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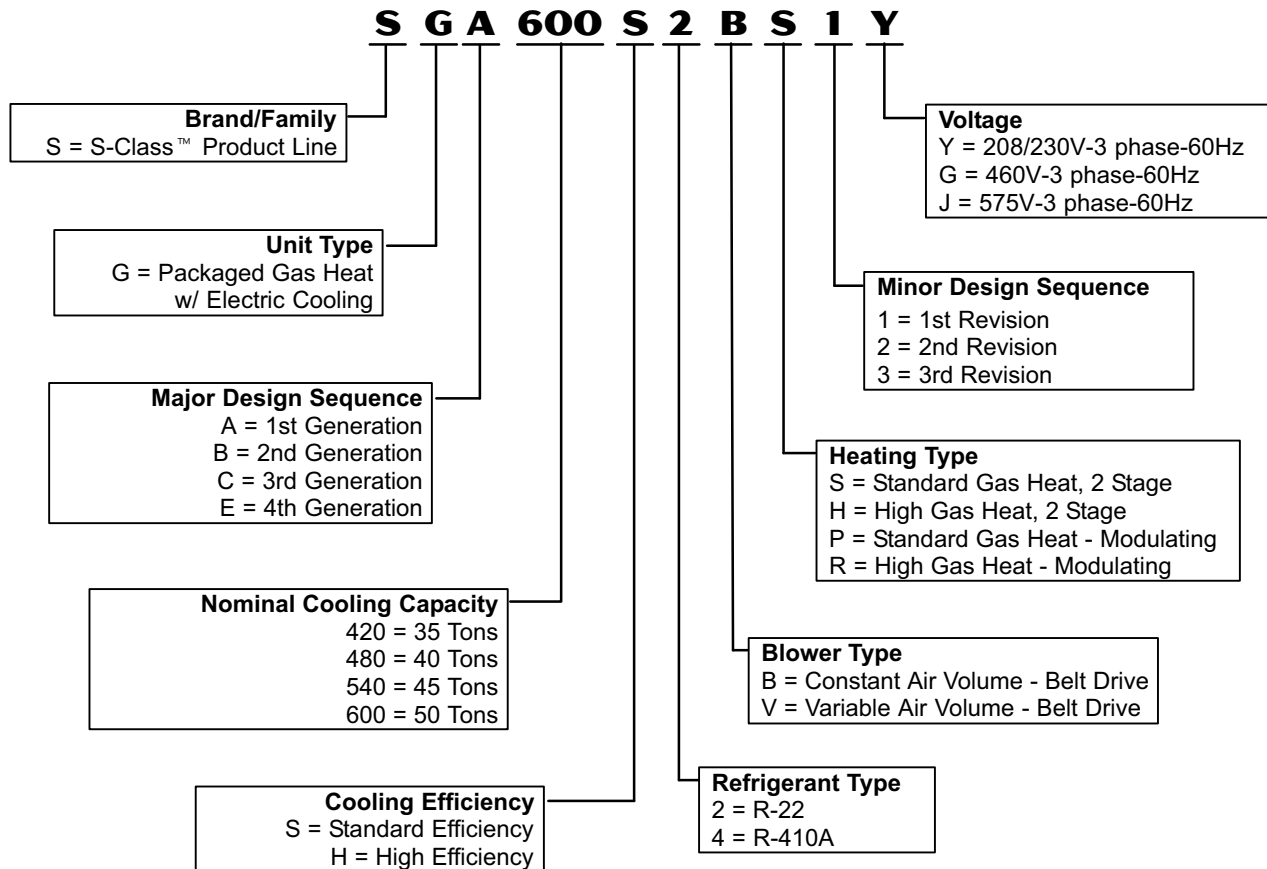
35, 40, 45, 50 Tons



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MODEL NUMBER IDENTIFICATION



GENERAL

Provides high performance and energy efficiency in one unit.

Low height unit provides more architectural flexibility and can reduce installation costs associated with hiding it from sight.

Wide variety of factory-installed and tested options means faster installations and more reliable start-ups.

Hinged access panels with easy access to components and straight outdoor coils speed maintenance, while common replacement parts reduce required inventory.

Save energy with an ASHRAE 90.1 compliant standard-efficiency model or maximize savings with a high-efficiency model.

ETL Listed.

COOLING SYSTEM

Two Cooling Efficiencies - standard or high efficiency units (40 ton model only).

Refrigerant - R-22 or R-410A (40, 50 ton models). R-22 (35, 40, 45, 50 ton models).

1 Copeland Scroll™ Compressors - resiliently mounted on rubber grommets.

Compressor Crankcase Heaters - protects against refrigeration migration.

Coil Construction - copper tube with enhanced rippled-edge aluminum fins.

2 Evaporator Coil - row-split for variable air volume models, face-split for constant air volume models.

Condensate Drain Pan - removable, painted, galvanized steel.

3 Outdoor Coil Fan Motors - thermal overload protected, enclosed, permanently lubricated ball bearings.

Outdoor Coil Fan Guard - PVC coated

Thermal Expansion Valves - assures optimal performance.

High Capacity Filter/Driers - protects system from dirt and moisture.

High Pressure Switches - protects compressor from overload conditions.

Low Pressure Switches - protects compressor from low pressure conditions.

Freezestats - protects the evaporator coil from damaging ice build-up.

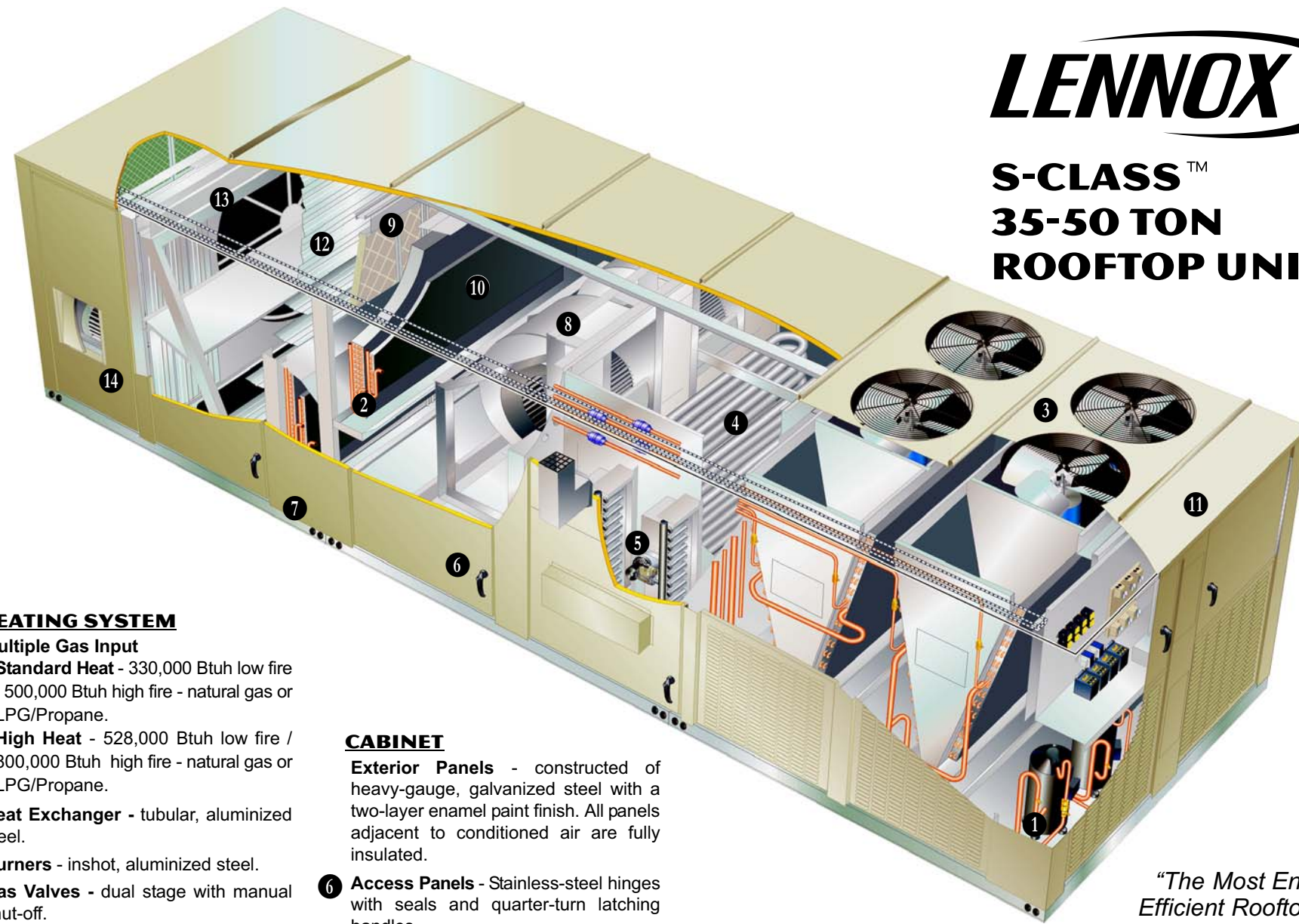
OPTIONS

Service Valves - Liquid & discharge lines
Stainless Steel Condensate Drain Pans
Fresh Air Tempering

Hot Gas Bypass

Discharge Air Temperature Control Sensor (standard with VAV units)

Spring Isolation (compressor deck)



LENNOX

S-CLASS™ 35-50 TON ROOFTOP UNITS

HEATING SYSTEM

Multiple Gas Input

Standard Heat - 330,000 Btuh low fire / 500,000 Btuh high fire - natural gas or LPG/Propane.

High Heat - 528,000 Btuh low fire / 800,000 Btuh high fire - natural gas or LPG/Propane.

4 Heat Exchanger - tubular, aluminized steel.

5 Burners - inshot, aluminized steel.

Gas Valves - dual stage with manual shut-off.

Direct Spark Ignition - provides positive main burner ignition.

Electronic Flame Sensor - assures safe operation.

Combustion Air Inducer - prepurges heat exchanger and vents flue products.

Fan and Limit Controls - protect against abnormal operating conditions.

Safety Switches

Flame roll-out switches

Combustion air inducer proving switches

OPTIONS/ACCESSORIES

Stainless Steel Heat Exchanger

Fresh Air Tempering

Discharge Air Temperature Control Sensor (standard with VAV units and modulating gas units)

Modulating Gas (500 and 800 kBtuh)

LPG/Propane Conversion

Low Temperature Vestibule Heater

CABINET

Exterior Panels - constructed of heavy-gauge, galvanized steel with a two-layer enamel paint finish. All panels adjacent to conditioned air are fully insulated.

6 Access Panels - Stainless-steel hinges with seals and quarter-turn latching handles.

Air Flow - Vertical or Horizontal

7 Base rail - full perimeter with rigging holes.

Unit base - fully insulated with bottom gas inlet.

Power and Gas Entry - through unit base or horizontal access knock-outs.

OPTIONS/ACCESSORIES

Coil Corrosion Protection

Double Wall Construction

Roof Curbs

BLOWER

8 Belt Drive Motor - standard or variable frequency drives are available. Overload protected, equipped with ball bearings. Available in 5, 7.5, 10, 15, 20, 25, and 30 hp.

Pulleys - adjustable for constant air volume models, fixed for variable air volume models.

Blower Wheel - internally braced, forward curved blades, statically and dynamically balanced.

9 AIR FILTERS

Disposable, 2-inch pleated MERV 7 filters.

OPTIONS/ACCESSORIES

4 in. MERV 7 Filters

2 in. MERV 11 Filters

2 in. MERV 15 Filters

2 in. Cleanable Metal Mesh Filters

Spring Isolation (blower frame)

10 HUMIDITROL® HOT GAS REHEAT

CAV Models Only

Provides dehumidification on demand using recommended method for reheat with comfort conditioning humidity control.

Improves indoor air quality.

Helps prevent damage due to high humidity levels.

Improves comfort levels by reducing space humidity levels.

ACCESSORIES

Remote Mounted Humidity Sensor Kit

"The Most Energy Efficient Rooftop Unit in the Industry! 1"

ELECTRICAL

Voltage Choice - 208/230V-3ph, 460V-3ph, or 575V-3ph

OPTIONS

HACR Circuit Breaker up to 250 Amp
Disconnect Switch up to 250 Amp

GFI Service Outlet (Powered and Un-powered)

Phase Monitor

11 INTELLIGENT UNIT CONTROLLER

Integrated Modular Controller (IMC) - solid-state, microprocessor-based control board that provides flexible control of all unit functions. Additional boards are used for economizer and VAV options.

OPTIONS/ACCESSORIES

Indoor Air Quality (CO₂) Sensor

Blower Proving Switch

Unit and System Controllers

Dirty Filter Switch

Smoke Detectors

Supply Static Limit Switch

Commercial Control Systems

ECONOMIZER/OUTDOOR AIR/EXHAUST OPTIONS

12 Economizer - fresh air ventilation that automatically controls outside air dampers. Provides improved indoor air quality while reducing energy costs

13 Energy Recovery Wheel (ERW) - reduces energy costs by using recycled energy to condition outdoor air before it enters the building, improving comfort and IAQ (indoor air quality). Includes bypass dampers for economizer mode. NOTE - Not available with units configured for horizontal airflow.

14 Power Exhaust Fans (PEF) - choice of standard or high static exhaust or high static exhaust with variable frequency drive. Exhausts stale air to the outside, improving indoor air quality.

Demand Control Ventilation - Optional CO₂ sensor required.

Outdoor Air CFM Control - helps maintain constant outdoor air cfm levels for VAV models.

High Static Power Exhaust Fans - Spring Isolation (blower frame).

Barometric Relief Dampers - allows relief of excess air.

¹ When considering steady state efficiency (EER) for single packaged rooftop units, 35-50 tons, G/E, E/E or cooling only, 3 phase voltage. Established through competitive literature review, July 2004. Claim pertains to 10.8 EER rating for the SGA480H4B unit.

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FEATURES AND BENEFITS

APPROVALS

ETL listed.

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

Tested at conditions included in ARI Standard 340/360-2000.

ISO 9001 Registered Manufacturing Quality System.

WARRANTY

Limited ten years on aluminized heat exchanger, limited fifteen years on optional stainless steel heat exchanger.

Limited five years on compressors. Limited three years on Integrated Modular Controller.

Limited one year all other covered components.

COOLING SYSTEM

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

Two efficiency levels provide flexibility.

System can operate from 0°F to 125°F without any additional controls.

Four, independent compressor circuits.

Compressors

Resiliently mounted on rubber grommets for quiet operation. Copeland Scroll™ compressors on all models for high performance, reliability and quiet operation.



Compressor Crankcase Heaters

Protects against refrigerant migration that can occur during off-cycles.

Thermal Expansion Valves

Assures optimal performance throughout the application range. Removable element head.

Filter/Driers

High capacity filter/driers protect the system from dirt and moisture.

High Pressure Switches

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

Low Pressure Switches

Protects the compressor from low pressure conditions such as low refrigerant charge, or low/no air flow. Manual reset.



Freezestats

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

Coil Construction

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

Evaporator Coil

Cross row circuiting with rifled copper tubing optimizes both sensible and latent cooling capacity. Low fin per inch count minimizes air pressure drop. Constant air volume models have face-split evaporator coils, variable air volume models have row-split evaporator coils designed to keep condensate water off of an inactive part of the coil so the condensate will not re-enter the air stream.

Condenser Coil

Slab design. Protected from hail or contact damage.

Condensate Drain Pan

Galvanized pan with positive slope is reversible.

Stainless steel is available as a factory installed option.

Drain connection extends outside unit.

Outdoor Coil Fan Motors

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

Outdoor Coil Fan

PVC coated fan guard furnished.

REQUIRED SELECTIONS

Cooling Efficiency

Specify either standard or high efficiency.

Refrigerant Choice

Specify either R-22 or R-410A refrigerant.

OPTIONS

Discharge Air Temperature Sensor

Sensor sends information to the IMC to cycle up to 4 stages of heating or cooling to maintain the discharge air setpoints for heating or cooling. Optional for CAV units (single zone or bypass zoning control) Automatically furnished with all Variable Air Volume (VAV) units. Sensor is shipped with the unit for remote field installation in the supply duct.

Fresh Air Tempering

Provides heating and cooling as needed to maintain the supply air temperature within a comfort range, regardless of the thermostat demand. Sensor ships with unit but must be field installed in the supply air duct. Requires change to IMC (ECTO) parameter in the field to activate this mode of operation.

Hot Gas Bypass

Bypasses hot gas from the first stage compressor to the suction line during low airflow operation to help prevent coil frosting and compressor damage. Allows operation down to 12.5% of nominal capacity. NOTE - Not available with Humiditrol® option.

Service Valves

Fully serviceable brass valves installed in discharge & liquid lines. Factory installed.

Spring Isolation

Spring isolation (2 inch diameter springs) under compressor deck. Rubber grommets under each compressor. Blocked for shipment to prevent movement.

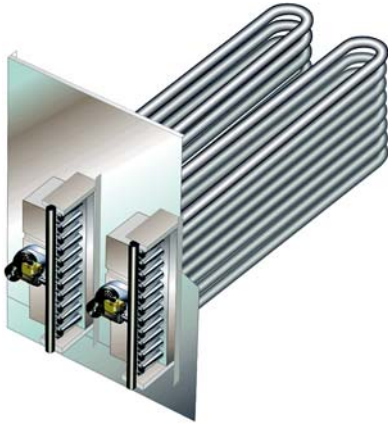
Stainless Steel Condensate Drain Pan

Factory installed.

FEATURES AND BENEFITS

HEATING SYSTEM

Aluminized steel inshot burners, direct spark ignition, electronic flame sensor, combustion air inducer, redundant automatic two-stage gas valves with manual shut-off.



Heat Exchanger

Tubular construction, aluminized steel, life cycle tested.

Stainless Steel Heat Exchanger is required if entering mixed air temperature is less than 45°F.

Fan & Limit Controls

Factory installed with fixed temperature setting.

Heat limit controls protect against overheating.

Safety Switches

Flame roll-out switches, flame sensors and combustion air inducer proving switches protect system operation.

All safety switches are monitored by the IMC unit controller and diagnostic errors are reported and recorded.

REQUIRED SELECTIONS

Gas Input - Order one:

Standard Heat - 330,000 Btuh low fire / 500,000 Btuh high fire, either natural gas or LPG/Propane.

High Heat - 528,000 Btuh low fire / 800,000 Btuh high fire, either natural gas or LPG/Propane.

Heat Exchanger

Specify aluminized or stainless steel.

OPTIONS / ACCESSORIES

Fresh Air Tempering

Provides heating and cooling as needed to maintain the supply air temperature within a comfort range, regardless of the thermostat demand. Sensor ships with unit but must be field installed in the supply air duct. Requires change to IMC (ECTO) parameter in the field to activate this mode of operation.

LPG/Propane Conversion

Conversion to LPG/Propane. Factory installed.

Modulating Gas

Enhances comfort by improving discharge air temperature control with full modulation of gas heat output from 25-100%. Stainless steel heat exchanger and discharge air temperature sensor are furnished as standard. Sensor is shipped with the unit for remote field installation in the supply duct.

Low Temperature Vestible Heater

Extends gas heat operation from -40°F (standard) down to -60°F. Electric heater automatically controls minimum temperature in gas burner compartment when temperature falls below -40°F.

Discharge Air Temperature Sensor

Sensor sends information to the IMC to cycle up to 4 stages of heating or cooling to maintain the discharge air setpoints for heating or cooling. Optional for CAV units (single zone or bypass zoning control) Automatically furnished with all Variable Air Volume (VAV) units and modulating gas units. Sensor is shipped with the unit for remote field installation in the supply duct.

AIR FILTERS

Disposable 2 inch pleated MERV 7 filters (Minimum Efficiency Reporting Value based on ASHRAE 52.2).

OPTIONS/ ACCESSORIES

MERV 7 Filters

Disposable, 4-inch pleated MERV 7.

MERV 11 Filters

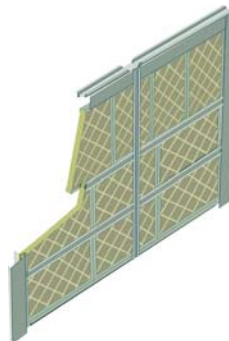
Disposable, 2-inch pleated MERV 11.

MERV 15 Filters

Disposable, 2-inch pleated MERV 15.

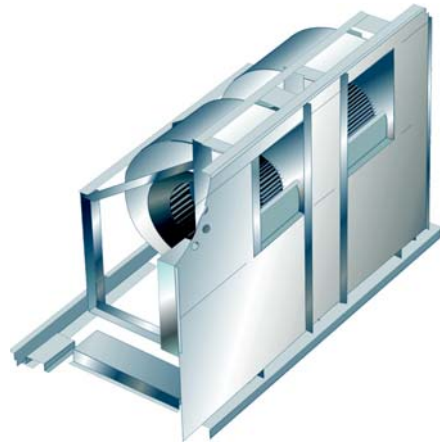
Cleanable Filters

Cleanable, 2-inch metal mesh.



BLOWER

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



Motor

Overload protected, equipped with ball bearings.

Belt drive motors are offered in several different sizes to maximize air performance.

Supply Air Blower

Forward curved blades, blower wheel is statically and dynamically balanced.

Belt drive motors with adjustable pulley for speed change on CAV units.

Grease fittings furnished.

REQUIRED SELECTIONS

Blower

Specify Constant Air Volume (CAV) or Variable Air Volume (VAV). See Blower Data Table for specifications.

Order one drive kit, see Drive Kit Specifications Table.

OPTIONS / ACCESSORIES

Spring Isolation

Spring isolation (2 inch diameter springs) under blower frame.

Blocked for shipment to prevent movement.

Supply Static Transducer

Transducer sends information to the IMC to control VFD blower speed. Optional for CAV units. Automatically furnished with all VAV units. Transducer is shipped with the unit for remote field installation in the supply duct.

Supply VFD Blower Bypass

Allows variable air volume (VAV) units to operate as a constant air volume (CAV) unit in case of variable frequency drive (VFD) failure. Factory Installed.

Supply Static Limit Switch

Field installed manual reset switch for supply static high pressure limit. Prevents exceeding pressure limit in supply air duct. Optional Mounting Kit includes tubing and adaptors.

FEATURES AND BENEFITS

CABINET

Construction

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

Base rails have rigging holes.

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

Power and Gas Entry

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

Exterior Panels

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

Insulation

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

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

Access Panels

Stainless-steel hinges on access panels are provided for service access.

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

Air-Flow

Units are available in vertical or horizontal air flow configuration.

OPTIONS / ACCESSORIES

Corrosion Protection

A completely flexible immersed coating with an electrodeposited dry film process. (AST ElectroFin™ E-Coat) Meets Mil Spec MIL-P-53084, ASTM B117 Standard Method Salt Spray Testing, ASTM 1153 Standard Specification for Methyl Isobutyl Ketone. Shall be available as an option for enhanced coil corrosion protection. Factory installed.

Double-Wall Construction

Factory installed inner metal liner on all panels adjacent to conditioned air. Factory installed.

Roof Curbs

Nailer strip furnished, mates to unit, shipped knocked down.

Standard Vertical - US National Roofing Contractors Approved, available in 14 inch and 24 inch heights. Field installed.

Also available - Roof curbs for vibration isolation, seismic conditions, seismic with wind restraints. Contact your Sales Representative for additional information.

FEATURES AND BENEFITS

CONTROLS

INTELLIGENT UNIT CONTROLLER



The Integrated Modular Controller (IMC) is a solid-state, microprocessor based control board that provides flexible control of all unit functions. All control voltage is provided via a 24V transformer with built-in circuit breaker protection.

Unit Control Modes

Zone Sensor Mode - The IMC can provide up to 4 stages of mechanical heating and cooling operation. Constant volume units in the single zone applications can use this control mode. To operate correctly, a zone sensor will provide space temperature information to the IMC. The IMC will house all space temperature setpoints and will control all rooftop unit staging and general operation functions. The IMC will also provide error code and diagnostic information.

Thermostat Mode (2 Heat/2 Cool) - Standard unit mode is 2 stages of heating and 2 stages of cooling. Constant volume units in either single zone or bypass zoning applications can use this control mode. To operate correctly, a thermostat or unit controller must provide the following wiring connections to the IMC: 1) ventilation demand, 2) occupied demand, 3) heating demand one, 4) heating demand two, 5) cooling demand one and 6) cooling demand two. In this set up, either the thermostat or unit controller will control the rooftop unit staging and general operation. The IMC functions primarily to determine unit error codes and provide diagnostic information.

Thermostat Mode Configured For Discharge Air Temperature Control - The IMC can provide up to four stages of cooling and heating operation for discharge air temperature control. Variable air volume units using a variable frequency drive on the supply fan and operating in a zoning application must use this control mode. Constant volume units in either single zone or bypass zoning application may use this control mode. To operate correctly, a unit controller must provide the following wiring connections to the IMC: 1) ventilation demand, 2) occupied demand, 3) heating demand and 4) cooling demand. In this control mode the IMC will control all cooling and heating staging to maintain the the discharge air temperature setpoints set

in the IMC. (Typically 55°F for cooling and 110°F for heating.). A third-party unit controller, or a thermostat can provide these inputs to the IMC. For example, if the unit controller passes along a demand for cooling then the IMC will activate the refrigeration system and increase or decrease cooling stages to maintain the discharge supply air temperature setpoint. In this mode, the IMC will also maintain the supply duct static pressure by directly controlling the supply fan variable frequency drive. Along with providing control of the rooftop unit, the Integrated Modular Controller will also provide error codes and diagnostic information.

Built-in functions include:

Blower On/Off Delay - Adjustable time delay between blower on and off.

Blower Air Delivery Options - Three air delivery options; single zone CAV, bypass zoning with bypass dampers, and modulating VAV with VFD.

Built-in Control Parameter Defaults - No programming required for standard CAV models.

Compressor Time-Off Delay - Adjustable time delay between compressor shutoff and start up.

DDC Compatible - Various third party DDC controllers can be factory or field installed. Refer to the Unit Controllers section for details.

Dirty Filter Switch Input - When a Dirty Filter Switch is installed, the IMC will signal when the indoor blower static pressure increases, indicating a dirty filter condition. Switch is optional and can be factory or field installed.

Discharge Air Temperature Control - The IMC will cycle up to 4 stages of heating or cooling to maintain the discharge air setpoints for heating or cooling. Optional for CAV units (single zone or bypass zoning control). Sensor is automatically furnished with all Variable Air Volume (VAV) units. Sensor is shipped with the unit for remote field installation in the supply duct.

Display/Sensor Readout - Displays control parameters, diagnostic codes, and sensor readings. The IMC unit controller displays temperature readings from return air, supply air, and outdoor air sensors that are furnished as standard on all L Series units. IMC will also display readings from optional sensors such as zone sensors, CO₂ sensors or relative humidity sensors.

Economizer Control Choice - The economizer is controlled by an add-on board to the IMC. The economizer control board has several choices for controlling the economizer. See Economizer / Outdoor Air / Exhaust Options.

Fresh Air Tempering - Provides heating and cooling as needed to maintain the supply air temperature within a comfort range, regardless of the thermostat demand. Sensor ships with unit but must be field installed in the supply air duct. Requires change to IMC (ECTO) parameter in the field to activate this mode of operation.

Extensive Unit Diagnostics - The IMC monitors all sensors and functions related to unit operation to provide critical information. The IMC will display detailed diagnostic information with over 90 diagnostic codes to pinpoint any problems and reduce troubleshooting time. All diagnostic codes are listed inside control access panel for easy reference.

Exhaust Fan Control Modes - Fans controlled by fresh air damper position (non-VFD power exhaust) or building static differential pressure transducer.

Permanent Diagnostic Code Storage - Maintains diagnostic codes through a power failure.

Field Changeable Control Parameters - Over 200 different control parameters allow customization of the unit operation by changing delays, cooling stages, deadbands, and setpoints.

Indoor Air Quality Input - The IMC is Demand Control Ventilation ready from the factory (optional field installed CO₂ sensor required). Two modes of operation are available: setpoint and proportional.

1 - Setpoint - Opens the economizer dampers to full position when CO₂ setpoint level is reached.

2 - Proportional - Opens the dampers at the first set point and gradually increases it as the CO₂ level increases until the second setpoint is reached.

Low Ambient Controls - Allows unit cooling operation down to 0°F.

Gas Valve Time Delay Between First and Second Stage - Allows gradual increase of input rate.

Minimum Compressor Run Time - Ensures proper oil return to the compressor.

Network Capable - The IMC can be daisy chained to other L Series units or L Connection® Network controllers using twisted pair wire.

Night Setback Mode - Adjusts setpoints, closes outdoor air dampers and operates the blower on demand, may be customized for special requirements.

Return Air Temperature Limit Control - Allows the user to override the demands based upon the return air temperature during either heating or cooling operation. Helps protect against abnormal operating conditions in the event of a room sensor or thermostat failure.

FEATURES AND BENEFITS

CONTROLS - CONTINUED

Safety Switch Input - Normally-closed digital input allows the IMC to respond to a external safety switch trip (phase protector, low voltage, etc.) shutting down unit operation.

Service Relay Output - Digital output can indicate a critical error has occurred to an external control device. Can also be configured to energize based on relative humidity, indoor air quality, outdoor air temperature or unit operation.

Smoke Alarm Mode - Control board has four choices for responding to a smoke alarm.

1 - Unit Off - unit will turn off.

2 - Positive Pressure - blower is energized, exhaust fan is de-energized, and the outdoor air dampers are opened.

3 - Negative Pressure - blower is energized, exhaust fan is energized, and the outdoor air dampers are closed.

4 - Purge - blower is energized, exhaust fan is energized, and the outdoor air dampers are opened.

Staging - 2 heat/2 cool. Capable of up to 4 heat/4 cool with zone sensor or third party DDC control system.

“Strike Three” Protection - Ends cooling or heating operation when any of the following occurs three times (adjustable) within a thermostat cycle: low pressure trip, high pressure trip, heat limit trip, or freeze-stat trip.

Gas Reheat - Control parameter option that allows simultaneous heating and cooling operation on CAV gas units for controlling humidity for process air applications such as supermarkets. Field installed relative humidity sensor or dehumidistat can be used.

On-Demand Dehumidification - Monitors and controls condenser hot gas bypass operation with Humiditrol option. Prioritizes heat and cool demand with dehumidification demand. Reheat demand can be enabled by digital input or a field installed relative humidity sensor can be used. CAV models only.

Thermostat Bounce Delay - Protects compressor from short cycling when mechanical thermostat is used.

Warm-up Mode Delay - Adjustable time that the economizer dampers are kept in the closed position during morning warm-up.

On-Board User Interface - Push-button, DIP switches used with three-digit display readout for field adjustment of control parameters. LED indicators for L Connection Network (transmit and receive) and for each thermostat input.

PC Interface - PC with optional Unit Controller software may be used to field or remotely adjust parameters, read alarms, or display unit status.

VAV Control - Supports variable air volume (VAV) units with variable

frequency drive or constant air volume units with bypass zoning control system. Constant air volume bypass zoning control units require add-on control board.

Zone Sensor Operation - Controls zone temperature with up to 4 stages of heating or cooling with optional zone sensor.

OPTIONS / ACCESSORIES

Factory or Field Installed

Blower Proving Switch

Monitors blower operation, shuts down unit if blower fails. Factory installed.

Dirty Filter Switch

Senses static pressure increase indicating dirty filter condition.

Fresh Air Tempering

Provides heating and cooling as needed to maintain the supply air temperature within a comfort range, regardless of the thermostat demand. Sensor ships with unit but must be field installed in the supply air duct. Requires change to IMC (ECTO) parameter in the field to activate this mode of operation.

Smoke Detector

Photoelectric type, installed in supply air section or return air section or both sections

Interoperability via BACnet® or LonTalk® Protocols

Communication compatible with third-party automation systems that support the BACnet Application Specific Controller device profile, LonMark® Space Comfort Controller functional profile, or LonMark Discharge Air Controller functional profile. See Page NO TAG.

Commercial Control Systems

L Connection® Network

Complete building automation control system for single or multi-zone applications. Options include local interface, software for local or remote communication, and hardware for networking other control functions. See L Connection Network Engineering Handbook Bulletin for details.

Aftermarket DDC

Novar® Unit Controller and options. See Page NO TAG.

Thermostats

Control system and thermostat options. Aftermarket unit controller options. See See Page NO TAG.

Blower On/Off Delay - Adjustable time delay between blower on and off.

Blower Air Delivery Options - Three air delivery options; single zone CAV, bypass zoning with bypass dampers, and modulating VAV with VFD.

Built-in Control Parameter Defaults - No programming required for standard CAV models.

Compressor Time-Off Delay - Adjustable time delay between compressor shutoff and start up.

DDC Compatible - Various third party DDC controllers can be factory or field installed.

Dirty Filter Switch Input - When a Dirty Filter Switch is installed, the IMC will signal when the indoor blower static pressure increases, indicating a dirty filter condition. Switch is optional and can be factory or field installed.

Display/Sensor Readout - Displays control parameters, diagnostic codes, and sensor readings. The IMC unit controller displays temperature readings from return air, supply air, and outdoor air sensors that are furnished as standard on all S-Class units. IMC will also display readings from optional sensors such as zone sensors, CO₂ sensors, outdoor air velocity or relative humidity sensors.

SERVICEABILITY

Designed to streamline general maintenance and decrease troubleshooting time.

Diagnostics

IMC diagnostic codes pinpoint problems, minimizing troubleshooting time.

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.

Toolless, Hinged Access Panels

Large access panels are hinged and have quarter-turn, latching handles for quick and easy access to maintenance areas. Filter access panels are hinged for easy access to the filters.

Coil Cleaning

Slab condenser coils allow easier cleaning.

Standard Components

A large number of common maintenance parts are standard reducing the need to carry a lot of different parts to the job or in inventory.

Compressor Compartment

Compressors are located near the perimeter of the unit for easier access. Compressors operation checks can be done without changing the air flow across the outdoor coils.

Thermal Expansion Valves

Thermal expansion valves are located near the perimeter of the unit for easier access.

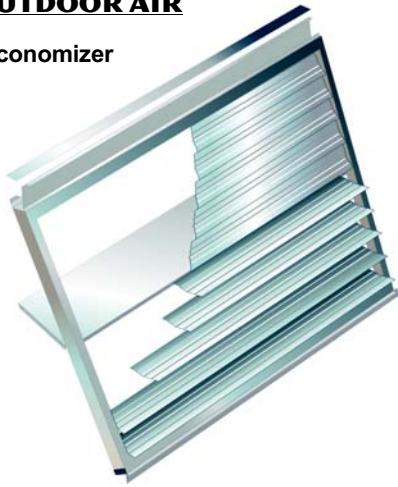
Removable element head allows change out of element and bulb without removing the TXV.

