BUILT TO A HIGHER STANDARD®

American Standard®

HEATING & AIR CONDITIONING

QUICK REFERENCE GUIDE JANUARY 2022

UPGRADE YOUR WEBSITE WITH CURRENT PRODUCT INFORMATION IN NO TIME.

Take advantage of our embeddable, customizable Online Product Guide. Add it to your website to show off the most up-to-date American Standard line-up.

HOW DO I GET STARTED?

STEP 1 Go to **ASAirProducts.com/db** and register for **FREE**

STEP 2 Follow the simple on-screen instructions

STEP 3 Copy your unique IFRAME code to your website

WHAT HAPPENS NEXT?

Instantly, the full line of American Standard Products will be displayed on your website and will be updated whenever there are changes!

- ✓ One-time set up (Automatically Updates)
- ✓ Can be full-frame or within a div
- ✓ Fully responsive for mobile applications
- ✓ Select which products will appear on your website

BUILT TO A HIGHER STANDARD®
American Standard®
HEATING & AIR CONDITIONING

BUILT TO A HIGHER STANDARD®

American Standard®

HEATING & AIR CONDITIONING

Contents - Light Commercial

For complete equipment / combination selections, installation instructions and warranty information, please refer to Product Data/Ratings and/or Installers Guides and Limited Warranty Handbooks.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Light Commercial Precedent Packaged Systems

For complete equipment / combination selections, installation instructions and warranty information, please refer to Product Data/Ratings and/or Installers Guides and Limited Warranty Handbooks.

Effective 1/1/22
14-1011-39

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Precedent Packaged Systems Features and Benefits

Table 1. Precedent™ features – standard and optional

	Standard Features	Options[a]		
		Factory Installed	Factory or Field Installed	Field Installed
1-year Limited Parts Warranty	X			
5-year Limited Compressor Warranty	X			
5-year Limited Heat Exchanger Compressor Warranty	X			
10-year Warranty Stainless Steel Heat Exchanger		X		
2" MERV 8 Filters or 2" MERV 13 Filters with Filter Removal Tool		X		
Anti-Short Cycle Timer (Standard with ReliaTel™)	X			
Belt Drive Motors[b]	X			
Black Epoxy Pre-Coated Coils[c]		X		
Barometric Relief			X	
CO_2 Sensor (wiring only)		X		
CO_2 Sensor[d]				X
Clogged Filter/Fan Failure Switch			X	
CompleteCoat™ Condenser Coil		X		
Condensate Overflow Switch		X		
Condenser Coil	X			
Convertible Airflow	X			
Colored and Numbered Wiring	X			
Cooling (Standard or High Efficiency)	X			
Crankcase Heaters	X			
Demand Control Ventilation			X	
Dehumidification Option		X		
Direct Drive Plenum Fan[e]	X	X		
Discharge Air Temperature Sensing Kit			X	
Easy Access Low Voltage Terminal Board (LTB)	X			
Economizer: Standard			X	
Economizer: Low Leak				X
Electric Heaters			X	
Fault Detection & Diagnostics (FDD); Meets CA Title 24 Requirements		X		
Filters	X			
Foil-Faced and Edge Captured Insulation	X			
Frostat™			X	
Hail Guards			X	
Heat Exchanger	X			
High Pressure Control	X			
Hinged Access Doors		X		
High Altitude Kit				X
High Static Drive				X
IAQ Dual Sloped, Plastic, Removable and Removable Drain Pan	X			
Liquid Line Refrigerant Drier	X			
Low Ambient Cooling to 0°F on Microprocessor Models	X			
Low Ambient Cooling to 40°F on Electromechanical Models	X			
Low Pressure Control	X			
Low Voltage Connections	X			
LP Conversion Kit				X

Precedent Packaged Systems Features and Benefits

Table 1. Precedent™ features – standard and optional (continued)

	Standard Features	Options[a]		
		Factory Installed	Factory or Field Installed	Field Installed
Manual Outside Air Damper				X
Microchannel Coils[f]	X			
Motorized Outside Air Damper				X
Multispeed Direct Drive Motors	X			
Multispeed Indoor Fan System		X		
Multiple Zone VAV (Variable Air Volume)		X		
Operating Charge of R-410A	X			
Outside Air Measuring/Monitoring Control (Traq Dampers)				X
Phase Balance/Loss/Reversal Protection	X			
Phase Monitor	X			
Powered Exhaust				X
Powered or Unpowered Convenience Outlet		X		
Provisions for Through-the-Base Gas and Condensate Drain Connections	X			
Quick Adapt Curbs				X
Quick Access Panels	X			
Quick Adjust Fan Motor Mounting Plate	X			
Quick Start Kit				X
Reference or Comparative Enthalpy			X	
Remote Potentiometer				X
Roof Curb				X
Single Point Power	X			
Single Side Service	X			
Single Zone Variable Air Volume (SZVAV)		X		
Stainless Steel Drain Pan		X		
Standardized Components	X			
Supply, Return or Plenum Air Smoke Detector		X		
Thermal Expansion Valve	X			
Through-the-Base Condensate	X			
Through-the-Base Electrical Access		X		
Through-the-Base Electrical with Circuit Breaker		X		
Through-the-Base Electrical with Disconnect Switch		X		
Ventilation Override Accessory				X
Vibration Isolators				X

(a) Refer to model number description for option availability.
(b) Option on 3 to 5 ton high efficiency units.
(c) Not available on microchannel coils.
(d) CO_2 sensor associated with demand control ventilation always field installed.
(e) Standard on: (T/Y)SC120H, (T/Y)HC074, 092,102F, (T/Y)HC120F. Optional on: (T/Y)SC092–102H.
(f) The microchannel type condenser coil is standard for T/YSC(072,090,092,102,120)H, T/YHC(048,060,072,074, 092,102,120)F and (T/Y)SC (036,048,060)G models.

Precedent Packaged Systems Features and Benefits

Table 2. Precedent™ control options — standard and optional

	Standard Features	Options[a]		
		Factory Installed	Factory or Field Installed	Field Installed
Dual Thermistor Remote Zone Sensor				X
Electromechanical or ReliaTel™ Microprocessor Controls	X			
Human Interface		X		
Humidity Sensor/Humidistat				X
Thermostat				X
Wireless Zone Sensor				X
Zone Sensor				X
BACnet® Communication Interface (BCI)			X	
LonTalk® Communication Interface (LCI)			X	
American Standard® Air-Fi® Wireless Communication Interface		X		
American Standard® Communication Interface			X	

Note: For more information, reference the Controls chapter.

[a] Refer to model number description for option availability.

Standard Features

Anti-Short Cycle Timer

Provides a 3 minute minimum “ON” time and 3 minute “OFF” time for compressors to enhance compressor reliability by assuring proper oil return.

Colored And Numbered Wiring

Save time and money tracing wires and diagnosing the unit.

Compressors

Precedent™ contains the best compressor technology available to achieve the highest possible performance. Dual compressors are outstanding for humidity control, light load cooling conditions and system back-up applications. Dual compressors are available on 6 to 10 tons models and allow for efficient cooling utilizing 3-stages of compressor operation (high efficiency models only).

Condenser Coil

Precedent™ boasts a patent-pending 1+1+1 condenser coil, permanently gapped for easy cleaning.

Controls — ReliaTel™ or Electromechanical

ReliaTel™ microprocessor controls provide unit control for heating, cooling and ventilating utilizing input from sensors that measure indoor and outdoor temperature and other zone

sensors. ReliaTel™ also provides outputs for building automation systems and expanded diagnostics. For a complete list of ReliaTel™ offerings, refer to the "Other Benefits" section within the Features and Benefits section of this catalog.

For the simpler job that does not require a building automation system, or expanded diagnostics capabilities, Precedent™ offers electromechanical controls. This 24-volt control includes the control transformer and contactor pressure lugs for power wiring.

Convertible Units

Units ship in a downflow configuration and can be easily converted to horizontal by simply moving two panels.

Units come complete with horizontal duct flanges so the contractor doesn't have to field fabricate them. These duct flanges are a time and cost saver.

Crankcase Heaters

These band heaters provide improved compressor reliability by warming the oil to prevent migration during off-cycles or low ambient conditions.

Direct Drive Motors

For additional static requirements, single-phase units offer multi-speed, direct drive motors. All 10 ton units and 6 to 8.5 ton high efficiency units offer variable speed direct drive motors.

Direct Drive Plenum Fan

The following units are equipped with a direct drive plenum fan design (all 10 ton units, 6 (074) to 8.5 ton high efficiency units, and optional on 7.5 (092) to 8.5 ton standard efficiency units). Plenum fan design includes a backward-curved fan wheel along with an external rotor direct drive variable speed indoor motor. All plenum fan designs have a variable speed adjustment potentiometer located in the control box.

Note: *Standard on: (T/Y)SC120H, (T/Y)HC074, 092, 102F, (T/Y)HC120F. Optional on (T/Y)SC092, 102H.*

Drain Pan

Every Precedent™ unit has a plastic, removable, dual-sloped drain pan (IAQ) that's easy to clean and reversible to allow installation of drain trap on either side of the unit.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Precedent Packaged Systems Features and Benefits

Easy Access Low Voltage Terminal Board

The low voltage terminal board is external to the electrical control cabinet. It is extremely easy to locate and attach the thermostat wire and test operation of all unit functions. This is another cost and time saving installation feature.

Foil Faced and Edge Captured Insulation

All panels in the evaporator section of the unit have cleanable foil-faced insulation. All edges are either captured or sealed to ensure no insulation fibers get into the airstream.

Heat Exchanger

The compact cabinet features a progressive tubular heat exchanger in low, medium and high heat capacities.

The heat exchanger is fabricated using corrosion-resistant aluminized steel tubes and burners as standard on all models. It has an induced draft blower to pull the gas mixture through the burner tubes. The heater has a direct spark ignition system which doubles as a safety device to prove the flame.

Low Ambient Cooling

All Precedent™ microprocessor units have cooling capabilities down to 0°F as standard. Electromechanical models have cooling capabilities to 40°F as built, or to 0°F by adding the optional low ambient control (Frostat™).

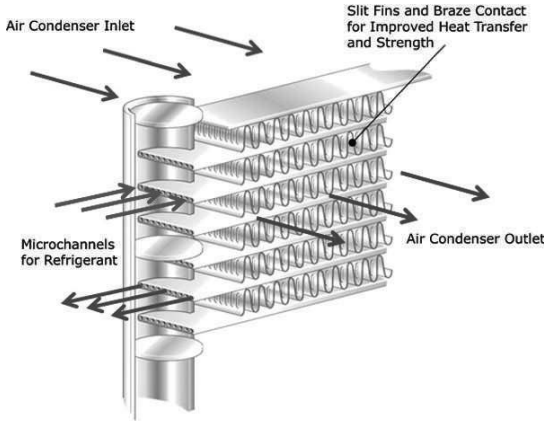
Low Voltage Connections

The wiring of the low voltage connections to the unit and the zone sensors is as simple as 1-1, 2-2, and 3-3. This simplified system makes it easy for the installer to wire.

Microchannel Condenser Coil

Microchannel condensing coils are all-aluminum coils with fully-brazed construction. This design reduces risk of leaks and provides increased coil rigidity — making them more rugged on the jobsite. Their flat streamlined tubes with small ports and metallurgical tube-to-fin bond allow for exceptional heat transfer. Microchannel all-aluminum construction provides several additional benefits:

- Light weight (simplifies coil handling)
- Easy to recycle
- Minimize galvanic corrosion



Precedent Packaged Systems Features and Benefits

Phase Monitoring Protection

Precedent™ units with 3-phase power are equipped with phase monitoring protection as standard. These devices protect motors and compressors against problems caused by phase loss, phase imbalance and phase reversal indication.

Quick Access Panels

Remove two screws for access to the standardized internal components and wiring.

Standardized Components

Components are placed in the same location on all units. Due to standardized components throughout the line, contractors/owners can stock fewer parts.

Through-the-Base Condensate

Every unit includes provisions for through-the-base condensate drain connections. This allows the drain to be connected through the roof curb instead of a roof penetration.

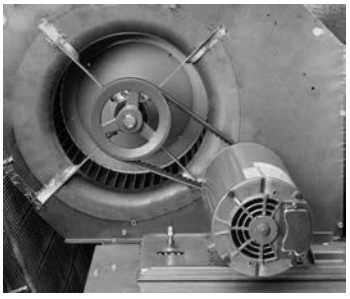
Other Benefits

- Cabinet design ensures water integrity
- Ease of Service, Installation and Maintenance
- Mixed model build enables "fastest in the industry" ship cycle times
- Outstanding Airflow Distribution
- ReliaTel™ Controls

Factory Installed Options

Belt Drive Motors

For additional static requirements, Precedent™ 3 to 5 tons, high efficiency (15 SEER) units offer an optional belt drive motor to meet a wide range of airflow needs.



Note: *Available for three-phase units only.*

Black Epoxy Pre-Coated Coils

The pre-coated coils are an economical option for protection in mildly corrosive environments.

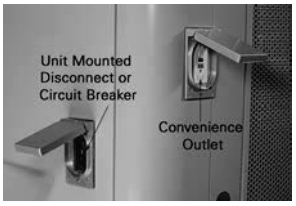
Note: *Not available on microchannel condenser coils.*

Circuit Breaker

This option is a factory installed thermal magnetic, molded case, HACR circuit breaker with provisions for through-the-base electrical connections.

Note: *Available on units equipped with through-the-base electrical.*

Precedent Packaged Systems Features and Benefits



Disconnect Switch

Note: *Available on units equipped with through-the-base electrical.*

Factory installed 3-pole, molded case, disconnect switch for through-the-base electrical connections.

Codes require a method of assured unit shutdown for servicing. Field-installed disconnects sometimes interfere with service access. Factory installation of unit disconnects reduces costs, assures proper mounting and provides the opportunity to upgrade to unit circuit breaker protection.

Convenience Outlet

This option is a GFCI, 120V/15amp, 2 plug, convenience outlet, either powered or unpowered. This option can only be ordered when through-the-base electrical with either the disconnect switch or circuit breaker option is ordered.

Note: *Convenience outlet not available on 575V units or 3 to 5 ton high efficiency units with direct drive indoor motor.*

CO_2 Sensor Wiring

This is the unit wiring for field installed $C0_2$ sensors. Factory-installed $C0_2$ sensor wiring saves time and ensures proper unit connections for the field installed $C0_2$ sensor kits.

CompleteCoat™ Condenser Coil

These coils provide excellent corrosion resistance as well as uniformity of coverage and coating thickness. This option is available for both fin-tube and microchannel condenser coils.

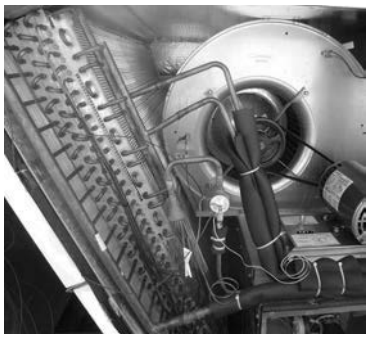
Condensate Overflow Switch

A condensate overflow switch is available to shut the unit down in the event that the condensate drain becomes clogged. This option protects the unit from water overflowing from the drain pan and entering the base of the unit.

Dehumidification (Hot Gas Reheat)

This option allows for increased outdoor air ventilation. It reduces humidity levels while increasing comfort level in the air space. Cooling can operate without a demand for dehumidification. The hot gas reheat coil is designed to deliver maximum reheat temperatures.

Precedent Packaged Systems Features and Benefits



Fault Detection and Diagnostics (FDD)

This offering meets the mandatory requirement of CA Title 24 of fully configurable diagnostics allowing fault history and reading fault codes at the unit. This option provides detection of the following faults: Air temperature sensor failure/fault and notification of acceptable economizer mode. The FDD system shall be certified by the Energy Commission as meeting the requirements.

Human Interface

The 5 inch color touchscreen human interface provides an intuitive user interface to the rooftop unit that speeds up unit commissioning, shortens unit troubleshooting times, and enhances preventative maintenance measures. The human interface includes several features such as:

- Data trending capabilities by means of time series graphs
- Historical alarm messages
- Real-time sensor measurements
- On board system setpoints
- USB port that enables the downloading of component runtime information as well as trended historical sensor data
- Customized reports

Note: *Refer to RT-SVX49*-EN for additional information.*

High Efficiency Filtration

Precedent™ units offer a variety of high efficiency filtration options. MERV 8 and MERV 13 filters provide additional filtration beyond the capabilities of typical 2" throwaway filters. Also, when MERV 8 or MERV 13 filters are ordered, units come equipped with a filter removal tool.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Precedent Packaged Systems Features and Benefits

Hinged Access Doors

These doors permit easy access to the filter, fan/heat and compressor/control sections. They reduce the potential roof damage from screws or sharp access door corners.

Multi-Speed Indoor Fan System

Multi-speed indoor fan system is designed for use in applications for meeting the minimum requirement of CA Title 24.

This system incorporates a multi-speed fan control to change the speed of the fan to 66% of full airflow based off of compressor stages.

Multiple-Zone VAV Control

A multiple-zone VAV (MZVAV) system consists of a packaged rooftop unit that serves several individually controlled zones. Each zone is equipped with a VAV terminal unit that varies the quantity of air delivered to maintain the desired temperature in that zone. The rooftop unit controller varies the speed of the indoor fan to maintain the static pressure in the supply ductwork at a setpoint, ensuring that all zones receive the necessary quantity of air. In addition, cooling capacity is cycled to maintain the supply air temperature at the desired setpoint.

For decades, American Standard has been an industry leader in rooftop VAV systems. Now, multiple-zone VAV control is available in the light commercial rooftop platform (3 to 25 tons).

Novar Unit Controls

Novar 3051 and 2024 are available for Precedent™ gas and electric heat models.

Single Zone VAV (SZVAV)

Single Zone VAV (SZVAV) is designed for use in single zone applications such as gymnasiums, auditoriums, manufacturing facilities, retail box stores, and any large open spaces where there is a diversity in the load profile. It is an ideal replacement to "yesterday's" constant-volume (CV) systems, as it reduces operating costs while improving occupant comfort.

SZVAV systems combine American Standard application, control and system integration knowledge to exactly match fan speed with cooling and heating loads, regardless of the operating condition. American Standard algorithms meet and/or exceed ASHRAE 90.1 SZVAV energy-saving recommendations and those of CA Title 24. The result is an optimized balance between zone temperature control and system energy savings. Depending on your specific application, energy savings can be as much as 20+%.

