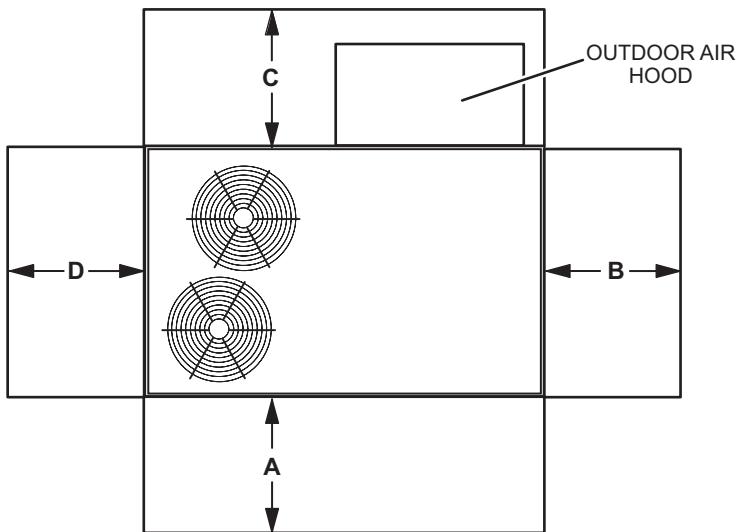






## UNIT CLEARANCES

### 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
Clearance to Combustibles	36	914	1	25	1	25	1	25	
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.

Clearance to Combustibles - Required for clearance to combustible material.

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	72	74	79	80	76	70	63	84
120	76	73	82	80	75	74	73	90
150	76	81	87	86	80	77	76	91

¹ Sound Rating Number according to ARI 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	
	Ibs.	kg	Ibs.	kg
092S Base Unit	922	418	1007	457
092S Max. Unit	1073	487	1158	525
102S Base Unit	922	418	1007	457
102S Max. Unit	1073	487	1158	525
120S Base Unit	962	436	1047	475
120S Max. Unit	1113	505	1198	543
150S Base Unit	1052	477	1137	516
150S Max. Unit	1203	546	1288	584

## OPTIONS / ACCESSORIES

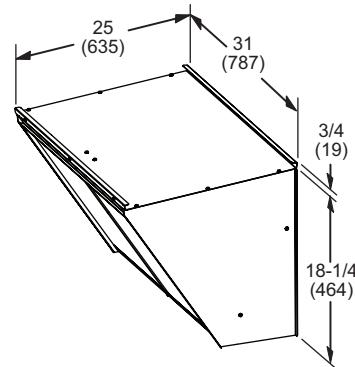
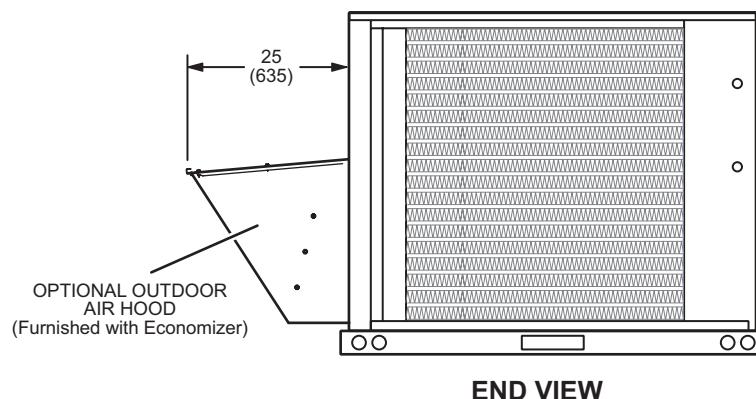
	Shipping Weight	
	Ibs.	kg
<b>ECONOMIZER / OUTDOOR AIR / EXHAUST</b>		
<b>Economizer</b>		
Downflow with Barometric Relief Dampers and Hoods	90	41
Horizontal with Barometric Relief Dampers and Hoods	95	43
Horizontal Low Profile Barometric Relief Dampers with Hood	8	4
<b>Outdoor Air Dampers With Hood</b>		
Motorized	44	20
Manual	27	12
<b>Power Exhaust</b>		
Downflow	60	27
Horizontal	41	19
<b>GAS HEAT EXCHANGER (NET WEIGHT)</b>		
Medium Heat (adder over standard heat)	9	4
High Heat (adder over standard heat)	32	15
<b>COIL/HAIL GUARDS</b>		
All models	50	23
<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>CEILING DIFFUSERS</b>		
Step-Down	RTD11-95S	118
	RTD11-135S	135
	RTD11-185S	168
Flush	FD11-95S	118
	FD11-135S	135
	FD11-185S	168