Service Valves (optional)

Optional factory installed liquid and discharge service valves allow refrigerant to be isolated to the high side for service work on the low side of the refrigeration system.

OUTDOOR AIR

Economizer



Parallel gear driven action return air and outdoor air dampers, plug-in connections to unit, nylon bearings, neoprene seals, 24-volt, fully-modulating, spring return motor, adjustable minimum damper position, damper assembly slides in unit. The IMC add-on board for economizer control is included with the economizer. Control board has several choices for controlling the economizer (DIP switch selections).

1 - Differential Sensible Control - Factory setting. Uses the outdoor air and return air sensors that are furnished with the unit. The IMC compares the outdoor air and return air and using setpoints, enables the economizer when the outdoor air temperature is below the configured setpoint and cooler than return air.

NOTE - Differential Sensible Control can be configured in the field to provide Offset Differential Sensible Control or Single Sensible Control.

In Offset Differential Sensible Control mode, the economizer is enabled if the temperature differential (offset) between outdoor air and return air reaches the configured setpoint.

In Single Sensible Control mode, the economizer is enabled when outdoor air temperature falls below the configured setpoint.

2 - Global Control - The IMC communicates with a DDC system with one global sensor (enthalpy or sensible) to determine whether outside air is suitable for free cooling on all units connected to the control system. Sensor must be field provided.

3 - Single Enthalpy Control - Outdoor air enthalpy sensor enables economizer if the outdoor enthalpy is less than the setpoint of the board. Factory installed.

4 - Differential Enthalpy Control - Two solid-state enthalpy sensors allow the economizer control board to select between outdoor air or return air, whichever has lower enthalpy. Factory installed.

Indoor Air Quality Input

The IMC is Demand Control Ventilation ready from the factory (optional field installed CO₂ sensor required). Two modes of operation are available: setpoint and proportional.

1 - Setpoint - Opens the economizer dampers to full position when CO₂ setpoint level is reached.

2 - Proportional - Opens the dampers at the first set point and gradually increases it as the CO₂ level increases until the second setpoint is reached.

Outdoor Air Dampers (Manual or Motorized)

Linked mechanical dampers (0 to 100% without return) outdoor air adjustable, installs in unit. Motorized model features spring return damper motor with plug-in connection.

Minimum entering mixed air temperature in heating mode is 45°F with aluminized steel heat exchanger. Maximum entering mixed air temperature in cooling mode is 100°F.

Fresh Air Tempering

The IMC has the option of heating and cooling as needed to maintain the supply air temperature within a comfort range, regardless of the thermostat demand. For factory option, sensor ships with unit but must be field installed in the supply air duct.

EXHAUST

Barometric Relief Dampers

Allows relief of excess air, aluminum blade dampers prevent blow back and outdoor air infiltration during off cycle, bird screen furnished. Factory installed.

Power Exhaust Fans (PEF)

Standard Static Power Exhaust

Choice of 50% (one motor) or 100% (two motors). Direct drive, 26 in., four-blade propeller-type fan. The motor is inherently protected and enclosed for maximum protection from weather, dust and corrosion.

High Static Power Exhaust

Choice of 50% (one motor) or 100% (two motors). Centrifugal-type power exhaust. Motors are available in 3, 5, or 7.5 hp. Overload protected, equipped with ball bearings. Forward curved blades, blower wheel is statically and dynamically balanced. Belt drive motors with adjustable pulley for speed change. Also available with VFD or VFD and Bypass.

NOTE - When ordering units configured for horizontal air discharge with high static power exhaust, Lennox recommends modification to the return air duct section to allow access to the power exhaust components for servicing.

Exhaust Fan Control Modes

23 exhaust fan modes for controlling the exhaust air. Fans controlled by fresh air damper position or differential pressure transducer.

OPTIONS (POWER EXHAUST)

Damper Position Control

IMC controls exhaust fan based on economizer damper position. In two fan operation, the fans are staged.

Differential Pressure Transducer

Differential pressure transducer compares atmospheric pressure to conditioned space static pressure for controlling exhaust fan. Transducer is factory installed. Furnished standard with VFD models.

Outdoor Air CFM Control

Maintains constant outdoor air CFM levels for VAV units featuring variable frequency drives on the supply fan and varying unit airflows. Using information from a velocity sensor located in the units' outdoor air section, the Integrated Modular Controller changes the economizer position to help minimize the effect of supply fan speed changes on outdoor air CFM levels. Setpoint for outdoor air CFM is established by field testing. Requires Integrated Modular Controller hardware version M1-7 and firmware version 5.10 or higher. Factory or field installed.

NOTE - Not available with Demand Control Ventilation (CO₂Sensor).

Spring Isolation

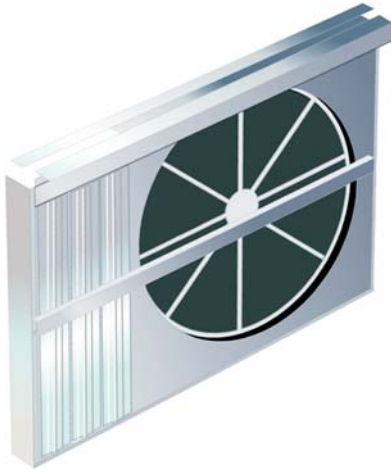
(High Static Power Exhaust Only)

Spring isolation (2 inch diameter springs) under blower frame.

Blocked for shipment to prevent movement. Factory installed.

OPTIONS / ACCESSORIES

Energy Recovery Wheel



NOTE - Not available with units configured for horizontal air flow.

Helps reduce energy use and improve comfort and IAQ levels by conditioning outdoor air before it enters the building. The ERW enthalpy wheel contains several pie shaped sections with several layers of a desiccant coated polymeric energy transfer surface. As the wheel rotates through the outdoor and exhaust air streams, it absorbs sensible and latent energy. In heating mode, the wheel rotates to provide a constant transfer of heat from the exhaust air stream to the outdoor air intake air stream. During cooling season, the process is reversed.

Sensible and latent energy are the two components of total energy. Sensible energy changes only the dry bulb temperature of a substance. Latent energy is not temperature, but the hidden (or 'latent') energy required to remove moisture from the air. The ERW transfers moisture in the vapor phase so there are no condensate drains needed or wet surfaces to promote fungal growth.

As the ERW wheel rotates, air flow direction is reversed every 1/2 rotation keeping dirt and dust particles from accumulating on the wheel, which could cause poor performance.

Bypass dampers are included for economizer operation.

Frost control consists of a thermostat located in the exhaust air downstream of the ERW. When low exhaust temperature indicates frost on the wheel, economizer outdoor air dampers close. The wheel continues to rotate and the power exhaust fans continue to operate, pulling warm building air across the rotating wheel to defrost it. When the defrost cycle is completed the economizer dampers return to the minimum outdoor air position.

Rated in accordance with ARI Air-to-Air Energy Recovery Ventilation Equipment Certification Program, which is based on ARI Standard 1060-2000. To obtain a copy of the Standard or to view Lennox' latest certified data, please visit the ARI website at www.ari.org.

See page 52 for specifications.

HUMIDITROL® HOT GAS REHEAT OPTION

CAV MODELS ONLY

Factory installed option designed to control humidity.

Provides dehumidification on demand using ASHRAE 90.1 recommended method for reheat with comfort conditioning humidity control.

In addition to a thermostat/room sensor used for conventional operation, a humidity sensor is required and must be located in the occupied space.

Humidity sensor provides input to the Integrated Modular Controller (IMC) which is used to control activation of the dehumidification operation.

Reheat controls are located in the compressor control section of the unit for easy access.

Benefits

Improves indoor air quality.

Helps prevent damage due to high humidity levels.

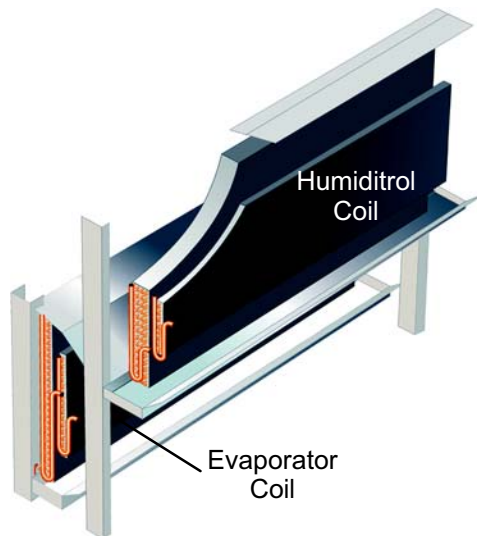
Improves comfort levels by reducing space humidity levels.

OPERATION

No Dehumidification Demand

The unit will operate conventionally whenever there is a demand for cooling or heating and no dehumidification demand.

Free cooling is only permitted when there is no demand for dehumidification.



Dehumidification and Cooling Demand (Room Sensor Application)

If both a dehumidification demand and a first stage cooling demand occur, the system will operate compressor 1 and compressor 2 in reheat and compressor 3 will operate in cooling.

If a demand for second stage cooling is initiated, compressor 1 and compressor 2 will operate in reheat and compressor 3 and compressor 4 will operate in cooling.

A demand for third stage cooling will terminate reheat and compressor 4 operation and operate compressor 1, compressor 2 and compressor 3 in cooling until third stage cooling demand is satisfied. A demand for fourth stage cooling will operate compressor 1, compressor 2, compressor 3 and compressor 4 in cooling.

Dehumidification Demand Only

The IMC is factory set at 60% relative humidity setpoint and can be adjusted at the IMC or with optional Unit Controller Software.

For Network Control Panel (NCP) applications, the humidity setpoint can be adjusted at the NCP. The unit will operate in the dehumidification mode until the relative humidity of the conditioned space is 3% below the setpoint.

Reheat operation will initiate on a dehumidification demand and does not require a cooling demand.

The reheat coil is sized to offset most of the first stage sensible cooling effect during reheat only operation. This reduction in sensible cooling capacity extends compressor run time to control humidity when cooling loads are light.

Solenoid valves divert hot gas from compressor 1 and compressor 2 to the reheat coil.

The cooled and dehumidified air from the evaporator is then reheated as it passes through the reheat coil.

The de-superheated and partially condensed refrigerant continues to the outdoor condenser coil where condensing is completed.

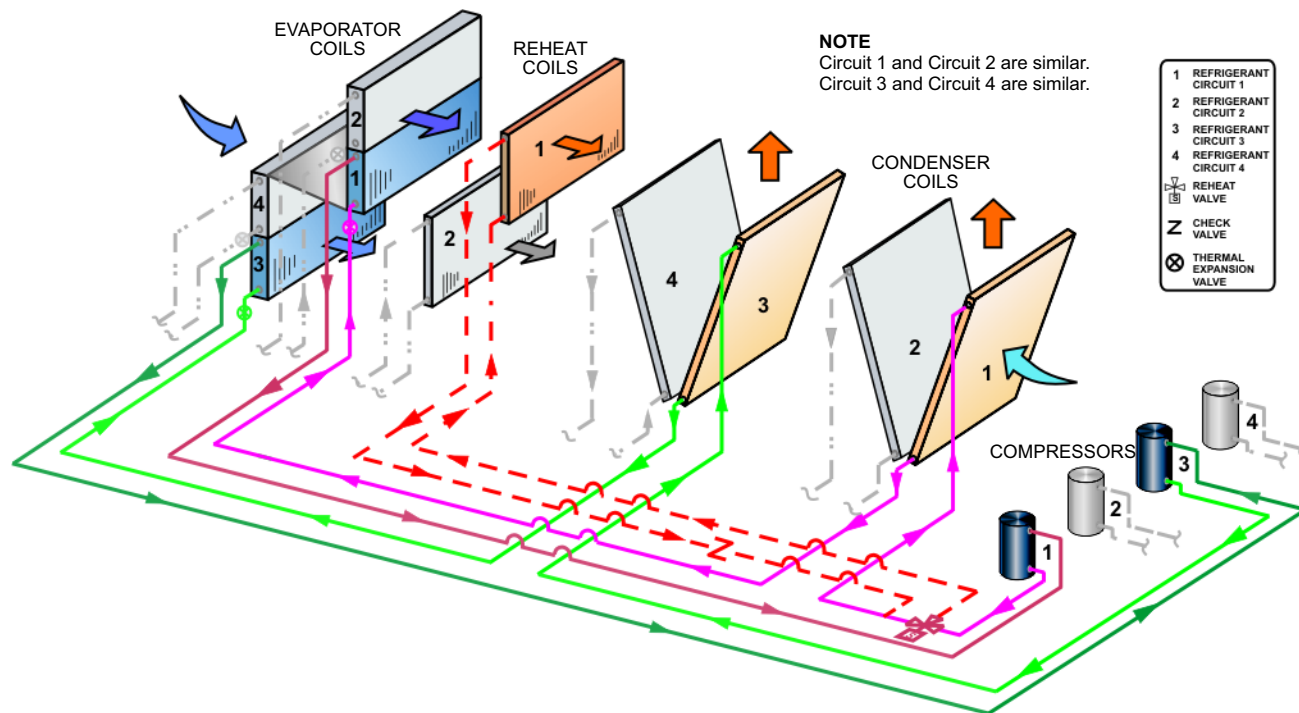
The unit will continue to operate in this mode until the dehumidification demand is satisfied.

A heating demand will terminate reheat operation.

ACCESSORIES

Humidity Sensor Kit, Remote Mounted - Humidity sensor required with Humiditrol Option. Field installed.

HUMIDITROL REFRIGERANT SCHEMATIC



SEQUENCE OF OPERATION

INTEGRATED MODULAR CONTROL (IMC) CONTROL MODES

Lennox' Integrated Modular Control (IMC) can operate in several different control modes. The selection of these control modes will depend upon several factors.

Unit type - constant air volume (CAV) or variable air volume (VAV) with supply fan variable frequency drive.

Zoning application (single zone, bypass zoning or zoning)

Which device will control rooftop unit staging and unit operation (thermostat / third party unit controller or the IMC)

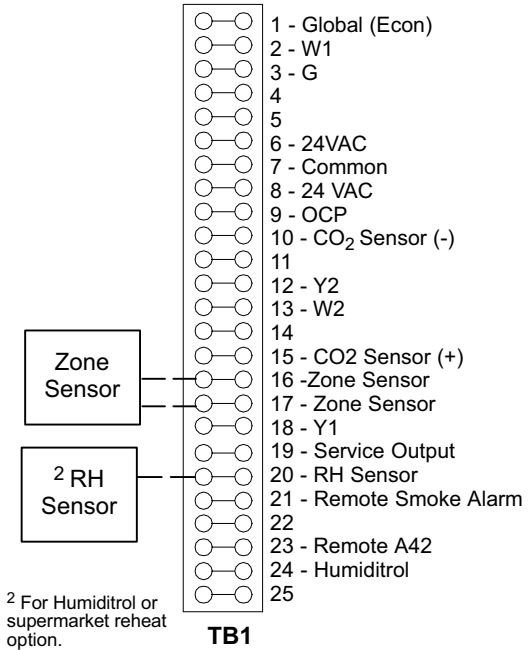
The desired level of unit heating and cooling staging (2 heat / 2 cool or 4 heat / 4 cool)

Integrated Modular Control (IMC) In Zone Sensor Mode

When in the zone sensor mode, the IMC can provide up to four stages of mechanical heating and cooling operation. Constant volume units in single zone applications can use this control mode. The zone sensor will provide space temperature information to the IMC. The IMC houses all space temperature setpoints and controls all rooftop unit staging and general operation. The IMC also determines unit error codes, provides diagnostic information and maintains safe operation limits.

It is important to note that scheduling and/or setpoint control requires the use of a L Connection™ Network Control Panel.

Constant Air Volume Unit in Single Zone Application



SEQUENCE OF OPERATION

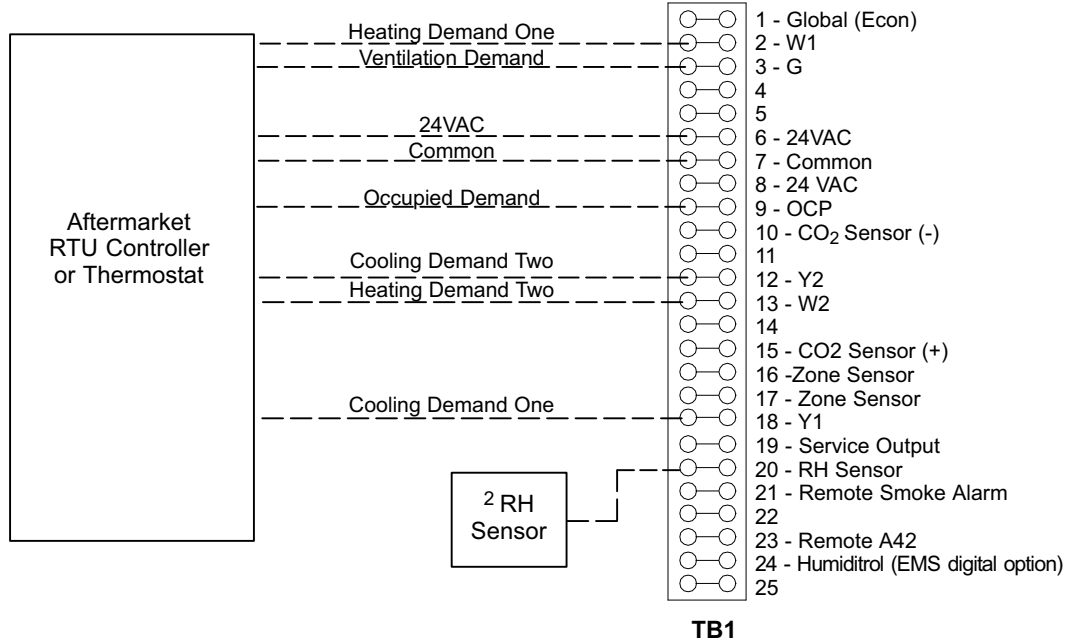
Integrated Modular Control (IMC) In Thermostat Mode

When in the thermostat mode, the IMC can provide up to two stages of mechanical heating and cooling operation. Constant volume units in either single zone or bypass zoning applications can use this control mode. To operate correctly, a Lennox or third

party thermostat or unit controller must provide the following wiring connections to the IMC: 1) ventilation demand 2) occupied demand 3) heating demand one 4) heating demand two 5) cooling demand one and 6) cooling demand two. In this configuration, either the

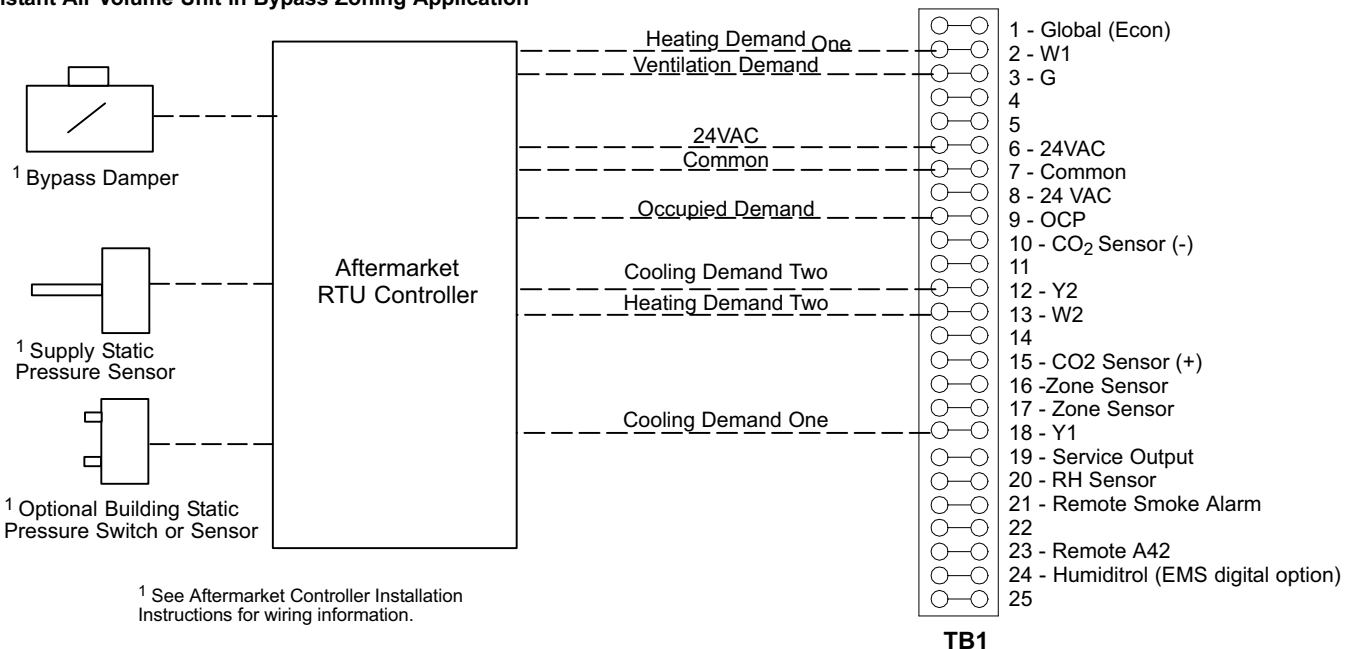
thermostat or unit controller will control the rooftop unit staging and general operation. The IMC functions primarily to determine unit error codes, provide diagnostic information and maintain safe operation limits.

Constant Air Volume Unit in Single Zone Application



¹ See Aftermarket Controller Installation Instructions for wiring information.
² For Humiditrol or supermarket reheat option.

Constant Air Volume Unit in Bypass Zoning Application



¹ See Aftermarket Controller Installation Instructions for wiring information.

SEQUENCE OF OPERATION

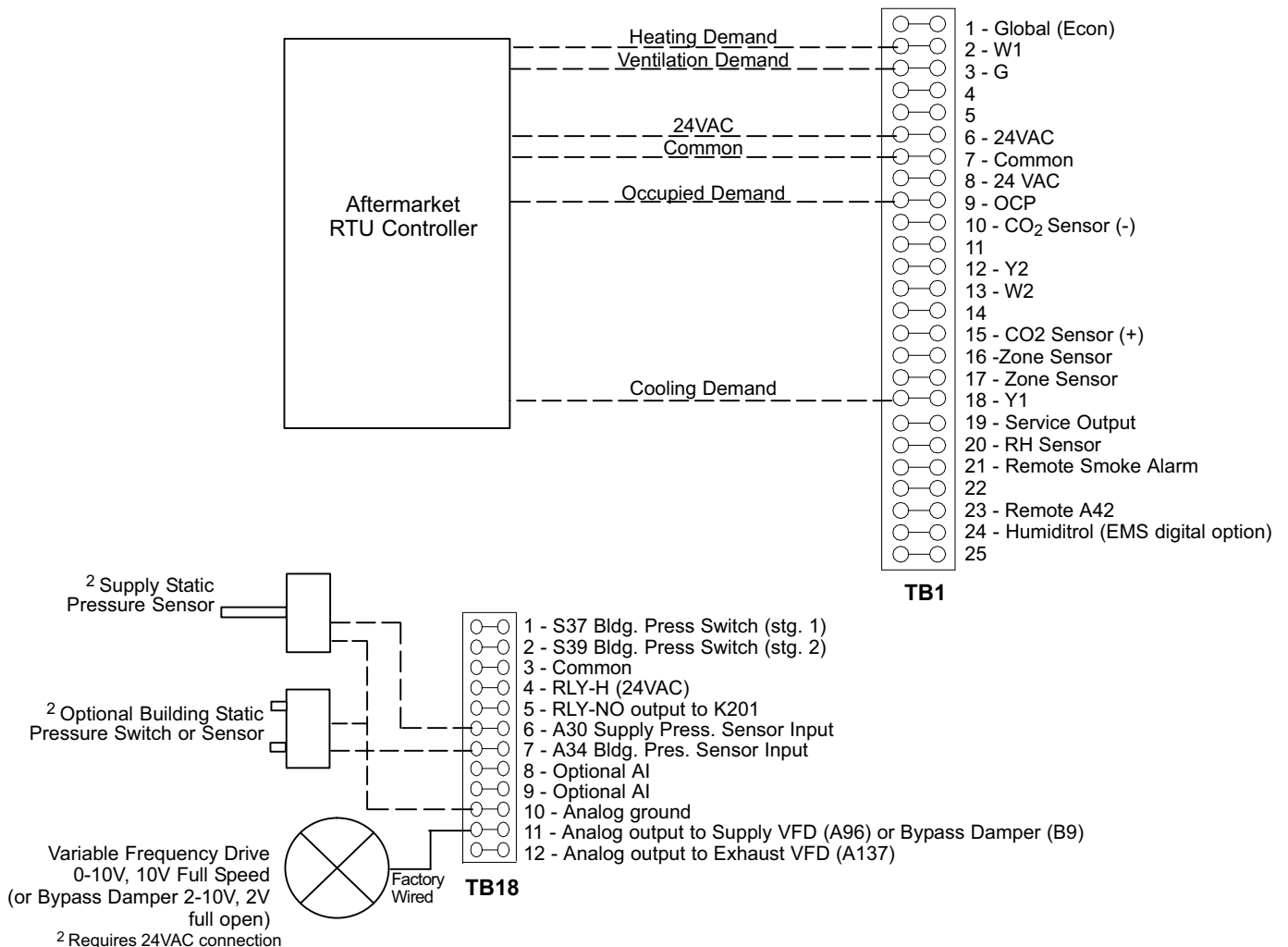
Integrated Modular Control (IMC) In Thermostat Mode Configured For Discharge Air Temperature Control

When in thermostat mode and configured for discharge air temperature control, the IMC can provide up to four stages of mechanical heating and cooling operation. Variable air volume units using a variable frequency drive on the supply fan and operating in a zoning application must use this control mode. Although not as common, constant volume units in either single zone or bypass zoning applications may also use this control mode.

To operate correctly, a Lennox or third party thermostat or unit controller must provide the following wiring connections to the IMC: 1) ventilation demand 2) occupied demand 3) heating demand and 4) cooling demand. In this control mode the IMC will control all cooling and heating staging to maintain the the discharge air temperature setpoints set in the IMC. (Typically 55°F for cooling and 110°F for heating.). A third-party unit controller, or a thermostat can provide these inputs to the IMC. For

example, if the unit controller passes along a demand for cooling then the IMC will activate the refrigeration system and increase or decrease cooling stages to maintain the discharge supply air temperature setpoint. In this mode, the IMC will also maintain the supply duct static pressure by directly controlling the supply fan variable frequency drive. Along with providing control of the rooftop unit, the Integrated Modular Controller will also provide error codes and diagnostic information.

Variable Air Volume Unit in Zoning Application



OPERATIONS COMMON TO ALL ROOFTOP UNITS

The following sequence of operation information applies to all S-Class™ rooftop units regardless of IMC control mode, unit type or zoning application.

Heating operation (modulating gas)

The S-Class unit features two separate gas burner sections, each with a modulating gas valve and a shut-off valve. The modulating gas heat section can provide continuous operation from 25-100% of total heat capacity.

Upon receiving a heating demand, the IMC will instruct the modulating gas unit to maintain a discharge air temperature setpoint (default 110°F). The unit maintains this setpoint by feeding information from a discharge air temperature sensor located in the supply duct back to the IMC. Based on this information, the IMC increases or decreases gas heat output to maintain the desired heating setpoint.

The IMC controls modulation by adjusting either one or both of the gas burner sections. Upon receiving a heating demand, the IMC will bring on both gas burner sections at 100%. When the discharge air temperature reaches the setpoint (default 110°F), the IMC will modulate both gas burner sections by the same amount between 100% and 50% to maintain the setpoint. If less heat is required to maintain the setpoint, the IMC will turn off the second gas burner section and modulate the first gas burner section between 100% and 50% (50% to 25% of total unit capacity).

The basic operation of modulating gas remains the same regardless of unit type or IMC mode. Gas heat modulation requires the necessary mechanical components, a discharge air temperature sensor located in the supply duct and a single heating demand to the IMC.

Occupied Demand

Upon receiving occupied and ventilation demands from the Lennox or third party unit controller, the IMC adjusts the fresh air damper to either a fixed minimum position or allows it to modulate based on a CO₂ sensor (demand control ventilation). The CO₂ sensor can be wired directly to the IMC, to another controller that can monitor the sensor and pass a signal to the IMC for damper control, or to both the IMC and another device for monitoring through the desired man-machine interface while the IMC maintains damper control.

During morning warm-up the IMC keeps the fresh air damper closed based on IMC configuration settings. Setpoints for minimum and maximum damper position and CO₂ control reside in the IMC memory, have factory default settings, and may be adjusted at start up. The user can change these settings either locally or remotely through Lennox' L Connection Network® Unit Controller Software. The user will not have the ability to adjust the settings through third party software or control devices.

Demand Control Ventilation

Demand control ventilation is used in applications where the demand for fresh outdoor air fluctuates during the occupied time period. Using a CO₂ sensor connected directly to the IMC, the unit can intelligently increase or decrease the amount of fresh outdoor air by changing the outdoor air damper position. The IMC has two operation modes available, setpoint or proportional, to control the outdoor air damper position.

Fresh Air Tempering (FAT)

In applications with large outdoor air requirements, Fresh Air Tempering is used to minimize temperature fluctuations in the conditioned space. The IMC controls discharge air temperature by energizing heating or cooling in response to the discharge supply air duct temperature. Fresh air tempering only occurs when there is no heating or cooling demand from the occupied space. The user must configure the IMC to turn on the fresh air tempering option.

Heating is energized when discharge air temperature falls below fresh air heating setpoint (60°F default) and terminates when the return air temperature is less than the setpoint. Cooling is energized when discharge air temperature rises above fresh air cooling setpoint (80°F default) and terminates when the return air temperature is greater than the setpoint. FAT will operate up to four stages of heating and cooling to maintain discharge air temperature. Standard heating and cooling demands will override FAT heating and cooling demands.

Hot Gas Bypass

By selecting the hot gas bypass option, the S-Class unit can operate in low airflow applications down to 12.5% of nominal capacity. As the suction line pressure decreases and the potential for coil frosting increases, the mechanical system bypasses hot refrigerant gas from the first stage compressor discharge line back to the suction line. The hot gas increases the pressure of the suction line and reduces the compressor capacity. A de-superheater valve bypasses refrigerant from the liquid line and mixes it with the hot gas before entering the suction line to maintain the setpoint suction gas superheat entering the compressor.

Discharge Air Cooling Reset Operation

Discharge air cooling reset operation saves energy by gradually increasing the discharge air setpoint as outside air temperature decreases. This operation also reduces the potential for overcooling if the zoning system is misapplied, has an abnormal condition, or has a dominant zone. The IMC has various advanced discharge air cooling reset options which can be selected at start up and are based on either return air temperature, outside air temperature, or both return and outdoor air temperature.

Discharge Air Heating Reset Operation

Discharge air heating reset operation saves energy by gradually decreasing the discharge air setpoint as outside air temperature increases. This operation reduces the potential for overheating if the zoning system is misapplied, has an abnormal condition, or has a dominant zone. The IMC has various advanced discharge air heating reset options which can be selected at start up and are based on either return air temperature, outside air temperature or both return and outdoor air temperature.

SEQUENCE OF OPERATION

OPERATIONS COMMON TO ALL ROOFTOP UNITS (Continued)

Building Pressure Control For Standard Or High Static Power Exhaust Fans

S-Class units can control building static pressure with either a standard or high static power exhaust fan. Each fan type is available in either a 50% (one fan) or 100% (two fans) configuration. Standard static power exhaust fans use a propeller while high static power exhaust fans use a centrifugal blower. All units featuring power exhaust fans must also have an economizer for proper operation.

Control of the fans can occur based on damper position or building differential static pressure transducers located outside the building and in the return duct. Using the differential pressure transducer allows for more precise control of building static pressure and ultimately better performance. Control of power exhaust fans can occur through the IMC, third party device or separate unit controller.

Damper Position Control

Power exhaust fans (standard or high static) with damper position control use damper position to determine when to activate fan operation. When the economizer damper is closed, the power exhaust fan will remain off. Once the economizer modulates open past a pre-determined position, the power exhaust fan will turn on. This allows the unit to relieve a portion of the incoming fresh outdoor air and help reduce building static pressure.

If using a 100% (two fans) power exhaust configuration, a second power exhaust fan will turn on once the economizer damper modulates open past a second pre-determined position. Turning on the second fan will allow the unit to further reduce building static pressure.

Differential Static Pressure Control

Power exhaust fans (standard or high static) with building differential static pressure transducer control use the actual building static pressure relative to the outdoor atmospheric pressure to activate fan operation. Based on actual building static pressure as determined by the building differential pressure transducer, the IMC, third party device or unit controller will instruct the power exhaust fan(s) to turn on or off as needed to maintain the building static pressure setpoint.

Turning on the fans decreases building pressure, while stopping fan operation increases building pressure. Power exhaust configurations with two fans have two stage capability for improved building static pressure performance and enhanced control.

The building pressure setpoint resides in the IMC.

Building Pressure Control For High Static Power Exhaust Fans With Variable Frequency Drives

S-Class units can control building static pressure with a high static power exhaust fan featuring a variable frequency drive, using building differential static pressure control. This system provides precise and powerful control of building static pressure. This system uses actual building static pressure relative to the outdoor atmospheric pressure and a variable frequency drive to activate fan operation and modulate fan speed. It is important to note that the IMC connects directly to and controls the variable frequency drive and that the building static pressure setpoint resides in the IMC.

Based on the actual building static pressure (as determined by the building pressure transducer) the IMC instructs the power exhaust fan(s) to increase or decrease speed as needed to maintain the building static pressure setpoint. Increasing fan speed decreases building pressure while decreasing fan speed increases building pressure. Power exhaust configurations with two fans (100% capacity) have the ability to remove more exhaust air than single fan configurations.

SEQUENCE OF OPERATION

CONSTANT AIR VOLUME (CAV) UNITS IN SINGLE ZONE APPLICATIONS WITH A LENNOX ZONE SENSOR (4 Heat / 4 Cool)

Integrated Modular Control (IMC) Operation

When using a Lennox zone sensor with the IMC operating in zone sensor mode, a packaged rooftop unit can provide up to four stages each of mechanical heating and cooling operation. The zone sensor provides space temperature information to the IMC. The IMC houses all space temperature setpoints and controls all rooftop unit staging and general operation functions. The IMC also determines unit error codes, provides diagnostic information and maintains safe operation limits

Ventilation Demand

When the IMC is in zone sensor control mode, the user has several different ventilation sequence of operation scenarios to choose from. The default mode causes the IMC to activate the supply fan when both a ventilation and either heating or cooling demand are present. This occurs independent of receiving an occupied demand. The user can change the default setting to allow the supply fan to run continuously when the IMC receives both a ventilation and occupied demand. This is independent of a call for either heating or cooling. When the IMC receives a ventilation demand and occupied demand is not present, the IMC will only activate the supply fan when it receives either a heating or cooling demand.