Note: *Building system modeling in energy simulation software such as TRACE is recommended to evaluate performance improvements for your application.*

SZVAV is fully integrated into the control system. It provides the simplest and fastest commissioning in the industry through proven factory-installed, wired, and tested system controllers. All control modules, logic boards and sensors are factory installed and tested to ensure the highest quality and most reliable system available. This means no special programming of algorithms, or hunting at the jobsite for field installed sensors, boards, etc. SZVAV is a quick and simple solution for many applications and is available from your most trusted rooftop VAV system solution provider -American Standard.

Note: *Only available on 7.5 to 20 tons units.*

Precedent Packaged Systems Features and Benefits

Stainless Steel Drain Pan

For excellent corrosion and oxidation resistance, the optional stainless steel drain pan provides a cleanable surface that complement other IAQ solutions such as high efficiency filtration (MERV 8 or 13), demand control ventilation (CO_2), and hot gas reheat.

Stainless Steel Heat Exchanger

The optional stainless steel heat exchanger is constructed of 409 stainless steel tubes and 439 stainless steel burners. It is resistant to corrosion and oxidation and easy to clean. The high strength to weight ratio allows for high ventilation rates with gas units. It is an excellent option to compliment the dehumidification option as a high outside air ventilation unit. With this option, a 10-year stainless steel heat exchanger warranty is standard.

Supply, Return, and Plenum Air Smoke Detector

With this option installed, if smoke is detected, all unit operation will be shut down. Reset will be manual at the unit. In order for the supply air smoke detector or return air smoke detector to properly sense smoke in the supply air stream or the return air stream, the air velocity entering the smoke detector unit must be between 500 - 4000 feet per minute. Equipment covered in this manual will develop an airflow velocity that falls within these limits over the entire airflow range specified in the evaporator fan performance table. Supply and/or return smoke detectors may not be used with the plenum smoke detector.

Figure 1. Supply/Return air smoke detector

Figure 2. Plenum Air Smoke Detector

Note: *Plenum smoke detectors have no auxiliary contacts for external connections.*

Through-the-Base Gas Access

Factory provided through-the-base openings simplify wiring and piping. Because these utility openings frequently minimize the number of roof penetrations, the integrity of roofing materials is enhanced.

Through-the-Base Electrical Access

An electrical service entrance shall be provided allowing electrical access for both control and main power connections inside the curb and through-the-base of the unit. Option will allow for field installation of liquid-tight conduit and an external field installed disconnect switch.

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Precedent Packaged Systems Features and Benefits

Factory or Field Installed Options

Barometric Relief

Designed to be used on downflow units, barometric relief is an unpowered means of relieving excess building pressure.

Clogged Filter/Fan Failure Switch

A dedicated differential pressure switch is available to achieve active fan failure indication and/or clogged filter indication.

These sensors allow a zone sensor service light or Integrated Comfort System to indicate a dirty filter or a fan that's not working. The field installation charges for these valuable feedback devices often eliminate them from consideration. Factory installation can make such features a good investment.

Discharge Air Temperature Sensing Kit

Provides true discharge air temperature sensing in heating models. This sensor is a status indicator readable through Tracer® or Tracker™.The kit is functional only with the ReliaTel™ options module.

Economizer (Standard)

This standard economizer accessory shall be available with or without barometric relief. The assembly includes fully modulating 0-100 percent motor and dampers, minimum position setting, preset linkage, wiring harness with plug, spring return actuator and fixed dry bulb control. The barometric relief shall provide a pressure operated damper that shall be gravity closing and shall prohibit entrance of outside air during the equipment "off" cycle. Optional solid state or differential enthalpy control shall be available for either factory or field installation. The economizer arrives in the shipping position and shall be moved to the operating position by the installing contractor.

Electric Heaters

Electric heat modules are available within the basic unit. If ordering the through-the-base electrical option with an electrical heater, the heater must be factory installed.

Fresh Air — Dampers and Economizer

0 - 25% manual or 0 - 50% motorized outside air hoods are available.

Economizers are equipped with either dry bulb or reference or comparative enthalpy sensing. These economizers provide free cooling as the outdoor temperature and/or humidity decreases. Correctly installed, they offer a valuable energy savings. Factory-installed economizers save time and ensure proper installation.

Frostat™

This capillary bulb embedded in the face of the evaporator coil or thermostat on the suction line monitors coil temperature to prevent evaporator icing and protect the compressor.

Precedent Packaged Systems Features and Benefits

Recommended for applications with low leaving air temperatures, low airflow and or high latent load applications.

Note: *Frostat™ is standard on all single-zone and multiple-zone VAV models.*

Hail Guards

Hail protection quality coil guards protects the condenser coil from vandalism and/or hail damage.

Low Leak Economizer

This accessory meets low leak requirements for ASHRAE 90.1, IECC, and CA Title 24 standards (4 cfm/ft^2@1" wg exterior air/return air). This option allows 100% outdoor air supply from 0-100% modulating dampers and is standard with barometric relief. It can be paired with powered exhaust for additional building pressure relief. This option can be paired with or without fault detection & diagnostics (FDD) to meet current mandatory CA Title 24 requirements.

The economizers come with three control options, dry bulb and reference or comparative enthalpy (optional).

Note: *Low leak economizers available on downflow units only.*

Reference or Comparative Enthalpy

Measures and communicates humidity while maximizing comfort control.

Field Installed Options

CO_2 Sensor — Demand Control Ventilation (DCV)

Demand-controlled ventilation (DCV) is a control strategy that responds to the actual demand (need) for ventilation by regulating the rate at which the HVAC system brings outdoor air into the building. A CO_2 sensor measures the concentration (parts per million, ppm) of CO_2 (carbon dioxide) in the air. As the CO_2 concentration changes, the outside air damper modulates to meet the current ventilation needs of the zone. The CO_2 sensor kit is available as a field installed accessory. Two field installed kits are offered; CO_2 sensor and wiring or CO_2 sensor only. The CO_2 Sensor only kit should be ordered with factory installed CO_2 sensor wiring. Factory installed CO_2 sensor wiring saves set-up time and ensures proper unit connections for the CO_2 sensor.

High Altitude Kit

While recommended for units applied above 2,000 feet, domestic contractors should consult with local authority on best practice. High altitude kits contain gas orifices that derate the gas input rate (Btuh/r) by 10%.

High Static Drive

Available on many models, this high static drive accessory extends the capability of the standard motor. Avoid expensive motors and operating costs by installing this optimized sheave accessory.

Humidity Sensor/Humidistat

The humidity sensor/humidistat, when used in conjunction with our dehumidification (hot gas reheat) units will provide outstanding humidity control and comfort. Humidity sensors can be wall or duct mounted. The humidity deadband can be set between 40% and 60% relative humidity.

Low Leak Economizer — Field Installed

This accessory meets low leak requirements for ASHRAE 90.1, IECC, and CA Title 24 standards (4 cfm/ft^2@1" wg exterior air/return air). This option allows 100% outdoor air supply from 0-100% modulating dampers and is standard with barometric relief. It can be paired with powered exhaust for additional building pressure relief.

Precedent Packaged Systems Features and Benefits

Note: *Available on downflow units only.*

LP Conversion Kit

Provided for field conversion of gas/electric units from natural gas to propane.

Outside Air Measuring/Monitoring Control (Traq Dampers)

Quantity of fresh air entering the unit will be measured and monitored via American Standard UC400 controller and series of pressure sensing rings mounted at the outside air intake.

Quick Adapt Curbs

Enables easy conversion of existing Voyager™ 3 to 10 ton units to Precedent™ units on replacement jobs.

Quick Start Kits

Single phase equipment to enable startup and prevent building lighting dimming during low voltage.

Roof Curbs

Available for downflow units. Only three roof curbs for the entire line simplifies curb selection.

Remote Potentiometer

When properly installed in the economizer control circuitry, this accessory provides a remote variable resistance to enable the operator to adjust the minimum damper position.

Ventilation Override Accessory

With the ventilation override accessory installed, the unit can be set to transition to up to 3 different pre-programmed sequences for smoke purge, pressurization, and exhaust. The transition occurs when a binary input on the RTOM is closed (shorted). This would typically be a hard wired relay output from a smoke detector or fire control panel. The ventilation override kit is available as a field installed accessory.

Other Benefits

Airflow Distribution

Airflow is outstanding. Precedent™ can replace an older machine with old ductwork and, in many cases, improve the comfort through better air distribution.

Cabinet Integrity

For added water integrity, Precedent™ has a raised 1 1/8" lip around the supply and return of the downflow units to prevent water from blowing into the ductwork.

The compact cabinet with rounded corners takes up less room. The beveled and ribbed top is aesthetically pleasing and designed to prevent water from pooling.

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Precedent Packaged Systems Features and Benefits

Flexibility

Precedent™ offers ultimate flexibility. Units are built to order in our standard "shortest in the industry" ship cycle time.

Rigorous Testing

All of the Precedent™ designs were rigorously rain tested at the factory to ensure water integrity.

Actual shipping tests were performed to determine packaging requirements. Units were test shipped around the country to determine the best packaging design. Factory shake and drop tests were used as part of the package design process to help assure that the unit arrives at the job site in top condition.

Rigging tests include lifting a unit into the air and letting it drop one foot, assuring that the lifting lugs and rails hold up under stress.

We perform a 100% coil leak test at the factory. The evaporator and condenser coils are leak tested at 600 psig. The assembled unit is leak tested to 465 psig.

All parts are inspected at the point of final assembly. Sub-standard parts are identified and rejected immediately.

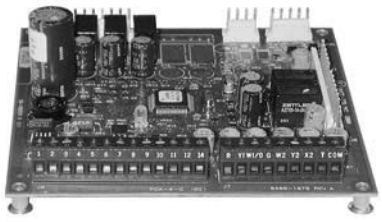
Every unit receives a 100% unit run test before leaving the production line to make sure it meets rigorous requirements.

Easy to Install, Service and Maintain

Because today's owners are very cost-conscious when it comes to service and maintenance, this unit was designed with direct input from service contractors. This valuable information helped to design a product that would get the service technician off the job quicker and save the owner money. This product line offers outstanding standard features enhanced by a variety of factory and field installed options, multiple control options, rigorously tested proven designs and superior product and technical support.

ReliaTel™ Controls

Figure 3. ReliaTel board



ReliaTel controls provide unit control for heating, cooling, and ventilating, utilizing input from sensors that measure outdoor and indoor temperature. ReliaTel also provides outputs for building automation systems and expanded diagnostics. Quality and reliability are enhanced through ReliaTel control and logic:

- Prevents the unit from short cycling, considerably improving compressor life.
- Ensures the compressor will run for a specific amount of time which allows oil to return for better lubrication, enhancing the reliability of the compressor.
- Reduces the number of components required to operate the unit, reducing possibilities for component failure.

ReliaTel Makes Installing and Servicing Easy

ReliaTel eliminates the need for field-installed, anti-short cycle timer and time delay relays. The wiring of the low voltage connections to the unit and the zone sensors is as easy as 1-1, 2-2, and 3-3. This simplified system makes wiring easier for the installer.

Precedent Packaged Systems Features and Benefits

ReliaTel Makes Testing Easy

ReliaTel requires no special tools to run the unit through its paces. Simply place a jumper between Test 1 and Test 2 terminals on the Low Voltage Terminal Board and the unit will walk through its operational steps automatically. The unit automatically returns control to the zone sensor after stepping through the test mode a single time, even if the jumper is left on the unit. As long as the unit has power and the "system on" LED is lit, ReliaTel is operational. The light indicates that the controls are functioning properly. ReliaTel features expanded diagnostic capabilities when utilized with American Standard Integrated Comfort™ Systems. Some zone sensor options have central control panel lights which indicate the mode the unit is in and possible diagnostic information (dirty filters for example).

ReliaTel Has Other Benefits

- The ReliaTel built-in anti-shortcycle timer, time delay relay and minimum "on" time control functions are factory tested to assure proper operation.
- ReliaTel softens electrical "spikes" by staging on fans, compressors and heaters.
- Intelligent Fallback is a benefit to the building occupant. If a component goes astray, the unit will continue to operate at predetermined temperature setpoint.
- Intelligent Anticipation is a standard feature. It functions continuously as ReliaTel and zone sensor(s) work together in harmony to provide much tighter comfort control than conventional electromechanical thermostats.
- The ReliaTel design is standardized across the board, ensuring a lower cost to owners.

Precedent 3-10 Ton Packaged Cooling Application Considerations

Application of this product should be within the cataloged airflow and cooling considerations.

Barometric Relief

This product line offers an optional barometric relief damper for use in conjunction with economizer option. This accessory consists of gravity dampers which open with increased pressure. As the building air pressure increases, the pressure in the unit return air section also increases, opening the dampers and relieving the conditioned space.

Note: *The effectiveness of barometric relief damper during economizing operation is limited, depending on the pressure drop of the return-air path. For some applications, powered exhaust may be better suited for preventing over-pressurization when economizing.*

Black Epoxy Coil

The coils are manufactured with a thermoset, vinyl coating that is bonded to the aluminum fin stock prior to the fin stamping process. These coils are an economical option for protection in mildly corrosive environments.

Notes:

- *Not to be used where seacoast applications exist.*
- *Not available on microchannel condenser coils.*

Clearance Requirements

The recommended clearances identified with unit dimensions should be maintained to assure adequate service maximum capacity and peak operating efficiency. Actual clearances which appear inadequate should be reviewed with the local American Standard sales personnel.

Model Number	Clearance required from duct to combustible surfaces (inches)
TSC036G	0
THC036E	1
TSC048G	0
THC048E,F	0
TSC060G	0
THC060E,F	0
TSC072H	0
THC072F	1
THC074F	1
TSC090H	1
TSC092H	0
THC092F	1
TSC102H	0
THC102F	1
TSC120H	1
THC120F	1

CompleteCoat™ Condenser Coil

The coils provide protection from corrosive environments and are ideal for seacoast applications.

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Precedent 3-10 Ton Packaged Cooling Application Considerations

Condensate Trap

The evaporator is a draw-thru configuration. A trap must be field provided prior to start-up on the cooling cycle.

Heating Operation

The heat exchanger is manufactured with aluminized steel. To prevent condensation within the heat exchanger, do not exceed 50% outside air or a minimum mixed air temperature of 40°F.

Low Airflow Operation

Units equipped electric heat or staged gas heat may not be selected for supply airflow less than 320 cfm/ton. Cooling-only units can be used in applications designed for supply airflow below 320 cfm/ton. The units must be high-efficiency models with dehumidification (hot gas reheat) or be equipped with a TXV, Frostat™, and crankcase heaters.

Units selected with multiple-speed indoor fan control, single-zone VAV control, or multiple-zone VAV control are capable of operating at supply airflows below 320 cfm/ton at part-load conditions, but design (or "full") airflow must be set to 320 cfm/ton or higher.

Low Ambient Cooling

The Precedent™ line features, with ReliaTel™ microprocessor controls, low ambient cooling down to 0°F. With electromechanical controls, Precedent™ features low ambient cooling to 40°F. The following features or options need to be included/considered when low ambient applications are required: continuous fan operation, crankcase heaters, thermal expansion valves, Frostat™.

Contact a local American Standard representative for more assistance with low ambient cooling applications.

Optional Stainless Steel Heat Exchanger

The optional stainless steel heat exchanger is manufactured with 409 stainless steel tubes and 439 stainless steel burners. To prevent corrosion and prolong heat exchanger reliability, the minimum mixed air temperature allowed across the heat exchanger is 20°F.

The stainless steel heat exchanger option is an excellent option that compliments the dehumidification package. Whenever high outside air or outside applications exist, these options should be utilized.

Unit Pitch

The unit has a reversible sloped condensate drain pans. The unit must be installed level. Any unit slope must be toward the side of unit where condensate drain is connected.

Precedent 3-10 Ton Packaged Cooling Selection Procedure

Cooling Capacity

Note: *Cooling capacity procedure is the same for electric heat (T*C) and gas heat (Y*C).*

1. Calculate the total and sensible cooling loads for the building at design conditions. Use the American Standard calculation methods or any other standard accepted method.
   Factors used in unit selection:
   - Packaged Cooling with Optional Electric Heat
   - Total Cooling Load: 57 MBh
   - Sensible Cooling Load: 40 MBh
   - Airflow: 2000 cfm
   - Electrical Characteristics: 460/60/3
   - Summer Design Conditions: Entering Evaporator Coil: 80°F DB/67°F WB
   - Outdoor Ambient: 95°F
   - External Static Pressure: 0.34 in. wg
   - Downflow Configuration
   - Efficiency: 14 SEER
   - Economizer
2. As a starting point, a rough determination must be made of the size of the unit. The final selection will be made after examining the performance at the given conditions. Divide the total cooling load by nominal Btuh per ton (12 MBh per ton); then round up to the nearest unit size.
   59 MBh/12 MBh = approx. 5 tons
3. Table 10, p. 40 shows that a TSC060G4 has a gross cooling capacity of 60 MBh and 49 MBh sensible capacity at 2000 cfm and 95°F DB outdoor ambient with 80°F DB, 67°F WB air entering the evaporator.
   Find capacity at intermediate conditions not in the table
   When the design conditions are between two numbers that are in the capacity table, interpolation is required to approximate the capacity.
   Note: *Extrapolation outside of the table conditions is not recommended.*
4. In order to select the correct unit which meets the building's requirements, the fan motor heat must be deducted from the gross cooling capacity. The amount of heat that the fan motor generates is dependent on the effort by the motor - cfm and static pressure. To determine the total unit static pressure take into account the following information.

External Static Duct System	0.34 wg
Standard Filter 2 in. from Table 148, p. 183	0.06 wg
Economizer from Table 148, p. 183 (100% Outside Air) *worst case	0.18 wg
Electric Heater Size 6 kW from Table 154, p. 187	0.06 wg
Total Static Pressure	0.64 wg

Note: *Reference heating capacity section on this page for determination of heater size.*

Note: *The evaporator fan performance has deducted the pressure drop for a filter already in the unit . Therefore, the actual total static pressure is 0.515-0.06 = 0.466 wg.*

With 2000 cfm and 0.47 wg , p. 70 shows 0.58 bhp for this unit.