## DIMENSIONS

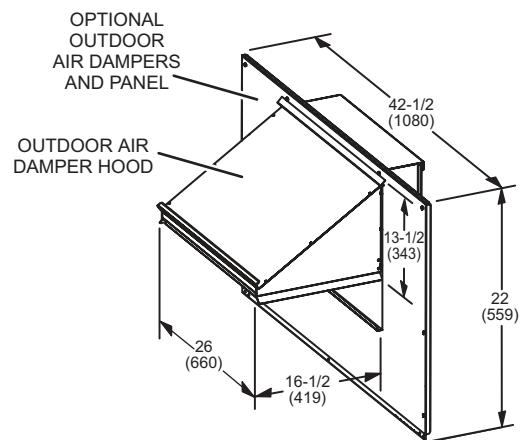
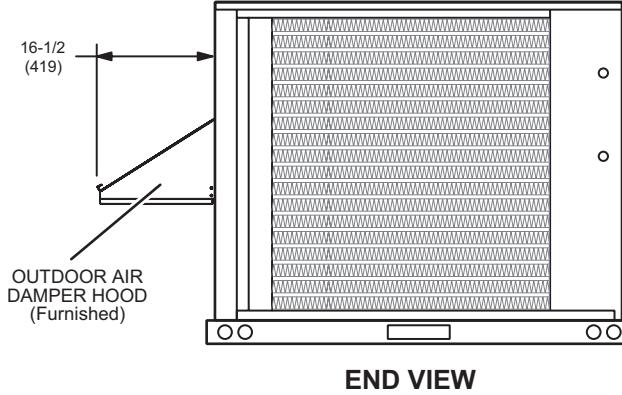
## ACCESSORIES

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



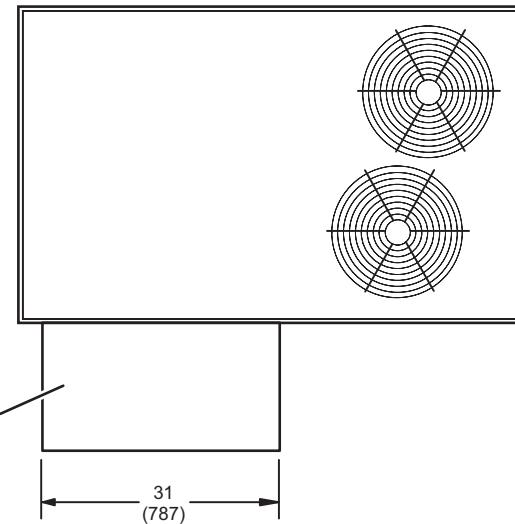
END VIEW

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

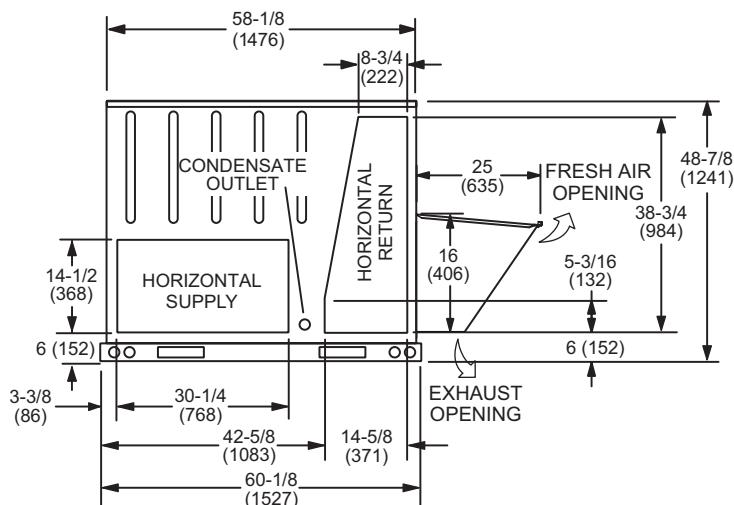


END VIEW

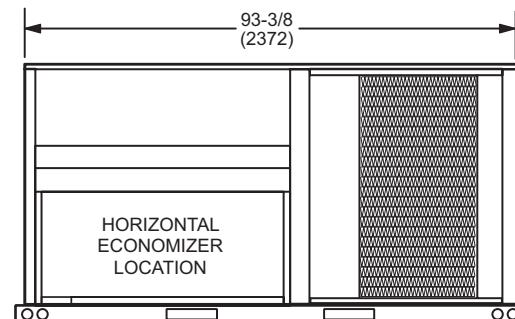
**OUTDOOR AIR HOOD DETAIL WITH OPTIONAL HORIZONTAL ECONOMIZER AND BAROMETRIC RELIEF DAMPERS  
(Horizontal Applications)**