Cooling Demand

The IMC directly monitors space temperature through the zone sensor. Based on this information, the IMC activates the different compressor stages to maintain the desired occupied space temperature setpoint. Increasing compressor stages provides more cooling capacity while decreasing compressor stages provides less cooling capacity. The IMC has direct control over the rooftop unit mechanical cooling staging operation. The user has the option to configure the IMC so that if the zone sensor fails, the IMC can use a backup operation to control unit operation.

S-Class units feature four separate compressors and refrigeration circuits that can provide up to four stages of mechanical cooling operation. For stage one operation, the IMC activates the first compressor (25% of total unit capacity). For stage two operation, the IMC activates the second compressor (50% unit capacity). For stage three operation, the IMC activates the third compressor (75% total unit capacity). For stage four operation, the IMC activates the fourth compressor (100% unit capacity).

Depending on the zone sensor configuration setting, occupants in the space can change the setpoint. The IMC automatically recognizes this change and instructs the unit to respond accordingly.

Cooling Demand With Economizer

If the outdoor air is suitable for free cooling and the unit has an economizer, the IMC will open the economizer and use fresh air for stage one cooling. For stage two cooling operation, the IMC activates the first compressor. For stage three cooling operation, the IMC activates the second compressor. For stage four cooling operation, the IMC activates the remaining compressors (number three and four). The IMC has direct control over the rooftop unit mechanical cooling staging and economizer operation.

Heating Demand (General Operation)

The IMC directly monitors space temperature through the zone sensor. Based on this information, the IMC turns on or off the heating stages to maintain the desired temperature setpoint. Increasing heating stages provides additional heating capacity while decreasing heating stages provides less heating capacity. The IMC has direct control over rooftop unit mechanical heating staging operation.

S-Class units feature four separate heating stages that can provide up to four stages of mechanical heating operation. The specific heating capacity varies for each stage depending on the heat source. Depending on the zone sensor configuration setting, occupants in the space can change the setpoint. The IMC automatically recognizes this change and instructs the unit to respond accordingly.

Heating Demand (Gas)

S-Class unit feature two separate gas burner sections that can provide up to a total of four stages of mechanical heating operation. For stage one operation, the IMC instructs the first gas burner to fire on low (33% of total unit capacity). For stage two operation, the IMC instructs the second gas burner to fire on low (for a total of 66% unit capacity). For stage three operation, the IMC instructs the first gas burner to fire on high (83% total unit capacity). For four stage operation, the IMC instructs the second gas burner to fire on high (100% unit capacity).

Humiditrol Dehumidification Operation - Dehumidification Demand

Upon a dehumidification only demand, the IMC activates compressors number one and two. At the same time, the IMC uses solenoid valves to divert hot gas from compressors one and two to the first reheat coil. The cooled and dehumidified air from the evaporator is then reheated as it passes through the reheat coil. The de-superheated and partially condensed refrigerant continues to the outdoor condenser coil where condensing is completed.

The reheat coil is sized to offset most of the first and second stages of sensible cooling effect during reheat only operation. This reduction in sensible cooling capacity extends compressor run time to control humidity when cooling loads are light. The unit continues to operate in this mode until the dehumidification demand is satisfied. A heating demand terminates reheat operation.

The IMC relative humidity setpoint is set at the factory for 60% and can be adjusted at the IMC or with the L Connection Network Unit Controller Software. For Network Control Panel (NCP) applications, the humidity setpoint can be adjusted at the NCP. The IMC also has an option for an external digital input for the dehumidification demand. This demand must be provided from an external third party unit controller.

Humiditrol Dehumidification Operation - Cooling Demand Only

The unit will operate conventionally whenever there is a demand for cooling and no dehumidification demand. The unit can provide up to four stages of mechanical cooling in this scenario. Free cooling is only permitted when an economizer is present, there is no demand for dehumidification and the outdoor air is suitable for this function.

Humiditrol Dehumidification Operation - Cooling And Dehumidification Demand

Stage one cooling demand with dehumidification demand: If both a dehumidification demand and a first stage cooling demand occur, the system activates the first three compressors plus reheat. This provides approximately 75% humidity removal capacity plus 25% cooling capacity.

Stage two cooling demand with dehumidification demand: A demand for second stage cooling plus dehumidification activates all four compressors plus reheat. This provides 100% humidity removal capacity plus approximately 50% cooling capacity.

Stage three cooling demand with dehumidification demand: A demand for stage three cooling plus dehumidification activates all three compressors. The fourth compressor and reheat coil will cease operation. This provides approximately 75% of humidity removal capacity and 75% cooling capacity.

Stage four cooling demand with dehumidification demand: A demand for stage four cooling plus dehumidification activates all four compressors. This will provide 100% humidity removal capacity and 100% cooling capacity.

CONSTANT AIR VOLUME (CAV) UNITS IN SINGLE ZONE APPLICATIONS WITH A THERMOSTAT OR THIRD PARTY UNIT CONTROLLER (2 Heat / 2 Cool)

Integrated Modular Control (IMC) Operation

When using a two-stage heat/cool thermostat or third party unit controller with the IMC in the thermostat mode, a packaged rooftop unit can provide up to two stages of mechanical heating and cooling operation.

To operate correctly, a thermostat or third party unit controller must provide the following wiring connections to the IMC: 1) ventilation demand 2) occupied demand 3) heating demand one 4) heating demand two 5) cooling demand one and 6) cooling demand two.

In this set up, either the thermostat or third party unit controller controls the rooftop unit staging and general operation. The IMC functions primarily to determine unit error codes, provide diagnostic information and maintain safe operation limits.

Ventilation Demand

Upon receiving a ventilation demand from the thermostat or third party unit controller, the IMC instructs the supply fan to start operation. The supply fan runs at full capacity as long as a ventilation demand is present.

Cooling Demand

Upon receiving a stage one demand for cooling from the thermostat or third party unit controller, the IMC activates the first two compressors, providing 50% cooling capacity. If the unit is unable to satisfy the call for cooling within a specified time period and receives a stage two cooling demand from the thermostat or third party unit controller, the IMC activates the third and fourth compressors, providing 100% cooling capacity. The thermostat or third party unit controller has direct control over the rooftop unit's staging capability.

Cooling Demand With Economizer

If the unit features an economizer and outdoor air is suitable for free cooling, a call for stage one cooling will activate the economizer. The unit will try to satisfy the cooling demand using outdoor air rather than mechanical cooling.

If the unit is unable to satisfy the call for cooling within a specified time period using the economizer and receives a stage two call for cooling from the thermostat or third party unit controller, the IMC activates all four compressors. This will provide 100% cooling capacity.

It is important to note that the thermostat or third party unit controller has direct control over the rooftop unit's staging capability. While the Integrated Modular Control typically has direct control over the economizer, it is possible for a thermostat or third party unit controller to directly control this functionality.

Heating Demand (General Operation)

Upon receiving a stage one heating demand from the thermostat or third party unit controller, the IMC activates the unit's heating section to start operation. This activates the first two stages of mechanical heat, providing approximately 66% heating capacity.

If the unit is unable to satisfy the call for heating within a specified time period and receives a stage two heating demand from the thermostat or third party controller, the IMC activates the third and fourth stages of heat, providing 100% heating capacity. It is important to note that the thermostat or third party unit controller has direct control over the rooftop unit's staging capability.

Heating Demand (Gas)

A stage one heating demand activates each heat exchanger's first stage of heat, providing 66% total heating capacity. A stage two heating demand activates each heat exchanger's second stage of heat, providing 100% total heating capacity.

Humiditrol Dehumidification Operation - Dehumidification Demand

Upon a dehumidification demand, the IMC activates compressor number one and two. At the same time, the IMC uses solenoid valves to divert hot gas from compressor one and two to the first reheat coil. The cooled and dehumidified air from the evaporator is then reheated as it passes through the reheat coil. The de-superheated and partially condensed refrigerant continues to the outdoor condenser coil where condensing is completed. The reheat coil is sized to offset most of the first and second stages of sensible cooling effect during reheat only operation. This reduction in sensible cooling capacity extends compressor run time to control humidity when cooling loads are light.

The unit will continue to operate in this mode until the dehumidification demand is satisfied. A heating demand will terminate reheat operation.

The IMC relative humidity setpoint is factory configured for 60% and can be adjusted at the IMC or with the L Connection Network Unit Controller software. For Network Control Panel (NCP) applications, the humidity setpoint can be adjusted at the NCP. The IMC also has an option for an external digital input to signal the dehumidification demand. This demand must be provided from an external third party DDC.

Humiditrol Dehumidification Operation - Cooling Demand

The unit operates conventionally whenever there is a demand for cooling and no dehumidification demand. The unit can provide up to two stages of mechanical cooling in this scenario. Free cooling is only permitted when an economizer is present, there is no demand for dehumidification and outdoor air is suitable for this function.

Humiditrol Dehumidification Operation - Cooling And Dehumidification Demand

Stage one cooling demand with dehumidification demand: If both a dehumidification demand and a first stage cooling demand occur, the system activates all four compressors plus the first stage of reheat. This provides 100% humidity removal capacity with approximately 50% cooling capacity.

Stage two cooling demand with dehumidification demand: A demand for second stage cooling activates all four compressors plus terminates any reheat operation. This provides 100% humidity removal capability and 100% cooling capacity. The IMC activates all compressors until the cooling demand is satisfied.

SEQUENCE OF OPERATION

CONSTANT AIR VOLUME (CAV) UNITS IN SINGLE ZONE APPLICATIONS WITH A THERMOSTAT OR THIRD PARTY UNIT CONTROLLER AND THE UNIT OPERATING IN DISCHARGE AIR TEMPERATURE CONTROL (4 Heat / 4 Cool)

Integrated Modular Control (IMC) Operation

When using a thermostat or third party unit controller with the IMC operating in the thermostat mode configured for discharge air temperature control, a packaged rooftop unit can provide up to four stages of mechanical heating and cooling operation.

To operate correctly, a thermostat or third party controller must provide the following wiring connections to the IMC: 1) ventilation demand 2) occupied demand 3) heating demand and 4) cooling demand. In this configuration the IMC will control the rooftop staging and general operation. The thermostat or third party unit controller only informs the IMC if there is a specific demand. For example, if the thermostat or third party unit controller passes along a demand for cooling, the IMC increases or decreases cooling stages to maintain the discharge supply air temperature setpoint. Along with providing control of the rooftop unit, the IMC also provides error codes, diagnostic information and maintains safe operating limits.

Ventilation Demand

Upon receiving a ventilation demand from the thermostat or unit controller, the IMC activates the supply fan. The supply fan operates at 100% capacity until the ventilation demand has been removed.

Cooling Demand

Upon receiving a cooling demand from the thermostat or unit controller, the IMC instructs the unit to maintain a cooling discharge air temperature setpoint. The IMC has direct control over the rooftop unit staging. The discharge supply air temperature setpoint resides in the IMC, has a factory default setting, and can be adjusted at start-up. The user can adjust the setpoint either locally or remotely with Lennox' L Connection Network Unit Controller software or at the IMC board. The user can not adjust the setpoint through a third party control device or software program.

The IMC receives discharge supply air temperature information directly from the temperature sensor, located in the supply duct system. Based on this information, the IMC activates the different compressor stages to maintain the discharge supply air temperature setpoint (55°F default). Increasing compressor stages provides more cooling capacity while decreasing compressor stages provides less cooling capacity.

S-Class units feature four separate compressors and refrigeration circuits that can provide up to four stages of mechanical cooling operation. For stage one operation, the IMC activates the first compressor (25% of total unit capacity). For stage two operation, the IMC activates the second compressor (50% unit capacity). For stage three operation, the IMC activates the third compressor (75% total unit capacity). For stage four operation, the IMC activates the fourth compressor (100% unit capacity).

Cooling Demand With Economizer

If outdoor air is suitable for free cooling and the unit has an economizer, the IMC opens the economizer and uses fresh air for stage one cooling. For stage two operation, the IMC activates one compressor. For stage three operation, the IMC activates a second compressor. For stage four operation, the IMC activates the remaining compressors (number three and four).

The IMC has direct control over the rooftop unit staging and economizer operation.

Heating Demand (General Operation)

Upon receiving a heating demand from a thermostat or a third party controller, the IMC instructs the unit to maintain a heating discharge air temperature setpoint. The IMC has direct control over the rooftop unit heating staging operation. The IMC receives discharge supply air temperature information directly from the temperature sensor located in the supply duct. Based on this information, the IMC activates the different heating stages to maintain the discharge supply air temperature setpoint (110°F default). Turning on additional heating stages increases the heating capacity, while turning off heating stages decreases the heating capacity.

The heating discharge air temperature setpoint resides in the IMC, has a factory default setting, and may be adjusted at start up. The user can adjust the setpoint either locally or remotely with Lennox' L Connection Network Unit Controller software or at the IMC board. The user can not adjust the setpoint through a third party control device or software program.

Heating Operation (gas)

S-Class units feature two separate gas burners that can provide up to a total of four stages of mechanical heating operation. For stage one operation, the IMC instructs the first gas burner to fire on low (33% of total unit capacity). For stage two operation, the IMC instructs the second gas burner to fire on low (66% of total unit capacity). For stage three operation, the IMC instructs the first gas burner to fire on high (83% of total unit capacity). For four stage operation, the IMC instructs the second gas burner to fire on high (100% of total unit capacity).

CONSTANT AIR VOLUME UNITS IN BYPASS (CAVB) ZONING APPLICATIONS WITH A THIRD PARTY UNIT CONTROLLER (2 Heat / 2 Cool)

Integrated Modular Control (IMC) Operation

When using a third party unit controller and the IMC is operating in the thermostat mode, a packaged rooftop unit can provide up to two stages of mechanical heating and cooling operation.

To operate correctly, a unit controller must provide the following wiring connections to the IMC: 1) ventilation demand 2) occupied demand 3) heating demand one 4) heating demand two 5) cooling demand one and 6) cooling demand two.

In this configuration the third party unit controller will control the rooftop unit staging and general operation. The IMC functions primarily to determine unit error codes, provide diagnostic information and maintain safe operating limits.

Unit Sequence Of Operation

Constant air volume units in bypass zoning applications featuring a Lennox or third party unit controller with the IMC operating in thermostat mode, have the same basic heating and cooling unit sequence of operations as constant air volume units in single zone applications featuring a third party unit controller, with the IMC operating in thermostat mode. For specific information, refer to the Constant Air Volume in Single Zone Applications with a Thermostat or Third Party Unit Controller section.

The following sequence of operation information is specific to constant air volume units in bypass zoning applications.

Supply Duct Bypass Damper

To maintain accurate supply duct static pressure control, constant volume units in bypass zoning applications use a bypass damper between the supply and return air ducts. In this scenario, the supply duct static pressure transducer and damper connect directly to the third party unit controller. Based on actual static pressure relative to setpoint, the third party unit controller either modulates open or closes the damper.

If the damper modulates further closed, the static pressure in the supply air duct increases. If the damper modulates further open, the static pressure in the supply air duct decreases. The IMC does not have direct control over the bypass damper in this scenario.

CONSTANT AIR VOLUME UNITS IN BYPASS (CAVB) ZONING APPLICATIONS WITH A THIRD PARTY UNIT CONTROLLER AND THE UNIT OPERATING IN DISCHARGE AIR TEMPERATURE CONTROL (4 Heat / 4 Cool)

Integrated Modular Control (IMC) Operation

When using a third party unit controller and the IMC is operating in thermostat mode and configured for discharge air temperature control, a packaged rooftop unit can provide up to four stages of mechanical heating and cooling operation. To operate correctly, a third party unit controller must provide the following wiring connections to the IMC: 1) ventilation demand 2) occupied demand 3) heating demand and 4) cooling demand.

In this configuration, the IMC controls the rooftop staging and general operation. The third party unit controller only informs the IMC controller as to whether or not there is a specific demand. For example, if the third party unit controller passes along a demand for cooling, then the IMC increases or decreases cooling stages to maintain the discharge supply air temperature setpoint. Along with controlling the rooftop unit, the IMC also determines error codes, provides diagnostic information and maintains safe operating limits.

Unit Sequence Of Operation

Constant air volume units in bypass zoning applications featuring a third party unit controller with the IMC operating in thermostat mode, configured for discharge air temperature control have the same basic heating and cooling unit sequence of operations as constant air volume units in single zone applications featuring a third party unit controller, with the IMC operating in thermostat mode with discharge air temperature control.

For specific unit sequence of operation information refer to the Constant Air Volume Units in Single Zone Applications with a Thermostat or Third Party Unit Controller and the Unit Operating in Discharge Air Temperature Control section.

The following sequence of operation information is specific to constant air volume units in bypass zoning applications.

Supply Duct Bypass Damper

To maintain accurate supply duct static pressure control, constant volume units in bypass zoning applications typically feature a bypass damper between the supply and return air ducts. In this scenario, the supply duct static pressure transducer and damper connect directly to the third party unit controller. Based on actual static pressure relative to setpoint, the unit controller either modulates open or modulates closed the bypass damper.

If the damper modulates further closed, the static pressure in the supply air duct increases. If the damper modulates further open, the static pressure in the supply air duct decreases. The IMC does not have any direct control over the bypass damper in this scenario.

SEQUENCE OF OPERATION

VARIABLE AIR VOLUME (VAV) UNITS IN ZONING APPLICATIONS WITH A THIRD PARTY UNIT CONTROLLER AND THE UNIT OPERATING IN DISCHARGE AIR TEMPERATURE CONTROL (4 Heat / 4 Cool)

Integrated Modular Control (IMC) Operation

When using a third party unit controller with the IMC operating in thermostat mode configured for discharge air temperature control, a packaged rooftop unit can provide up to four stages of mechanical heating and cooling operation. To operate correctly, a third party unit controller must provide the following wiring connections to the IMC: 1) ventilation demand 2) occupied demand 3) heating demand and 4) cooling demand.

In this configuration, the IMC controls the rooftop unit staging and general operation. The third party unit controller only informs the IMC as to whether or not there is a specific demand. For example, if the unit controller passes along a demand for cooling, then the IMC increases or decreases cooling stages to maintain the discharge supply air temperature setpoint. In this mode, the IMC also maintains the supply duct static pressure by directly controlling the supply fan variable frequency drive. Along with providing control of the rooftop unit, the IMC determines error codes, supplies diagnostic information and maintains safe operating limits.

Ventilation Demand

Upon receiving a ventilation demand from the unit controller, the IMC instructs the supply fan variable frequency drive to start the supply fan and maintain a constant supply duct static pressure setpoint. The IMC has direct control over the variable frequency drive and supply fan.

The IMC receives supply duct static pressure information directly from a supply duct static pressure sensor located approximately three quarters down the length of the longest main supply duct. Based on information from the supply duct static pressure transducer relative to setpoint, the IMC instructs the variable frequency drive to either increase or decrease the speed of the supply fan. Speeding up the supply fan will increase the supply duct static pressure while slowing down the supply fan speed will decrease the supply duct static pressure. For increased flexibility, the IMC has separate, adjustable static pressure setpoints for ventilation, cooling, heating and smoke alarms. These set points reside in the IMC memory, have factory default settings and may be adjusted in the field prior to start-up.

Cooling Demand

Upon receiving a cooling demand from the unit controller, the IMC instructs the unit to maintain a cooling discharge air temperature setpoint. The IMC has direct control over the rooftop unit staging. The IMC receives discharge supply air temperature information directly from the supply duct temperature sensor located in the supply duct system. Based on this information, the IMC turns on or off the different compressor stages to maintain the discharge supply air temperature setpoint (55°F default). Increasing compressor stages provides more cooling capacity while decreasing compressor stages provides less cooling capacity.

S-Class units feature four separate compressor and refrigeration circuits that can provide up to four stages of mechanical cooling operation. For stage one operation, the IMC activates the first compressor (25% of total unit capacity). For stage two operation, the IMC activates the second compressor (50% unit capacity). For stage three operation, the IMC activates the third compressor (75% total unit capacity). For stage four operation, the IMC activates the fourth compressor (100% unit capacity).

The discharge supply air temperature setpoint resides in the IMC, has a factory default setting, and can be adjusted at start-up. The user can adjust the setpoint either locally or remotely with the L Connection Network Unit Controller software or at the IMC board. The user cannot adjust the setpoint through a third party control device or software program.

Cooling Demand With Economizer

If outdoor air is suitable for free cooling and the unit has an economizer, the IMC opens the economizer and uses fresh air for stage one cooling. For stage two operation, the IMC activates one compressor. For stage three operation, the IMC activates a second compressor. For stage four operation, the IMC activates the remaining compressors (number three and four).

The IMC has direct control over the rooftop unit staging and economizer operation.

Heating demand (general operation)

Upon receiving a heating demand from the third party unit controller, the IMC instructs the unit to maintain a heating discharge air temperature setpoint. The IMC has direct control over the rooftop unit heating staging operation. The IMC receives discharge supply air temperature information directly from the supply duct temperature sensor located in the supply duct system. Based on this information, the IMC turns on or off mechanical heating stages to maintain the discharge supply air temperature setpoint (110°F default). Adding heat stages increases heat capacity while removing heat stages decreases heat capacity.

The heating discharge air temperature set point resides in the IMC, has a factory default setting, and may be adjusted at start up. The user can adjust the setpoint either locally or remotely with the L Connection Network Unit Controller software. The user cannot adjust the setpoint through a third party control device or software program.

SEQUENCE OF OPERATION

VARIABLE AIR VOLUME (VAV) UNITS IN ZONING APPLICATIONS WITH A OR THIRD PARTY UNIT CONTROLLER AND THE UNIT OPERATING IN DISCHARGE AIR TEMPERATURE CONTROL (4 Heat / 4 Cool)

(Continued)

Heating Operation (Gas)

S-Class units feature two separate gas burners that can provide up to a total of four stages of mechanical heating operation. For stage one operation, the IMC instructs the first gas burner to fire on low (33% of total unit capacity). For stage two operation, the IMC instructs the second gas burner to fire on low (66% of total unit capacity). For stage three operation, the IMC instructs the first gas burner to fire on high (83% of total unit capacity). For four stage operation, the IMC instructs the second gas burner to fire on high (100% of total unit capacity).

Morning Warm Up

S-Class units have an intelligent and innovative morning warm up control scheme. As the VAV system shifts from unoccupied to occupied, the IMC automatically keeps the economizer shut for 60 minutes (default) or until the first cooling demand. On cold days this prevents unconditioned fresh outdoor air from entering the building and helps to reduce energy usage. Because most VAV systems perform morning warm up before occupants enter the building, the absence of fresh outdoor air typically does not cause any problems.

Upon the first call for heating in this scenario, the IMC instructs the unit to turn on the heating section and start supply fan operation. Because the IMC controls the heat staging and supply fan operation based on actual discharge supply air temperature control and supply duct static pressure, the rooftop unit automatically selects the proper staging and supply fan speed to ensure optimal performance.

Typically in this scenario all zones are below the desired room temperature setpoint so the VAV boxes will be fully open. This causes the supply duct static pressure to be low so the IMC speeds up the fan to maintain the supply duct static pressure setpoint. As the supply fan speeds up and increases the total supply air volume, the heating section turns on additional stages to maintain the correct discharge supply air temperature setpoint. In the event the IMC receives a call for cooling from the third party unit controller, the IMC switches to cooling mode and opens the economizer. This intelligent control scheme helps prevent potential problems caused by stuck VAV box dampers and supply duct static over pressurization.

Outdoor Air CFM Control

The Outdoor Air CFM Control option allows variable air volume units to minimize the effect of supply fan speed changes and maintain a constant outdoor air CFM level. A sensor located in the outdoor air section of the unit measures the outdoor air velocity and relays the information to the IMC. Based on the velocity information, the IMC automatically adjusts the economizer position, offsetting the supply fan speed changes and maintaining a constant outdoor air CFM level.

OPTIONS/ACCESSORIES

Item	Factory	Field
COOLING SYSTEM		
High Efficiency - R-410A (40 Ton Models)	<input type="radio"/>	
Standard Efficiency - R-22 (35, 40, 45, 50 Ton Models)	<input type="radio"/>	
Standard Efficiency - R-410A (50 Ton Model)	<input type="radio"/>	
Service Valves	<input type="radio"/>	
Stainless Steel Condensate Drain Pan	<input type="radio"/>	
Corrosion Protection - Condenser and Evaporator Coils	<input type="radio"/>	
Hot Gas Bypass (Not available with Humiditrol Option)	<input type="radio"/>	
Spring Isolation (compressor deck)	<input type="radio"/>	
HEATING SYSTEM		
Standard Heat (2 Stage)	<input type="radio"/>	
High Heat (2 Stage)	<input type="radio"/>	
LPG/Propane	<input type="radio"/>	
Modulating Gas (with stainless steel heat exchanger)	<input type="radio"/>	
Stainless Steel Heat Exchanger	<input type="radio"/>	
Low Temperature Vestibule Heater	<input type="radio"/>	
AIR FILTERS		
MERV 7 - Four Inch	<input type="radio"/>	
MERV 11 High Efficiency - Two Inch	<input type="radio"/>	
MERV 15 High Efficiency - Two Inch	<input type="radio"/>	
Cleanable Metal Mesh - Two Inch	<input type="radio"/>	
BLOWER		
Supply Motor - 5, 7.5, 10, 15, 20, 25, 30 hp Standard Efficiency CAV	<input type="radio"/>	
Supply Motor - 5, 7.5, 10, 15, 20, 25, 30 hp Standard Efficiency VAV with VFD	<input type="radio"/>	
Supply VFD Blower Bypass (VAV units with VFD only)	<input type="radio"/>	
Spring Isolation (blower frame)	<input type="radio"/>	
CABINET		
Air Flow - Vertical	<input type="radio"/>	
Air Flow - Horizontal	<input type="radio"/>	
Double Wall Construction	<input type="radio"/>	
I ROOF CURBS - STANDARD		
14 in. height	S1CURB10E-1	X
24 in. height	S1CURB11E-1	X
CONTROLS		
Blower Proving Switch	<input type="radio"/>	
Commercial Controls	L Connection® Building Automation System	X
	IMC BACnet® Module - C0CTRL50AE1L	<input type="radio"/>
	IMC LonTalk® Module - C0CTRL51AE1L	<input type="radio"/>
	Novar® ETM-2051 Unit Controller (not available for VAV applications)	<input type="radio"/>
Dirty Filter Switch	<input type="radio"/>	
² Discharge Air Temperature Sensor - Duct Mounted	<input type="radio"/>	
Supply Static Pressure Limit Switch - Duct Mounted	C0SNSR11AE1 (Switch)	X
	C0SNSR12AE1- (Mounting Kit)	X
Smoke Detector	Return	<input type="radio"/>
	Supply	<input type="radio"/>
	Supply & Return	<input type="radio"/>
² Supply Static Pressure Transducer - Duct Mounted	<input type="radio"/>	

- Configure to Order (Factory Installed)

X - Field Installed.

¹ Also available - Roof curbs for vibration isolation, seismic conditions, seismic with wind restraints. Contact your Sales Representative for additional information.

² Optional for Constant Air Volume (CAV) units (single zone or bypass zoning control). Automatically furnished with all Variable Air Volume (VFD) units. Shipped with the unit for remote field installation in the supply duct.

OPTIONS/ACCESSORIES

Item	Factory	Field
ELECTRICAL		
Voltage (60HZ) - 208/230V-3 phase, 460V-3 phase or 575V-3 phase	<input type="radio"/>	
HACR Circuit Breakers - 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250 amp	<input type="radio"/>	
Disconnect Switch - 150, 250 amp	<input type="radio"/>	
GFI Service Outlets (field wired)	<input type="radio"/>	
GFI Service Outlets (powered)	<input type="radio"/>	
Phase Monitor	<input type="radio"/>	
HUMIDITROL® CONDENSER REHEAT (CAV UNITS ONLY)		
Humiditrol	<input type="radio"/>	
Humidity Sensor Kit, Remote Mounted (required)		X
Remote Sensor Wall Seal Plate		X
ECONOMIZER/OUTDOOR AIR/EXHAUST		
Economizer	<input type="radio"/>	
Economizer Controls		
Differential Sensible (factory setting)	<input type="radio"/>	
Global Control	<input type="radio"/>	
Single Enthalpy	<input type="radio"/>	
Differential Enthalpy	<input type="radio"/>	
Fresh Air Tempering	<input type="radio"/>	
Indoor Air Quality CO ₂ Sensor		X
Outdoor Air CFM Control	C0SNSR23DE1	X
Outdoor Air Dampers - Manual or Motorized	<input type="radio"/>	
Barometric Relief Dampers	<input type="radio"/>	
Power Exhaust (see next page for specifications)		
50% Standard Static	<input type="radio"/>	
100% Standard Static	<input type="radio"/>	
50% High Static Power Exhaust	<input type="radio"/>	
100% High Static Power Exhaust	<input type="radio"/>	
50% High Static Power Exhaust with VFD	<input type="radio"/>	
100% High Static Power Exhaust with VFD	<input type="radio"/>	
50% High Static Power Exhaust with VFD and Bypass	<input type="radio"/>	
100% High Static Power Exhaust with VFD and Bypass	<input type="radio"/>	
Power Exhaust Controls		
Damper Position Control	<input type="radio"/>	
¹ Differential Pressure Transducer	<input type="radio"/>	
High Static Power Exhaust Options		
Spring Isolation (blower frame)	<input type="radio"/>	
Energy Recovery Wheel (not available with horizontal configured units)	<input type="radio"/>	

○ - Configure to Order (Factory Installed)

X - Field Installed.

¹ Furnished as standard with all High Static Power Exhaust with VFD.

SPECIFICATIONS**OPTIONAL POWER EXHAUST FANS**

Standard Static PEF (50%)	(No.) Motor output	(1) 1 hp
	Motor rpm	1140
	(No.) Diameter - in.	(1) 26
	No. of blades	4
Standard Static PEF (100%)	(No.) Motor output	(2) 1 hp
	Motor rpm	1140
	(No.) Diameter - in.	(2) 26
	No. of blades	4
High Static PEF (50%)	(No.) Nominal motor output	(1) 3, 5 or 7.5 hp available See Blower Data Tables for selection
	Motor - Drive Kit	690 to 1065 rpm available See Blower Drive Kit Tables for selection
	(No.) Blower wheel nominal diameter x width	(1) 18 x 15
High Static PEF (100%)	(No.) Nominal motor output	(2) 3, 5 or 7.5 hp available See Blower Data Tables for selection
	Motor - Drive Kit	690 to 1065 rpm available See Blower Drive Kit Tables for selection
	(No.) Blower wheel nominal diameter x width	(2) 18 x 15

SPECIFICATIONS
35 TON STANDARD EFFICIENCY - R-22

General Data		Nominal Tonnage	35 Ton	35 Ton
		Model No.	SGA420S2B	SGA420S2V
		Efficiency Type	Standard	Standard
		Blower Type	Constant Air Volume (CAV)	Variable Air Volume (VAV)
Cooling Performance	Gross Cooling Capacity - Btuh (kW)		440,000 (128.9)	440,000 (128.9)
	¹ Net Cooling Capacity - Btuh (kW)		420,000 (123.1)	420,000 (123.1)
	ARI Rated Air Flow - cfm (L/s)		12,250 (5780)	12,250 (5780)
	Total Unit Power (kW)		40	40
	¹ EER (Btuh/Watt)		10.5	10.5
	² Integrated Part Load Value (Btuh/Watt)		10.8	12.6
	Refrigerant Type		R-22	R-22
	Refrigerant Charge Furnished	Circuit 1	21 lbs. 0 oz. (9.5 kg)	21 lbs. 0 oz. (9.5 kg)
	Circuit 2	21 lbs. 0 oz. (9.5 kg)	21 lbs. 0 oz. (9.5 kg)	
	Circuit 3	21 lbs. 0 oz. (9.5 kg)	19 lbs. 0 oz. (8.6 kg)	
	Circuit 4	21 lbs. 0 oz. (9.5 kg)	19 lbs. 0 oz. (8.6 kg)	
Refrigerant Charge Furnished with Humiditrol Option	Circuit 1	25 lbs. 0 oz. (11.3 kg)	---	
	Circuit 2	25 lbs. 0 oz. (11.3 kg)	---	
	Circuit 3	21 lbs. 0 oz. (9.5 kg)	---	
	Circuit 4	21 lbs. 0 oz. (9.5 kg)	---	
Gas Heating Options Available - See Page 33		Standard or High Capacity, Staged or Modulating Control		
Compressor Type (no.)		Scroll (4)		Scroll (4)
Condenser Coils	Net face area - sq. ft. (m ²) total		94.1 (8.74)	94.1 (8.74)
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)
	Number of rows		2	2
	Fins per inch (m)		20 (787)	20 (787)
Condenser Fans	Motor horsepower (W)		3/4 (559)	3/4 (559)
	Motor rpm		1075	1075
	Total Motor watts		3600	3600
	Diameter - in. (mm)		(6) 24 (610)	(6) 24 (610)
	No. of blades		4	4
	Total Air volume - cfm (L/s)		30,000 (14,200)	30,000 (14,200)
Evaporator Coils	Net face area - sq. ft. (m ²) total		37.1	37.1
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)
	No. of rows		4	4
	Fins per inch (m)		14 (551)	14 (551)
	Drain connection - number and size		(1) 1 in. NPT coupling	(1) 1 in. NPT coupling
	Expansion device type	Balanced Port Thermostatic Expansion Valve, removeable power head		
Indoor Blower and Drive Selection	Nominal motor output	5 to 30 hp available - See Blower Data Tables for selection		
	Motor - Drive kit	480 to 1365 rpm available - See Blower Drive Kit Tables for selection	775 to 1310 rpm available - See Blower Drive Kit Tables for selection	
	Blower wheel nominal diameter x width	(2) 20 x 15 (508 x 381)		(2) 20 x 15 (508 x 381)
Filters	Type of filter	Disposable, pleated		
	No. and size - in. (mm)	(11) 25 x 16 x 2 (635 x 406 x 51)		
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 Tested at conditions included in ARI Standard 340/360; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air; minimum external duct static pressure.

² Integrated Part Load Value tested at 80°F (27°C) outdoor air temperature.