Note: *Below the table is the formula to calculate fan motor heat.*

2.87 x bhp + 0.15 = MBh

2.87 x 0.575 + 0.15 = 1.8 MBh

Now subtract the fan motor heat from the gross cooling capacity of the unit:

Net Total Cooling Capacity = 60 MBh - 1.8 = 58.2 MBh

Net Sensible Cooling Capacity = 49 MBh - 1.8= 47.2 MBh

Subtract sensible from total capacity to find latent capacity

Net Latent Capacity = 60.5 - 46.3 = 11 MBh

5. Compare your resulting capacities to the building load. If the performance will not meet the required load of the building's total or sensible cooling load, try a selection at the next higher size unit.

Heating Capacity

Note: *Heating capacity procedure DIFFERS for electric heat (T*C) and gas heat (Y*C).*

1. Calculate the heating loads for the building at design conditions. Use the American Standard calculation methods or any other standard accepted method.
2. Size the system heating capacity to match the calculated building heating load. The following are building heating requirements:
   Total heating load of 15 MBh
   2000 cfm
   T*C units with optional electric heat: 460V/3 phase power supply
   A 6 kW heater will deliver 20.48 MBh at 480 volts. In order to determine capacity at 460 volts, the heater voltage correction factor must be used. Therefore, 20.48 MBh x 0.918 (voltage correction factor) = 18.8 MBh.
   Y*C units with gas heat: Fuel - natural gas.
   60 MBh, 80 MBh, 120 MBh, and 130 MBh input models.. The output capacities of these furnaces are 49.2 MBh, 65.6 MBh, 98.4 MBh, and 106.6 MBh respectively. The low heat model with 49.2 MBh best matches the building requirements.

Air Delivery Selection

Note: *Air delivery procedure is the same for electric heat and gas heat units.)*

External static pressure drop through the air distribution system has been calculated to be 0.5 inches of water. For a TSC060G4 at 2000 cfm and 0.47 static pressure, the standard direct drive motor will give the desired airflow at a rated bhp of 0.58 and 924 rpm.

Dehumidification Selection

Note: *Dehumidification selection procedure is the same for both electric heat (THC) and gas heat (YHC) models.*

Typical 5 ton THC060E	OA Conditions	RA conditions
2000 cfm Total Supply Airflow	Part load day and raining	75ºF db
800 cfm Outside Air (40%)	68ºF db	63ºF wb
1200 cfm Return Air	67ºF wb	
0.34" External Static Pressure	95% RH	

1. Determine the mixed/entering air condition (MA)
   MA = (% outside air*outside air dry-bulb temperature) + (% return air*return air dry-bulb temperature)

MA = (0.40*68°F) + (0.60*75°F)

MA = 72.20°F db

Repeat for wet-bulb temperature (wb)

MA 72.2°F db

64.6°F wb

2. Determine the additional static pressure drop for a reheat unit.

   Astatic pressure drop of 0.13" for the reheat coil and an additional 0.08 for the mandatory 2" pleated filters required when ordering the dehumidification option. Total static pressure =

   .34 + 0.08 + 0.13= 0.55

   Note: *Do not forget to also add any additional static from other accessories. This selection does not include additional accessories.*

   A standard motor and drive is needed for this airflow and static pressure range.

3. Determine leaving *evaporator* temperature (SA')

   Leaving Evaporator Temperature = SA'

   Utilizing the manual **Cooling Capacity** selection method as previously described, find the leaving evaporator temperatures with the following formula:

$$\Delta \text{ Temp} = \frac{\text{gross sensible or gross latent cooling capacity in Btuh}}{(\text{cfm})\ (1.085)}$$

   Subtract your sensible Δ temp from the entering db and latent Δ temp from the entering wb to determine the leaving evaporator db & wb (temperatures without the addition of fan heat).

   52.7°F db

   52.7°F wb

   52.7°F dp

4. Determine leaving *unit* temperature in standard cooling mode.

   Repeat Step 3. substituting **net** sensible or latent capacity for **gross** sensible or latent capacity to find the leaving unit temperature including fan heat.

   53.7°F db

   53.1°F wb

5. Determine reheat temperature rise.

   Using the leaving *evaporator* temp (SA') determine the reheat temperature rise for that particular cfm: +/- 9.0°F db.

   Note: *Reheat temperature rise is based on* ***supply airflow*** *and leaving* ***evaporator coil*** *temperature.*

6. Determine leaving unit sensible temperature *with reheat active* (SA)

   Reheat temperature (obtained in Step 5 + (SA' + fan heat) = SA.

   Note: *(SA' + fan heat) = leaving unit temperature in standard cooling mode from Step 4.*

   19.0°F db + 53.7°F = 72.7°F db

   SA = 72.7°F

   Since reheat adds only sensible heat, the dewpoint temperature will remain constant so follow the dewpoint temperature line across the psychrometric chart to find the new wb temperature.

   +/– 60.5°F wb

   52.7 dp

   49.9% RH

Precedent 3-10 Ton Packaged Cooling Selection Procedure

If the space relative humidity is equal to or above the space relative humidity setpoint, the dehumidification option will:

- Energize compressor or both compressors (2 stage compressor units).
- Hot gas reheat valve is energized and hot gas is diverted to the reheat coil.
- Dehumidification/reheat is terminated when space humidity is reduced to 5% below relative humidity setpoint.

At MA air enters the RTU. The RTU filters, cools, and dehumidifies the air as it moves through the evaporator coil. Air leaves the evaporator coil saturated at the preset dew point condition (SA') and is reheated by the hot gas reheat coil to deliver 72.7°F (SA) supply air to the space.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Precedent 3-10 Ton Packaged Cooling Model Number Description

Digit 1 — Unit Type

T = DX Cooling
Y = DX Cooling, Gas Heat

Digit 2 — Efficiency

S = Standard Efficiency
H = High Efficiency

Digit 3 — Airflow

C = Convertible

Digit 4,5,6 — Nominal Gross Cooling Capacity (MBh)

036 = 3 Ton
048 = 4 Ton
060 = 5 Ton
072 = 6 Ton
074 = 6 Ton, Dual Compressor
090 = 7.5 Ton, Single Compressor
092 = 7.5 Ton, Dual Compressor
102 = 8.5 Ton
120 = 10 Ton

Digit 7 — Major Design Sequence

Digit 8 — Voltage Selection

3 = 208–230/60/3
4 = 460/60/3
W = 575/60/3

Digit 9 — Unit Controls

E = Electromechanical
R = ReliaTel™ Microprocessor

Digit 10 — Heating

Note: *Applicable to Digit 1, T models only.*

0 = No Electric Heat
B = 6 kW (3 phase)
C = 9 kW (3 phase)
E = 12 kW (3 phase)
G = 18 kW (3 phase)
J = 23 kW (3 phase)
K = 27 kW (3 phase)
N = 36 kW (3 phase)
P = 54 kW (3 phase)

Digit 10 — Heating (continued)

Note: *Applicable to Digit 1, Y models only.*

L = Low Heat
M = Medium Heat
H = High Heat
X = Low Heat, Stainless Steel Heat Exchanger
Y = Medium Heat, Stainless Steel Heat Exchanger
Z = High Heat, Stainless Steel Heat Exchanger

Digit 11 — Minor Design Sequence

A = First Sequence[3]
B = Second Sequence[4]

Digit 12, 13 — Service Sequence

****** = Factory Assigned

Digit 14 — Fresh Air Selection

0 = No Fresh Air
A = Manual Outside Air Damper 0–50%[5]
B = Motorized Outside Air Damper 0–50%[6]
C = Economizer, Dry Bulb 0–100% without Barometric Relief[7]
D = Economizer, Dry Bulb 0–100% with Barometric Relief[7]
E = Economizer, Reference Enthalpy 0–100% without Barometric Relief[7,8]
F = Economizer, Reference Enthalpy 0–100% with Barometric Relief[7,8]
G = Economizer, Comparative Enthalpy 0–100% without Barometric Relief[7,8]
H = Economizer, Comparative Enthalpy 0–100% with Barometric Relief[7,8]
K = Low Leak Economizer with Barometric Relief
M = Low Leak Economizer with Barometric Relief
P = Low Leak Economizer with Comparative Enthalpy with Barometric Relief

Digit 15 — Supply Fan/Drive Type/ Motor

0 = Standard Drive[9]
1 = Oversized Motor
2 = Optional Belt Drive Motor[10]
6 = Single Zone VAV[11,12]
7 = Multi-Speed Indoor Fan[13]
E = VAV Supply Air Temperature Controls Standard Motor[12]

Digit 16 — Hinged Service Access/ Filters

0 = Standard Panels/Standard Filters
A = Hinged Access Panels/Standard Filters
B = Standard Panels/2" MERV 8 Filters
C = Hinged Access Panels/2" MERV 8 Filters
D = Standard Panels/2" MERV 13 Filters
E = Hinged Access Panels/2" MERV 8 Filters

Digit 17 — Condenser Coil Protection

0 = Standard Coil
1 = Standard Coil with Hail Guard
2 = Black Epoxy Coil Pre-Coated Condenser Coil[14]
3 = Black Epoxy Coil Pre-Coated Condenser Coil with Hail Guard[14]
4 = CompleteCoat™ with Condenser Coil
5 = CompleteCoat™ with Hail Guard

Digit 18 — Through-the-Base Provisions

Note: *Applicable to Digit 1, T or Y models only.*

0 = No Through-the-Base Provisions
A = Through-the-Base Electric[15]

Note: *Applicable to Digit 1, Y models only.*

B = Through-the-Base Gas Piping[16]
C = Through-the-Base Electric and Gas Piping[16]

Digit 19 — Disconnect/Circuit Breaker (three-phase only)

0 = No Disconnect/No Circuit Breaker
1 = Unit Mounted/Non-Fused Disconnect[15]
2 = Unit Mounted Circuit Breaker[15]

Digit 20— Convenience Outlet

0 = No Convenience Outlet
A = Unpowered Convenience Outlet
B = Powered Convenience Outlet (three-phase only)[17]

Digit 21— Communications Options[8]

0 = No Communications Interface
1 = American Standard® Communications Interface
2 = LonTalk® Communications Interface
3 = Novar 2024 Controls[18]
4 = Novar 3051 Controls without Zone Sensor[18]
5 = Novar 3051 Controls Interface with DCV[18]
6 = BACnet® Communications Interface
7 = American Standard® Air-Fi® Communications Interface[19]

Digit 22— Refrigeration System Option

0 = Standard Refrigeration System[20]
B = Dehumidification Option[21,22]

Digit 23— Refrigeration Controls

Note: *Applicable to Digit 7 = E, F, G, H.*

0 = No Refrigeration Control[23]
1 = Frostat™[24,25]

Precedent 3-10 Ton Packaged Cooling Model Number Description

Digit 24— Smoke Detector[26]

0 = No Smoke Detector
A = Return Air Smoke Detector[27,28]
B = Supply Air Smoke Detector
C = Supply and Return Air Smoke Detectors[27,28]
D = Plenum Smoke Detector

Digit 25— System Monitoring Controls

0 = No Monitoring Control[29]
1 = Clogged Filter Switch[29]
2 = Fan Filter Switch[29]
3 = Discharge Air Sensing Tube[29]
4 = Clogged Filter Switch and Fan Filter Switch[29]
5 = Clogged Filter Switch and Discharge Air Sensing Tube[29]
6 = Fan Failure Switch and Discharge Air Sensing Tube[29]
7 = Clogged Filter Switch, Fan Failure Switch and Discharge Air Sensing Tube[29]
8 = Novar Return Air Sensor (NOVAR 2024)[30,18]
9 = Novar Zone Temp Sensor (NOVAR 3051)[31,18]
A = Condensate Drain Pan Overflow Switch)
B = Clogged Filter Switch[29] and Condensate Drain Pan Overflow Switch
C = Fan Failure Switch[29] and Condensate Drain Pan Switch
D = Discharge Air Sensing[29] and Condensate Overflow Switch
E = Clogged Filter Switch[29], Fan Failure Switch and Condensate Drain Pan Overflow Switch
F = Clogged Filter Switch[29], Discharge Air Sensing Tube[29] and Condensate Drain Pan Overflow Switch
G = Fan Failure Switch, Discharge Air Sensing Tube[29] and Condensate Drain Pan Overflow Switch
H = Clogged Filter Switch[29], Fan Failure Switch[29], Discharge Air Sensing[29] and Condensate Drain Pan Overflow Switch

Digit 26— System Monitoring Controls

0 = No Monitoring Control
A = Demand Control Ventilation (CO_2)[32,33]
B = Low Leak Economizer with FDD (Fault Detection & Diagnostics)
C = FDD (Fault Detection & Diagnostics) with DCV (Demand Control Ventilation)

Digit 27— Unit Hardware Enhancements
0 = No Enhancements
1 = Stainless Steel Drain Pan

Digit 31— Advanced Unit Controls

0 = Standard Unit Controls
1 = Human Interface

Precedent 3-10 Ton Packaged Cooling Model Number Description

Model Number Notes

Notes:

1. Standard on T/YSC 6, 7.5 (single and dual systems), 8.5, 10 ton standard efficiency models and T/YHC 4, 5, 6, 7.5, 8.5, 10 ton MCHE high efficiency models (except for 4, 5, 6 ton dehumidification models).
2. Available on 3 to 5 ton models.
3. Available for all models except gas/electric, 3 to 5 tons high efficiency single phase and 3 to 5 tons standard efficiency 3 phase.
4. Available for gas/electric, 3 to 5 tons high efficiency single phase and 3 to 5 tons standard efficiency single phase models.
5. Manual outside air damper will ship factory supplied within the unit, but must be field installed.
6. Motorized outside air damper is not available on multi-speed or SZVAV (single zone variable air volume) products.
7. Economizer with barometric relief is for downflow configured units only. Order economizer without barometric relief for horizontal configuration. Barometric relief for horizontal configured units must be ordered as field installed accessory.
8. Not available with electromechanical controls.
9. Multi-speed, direct drive motor with no belt drive option is standard on 3 to 5 ton, standard efficiency, 13/14 SEER units. Multi-speed, direct drive motor with a belt drive option is available for 3 to 5 ton, 15 SEER units. On 6 to 10 tons, multispeed direct drive is standard on all 10 ton and 6 (074) to 8.5 ton high efficiency. Belt drive is standard on all other units. Reference Table 3, p. 28 table.
10. Reference Table 3, p. 28 table.
11. Single zone VAV is only available on 6 to 10 tons high efficiency and 7.5 to 10 ton standard efficiency products with ReliaTel™ controls.
12. Discharge air sensing is also standard equipment on units with single zone and supply air temperature control VAV.
13. Multi-speed indoor fan available only on 6, 7.5 & 8.5 tons high efficiency, and 7.5 to 10 ton products with ReliaTel™ controls.
14. Epoxy coil and epoxy with hail guard options are not available for units with microchannel condenser coil.
15. Through-the-base electric required when ordering disconnect/circuit breaker options.
16. Includes gas piping and shutoff (field assembly required).
17. Requires use of disconnect or circuit breaker. Reference Table 4, p. 29 table.
18. Novar is not available with SZVAV products.
19. Must be used with BACnet® open protocol.
20. Standard metering devices are TXVs.
21. Requires selection of 2" pleated filters (option B or C) for Digit 16.
22. Not available on all single phase or standard efficiency.
23. High pressure control is standard on all units.
24. Frostat™ cannot be field installed in electro-mechanical units.
25. Frostat™ standard on Y/TSC036 to 060G and T/YSC090H electromechanical, multi-speed and SZVAV (single zone variable air volume) products.
26. Not available with high temperature duct sensor accessory.
27. The return air smoke detector may not fit up or work properly on the Precedent™ units when used in conjunction with 3rd party accessories such as bolt on heat wheels, economizers and power exhaust. Do not order the return air smoke detectors when using this type of accessory.
28. Return air smoke detector cannot be ordered with Novar controls.
29. These options are standard when ordering Novar controls.
30. This option is used when ordering Novar controls.
31. Novar sensor utilized with Digit 21 = (4) Novar 3051 controls without zone sensor.
32. Demand control ventilation not available with electromechanical controls.
33. Demand control ventilation option includes wiring only. The $C0_2$ sensor is a field-installed only option.