TOP VIEW



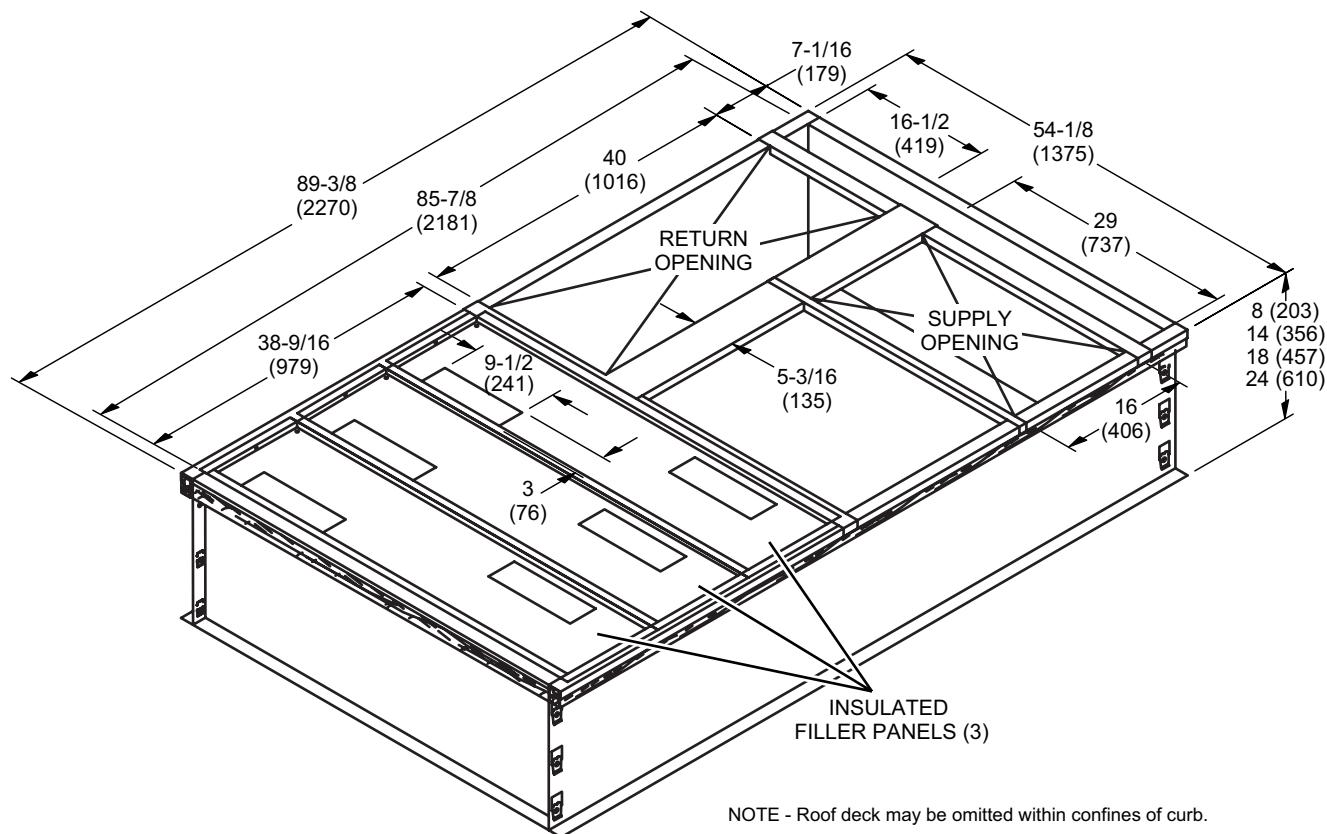
END VIEW



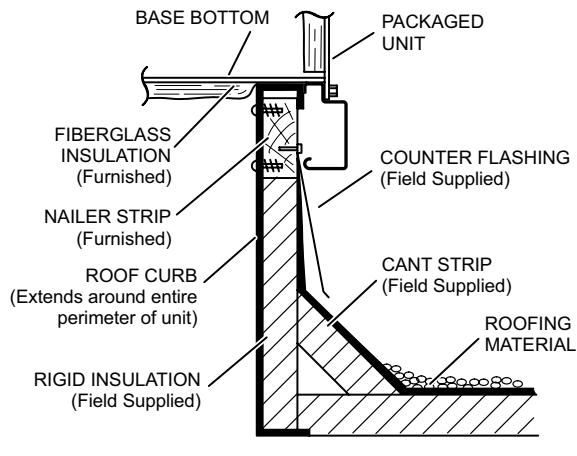
BACK VIEW

Note - Supply and Return Air Ducts must be supported.