SPECIFICATIONS
40 TON STANDARD EFFICIENCY - R-22

General Data		Nominal Tonnage	40 Ton SGA480S2B Standard Constant Air Volume (CAV)	40 Ton SGA480S2V Standard Variable Air Volume (VAV)
		Model No.		
		Efficiency Type		
		Blower Type		
Cooling Performance	Gross Cooling Capacity - Btuh (kW)		485,000 (142)	470,000 (137.6)
	¹ Net Cooling Capacity - Btuh (kW)		465,000 (136.2)	450,000 (131.8)
	ARI Rated Air Flow - cfm (L/s)		14,800 (6985)	14,800 (6985)
	Total Unit Power (kW)		46.5	45.0
	¹ EER (Btuh/Watt)		10.0	10.0
	² Integrated Part Load Value (Btuh/Watt)		10.8	12.6
	Refrigerant Type		R-22	R-22
	Refrigerant Charge Furnished			
		Circuit 1	21 lbs. 0 oz. (9.5 kg)	21 lbs. 0 oz. (9.5 kg)
		Circuit 2	21 lbs. 0 oz. (9.5 kg)	21 lbs. 0 oz. (9.5 kg)
		Circuit 3	21 lbs. 0 oz. (9.5 kg)	19 lbs. 0 oz. (8.6 kg)
		Circuit 4	21 lbs. 0 oz. (9.5 kg)	19 lbs. 0 oz. (8.6 kg)
Refrigerant Charge Furnished with Humiditrol Option				
		Circuit 1	25 lbs. 0 oz. (11.3 kg)	---
		Circuit 2	25 lbs. 0 oz. (11.3 kg)	---
		Circuit 3	21 lbs. 0 oz. (9.5 kg)	---
		Circuit 4	21 lbs. 0 oz. (9.5 kg)	---
Gas Heating Options Available - See Page 33			Standard or High Capacity, Staged or Modulating Control	
Compressor Type (no.)			Scroll (4)	Scroll (4)
Condenser Coils	Net face area - sq. ft. (m ²) total		94.1 (8.74)	94.1 (8.74)
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)
	Number of rows		2	2
	Fins per inch (m)		20 (787)	20 (787)
Condenser Fans	Motor horsepower (W)		3/4 (559)	3/4 (559)
	Motor rpm		1075	1075
	Total Motor watts		3600	3600
	Diameter - in. (mm)		(6) 24 (610)	(6) 24 (610)
	No. of blades		4	4
	Total Air volume - cfm (L/s)		30,000 (14,200)	30,000 (14,200)
Evaporator Coils	Net face area - sq. ft. (m ²) total		37.1	37.1
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)
	No. of rows		4	4
	Fins per inch (m)		14 (551)	14 (551)
	Drain connection - number and size		(1) 1 in. NPT coupling	(1) 1 in. NPT coupling
	Expansion device type		Balanced Port Thermostatic Expansion Valve, removeable power head	
Indoor Blower and Drive Selection	Nominal motor output		5 to 30 hp available - See Blower Data Tables for selection	
	Motor - Drive kit		480 to 1365 rpm available - See Blower Drive Kit Tables for selection	775 to 1310 rpm available - See Blower Drive Kit Tables for selection
	Blower wheel nominal diameter x width		(2) 20 x 15 (508 x 381)	(2) 20 x 15 (508 x 381)
Filters	Type of filter		Disposable, pleated	
	No. and size - in. (mm)		(11) 25 x 16 x 2 (635 x 406 x 51)	
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 Tested at conditions included in ARI Standard 340/360; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air; minimum external duct static pressure.

² Integrated Part Load Value tested at 80°F (27°C) outdoor air temperature.

SPECIFICATIONS
45 TON STANDARD EFFICIENCY - R-22

General Data		45 Ton SGA540S2B Standard Constant Air Volume (CAV)	45 Ton SGA540S2V Standard Variable Air Volume (VAV)
Cooling Performance	Gross Cooling Capacity - Btuh (kW)	550,000 (161.2)	540,000 (158.2)
	¹ Net Cooling Capacity - Btuh (kW)	525,000 (153.8)	520,000 (152.4)
	ARI Rated Air Flow - cfm (L/s)	14,600 (6890)	14,600 (6890)
	Total Unit Power (kW)	55.3	54.7
	¹ EER (Btuh/Watt)	9.5	9.5
	² Integrated Part Load Value (Btuh/Watt)	10.0	11.2
	Refrigerant Type	R-22	R-22
Refrigerant Charge Furnished	Circuit 1	21 lbs. 0 oz. (9.5 kg)	21 lbs. 0 oz. (9.5 kg)
	Circuit 2	21 lbs. 0 oz. (9.5 kg)	21 lbs. 0 oz. (9.5 kg)
	Circuit 3	21 lbs. 0 oz. (9.5 kg)	19 lbs. 0 oz. (8.6 kg)
	Circuit 4	21 lbs. 0 oz. (9.5 kg)	19 lbs. 0 oz. (8.6 kg)
Refrigerant Charge Furnished with Humiditrol Option	Circuit 1	25 lbs. 0 oz. (11.3 kg)	---
	Circuit 2	25 lbs. 0 oz. (11.3 kg)	---
	Circuit 3	21 lbs. 0 oz. (9.5 kg)	---
	Circuit 4	21 lbs. 0 oz. (9.5 kg)	---
Gas Heating Options Available - See Page 33		Standard or High Capacity, Staged or Modulating Control	
Compressor Type (no.)		Scroll (4)	Scroll (4)
Condenser Coils	Net face area - sq. ft. (m ²) total	94.1 (8.74)	94.1 (8.74)
	Tube diameter - in. (mm)	3/8 (9.5)	3/8 (9.5)
	Number of rows	2	2
	Fins per inch (m)	20 (787)	20 (787)
Condenser Fans	Motor horsepower (W)	3/4 (559)	3/4 (559)
	Motor rpm	1075	1075
	Total Motor watts	3600	3600
	Diameter - in. (mm)	(6) 24 (610)	(6) 24 (610)
	No. of blades	4	4
	Total Air volume - cfm (L/s)	30,000 (14,200)	30,000 (14,200)
Evaporator Coils	Net face area - sq. ft. (m ²) total	37.1	37.1
	Tube diameter - in. (mm)	3/8 (9.5)	3/8 (9.5)
	No. of rows	4	4
	Fins per inch (m)	14 (551)	14 (551)
	Drain connection - number and size	(1) 1 in. NPT coupling	(1) 1 in. NPT coupling
	Expansion device type	Balanced Port Thermostatic Expansion Valve, removeable power head	
Indoor Blower and Drive Selection	Nominal motor output	5 to 30 hp available - See Blower Data Tables for selection	
	Motor - Drive kit	480 to 1365 rpm available - See Blower Drive Kit Tables for selection	775 to 1310 rpm available - See Blower Drive Kit Tables for selection
	Blower wheel nominal diameter x width	(2) 20 x 15 (508 x 381)	(2) 20 x 15 (508 x 381)
Filters	Type of filter	Disposable, pleated	
	No. and size - in. (mm)	(11) 25 x 16 x 2 (635 x 406 x 51)	
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 Tested at conditions included in ARI Standard 340/360; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air; minimum external duct static pressure.

² Integrated Part Load Value tested at 80°F (27°C) outdoor air temperature.

SPECIFICATIONS
50 TON STANDARD EFFICIENCY - R-22

General Data		Nominal Tonnage	50 Ton SGA600S2B Standard Constant Air Volume (CAV)	50 Ton SGA600S2V Standard Variable Air Volume (VAV)
		Model No.		
		Efficiency Type		
		Blower Type		
Cooling Performance	Gross Cooling Capacity - Btuh (kW)		600,000 (175.8)	590,000 (172.3)
	¹ Net Cooling Capacity - Btuh (kW)		575,000 (168.5)	565,000 (165.5)
	ARI Rated Air Flow - cfm (L/s)		15,000 (7080)	15,000 (7080)
	Total Unit Power (kW)		60.5	59.5
	¹ EER (Btuh/Watt)		9.5	9.5
	² Integrated Part Load Value (Btuh/Watt)		10.0	11.2
	Refrigerant Type		R-22	R-22
	Refrigerant Charge Furnished			
		Circuit 1	23 lbs. 0 oz. (10.4 kg)	23 lbs. 0 oz. (10.4 kg)
		Circuit 2	23 lbs. 0 oz. (10.4 kg)	23 lbs. 0 oz. (10.4 kg)
		Circuit 3	23 lbs. 0 oz. (10.4 kg)	21 lbs. 0 oz. (9.5 kg)
		Circuit 4	23 lbs. 0 oz. (10.4 kg)	21 lbs. 0 oz. (9.5 kg)
Refrigerant Charge Furnished with Humiditrol Option				
		Circuit 1	26 lbs. 0 oz. (11.8 kg)	---
		Circuit 2	26 lbs. 0 oz. (11.8 kg)	---
		Circuit 3	23 lbs. 0 oz. (10.4 kg)	---
		Circuit 4	23 lbs. 0 oz. (10.4 kg)	---
Gas Heating Options Available - See Page 33			Standard or High Capacity, Staged or Modulating Control	
Compressor Type (no.)			Scroll (4)	Scroll (4)
Condenser Coils	Net face area - sq. ft. (m ²) total		94.1 (8.74)	94.1 (8.74)
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)
	Number of rows		3	3
	Fins per inch (m)		20 (787)	20 (787)
Condenser Fans	Motor horsepower (W)		3/4 (559)	3/4 (559)
	Motor rpm		1075	1075
	Total Motor watts		4230	4230
	Diameter - in. (mm)		(6) 24 (610)	(6) 24 (610)
	No. of blades		4	4
	Total Air volume - cfm (L/s)		29,000 (13,685)	29,000 (13,685)
Evaporator Coils	Net face area - sq. ft. (m ²) total		37.1	37.1
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)
	No. of rows		4	4
	Fins per inch (m)		14 (551)	14 (551)
	Drain connection - number and size		(1) 1 in. NPT coupling	(1) 1 in. NPT coupling
	Expansion device type		Balanced Port Thermostatic Expansion Valve, removeable power head	
Indoor Blower and Drive Selection	Nominal motor output		5 to 30 hp available - See Blower Data Tables for selection	
	Motor - Drive kit		480 to 1365 rpm available - See Blower Drive Kit Tables for selection	775 to 1310 rpm available - See Blower Drive Kit Tables for selection
	Blower wheel nominal diameter x width		(2) 20 x 15 (508 x 381)	(2) 20 x 15 (508 x 381)
Filters	Type of filter		Disposable, pleated	
	No. and size - in. (mm)		(11) 25 x 16 x 2 (635 x 406 x 51)	
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 Tested at conditions included in ARI Standard 340/360; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air; minimum external duct static pressure.

² Integrated Part Load Value tested at 80°F (27°C) outdoor air temperature.

SPECIFICATIONS
50 TON STANDARD EFFICIENCY - R-410A

General Data		Nominal Tonnage	50 Ton SGA600S4B Standard Constant Air Volume (CAV)	50 Ton SGA600S4V Standard Variable Air Volume (VAV)	
		Model No.			
		Efficiency Type			
		Blower Type			
Cooling Performance	Gross Cooling Capacity - Btuh (kW)		600,000 (175.8)	590,000 (172.8)	
	¹ Net Cooling Capacity - Btuh (kW)		575,000 (168.5)	565,000 (165.5)	
	ARI Rated Air Flow - cfm (L/s)		17,000 (8025)	17,000 (8025)	
	Total Unit Power (kW)		60.5	59.5	
	¹ EER (Btuh/Watt)		9.5	9.5	
	² Integrated Part Load Value (Btuh/Watt)		9.8	11.0	
	Refrigerant Type		R-410A	R-410A	
	Refrigerant Charge Furnished	Circuit 1		27 lbs. 0 oz. (12.24 kg)	27 lbs. 0 oz. (12.24 kg)
		Circuit 2		27 lbs. 0 oz. (12.24 kg)	27 lbs. 0 oz. (12.24 kg)
		Circuit 3		27 lbs. 0 oz. (12.24 kg)	24 lbs. 0 oz. (10.89 kg)
Circuit 4			27 lbs. 0 oz. (12.24 kg)	24 lbs. 0 oz. (10.89 kg)	
Refrigerant Charge Furnished with Humiditrol Option	Circuit 1		30 lbs. 0 oz. (13.61 kg)	---	
	Circuit 2		30 lbs. 0 oz. (13.61 kg)	---	
	Circuit 3		27 lbs. 0 oz. (12.24 kg)	---	
	Circuit 4		27 lbs. 0 oz. (12.24 kg)	---	
Gas Heating Options Available - See Page 33			Standard or High Capacity, Staged or Modulating Control		
Compressor Type (no.)			Scroll (4)	Scroll (4)	
Condenser Coils	Net face area - sq. ft. (m ²) total		94.1 (8.74)	94.1 (8.74)	
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)	
	Number of rows		3	3	
	Fins per inch (m)		20 (787)	20 (787)	
Condenser Fans	Motor horsepower (W)		3/4 (559)	3/4 (559)	
	Motor rpm		1075	1075	
	Total Motor watts		4230	4230	
	Diameter - in. (mm)		(6) 24 (610)	(6) 24 (610)	
	No. of blades		4	4	
	Total Air volume - cfm (L/s)		29,000 (13,685)	29,000 (13,685)	
Evaporator Coils	Net face area - sq. ft. (m ²) total		37.1	37.1	
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)	
	No. of rows		4	4	
	Fins per inch (m)		14 (551)	14 (551)	
	Drain connection - number and size		(1) 1 in. NPT coupling	(1) 1 in. NPT coupling	
Expansion device type			Balanced Port Thermostatic Expansion Valve, removeable power head		
Indoor Blower and Drive Selection	Nominal motor output		5 to 30 hp available - See Blower Data Tables for selection		
	Motor - Drive kit		480 to 1365 rpm available - See Blower Drive Kit Tables for selection	775 to 1310 rpm available - See Blower Drive Kit Tables for selection	
	Blower wheel nominal diameter x width		(2) 20 x 15 (508 x 381)	(2) 20 x 15 (508 x 381)	
Filters	Type of filter		Disposable, pleated		
	No. and size - in. (mm)		(11) 25 x 16 x 2 (635 x 406 x 51)		
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 Tested at conditions included in ARI Standard 340/360; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air; minimum external duct static pressure.

² Integrated Part Load Value tested at 80°F (27°C) outdoor air temperature.

SPECIFICATIONS
40 TON HIGH EFFICIENCY - R-410A

General Data		Nominal Tonnage	40 Ton	40 Ton	
		Model No.	SGA480H4B	SGA480H4V	
		Efficiency Type	High	High	
		Blower Type	Constant Air Volume (CAV)	Variable Air Volume (VAV)	
Cooling Performance	Gross Cooling Capacity - Btuh (kW)		495,000 (144.9)	480,000 (140.5)	
	¹ Net Cooling Capacity - Btuh (kW)		475,000 (139.1)	460,000 (131.8)	
	ARI Rated Air Flow - cfm (L/s)		14,800 (6985)	14,800 (6985)	
	Total Unit Power (kW)		44.0	43.4	
	¹ EER (Btuh/Watt)		10.8	10.6	
	² Integrated Part Load Value (Btuh/Watt)		11.8	13.2	
	Refrigerant Type		R-410A	R-410A	
	Refrigerant Charge Furnished	Circuit 1		27 lbs. (12.2 kg)	27 lbs. (12.2 kg)
		Circuit 2		27 lbs. (12.2 kg)	27 lbs. (12.2 kg)
		Circuit 3		27 lbs. (12.2 kg)	24 lbs. (10.9 kg)
Circuit 4			27 lbs. (12.2 kg)	24 lbs. (10.9 kg)	
Refrigerant Charge Furnished with Humiditrol Option	Circuit 1		30 lbs. (13.6 kg)	---	
	Circuit 2		30 lbs. (13.6 kg)	---	
	Circuit 3		27 lbs. (12.2 kg)	---	
	Circuit 4		27 lbs. (12.2 kg)	---	
Gas Heating Options Available - See Page 33		Standard or High Capacity, Staged or Modulating Control			
Compressor Type (no.)			Scroll (4)	Scroll (4)	
Condenser Coils	Net face area - sq. ft. (m ²) total		94.1 (8.74)	94.1 (8.74)	
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)	
	Number of rows		3	3	
	Fins per inch (m)		20 (787)	20 (787)	
Condenser Fans	Motor horsepower (W)		3/4 (559)	3/4 (559)	
	Motor rpm		1075	1075	
	Total Motor watts		4230	4230	
	Diameter - in. (mm)		(6) 24 (610)	(6) 24 (610)	
	No. of blades		4	4	
	Total Air volume - cfm (L/s)		29,000 (13,700)	29,000 (13,700)	
Evaporator Coils	Net face area - sq. ft. (m ²) total		37.1	37.1	
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)	
	No. of rows		4	4	
	Fins per inch (m)		14 (551)	14 (551)	
	Drain connection - number and size		(1) 1 in. NPT coupling	(1) 1 in. NPT coupling	
Expansion device type		Balanced Port Thermostatic Expansion Valve, removeable power head			
Indoor Blower and Drive Selection	Nominal motor output	5 to 30 hp available - See Blower Data Tables for selection			
	Motor - Drive kit	480 to 1365 rpm available - See Blower Drive Kit Tables for selection	775 to 1310 rpm available - See Blower Drive Kit Tables for selection		
	Blower wheel nominal diameter x width	(2) 20 x 15 (508 x 381)	(2) 20 x 15 (508 x 381)		
Filters	Type of filter	Disposable, pleated			
	No. and size - in. (mm)	(11) 25 x 16 x 2 (635 x 406 x 51)			
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 Tested at conditions included in ARI Standard 340/360; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air; minimum external duct static pressure.

² Integrated Part Load Value tested at 80°F (27°C) outdoor air temperature.

SPECIFICATIONS - GAS HEAT

Gas Heating Performance (2 Stage)		Heat Input Type	Standard 2 Stage	High 2 Stage
Input - First Stage	Btuh (kW)		330,000 (96.6)	528,000 (154.6)
Input - Second Stage	Btuh (kW)		500,000 (146.4)	800,000 (234.4)
Output - First Stage	Btuh (kW)		264,000 (77.3)	422,400 (123.7)
Output - Second Stage	Btuh (kW)		400,000 (117.1)	640,000 (187.4)
Gas Heating Performance (4 Stage)		Heat Input Type	Standard 4 Stage	High 4 Stage
Input - First Stage	Btuh (kW)		165,000 (48.3)	264,000 (77.4)
Input - Second Stage	Btuh (kW)		330,000 (96.7)	528,000 (154.7)
Input - Third Stage	Btuh (kW)		415,000 (121.6)	664,000 (194.6)
Input - Fourth Stage	Btuh (kW)		500,000 (146.5)	800,000 (234.4)
Output - First Stage	Btuh (kW)		132,000 (38.7)	211,200 (61.9)
Output - Second Stage	Btuh (kW)		264,000 (77.4)	422,400 (124.8)
Output - Third Stage	Btuh (kW)		332,000 (97.3)	531,200 (155.6)
Output - Fourth Stage	Btuh (kW)		400,000 (117.2)	640,000 (187.5)
Gas Heating Performance (Fully Modulating)		Heat Input Type	Standard Fully Modulating	High Fully Modulating
Input - Minimum	Btuh (kW)		125,000 (36.6)	200,000 (58.6)
Input - Full	Btuh (kW)		500,000 (146.5)	800,000 (234.4)
Output - Minimum	Btuh (kW)		100,000 (29.3)	160,000 (46.9)
Output - Full	Btuh (kW)		400,000 (117.2)	640,000 (187.5)
Temperature Rise Range - °F			10 - 40	25 - 55
Thermal Efficiency			80%	
Gas Supply Connections			1-1/4 in. NPT	
Recommended Gas Supply Pressure		Natural	7 in. w.g. (1.5 kPa)	
		LPG/Propane	11 in. w.g. (2.7 kPa)	

HIGH ALTITUDE INFORMATION

Units are certified for operation from 0 to 2000 feet (610 m) above sea level. If the unit is installed at altitudes above 2000 feet (610 m), the unit must be derated 4% for every 1000 (305 m) feet above sea level. Thus, at an altitude of 4000 feet (1219 m), the unit would require a 16% derate.

BLOWER DATA

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL, HIGH GAS HEAT, ECONOMIZER, ONE ROW REHEAT COIL & AIR FILTERS IN PLACE

Add factory installed options air resistance, then determine from blower table blower motor output and drive kit required.

See page 49 for horizontal configured unit air resistance.

See page 50 for factory installed options air resistance data.

See page 51 for factory installed drive kit specifications.

TOTAL STATIC PRESSURE - 2.6 thru 4.6 in. w.g. For .2 thru 2.4 in. w.g., see previous page

Air Volume cfm (L/s)	TOTAL STATIC PRESSURE — Inches Water Gauge (Pa)																					
	2.6 (645)		2.8 (95)		3.0 (745)		3.2 (795)		3.4 (845)		3.6 (895)		3.8 (945)		4.0 (995)		4.2 (1045)		4.4 (1095)		4.6 (1145)	
	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)
8000 (3775)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8500 (4010)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9000 (4245)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9500 (4485)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10,000 (4720)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10,500 (4955)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11,000 (5190)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11,500 (5425)	925	11.70 (8.73)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12,000 (5665)	935	12.50 (9.33)	965	13.30 (9.92)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12,500 (5900)	945	13.25 (9.88)	975	14.15 (10.56)	1000	14.90 (11.12)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13,000 (6135)	955	14.00 (10.44)	980	14.80 (11.04)	1010	15.75 (11.75)	1035	16.60 (12.38)	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13,500 (6370)	960	14.60 (10.89)	990	15.65 (11.67)	1015	16.50 (12.31)	1045	17.55 (13.09)	1070	18.40 (13.73)	---	---	---	---	---	---	---	---	---	---	---	
14,000 (6605)	970	15.35 (11.45)	1000	16.45 (12.27)	1025	17.35 (12.94)	1050	18.30 (13.65)	1075	19.20 (14.32)	1100	20.15 (15.03)	---	---	---	---	---	---	---	---	---	
14,500 (6845)	975	15.95 (11.90)	1005	17.10 (12.76)	1035	18.25 (13.61)	1060	19.25 (14.36)	1085	20.20 (15.07)	1110	21.20 (15.82)	1135	22.25 (16.60)	---	---	---	---	---	---	---	
15,000 (7080)	980	16.55 (12.35)	1010	17.70 (13.20)	1040	18.95 (14.14)	1070	20.15 (15.03)	1095	21.20 (15.82)	1120	22.30 (16.64)	1140	23.15 (17.27)	1165	24.20 (18.05)	1185	25.10 (18.72)	---	---	---	---
15,500 (7315)	985	17.15 (12.79)	1020	18.55 (13.84)	1045	19.60 (14.62)	1075	20.90 (15.59)	1100	22.00 (16.41)	1125	23.10 (17.23)	1150	24.25 (18.09)	1175	25.40 (18.95)	1195	26.30 (19.62)	1215	27.25 (20.33)	1235	28.15 (21.00)
16,000 (7550)	995	17.95 (13.39)	1025	19.20 (14.32)	1055	20.50 (15.29)	1080	21.65 (16.15)	1110	23.00 (17.16)	1135	24.20 (18.05)	1160	25.35 (18.91)	1180	26.35 (19.66)	1205	27.55 (20.55)	1225	28.50 (21.26)	1245	29.50 (22.01)
16,500 (7785)	1000	18.60 (13.88)	1030	19.85 (14.81)	1060	21.20 (15.82)	1085	22.35 (16.67)	1115	23.80 (17.75)	1140	25.00 (18.65)	1165	26.25 (19.58)	1190	27.50 (20.52)	1215	28.80 (21.48)	1235	29.80 (22.23)	1255	30.85 (23.01)
17,000 (8020)	1005	19.25 (14.36)	1035	20.55 (15.33)	1065	21.90 (16.34)	1095	23.30 (17.38)	1120	24.55 (18.31)	1145	25.80 (19.25)	1170	27.10 (20.22)	1195	28.40 (21.19)	1220	29.75 (22.19)	1245	31.10 (23.20)	1265	32.20 (24.02)
17,500 (8260)	1010	19.95 (14.88)	1040	21.25 (15.85)	1070	22.60 (16.86)	1100	24.05 (17.94)	1125	25.30 (18.87)	1155	26.90 (20.07)	1180	28.25 (21.07)	1205	29.60 (22.08)	1225	30.70 (22.90)	1250	32.15 (23.98)	1275	33.55 (25.03)
18,000 (8495)	1020	20.90 (15.59)	1045	21.95 (16.37)	1075	23.35 (17.42)	1105	24.80 (18.50)	1130	26.10 (19.47)	1160	27.70 (20.66)	1185	29.10 (21.71)	1210	30.50 (22.75)	1235	31.95 (23.83)	1260	33.40 (24.92)	1280	34.60 (25.81)
18,500 (8730)	1025	21.70 (16.19)	1055	23.00 (17.16)	1080	24.15 (18.02)	1110	25.60 (19.10)	1135	26.90 (20.07)	1165	28.55 (21.30)	1190	29.95 (22.34)	1215	31.40 (23.42)	1240	32.90 (24.54)	1265	34.40 (25.66)	1285	35.65 (26.59)
19,000 (8965)	1035	22.80 (17.01)	1060	23.85 (17.79)	1090	25.20 (18.80)	1115	26.45 (19.73)	1145	28.00 (20.89)	1170	29.40 (21.93)	1195	30.85 (23.01)	1220	32.30 (24.10)	1245	33.85 (25.25)	1270	35.40 (26.41)	1295	37.00 (27.60)
19,500 (9200)	1045	23.95 (17.87)	1070	24.95 (18.61)	1095	26.10 (19.47)	1125	27.55 (20.55)	1150	28.90 (21.56)	1175	30.25 (22.57)	1200	31.75 (23.69)	1225	33.25 (24.80)	1255	35.10 (26.18)	1275	36.40 (27.15)	1300	38.05 (28.39)
20,000 (9440)	1060	25.35 (18.91)	1080	26.15 (19.51)	1105	27.30 (20.37)	1130	28.50 (21.26)	1155	29.80 (22.23)	1180	31.20 (23.28)	1205	32.65 (24.36)	1235	34.50 (25.74)	1260	36.10 (26.93)	1280	37.40 (27.90)	1305	39.10 (29.17)
20,500 (9675)	1070	26.65 (19.88)	1090	27.45 (20.48)	1115	28.55 (21.30)	1140	29.75 (22.19)	1165	31.05 (23.16)	1190	32.45 (24.21)	1215	33.90 (25.29)	1240	35.50 (26.48)	1265	37.10 (27.68)	1290	38.75 (28.91)	1310	40.15 (29.95)
21,000 (9910)	1085	28.25 (21.07)	1105	29.00 (21.63)	1125	29.90 (22.31)	1150	31.05 (23.16)	1170	32.10 (23.95)	1195	33.45 (24.95)	1220	34.95 (26.07)	1245	36.50 (27.23)	1270	38.10 (28.42)	1295	39.80 (29.69)	1315	41.20 (30.74)
21,500 (10,145)	1095	29.70 (22.16)	1115	30.45 (22.72)	1135	31.30 (23.35)	1160	32.45 (24.21)	1180	33.45 (24.95)	1205	34.85 (26.00)	1225	36.00 (26.86)	1250	37.55 (28.01)	1275	39.20 (29.24)	1300	40.90 (30.51)	1325	42.65 (31.82)
22,000 (10,380)	1110	31.45 (23.46)	1130	32.20 (24.02)	1150	33.00 (24.62)	1170	33.95 (25.33)	1190	34.95 (26.07)	1210	36.00 (26.86)	1235	37.45 (27.94)	1260	39.00 (29.09)	1280	40.30 (30.06)	1305	42.00 (31.33)	1330	43.80 (32.67)
22,500 (10,620)	1125	33.30 (24.84)	1145	34.05 (25.40)	1160	34.60 (25.81)	1180	35.50 (26.48)	1200	36.45 (27.19)	1220	37.55 (28.01)	1245	38.95 (29.06)	1265	40.20 (29.99)	1290	41.80 (31.18)	1310	43.15 (32.19)	1335	44.95 (33.53)

BLOWER DATA

POWER EXHAUST FANS

¹ 50% HIGH STATIC OPERATION WITH ERW (BY-PASS DAMPERS CLOSED)

Air Volume cfm (L/s)	Return Duct Negative Static Pressure - Inches Water Gauge (Pa)																					
	0 (0)		.10 (25)		.20 (50)		.30 (75)		.40 (100)		.50 (125)		.60 (150)		.70 (175)		.80 (200)		.90 (225)		1.0 (250)	
	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)
2500 (1180)	390	0.35 (0.26)	460	0.50 (0.37)	530	0.70 (0.52)	600	0.90 (0.67)	670	1.15 (0.86)	735	1.40 (1.04)	805	1.70 (1.27)	870	2.00 (1.49)	935	2.35 (1.75)	1005	2.75 (2.05)	1070	3.10 (2.31)
3000 (1415)	465	0.60 (0.45)	525	0.75 (0.56)	585	1.00 (0.75)	645	1.20 (0.90)	700	1.45 (1.08)	760	1.75 (1.31)	815	2.05 (1.53)	870	2.35 (1.75)	930	2.70 (2.01)	985	3.05 (2.28)	1040	3.45 (2.57)
3500 (1650)	545	0.95 (0.71)	595	1.15 (0.86)	645	1.35 (1.01)	695	1.60 (1.19)	745	1.90 (1.42)	795	2.20 (1.64)	845	2.50 (1.87)	895	2.85 (2.13)	945	3.20 (2.39)	990	3.55 (2.65)	1040	3.95 (2.95)
4000 (1890)	620	1.35 (1.01)	665	1.60 (1.19)	710	1.90 (1.42)	755	2.15 (1.60)	800	2.45 (1.83)	840	2.75 (2.05)	885	3.10 (2.31)	930	3.45 (2.57)	975	3.80 (2.83)	1015	4.15 (3.10)	1060	4.60 (3.43)
4500 (2125)	700	1.95 (1.45)	740	2.25 (1.68)	780	2.55 (1.90)	820	2.85 (2.13)	855	3.10 (2.31)	895	3.45 (2.57)	935	3.80 (2.83)	975	4.20 (3.13)	1015	4.60 (3.43)	1050	4.95 (3.69)	1090	5.35 (3.99)
5000 (2360)	775	2.70 (2.01)	815	3.00 (2.24)	850	3.30 (2.46)	885	3.65 (2.72)	920	4.00 (2.98)	955	4.35 (3.25)	990	4.70 (3.51)	1025	5.10 (3.80)	1060	5.50 (4.10)	1095	5.90 (4.40)	1130	6.30 (4.70)
5500 (2595)	855	3.60 (2.69)	885	3.90 (2.91)	920	4.25 (3.17)	950	4.60 (3.43)	985	5.00 (3.73)	1015	5.35 (3.99)	1050	5.75 (4.29)	1080	6.15 (4.59)	1110	6.55 (4.89)	1145	7.00 (5.22)	1175	7.40 (5.52)
6000 (2830)	935	4.70 (3.51)	965	5.05 (3.77)	990	5.35 (3.99)	1020	5.75 (4.29)	1050	6.15 (4.59)	1080	6.55 (4.89)	1110	6.95 (5.18)	1140	7.40 (5.52)	1170	7.85 (5.86)	1200	8.30 (6.19)	1225	8.70 (6.49)

POWER EXHAUST FANS

¹ 100% HIGH STATIC OPERATION WITH ERW (BY-PASS DAMPERS CLOSED)

Air Volume cfm (L/s)	Return Duct Negative Static Pressure - Inches Water Gauge (Pa)																					
	0 (0)		.10 (25)		.20 (50)		.30 (75)		.40 (100)		.50 (125)		.60 (150)		.70 (175)		.80 (200)		.90 (225)		1.0 (250)	
	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)
5000 (2360)	445	0.85 (0.63)	505	1.15 (0.86)	565	1.45 (1.08)	625	1.85 (1.38)	680	2.20 (1.64)	740	2.65 (1.98)	800	3.15 (2.35)	855	3.60 (2.69)	910	4.15 (3.10)	970	4.75 (3.54)	1025	5.30 (3.95)
5500 (2595)	490	1.15 (0.86)	545	1.45 (1.08)	600	1.80 (1.34)	650	2.15 (1.60)	705	2.55 (1.90)	760	3.05 (2.28)	810	3.50 (2.61)	865	4.00 (2.98)	915	4.55 (3.39)	970	5.15 (3.84)	1020	5.70 (4.25)
6000 (2830)	535	1.45 (1.08)	585	1.80 (1.34)	635	2.15 (1.60)	685	2.60 (1.94)	735	3.00 (2.24)	780	3.45 (2.57)	830	3.95 (2.95)	880	4.50 (3.36)	925	5.00 (3.73)	975	5.60 (4.18)	1020	6.15 (4.59)
6500 (3065)	580	1.85 (1.38)	625	2.20 (1.64)	670	2.60 (1.94)	715	3.00 (2.24)	760	3.45 (2.57)	805	3.95 (2.95)	850	4.45 (3.32)	895	4.95 (3.69)	940	5.50 (4.10)	985	6.10 (4.55)	1030	6.75 (5.04)
7000 (3305)	625	2.35 (1.75)	665	2.70 (2.01)	710	3.15 (2.35)	750	3.55 (2.65)	795	4.05 (3.02)	835	4.50 (3.36)	880	5.05 (3.77)	920	5.60 (4.18)	960	6.15 (4.59)	1005	6.80 (5.07)	1045	7.40 (5.52)
7500 (3540)	670	2.90 (2.16)	710	3.30 (2.46)	750	3.75 (2.80)	790	4.20 (3.13)	825	4.65 (3.47)	865	5.15 (3.84)	905	5.70 (4.25)	945	6.25 (4.66)	985	6.85 (5.11)	1025	7.50 (5.60)	1060	8.05 (6.01)
8000 (3775)	715	3.50 (2.61)	750	3.90 (2.91)	790	4.40 (3.28)	825	4.85 (3.62)	860	5.35 (3.99)	900	5.90 (4.40)	935	6.45 (4.81)	975	7.05 (5.26)	1010	7.65 (5.71)	1045	8.25 (6.15)	1080	8.85 (6.60)
8500 (4010)	760	4.20 (3.13)	795	4.65 (3.47)	830	5.15 (3.84)	865	5.65 (4.21)	900	6.20 (4.63)	935	6.75 (5.04)	970	7.30 (5.45)	1000	7.85 (5.86)	1035	8.45 (6.30)	1070	9.10 (6.79)	1105	9.80 (7.31)
9000 (4245)	800	4.90 (3.66)	835	5.45 (4.07)	870	5.95 (4.44)	900	6.45 (4.81)	935	7.05 (5.26)	970	7.65 (5.71)	1000	8.20 (6.12)	1035	8.85 (6.60)	1065	9.40 (7.01)	1100	10.15 (7.57)	1130	10.75 (8.02)
9500 (4485)	845	5.80 (4.33)	880	6.35 (4.74)	910	6.85 (5.11)	940	7.40 (5.52)	975	8.05 (6.01)	1005	8.60 (6.42)	1035	9.20 (6.86)	1065	9.80 (7.31)	1095	10.45 (7.80)	1130	11.20 (8.36)	1160	11.90 (8.88)
10,000 (4720)	890	6.75 (5.04)	920	7.30 (5.45)	950	7.85 (5.86)	980	8.45 (6.30)	1010	9.05 (6.75)	1040	9.65 (7.20)	1070	10.30 (7.68)	1100	11.00 (8.21)	1130	11.65 (8.69)	1160	12.35 (9.21)	1190	13.10 (9.77)
10,500 (4955)	935	7.85 (5.86)	965	8.45 (6.30)	995	9.05 (6.75)	1020	9.60 (7.16)	1050	10.25 (7.65)	1080	10.90 (8.13)	1105	11.50 (8.58)	1135	12.20 (9.10)	1165	12.95 (9.66)	1190	13.60 (10.15)	1220	14.35 (10.71)
11,000 (5190)	980	9.00 (6.71)	1010	9.65 (7.20)	1035	10.25 (7.65)	1060	10.80 (8.06)	1090	11.55 (8.62)	1115	12.15 (9.06)	1145	12.90 (9.62)	1170	13.55 (10.11)	1195	14.20 (10.59)	1225	15.00 (11.19)	1250	15.70 (11.71)
11,500 (5425)	1025	10.30 (7.68)	1050	10.90 (8.13)	1075	11.50 (8.58)	1105	12.30 (9.18)	1130	12.90 (9.62)	1155	13.60 (10.15)	1180	14.25 (10.63)	1205	14.95 (11.15)	1235	15.80 (11.79)	1260	16.55 (12.35)	1285	17.30 (12.91)
12,000 (5665)	1070	11.75 (8.77)	1095	12.40 (9.25)	1120	13.05 (9.74)	1145	13.75 (10.26)	1170	14.40 (10.74)	1195	15.15 (11.30)	1220	15.85 (11.82)	1245	16.60 (12.38)	1270	17.40 (12.98)	1295	18.15 (13.54)	1320	18.95 (14.14)

NOTE - See page 51 for factory installed drive kit specifications.