Table 3. Digit 15 Selection Details

Digit 15 = 0
Standard Efficiency
3 Phase (3 to 5 Ton) = Multispeed Direct Drive Motor
3 Phase (6 to 8.5 Ton) = Belt Drive
3 Phase (10 Ton) = Ultra High Efficiency Direct Drive Plenum Fan
High Efficiency
3 Phase (3 to 5 ton) = High Efficiency Multispeed Direct Drive Motor
3 Phase (3 to 5 ton w/Dehumidification) = Belt Drive Motor
3 Phase [6 (074) to 10 ton] = Ultra High Efficiency Direct Drive Plenum Fan
Digit 15 = 2
Standard Efficiency
3 Phase = Not Available
High Efficiency
3 Phase (3 to 5 tons) = May be Ordered

Precedent 3-10 Ton Packaged Cooling Model Number Description

Table 3. Digit 15 Selection Details (continued)

3 Phase (3 to 5 tons w/dehumidification) = Not Available
3 Phase (6 to 10 tons) = Not Available

Table 4. Not Available in Model Number

Standard Efficiency
3 to 5 Tons and 10 Ton w/575V
High Efficiency
3 to 5 Tons w/Standard Indoor Motor w/460V
High Efficiency 575V

Precedent 3-10 Ton Packaged Cooling General Data

Table 5. General data — 3 to 5 tons — standard efficiency

	3 Tons	4 Tons	5 Tons
	T/YSC036G3,4,W	**T/YSC048G3,4,W**	**T/YSC060G3,4,W**
Cooling Performance[a]			
Gross Cooling Capacity	37,000	49,000	60,000
EER/SEER[b]	12.0/14.0	12.0/14.0	12.0/14.0
Nominal cfm/AHRI Rated cfm	1,200/1,200	1,600/1,600	2,000/2,000
AHRI Net Cooling Capacity	36,000	48,000	58,500
System Power (kW)	3.00	4.00	4.88
Compressor			
Number/Type	1/Scroll	1/Scroll	1/Scroll
Sound			
Outdoor Sound Rating (dB)[c]	79	80	81
Outdoor Coil			
Type	Microchannel	Microchannel	Microchannel
Configuration	Full Face	Full Face	Full Face
Tube Size (in.)	0.63	0.63	1.00
Face Area (sq. ft.)	10.50	10.50	11.90
Rows/FPI (Fins per inch)	1/23	1/23	1/23
Indoor Coil			
Type	Microchannel	Microchannel	Microchannel
Configuration	Full Face	Full Face	Full Face
Tube Size (in.)	0.63	0.63	0.81
Face Area (sq. ft.)	6.98	6.98	8.15
Rows/FPI (Fins per inch)	2/16	2/16	2/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection No./Size (in.)	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan			
Type	Propeller	Propeller	Propeller
No. Used/Diameter (in.)	1/22	1/22	1/22
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1
CFM	3,600	4,050	3950
Motor HP	0.25	0.33	0.40
Motor RPM	1,100	1,100	1100
Indoor Fan			
Type (Standard)	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter (in.)/Width (in.)	1	1	1
Drive Type/No. Speeds/RPM	11x11	11x11	11x11
Number Motors	Direct/5[d]	Direct/5[d]	Direct/5[d]
Motor HP	0.75/1.5	1.0/1.5	1.0/1.5
Motor Frame Size	48	48	48
Filters[e]			
Type Furnished	Throwaway	Throwaway	Throwaway
Number Size Recommended	(2) 20x35x2	(2) 20x35x2	(2) 20x35x2
Refrigerant Charge[f]			
lbs of R-410A	3.2	3.5	4.8
Heating Performance (Gas/ Electric Only)[g]			
Heating Input			
Low Heat Input (Btu)	80,000 / 56,000	80,000 / 56,000	80,000 / 56,000
Mid Heat Input (Btu)	100,000 / 70,000	100,000 / 70,000	100,000 / 70,000
High Heat Input (Btu)	120,000 / 84,000	130,000 / 91,000	150,000 / 105,000

Precedent 3-10 Ton Packaged Cooling General Data

Table 5. General data — 3 to 5 tons — standard efficiency (continued)

	3 Tons	4 Tons	5 Tons
	T/YSC036G3,4,W	T/YSC048G3,4,W	T/YSC060G3,4,W
Heating Output			
Low Heat Output (Btu)	64,800 / 45,300	64,800 / 45,300	64,800 / 45,300
Mid Heat Output (Btu)	81,000 / 56,700	81,000 / 56,700	81,000 / 56,700
High Heat Output (Btu)	97,200 / 68,000	105,300 / 73,700	121,500 / 85,100
Steady State Efficiency %			
Low Heat Input (Btu)	81	81	81
Mid Heat Input (Btu)	81	81	81
High Heat Input (Btu)	81	81	81
No. Burners			
Low Heat Output (Btu)	2	2	2
Mid Heat Output (Btu)	3	3	3
High Heat Output (Btu)	4	4	4
No. Stages			
Low Heat Input (Btu)	2	2	2
Mid Heat Input (Btu)	2	2	2
High Heat Input (Btu)	2	2	2
Gas Supply Line Pressure			
Natural (minimum/maximum)	4.5/14.0	4.5/14.0	4.5/14.0
LP (minimum/maximum)	11.0/14.0	11.0/14.0	11.0/14.0
Gas Connection Pipe Size (in.)			
Low Heat	1/2	1/2	1/2
Mid Heat	1/2	1/2	1/2
High Heat	3/4	3/4	3/4

(a) Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 210/240.

(b) EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.

(c) Outdoor sound rating shown is tested in accordance with AHRI Standard 270. For additional information reference the outdoor sound power level data in the performance section.

(d) For multispeed direct drive rpm TSC/YSC values, reference the direct drive, evaporator fan performance data.

(e) Optional 2" MERV 8 and MERV 13 filters also available.

(f) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

(g) Heating performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level. Applicable to gas/electric units only.

Precedent 3-10 Ton Packaged Cooling General Data

Table 6. General data — 6 to 10 tons — standard efficiency

	6 Tons	7.5 Tons	7.5 Tons	8.5 Tons	10 Tons
	T/YSC 072H3,4,W	Single Compressor T/YSC 090H3,4,W	Dual Compressor T/YSC 092H3,4,W	T/YSC 102H3,4,W	T/YSC 120H3,4,W
Cooling Performance[a]					
Gross Cooling Capacity	75,000	92,500	94,800	107,200	116,000
EER[b]	11.2	11.2	11.2	11.2	11.2
Nominal cfm/AHRI Rated cfm	2,400/2,100	3,000/2,400	3,000/2,325	3,400/2,720	4,000/4,000
AHRI Net Cooling Capacity	71,000	87,000	90,000	102,000	113,000
IEER (T/Y)[c]	12.9 / 12.7	12.9 / 12.7	12.9/12.7[d]	12.9 / 12.7[e]	12.9/12.7
System Power (kW)	6.36	7.77	8.04	9.11	10.09
Compressor					
Number/Type	1/Scroll	1/Scroll	2/Scroll	2/Scroll	2/Scroll
Sound					
Outdoor Sound Rating (dB)[f]	89	89	91	88	88
Outdoor Coil					
Type	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel
Configuration	Full Face	Full Face	Face-split	Face-Split	Face Split
Tube Size (in.)	0.71	1.00	0.71	1	1
Face Area (sq. ft.)	16.91	16.91	17.31	20.77	20.77
Rows/FPI (Fins per inch)	1/23	1/21	1/23	1/21	1/20
Indoor Coil					
Type	Lanced	Lanced	Lanced	Lanced	Lanced
Configuration	Full Face	Full Face	Face-split	Intertwined	Intertwined
Tube Size (in.)	0.3125	0.3125	0.3125	0.3125	0.3125
Face Area (sq. ft.)	9.89	9.89	12.36	12.36	12.36
Rows/FPI (Fins per inch)	3/16	4/16	3/16	4/16	4/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection No./Size (in.)	1¾ NPT	1¾ NPT	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan					
Type	Propeller	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter (in.)	1/26	1/26	1/26	1/26	1/26
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1
CFM	6,037	6400	6600	6680	6800
Motor HP	0.70	0.70	0.70	0.70	0.70
Motor RPM	1,100	1,100	1,100	1,100	1,100
Indoor Fan					
Type	FC Centrifugal	FC Centrifugal	FC Centrifugal[g]	FC Centrifugal[g]	BC Plenum
No. Used/Diameter (in.)/Width (in.)	1/12x12	1/12x12	1/15x15[h]	1/15x15[h]	1/23.0315x6.14
Drive Type/No. Speeds/RPM	Belt/Variable/1,750	Belt/Variable/1,750	Belt/Variable/1,750 [i]	Belt/Variable/1,750 [i]	Direct/Variable[f]
Motor HP (Standard/Oversized)	1.0/2.0	1.0/3.0	1.0/3.0[j]	2.0/3.0[j]	2.75/—
Motor Frame Size (Standard/Oversized)	56/56	56/56	56/56	56/56	—/—
Filters[k]					
Type Furnished	Throwaway	Throwaway	Throwaway	Throwaway	Throwaway
Number Size Recommended	(4) 16x25x2	(4) 16x25x2	(4) 20x25x2	(4) 20x25x2	(4) 20x25x2
Refrigerant Charge[l]					
lbs of R-410A	5.5	7.5	3.8/3.6	6.2/3.9	5.6/4.4
Heating Performance (Gas/ Electric Only)[m]					
Heating Input					
Low Heat Input (Btu)	80,000	120,000	120,000	120,000	150,000/105,000
Mid Heat Input (Btu)	120,000	150,000/105,000	150,000/105,000	150,000/105,000	200,000/140,000
High Heat Input (Btu)	150,000/105,000	200,000/140,000	200,000/140,000	200,000/140,000	235,000/164,500

Precedent 3-10 Ton Packaged Cooling General Data

Table 6. General data — 6 to 10 tons — standard efficiency (continued)

	6 Tons	7.5 Tons	7.5 Tons	8.5 Tons	10 Tons
	T/YSC 072H3,4,W	Single Compressor T/YSC 090H3,4,W	Dual Compressor T/YSC 092H3,4,W	T/YSC 102H3,4,W	T/YSC 120H3,4,W
Heating Output					
Low Heat Output (Btu)	64,000	96,000	96,000[n]	96,000[n]	120,000/84,000
Mid Heat Output (Btu)	96,000	120,000/84,000	120,000/84,000[n]	120,000/84,000[n]	160,000/112,000
High Heat Output (Btu)	120,000/84,000	160,000/112,000	160,000/112,000[n]	160,000/112,000[n]	188,000/131,600
Steady State Efficiency %					
Low Heat Input (Btu)	80	80	80[o]	80[o]	80
Mid Heat Input (Btu)	80	80	80[o]	80[o]	80
High Heat Input (Btu)	80	80	80[o]	80[o]	80
No. Burners					
Low Heat Output (Btu)	2	3	3	3	3
Mid Heat Output (Btu)	3	3	3	3	4
High Heat Output (Btu)	3	4	4[p]	4[p]	5
No. Stages					
Low Heat Input (Btu)	1	1	1	1	2
Mid Heat Input (Btu)	1	2	2	2	2
High Heat Input (Btu)	2	2	2	2	2
Gas Supply Line Pressure					
Natural (minimum/maximum)	4.5/14.0	4.5/14.0	4.5/14.0	4.5/14.0	4.5/14.0
LP (minimum/maximum)	11.0/14.0	11.0/14.0	11.0/14.0	11.0/14.0	11.0/14.0
Gas Connection Pipe Size (in.)					
Low Heat	1/2	1/2	1/2	1/2	3/4
Mid Heat	1/2	3/4	3/4	3/4	3/4
High Heat	3/4	3/4	3/4	3/4	3/4

[a] Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 340/360.

[b] EER is rated at AHRI conditions and in accordance with DOE test procedures.

[c] Integrated Efficiency Ratio (IEER) is rated in accordance with AHRI Standard 340/360. The IEER rating requires that the unit efficiency be determined at 100%, 75%, 50% and 25% load (net capacity) at the specified in AHRI Standard.

[d] 13.7 IEER for SZVAV option, 13.4 IEER for Title24 2 speed fan option.

[e] 13.7 IEER for SZVAV option, 13.4 IEER for Title24 2 speed fan option

[f] Outdoor sound rating shown is tested in accordance with AHRI Standard 270. For additional information reference the outdoor sound power level data in the performance section.

[g] For SZVAV / Title 24 Option, Backward Airfoil Plenum

[h] For SZVAV / Title 24 Option, 1/23.03

[i] For SZVAV / Title 24 Option, Plenum/Variable/1,700

[j] For SZVAV / Title 24 Option, 2.75

[k] Optional 2" MERV 8 and MERV 13 filters also available.

[l] Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

[m] Heating performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level. Applicable to gas/electric units only.

[n] For SZVAV / Title24 Option, Low = 97,200, Mid = 121,500, High = 162,000

[o] For SZVAV / Title24 Option, Steady State Efficiency = 81%

[p] 5 burners for SZVAV / Title24 Option

Precedent 3-10 Ton Packaged Cooling General Data

Table 7. General data — 3 to 5 tons — high efficiency

	3 Tons T/YHC 036E3,4,W	4 Tons T/YHC 048E3,4,W	4 Tons T/YHC 048F3,4,W	5 Tons T/YHC 060E3,4,W	5 Tons T/YHC 060F3,4,W
Cooling Performance[a]					
Gross Cooling Capacity	37,600	49,930	49,930	61,000	61,000
EER/SEER[b]	E3,4= 12.7/15.0 EW=12.0/14.4"	14.2	13.2/15.0	14.2	12.85/15.0
Nominal cfm/AHRI Rated cfm	1,200/1,200	1,600/1,600	1,600/1,600	2,000/2,000	2,000/2,000
AHRI Net Cooling Capacity	37,000	49,000	49,000	60,000	60,000
System Power (kW)	2.99	3.67	3.67	4.67	4.67
Compressor					
Number/Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Sound					
Outdoor Sound Rating (dB)[c]	81	87	87	87	87
Outdoor Coil					
Type	Lanced	Lanced	Microchannel	Lanced	Microchannel
Configuration	Full Face	Full Face	Full Face	Full Face	Full Face
Tube Size (in.)	0.3125	0.3125	0.71	0.3125	0.71
Face Area (sq. ft.)	10.96	17.00	16.91	17	16.91
Rows/FPI (Fins per inch)	2/16	3/16	1/23	3/16	1/23
Indoor Coil					
Type	Lanced	Lanced	Lanced	Lanced	Lanced
Configuration	Full Face	Full Face	Full Face	Full Face	Full Face
Tube Size (in.)	0.3125	0.3125	0.3125	0.3125	0.3125
Face Area (sq. ft.)	7.71	9.27	9.27	9.89	9.89
Rows/FPI (Fins per inch)	3/16	3/16	3/16	4/16	4/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection No./Size (in.)	1¾ NPT	1¾ NPT	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan					
Type	Propeller	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter (in.)	1/22	1/26	1/26	1/26	1/26
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1
CFM	3,064	3,982	3,982	3,953	3,953
Motor HP	0.20	0.40	0.40	0.40	0.40
Motor RPM	1,075	1,075	1,075	1,075	1,075
Indoor Fan					
Type (Standard)[d]	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter (in.)/Width (in.)	1/11x11	1/11x11	1/11x11	1/11x11	1/11x11
Drive Type/No. Speeds/RPM[e]	Direct/5	Direct/5	Direct/5	Direct/5	Direct/5
Number Motors	1	1	1	☐	☐
Motor HP	0.75	1.0	1.0	1.0	1.0
Motor Frame Size	48	48	48	48	48
Indoor Fan					
Type (Optional)	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter (in.)/Width (in.)	1/11x11	1/11x11	1/11x11	1/11x11	1/11x11
Drive Type/No. Speeds/RPM	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
Number Motors	1	1	1	☐	☐
Motor HP	1.0	1.0	1.0	1.0	1.0
Motor Frame Size	56	56	56	56	56
Filters[f]					
Type Furnished	Throwaway	Throwaway	Throwaway	Throwaway	Throwaway
Number Size Recommended	(2) 20x30x2	(4) 16x25x2	(4) 16x25x2	(4) 16x25x2	(4) 16x25x2
Optional Hot Gas Reheat Coil					
Tube Size (in.) OD	0.3125	0.3125	—	0.3125	—

Precedent 3-10 Ton Packaged Cooling General Data

Table 7. General data — 3 to 5 tons — high efficiency (continued)

	3 Tons	4 Tons	4 Tons	5 Tons	5 Tons
	T/YHC 036E3,4,W	T/YHC 048E3,4,W	T/YHC 048F3,4,W	T/YHC 060E3,4,W	T/YHC 060F3,4,W
Face Area (sq. ft.)	5.23	6.28	—	6.28	—
Rows/FPI (Fins per inch)	1/16	1/16	—	1/16	—
Refrigerant Charge (lbs. of R-410A)[g]					
Standard	6.2	—	5.2	—	6.1
Optional Hot Gas Reheat Coil	10.5	15.2	—	15.7	—
Heating Performance (Gas/ Electric Only)[h]					
Heating Input					
Low Heat Input (Btu)	60,000	60,000	60,000	60,000	60,000
Mid Heat Input (Btu)	80,000	80,000	80,000	80,000	80,000
High Heat Input (Btu)	120,000	120,000	120,000	130,000	130,000
Heating Output					
Low Heat Output (Btu)	48,000	49,000	49,000	49,000	49,000
Mid Heat Output (Btu)	64,000	64,000	64,000	64,000	64,000
High Heat Output (Btu)	96,000	96,000	96,000	104,000	104,000
AFUE %					
Low Heat Input (Btu)	78	80	80	80	80
Mid Heat Input (Btu)	78	79	79	79	79
High Heat Input (Btu)	78	79	79	80	80
Steady State Efficiency %					
Low Heat Input (Btu)	80	81	81	81	81
Mid Heat Input (Btu)	80	80	80	80	80
High Heat Input (Btu)	80	81	81	80	80
No. Burners					
Low Heat Output (Btu)	2	2	2	2	2
Mid Heat Output (Btu)	2	2	2	2	2
High Heat Output (Btu)	3	3	3	3	3
No. Stages					
Low Heat Input (Btu)	1	1	1	1	1
Mid Heat Input (Btu)	1	1	1	1	1
High Heat Input (Btu)	1	1	1	1	1
Gas Supply Line Pressure					
Natural (minimum/maximum)	4.5/14.0	4.5/14.0	4.5/14.0	4.5/14.0	4.5/14.0
LP (minimum/maximum)	11.0/14.0	11.0/14.0	11.0/14.0	11.0/14.0	11.0/14.0
Gas Connection Pipe Size (in.)					
Low Heat	1/2	1/2	1/2	1/2	1/2
Mid Heat	1/2	1/2	1/2	1/2	1/2
High Heat	1/2	1/2	1/2	1/2	1/2

Note: 575V (W voltage) is only available as YHC. No THC models available with 575V (W voltage).

[a] Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 210/240.

[b] EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.

[c] Outdoor sound rating shown is tested in accordance with AHRI Standard 270. For additional information reference the outdoor sound power level data in the performance section.

[d] Belt drive fan is standard on units with reheat option.

[e] For multispeed direct drive rpm THC/YHC values, reference the direct drive, evaporator fan performance data.

[f] Optional 2" MERV 8 and MERV 13 filters also available.