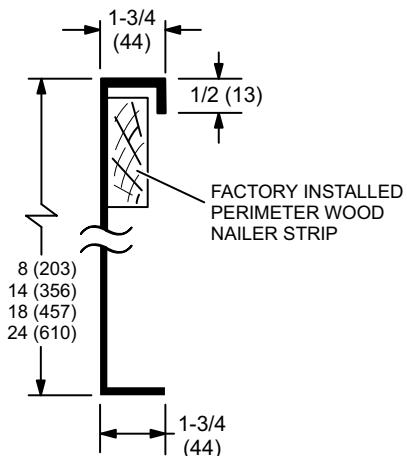
## HYBRID CURBS - DOUBLE DUCT OPENING



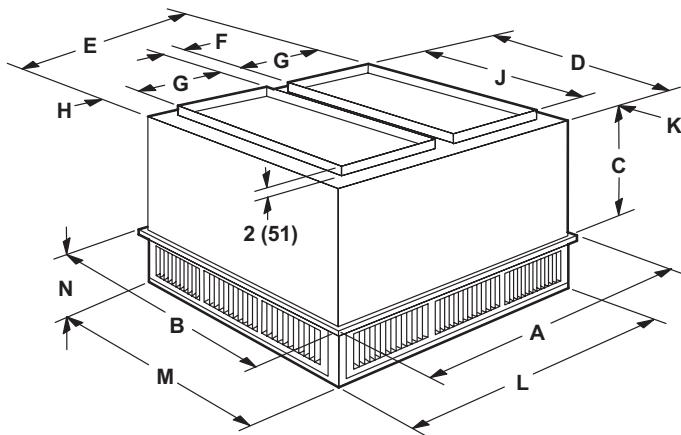
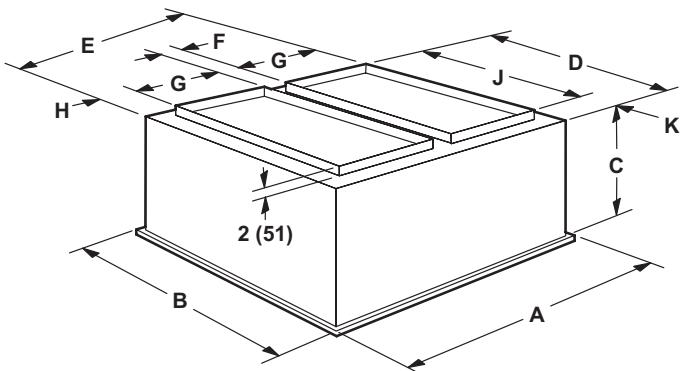
## TYPICAL FLASHING DETAIL FOR ROOF CURB



## DETAIL ROOF CURB





**COMBINATION CEILING SUPPLY AND RETURN DIFFUSERS****STEP-DOWN CEILING DIFFUSER****FLUSH CEILING DIFFUSER**

Model Number		RTD11-135S	RTD11-185S
A	in.	47-5/8	47-5/8
	mm	1210	1210
B	in.	35-5/8	47-5/8
	mm	905	1210
C	in.	20-5/8	24-5/8
	mm	524	625
D	in.	33-1/2	45-1/2
	mm	851	1156
E	in.	45-1/2	45-1/2
	mm	1156	1156
F	in.	4-1/2	4-1/2
	mm	114	114
G	in.	18	18
	mm	457	457
H	in.	2-1/2	2-1/2
	mm	64	64
J	in.	28	36
	mm	711	914
K	in.	2-3/4	4-3/4
	mm	70	121
L	in.	45-1/2	45-1/2
	mm	1156	1156
M	in.	33-1/2	45-1/2
	mm	851	1156
N	in.	9-1/8	10-1/8
	mm	232	257
Duct Size	in.	18 x 28	18 x 36
	mm	457 x 711	457 x 914

Model Number		FD11-135S	FD11-185S
A	in.	47-5/8	47-5/8
	mm	1210	1210
B	in.	35-5/8	47-5/8
	mm	905	1210
C	in.	23-1/4	29-1/4
	mm	591	743
D	in.	33	45
	mm	838	1143
E	in.	45	45
	mm	1143	1143
F	in.	4-1/2	4-1/2
	mm	114	114
G	in.	18	18
	mm	457	457
H	in.	2-1/4	2-1/4
	mm	57	57
J	in.	28	36
	mm	711	914
K	in.	2-1/2	4-1/2
	mm	64	114
Duct Size	in.	18 x 28	18 x 36
	mm	457 x 711	457 x 914

## REVISIONS

Sections	Description of Change
Options / Accessories	Updated Electric Heat kit catalog numbers



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