¹ Size power exhaust fans with ERW in economizer mode to minimize building static pressure during "free" cooling. See Page 37.

BLOWER DATA

POWER EXHAUST FANS STANDARD STATIC (1 TWO FAN OPERATION)

Return Duct Negative Static Pressure		Air Volume		Return Duct Negative Static Pressure		Air Volume	
Inches Water Gauge	Pa	cfm	L/s	Inches Water Gauge	Pa	cfm	L/s
0	0	12,100	5710	0.50	125	5700	2690
0.05	12	11,600	5475	0.55	137	5000	2360
0.10	25	11,150	5260	0.60	150	4300	2030
0.15	37	10,600	5000	0.65	162	3800	1795
0.20	50	10,100	4765	0.70	175	3400	1605
0.25	62	9500	4485	0.75	187	3000	1415
0.30	75	8900	4200	0.80	200	2500	1180
0.35	87	8200	3870	0.85	211	2300	1085
0.40	100	7400	3490	0.90	250	2000	945
0.45	112	6500	3065				

¹ For one fan operation, use half of the air volume value.

OUTDOOR AIR PERCENTAGE VS. FRESH AIR DAMPER ANGLE - Less ERW

Fresh Air Damper Opening Angle	Percentage of Outdoor Air Available at Various Return Duct Static Pressures - in. w.g. (Pa)			
	0.2 (50)	0.4 (100)	0.6 (150)	0.8 (200)
10°	5%	11%	16%	21%
20°	19%	25%	30%	36%
30°	34%	39%	44%	50%
40°	48%	53%	59%	64%
50°	62%	68%	73%	79%
60°	77%	82%	87%	93%
70°	91%	96%	100%	100%
80°	100%	100%	100%	100%

NOTE - Outdoor air percentage will vary when a variable frequency drive (VFD) drive is used on the supply air blower.

OUTDOOR AIR PERCENTAGE VS. FRESH AIR DAMPER ANGLE - With ERW

¹ ERW Static Pressure	in. w.g. Pa	Percentage of Outdoor Air Available at Various Return Duct Static Pressures																	
		0.0 (0) Return Duct Static						0.2 (50) Return Duct Static						0.4 (100) Return Duct Static					
		1.2	1.0	0.8	0.6	0.4	0.2	1.2	1.0	0.8	0.6	0.4	0.2	1.2	1.0	0.8	0.6	0.4	0.2
		300	250	200	150	100	50	300	250	200	150	100	50	300	250	200	150	100	50
	10°	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	20°	9%	4%	---	---	---	---	14%	9%	4%	---	---	---	19%	14%	9%	4%	---	---
Fresh Air Damper Opening Angle	30°	23%	18%	13%	8%	2%	---	28%	23%	18%	13%	8%	2%	34%	28%	23%	18%	13%	8%
	40°	38%	32%	27%	22%	17%	11%	43%	38%	32%	27%	22%	17%	48%	43%	38%	32%	27%	22%
	50°	52%	46%	41%	36%	31%	25%	57%	52%	46%	41%	36%	31%	62%	57%	52%	46%	41%	36%
	60°	66%	61%	55%	50%	45%	39%	71%	66%	61%	55%	50%	45%	77%	71%	66%	61%	55%	50%
	70°	81%	75%	70%	64%	59%	54%	86%	81%	75%	70%	64%	59%	91%	86%	81%	75%	70%	64%
	80°	95%	89%	84%	78%	73%	68%	100%	95%	89%	84%	78%	73%	100%	100%	95%	89%	84%	78%

¹ ERW Static Pressure	in. w.g. Pa	Percentage of Outdoor Air Available at Various Return Duct Static Pressures											
		0.6 (150) Return Duct Static						0.8 (200) Return Duct Static					
		1.2	1.0	0.8	0.6	0.4	0.2	1.2	1.0	0.8	0.6	0.4	0.2
		300	250	200	150	100	50	300	250	200	150	100	50
	10°	---	---	---	---	---	---	---	---	---	---	---	---
Fresh Air Damper Opening Angle	20°	25%	19%	14%	9%	4%	---	30%	25%	19%	14%	9%	4%
	30°	39%	34%	28%	23%	18%	13%	44%	39%	34%	28%	23%	18%
	40°	54%	48%	43%	38%	32%	27%	59%	54%	48%	43%	38%	32%
	50°	68%	62%	57%	52%	46%	41%	73%	68%	62%	57%	52%	46%
	60°	84%	77%	71%	66%	61%	55%	87%	84%	77%	71%	66%	61%
	70°	97%	91%	86%	81%	75%	70%	100%	97%	91%	86%	81%	75%
80°	100%	100%	100%	95%	89%	84%	100%	100%	100%	100%	95%	89%	

NOTE - Outdoor air percentage will vary when a variable frequency drive (VFD) drive is used on the supply air blower.

¹ See page 52 for Energy Recovery Wheel Specifications.

BLOWER DATA**AIR RESISTANCE****HORIZONTAL AIRFLOW APPLICATIONS**

Air Volume		Standard Static Power Exhaust fans or No Power Exhaust Fans		50% High Static Power Exhaust Fans		100% High Static Power Exhaust Fans	
cfm	L/s	in. w.g.	Pa	in. w.g.	Pa	in. w.g.	Pa
10,000	4720	.20	50	.23	57	.25	62
10,500	4955	.20	50	.25	62	.30	75
11,000	5190	.20	50	.25	62	.30	75
11,500	5425	.20	50	.30	75	.40	99
12,000	5665	.20	50	.33	82	.45	112
12,500	5900	.20	50	.35	87	.50	124
13,000	6135	.20	62	.38	94	.55	137
13,500	6370	.25	62	.43	107	.60	149
14,000	6605	.25	62	.45	112	.65	162
14,500	6845	.25	62	.48	119	.70	174
15,000	7080	.30	75	.55	137	.80	199
15,500	7315	.30	75	.58	144	.85	211
16,000	7550	.30	75	.63	157	.95	236
16,500	7785	.30	75	.63	157	.95	236
17,000	8020	.30	75	.68	169	1.05	261
17,500	8260	.30	75	.70	174	1.10	274
18,000	8495	.30	75	.75	186	1.20	298
18,500	8730	.30	75	.78	194	1.25	311
19,000	8965	.30	75	.83	206	1.35	336
19,500	9200	.30	75	.83	206	1.40	348
20,000	9440	.30	75	.90	224	1.50	373
20,500	9675	.35	87	.94	234	1.60	398
21,000	9910	.35	87	.98	244	1.70	423
21,500	10,145	.35	87	1.02	254	1.80	448
22,000	10,380	.35	87	1.04	258	1.90	472
22,500	10,615	.35	87	1.10	273	2.00	497

BLOWER DATA

FACTORY INSTALLED OPTIONS AIR RESISTANCE

ECONOMIZER RETURN AIR DAMPER WITH ERW

Outdoor Air Volume With ERW		Return Duct Negative Static Pressure									
		0.2 in. w.g. (50 Pa)		0.4 in. w.g. (100 Pa)		0.6 in. w.g. (150 Pa)		0.8 in. w.g. (200 Pa)		1.0 in. w.g. (250 Pa)	
cfm	L/s	in. w.g.	Pa	in. w.g.	Pa	in. w.g.	Pa	in. w.g.	Pa	in. w.g.	Pa
3250	1535	0.32	80	0.12	30	---	---	---	---	---	---
3500	1650	0.36	90	0.16	40	---	---	---	---	---	---
3750	1770	0.40	99	0.20	50	---	---	---	---	---	---
4000	1888	0.44	109	0.24	60	0.04	10	---	---	---	---
4250	2005	0.48	119	0.28	70	0.08	20	---	---	---	---
4500	2124	0.52	129	0.32	80	0.12	30	---	---	---	---
4750	2240	0.57	142	0.37	92	0.17	42	---	---	---	---
5000	2360	0.60	149	0.40	99	0.20	50	---	---	---	---
5250	2475	0.65	162	0.45	112	0.25	62	0.05	12	---	---
5500	2595	0.68	169	0.48	119	0.28	70	0.08	20	---	---
5750	2715	0.73	182	0.53	132	0.33	82	0.13	32	---	---
6000	2830	0.76	189	0.56	139	0.36	90	0.16	40	---	---
6250	2949	0.81	201	0.61	152	0.41	102	0.21	52	0.01	2
6500	3065	0.84	209	0.64	159	0.44	109	0.24	60	0.04	10
6750	3185	0.89	221	0.69	172	0.49	122	0.29	72	0.09	22
7000	3305	0.93	231	0.73	182	0.53	132	0.33	82	0.13	32
7250	3420	0.97	241	0.77	191	0.57	142	0.37	92	0.17	42
7500	3540	1.01	251	0.81	201	0.61	152	0.41	102	0.21	52
7750	3655	1.05	261	0.85	211	0.65	162	0.45	112	0.25	62
8000	3775	1.09	271	0.89	221	0.69	172	0.49	122	0.29	72
8250	3895	1.13	281	0.93	231	0.73	182	0.53	132	0.33	82
8500	4010	1.17	291	0.97	241	0.77	191	0.57	142	0.37	92
8750	4130	1.21	301	1.01	251	0.81	201	0.61	152	0.41	102
9000	4245	1.25	310	1.05	261	0.85	211	0.65	162	0.45	112

WET INDOOR COIL

Air Volume		Wet Indoor Coil	
cfm	L/s	in. w.g.	Pa
12,000	5665	0.20	50
13,000	6135	0.22	55
14,000	6605	0.24	60
15,000	7080	0.27	67
16,000	7550	0.30	75
17,000	8025	0.33	82
18,000	8495	0.36	90
19,000	8965	0.39	97
20,000	9440	0.42	104
21,000	9910	0.45	112
22,000	10,380	0.48	119

BLOWER DRIVE KITS

VARIABLE FREQUENCY DRIVE KIT SPECIFICATIONS

Nominal hp	Nominal kW	Drive Kit Number	Maximum RPM @ 60Hz VFD Output (Fixed Pulley)
5	3.7	1	775
7.5	5.6	2	945
10	7.5	3	1090
		4	1190
15	11.2	5	1375

Nominal hp	Nominal kW	Drive Kit Number	Maximum RPM @ 60Hz VFD Output (Fixed Pulley)
20	14.9	6	1125
		7	1350
25	18.6	8	1350
30	22.4	9	1310

NOTE - Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. For VFD applications, nominal motor output is also maximum usable motor output.

CONSTANT AIR VOLUME DRIVE KIT SPECIFICATIONS

Nominal hp	Maximum hp	Nominal kW	Maximum kW	Drive Kit Number	RPM Range (Adjustable Pulley)
5	5.75	3.7	4.3	10	480-565
				11	555-665
				14	655-790
7.5	8.63	5.6	6.4	12	565-695
				13	585-700
				15	655-790
				16	685-825
				19	775-930
				20	810-980
				10	11.5
				17	700-835
				19	775-930
				22	820-1010
				23	905-1090
				26	985-1190
15	17.25	11.2	12.9	18	740-895
				21	810-980
				24	915-1105
				25	975-1165
				27	1070-1290
				28	985-1190
20	23	14.9	17.2	29	740-895
				30	810-980
				31	915-1105
				32	975-1165
				35	1115-1345
25	28.75	18.6	21.4	33	975-1165
				37	1140-1365
30	34.5	22.4	25.7	34	1065-1270
				36	1135-1325

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

HIGH STATIC POWER EXHAUST FANS - DRIVE KIT SPECIFICATIONS - CAV or VFD

Nominal hp per blower	¹ Maximum hp per blower	Nominal kW per blower	¹ Maximum kW per blower	RPM Range ³ Adjustable	Drive Kit Number		
					50% Applications Rear Position	² 100% Applications Order One Each:	
					Front Position	Rear Position	
3	3.45	2.2	3.0	735-920	6(A)-B35	6(B)-B36	6(A)-B35
				690-845			
5	5.75	3.7	4.3	795-975	3(A)-B35	3(B)-B36	3(A)-B35
				735-920			
7.5	8.63	5.6	6.4	850-1065	1(A)-B35	1(B)-B36	1(A)-B35
				820-980			

¹ In VFD applications, nominal motor output is also maximum usable motor output.

² Two drive kits are required for the same rpm, one for the front blower position and one for the rear blower position because of different belt length requirements.

³ Adjustable motor pulleys are factory set for maximum RPM in VFD applications.

ENERGY RECOVERY WHEEL SPECIFICATIONS

1 Enthalpy Wheel ARI Rating Data	Nominal Airflow		6600 cfm		
	EATR - Exhaust Air Transfer Ratio	at minus 1 in. w. c.	4.6%		
		at 0 in. w.c.	1.9%		
		at 1 in. w.c.	0.9%		
	OACF Outdoor Air Correction Factor	at minus 1 in. w. c.	0.99%		
		at 0 in. w.c.	1.05%		
at 1 in. w.c.		1.08%			
1 Thermal Ratings at 0.95 in. w.c. Pressure Differential	Total Effectiveness	100% Airflow Heating	Sensible	Latent	Total
		75% Airflow Heating	68	60	65
		100% Airflow Cooling	73	67	71
		75% Airflow Cooling	68	60	63
	Net Effectiveness	100% Airflow Heating	73	67	70
		100% Airflow Cooling	68	60	65
		100% Airflow Heating	68	60	65
		100% Airflow Cooling	68	60	63
Dimensions	diameter x width - in. (mm)		63 x 3 (1600 x 76)		

¹ Rated in accordance with ARI Standard 1060-2001. For further information, please reference ARI 1060-2001 Standard For Rating Air-to-Air Heat Exchangers For Energy Recovery Ventilation Equipment.

EFFECTIVENESS

Air Flow cfm	Static Pressure in. w.c.	Effectiveness (%)			
		Sensible	Latent	Cooling	Total Heating
3250	0.45	79.7	75.1	76.9	78.0
3500	0.48	78.8	73.9	75.9	77.0
3750	0.52	77.9	72.8	74.9	76.1
4000	0.55	77.0	71.7	73.8	54.1
4250	0.59	76.1	70.6	72.8	74.1
4500	0.62	75.3	69.4	71.8	73.2
4750	0.66	74.4	68.3	70.7	72.2
5000	0.69	73.5	67.2	69.7	71.2
5250	0.73	72.6	66.1	68.7	70.3
5500	0.76	71.8	64.9	67.7	69.3
5750	0.80	70.9	63.8	66.6	68.3
6000	0.83	70.0	62.7	65.6	67.4
6250	0.87	69.1	61.6	64.6	66.4
6500	0.90	68.2	60.4	63.5	65.4
6750	0.94	67.4	59.3	62.5	64.5
7000	0.97	66.5	58.2	61.5	63.5
7250	1.01	65.6	57.1	60.4	62.5
7500	1.04	64.7	55.9	59.4	61.6
7750	1.08	63.8	54.8	58.4	60.6
8000	1.11	62.9	53.6	57.3	59.6
8250	1.15	62.0	52.5	56.3	58.7
8500	1.18	61.1	51.4	55.2	57.7
8750	1.22	60.3	50.2	54.2	56.7
9000	1.25	59.4	49.1	53.1	55.7

ELECTRICAL DATA

208/230V - 3 PHASE

35 TON STANDARD EFFICIENCY

General Data		Model No.		SGA420S2						
Line Voltage Data - 60Hz		208/230V - 3 phase								
Compressors (4)	Rated load amps each (total)	28.9 (115.6)								
	Locked rotor amps each (total)	195 (780)								
Condenser Fan Motors (6)	Full load amps each (total)	3.7 (22.2)								
	Locked rotor amps each (total)	7.3 (43.8)								
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30		
	Full load amps	16.7	24.2	30.8	46.2	59.4	74.8	78		
	Locked rotor amps	105	152	193	257	321	404	481		
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	175	200	200	225	250	³ 300	³ 300		
	50% Standard Static (1) 1 hp motor	175	200	200	225	250	³ 300	³ 300		
	100% Standard Static (2) 1 hp motor	200	200	200	250	250	³ 300	³ 300		
	50% High Static (1) 3 hp motor	200	200	200	250	250	³ 300	³ 300		
	100% High Static (2) 3 hp motor	200	200	225	250	250	³ 300	³ 300		
	50% High Static (1) 5 hp motor	200	200	225	250	250	³ 300	³ 300		
	100% High Static (2) 5 hp motor	225	225	225	250	³ 300	³ 300	³ 300		
	50% High Static (1) 7.5 hp motor	200	200	225	250	250	³ 300	³ 300		
	100% High Static (2) 7.5 hp motor	250	250	250	250	³ 300	³ 350	³ 350		
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	165	172	179	194	207	223	⁴ 226		
	50% Standard Static (1) 1 hp motor	169	177	183	199	212	⁴ 227	⁴ 231		
	100% Standard Static (2) 1 hp motor	174	182	188	204	217	⁴ 232	⁴ 235		
	50% High Static (1) 3 hp motor	175	183	189	205	218	⁴ 233	⁴ 236		
	100% High Static (2) 3 hp motor	186	193	200	215	⁴ 228	⁴ 244	⁴ 247		
	50% High Static (1) 5 hp motor	181	189	195	211	224	⁴ 239	⁴ 243		
	100% High Static (2) 5 hp motor	198	205	212	⁴ 227	⁴ 241	⁴ 256	⁴ 259		
	50% High Static (1) 7.5 hp motor	189	196	203	218	⁴ 231	⁴ 247	⁴ 250		
	100% High Static (2) 7.5 hp motor	213	220	⁴ 227	⁴ 242	⁴ 256	⁴ 271	⁴ 274		

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	4.8	9.6	10.6	21.2	16.7	33.4	24.2	48.4
	Locked rotor amps total	23	46	66	132	105	210	152	304
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	2.3							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

³ Any maximum overcurrent device exceeding 250 amps must be field provided and installed external to the unit.

⁴ Factory installed disconnect not available. Must be field provided.

ELECTRICAL DATA

460V - 3 PHASE

35 TON STANDARD EFFICIENCY

General Data		Model No.		SGA420S2						
Line Voltage Data - 60Hz		460V - 3 phase								
Compressors (4)	Rated load amps each (total)	14.8 (59.2)								
	Locked rotor amps each (total)	95 (380)								
Condenser Fan Motors (6)	Full load amps each (total)	1.9 (11.4)								
	Locked rotor amps each (total)	3.7 (22.2)								
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30		
	Full load amps	7.6	11	14	21	27	34	35		
	Locked rotor amps	45.6	66	84	116	145	183	218		
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	90	100	100	110	125	125	150		
	50% Standard Static (1) 1 hp motor	100	100	100	110	125	150	150		
	100% Standard Static (2) 1 hp motor	100	100	100	110	125	150	150		
	50% High Static (1) 3 hp motor	100	100	100	110	125	150	150		
	100% High Static (2) 3 hp motor	100	110	110	125	125	150	150		
	50% High Static (1) 5 hp motor	100	100	110	125	125	150	150		
	100% High Static (2) 5 hp motor	110	110	110	125	125	150	150		
	50% High Static (1) 7.5 hp motor	100	110	110	125	125	150	150		
	100% High Static (2) 7.5 hp motor	125	125	125	125	150	150	150		
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	84	87	90	97	103	110	111		
	50% Standard Static (1) 1 hp motor	86	89	92	99	105	112	113		
	100% Standard Static (2) 1 hp motor	88	92	95	102	108	115	116		
	50% High Static (1) 3 hp motor	88	92	95	102	108	115	116		
	100% High Static (2) 3 hp motor	93	97	100	107	113	120	121		
	50% High Static (1) 5 hp motor	91	95	98	105	111	118	119		
	100% High Static (2) 5 hp motor	99	102	105	112	118	125	126		
	50% High Static (1) 7.5 hp motor	95	98	101	108	114	121	122		
	100% High Static (2) 7.5 hp motor	106	109	112	119	125	132	133		

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	2.4	4.8	4.8	9.6	7.6	15.2	11.0	22.0
	Locked rotor amps total	11.5	23	26.8	53.6	45.6	91.2	66.0	132.0
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.2							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

575V - 3 PHASE

35 TON STANDARD EFFICIENCY

General Data		Model No.		SGA420S2						
		Line Voltage Data - 60Hz		575V - 3 phase						
Compressors (4)	Rated load amps each (total)	10.8 (43.2)								
	Locked rotor amps each (total)	80 (320)								
Condenser Fan Motors (6)	Full load amps each (total)	1.6 (9.6)								
	Locked rotor amps each (total)	3.4 (20.4)								
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30		
	Full load amps	6.1	9	11	17	22	27	32		
	Locked rotor amps	36.6	54	66	93	116	146	174		
¹ Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	70	70	70	90	100	110	125		
	50% Standard Static (1) 1 hp motor	70	70	80	90	100	110	125		
	100% Standard Static (2) 1 hp motor	70	80	80	90	100	110	125		
	50% High Static (1) 3 hp motor	70	80	80	90	100	110	125		
	100% High Static (2) 3 hp motor	80	80	80	90	110	110	125		
	50% High Static (1) 5 hp motor	70	80	80	90	100	110	125		
	100% High Static (2) 5 hp motor	80	90	90	100	110	125	125		
	50% High Static (1) 7.5 hp motor	80	80	80	100	110	110	125		
	100% High Static (2) 7.5 hp motor	100	100	100	110	110	125	125		
² Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	63	66	68	74	79	84	89		
	50% Standard Static (1) 1 hp motor	65	68	70	76	81	86	91		
	100% Standard Static (2) 1 hp motor	67	70	72	78	83	88	93		
	50% High Static (1) 3 hp motor	67	70	72	78	83	88	93		
	100% High Static (2) 3 hp motor	71	74	76	82	87	92	97		
	50% High Static (1) 5 hp motor	69	72	74	80	85	90	95		
	100% High Static (2) 5 hp motor	75	78	80	86	91	96	101		
	50% High Static (1) 7.5 hp motor	72	75	77	83	88	93	98		
	100% High Static (2) 7.5 hp motor	81	84	86	92	97	102	107		

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	2	4	3.9	7.8	6.1	12.2	9	18
	Locked rotor amps total	8.9	17.8	23.4	46.8	36.6	73.2	54	108
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.0							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

208/230V - 3 PHASE

40 TON STANDARD EFFICIENCY

General Data		Model No.		SGA480S2						
Line Voltage Data - 60Hz		208/230V - 3 phase								
Compressors (4)	Rated load amps each (total)	30.2 (120.8)								
	Locked rotor amps each (total)	225 (900)								
Condenser Fan Motors (6)	Full load amps each (total)	3.7 (22.2)								
	Locked rotor amps each (total)	7.3 (43.8)								
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30		
	Full load amps	16.7	24.2	30.8	46.2	59.4	74.8	78		
	Locked rotor amps	105	152	193	257	321	404	481		
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	175	200	200	225	250	³ 300	³ 300		
	50% Standard Static (1) 1 hp motor	200	200	200	250	250	³ 300	³ 300		
	100% Standard Static (2) 1 hp motor	200	200	200	250	250	³ 300	³ 300		
	50% High Static (1) 3 hp motor	200	200	225	250	250	³ 300	³ 300		
	100% High Static (2) 3 hp motor	200	225	225	250	³ 300	³ 300	³ 300		
	50% High Static (1) 5 hp motor	200	200	225	250	250	³ 300	³ 300		
	100% High Static (2) 5 hp motor	225	225	250	250	³ 300	³ 300	³ 350		
	50% High Static (1) 7.5 hp motor	200	225	225	250	³ 300	³ 300	³ 300		
	100% High Static (2) 7.5 hp motor	250	250	250	³ 300	³ 300	³ 350	³ 350		
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	170	178	184	200	213	⁴ 228	⁴ 231		
	50% Standard Static (1) 1 hp motor	175	182	189	204	218	⁴ 233	⁴ 236		
	100% Standard Static (2) 1 hp motor	180	187	194	209	222	⁴ 238	⁴ 241		
	50% High Static (1) 3 hp motor	181	188	195	210	223	⁴ 239	⁴ 242		
	100% High Static (2) 3 hp motor	191	199	205	221	⁴ 234	⁴ 249	⁴ 253		
	50% High Static (1) 5 hp motor	187	194	201	216	⁴ 229	⁴ 245	⁴ 248		
	100% High Static (2) 5 hp motor	203	211	218	⁴ 233	⁴ 246	⁴ 262	⁴ 265		
	50% High Static (1) 7.5 hp motor	194	202	208	224	⁴ 237	⁴ 252	⁴ 256		
	100% High Static (2) 7.5 hp motor	218	⁴ 226	⁴ 233	⁴ 248	⁴ 261	⁴ 277	⁴ 280		

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	4.8	9.6	10.6	21.2	16.7	33.4	24.2	48.4
	Locked rotor amps total	23	46	66	132	105	210	152	304
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	2.3							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

³ Any maximum overcurrent device exceeding 250 amps must be field provided and installed external to the unit.

⁴ Factory installed disconnect not available. Must be field provided.

ELECTRICAL DATA

460V - 3 PHASE

40 TON STANDARD EFFICIENCY

General Data		Model No.		SGA480S2					
Line Voltage Data - 60Hz		460V - 3 phase							
Compressors (4)	Rated load amps each (total)	15.6 (62.4)							
	Locked rotor amps each (total)	114 (456)							
Condenser Fan Motors (6)	Full load amps each (total)	1.9 (11.4)							
	Locked rotor amps each (total)	3.7 (22.2)							
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30	
	Full load amps	7.6	11	14	21	27	34	35	
	Locked rotor amps	45.6	66	84	116	145	183	218	
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	100	100	100	110	125	150	150	
	50% Standard Static (1) 1 hp motor	100	100	110	110	125	150	150	
	100% Standard Static (2) 1 hp motor	100	110	110	125	125	150	150	
	50% High Static (1) 3 hp motor	100	110	110	125	125	150	150	
	100% High Static (2) 3 hp motor	110	110	110	125	125	150	150	
	50% High Static (1) 5 hp motor	100	110	110	125	125	150	150	
	100% High Static (2) 5 hp motor	110	110	110	125	150	150	150	
	50% High Static (1) 7.5 hp motor	110	110	110	125	125	150	150	
	100% High Static (2) 7.5 hp motor	125	125	125	125	150	150	175	
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	87	90	93	100	106	113	114	
	50% Standard Static (1) 1 hp motor	89	93	96	103	109	116	117	
	100% Standard Static (2) 1 hp motor	92	95	98	105	111	118	119	
	50% High Static (1) 3 hp motor	92	95	98	105	111	118	119	
	100% High Static (2) 3 hp motor	97	100	103	110	116	123	124	
	50% High Static (1) 5 hp motor	95	98	101	108	114	121	122	
	100% High Static (2) 5 hp motor	102	106	109	116	122	129	130	
	50% High Static (1) 7.5 hp motor	98	101	104	111	117	124	125	
	100% High Static (2) 7.5 hp motor	109	112	115	122	128	135	136	

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	2.4	4.8	4.8	9.6	7.6	15.2	11.0	22.0
	Locked rotor amps total	11.5	23	26.8	53.6	45.6	91.2	66.0	132.0
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.2							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

575V - 3 PHASE

40 TON STANDARD EFFICIENCY

General Data		Model No.		SGA480S2					
Line Voltage Data - 60Hz		575V - 3 phase							
Compressors (4)	Rated load amps each (total)	12.2 (48.8)							
	Locked rotor amps each (total)	80 (320)							
Condenser Fan Motors (6)	Full load amps each (total)	1.6 (9.6)							
	Locked rotor amps each (total)	3.4 (20.4)							
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30	
	Full load amps	6.1	9	11	17	22	27	32	
	Locked rotor amps	36.6	54	66	93	116	146	174	
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	80	80	80	90	100	110	125	
	50% Standard Static (1) 1 hp motor	80	80	80	90	110	110	125	
	100% Standard Static (2) 1 hp motor	80	80	80	100	110	110	125	
	50% High Static (1) 3 hp motor	80	80	80	100	110	110	125	
	100% High Static (2) 3 hp motor	80	90	90	100	110	125	125	
	50% High Static (1) 5 hp motor	80	80	90	100	110	125	125	
	100% High Static (2) 5 hp motor	90	90	90	100	110	125	125	
	50% High Static (1) 7.5 hp motor	80	90	90	100	110	125	125	
	100% High Static (2) 7.5 hp motor	100	100	110	110	125	125	125	
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	69	72	74	80	85	90	95	
	50% Standard Static (1) 1 hp motor	71	74	76	82	87	92	97	
	100% Standard Static (2) 1 hp motor	73	76	78	84	89	94	99	
	50% High Static (1) 3 hp motor	73	76	78	84	89	94	99	
	100% High Static (2) 3 hp motor	77	80	82	88	93	98	103	
	50% High Static (1) 5 hp motor	75	78	80	86	91	96	101	
	100% High Static (2) 5 hp motor	81	84	86	92	97	102	107	
	50% High Static (1) 7.5 hp motor	78	81	83	89	94	99	104	
	100% High Static (2) 7.5 hp motor	87	90	92	98	103	108	113	

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
Motor hp		1	1	3	3	5	5	7.5	7.5
Number of Motors		1	2	1	2	1	2	1	2
Full load amps total		2	4	3.9	7.8	6.1	12.2	9	18
Locked rotor amps total		8.9	17.8	23.4	46.8	36.6	73.2	54	108
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.0							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

208/230V - 3 PHASE

40 TON HIGH EFFICIENCY

General Data		Model No.		SGA480H4					
		Line Voltage Data - 60Hz		208/230V - 3 phase					
Compressors (4)	Rated load amps each (total)	30.2 (120.8)							
	Locked rotor amps each (total)	225 (900)							
Condenser Fan Motors (6)	Full load amps each (total)	3.7 (22.2)							
	Locked rotor amps each (total)	7.3 (43.8)							
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30	
	Full load amps	16.7	24.2	30.8	46.2	59.4	74.8	78	
	Locked rotor amps	105	152	193	257	321	404	481	
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	175	200	200	225	250	300	300	
	50% Standard Static (1) 1 hp motor	200	200	200	250	250	300	300	
	100% Standard Static (2) 1 hp motor	200	200	200	250	250	300	300	
	50% High Static (1) 3 hp motor	200	200	225	250	250	300	300	
	100% High Static (2) 3 hp motor	200	225	225	250	300	300	300	
	50% High Static (1) 5 hp motor	200	200	225	250	250	300	300	
	100% High Static (2) 5 hp motor	225	225	250	250	300	300	350	
	50% High Static (1) 7.5 hp motor	200	225	225	250	300	300	300	
	100% High Static (2) 7.5 hp motor	250	250	250	300	300	350	350	
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	170	178	184	200	213	228	231	
	50% Standard Static (1) 1 hp motor	175	182	189	204	218	233	236	
	100% Standard Static (2) 1 hp motor	180	187	194	209	222	238	241	
	50% High Static (1) 3 hp motor	181	188	195	210	223	239	242	
	100% High Static (2) 3 hp motor	191	199	205	221	234	249	253	
	50% High Static (1) 5 hp motor	187	194	201	216	229	245	248	
	100% High Static (2) 5 hp motor	203	211	218	233	246	262	265	
	50% High Static (1) 7.5 hp motor	194	202	208	224	237	252	256	
	100% High Static (2) 7.5 hp motor	218	226	233	248	261	277	280	

OPTIONAL ACCESSORIES

Service Outlet (2) 115 volt GFCI (amp rating)		15							
Optional Power Exhaust Fan(s)	Static Type	Standard 50%	Standard 100%	High 50%	High 100%	High 50%	High 100%	High 50%	High 100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	4.8	9.6	10.6	21.2	16.7	33.4	24.2	48.4
	Locked rotor amps total	23	46	66	132	105	210	152	304
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	2.3							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

³ Any maximum overcurrent device exceeding 250 amps must be field provided and installed external to the unit.

⁴ Factory installed disconnect not available. Must be field provided.