[g] Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

Precedent 3-10 Ton Packaged Cooling General Data

Table 8. General data — 6 to 7.5 tons — high efficiency

	6 Tons	6 Tons	7.5 Tons
	Single Compressor T/YHC072E/F3,4,W	Dual Compressor T/YHC074F3,4	T/YHC092F3,4,W
Cooling Performance[a]			
Gross Cooling Capacity	72,000	73,000	92,000
EER[b]	12.6	13.1	12.6
Nominal cfm/AHRI Rated cfm	2,400/2,100	2,400/2,100	3,000/2,625
AHRI Net Cooling Capacity	68,000	71,000	89,000
IEER[c]	14.5	15.5[d]	14.5[e]
System Power (kW)	5.37	5.42	7.06
Compressor			
Number/Type	1/Scroll	2/Scroll	2/Scroll
Sound			
Outdoor Sound Rating (dB)[f]	89	89	88
Outdoor Coil			
Type	Microchannel	Microchannel	Microchannel
Configuration	Full Face	Face-Split	Face-Split
Tube Size (in.)	0.71	1	1
Face Area (sq. ft.)	20.77	20.77	20.77
Rows/FPI (Fins per inch)	1/23	1/20	1/20
Indoor Coil			
Type	Lanced	Lanced	Lanced
Configuration	Full Face	Intertwined	Intertwined
Tube Size (in.)	0.3125	0.3125	0.3125
Face Area (sq. ft.)	12.36	12.36	12.36
Rows/FPI (Fins per inch)	4/16	4/16	4/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection No./Size (in.)	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan			
Type	Propeller	Propeller	Propeller
No. Used/Diameter (in.)	1/26	1/26	1/26
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1
CFM	5900	5750	6800
Motor HP	0.7	0.7	0.75
Motor RPM	1100	1100	1100
Indoor Fan			
Type	FC Centrifugal	BC Plenum	BC Plenum
No. Used/Diameter (in.)/Width (in.)	1/15x15	1/23.0315x6.14	1/23.0315x6.14
Drive Type/No. Speeds[g]/RPM	Belt/Variable/1,750	Direct/Variable	Direct/Variable
Motor HP (Standard/Oversized)	1.0/2.0	2.75/—	2.75/—
Motor Frame Size (Standard/Oversized)	56/56	—/—	—/—
Filters[h]			
Type Furnished	Throwaway	Throwaway	Throwaway
Number Size Recommended	(4) 20x25x2	(4) 20x25x2	(4) 20x25x2
Optional Hot Gas Reheat Coil			
Tube Size (in.) OD	—	—	0.3125
Face Area (sq. ft.)	—	—	8.652
Rows/FPI (Fins per inch)	—	—	1/16
Refrigerant Charge[i]			
Standard	7.7	5.8/4.1	5.5/4.2
Optional Hot Gas Reheat Coil	—	—	6.2/4.3
Heating Performance (Gas/ Electric Only)[j]			
Heating Input			

Precedent 3-10 Ton Packaged Cooling General Data

Table 8. General data — 6 to 7.5 tons — high efficiency (continued)

	6 Tons	6 Tons	7.5 Tons
	Single Compressor T/YHC072E/F3,4,W	Dual Compressor T/YHC074F3,4	T/YHC092F3,4,W
Low Heat Input (Btu)	80,000	80,000	120,000
Mid Heat Input (Btu)	120,000	120,000	150,000/105,000
High Heat Input (Btu)	150,000/105,000	150,000/105,000	200,000/140,000
Heating Output			
Low Heat Output (Btu)	64,000	64,800	96,000
Mid Heat Output (Btu)	96,000	97,200	120,000/84,000
High Heat Output (Btu)	120,000/84,000	121,500/85,050	160,000/112,000
Steady State Efficiency %			
Low Heat Input (Btu)	80	81	80
Mid Heat Input (Btu)	80	81	80
High Heat Input (Btu)	80	81	80
No. Burners			
Low Heat Output (Btu)	3	3	3
Mid Heat Output (Btu)	3	3	3
High Heat Output (Btu)	4	4	4
No. Stages			
Low Heat Input (Btu)	1	1	1
Mid Heat Input (Btu)	1	1	2
High Heat Input (Btu)	2	2	2
Gas Supply Line Pressure			
Natural (minimum/maximum)	4.5/14.0	4.5/14.0	4.5/14.0
LP (minimum/maximum)	11.0/14.0	11.0/14.0	11.0/14.0
Gas Connection Pipe Size (in.)			
Low Heat	1/2	1/2	1/2
Mid Heat	1/2	1/2	3/4
High Heat	3/4	3/4	3/4

Note: 575V (W voltage) is only available as YHC. No THC models available with 575V (W voltage).

(a) Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 340/360.

(b) EER is rated at AHRI conditions and in accordance with DOE test procedures.

(c) Integrated Efficiency Ratio (IEER) is rated in accordance with AHRI Standard 340/360. The IEER rating requires that the unit efficiency be determined at 100%, 75%, 50% and 25% load (net capacity) at the specified in AHRI Standard.

(d) 16.0 IEER for multi-speed, SZVAV, and MZVAV.

(e) 15.0 IEER for multi-speed, SZVAV, and MZVAV 208-230/460V.

(f) Outdoor sound rating shown is tested in accordance with AHRI Standard 270. For additional information reference the outdoor sound power level data in the performance section.

(g) For multispeed direct drive rpm T/YHC values, reference the direct drive, evaporator fan performance data. This note only applicable to T/YHC074F3,4,W and T/YHC092F3,4,W.

(h) Optional 2" MERV 8 and MERV 13 filters also available.

(i) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

(j) Heating performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level. Applicable to gas/electric units only.

Precedent 3-10 Ton Packaged Cooling General Data

Table 9. General data — 8.5 to 10 tons — high efficiency

	8.5 Tons	10 Tons
	T/YHC102F3,4,W	T/YHC120F3,4,W
Cooling Performance[a]		
Gross Cooling Capacity	104,000	116,000
EER[b]	T = 12.5 Y=12.4	12.4
Nominal cfm/AHRI Rated cfm	3,400/2,720	4,000/3,800
AHRI Net Cooling Capacity	99,000	113,000
IEER[c]	T= 14.7[d] YHC102FW=14.5	IEER = 14.7 SZVAV, IEER = 15.2
System Power (kW)	7.92	9.11
Compressor		
Number/Type	2/Scroll	2/Scroll
Sound		
Outdoor Sound Rating (dB)[e]	89	87
Outdoor Coil		
Type	Microchannel	Microchannel
Configuration	Face Split	Face Split
Tube Size (in.)	1	1
Face Area (sq. ft.)	20.77	26.77
Rows/FPI (Fins per inch)	1/20	1/23
Indoor Coil		
Type	Lanced	Lanced
Configuration	Intertwined	Intertwined
Tube Size (in.)	0.3125	0.3125
Face Area (sq. ft.)	12.36	16.65
Rows/FPI (Fins per inch)	5/16	4/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection No./Size (in.)	1¾ NPT	1¾ NPT
Outdoor Fan		
Type	Propeller	Propeller
No. Used/Diameter (in.)	1/26	1/30
Drive Type/No. Speeds	Direct/1	Direct/1
CFM	6,800	7,540
Motor HP	0.75	0.75
Motor RPM	1,100	1,100
Indoor Fan		
Type (Standard)	BC Plenum	BC Plenum
No. Used/Diameter (in.)/Width (in.)	1/23.0315x6.14	1/23.0315x6.14
Drive Type/No. Speeds/RPM[f]	Direct/Variable	Direct/Variable
Motor HP	2.75/—	2.75/—
Motor Frame Size	—/—	—/—
Filters[g]		
Type Furnished	Throwaway	Throwaway
Number Size Recommended	(4) 20x25x2	(3) 20x25x2 (2) 20x30x2
Optional Hot Gas Reheat Coil		
Tube Size (in.) OD	0.3125	0.3125
Face Area (sq. ft.)	8.652	15.23
Rows/FPI (Fins per inch)	1/16	1/16
Refrigerant Charge (lbs. of R-410A)[h]		
Standard	6.3/4.9	7.7/5.2
Optional Hot Gas Reheat Coil	6.6/4.7	8.6/5.2
Heating Performance (Gas/Electric Only)[i]		

Precedent 3-10 Ton Packaged Cooling General Data

Table 9. General data — 8.5 to 10 tons — high efficiency (continued)

	8.5 Tons	10 Tons
	T/YHC102F3,4,W	T/YHC120F3,4,W
Heating Input		
Low Heat Input (Btu)	120,000	150,000/105,000
Mid Heat Input (Btu)	150,000/105,000	200,000/140,000
High Heat Input (Btu)	200,000/140,000	250,000/175,000
Heating Output		
Low Heat Output (Btu)	96,000	120,000/84,000
Mid Heat Output (Btu)	120,000/84,000	160,000/112,000
High Heat Output (Btu)	160,000/112,000	200,000/140,000
Steady State Efficiency %		
Low Heat Input (Btu)	80	80
Mid Heat Input (Btu)	80	80
High Heat Input (Btu)	80	80
No. Burners		
Low Heat Output (Btu)	3	3
Mid Heat Output (Btu)	3	4
High Heat Output (Btu)	4	5
No. Stages		
Low Heat Input (Btu)	1	2
Mid Heat Input (Btu)	2	2
High Heat Input (Btu)	2	2
Gas Supply Line Pressure		
Natural (minimum/maximum)	4.5/14.0	4.5/14.0
LP (minimum/maximum)	11.0/14.0	11.0/14.0
Gas Connection Pipe Size (in.)		
Low Heat	1/2	3/4
Mid Heat	3/4	3/4
High Heat	3/4	3/4

Note: 575V (W voltage) is only available as YHC. No THC models available with 575V (W voltage).

(a) Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 340/360.

(b) EER is rated at AHRI conditions and in accordance with DOE test procedures.

(c) Integrated Efficiency Ratio (IEER) is rated in accordance with AHRI Standard 340/360. The IEER rating requires that the unit efficiency be determined at 100%, 75%, 50% and 25% load (net capacity) at the specified in AHRI Standard.

(d) 15.5 IEER for SZVAV

(e) Outdoor sound rating shown is tested in accordance with AHRI Standard 270. For additional information reference the outdoor sound power level data in the performance section.

(f) For multispeed direct drive rpm THC/YHC values, reference the direct drive, evaporator fan performance data.

(g) Optional 2" MERV 8 and MERV 13 filters also available.

(h) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

(i) Heating performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level. Applicable to gas/electric units only.

Precedent 3-5 Ton Packaged Cooling Selection Procedure

Cooling Capacity

Note: *Cooling Capacity Procedure is the same for electric heat (T*C) and gas heat (Y*C).*

1. Calculate the building's total and sensible cooling loads at design conditions. Use the American Standard calculation methods or any other standard accepted method. Factors used in unit selection:
   - Packaged Cooling with Optional Electric Heat
   - Total Cooling Load: 58 MBh
   - Sensible Cooling Load: 40 MBh
   - Airflow: 2000 cfm
   - Electrical Characteristics: 460/60/3
   - Summer Design Conditions: Entering Evaporator Coil: 80 DB
   - 67 WB Outdoor Ambient: 95
   - External Static Pressure: 0.36 in. wg
   - Downflow Configuration
   - Efficiency: 17 SEER
   - Economizer
2. As a starting point, a rough determination must be made of the size of the unit. The final selection will be made after examining the performance at the given conditions. Divide the total cooling load by nominal Btuh per ton (12 MBh per ton); then round up to the nearest unit size. 59 MBh / 12 MBh = approx. 5 tons
3. Table 7, p. 35 shows that a THC067E4 has a **gross** cooling capacity of 60.0 MBh and 45.29 MBh sensible capacity at 2000 cfm and 95 DB outdoor ambient with 80 DB, 67 WB air entering the evaporator.

   To Find Capacity at Intermediate Conditions not in the table
   When the design conditions are between two numbers that are in the capacity table, interpolation is required to approximate the capacity.
   Note: *Extrapolation outside of the table conditions is not recommended.*
4. In order to select the correct unit which meets the building's requirements, the fan motor heat must be deducted from the gross cooling capacity. The amount of heat that the fan motor generates is dependent on the effort by the motor - cfm and static pressure. To determine the total unit static pressure:

External Static Duct System	0.36 wg
Standard Filter 2 in. from Table 17, p. 44	0.05 wg
Economizer from Table 17, p. 44 (100% Outside Air) *worst case	0.11 wg
Electric Heater Size 6 kW from Table 17, p. 44	0.02 wg
Total Static Pressure	0.54 wg

Note: (reference "Heating Capacity" on page 22 for determination of heater size)

Precedent 3-5 Ton Packaged Cooling Selection Procedure

Note: *The evaporator fan performance Table 13, p. 42 has deducted the pressure drop for a filter already in the unit (see note below Table 13, p. 42). Therefore, the actual total static pressure is 0.54 -0.5 (from Table 17, p. 44) = 0.49 wg.*

With 2000 cfm and 0.5 wg.
Table 13, p. 42 shows 0.55 bhp for this unit.

Note: *Below the table is the formula to calculate Fan Motor Heat*

2.9245 x bhp + 0.055 = MBh.
2.9245 x 0.55 + 0.055 = 1.7 MBh.

Now subtract the fan motor heat from the gross cooling capacity of the unit:

Net Total Cooling Capacity
= 60.0 MBh - 1.7 = 58.3 MBh

Net Sensible Cooling Capacity
= 45.3 MBh - 1.7 = 43.6 MBh

Subtracting Sensible from Total Capacity to find Latent Capacity

Net Latent Capacity
= 58.3 - 43.6 = 14.7 MBh

5. Compare your resulting capacities to the building load. If the performance will not meet the required load of the building's total or sensible cooling load, try a selection at the next higher size unit.

Heating Capacity

Note: *Heating capacity procedure DIFFERS for electric heat (THC) and gas heat (YHC) units*

1. Calculate the building heating load using the American Standard calculation form or other standard accepted method.
2. Size the system heating capacity to match the calculated building heating load. The following are building heating requirements:
   Total heating load of 15 MBh
   2000 cfm
   THC units with optional electric heat: 460V/3 phase Power Supply
   The electric heat accessory capacities are listed in Table 19, p. 45. From the table, a 6 kW heater will deliver 20.48 MBh at 480 volts. In order to determine capacity at 460 volts, the heater voltage correction factor from Table 20, p. 45 must be used. Therefore, 20.48 MBh x 0.918 (voltage correction factor) = 18.8 MBh
   YHC units with gas heat: Fuel- natural gas.
   60 MBh, 80 MBh and 130 MBh input models shown in Table 17, p. 44. The output capacities of these furnaces are 48 MBh, 64 MBh and 104 MBh respectively. The low heat model with 48 MBh best matches the building requirements.

Air Delivery Selection

Note: *Air delivery procedure is the same for electric heat and gas heat units.)*

External static pressure drop through the air distribution system has been calculated to be 0.5 inches of water. Enter Table 12, p. 41 for a THC067E4 at 2000 cfm and 0.5 static pressure. The standard direct drive motor will give the desired airflow at a rated bhp of 0.55 and 835 rpm.

Precedent 3-5 Ton Packaged Cooling Selection Procedure

Dehumidification Selection

Dehumidification selection procedure is the same for both electric heat (THC) and gas heat (YHC) models).

Typical 5 ton THC067E	OA Conditions	RA conditions
2000 cfm Total Supply airflow	Part load day and raining	75°F db
800 cfm Outside Air (40%)	68°F db	63°F wb
1200 cfm Return Air	67°F wb	
0.34 inch External Static Pressure	95% RH	

1. Determine the mixed/entering air condition (MA).

MA = (% outside air*outside air dry-bulb temperature) + (% return air*return air dry-bulb temperature)

MA = (0.40*68°F) + (0.60*75°F)

MA = 72.20°F db

Repeat for wet-bulb temperature (wb).

MA 72.2°F db
64.6°F wb

2. Determine the additional static pressure drop for a reheat unit.

   Table 17, p. 44 shows a static pressure drop of 0.13 inch for the reheat coil and an additional 0.08 for the mandatory 2 inch pleated filters required when ordering the dehumidification option. Total static pressure =

   0.34 + 0.08 + 0.13= 0.55

Note: *Do not forget to also add any additional static from other accessories. This selection does not include additional accessories.*

3. Determine leaving evaporator temperature (SA').

   Leaving Evaporator Temperature = SA'

   Utilizing the manual **Cooling Capacity** selection method as previously described, find the leaving evaporator temperatures with the formula:

$$\Delta \text{ Temp} = \frac{\text{gross sensible or gross latent cooling capacity in Btuh}}{\text{(cfm) (1.085)}}$$

   Subtract your sensible Δ temp from the entering db and latent Δ temp from the entering wb to determine the leaving evaporator db and wb (temperatures without the addition of fan heat).

   52.7°F db
   52.7°F wb
   52.7°F dp

4. Determine leaving unit temperature in standard cooling mode.

   Repeat Step 3a substituting **net** sensible or latent capacity for **gross** sensible or latent capacity to find the leaving unit temperature including fan heat.

   53.7°F db
   53.1°F wb

5. Determine reheat temperature rise.

   Using the leaving evaporator temp (SA'), go to Table 22, p. 46 and determine the reheat temperature rise for that particular cfm: ≅17.0°F db

Precedent 3-5 Ton Packaged Cooling Selection Procedure

Note: *Reheat temperature rise is based on* ***supply airflow*** *and leaving* ***evaporator coil*** *temperature.*

6. Determine leaving unit sensible temperature with reheat active (SA)
   Reheat temperature (obtained in step 4) + (SA' + fan heat) = SA

Note: *(SA' + fan heat) = leaving unit temperature in standard cooling mode from step 3b.*

19.0°F db + 53.7°F = 72.7°F db

SA=72.7°F

Since reheat adds only sensible heat, the dewpoint temperature will remain constant so follow the dewpoint temperature line across the psychrometric chart to find the new wb temperature.