ELECTRICAL DATA

460V - 3 PHASE

40 TON HIGH EFFICIENCY

General Data		Model No.		SGA480H4						
Line Voltage Data - 60Hz		460V - 3 phase								
Compressors (4)	Rated load amps each (total)	16.7 (66.8)								
	Locked rotor amps each (total)	114 (456)								
Condenser Fan Motors (6)	Full load amps each (total)	1.9 (11.4)								
	Locked rotor amps each (total)	3.7 (22.2)								
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30		
	Full load amps	7.6	11	14	21	27	34	35		
	Locked rotor amps	45.6	66	84	116	145	183	218		
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	100	110	110	125	125	150	150		
	50% Standard Static (1) 1 hp motor	110	110	110	125	125	150	150		
	100% Standard Static (2) 1 hp motor	110	110	110	125	125	150	150		
	50% High Static (1) 3 hp motor	110	110	110	125	125	150	150		
	100% High Static (2) 3 hp motor	110	110	110	125	125	150	150		
	50% High Static (1) 5 hp motor	110	110	110	125	125	150	150		
	100% High Static (2) 5 hp motor	110	125	125	125	150	150	150		
	50% High Static (1) 7.5 hp motor	110	110	125	125	150	150	150		
	100% High Static (2) 7.5 hp motor	125	125	125	125	150	175	175		
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	92	95	98	105	111	118	119		
	50% Standard Static (1) 1 hp motor	94	97	100	107	113	120	121		
	100% Standard Static (2) 1 hp motor	96	100	103	110	116	123	124		
	50% High Static (1) 3 hp motor	96	100	103	110	116	123	124		
	100% High Static (2) 3 hp motor	101	105	108	115	121	128	129		
	50% High Static (1) 5 hp motor	99	103	106	113	119	126	127		
	100% High Static (2) 5 hp motor	107	110	113	120	126	133	134		
	50% High Static (1) 7.5 hp motor	103	106	109	116	122	129	130		
	100% High Static (2) 7.5 hp motor	114	117	120	127	133	140	141		

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
Motor hp		1	1	3	3	5	5	7.5	7.5
Number of Motors		1	2	1	2	1	2	1	2
Full load amps total		2.4	4.8	4.8	9.6	7.6	15.2	11.0	22.0
Locked rotor amps total		11.5	23	26.8	53.6	45.6	91.2	66.0	132.0
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.2							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

575V - 3 PHASE

40 TON HIGH EFFICIENCY

General Data		Model No.	SGA480H4						
Line Voltage Data - 60Hz		575V - 3 phase							
Compressors (4)	Rated load amps each (total)	12.2 (48.8)							
	Locked rotor amps each (total)	80 (320)							
Condenser Fan Motors (6)	Full load amps each (total)	1.6 (9.6)							
	Locked rotor amps each (total)	3.4 (20.4)							
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30	
	Full load amps	6.1	9	11	17	22	27	32	
	Locked rotor amps	36.6	54	66	93	116	146	174	
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	80	80	80	90	100	110	125	
	50% Standard Static (1) 1 hp motor	80	80	80	90	110	110	125	
	100% Standard Static (2) 1 hp motor	80	80	80	100	110	110	125	
	50% High Static (1) 3 hp motor	80	80	80	100	110	110	125	
	100% High Static (2) 3 hp motor	80	80	90	100	110	125	125	
	50% High Static (1) 5 hp motor	80	80	90	100	110	125	125	
	100% High Static (2) 5 hp motor	90	90	90	100	110	125	125	
	50% High Static (1) 7.5 hp motor	80	90	90	100	110	125	125	
	100% High Static (2) 7.5 hp motor	100	100	110	110	125	125	125	
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	69	72	74	80	85	90	95	
	50% Standard Static (1) 1 hp motor	71	74	76	82	87	92	97	
	100% Standard Static (2) 1 hp motor	73	76	78	84	89	94	99	
	50% High Static (1) 3 hp motor	73	76	78	84	89	94	99	
	100% High Static (2) 3 hp motor	77	80	82	88	93	98	103	
	50% High Static (1) 5 hp motor	75	78	80	86	91	96	101	
	100% High Static (2) 5 hp motor	81	84	86	92	97	102	107	
	50% High Static (1) 7.5 hp motor	78	81	83	89	94	99	104	
	100% High Static (2) 7.5 hp motor	87	90	92	98	103	108	113	

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	2	4	3.9	7.8	6.1	12.2	9	18
	Locked rotor amps total	8.9	17.8	23.4	46.8	36.6	73.2	54	108
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.0							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

208/230V - 3 PHASE

45 TON STANDARD EFFICIENCY

General Data		Model No.		SGA540S2						
Line Voltage Data - 60Hz		208/230V - 3 phase								
Compressors (4)	Rated load amps each (total)	37.2 (148.8)								
	Locked rotor amps each (total)	239 (956)								
Condenser Fan Motors (6)	Full load amps each (total)	3.7 (22.2)								
	Locked rotor amps each (total)	7.3 (43.8)								
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30		
	Full load amps	16.7	24.2	30.8	46.2	59.4	74.8	78		
	Locked rotor amps	105	152	193	257	321	404	481		
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	225	225	250	250	³ 300	³ 300	³ 300		
	50% Standard Static (1) 1 hp motor	225	225	250	250	³ 300	³ 300	³ 350		
	100% Standard Static (2) 1 hp motor	225	250	250	250	³ 300	³ 350	³ 350		
	50% High Static (1) 3 hp motor	225	250	250	250	³ 300	³ 350	³ 350		
	100% High Static (2) 3 hp motor	250	250	250	250	³ 300	³ 350	³ 350		
	50% High Static (1) 5 hp motor	250	250	250	250	³ 300	³ 350	³ 350		
	100% High Static (2) 5 hp motor	250	250	250	³ 300	³ 300	³ 350	³ 350		
	50% High Static (1) 7.5 hp motor	250	250	250	³ 300	³ 300	³ 350	³ 350		
	100% High Static (2) 7.5 hp motor	250	³ 300	³ 300	³ 300	³ 350	³ 350	³ 350		
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	200	207	214	⁴ 229	⁴ 242	⁴ 258	⁴ 261		
	50% Standard Static (1) 1 hp motor	205	212	219	⁴ 234	⁴ 247	⁴ 263	⁴ 266		
	100% Standard Static (2) 1 hp motor	209	217	223	⁴ 239	⁴ 252	⁴ 267	⁴ 271		
	50% High Static (1) 3 hp motor	210	218	224	⁴ 240	⁴ 253	⁴ 268	⁴ 272		
	100% High Static (2) 3 hp motor	221	⁴ 228	⁴ 235	⁴ 250	⁴ 264	⁴ 279	⁴ 282		
	50% High Static (1) 5 hp motor	216	224	⁴ 231	⁴ 246	⁴ 259	⁴ 275	⁴ 278		
	100% High Static (2) 5 hp motor	⁴ 233	⁴ 241	⁴ 247	⁴ 263	⁴ 276	⁴ 291	⁴ 294		
	50% High Static (1) 7.5 hp motor	224	⁴ 231	⁴ 238	⁴ 253	⁴ 267	⁴ 282	⁴ 285		
	100% High Static (2) 7.5 hp motor	⁴ 248	⁴ 256	⁴ 262	⁴ 278	⁴ 291	⁴ 306	⁴ 309		

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
Motor hp		1	1	3	3	5	5	7.5	7.5
Number of Motors		1	2	1	2	1	2	1	2
Full load amps total		4.8	9.6	10.6	21.2	16.7	33.4	24.2	48.4
Locked rotor amps total		23	46	66	132	105	210	152	304
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	2.3							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

³ Any maximum overcurrent device exceeding 250 amps must be field provided and installed external to the unit.

⁴ Factory installed disconnect not available. Must be field provided.

ELECTRICAL DATA

460V - 3 PHASE

45 TON STANDARD EFFICIENCY

General Data		Model No.		SGA540S2					
		Line Voltage Data - 60Hz		460V - 3 phase					
Compressors (4)	Rated load amps each (total)	17.3 (69.2)							
	Locked rotor amps each (total)	125 (500)							
Condenser Fan Motors (6)	Full load amps each (total)	1.9 (11.4)							
	Locked rotor amps each (total)	3.7 (22.2)							
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30	
	Full load amps	7.6	11	14	21	27	34	35	
	Locked rotor amps	45.6	66	84	116	145	183	218	
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	110	110	110	125	125	150	150	
	50% Standard Static (1) 1 hp motor	110	110	110	125	125	150	150	
	100% Standard Static (2) 1 hp motor	110	110	110	125	125	150	150	
	50% High Static (1) 3 hp motor	110	110	110	125	125	150	150	
	100% High Static (2) 3 hp motor	110	110	125	125	150	150	150	
	50% High Static (1) 5 hp motor	110	110	125	125	150	150	150	
	100% High Static (2) 5 hp motor	125	125	125	125	150	150	175	
	50% High Static (1) 7.5 hp motor	110	125	125	125	150	150	150	
	100% High Static (2) 7.5 hp motor	125	125	125	150	150	175	175	
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	94	98	101	108	114	121	122	
	50% Standard Static (1) 1 hp motor	97	100	103	110	116	123	124	
	100% Standard Static (2) 1 hp motor	99	102	105	112	118	125	126	
	50% High Static (1) 3 hp motor	99	102	105	112	118	125	126	
	100% High Static (2) 3 hp motor	104	107	110	117	123	130	131	
	50% High Static (1) 5 hp motor	102	105	108	115	121	128	129	
	100% High Static (2) 5 hp motor	109	113	116	123	129	136	137	
	50% High Static (1) 7.5 hp motor	105	109	112	119	125	132	133	
	100% High Static (2) 7.5 hp motor	116	120	123	130	136	143	144	

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	2.4	4.8	4.8	9.6	7.6	15.2	11.0	22.0
	Locked rotor amps total	11.5	23	26.8	53.6	45.6	91.2	66.0	132.0
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.2							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

575V - 3 PHASE

45 TON STANDARD EFFICIENCY

General Data		Model No.		SGA540S2						
Line Voltage Data - 60Hz		575V - 3 phase								
Compressors (4)	Rated load amps each (total)	12.4 (49.6)								
	Locked rotor amps each (total)	80 (320)								
Condenser Fan Motors (6)	Full load amps each (total)	1.6 (9.6)								
	Locked rotor amps each (total)	3.4 (20.4)								
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30		
	Full load amps	6.1	9	11	17	22	27	32		
	Locked rotor amps	36.6	54	66	93	116	146	174		
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	80	80	80	90	100	110	125		
	50% Standard Static (1) 1 hp motor	80	80	80	100	110	110	125		
	100% Standard Static (2) 1 hp motor	80	80	90	100	110	110	125		
	50% High Static (1) 3 hp motor	80	80	90	100	110	110	125		
	100% High Static (2) 3 hp motor	80	90	90	100	110	125	125		
	50% High Static (1) 5 hp motor	80	90	90	100	110	125	125		
	100% High Static (2) 5 hp motor	90	90	90	110	110	125	125		
	50% High Static (1) 7.5 hp motor	90	90	90	100	110	125	125		
	100% High Static (2) 7.5 hp motor	100	100	110	110	125	125	150		
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	70	73	75	81	86	91	96		
	50% Standard Static (1) 1 hp motor	72	75	77	83	88	93	98		
	100% Standard Static (2) 1 hp motor	74	77	79	85	90	95	100		
	50% High Static (1) 3 hp motor	74	77	79	85	90	95	100		
	100% High Static (2) 3 hp motor	78	81	83	89	94	99	104		
	50% High Static (1) 5 hp motor	76	79	81	87	92	97	102		
	100% High Static (2) 5 hp motor	82	85	87	93	98	103	108		
	50% High Static (1) 7.5 hp motor	79	82	84	90	95	100	105		
	100% High Static (2) 7.5 hp motor	88	91	93	99	104	109	114		

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
Motor hp		1	1	3	3	5	5	7.5	7.5
Number of Motors		1	2	1	2	1	2	1	2
Full load amps total		2	4	3.9	7.8	6.1	12.2	9	18
Locked rotor amps total		8.9	17.8	23.4	46.8	36.6	73.2	54	108
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.0							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

208/230V - 3 PHASE

50 TON STANDARD EFFICIENCY - R-22

General Data		Model No.		SGA600S2					
Line Voltage Data - 60Hz		208/230V - 3 phase							
Compressors (4)	Rated load amps each (total)	42.4 (169.6)							
	Locked rotor amps each (total)	245 (980)							
Condenser Fan Motors (6)	Full load amps each (total)	3.7 (22.2)							
	Locked rotor amps each (total)	7.3 (43.8)							
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30	
	Full load amps	16.7	24.2	30.8	46.2	59.4	74.8	78	
	Locked rotor amps	105	152	193	257	321	404	481	
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	250	250	250	250	³ 300	³ 350	³ 350	
	50% Standard Static (1) 1 hp motor	250	250	250	³ 300	³ 300	³ 350	³ 350	
	100% Standard Static (2) 1 hp motor	250	250	250	³ 300	³ 300	³ 350	³ 350	
	50% High Static (1) 3 hp motor	250	250	250	³ 300	³ 300	³ 350	³ 350	
	100% High Static (2) 3 hp motor	250	250	250	³ 300	³ 300	³ 350	³ 350	
	50% High Static (1) 5 hp motor	250	250	250	³ 300	³ 300	³ 350	³ 350	
	100% High Static (2) 5 hp motor	250	³ 300	³ 300	³ 300	³ 350	³ 350	³ 400	
	50% High Static (1) 7.5 hp motor	250	250	³ 300	³ 300	³ 350	³ 350	³ 350	
	100% High Static (2) 7.5 hp motor	³ 300	³ 300	³ 300	³ 300	³ 350	³ 400	³ 400	
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	222	⁴ 229	⁴ 236	⁴ 251	⁴ 265	⁴ 280	⁴ 283	
	50% Standard Static (1) 1 hp motor	227	⁴ 234	⁴ 241	⁴ 256	⁴ 269	⁴ 285	⁴ 288	
	100% Standard Static (2) 1 hp motor	⁴ 231	⁴ 239	⁴ 246	⁴ 261	⁴ 274	⁴ 290	⁴ 293	
	50% High Static (1) 3 hp motor	⁴ 232	⁴ 240	⁴ 247	⁴ 262	⁴ 275	⁴ 291	⁴ 294	
	100% High Static (2) 3 hp motor	⁴ 243	⁴ 251	⁴ 257	⁴ 273	⁴ 286	⁴ 301	⁴ 304	
	50% High Static (1) 5 hp motor	⁴ 239	⁴ 246	⁴ 253	⁴ 268	⁴ 281	⁴ 297	⁴ 300	
	100% High Static (2) 5 hp motor	⁴ 255	⁴ 263	⁴ 269	⁴ 285	⁴ 298	⁴ 313	⁴ 317	
	50% High Static (1) 7.5 hp motor	⁴ 246	⁴ 254	⁴ 260	⁴ 276	⁴ 289	⁴ 304	⁴ 307	
	100% High Static (2) 7.5 hp motor	⁴ 270	⁴ 278	⁴ 284	⁴ 300	⁴ 313	⁴ 328	⁴ 332	

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	4.8	9.6	10.6	21.2	16.7	33.4	24.2	48.4
	Locked rotor amps total	23	46	66	132	105	210	152	304
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	2.3							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

³ Any maximum overcurrent device exceeding 250 amps must be field provided and installed external to the unit.

⁴ Factory installed disconnect not available. Must be field provided.

ELECTRICAL DATA

460V - 3 PHASE

50 TON STANDARD EFFICIENCY - R-22

General Data		Model No.		SGA600S2					
Line Voltage Data - 60Hz		460V - 3 phase							
Compressors (4)	Rated load amps each (total)	17.7 (70.8)							
	Locked rotor amps each (total)	125 (500)							
Condenser Fan Motors (6)	Full load amps each (total)	1.9 (11.4)							
	Locked rotor amps each (total)	3.7 (22.2)							
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30	
	Full load amps	7.6	11	14	21	27	34	35	
	Locked rotor amps	45.6	66	84	116	145	183	218	
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	110	110	110	125	125	150	150	
	50% Standard Static (1) 1 hp motor	110	110	110	125	125	150	150	
	100% Standard Static (2) 1 hp motor	110	110	110	125	125	150	150	
	50% High Static (1) 3 hp motor	110	110	110	125	125	150	150	
	100% High Static (2) 3 hp motor	110	125	125	125	150	150	150	
	50% High Static (1) 5 hp motor	110	110	125	125	150	150	150	
	100% High Static (2) 5 hp motor	125	125	125	125	150	175	175	
	50% High Static (1) 7.5 hp motor	110	125	125	125	150	150	150	
	100% High Static (2) 7.5 hp motor	125	125	125	150	150	175	175	
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	96	99	102	109	115	122	123	
	50% Standard Static (1) 1 hp motor	98	102	105	112	118	125	126	
	100% Standard Static (2) 1 hp motor	101	104	107	114	120	127	128	
	50% High Static (1) 3 hp motor	101	104	107	114	120	127	128	
	100% High Static (2) 3 hp motor	106	109	112	119	125	132	133	
	50% High Static (1) 5 hp motor	104	107	110	117	123	130	131	
	100% High Static (2) 5 hp motor	111	115	118	125	131	138	139	
	50% High Static (1) 7.5 hp motor	107	110	113	120	126	133	134	
	100% High Static (2) 7.5 hp motor	118	121	124	131	137	144	145	

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	2.4	4.8	4.8	9.6	7.6	15.2	11.0	22.0
	Locked rotor amps total	11.5	23	26.8	53.6	45.6	91.2	66.0	132.0
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.2							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

575V - 3 PHASE

50 TON STANDARD EFFICIENCY - R-22

General Data		Model No.		SGA600S2						
Line Voltage Data - 60Hz		575V - 3 phase								
Compressors (4)	Rated load amps each (total)	14.3 (57.2)								
	Locked rotor amps each (total)	100 (400)								
Condenser Fan Motors (6)	Full load amps each (total)	1.6 (9.6)								
	Locked rotor amps each (total)	3.4 (20.4)								
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30		
	Full load amps	6.1	9	11	17	22	27	32		
	Locked rotor amps	36.6	54	66	93	116	146	174		
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	90	90	90	100	110	125	125		
	50% Standard Static (1) 1 hp motor	90	90	90	100	110	125	125		
	100% Standard Static (2) 1 hp motor	90	90	100	110	110	125	125		
	50% High Static (1) 3 hp motor	90	90	100	100	110	125	125		
	100% High Static (2) 3 hp motor	90	100	100	110	125	125	125		
	50% High Static (1) 5 hp motor	90	100	100	110	110	125	125		
	100% High Static (2) 5 hp motor	100	100	100	110	125	125	150		
	50% High Static (1) 7.5 hp motor	100	100	100	110	125	125	125		
	100% High Static (2) 7.5 hp motor	110	110	110	125	125	125	150		
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	78	81	83	89	94	99	104		
	50% Standard Static (1) 1 hp motor	80	83	85	91	96	101	106		
	100% Standard Static (2) 1 hp motor	82	85	87	93	98	103	108		
	50% High Static (1) 3 hp motor	82	85	87	93	98	103	108		
	100% High Static (2) 3 hp motor	86	89	91	97	102	107	112		
	50% High Static (1) 5 hp motor	84	87	89	95	100	105	110		
	100% High Static (2) 5 hp motor	90	93	95	101	106	111	116		
	50% High Static (1) 7.5 hp motor	87	90	92	98	103	108	113		
	100% High Static (2) 7.5 hp motor	96	99	101	107	112	117	122		

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
Motor hp		1	1	3	3	5	5	7.5	7.5
Number of Motors		1	2	1	2	1	2	1	2
Full load amps total		2	4	3.9	7.8	6.1	12.2	9	18
Locked rotor amps total		8.9	17.8	23.4	46.8	36.6	73.2	54	108
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.0							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

208/230V - 3 PHASE

50 TON STANDARD EFFICIENCY - R-410A

General Data		Model No.		SGA600S4						
Line Voltage Data - 60Hz		208/230V - 3 phase								
Compressors (4)	Rated load amps each (total)	48.1 (192.4)								
	Locked rotor amps each (total)	245 (980.0)								
Condenser Fan Motors (6)	Full load amps each (total)	3.7 (22.2)								
	Locked rotor amps each (total)	7.3 (43.8)								
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30		
	Full load amps	16.7	24.2	30.8	46.2	59.4	74.8	78		
	Locked rotor amps	105	152	193	257	321	404	481		
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	250	³ 300	³ 300	³ 300	³ 350	³ 350	³ 350		
	50% Standard Static (1) 1 hp motor	250	³ 300	³ 300	³ 300	³ 350	³ 350	³ 350		
	100% Standard Static (2) 1 hp motor	³ 300	³ 300	³ 300	³ 300	³ 350	³ 350	³ 400		
	50% High Static (1) 3 hp motor	³ 300	³ 300	³ 300	³ 300	³ 350	³ 350	³ 400		
	100% High Static (2) 3 hp motor	³ 300	³ 300	³ 300	³ 300	³ 350	³ 400	³ 400		
	50% High Static (1) 5 hp motor	³ 300	³ 300	³ 300	³ 300	³ 350	³ 400	³ 400		
	100% High Static (2) 5 hp motor	³ 300	³ 300	³ 300	³ 350	³ 350	³ 400	³ 400		
	50% High Static (1) 7.5 hp motor	³ 300	³ 300	³ 300	³ 300	³ 350	³ 400	³ 400		
	100% High Static (2) 7.5 hp motor	³ 300	³ 350	³ 350	³ 350	³ 350	³ 400	³ 400		
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	4 246	4 254	4 260	4 276	4 289	4 304	4 307		
	50% Standard Static (1) 1 hp motor	4 251	4 258	4 265	4 280	4 294	4 309	4 312		
	100% Standard Static (2) 1 hp motor	4 256	4 263	4 270	4 285	4 298	4 314	4 317		
	50% High Static (1) 3 hp motor	4 257	4 264	4 271	4 286	4 299	4 315	4 318		
	100% High Static (2) 3 hp motor	4 267	4 275	4 281	4 297	4 310	4 325	4 329		
	50% High Static (1) 5 hp motor	4 263	4 270	4 277	4 292	4 306	4 321	4 324		
	100% High Static (2) 5 hp motor	4 280	4 287	4 294	4 309	4 322	4 338	4 341		
	50% High Static (1) 7.5 hp motor	4 270	4 278	4 284	4 300	4 313	4 328	4 332		
	100% High Static (2) 7.5 hp motor	4 295	4 302	4 309	4 324	4 337	4 353	4 356		

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	4.8	9.6	10.6	21.2	16.7	33.4	24.2	48.4
	Locked rotor amps total	23	46	66	132	105	210	152	304
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	2.3							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

³ Any maximum overcurrent device exceeding 250 amps must be field provided and installed external to the unit.

⁴ Factory installed disconnect not available. Must be field provided.

ELECTRICAL DATA

460V - 3 PHASE

50 TON STANDARD EFFICIENCY - R-410A

General Data		Model No.	SGA600S4						
Line Voltage Data - 60Hz		460V - 3 phase							
Compressors (4)	Rated load amps each (total)	18.6 (74.4)							
	Locked rotor amps each (total)	125 (500.0)							
Condenser Fan Motors (6)	Full load amps each (total)	1.9 (11.4)							
	Locked rotor amps each (total)	3.7 (22.2)							
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30	
	Full load amps	7.6	11	14	21	27	34	35	
	Locked rotor amps	45.6	66	84	116	145	183	218	
¹ Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	110	110	110	125	125	150	150	
	50% Standard Static (1) 1 hp motor	110	110	125	125	150	150	150	
	100% Standard Static (2) 1 hp motor	110	125	125	125	150	150	150	
	50% High Static (1) 3 hp motor	110	125	125	125	150	150	150	
	100% High Static (2) 3 hp motor	125	125	125	125	150	150	175	
	50% High Static (1) 5 hp motor	125	125	125	125	150	150	150	
	100% High Static (2) 5 hp motor	125	125	125	125	150	175	175	
	50% High Static (1) 7.5 hp motor	125	125	125	125	150	150	175	
	100% High Static (2) 7.5 hp motor	125	125	150	150	150	175	175	
² Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	100	103	106	113	119	126	127	
	50% Standard Static (1) 1 hp motor	102	106	109	116	122	129	130	
	100% Standard Static (2) 1 hp motor	105	108	111	118	124	131	132	
	50% High Static (1) 3 hp motor	105	108	111	118	124	131	132	
	100% High Static (2) 3 hp motor	109	113	116	123	129	136	137	
	50% High Static (1) 5 hp motor	107	111	114	121	127	134	135	
	100% High Static (2) 5 hp motor	115	118	121	128	134	141	142	
	50% High Static (1) 7.5 hp motor	111	114	117	124	130	137	138	
	100% High Static (2) 7.5 hp motor	122	125	128	135	141	148	149	

OPTIONAL ACCESSORIES

Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	2.4	4.8	4.8	9.6	7.6	15.2	11.0	22.0
	Locked rotor amps total	11.5	23	26.8	53.6	45.6	91.2	66.0	132.0
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.2							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA

575V - 3 PHASE

50 TON STANDARD EFFICIENCY - R-410A

General Data		Model No.		SGA600S4					
Line Voltage Data - 60Hz		575V - 3 phase							
Compressors (4)	Rated load amps each (total)	14.8 (59.2)							
	Locked rotor amps each (total)	100 (400.0)							
Condenser Fan Motors (6)	Full load amps each (total)	1.6 (9.6)							
	Locked rotor amps each (total)	3.4 (20.4)							
Evaporator Blower Motor	Motor Output-hp	5	7.5	10	15	20	25	30	
	Full load amps	6.1	9	11	17	22	27	32	
	Locked rotor amps	36.6	54	66	93	116	146	174	
1 Maximum Overcurrent Protection (amps) With Power Exhaust Fans and ERW	without power exhaust	90	90	90	100	110	125	125	
	50% Standard Static (1) 1 hp motor	90	90	100	110	110	125	125	
	100% Standard Static (2) 1 hp motor	90	100	100	110	110	125	125	
	50% High Static (1) 3 hp motor	90	100	100	110	110	125	125	
	100% High Static (2) 3 hp motor	100	100	100	110	125	125	125	
	50% High Static (1) 5 hp motor	100	100	100	110	125	125	125	
	100% High Static (2) 5 hp motor	100	100	110	110	125	125	150	
	50% High Static (1) 7.5 hp motor	100	100	100	110	125	125	150	
	100% High Static (2) 7.5 hp motor	110	110	110	125	125	125	150	
2 Minimum Circuit Ampacity With Power Exhaust Fans and ERW	without power exhaust	80	83	85	91	96	101	106	
	50% Standard Static (1) 1 hp motor	82	85	87	93	98	103	108	
	100% Standard Static (2) 1 hp motor	84	87	89	95	100	105	110	
	50% High Static (1) 3 hp motor	84	87	89	95	100	105	110	
	100% High Static (2) 3 hp motor	88	91	93	99	104	109	114	
	50% High Static (1) 5 hp motor	86	89	91	97	102	107	112	
	100% High Static (2) 5 hp motor	92	95	97	103	108	113	118	
	50% High Static (1) 7.5 hp motor	89	92	94	100	105	110	115	
	100% High Static (2) 7.5 hp motor	98	101	103	109	114	119	124	

OPTIONAL ACCESSORIES

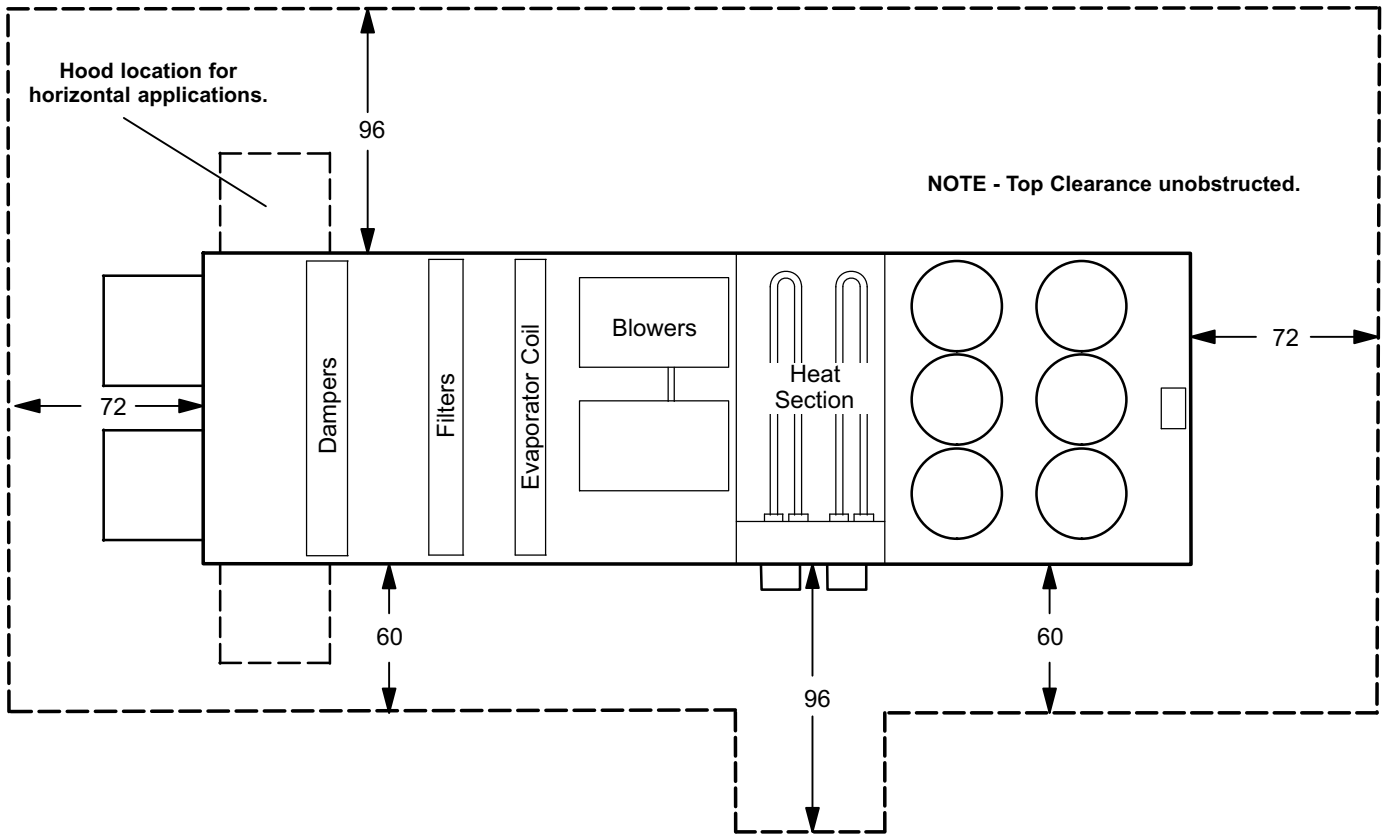
Optional Power Exhaust Fan(s)	Static Type	Standard	Standard	High	High	High	High	High	High
		50%	100%	50%	100%	50%	100%	50%	100%
	Motor hp	1	1	3	3	5	5	7.5	7.5
	Number of Motors	1	2	1	2	1	2	1	2
	Full load amps total	2	4	3.9	7.8	6.1	12.2	9	18
	Locked rotor amps total	8.9	17.8	23.4	46.8	36.6	73.2	54	108
Optional Energy Recovery Wheel (ERW)	(No.) hp	(1) 1/4							
	Full load amps	1.0							
Service Outlet (2) 115 volt GFCI (amp rating)		15							

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

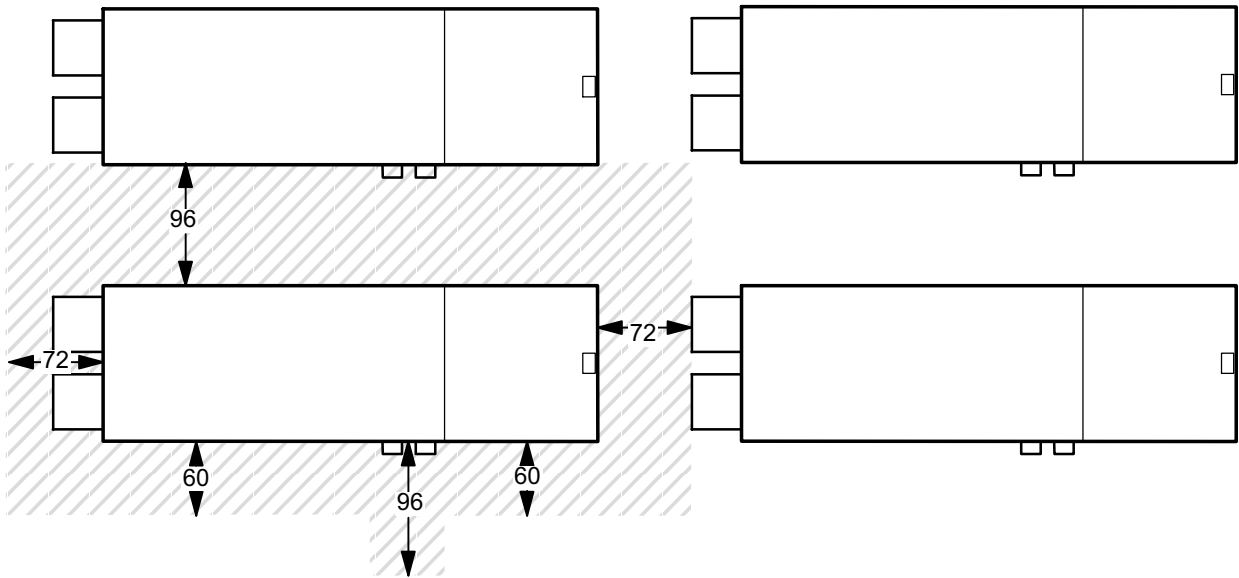
¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

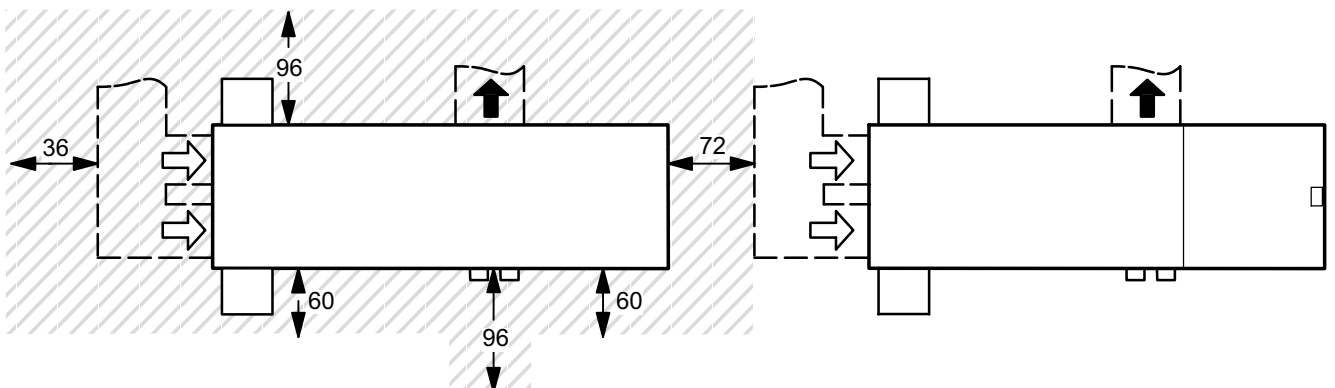
INSTALLATION/SERVICE CLEARANCES - INCHES



Vertical Airflow Applications - Service clearances can be shared by multiple units.



Horizontal Airflow Applications - Service clearances can be shared by multiple units.



OPTIONAL UNIT CONTROLLERS AND SYSTEMS INTEGRATION

FACTORY OR FIELD INSTALLED

NOVAR ETM-2051 (not available for VAV applications)

Electronic Thermostat Module (ETM)/Blower Proving Switch/Return Air Sensor/Discharge Air Sensor/Wiring Harness -

Module monitors unit operation from different sensors installed in unit and monitors unit diagnostic codes of the IMC. The ETM has outputs for 2 stage heat/2 stage cool, 7 relay outputs: fan Cool 1, Cool 2, Heat 1, Heat 2, Economizer, Night Mode, automatic or continuous blower operation, economizer damper operation and night setback, features: day/occupied mode with low enthalpy (outdoor air damper open), high enthalpy (outdoor air damper closed) or night/unoccupied mode (outdoor air damper closed), network communication (RS-485, shielded pair twisted wire), local override (1 to 255 minutes), watchdog function, fail-safe operation, ETM allows units to be "daisy chained" together (up to 31 units) to be operated from one central location with an "executive" type control processor (on-site or off-site), built-in time delays, built-in unit operating defaults, diagnostic LED's indicate various operating functions, surge suppression protects ETM against lightning or voltage spikes, Blower Proving Switch monitors blower operation and locks out unit in case of blower failure, Return Air Sensor provides input to ETM module to determine heating or cooling operation and number of stages required, Discharge Air Sensor monitors leaving air temperature during unit operation.

C0CTRL35EA1L

FIELD INSTALLED

Room Temperature Sensor with Adjustable Temperature Setpoint and Built-in Night Setback Override Button - Provides input to ETM module to determine heating or cooling operation and number of stages required. Temperature setpoint adjustment. Override button allows momentary override of night setback during unoccupied mode. Status LED.

C0SNZN75AE1-

Room Temperature Sensor - Provides input to ETM module to determine heating or cooling operation and number of stages required.

C0SNZN74AE1-

Room Temperature Sensor with Switchover - Used to sense indoor space temperatures in commercial and industrial environments. In programmable "fall-back" configuration, provides capability to switch over control to a secondary sensor if the signal is lost from this sensor.

C0SNZN76AE1-

Averaging Sensor - Used for temperature averaging in a large room.

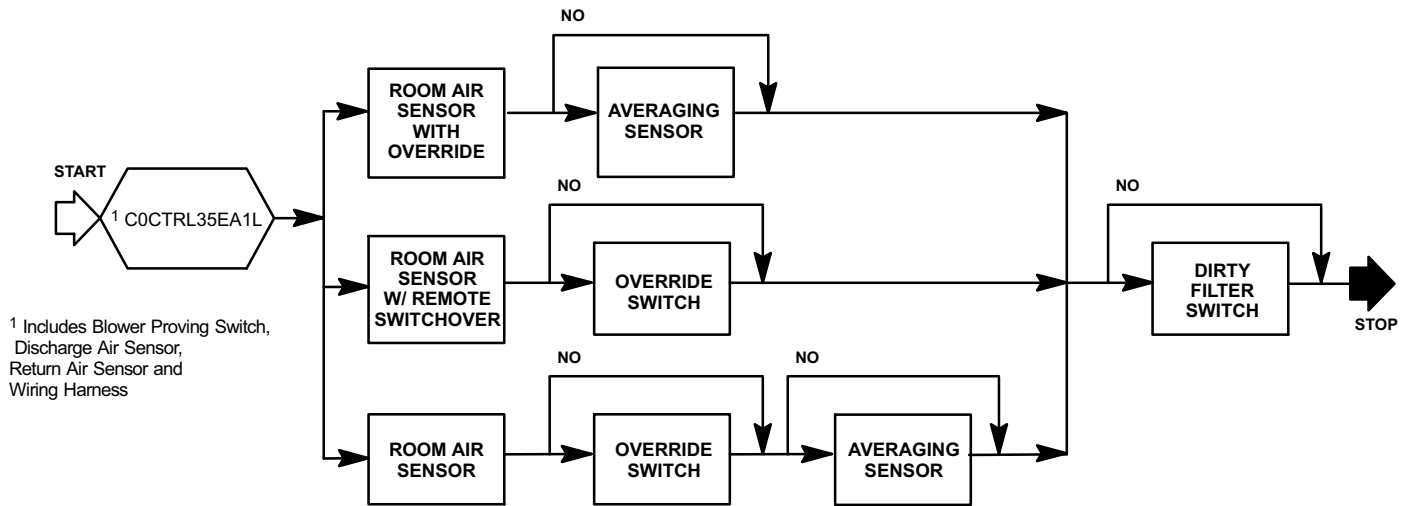
C0SNZN74AE1-

Override Switch - After Hours Remote Override Button - Wall Plate furnished.

C0SWCH20AE1-

Dirty Filter Switch - Senses static pressure increase indicating a dirty filter condition.

C0SWCH00AE1-



OPTIONAL UNIT CONTROLLERS AND SYSTEMS INTEGRATION

FACTORY OR FIELD INSTALLED

IMC LONTALK® MODULE

The IMC LonTalk module allows communication between the Lennox IMC (M1-7, v5.10+) controller and a LonWorks® network. The module translates input and output variables between the Lennox protocol and the LonTalk protocol. The IMC LonTalk Module has been developed to communicate with building automation systems that support the LonMark® Space Comfort Controller (SCC) or Discharge Air Controller (DAC) functional profiles. A Lennox zone sensor, a LonTalk network zone sensor, or a LonTalk thermostat or DDC controller may be used to send the zone temperature or thermostat demands to the IMC.

The IMC LonTalk Module utilizes an FTT-10A free topology transceiver communicating at 78.8 kbps. It is compatible with Echelon® qualified twisted pair cable such as Lennox model no. C0MISC03AE1-, Belden 8471 or NEMA Level 4 cables. The Module can communicate up to 1640 ft. (500m) with no repeater and up to 3200 ft. (1000m) with one repeater. The LonWorks limit of 64 nodes per segment applies to this device. One termination module, Lennox model no. C0MISC90AE1- is required for free topology segments and two are required for doubly terminated bus topology segments. Termination modules must be field provided.

C0CTRL51AE1L

NOTE: A qualified systems integrator with adequate training and experience is required to integrate and commission the IMC LonTalk Module into a third-party LonTalk building automation system. A LonWorks network configuration software tool such as LonMaker® (or equivalent) is required to commission the LonWorks network. An external interface file (XIF) will be made available upon request.

LONWORKS NETWORK VARIABLES - INPUTS

LonMark Name	Variable Type	Description
nviApplicMode	SNVT_hvac_mode	Unit application mode
0-Auto		Auto (unit-defined operation)
1-Heat		Demand for full heating
3-Cool		Demand for full cooling
6-Off		Unit off (IMC standby)
9-Fan only		Main fan (blower) on
254-Reset		Force controller reset
255-Null		Same as auto.
nviOAMinPos	SNVT_lev_percent	Min economizer damper position
nviOccManCmd	SNVT_occupancy	Zone occupied status
nviOccSchedule	SNVT_tod_event	Occupancy scheduler input used to put controller unit into different occupancy modes
nviOccSensor	SNVT_occupancy	Occupancy sensor input. Used to indicate the presence of occupants
nviSpaceDehumSP	SNVT_lev_percent	Zone relative humidity set point
nviSetpoint	SNVT_temp_p	Zone temperature setpoint
nviSetptOffset	SNVT_temp_p	Zone temp setpoint offset
nviSpaceTemp	SNVT_temp_p	Remote zone temp.
nviEmergOverride	SNVT_hvac_emerg	Emergency smoke override
nviComprEnable	SNVT_switch	Compressor enable
nviPriHeatEnable	SNVT_switch	Primary heat enable
nviAuxHeatEnable	SNVT_switch	Auxiliary heat enable

OPTIONAL UNIT CONTROLLERS AND SYSTEMS INTEGRATION

IMC LONTALK® MODULE (Continued)

LONWORKS NETWORK VARIABLES - OUTPUTS

LonMark Name	Variable Type	Description
snvoIMCVersion	Manufacturer defined	IMC firmware version. D0-D3 (ASCII)
snvoUnitID	Manufacturer defined	Unit ID. \$3x-Gas/Elect \$4x-Elect/Elect \$5x-Heat Pump
nvoUnitStatus:	SNVT_hvac_status	Unit operation mode (i.e. cool, heat, etc)
1 - HVAC heat		
2 - HVAC morning warmup		
3 - HVAC cool		
5 - HVAC pre-cool		
6 - HVAC off		
7 - HVAC test		
8 - HVAC emergency heat		
9 - HVAC fan only		
12 - HVAC max heat		
14 - HVAC dehumidification		
129 - HVAC fresh air heating		
131 - HVAC fresh air cooling		
145 - HVAC defrost 1		
161 - HVAC defrost 2		
177 - HVAC defrost 1 2		
nvoSpaceTemp	SNVT_temp_p	Zone Temperature, effective
nvoDischAirTemp	SNVT_temp_p	Supply air temperature
nvoEffectOccup	SNVT_occupancy	Zone occupied status
nvoLocalOATemp	SNVT_temp_p	Outdoor air temperature
nvoLocalSpaceTemp	SNVT_temp_p	Zone Temperature, local
nvoOADamper	SNVT_lev_percent	Economizer damper position
nvoHeatPrimary	SNVT_lev_percent	Primary heating status
nvoHeatSecondary	SNVT_lev_percent	Heat pump electric strip heating status
nvoCoolPrimary	SNVT_lev_percent	Cooling compressor 1-4 status (on/off)
nvoEconEnabled	SNVT_switch	Economizer outdoor air suitable
nvoSupFanStatus	SNVT_switch	Supply fan status
nvoEffectSetpt	SNVT_temp_p	Zone temperature set points
snvoCurrentError	Manufacturer defined	Currently displayed error code
snvoCommStatus	Manufacturer defined	IMC Communicating
snvoErrorPointer	Manufacturer defined	Error pointer. This value points to the next available alarm code location. It runs from 0 to 83 and then returns to 0. Tracking this value and using the ten most recent IMC error codes (next variable) allows an application to 1) determine when new errors are logged by the IMC, 2) what those errors are, and 3) if any errors have been missed due to network delays or other reasons.
snvoMostRecErr1-10	Manufacturer defined	Alarm codes listed in the IMC manual
nvoSpaceCO2	SNVT_ppm	Zone CO ₂ level (PPM), local
nvoSpaceRHEff	SNVT_lev_percent	Zone relative humidity, effective
nvoSpaceRH	SNVT_lev_percent	Zone relative humidity, local
nvoEffSpaceDHSP	SNVT_lev_percent	Zone relative humidity set point
nvoDehumidifier	SNVT_switch	Dehumidification status
nvoRATemp	SNVT_temp_p	Return air temperature
nvoBldgStatPress	SNVT_press_p	Analog Input 2 (GP1 - VAV Bldg Static)
nvoDuctStatPress	SNVT_press_p	Analog Input 1 (GP1 - VAV Supply Static)
nvoExhFanStatus	SNVT_switch	Exhaust fan status

OPTIONAL UNIT CONTROLLERS AND SYSTEMS INTEGRATION

FACTORY OR FIELD INSTALLED

IMC BACNET® MODULE

The IMC BACnet module allows communication between the Lennox IMC (M1-7, v5.10+) controller and a BACnet MSTP network. The module translates input and output variables between the Lennox protocol and the BACnet protocol. The IMC BACnet Module has been developed to communicate with building automation systems that support the BACnet Application Specific Controller (B-ASC) device profile. A Lennox zone sensor, a BACnet network zone sensor, or a BACnet thermostat or DDC controller may be used to send the zone temperature or thermostat demands to the IMC.

The IMC BACnet Module is compatible with MSTP EIA-485 daisy-chain networks communicating at 38.4 kbps. It is compatible with twisted pair, shielded cable such as Lennox model nos. C0MISC00AE1-, C0MISC04AE1- or C0MISC01AE1- or Belden 8761, 88761. A maximum of 31 IMC BACnet Modules can be included per network. The BACnet MSTP maximum total bus length (without repeater) of 850 ft. (260m) applies to this device. A 120 ohm resistor must be added to the last module in the daisy chain (included in field kit).

COCTRL50AE1L

NOTE: A qualified systems integrator with adequate training and experience is required to integrate and commission the IMC BACnet Module into a third-party BACnet building automation system. A BACnet network configuration software tool is required to commission the BACnet network.

INPUTS TO IMC

BACnet Object Name	Object Type: ID: Units	Description
Application Mode Control	AO: 101:95 (No_Units)	Unit application
0 - Auto		Auto (unit-defined operation)
1 - Heat		Demand for full Heating
3 - Cool		Demand for full Cooling
6 - Off		Unit Off (IMC stand by)
9 - Fan only		Main fan (blower) on
228 - Cool 1		Thermostat input Y1
232 - Cool 2		Thermostat input Y2
236 - Cool 3		Thermostat input Y1 & Y2
225 - Heat 1		Thermostat input W1
226 - Heat 2 (heat pump only)		Thermostat input W2 (heat pump emergency heat)
227 - Heat 3		Thermostat input W1 & W2
229 - Supermarket Reheat Lo		Thermostat input Y1 & W1
230 - Supermarket Reheat Hi		Thermostat input Y1 & W2
254 - Reset		Force controller reset
255 - Null		Same as auto.
Outdoor Air Min Pos Control	AO: 102 : 98 (Percent)	Min economizer damper position
Occupancy Override Control	AO: 103: 95 (No_Units)	Zone occupied status
Occupancy Scheduler Control	AO: 104: 95 (No_Units)	Occupancy scheduler input used to put controller unit into different occupancy modes.
Occupancy Sensor Input	AO: 107: 95 (No_Units)	Occupancy sensor input. Used to indicate the presence of occupants
Space Dehumidification Setpt	AO: 108: 98 (Percent)	Zone relative humidity set point
Temperature Setpoint (abs)	AO: 109: 64 (Degrees - Fahrenheit)	Zone temperature setpoint
Temperature Setpoint Offset	AO: 110: 64 (Degrees - Fahrenheit)	Zone temp setpoint offset
Space Temperature Input	AO: 113: 64 (Degrees - Fahrenheit)	Remote zone temp.
Emergency Override Control	AO: 114: 95 (No_Units)	Emergency smoke override
Compressor Enable Control	AO: 115: 98 (Percent)	Compressor enable
Primary Heat Enable Control	AO: 117: 98 (Percent)	Primary heat enable
Auxiliary Heat Enable Control	AO: 119: 98 (Percent)	Auxiliary heat enable

OPTIONAL UNIT CONTROLLERS AND SYSTEMS INTEGRATION

IMC BACNET® MODULE (Continued)

OUTPUTS FROM IMC

OUTPUTS FROM IMC

IMC Version [00].....[07]	AI: 200-207 : 95 (No_Units)	IMC firmware version. (null terminated ASCII)
Unit ID	AI: 231 : 95 (No_Units)	Unit ID \$3x-Gas/Elect. \$4x-Elect/Elect. \$5x-Heat Pump
Unit Status	AI :232 : 95 (No_Units)	Unit operation mode (i.e. cool, heat, etc.)
1 - HVAC heat		
2 - HVAC morning warm-up		
3 - HVAC cool		
5 - HVAC pre-cool		
6 - HVAC off		
7 - HVAC test		
8 - HVAC emergency heat		
9 - HVAC fan only		
12 - HVAC max heat		
14 - HVAC dehumidification		
129 - HVAC fresh air heating		
131 - HVAC fresh air cooling		
145 - HVAC defrost 1		
161 - HVAC defrost 2		
177 - HVAC defrost 1, 2		
Space Temperature	AI: 239 : 64 : 95 (Degrees - Fahrenheit))	
Discharge Air Temperature	AI: 240 : 64 (Degrees - Fahrenheit)	Supply air temperature
Effective Occupancy	AI : 241 : 95 (No_ Unit)	Zone occupied status
Local Outside Air Temperature	AI 242 : 64 (Degrees - Fahrenheit)	Outdoor air temperature
Local Space Temperature	AI: 243 :64 (Degrees Fahrenheit)	Zone Temperature, local
Outside Air Damper	AI: 244 : 98 (Percent)	Economizer damper position
Heat Primary	AI: 245 :98 (Percent)	Primary heating status
Heat Secondary	AI: 246 : 98 (Percent)	Heat pump electric strip heating status
Cool Primary	AI: 247 : 98 (Percent)	Cooling compressor 1-4 status (on/off)
Economizer Enabled	AI: 248 : 95 (Percent)	Economizer outdoor air suitable
Supply Fan Status	AI: 250 : 98 (Percent)	Supply fan status
Space Temperature Set Point (Eff)	AI: 252 :64 (Degrees Fahrenheit)	Zone temperature set points
Current Error	AI: 253 : 95 (No_Units)	Currently displayed error code
Error Pointer	AI: 254 : 95 (No_Units)	Error pointer. This value points to the next available alarm code location. It runs from 0 to 83 and then rolls-over to 0. Tracking this value and using the ten most recent error codes (below) allows an application to determine when new errors are logged by the IMC, what those errors are, and if any errors have been missed due to network delays or for any other reason.
Most recent Error 1..10	AI: 255-264 : 95 (No _Units)	IMC alarm codes as listed in the IMC manual.
Space CO2 Sensor (Local)	AI : 274 :96 (Parts per million)	Zone CO ₂ level (PPM), local
Space Humidity (Local)	AI: 276 : 98 (Percent)	Zone relative humidity, local
Dehumidification Set Point (Eff)	AI: 278 : 98 (Percent)	Zone relative humidity set point
Dehumidification Status	AI: 279 : 95 (No_Units)	Dehumidification status
Return Air Temperature	AI: 281 :64 (Degrees Fahrenheit))	Return air temperature
Building Static Pressure	AI: 282 : 64 (Inches of water)	Analog Input 2 (GP1 - VAV Bldg Static)
Duct Static Pressure	AI: 282 : 64 (Inches of water)	Analog Input 1 (GP1 - VAV Supply Static)
Exhaust Fan Status	AI: 285 :98 (Percent)	Exhaust fan status
Controller Online	B1:100 :95 (No_Units)	IMC Communicating

OPTIONAL CONVENTIONAL TEMPERATURE CONTROL SYSTEMS - FIELD INSTALLED

COMMERCIAL TOUCHSCREEN THERMOSTAT



Intuitive Touchscreen Interface - **Two Stage Heating / Two Stage Cooling Conventional or Heat Pump** - Seven Day Programmable - Four Time Periods/Day - Economizer Output - Title 24 Compliant - ENERGY STAR® Qualified - Backlit Display - Automatic Changeover

C0STAT02AE1L

Sensors For Touchscreen Thermostat

- 1 Remote non-adjustable wall mount 20k temperature sensor C0SNZN01AE1-
- 1 Remote non-adjustable wall mount 10k averaging temperature sensor C0SNZN73AE1-
- 1 Remote non-adjustable duct mount temperature sensor C0SNDC00AE1-
- Outdoor temperature sensor C0SNSR03AE1-

Accessories For Touchscreen Thermostat

- Locking cover (clear) C0MISC15AE1-

¹ Remote sensors for C0STAT02AE1L can be applied in the following combinations: (1) C0SNZN01AE1-, (2) C0SNZN73AE1-, (2) C0SNZN01AE1- and (1) C0SNZN73AE1-, (4) C0SNZN01AE1-, (3) C0SNZN01AE1- and (2) C0SNZN73AE1.

DIGITAL NON-PROGRAMMABLE THERMOSTATS



Intuitive Interface - Automatic Changeover - Simple Up and Down Temperature Control

Two-stage heating / cooling conventional systems C0STAT10AE1L

Sensor For Digital Non-Programmable Thermostats Above

- Remote wall mounted temperature sensor C0SNZN00AE1-



Intuitive Interface - Automatic Changeover - Backlit Display - Simple Up and Down Temperature Control

One-stage heating / cooling conventional systems C0STAT12AE1L

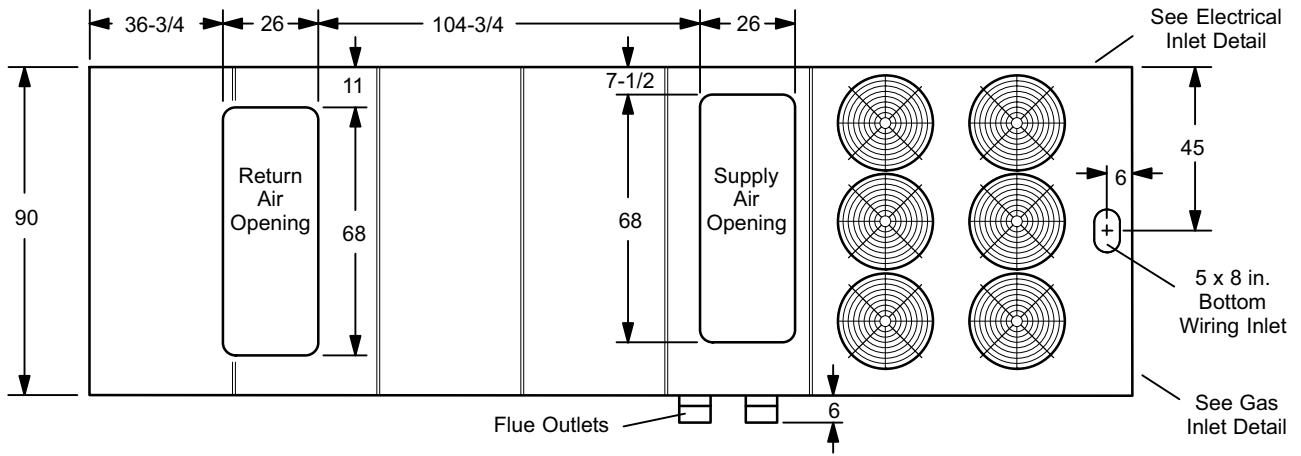
Sensor For Digital Non-Programmable Thermostats Above

- Outdoor temperature sensor C0SNSR04AE1-

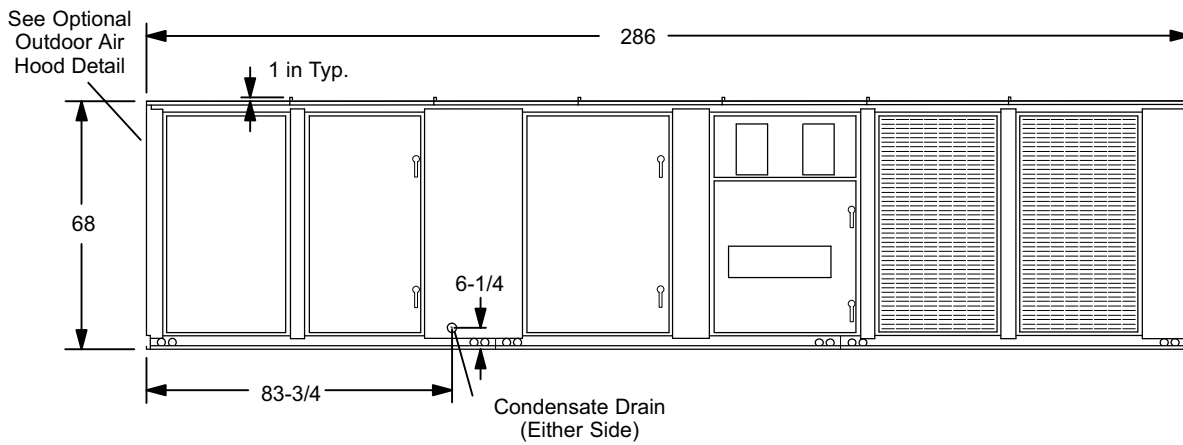
Accessories For Digital Non-Programmable Thermostats Above

- Optional wall mounting plate C0MISC17AE1-

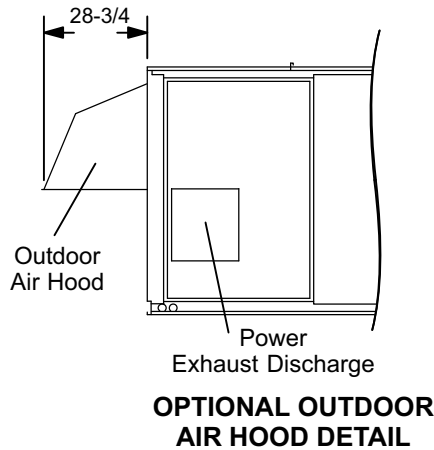
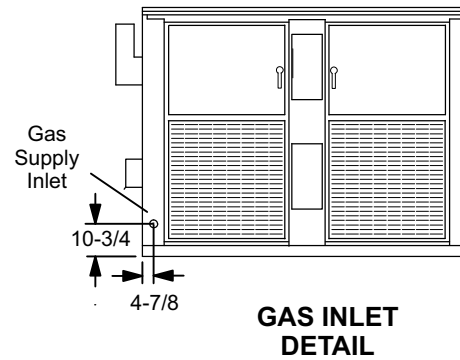
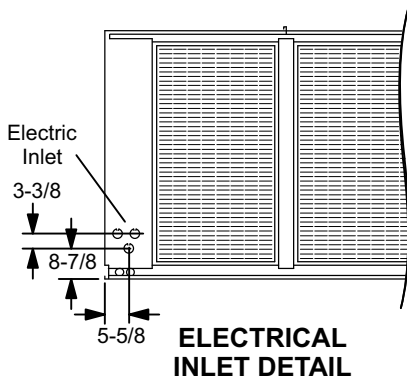
DIMENSIONS - INCHES - VERTICAL AIRFLOW



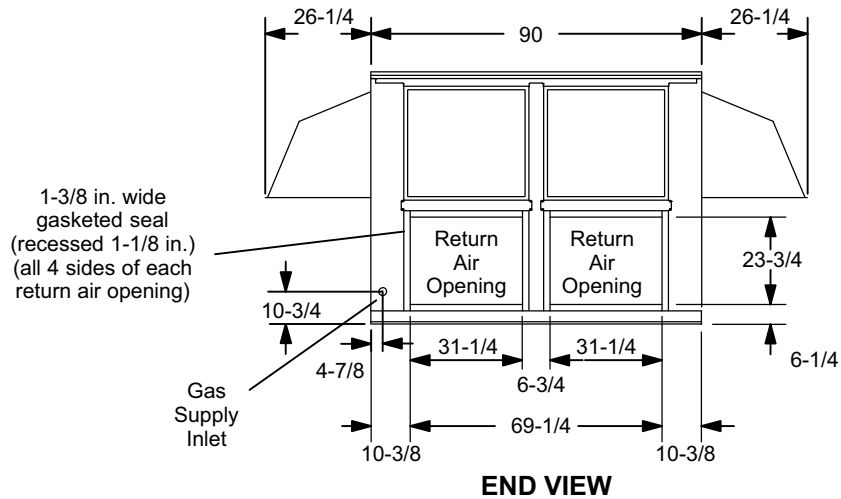
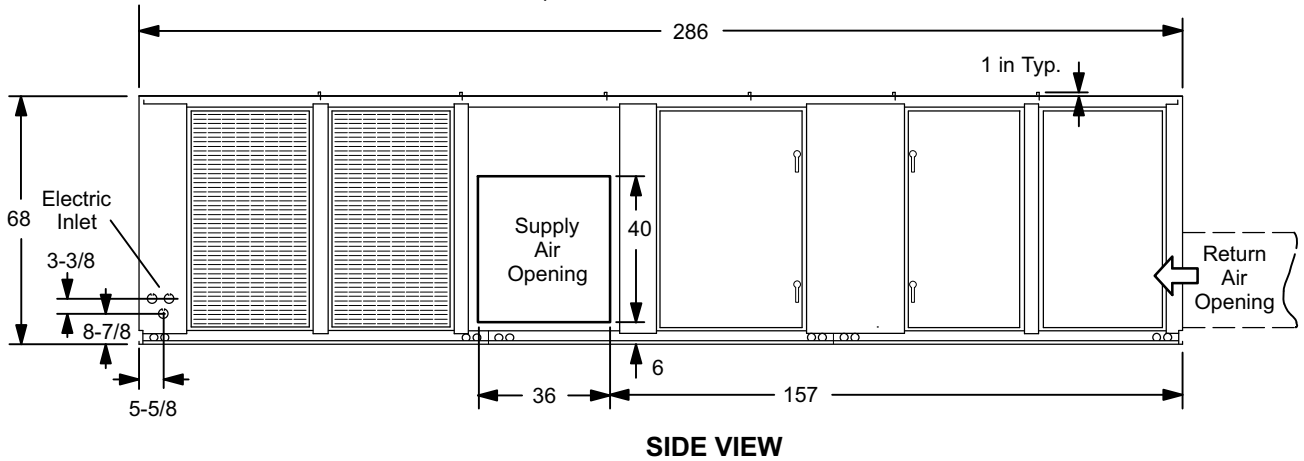
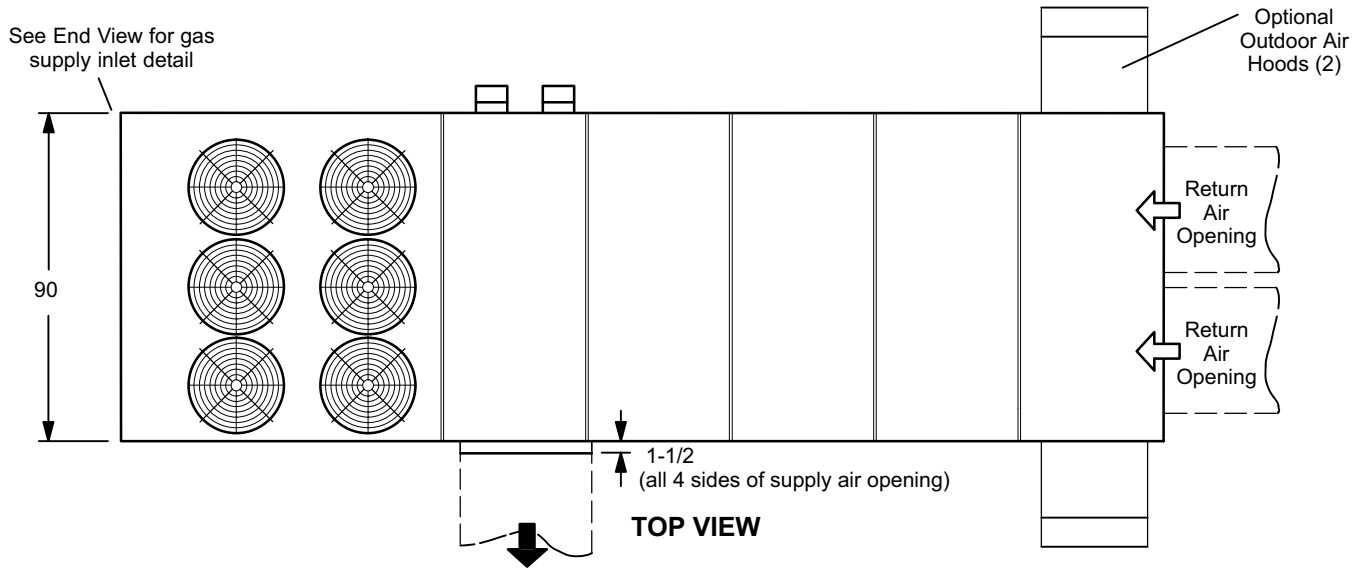
TOP VIEW - Base Section