+/–60.5°F wb
52.7 dp
49.9% RH

If the space relative humidity is equal to or above the space relative humidity setpoint, the Dehumidification option will:

- Energize compressor
- Hot gas reheat valve is energized and hot gas is diverted to the reheat coil
- Dehumidification/reheat is terminated when space humidity is reduced to 5% below relative humidity setpoint

At MA air enters the RTU. The RTU filters, cools, and dehumidifies the air as it moves through the evaporator coil. Air leaves the evaporator coil saturated at the preset dew point condition (SA') and is reheated by the hot gas reheat coil to deliver 72.7°F (SA) supply air to the space.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Precedent 3-5 Ton Packaged Cooling Model Number Description

Digit 1 - Unit Type

T DX Cooling
Y DX Cooling, Gas Heat

Digit 2 - Efficiency

H High Efficiency

Digit 3 - Airflow

C Convertible

Digit 4,5,6 - Nominal Gross Cooling Capacity (MBh)

037 3 Ton
047 4 Ton
067 5 Ton

Digit 7 - Major Design Sequence

E R-410A Refrigerant

Digit 8 - Voltage Selection

3 208-230/60/3
4 460/60/3
W 575/60/3

Digit 9 - Unit Controls

R ReliaTel™ Microprocessor

Digit 10 - Heating Capacity

Note: *Applicable to Digit 1, T models only*

0 No Electric Heat
B 6 kW (3 phase)
E 12 kW (3 phase)
G 18 kW (1and 3 phase)
J 23 kW (3 phase)

Note: *Applicable to Digit 1, Y models only*

L Low Heat
M Medium Heat
H High Heat
X Low Heat, Stainless Steel Heat Exchanger
Y Medium Heat, Stainless Steel Heat Exchanger
Z High Heat, Stainless Steel Heat Exchanger

Digit 11 - Minor Design Sequence

A First Sequence[14]

Digit 12,13 - Service Sequence

** Factory Assigned

Digit 14 - Fresh Air Selection

0 No Fresh Air
A Manual Outside Air Damper 0-50%[2]
B Motorized Outside Air Damper 0-50%
C Economizer, Dry Bulb 0-100% without Barometric Relief[5]
D Economizer, Dry Bulb 0-100% with Barometric Relief[5]
E Economizer, Reference Enthalpy 0-100% without Barometric Relief[5]
F Economizer, Reference Enthalpy 0-100% with Barometric Relief[5]
G Economizer, Comparative Enthalpy 0-100% without Barometric Relief[5]
H Economizer, Comparative Enthalpy 0-100% with Barometric Relief[5]
K Low Leak Economizer with Barometric Relief
M Low Leak Economizer with Reference Enthalpy with Barometric Relief
P Low Leak Economizer with Comparative Enthalpy with Barometric Relief

Digit 15 - Supply Fan/Drive Type/ Motor

0 Standard Drive[4]
6 Single Zone VAV[18]
E VAV Supply Air Temperature Control Standard Motor[18]

Digit 16 - Hinged Service Access/ Filters

0 Standard Panels/Standard Filters
A Hinged Access Panels/Standard Filters
B Standard Panels/2 inch MERV 8 Filters
C Hinged Access Panels/2 inch MERV 8 Filters
D Standard Panels/2 inch MERV 13 Filters
E Hinged Access Panels/2 inch MERV 13 Filters

Digit 17 - Condenser Coil Protection

0 Standard Coil
1 Standard Coil with Hail Guard
2 Black Epoxy Pre-Coated Condenser Coil
3 Black Epoxy Pre-Coated Condenser Coil with Hail Guard
4 CompleteCoat™ Condenser Coil
5 CompleteCoat™ Condenser Coil with Hail Guard

Digit 18 - Through the Base Provisions

0 No Through-the-Base Provisions
A Through-the-Base Electric[6]
B Through-the-Base Gas Piping[12]
C Through-the-Base Electric and Gas Piping[12]

Digit 19 - Disconnect/Circuit Breaker (three-phase only)

0 No Disconnect/No Circuit Breaker
1 Unit Mounted Non-Fused Disconnect[6]
2 Unit Mounted Circuit Breaker[6]

Digit 20 - Convenience Outlet

0 No Convenience Outlet
A Unpowered Convenience Outlet
B Powered Convenience Outlet (three-phase only)[7]

Digit 21 - Communications Options

0 No Communications Interface
2 LonTalk® Communications Interface
6 BACnet® Communications Interface
7 Air-Fi® Wireless Communications[19]

Digit 22 - Refrigeration System Option

0 Standard Refrigeration System[8]
B Dehumidification Option[15]

Digit 23 - Refrigeration Controls

Note: *Applicable to Digit 7 = E*

0 No Refrigeration Control[3]
1 Frostat™
2 Crankcase Heater[1]
3 Frostat and Crankcase Heater[1]

Digit 24 - Smoke Detector[13]

0 No Smoke Detector
A Return Air Smoke Detector[9,10]
B Supply Air Smoke Detector
C Supply and Return Air Smoke Detectors[9,10]
D Plenum Smoke Detector

Digit 25 - System Monitoring Controls

0 No Monitoring Control[11]
1 Clogged Filter Switch[11]
2 Fan Failure Switch[11]
3 Discharge Air Sensing Tube[11]
4 Clogged Filter Switch and Fan Failure Switch[11]
5 Clogged Filter Switch and Discharge Air Sensing Tube[11]
6 Fan Failure Switch and Discharge Air Sensing Tube[11]
7 Clogged Filter Switch, Fan Failure Switch and Discharge Air Sensing Tube[11]

A Condensate Drain Pan Overflow Switch

Precedent 3-5 Ton Packaged Cooling Model Number Description

B Clogged Filter Switch[11] and Condensate Drain Pan Overflow Switch
C Fan Failure Switch[11] and Condensate Drain Pan Overflow Switch
D Discharge Air Sensing[11] and Condensate Drain Pan Overflow Switch
E Clogged Filter Switch[11], Fan Failure Switch[11] and Condensate Drain Pan Overflow Switch
F Clogged Filter Switch[11], Discharge Air Sensing Tube[11] and Condensate Drain Pan Overflow Switch
G Fan Failure Switch[11], Discharge Air Sensing Tube[11] and Condensate Drain Pan Overflow Switch
H Clogged Filter Switch[11], Fan Failure Switch[11], Discharge Air Sensing[11] and Condensate Drain Pan Overflow Switch

Digit 26 - System Monitoring Controls

0 No Monitoring Controls
A Demand Control Ventilation (CO_2)[16,17]

Digit 27 - Unit Hardware Enhancements

0 No Enhancements
1 Stainless Steel Drain Pan

Digit 31 - Advanced Unit Controls

0 Standard Unit Controls
1 Human Interface

Digit 34 - Ultra Low NOx Gas Furnace (CA Only)

0 - None
A - 14 ng/J NOx Emissions [20,21,22,23,24,25]

Model Number Notes

1. Standard on all variable stage units.
2. Manual outside air damper will ship factory supplied within the unit, but must be field installed.
3. High pressure control is standard on all units.
4. Direct drive is standard for 3 to 5 ton variable stage units.

Digit 15 = 0, 6

3 Phase (3-5 ton) - High Efficiency Constant CFM

5. Economizer with Barometric Relief is for downflow configured units only. Order Economizer without Barometric Relief for horizontal configuration. Barometric Relief for horizontal configured units must be ordered as field installed accessory.
6. Through the base electric required when ordering disconnect/circuit breaker options.
7. Requires use of Disconnect or Circuit Breaker.

Not Available

High Efficiency
3-5 ton w/Standard Indoor Motor w/460V or 575V

8. Standard metering devices are TXVs.
9. The return air smoke detector may not fit up or work properly on the Precedent units when used in conjunction with 3rd party accessories such as bolt on heat wheels, economizers and power exhaust. Do not order the return air smoke detectors when using this type of accessory.
10. Return Air Smoke Detector cannot be ordered with Novar Controls.
11. These options are standard when ordering Novar Controls.
12. Includes gas piping and shutoff (field assembly required).
13. Not available with high temperature duct sensor accessory.
14. Available for T/Y 3,4,5 ton high efficiency models.
15. Requires selection of 2 inch Pleated Filters (option B or C) for Digit 16.
16. Demand Control Ventilation not available with electromechanical controls.
17. Demand Control Ventilation Option includes wiring only. The CO_2 sensor is a field-installed only option.
18. Discharge Air Sensing is also standard equipment on units with Single Zone and Supply Air Temperature Control VAV.
19. Must be used with BACnet® open protocol.
20. No 575V with Ultra Low NOx
21. Ultra Low NOx requires SSHX Option (Digit 10 = X or Y)
22. Ultra Low NOx has 3T Only available with LOW heat (digit 10=X)
23. Ultra Low NOx has NO High Heat Available
24. High Altitude kit is not available with Ultra Low NOx option
25. LP Conversion kit is not available with Ultra Low NOx option.

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Precedent 3-5 Ton Packaged Cooling General Data

Table 1. General data - 3 to 5 tons 17 Plus

	3 Tons	4 Tons	5 Tons
	T/YHC037E3,4,W[a]	T/YHC047E3,4,W[a]	T/YHC067E3,4,W[a]
Cooling Performance[b]			
Gross Cooling Capacity - High Stage	36,500	50,500	60,000
EER/SEER[c]	13.0/17.5	13.0/17.5	13.0/17.2
Nominal CFM-High Stage/AHRI Rated CFM	1,200/1,200	1,600/1,600	2,000/2,000
Nominal CFM-Low Stage	840	1,120	1,400
AHRI Net Cooling Capacity-High Stage	36,000	49,000	58,500
System Power-High Stage (KW)	2.78	3.67	4.57
Compressor			
No./Type	1/Scroll (2 Stage)	1/Scroll (2 Stage)	1/Scroll (2 Stage)
Outdoor Sound Rating (dB)[d]	81	87	87
Outdoor Coil - Type	Lanced	Lanced	Lanced
Tube Size (in.) OD	0.3125	0.3125	0.3125
Face Area (sq. ft)	17.00	17.00	17.00
Rows/FPI	3/17	3/16	3/16
Indoor Coil - Type	Lanced	Lanced	Lanced
Tube Size (in.) OD	0.3125	0.3125	0.3125
Face Area (sq. ft)	7.71	9.27	9.89
Rows/FPI	3/16	3/16	4/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection No./Size (in.)	1 3/4 NPT	1 3/4 NPT	1 3/4 NPT
Outdoor Fan - Type	Propeller	Propeller	Propeller
No. Used / Diameter (in.)	1/22	1/26	1/26
Drive Type / No. Speeds	Direct/1	Direct/1	Direct/1
CFM	3064	3982	3953
Motor HP	0.2/0.4	0.4	0.4
Motor RPM	1075	1075	1075
Indoor Fan - Type (Optional)	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used / Diameter (in.)	1/11 x 11	1/11 x 11	1/11 x 11
Drive Type / Number. Speeds	Direct/Variable	Direct/Variable	Direct/Variable
Number Motors	1	1	1
Motor HP (Standard/Oversized)	0.75	1.0	1.0
Motor Frame Size (Standard/Oversized)	48	48	48
Filters - Type Furnished[e]	Throwaway	Throwaway	Throwaway
(No.) Size Recommended	(2) 20 x 30 x 2	(4) 16 x 25 x 2	(4) 16 x 25 x 2
Optional Hot Gas Reheat Coil -Type			
Tube Size (in.)OD	0.3125	0.3125	0.3125
Face Area (sq. ft.)	5.23	6.28	6.28
Rows/FPI	1/16	1/16	1/16
Refrigerant Charge (Lbs of R-410A)[f]			
Standard	7.8	10.8	12.5
Optional Hot Gas Reheat Coil	10.5	15.2	15.3

Precedent 3-5 Ton Packaged Cooling General Data

Table 1. General data - 3 to 5 tons 17 Plus

	3 Tons			4 Tons			5 Tons		
	T/YHC037E3,4,W[a]			T/YHC047E3,4,W[a]			T/YHC067E3,4,W[a]		
Gas/Electric Only									
Heating Performance[g]									
Heating Models	**Low**	**Med**	**High**	**Low**	**Med**	**High**	**Low**	**Med**	**High**
Heating Input (Btu)	60,000	80,000	100,000	60,000	80,000	120,000	60,000	80,000	130,000
Heating Output (Btu)	48,000	64,000	80,000	49,000	64,000	96,000	49,000	64,000	104,000
Steady State Efficiency (%)	80%	80%	81%	81%	80%	81%	81%	80%	80%
No. Burners	2	2	3	2	2	3	2	2	3
No. Stages	1	1	1	1	1	1	1	1	1
Gas Supply Line Pressure									
Natural (minimum / maximum)	4.5/14.0			4.5/14.0			4.5/14.0		
LP (minimum / maximum)	11/14.0			11/14.0			11/14.0		
Gas Connection Pipe Size (in.)	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2

(a) 575 (W voltage) is only available as YHC. No THC models available with 575V (W voltage).
(b) High Stage Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI standard 210/240.
(c) EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
(d) Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270. For additional information refer to Table 16, p. 44.
(e) Optional 2 inch MERV 8 and MERV 13 pleated filters also available.
(f) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.
(g) Heating performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level. Applicable to Gas/Electric units only.

Table 2. General data - 3 to 5 tons 17 Plus with Ultra Low NOx gas

Ultra Low NOx Digit 34 = A	3 Tons YHC037E3,4[a]	4 Tons YHC047E3,4[a]		5 Tons YHC067E3,4[a]	
Heating Performance[b]					
Heat Models	**Low**	**Low**	**Med**	**Low**	**Med**
Heating Input (Btu)	60,000	60,000	90,000	60,000	90,000
Heating Output (Btu)	48,600	48,600	72,900	48,600	72,900
Stead State Efficiency (%)	81%	81%	81%	81%	81%
No. Burners	2	2	3	2	3
No. Stages	1	1	1	1	1
Gas Supply Line Pressure					
Natural (minimum / maximum)	4.5/14.0	4.5/14.0		4.5/14.0	
Gas Connection Pipe Size (in.)	1/2	1/2	1/2	1/2	1/2

(a) No digit 8, W , 575 volt offered on Ultra Low NOx gas furnace option.
(b) Ultra Low NOx gas furnace option not available for High Altitude installations above 2000 feet.

Precedent 3-10 Ton Packaged Heat Pumps Selection Procedure

Cooling Capacity

1. Calculate the building's total and sensible cooling loads at design conditions. Use the American Standard® calculation methods or any other standard accepted method. Factors used in unit selection:
   - Total Cooling Load: 71 MBh
   - Sensible Cooling Load: 45 MBh
   - Airflow: 2400 cfm
   - Electrical Characteristics: 460/60/3
   - Summer Design Conditions: Entering
   - Evaporator Coil: 80 DB, 67 WB Outdoor Ambient: 95
   - External Static Pressure: 0.47 in. wg
   - Downflow Configuration
   - Economizer
2. As a starting point, a rough determination must be made of the size of the unit. The final selection will be made after examining the performance at the given conditions. Divide the total cooling load by nominal BTUH per ton (12 MBh per ton); then round up to the nearest unit size. 71 MBh / 12 MBh = approx. 6 tons
3. Table 13, p. 38 shows that a WSC072H4 has a **gross** cooling capacity of 78.0 MBh and 56.7 MBh sensible capacity at 2400 cfm and 95 DB outdoor ambient with 80 DB, 67 WB air entering the evaporator.

   To Find Capacity at Intermediate Conditions not in the table

   When the design conditions are between two numbers that are in the capacity table, interpolation is required to approximate the capacity.

   Note: *Extrapolation outside of the table conditions is not recommended.*
4. In order to select the correct unit which meets the building's requirements, the fan motor heat must be deducted from the gross cooling capacity. The amount of heat that the fan motor generates is dependent on the effort by the motor - cfm and static pressure. To determine the total unit static pressure:

External Static Duct System	0.47 wg
Economizer from Table 89, p. 108 (100% Outside Air)	0.11 wg
Electric Heater Size 9 kW from Table 89, p. 108	0.02 wg
Total Static Pressure	0.60 wg

Note: (reference "Heating Capacity" section on this page for determination of heater size)

With 2400 cfm and 0.60 wg. Table 38, p. 62 shows 0.75 bhp for this unit. Note below the table gives a formula to calculate Fan Motor Heat,

2.829 x bhp + 0.4024 = MBh
2.829 x 0.75 + 0.4024 = 2.52 MBh

Now subtract the fan motor heat from the gross cooling capacity of the unit:

Net Total Cooling Capacity
= 78.0 MBh - 2.52 = 75.48 MBh

Net Sensible Cooling Capacity
= 56.74 MBh - 2.52 = 54.22 MBh

Precedent 3-10 Ton Packaged Heat Pumps Selection Procedure

5. Compare results to original load requirements. If the performance will not meet the required total or sensible cooling load, try a selection at the next higher size unit.

Heating Capacity

1. Calculate the building heating load using the American Standard® calculation form or other standard accepted method.
2. Size the equipment using Table 93, p. 113 to match the heating loads at design conditions.

   Total heating load of 65 MBh

   Outdoor Ambient (Winter): 17 DB

   Indoor Return Temperature: 60 DB

   Airflow: 2400 cfm

   Use the integrated portion of Table 93, p. 113 for WSC072 to determine capacity at winter design conditions. The mechanical heating portion of the heat pump will provide 40.5 MBh.
3. Because 40.5 is less than the building's required heating capacity at winter design conditions, a supplementary heater must be selected.
   65 MBh- 40.5MBh = 24.5 MBh
   The auxiliary electric heat capacities are listed in Table 112, p. 125. From the table, a 9 kW heater will deliver 30.73 MBh at 480 volts. In order to determine capacity at 460 volts, the heater voltage correction factor from Table 114, p. 126 must be used. Therefore, 30.73 MBH x .918 (voltage correction factor) = 28.2 MBh. A 9 kW heater should be selected.

Air Delivery Selection

External static pressure drop through the air distribution system has been calculated to be 0.60 inches of water. Enter Table 38, p. 62 for a WSC072H4 at 2400 cfm and 0.60 static pressure. The belt drive motor will give the desired airflow at a rated bhp of 0.75 and 847 rpm.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Precedent 3-10 Ton Packaged Heat Pumps Model Number Description

Digit 1 - Unit Type

W = Packaged Heat Pump[2]
D = Dual Fuel Heat Pump[2]

Digit 2 - Efficiency

S = Standard Efficiency
H = High Efficiency

Digit 3 - Airflow

C = Convertible

Digit 4,5,6 - Nominal Gross Cooling Capacity (MBh)

036 = 3 Ton
048 = 4 Ton
060 = 5 Ton
072 = 6 Ton
074 = 6 Ton
090 = 7.5 Ton
092 = 7.5 Ton
102 = 8.5 Ton
120 = 10 Ton

Digit 7 - Major Design Sequence

Digit 8 - Voltage Selection

3 = 208-230/60/3
4 = 460/60/3
W = 575/60/3

Digit 9 - Unit Controls

R = ReliaTel™ Microprocessor

Digit 10 - Heating Capacity

Note: *Applicable to Digit 1,W models only.*

0 = No Electric Heat
B = 6 kW
C = 9 kW
E = 12 kW
G = 18 kW
J = 23 kW
K = 27 kW
N = 36 kW
P = 54 kW

Note: *Applicable to Digit 1,D models only*

L = Low Heat
M = Medium Heat
H = High Heat
X = Low Heat, Stainless Steel Heat Exchanger
Y = Medium Heat, Stainless Steel Heat Exchanger
Z = High Heat, Stainless Steel Heat Exchanger

Digit 11 - Minor Design Sequence

Digit 12,13 - Service Sequence

** Factory Assigned

Digit 14 - Fresh Air Selection

0 = No Fresh Air
A = Manual Outside Air Damper 0-50%[1]
B = Motorized Outside Air Damper 0-50%[10]
C = Economizer, Dry Bulb 0-100% without Barometric Relief[4]
D = Economizer, Dry Bulb 0-100% with Barometric Relief[4]
E = Economizer, Reference Enthalpy 0-100% without Barometric Relief[4]
F = Economizer, Reference Enthalpy 0-100% with Barometric Relief[4]
G = Economizer, Comparative Enthalpy 0-100% without Barometric Relief[4]
H = Economizer, Comparative Enthalpy 0-100% with Barometric Relief[4]
K = Low Leak Economizer with Barometric Relief
M = Low Leak Economizer with Reference Enthalpy with Barometric Relief
P = Low Leak Economizer with Comparative Enthalpy with Barometric Relief

Digit 15 - Supply Fan/Drive Type/ Motor

0 = Standard Drive[3]
1 = Oversized Motor[3]
2 = Optional Belt Drive Motor
6 = Single Zone Variable Air Volume (SZVAV)[14]
7 = Multi-Speed Indoor Fan[12]
8 = Single Zone Variable Air Volume (SZVAV) w/Oversized Motor[14]
E = Multi-Zone Variable Air Volume (MZVAV)[14]
F = Multi-Zone Variable Air Volume (MZVAV) w/Oversized Motor[14]

Digit 16 - Hinged Service Access/ Filters

0 = Standard Panels/Standard Filters
A = Hinged Access Panels/Standard Filters
B = Standard Panels/2" MERV 8 Filters
C = Hinged Access Panels/2" MERV 8 Filters
D = Standard Panels/2" MERV 13 Filters
E = Hinged Access Panels/2" MERV 13 Filters

Digit 17 - Condenser Coil Protection

0 = Standard Coil
1 = Standard Coil with Hail Guard
2 = Black Epoxy Pre-Coated Condenser Coil
3 = Black Epoxy Pre-Coated Condenser Coil with Hail Guard

Digit 18 - Through-the-Base Provisions

0 = No Through-the-Base Provisions
A = Through-the-Base Electric[5]
B = Through-the-Base Gas Piping[17]
C = Through-the-Base Electric and Gas Piping[17]

Digit 19 - Disconnect/Circuit Breaker (three-phase only)

0 = No Disconnect/No Circuit Breaker
1 = Unit Mounted Non-Fused Disconnect[5]
2 = Unit Mounted Circuit Breaker[5]

Digit 20 - Convenience Outlet

0 = No Convenience Outlet
A = Unpowered Convenience Outlet
B = Powered Convenience Outlet (three-phase only)[6]

Digit 21 - Communications Options

0 = No Communications Interface
1 = American Standard® Communications Interface
2 = LonTalk® Communications Interface
6 = BACnet® Communications Interface
7 = Air-Fi® Wireless Communications[15]

Digit 22 - Refrigeration System Option

0 = Standard Refrigeration System[7]

Digit 23 - Refrigeration Controls

0 = No Refrigeration Control[2]
1 = Frostat™ [11]
2 = Crankcase Heater[16]
3 = Frostat and Crankcase Heater[11,16]

Digit 24 - Smoke Detector

0 = No Smoke Detector
A = Return Air Smoke Detector[8]
B = Supply Air Smoke Detector
C = Supply and Return Air Smoke Detectors[8]
D = Plenum Smoke Detector

Digit 25 - System Monitoring Controls

0 = No Monitoring Control
1 = Clogged Filter Switch
2 = Fan Failure Switch
3 = Discharge Air Sensing Tube
4 = Clogged Filter Switch and Fan Fail Switch
5 = Clogged Filter Switch and Discharge Air Sensing Tube
6 = Fan Fail Switch and Discharge AirSensing Tube
7 = Clogged Filter and Fan Fail Switches and Discharge Air Sensing Tube
A = Condensate Drain Pan Overflow Switch
B = Clogged Filter Switch and Condensate Drain Pan Overflow Switch
C = Fan Failure Switch and

Precedent 3-10 Ton Packaged Heat Pumps Model Number Description

Condensate Drain Pan Overflow Switch
- D = Discharge Air Sensing and Condensate Drain Pan Overflow Switch
- E = Clogged Filter Switch, Fan Failure Switch and Condensate Drain Pan Overflow Switch
- F = Clogged Filter Switch, Discharge Air Sensing Tube and Condensate Drain Pan Overflow Switch
- G = Fan Failure Switch, Discharge Air Sensing Tube and Condensate Drain Pan Overflow Switch
- H = Clogged Filter Switch, Fan Failure Switch, Discharge Air Sensing and Condensate Drain Pan Overflow Switch

Digit 26 - System Monitoring Controls
- 0 = No Monitoring Controls
- A = Demand Control Ventilation (CO_2)[13]
- B = Low Leak Economizer with FDD (Fault Detection and Diagnostics)
- C = FDD (Fault Detection and Diagnostics) with DCV (Demand Control Ventilation)

Digit 27 - Unit Hardware Enhancements
- 0 = No Enhancements
- 1 = Stainless Steel Drain Pan

Digit 31 - Advanced Unit Controls
- 0 = Standard Unit Controls
- 1 = Human Interface

Model Number Notes

1. Manual outside air damper will ship factory supplied within the unit, but must be field installed.
2. High pressure control is standard on all units.
3. Multi-stage, direct drive standard on 3 to 5 tons models. Belt drive standard on 6 to 8.5 tons standard efficiency models. Variable speed direct drive standard on 10 tons models and 6 to 8.5 tons high efficiency models.
4. Economizer with barometric relief is for downflow configured units only. Order economizer without barometric relief for horizontal configuration. Barometric relief for horizontal configured units must be ordered as field installed accessory.
5. Through-the-base electric required when ordering disconnect/circuit breaker options.
6. Requires use of disconnect or circuit breaker.
7. Standard metering devices are TXVs.
8. The return air smoke detector may not fit up or work properly on the Precedent™ units when used in conjunction with 3rd party accessories such as bolt on heat wheels, economizers and power exhaust. Do not order the return air smoke detectors when using this type of accessory.
9. Requires hinged access panels.
10. Motorized outside air damper is not available on Multi-Speed or SZVAV (Single Zone Variable Air Volume) or MZVAV (Multi Zone Variable Air Volume) products.
11. Frostat™ standard on 6 to 10 tons high efficiency heat pump, multi-speed and SZVAV (single zone variable air volume) products.
12. Multi-speed indoor fan available on 6, 7.5, 8.5 and 10 tons products.
13. Demand control ventilation option includes wiring only. The CO_2 sensor is a field-installed only option.
14. SZVAV/MZVAV is available on all high efficiency models. SZVAV is also available on 7.5 to 10 tons standard efficiency models.
15. Must be used with BACnet® open protocol.
16. Crankcase heater is standard on all 3 to 10 tons heat pumps.
17. Includes gas piping and shutoff (field assembly required).

Precedent 3-10 Ton Packaged Heat Pumps General Data

Table 3. General data - 3 to 5 tons - standard efficiency

	3 Tons	4 Tons	5 Tons
	WSC036H3,4,W	**WSC048H3,4,W**	**WSC060H3,4,W**
Cooling Performance[a]			
Gross Cooling Capacity	39,500	50,000	61,000
EER/SEER[b]	3,4 = 12.1/14.3 W = 12.0/14.3	3,4 = 12.3/14.3 W = 12.2/14.3	3,4 = 12.3/14.3 W = 12.2/14.3
Nominal cfm/AHRI Rated cfm	1,200/1,200	1,600/1,600	2,000/2,000
AHRI Net Cooling Capacity	39,000	49,000	60,000
System Power (kW)	3.22	3.98	4.88
Heating Performance[c]			
High Temp. Btuh Rating	36,000	47,500	59,000
System Power kW/COP	3.01/3.50	3.98/3.50	4.94/3.50
Low Temp. Btuh Rating	20,600	26,000	35,000
System Power kW/COP	2.74/2.20	3.31/2.30	4.46/2.30
HSPF (Btu/Watts-hr)	8.00	8.20	8.20
Compressor			
Number/Type	1/Scroll	1/Scroll	1/Scroll
Sound			
Outdoor Sound Rating (dB)[d]	81	82	87
Outdoor Coil			
Type	Lanced	Lanced	Lanced
Tube Size (in.)	0.3125	0.3125	0.3125
Face Area (sq. ft.)	12.33	12.33	17.00
Rows/FPI	2/16	3/16	3/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Indoor Coil			
Type	Lanced	Lanced	Lanced
Tube Size (in.)	0.3125	0.3125	0.3125
Face Area (sq. ft.)	8.74	8.74	9.27
Rows/FPI	3/16	3/16	3/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection Number/Size (in.)	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan			
Type	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	1/22	1/22	1/26
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1
cfm	3,600	4,050	5,130
Motor hp	0.25	0.33	0.40
Motor rpm	1,100	1,100	1,100

Precedent 3-10 Ton Packaged Heat Pumps General Data

Table 3. General data - 3 to 5 tons - standard efficiency (continued)

	3 Tons	4 Tons	5 Tons
	WSC036H3,4,W	**WSC048H3,4,W**	**WSC060H3,4,W**
Indoor Fan			
Type (Standard)	FC Centrifugal	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)/Width (in.)	1/11x11	1/11x11	1/11x11
Drive Type/No. Speeds/rpm	Direct/5(e)	Direct/5(e)	Direct/5(e)
Motor hp (standard/oversized)	0.75/1.5	1.0/1.5	1.0/1.5
Motor Frame Size (standard/oversized)	48/48	48/48	48/48
Filters(f)			
Type Furnished	Throwaway	Throwaway	Throwaway
Number Size Recommended	(2) 20x35x2	(2) 20x35x2	(4) 16x25x2
Refrigerant Charge(g)			
Pounds of R-410A	7.7	9.3	11.5

(a) Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 210/240.
(b) EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
(c) Heating performance is rated at 47°F ambient with 43°F wet bulb, 70°F entering dry bulb, 60°F entering wet bulb. High temp. Btuh rating includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 210/240.
(d) Outdoor sound rating shown is tested in accordance with AHRI Standard 270. For additional information reference the outdoor sound power level data in the performance section.
(e) For multispeed direct drive rpm values, reference the direct drive, evaporator fan performance table.
(f) Optional 2" MERV 8 and MERV 13 filters also available.
(g) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

Table 4. General data - 6 to 10 tons - standard efficiency

	6 Tons	7.5 Tons	7.5 Tons	8.5 Tons	10 Tons
	WSC072H3,4,W	**WSC090H3,4,W**	**WSC092H3,4,W**	**WSC102H3,4,W**	**WSC120H3,4,W**
Cooling Performance(a)					
Gross Cooling Capacity	78,000	93,500	95,300	103,200	118,100
EER(b)	11.4	11.1	11.3	11.0	11.0
Nominal cfm/AHRI Rated cfm	2,400/2,100	3,000/2,625	3,000/3,000	3,400/3,315	4,000/4,000
AHRI Net Cooling Capacity	75,000	90,000	93,000	100,000	115,000
IEER(c)	13.0	12.2	12.4(d)	12.2(d)	12.2(d)
System Power (kW)	6.58	8.11	8.23	9.09	10.45
Heating Performance(e)					
High Temp. Btuh Rating	71,000	87,000	88,000(f)	92,000(f)	106,000
System Power kW/COP	5.95/3.50	7.50/3.40	7.59/3.40	7.93/3.40	9.14/3.40
Low Temp. Btuh Rating	39,000	48,000	48,000	48,500	58,500
System Power kW/COP	5.2/2.30	6.25/2.25	6.25/2.25	6.77/2.10	7.62/2.25
HSPF (Btu/Watts-hr)	—	—	—	—	—
Compressor					
Number/Type	1/Scroll	1/Scroll	1/Scroll (2 Stage)	1/Scroll (2 Stage)	1/Scroll (2 Stage)
Sound					
Outdoor Sound Rating (dB)(g)	89	86	86	85	86

Precedent 3-10 Ton Packaged Heat Pumps General Data

Table 4. General data - 6 to 10 tons - standard efficiency (continued)

	6 Tons	7.5 Tons	7.5 Tons	8.5 Tons	10 Tons
	WSC072H3,4,W	**WSC090H3,4,W**	**WSC092H3,4,W**	**WSC102H3,4,W**	**WSC120H3,4,W**
Outdoor Coil - Type	Lanced	Lanced	Lanced	Lanced	Lanced
Configuration	Full Face	Full Face	Full Face	Full Face	Full Face
Tube Size (in.)	0.3125	0.3125	0.3125	0.3125	0.3125
Face Area (sq. ft.)	17.00	19.83	19.83	23.34	23.34
Rows/FPI	3/16	3/16	3/16	3/16	3/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Indoor Coil - Type	Lanced	Lanced	Lanced	Lanced	Lanced
Configuration	Full Face	Full Face	Full Face	Full Face	Full Face
Tube Size (in.)	0.3125	0.3125	0.3125	0.3125	0.3125
Face Area (sq. ft.)	9.89	12.36	12.36	12.36	12.36
Rows/FPI	4/16	3/16	3/16	4/16	4/16
Refrigerant Control	Orifice	Orifice	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection Number/Size (in.)	1¾ NPT	1¾ NPT	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	1/26	1/26	1/26	1/26	1/26
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1
cfm	5,800	6,200	6,200	6,200	6,200
Motor hp	0.70	0.70	0.70	0.70	0.70
Motor rpm	1,100	1,100	1,100	1,100	1,100
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal(h)	FC Centrifugal(h)	BC Plenum
Number Used/Diameter (in.)/ Width (in.)	1/12x12	1/15 x 15	1/15 x 15(i)	1/15 x 15(i)	1/19.7x15
Drive Type/No. Speeds/rpm	Belt/Variable/1,750	Belt/Variable/1,750	Belt/ Variable/1,750(j)	Belt/ Variable/1,750(j)	Direct/Variable(k)
Motor hp (Standard/Oversized)	1.0/2.0	1.0/3.0	1.0/3.0(l)	2.0/3.0(l)	2.75/—
Motor Frame Size (Standard/ Oversized)	56/56	56/56	56/56	56/56	—/—
Filters(m) - Type Furnished	Throwaway	Throwaway	Throwaway	Throwaway	Throwaway
Number Size Recommended	(4) 16x25x2	(4) 20x25x2	(4) 20x25x2	(4) 20x25x2	(4) 20x25x2
Refrigerant Charge(n)					
Pounds of R-410A	12.0	13.8	14.6	18.0	16.3

(a) Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on ARI Standard 340/360.
(b) EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
(c) Integrated Efficiency Ratio (IEER) is rated in accordance with AHRI Standard 340/360. The IEER rating requires that the unit efficiency be determined at 100%, 75%, 50% and 25% load (net capacity) at the specified in AHRI Standard.
(d) 13.4 IEER for SZVAV option, 12.9 IEER for Title 24 2-speed fan option.
(e) Heating performance is rated at 47°F ambient with 43°F wet bulb, 70°F entering dry bulb, 60°F entering wet bulb. High temp. Btu/h Rating includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
(f) For SZVAV/Title 24 option, 8.5 tons high temp. Btuh rating = 89,000, 7.5 Tons high temp. Btuh rating = 87,000.
(g) Outdoor sound rating shown is tested in accordance with AHRI Standard 270-2015. For additional information reference the outdoor sound power level data in the performance section.
(h) For SZVAV/Title 24 option, backward airfoil plenum.
(i) For SZVAV/Title 24 option, 1/19.7X15.
(j) For SZVAV/Title 24 option, direct/variable.
(k) For multispeed direct drive rpm values, reference the direct drive, evaporator fan performance table.
(l) For SZVAV/Title 24 option, 2.75.
(m) Optional 2" MERV 8 and MERV 13 filters also available.

Precedent 3-10 Ton Packaged Heat Pumps General Data

(n) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

Table 5. General data - 3 to 5 tons - high efficiency

	3 Tons	4 Tons	5 Tons
	WHC036H3,4,W	**WHC048H3,4,W**	**WHC060H3,4,W**
Cooling Performance[a]			
Gross Cooling Capacity-High Stage	36,400	48,750	61,000
EER/SEER[b]	12.5/16.0	13.0/16.5	3=13.0/16.4 4,W=12.9/16.2
Nominal cfm-High Stage/AHRI Rated cfm	1,200/1,200	1,600/1,680	2,000/2,000
Nominal cfm-Low Stage/AHRI Rated cfm	840	1,120	1,400
AHRI Net Cooling Capacity-High Stage	36,000	48,000	60,000
System Power-High Stage (kW)	2.88	3.69	4.62
Heating Performance[c]			
High Temp. Btuh Rating-High Stage	32,200	44,000	57,000
System Power kW/COP-High Stage	2.62/3.60	3.58/3.60	4.64/3.60
Low Temp. Btuh Rating-High Stage	21,400	24,000	34,400
System Power kW/COP-High Stage	2.73/2.30	3.06/2.30	4.38/2.30
HSPF (Btu/Watts-hr)	8.80	8.80	9.00
Compressor			
Number/Type	1/Scroll (2-stage)	1/Scroll (2-stage)	1/Scroll (2-stage)
Sound			
Outdoor Sound Rating (dB)[d]	81	87	87
Outdoor Coil			
Type	Lanced	Lanced	Lanced
Tube Size (in.)	0.3125	0.3125	0.3125
Face Area (sq. ft.)	12.33	17.00	17.00
Rows/FPI	3/16	3/16	3/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Indoor Coil			
Type	Lanced	Lanced	Lanced
Tube Size (in.)	0.3125	0.3125	0.3125
Face Area (sq. ft.)	8.74	9.27	9.27
Rows/FPI	3/16	3/16	3/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection Number/Size (in.)	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan			
Type	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	1/22	1/26	1/26
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1
cfm	3,600	5,130	5,130
Motor hp	0.25	0.40	0.40
Motor rpm	1,100	1,100	1,100

Precedent 3-10 Ton Packaged Heat Pumps General Data

Table 5. General data - 3 to 5 tons - high efficiency (continued)

	3 Tons	4 Tons	5 Tons
	WHC036H3,4,W	**WHC048H3,4,W**	**WHC060H3,4,W**
Indoor Fan			
Type (Standard)	FC Centrifugal	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)/Width (in.)	1/11x11	1/11x11	1/11x11
Drive Type/No. Speeds/rpm	Direct/Variable	Direct/Variable	Direct/Variable
Motor hp (standard/oversized)	0.75/1.5	1.0/1.5	1.0/1.5
Motor Frame Size (standard/oversized)	48/48	48/48	48/48
Filters[e]			
Type Furnished	Throwaway	Throwaway	Throwaway
Number Size Recommended	(2) 20x35x2	(4) 16x25x2	(4) 16x25x2
Refrigerant Charge[f]			
Pounds of R-410A	8.8	10.8	10.8

(a) Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 210/240.
(b) EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
(c) Heating performance is rated at 47°F ambient with 43°F wet bulb, 70°F entering dry bulb, 60°F entering wet bulb. High temp. Btuh rating includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 210/240.
(d) Outdoor sound rating shown is tested in accordance with AHRI Standard 270. For additional information reference the outdoor sound power level data in the performance section.
(e) Optional 2" MERV 8 and MERV 13 filters also available.
(f) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