SIDE VIEW

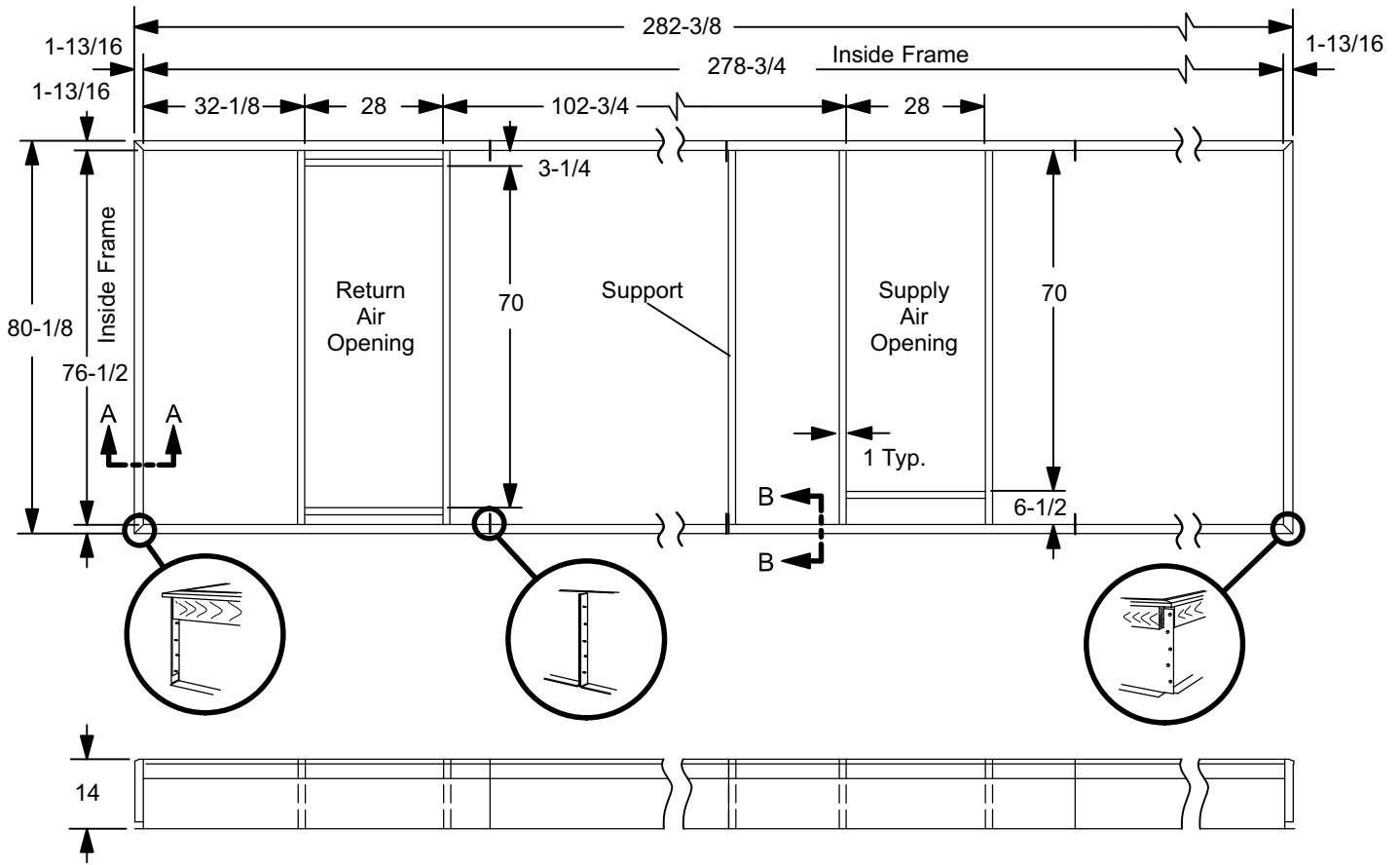


DIMENSIONS - INCHES - HORIZONTAL AIRFLOW

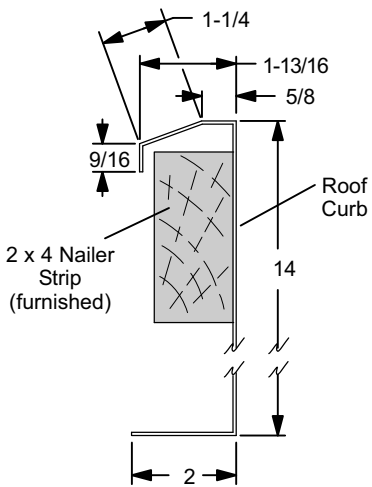


ACCESSORY DIMENSIONS - INCHES

ROOF CURB - 14 inch high

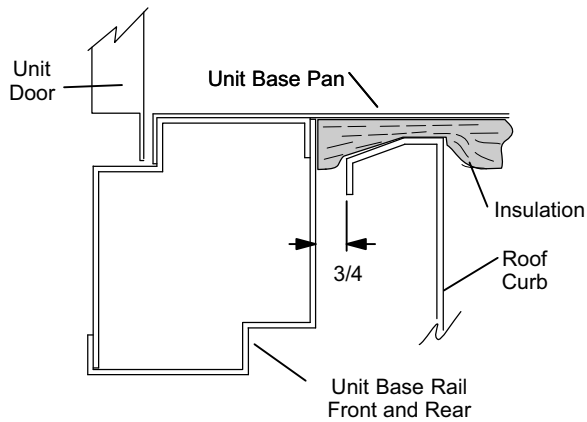


ROOF CURB SECTION A-A



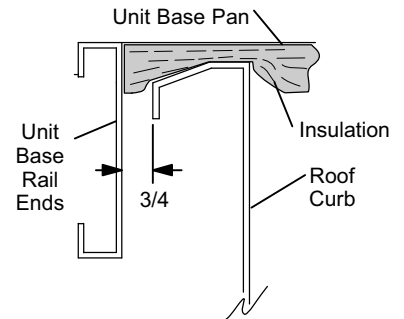
SIDE SECTION B-B

With Unit Base Rail and Pan



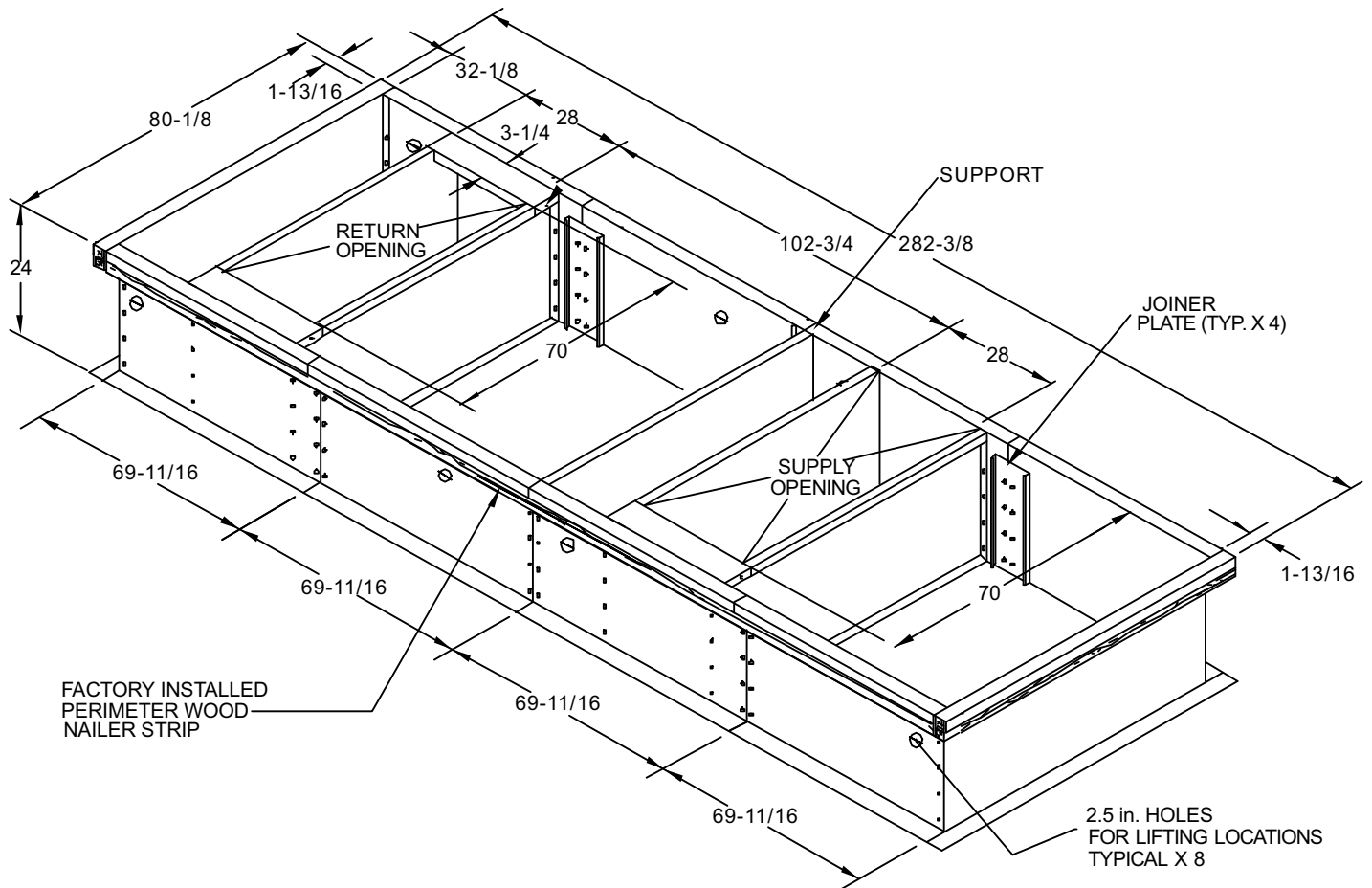
END SECTION A-A

With Unit Base Rail and Pan



ACCESSORY DIMENSIONS - INCHES

ROOF CURB - 24 inch high



WEIGHT DATA - LBS.

UNIT WEIGHTS

Model Number	¹ Operating Weight - Base Unit	Maximum Unit Rigging Weight
SGA420S2*S SGA480S2*S SGA540S2*S	6275	7945
SGA600S2*S	6425	8095
SGA420S2*H SGA480S2*H SGA540S2*H	6385	8055
SGA600S2*H	6535	8205
SGA480H4*S SGA600S4*S	6425	8095
SGA480H4*H SGA600S4*H	6535	8205

¹ For total weight add base unit weight, indoor blower motor weight and weight of all accessories.

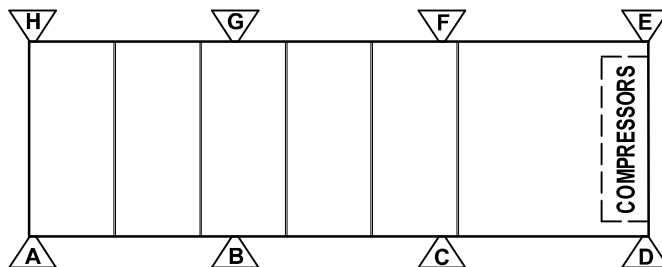
INDOOR BLOWER WEIGHTS

Constant Air Volume Blower Motors - hp							Variable Air Volume Blower Motors - hp weights include variable frequency drive and bypass										
5	7.5	10	15	20	25	30	5	7.5	10	15	20	25 208/230V & 460V		575V	30 208/230V & 460V		575V
70	127	141	187	211	263	300	90	157	171	232	256	318	346	360	390		

OPTIONAL ACCESSORY WEIGHTS

Power Exhaust				
High Static PEF			Standard Static PEF	
50% One Centrifugal Blower	100% Two Centrifugal Blowers	Variable Frequency Drive (VFD)	50% One Propeller-Type Fan	100% Two Propeller-Type Fans
300	500	50	60	120
Barometric Relief Dampers	Disconnect or Circuit Breaker	Economizer	Energy Recovery Wheel	Humiditrol®
50	30	165	420	150
Outdoor Air Dampers	Powered GFI Service Outlet	Roof Curb 14 in.	Roof Curb 24 in.	Service Valves
140	30	375	800	25

POINT LOADING



PERCENTAGES OF TOTAL UNIT WEIGHT

To calculate point loads for a specific model, multiply percentages by unit operating weight.

Unit Configuration	A	B	C	D	E	F	G	H
No Power Exhaust or ERW	6%	10%	15%	15%	18%	18%	12%	6%
With Power Exhaust	9%	11%	13%	13%	16%	16%	13%	9%
With Power Exhaust and ERW	10%	12%	12%	12%	15%	15%	14%	10%

GUIDE SPECIFICATIONS

Optional text is indicated by brackets []; delete optional text in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

This specification is designed for Lennox S-Class™ Packaged Rooftop Units. These products are manufactured by Lennox Industries Inc. Revise section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

SECTION 15730

UNITARY AIR CONDITIONING EQUIPMENT

PART 1 GENERAL

PART 1.01 SUMMARY

- A. Section Includes: 35, 40, 45 and 50 ton packaged gas/electric and electric/electric rooftop units with variable or constant air volume.

Specifier Note: Revise paragraph below to suit project requirements. Add section numbers and titles per CSI *MasterFormat* and specifier's practice.

- B. Related Sections:

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain Reference Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 1 References Section may establish the edition date of standards. This article does not require compliance with standard, but is merely a listing of references used. Article below should list only those industry standards referenced in this section. Retain only those reference standards to be used within the text of this Section. Add and delete as required for specific project.

PART 1.02 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI/ASHRAE 15 Safety Standard for Refrigeration Systems.
 - 2. ANSI/ASHRAE/IESNA 90.1 Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings.
 - 3. ANSI Z21.47 Gas-Fired Central Furnaces.
- B. Air Conditioning and Refrigeration Institute (ARI):
- C. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE):
 - 1. ASHRAE 52.2 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size (ANSI approved).
 - 2. ASHRAE 62.1 Ventilation Standard for Acceptable Indoor Air Quality.
- D. Canadian Standards Association (CSA):
 - 1. CAN/CSA B149.1 Natural Gas and Propane Installation Code.
 - 2. CAN/CSA B149.2 Propane Storage and Handling Code.
 - 3. CSA C22.1 Canadian Electrical Code.
 - 4. CSA 2.3 Gas-Fired Central Furnaces.
- E. U.S. Energy Policy Act of 1992 (EPACT).
- F. U.S. National Appliance Energy Conservation Act (NAECA):
 - 1. NAECA 1988.
- G. National Fire Protection Association (NFPA):
 - 1. NFPA 90A Installation of Air Conditioning and Ventilation Systems.
- H. Underwriters Laboratories, Inc. (UL):
 - 1. UL 1995 Standard for Safety for Heating and Cooling Equipment.

Specifier Note: Article below should be restricted to statements describing design or performance requirements and functional (not dimensional) tolerances of a complete system. Limit descriptions to composite and operational properties required to link components of a system together and to interface with other systems.

GUIDE SPECIFICATIONS

PART 1.03 SYSTEM DESCRIPTION

- A. Design Requirements: Provide products and systems that have been manufactured, fabricated and installed to the following criteria:
1. ANSI/ASHRAE/IESNA 90.1.
 2. ANSI Z21.47-2000/CSA 2.3.
 3. CAN/CSA B149.1.
 4. CAN/CSA B149.2.
 5. CSA C22.1.
 6. UL 1995.

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 1 Submittal Procedures Section.

PART 1.04 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of Contract and Division 1 Submittal Procedures.
- B. Product Data: Submit product data, including manufacturer's product data sheets, for specified products.
- C. Shop Drawings:
1. Submit shop drawings in accordance with Section [01330 - Submittal Procedures].
 2. Indicate:
 - a. Equipment, piping and connections, together with valves, strainers, control assemblies, thermostatic controls, auxiliaries and hardware, and recommended ancillaries which are mounted, wired and piped ready for final connection to building system, its size and recommended bypass connections.
 - b. Piping, valves and fittings shipped loose showing final location in assembly.
 - c. Control equipment shipped loose, showing final location in assembly.
 - d. [Complete internal panel pneumatic tube piping and wiring and external panel pneumatic tube piping and wiring, both as schematics and as actually assembled].
 - e. Dimensions, internal and external construction details, recommended method of installation with proposed structural steel support, mounting curb details, sizes and location of mounting bolt holes; include mass distribution drawings showing point loads.
 - f. Detailed composite wiring diagrams for control systems showing factory installed wiring and equipment on packaged equipment or required for controlling devices or ancillaries, accessories and controllers.
 - g. Pump and fan performance curves.
 - h. Details of vibration isolation.
 - i. Type of refrigerant used.
 - j. Plan view, front view, end view, back view and curb detail with dimensions.
- D. Quality Assurance:
1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
 2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 3. Manufacturer's Instructions: Manufacturer's installation instructions.

Specifier Note: Coordinate paragraph below with Part 3 Field Quality Requirements Article herein. Retain or delete as applicable.

- E. Manufacturer's Field Reports: Manufacturer's field reports specified.
- F. Closeout Submittals: Submit following:
1. Warranty: Warranty documents specified.
 2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance. Include names and addresses of spare part suppliers.
 3. Provide brief description of unit, with details of function, operation, control and component service.
 4. Provide equipment inspection report and equipment operation test report.
 5. Commissioning Report: Submit commissioning reports, report forms and schematics in accordance with Section 01810 - Commissioning.

GUIDE SPECIFICATIONS

PART 1.05 QUALITY ASSURANCE

A. Qualifications:

1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction and approving application method.

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Conditions of the Contract and Division 1 Regulatory Requirements Section. Repetitive statements should be avoided. Current data on building code requirements and product compliance may be obtained from filter manufacturer technical support specialists

B. Regulatory Requirements: Provide Packaged Gas Electric, Rooftop Unit that complies with following requirements:

1. ARI 340/360.
2. ASHRAE 52.2.
3. CAN/CSA B149.1.
4. CAN/CSA B149.2.
5. CSA C22.1.
6. NFPA 90A.

C. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings).

PART 1.06 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 1 Product Requirements.

B. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

C. Packing, Shipping, Handling and Delivery:

1. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
2. Ship, handle and unload units according to manufacturer's instructions.

D. Storage and Protection:

1. Store materials protected from exposure to harmful weather conditions.
2. Factory shipping covers to remain in place until installation.

PART 1.07 PROJECT CONDITIONS

A. Installation location: [Confirm design conditions and temperature.]

Specifier Note: Coordinate article below with Conditions of the Contract and with Division 1 Closeout Submittals (Warranty).

PART 1.08 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

Specifier Note: Coordinate paragraph below with manufacturer's warranty requirements.

C. Warranty: Commencing on Date of Installation.

1. Aluminized Heat Exchangers: 10 years (limited).
2. Stainless Steel Heat Exchangers: 15 years (limited).
3. Compressors: 5 years (limited).
4. Integrated Modular Controller: 3 years (limited).
5. Other System Components: 1 year (limited).

GUIDE SPECIFICATIONS

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

PART 2.01 ROOFTOP UNITS

- A. Manufacturer: Lennox Industries Inc.
 - 1. Contact: 2100 Lake Park Blvd., Richardson, TX 75080; Telephone: (800) 453-6669; website: www.lennox.com.
- B. Proprietary Products/Systems: Lennox' S-Class™ Packaged Rooftop Units, including the following equipment:
 - 1. Cabinet: [Vertical] [Horizontal] supply and return airflow configuration with:
 - a. Interior Panels: Constructed of heavy gauge, galvanized steel [With factory installed, enhanced corrosion protection].
 - b. Exterior Panels: Constructed of heavy gauge, galvanized steel with 2-layer enamel paint finish.
 - c. Access Panel: Hinged for service access with seals and quarter-turn latching handles providing tight air and water seal.
 - d. Openings:
 - 1) Unit base and horizontal access knockouts for electrical line entry.
 - 2) Raised edges around duct and power entry openings.
 - e. Insulation:
 - 1) Panels adjacent to conditioned air insulated with non-hygroscopic fiberglass insulation [And with factory installed metal liner].
 - 2) Unit base fully insulated.
 - f. Base Rail: Full perimeter steel base rail with rigging holes.
 - 2. Wiring:
 - a. Color-coded and continuously marked to identify point-to-point component connections.
 - 3. Cooling System:
 - a. Capable of operating from 0 degrees F - 125 degrees F (-18 - 52 degrees C) without installation of additional controls.
 - b. [High efficiency, factory charged with R-410A (40 ton unit only)] [Standard efficiency, factory charged with R-22] [Standard efficiency, factory charged with R-410A (50 ton unit only)].
 - c. Four independent compressor circuits.
 - d. Compressors: Resiliently mounted, Copeland scroll type.
 - e. Compressor crankcase heaters.
 - f. Thermal expansion valves with removable element head.
 - g. Filter/driers.
 - h. High pressure switches for overload protection; manual reset.
 - i. Low pressure switches with manual reset.
 - j. Freezestats for ice damage protection.
 - k. Coil Construction: Factory leak tested, copper tube construction with enhanced rippled-edge aluminum fins, flared shoulder tubing connections and silver solder.
 - l. Evaporator Coil: [Face-split (constant volume models)] [Row-split (variable air volume models)] coils of cross flow circuiting with rifled copper tubing [With corrosion protection coating, painted base pan and painted door panels].
 - m. Condenser Coils: Slab design protected from weather or contact damage [With corrosion protection coating and painted base pan].
 - n. Outdoor Coil Fan Motors: Thermal overload protected, enclosed, permanently lubricated ball bearings, shaft up, wire basket mount.
 - o. Outdoor Coil Fan with PVC coated fan guard.
 - p. Condensate Drain Pan: [Galvanized] [Stainless steel] with reversible positive slope and drain connection extending outside unit.

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Specifier Note: The following features are optional. Include as necessary.

- q. Optional factory installed equipment:
 - 1) Compressor Vibration Isolation: Factory installed 2 inch (51 mm) springs, compressor deck completely isolated.
 - 2) Service Valves: Factory installed, fully serviceable.
 - 3) Blower Vibration Isolation: Factory installed, supply air, 2 inch (51 mm) springs, supply air mounting frame completely isolated.
 - 4) Hot Gas Bypass. Factory installed, bypasses hot gas refrigerant from first stage compressor to suction line, de-superheater valve bypasses refrigerant from liquid line to maintain constant suction superheat [not available with Humiditrol option]

Specifier Note: The following optional equipment is available only for Constant Air Volume models.

- r. Humiditrol Hot Gas Reheat: Factory installed humidity control with 3 modes of operation - No Dehumidification Demand, Dehumidification and Cooling Demand, Dehumidification Demand only.
4. Heating System:
- a. Gas:
 - 1) Aluminized steel inshot burners, direct-spark ignition, electronic flame sensor, 2-speed combustion air inducer, redundant automatic 2-stage gas valves with manual shutoff.
 - 2) Heat Exchanger: Life cycle tested, [Aluminized steel, tubular design (for applications with entering mixed air temperatures of 45 degrees F (7 degrees C) or above)] [Stainless steel, tubular design (for applications with entering mixed air temperatures below 45 degrees F (7 degrees C))].
 - 3) Fan and Limit Controls: Factory installed with fixed temperature setting.
 - 4) Safety Switches: Flame rollout switches, flame sensors and combustion air inducer proving switches monitored by IMC unit controller.
 - 5) [Standard heat with 330,000 Btuh low fire/500,000 Btuh high fire input] [High heat with 528,000 Btuh low fire/800,000 Btuh high fire input] [Natural gas] [LPG/Propane].

Specifier Note: The following features are optional. Include as necessary.

- 6) Optional Factory Installed Equipment:
 - a) Low Temperature Vestibule Heater: Factory installed, allows operation down to minus 60 degrees F (minus 51 degrees C).
 - b) Modulating Gas: Stainless steel heat exchanger, full modulation from 25-100%, discharge air temperature control [Standard heat with 500,000 Btuh high fire input] [High heat with 800 Btuh high fire input] [Natural gas] [LPG/Propane]
- b. Electric:
 - 1) Elements shall be heavy duty nickel chromium internally wired with a maximum density of 47 watts per square inch.
 - 2) Available on vertical downflow discharge units.
 - 3) Power supply [Dual point power] [Single point power].
 - 4) Rated airflow shall be a minimum of 280 CFM per nominal ton.
 - 5) 35 ton unit, 208-230/3/60 with [30 kW] [45 kW] [60 kW] [75 kW] [90 kW] electric heater.
 - 6) 35 ton unit, [460/3/60] [575/3/60] with [30 kW] [45 kW] [60 kW] [75 kW] [90 kW] [105 kW] [120 kW] electric heater.
 - 7) 40 ton, 208-230/3/60 with [30 kW] [45 kW] [60 kW] [75 kW] [90 kW] electric heater.
 - 8) 40 ton, [460/3/60] [575/3/60] with [30 kW] [45 kW] [60 kW] [75 kW] [90 kW] [105 kW] [120 kW] [135 kW] [150 kW] electric heater.
 - 9) 45 ton, 208-230/3/60 with [45 kW] [60 kW] [75 kW] [90 kW] electric heater.
 - 10) 45 ton, [460/3/60] [575/3/60] with [45 kW] [60 kW] [75 kW] [90 kW] [105 kW] [120 kW] [135 kW] [150 kW] [165 kW] electric heater.
 - 11) 50 ton, 208-230/3/60 with [45 kW] [60 kW] [75 kW] [90 kW] electric heater.
 - 12) 50 ton, [460/3/60] [575/3/60] with [45 kW] [60 kW] [75 kW] [90 kW] [105 kW] [120 kW] [135 kW] [150 kW] [165 kW] [180 kW] electric heater.

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5. Air Filters:
 - a. [Disposable 2 inch (51 mm) pleated MERV 7] [Disposable 2 inch (51 mm) pleated MERV 11] [Disposable 2 inch (51 mm) pleated MERV 15] [Disposable 4 inch (102 mm) pleated MERV 7] [Cleanable 2 inch (51 mm) metal mesh].
6. Blower:
 - a. [Constant air volume with adjustable pulleys] [Variable air volume with fixed pulleys and variable frequency drive] [Variable air volume with fixed pulleys and variable frequency drive with bypass].
 - b. Supply air blower: Forward curved blades, statically and dynamically balanced wheel, furnished grease fittings.
 - c. Overload protected motor with ball bearings.
7. Controls:
 - a. Intelligent Unit Controller: Solid-state microprocessor based control board with control voltage provided via 24 V transformer with built-in circuit protection. Built in functions include:
 - 1) Blower on/off delay.
 - 2) Built-in control parameter defaults.
 - 3) Compressor time-off delay.
 - 4) DDC compatible.
 - 5) Dirty filter switch input.
 - 6) Display/sensor readout.
 - 7) Economizer control choice, including: sensible control, differential sensible control, global enthalpy control, outdoor enthalpy control and differential enthalpy control.
 - 8) Fresh air tempering.
 - 9) Greater than 85 extensive unit diagnostics.
 - 10) Permanent diagnostic code storage.
 - 11) Field changeable control parameters.
 - 12) Indoor air quality input with setpoint and proportional modes of operation.
 - 13) Low ambient controls.
 - 14) Gas valve time delay between first and second stages.
 - 15) Minimum compressor run time.
 - 16) Network capability.
 - 17) Night setback mode.
 - 18) Return air temperature limit control.
 - 19) Safety switch input.
 - 20) Service relay output.
 - 21) Smoke alarm mode with choices of unit off, positive pressure, negative pressure or purge.
 - 22) Staging.
 - 23) "Strike Three" protection.
 - 24) Hot gas reheat.
 - 25) Thermostat bounce delay.
 - 26) Warm-up mode delay.
 - 27) On-board user interface.
 - 28) PC interface.
 - 29) Discharge air temperature staging control.

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Specifier Note: The following features are optional. Include as necessary.

- b. Optional Factory Installed Controls:
 - 1) Blower proving switch.
 - 2) Commercial DDC controls.
 - 3) Dirty filter switch.
 - 4) Smoke detector.
 - 5) Indoor air quality (CO₂) sensor.
 - 6) Remote discharge air temperature sensor.
 - 7) Thermostat control systems.
- 8. Electrical: [208/230 V] [460 V] [575 V], 3-phase, 60 Hz.

Specifier Note: The following features are optional. Include as necessary.

- a. Optional Factory Installed Controls:
 - 1) Circuit Breakers: Factory installed, externally accessible, up to 250 amps.
 - 2) Disconnect Switch: Factory installed, externally accessible, up to 250 amps.
 - 3) GFI Service Outlets: Factory installed, [Field wired] [Factory wired] 115 V ground fault circuit interrupter.
 - 4) Phase Monitor: Factory installed, [208/230 V] [460 V] [575V], 3-phase, 60 Hz.
- 9. Economizer/Outdoor Air/Exhaust Options:

Specifier Note: The following features are optional. Include as necessary.

- a. Optional Factory Installed Controls:
 - 1) Economizer: Factory installed, parallel gear driven, 24 V fully modulating spring return motor with IMC add-on board for economizer control.
 - 2) Differential Enthalpy Economizer Control: Two, factory installed, solid-state enthalpy sensors.
 - 3) Outdoor Enthalpy Economizer Control: Factory installed outdoor air enthalpy sensor.
 - 4) Global Enthalpy Economizer Control: Factory installed.
 - 5) Differential Sensible Economizer Control: Two, factory installed, solid-state temperature sensors.
 - 6) Outdoor Sensible Economizer Control: Factory installed outdoor air temperature sensor.
 - 7) Barometric Relief Dampers: Aluminum blade, factory installed with bird screen.
 - 8) Motorized Outdoor Air Damper Section: Linked mechanical dampers factory installed within unit.
 - 9) Manual Outdoor Air Damper Section: Linked mechanical dampers factory installed within unit.
 - 10) High Static Power Exhaust Fan[s]: [50%] [100%] factory installed [3] [5] [7.5] hp motor[s] controlled by [Damper position] [Solid state] [Solid state with VFD, no bypass] [Solid state with VFD, with bypass] [Pressure differential].
 - 11) High Static Power Exhaust Fan Vibration Isolation: Factory installed, 2" (51 mm) springs, high static power exhaust fan deck completely isolated.
 - 12) Power Exhaust Fan[s]: [One] [Two] factory installed [Controlled by damper position] [Solid state] [Pressure differential].
 - 13) Energy Recovery Wheel: Factory installed with defrost controls and bypass dampers for economizer operation (not available on units with horizontal supply and return airflow distribution).
 - 14) Outdoor Air CFM Control:
 - a) Shall control outdoor airflow from 0 - 40% of total nominal unit airflow (400 CFM per ton).
 - b) Shall maintain +/- 5% of the set amount of outdoor air CFM airflow into the unit as specified by the design engineer.
 - c) Shall be located in the return air stream of the packaged rooftop unit.
- b) Optional Field Installed Controls:
 - Outdoor Air CFM Control:
 - a) Shall control outdoor airflow from 0 - 40% of total nominal unit airflow (400 CFM per ton).
 - b) Shall maintain +/- 5% of the set amount of outdoor air CFM airflow into the unit as specified by the design engineer.
 - c) Shall be mounted in the field per supplied instructions.

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Specifier Note: Edit Article below to suit project requirements. If substitutions are permitted, edit text below. Add text to refer to Division 1 Project Requirements (Product Substitutions Procedures) Section.

PART 2.02 PRODUCT SUBSTITUTIONS

- A. Substitutions: No substitutions permitted.

PART 3 EXECUTION

PART 3.01 MANUFACTURER'S INSTRUCTIONS

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and [Lennox Industries Inc.] SPEC-DATA® sheets.

PART 3.02 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

PART 3.03 INSTALLATION

- A. Install packaged rooftop units in accordance with manufacturer's instructions [On roof curbs provided by manufacturer] [As indicated].
- B. Run drain line from cooling coil condensate drain pan to discharge [Over roof drain].
- C. Duct Connections:
 - 1. Insulate and weatherproof exterior ducts, joints and openings in roof or building walls with flashing and sealing compounds.
 - 2. Insulate ducts passing through unconditioned spaces.
- D. Condensate Drains:
 - 1. Install trap between drain connection and open vent for proper condensate removal.
 - 2. Fit tee to trap to direct condensate downward.
 - 3. Vent condensate line.
 - 4. Dispose of condensate in accordance with local codes.
 - 5. Refer to manufacturer's instructions for condensate drain location.

Specifier Note: Include the following section for Gas Units.

- E. Gas Piping:
 - 1. Install drip leg on vertical pipe runs.
 - 2. Install ground joint union between gas control manifold and main manual shutoff valve.
 - 3. Ensure threaded joint compounds are resistant to action of liquefied petroleum gases.
 - 4. Disconnect and isolate gas valve prior to pressure testing gas lines.
 - 5. Check piping connections for gas leaks.

Specifier Note: Use following sentence when units are installed above 2000 feet (610 m).

- F. High Altitude Derate: Derate units 4% for every 2000 feet (610m) above sea level.

G. Electrical Connections:

- 1. Power Supply:
 - a. Complete installation prior to applying power or closing disconnect switch.
 - b. Refer to unit startup directions and wiring diagram.
 - c. Refer to unit nameplate for minimum circuit ampacity and maximum fuse size.
- 2. Control Wiring:

Specifier Note: For all applications using remotely installed electromechanical and electronic thermostats, 18 AWG wire is required.

- a. Use [18 AWG] [] wire. If remote temperature controller uses triacs, ensure load on triacs is a minimum of 40ma by using relay interface to input terminals on unit or provide 1000 ohm, 5 watt resistors wired in parallel to unit input terminals.

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PART 3.04 FIELD QUALITY CONTROL

Specifier Note: Use the following Articles only when manufacturer's field services are desired to verify the quality of the installed components. Establish the number and duration of periodic site visits required by Manufacturer and specify below. Consult Manufacturer for services required. Delete if field services are not required.

- A. Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its product[s], and submit written reports in acceptable format to verify compliance of Work with Contract.
- B. Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- C. Schedule site visits to review Work at stages listed:
 - 1. After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.
 - 2. [Twice] during progress of Work at [25%] and [60%] complete.
 - 3. Upon completion of Work, after cleaning is carried out.
- D. Obtain reports within [3] days of review and submit.

PART 3.05 UNIT POWERUP

- A. Install unit in accordance with installation instructions and applicable codes.
- B. Inspect field- and factory-installed electrical wiring for loose connections, and tighten as required.

PART 3.06 PERFORMANCE VERIFICATION

Specifier Note: Commissioning must ensure performance verification of every part of the unit including, but not necessarily limited to, the following components, as a factory-built and packaged unit: mixing chamber or plenum with outside air and return air dampers; filters; gas-fired heating unit; DX refrigeration system (with air-cooled condenser and DX cooling coil with drain pan); supply fan with motor and drive; exhaust fan with motor and drive; exhaust air dampers; weatherproof curbs.

- A. General:
 - 1. Perform rooftop air handling unit verification in accordance with Section 01750 - Starting and Adjusting, supplemented as follows:
 - 2. Settings:
 - a. Set outside air and return air dampers for minimum outside air.
 - 3. Measurements:
 - a. Measure supply fan capacity.
 - b. Measure pressure drop at each component of air handling unit.
 - c. Measure DBT, WBT of SA, RA, EA.
 - d. Measure air-cooled condenser discharge DBT.
 - e. Measure flow rates (minimum and maximum) of SA, RA, EA, relief air.
 - f. Measure radiated and discharge sound power levels under maximum heating demand and under maximum cooling demand with compressors running.
 - g. Measure exhaust fan capacity.
 - h. Measure DX refrigeration system performance as specified.
 - 4. Simulations:
 - a. Simulate maximum cooling load and measure refrigerant hot gas and suction temperatures and pressures.
 - b. Simulate maximum heating load and:
 - 1) Verify temperature rise across heat exchanger.
 - 2) Perform flue gas analysis. Adjust for peak efficiency.
 - 3) Verify combustion airflow to heat exchanger.
 - 4) Simulate minimum heating load and repeat measurements.

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5. Control Strategies:
 - a. Verify operating control strategies, including:
 - 1) Heat exchanger operating and high limit.
 - 2) Early morning warm-up cycle.
 - 3) Freeze protection.
 - 4) Economizer cycle operation, temperature of change-over.
 - 5) Alarms.
 - 6) Voltage drop across thermostat wiring.
 - 7) Operation of remote panel including pilot lights, failure modes.
6. Operation and Adjustment:
 - a. Check for smooth, vibrationless correct rotation of supply fan impeller and scroll compressors.
 - b. Adjust impeller speed as necessary and repeat measurement of fan capacity.
 - c. Reduce differences between fan capacity at minimum and maximum outside air to less than [5]%.
[5]%
 - d. Reduce difference between fan capacity at full cooling and fan capacity at full heating to less than [5]%.
[5]%
 - e. OAD: Verify for proper stroking, interlock with RAD.
 - f. Use smoke test to verify no short-circuiting of EA, relief air to outside air intake.
 - g. Check for smooth, vibrationless, correct rotation of exhaust fan impeller.
 - h. Adjust impeller speed as necessary and repeat measurement of exhaust fan capacity.
 - i. Check capacity of heating unit.
 - j. Refer to other sections of these specifications for PV procedures for other components.

PART 3.07 COMPLETION AND CLEANUP

- A. On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

REVISIONS

Sections	Description of Change
Controls	Removed L Connections details. Added reference to L Connection bulletin. Changed Novar 2015 usage - Not available for VAV applications. Deleted Sectra Zone Control System. Updated Conventional Temperature Control System.
Options / Accessories	Added MERV 15 Filter.



Energy recovery component rated in accordance with ARI Standard 1060-2000 and certified to ARI. Actual performance in packaged equipment may vary.



Visit us at www.lennox.com
For the latest technical information, www.lennoxcommercial.com
Contact us at 1-800-4-LENNOX

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

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