Table 6. General data - 6 to 10 tons - high efficiency

	6 Tons	7.5 Tons	8.5 Tons	10 Tons
	WHC074H3,4,W	**WHC092H3,4,W**	**WHC102H3,4,W**	**WHC120H3,4,W**
Cooling Performance[a]				
Gross Cooling Capacity - High Stage	78,900	96,200	105,900	123,600
EER[b]	12.1	11.8	3,4 = 12.0 / W = 11.8	11.5
Nominal CFM-High Stage / ARI Rated CFM	2,400 / 2,400	3,000 / 3,000	3,400 / 3,400	4,000 / 4,000
Nominal CFM-Low Stage / ARI Rated CFM	1,560	1,950	2,210	2,600
ARI Net Cooling Capacity - High Stage	78,000	95,000	104,000	121,000
IEER[c]	15.5[d]	15.5[d]	15.5[d]	15.5[d]
System Power - High Stage (kW)	6.45	8.05	8.67	10.52
Heating Performance[e]				
High Temp. Btuh Rating - High Stage	75,000	87,000	93,000	118,000
System Power kW/COP - High Stage	6.28 / 3,4 = 3.50 6.32 / W = 3.48	7.29 / 3,4 = 3.50 7.33 / W = 3.48	7.51 / 3,4 = 3.63 7.55 / W = 3.61	9.53 / 3,4 = 3.63 9.58 / W = 3.61
Low Temp. Btuh Rating - High Stage	40,000	49,000	57,000	61,000
System Power kW/COP - High Stage	5.21 / 2.25	6.38 / 2.25	7.42 / 2.25	7.95 / 2.25
Compressor				
Number/Type	2 / Scroll	2 / Scroll	2 / Scroll	2 / Scroll
Sound				
Outdoor Sound Rating (dB)[f]	86	86	85	85

Precedent 3-10 Ton Packaged Heat Pumps General Data

Table 6. General data - 6 to 10 tons - high efficiency (continued)

	6 Tons	7.5 Tons	8.5 Tons	10 Tons
	WHC074H3,4,W	**WHC092H3,4,W**	**WHC102H3,4,W**	**WHC120H3,4,W**
Outdoor Coil - Type	Lanced	Lanced	Lanced	Lanced
Configuration	Full Face	Full Face	Full Face	Full Face
Tube Size (in.)	0.3125	0.3125	0.3125	0.3125
Face Area (sq. ft.)	19.83	19.83	23.34	25.56
Rows/FPI	3 / 16	3 / 16	3 / 16	4 / 16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Indoor Coil - Type	Lanced	Lanced	Lanced	Lanced
Configuration	Full Face	Full Face	Full Face	Full Face
Tube Size (in.)	0.3125	0.3125	0.3125	0.3125
Face Area (sq. ft.)	12.36	12.36	12.36	16.59
Rows/FPI	3 / 16	3 / 16	4 / 16	4 / 16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection Number/Size (in.)	1¾ NPT	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	1 / 26	1 / 26	1 / 26	1 / 30
Drive Type/No. Speeds	Direct / 1	Direct / 1	Direct / 1	Direct / 1
cfm	6200	6200	6200	6900
Motor hp	0.70	0.70	0.70	0.75
Motor rpm	1,100	1,100	1,100	1,100
Indoor Fan - Type (Standard)	BC Plenum	BC Plenum	BC Plenum	BC Plenum
Number Used/Diameter (in.)/Width (in.)	1 / 19.7x15	1 / 19.7x15	1 / 19.7x15	1 / 19.7x15
Drive Type/No. Speeds/rpm	Direct/Variable(g)	Direct/Variable(g)	Direct/Variable(g)	Direct/Variable(g)
Motor hp (Standard/Oversized)	2.75 / -	2.75 / -	2.75 / -	2.75 / -
Motor Frame Size (Standard/Oversized)	- / -	- / -	- / -	- / -
Filters(h) - Type Furnished	Throwaway	Throwaway	Throwaway	Throwaway
Number Size Recommended	(4) 20x25x2	(4) 20x25x2	(4) 20x25x2	(3) 20x25x2 (2) 20x30x2
Refrigerant Charge(i)				
Pounds of R-410A	14.5	14.2	17.0	23.9

(a) Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on ARI Standard 340/360.
(b) EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
(c) Integrated Efficiency Ratio (IEER) is rated in accordance with AHRI Standard 340/360. The IEER rating requires that the unit efficiency be determined at 100%, 75%, 50% and 25% load (net capacity) at the specified in AHRI Standard.
(d) 16.5 IEER for SZ/MZVAV option, 16.0 IEER for Title24 2 speed fan option.
(e) Heating performance is rated at 47°F ambient with 43°F wet bulb, 70°F entering dry bulb, 60°F entering wet bulb. High temp. Btu/h Rating includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
(f) Outdoor sound rating shown is tested in accordance with AHRI Standard 270-2015. For additional information reference the outdoor sound power level data in the performance section.
(g) For multispeed direct drive rpm values, reference the direct drive, evaporator fan performance tables.
(h) Optional 2" MERV 8 and MERV 13 filters also available.
(i) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

Precedent 3-10 Ton Packaged Heat Pumps General Data

Table 7. General data - 3 to 5 tons - dual fuel efficiency

	3 Tons	4 Tons	5 Tons
	DHC036H3,4,W	**DHC048H3,4,W**	**DHC060H3,4,W**
Cooling Performance[a]			
Gross Cooling Capacity-High Stage	36,400	48,750	61,000
EER/SEER[b]	3=12.5/15.7 4,W=12.5/15.6	13.0/16.5	3=12.8/16.2 4,W=12.8/16.0
Nominal cfm-High Stage/AHRI Rated cfm	1,200/1,200	1,600/1,680	2,000/2,000
Nominal cfm-Low Stage/AHRI Rated cfm	840	1,120	1,400
AHRI Net Cooling Capacity-High Stage	36,000	48,000	60,000
System Power-High Stage (kW)	2.88	3.69	4.69
Heating Performance[c]			
High Temp. Btuh Rating-High Stage	32,200	44,000	57,000
System Power kW/COP-High Stage	2.62/3.60	3.58/3.60	4.64/3.60
Low Temp. Btuh Rating-High Stage	21,400	24,000	34,400
System Power kW/COP-High Stage	2.73/2.30	3.06/2.30	4.38/2.30
HSPF (Btu/Watts-hr)	8.80	8.80	8.90
Compressor			
Number/Type	1/Scroll (2-stage)	1/Scroll (2-stage)	1/Scroll (2-stage)
Sound			
Outdoor Sound Rating (dB)[d]	81	87	87
Outdoor Coil			
Type	Lanced	Lanced	Lanced
Tube Size (in.)	0.3125	0.3125	0.3125
Face Area (sq. ft.)	12.33	17.00	17.00
Rows/FPI	3/16	3/16	3/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Indoor Coil			
Type	Lanced	Lanced	Lanced
Tube Size (in.)	0.3125	0.3125	0.3125
Face Area (sq. ft.)	8.74	9.27	9.27
Rows/FPI	3/16	3/16	3/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection Number/Size (in.)	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan			
Type	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	1/22	1/26	1/26
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1
cfm	3,600	5,130	5,130
Motor hp	0.25	0.40	0.40
Motor rpm	1,100	1,100	1,100
Indoor Fan			
Type (Standard)	FC Centrifugal	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)/Width (in.)	1/11x11	1/11x11	1/11x11
Drive Type/No. Speeds/rpm	Direct/Variable	Direct/Variable	Direct/Variable
Motor hp (standard)	0.75	1.0	1.0

Precedent 3-10 Ton Packaged Heat Pumps General Data

Table 7. General data - 3 to 5 tons - dual fuel efficiency (continued)

	3 Tons	4 Tons	5 Tons
	DHC036H3,4,W	**DHC048H3,4,W**	**DHC060H3,4,W**
Motor Frame Size (standard)	48	48	48
Filters[e]			
Type Furnished	Throwaway	Throwaway	Throwaway
Number Size Recommended	(2) 20x35x2	(4) 16x25x2	(4) 16x25x2
Refrigerant Charge[f]			
Pounds of R-410A	8.8	10.8	10.8
Gas Heating Performance (Dual Fuel Only)[g]			
Gas Heating Input (2nd stage/1st stage)			
Low Heat Input (Btu)	60,000/42,000	60,000/42,000	60,000/42,000
Mid Heat Input (Btu)	80,000/56,000	100,000/70,000	100,000/72,000
High Heat Input (Btu)	100,000/70,000	130,000/91,000	150,000/105,000
Gas Heating Output (2nd stage/1st stage)			
Low Heat Output (Btu)	48,600/34,020	48,600/34,020	48,600/34,020
Mid Heat Output (Btu)	64,800/45,360	81,000/56,700	81,000/58,320
High Heat Output (Btu)	81,000/56,700	105,300/73,710	121,500/85,050
Steady State Efficiency %	81%	81%	81%
No. Burners			
Low Heat Output (Btu)	2	2	2
Mid Heat Output (Btu)	2	3	3
High Heat Output (Btu)	3	3	4
No. Stages			
Low Heat Input (Btu)	2	2	2
Mid Heat Input (Btu)	2	2	2
High Heat Input (Btu)	2	2	2
Gas Supply Line Pressure			
Natural (minimum/maximum)	4.5/14.0	4.5/14.0	4.5/14.0
LP (minimum/maximum)	N/A	N/A	N/A
Gas Connection Pipe Size (in.)			
Low Heat	1/2	1/2	1/2
Mid Heat	1/2	1/2	1/2
High Heat	1/2	3/4	3/4

(a) Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 210/240.
(b) EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
(c) Heating performance is rated at 47°F ambient with 43°F wet bulb, 70°F entering dry bulb, 60°F entering wet bulb. High temp. Btuh rating includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on AHRI Standard 210/240.
(d) Outdoor sound rating shown is tested in accordance with AHRI Standard 270. For additional information reference the outdoor sound power level data in the performance section.
(e) Optional 2" MERV 8 and MERV 13 filters also available.
(f) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.
(g) Heating performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level. Applicable to dual fuel units only.

Precedent 3-10 Ton Packaged Heat Pumps General Data

Table 8. General data - 6 to 10 tons - dual fuel efficiency

	6 Tons	7.5 Tons	8.5 Tons	10 Tons
	DHC074H3,4,W	DHC092H3,4,W	DHC102H3,4,W	DHC120H3,4,W
Cooling Performance[a]				
Gross Cooling Capacity - High Stage	78,900	96,200	105,900	123,600
EER[b]	12.1	11.8	3,4 = 12.0 / W = 11.8	11.5
Nominal CFM-High Stage / ARI Rated CFM	2,400 / 2,400	3,000 / 3,000	3,400 / 3,400	4,000 / 4,000
Nominal CFM-Low Stage / ARI Rated CFM	1,560	1,950	2,210	2,600
ARI Net Cooling Capacity - High Stage	78,000	95,000	104,000	121,000
IEER[c]	15.5[d]	15.5[d]	15.5[d]	15.5[d]
System Power - High Stage (kW)	6.45	8.05	8.67	10.52
Heating Performance[e]				
High Temp. Btuh Rating - High Stage	75,000	87,000	93,000	118,000
System Power kW/COP - High Stage	6.28 / 3,4 = 3.50 6.32 / W = 3.48	7.29 / 3,4 = 3.50 7.33 / W = 3.48	7.51 / 3,4 = 3.63 7.55 / W = 3.61	9.53 / 3,4 = 3.63 9.58 / W = 3.61
Low Temp. Btuh Rating - High Stage	40,000	49,000	57,000	61,000
System Power kW/COP - High Stage	5.21 / 2.25	6.38 / 2.25	7.42 / 2.25	7.95 / 2.25
Compressor				
Number/Type	2 / Scroll	2 / Scroll	2 / Scroll	2 / Scroll
Sound				
Outdoor Sound Rating (dB)[f]	86	86	85	85
Outdoor Coil - Type	Lanced	Lanced	Lanced	Lanced
Configuration	Full Face	Full Face	Full Face	Full Face
Tube Size (in.)	0.3125	0.3125	0.3125	0.3125
Face Area (sq. ft.)	19.83	19.83	23.34	25.56
Rows/FPI	3 / 16	3 / 16	3 / 16	4 / 16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Indoor Coil - Type	Lanced	Lanced	Lanced	Lanced
Configuration	Full Face	Full Face	Full Face	Full Face
Tube Size (in.)	0.3125	0.3125	0.3125	0.3125
Face Area (sq. ft.)	12.36	12.36	12.36	16.59
Rows/FPI	3 / 16	3 / 16	4 / 16	4 / 16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection Number/Size (in.)	1¾ NPT	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan - Type	Propeller	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	1 / 26	1 / 26	1 / 26	1 / 30
Drive Type/No. Speeds	Direct / 1	Direct / 1	Direct / 1	Direct / 1
cfm	6200	6200	6200	6900
Motor hp	0.70	0.70	0.70	0.75
Motor rpm	1,100	1,100	1,100	1,100
Indoor Fan - Type (Standard)	BC Plenum	BC Plenum	BC Plenum	BC Plenum
Number Used/Diameter (in.)/Width (in.)	1 / 19.7x15	1 / 19.7x15	1 / 19.7x15	1 / 19.7x15
Drive Type/No. Speeds/rpm	Direct/Variable[g]	Direct/Variable[g]	Direct/Variable[g]	Direct/Variable[g]
Motor hp (Standard/Oversized)	2.75 / -	2.75 / -	2.75 / -	2.75 / -
Motor Frame Size (Standard/Oversized)	- / -	- / -	- / -	- / -

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Light Commercial Voyager Packaged Systems

For complete equipment / combination selections, installation instructions and warranty information, please refer to Product Data/Ratings and/or Installers Guides and Limited Warranty Handbooks.

Effective 1/1/22
14-1011-39

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Voyager 2 Packaged Systems Features and Benefits

Note: *Packaged Rooftop units cooling, heating capacities, and efficiencies are AHRI certified within scope of AHRI Standard 340-360 (I-P) and ANSIZ21.47 and 10 CFR Part 431 pertaining to Commercial Warm Air Furnaces (gas heating units).*

Standard Features and Available Options

Table 1. Voyager™ Light Commercial control features — standard and optional

	Standard Features	Options[a]		
		Factory Installed	Factory or Field Installed	Field Installed
BACnet® Communications Interface (BCI)			X	
Discharge Line Thermostat	X			
Humidity Sensor				X
LonTalk® Communications Interface (LCI)			X	
ReliaTel™ Microprocessor Controls	X			
ReliaTel™ Options Module			X	
Thermostat				X
American Standard® Air-Fi® Wireless Communication Interface		X		
American Standard® Communications Interface (TCI)			X	
Wireless Zone Sensor				X
Zone Sensors and Remote Zone Sensors				X

(a) Refer to model number description for option availability

Table 2. Voyager™ Light Commercial features - standard and optional

	Standard Features	Options[a]		
		Factory Installed	Factory or Field Installed	Field Installed
1-year Limited Parts Warranty	X			
5-year Limited Compressor Warranty	X			
5-year Limited Heat Exchanger Warranty (12½–17½ Tons); 1 Year on 20 and 25 Tons	X			
2-in MERV 8 Filters or 2-in MERV 13 Filters with Filter Removal Tool		X		
2-in throwaway filters	X			
3 Stages of Cooling Capability on 12½–20 Tons, 4 Stages of Cooling Capability on 25 Tons (High Efficiency Units Only)	X			
Anti-Short Cycle Timer	X			
Barometric Relief[b]	X			
Belt Drive Motors	X			
Clogged Filter/Fan Failure Switch			X	
CO_2 Sensor				X
CO_2 Sensor Wiring (Wiring Only)		X		
Colored and Numbered Wiring	X			
Complete Coat™ Microchannel Condenser Coil		X		
Condensate Overflow Switch		X		
Crankcase Heaters	X			
Dedicated Airflow	X			

Voyager 2 Packaged Systems Features and Benefits

Table 2. Voyager™ Light Commercial features - standard and optional (continued)

	Standard Features	Options[a]		
		Factory Installed	Factory or Field Installed	Field Installed
Dehumidification (Hot Gas Reheat)		X		
Digital Display Zone Sensor				X
Discharge Air Temperature Sensing Kit			X	
Easy Access Low Voltage Terminal Board (LTB)	X			
Economizer - Standard, Downflow			X	
Economizer - Standard, Horizontal				X
Electric Heaters			X	
Fault Detection and Diagnostics (FDD)		X		
Foil-Faced and Edge Captured Insulation	X			
Frostat™			X	
High and Low Static Drive Kits				X
High Efficiency Drum and Tube Heat Exchanger	X			
High Efficiency Gas Heat with Hot Surface Ignition	X			
High Efficiency Motors		X		
High Pressure Cutout	X			
High Short Circuit Current Rated (SCCR) Electrical Subsystem		X		
Hinged Access Doors		X		
Human Interface - 5 inch Color Touchscreen		X		
IAQ Sloped Condensate Drain Pan	X			
Indoor Fan Motor Shaft Grounding Ring			X	
Liquid Line Refrigerant Drier	X			
Low Ambient Cooling to 0°F	X			
Low Leak Economizer - Downflow			X	
Low Leak Economizer - Downflow and Horizontal				X
LP Conversion Kit				X
Manual Outside Air Dampers				X
Microchannel Type Condenser Coils	X			
Microchannel Type Evaporator Coils (Standard Efficiency Only)	X			
Modulating Gas Heat Furnace with a 2.5:1 Turndown Ratio		X		
Motorized Outside Air Dampers				X
Multi-Speed Indoor Fans		X		
Multiple Zone Variable Air Volume (MZVAV)		X		
Operating Charge of R-410A	X			
Outside Air Measuring/Monitoring Control (Traq Dampers)				X
Oversized Motors			X	
Phase Monitor	X			
Powered Exhaust				X
Powered or Unpowered Convenience Outlet		X		
Provisions for Through-the-Base Gas Connections	X			
Quick Access Panels	X			
Quick Adjust Idler Arm Pulley	X			
Reference or Comparative Enthalpy			X	

Voyager 2 Packaged Systems Features and Benefits

Table 2. Voyager™ Light Commercial features - standard and optional (continued)

	Standard Features	Options[a]		
		Factory Installed	Factory or Field Installed	Field Installed
Remote Potentiometer				X
Roof Curb (Downflow Only)				X
Single Point Power	X			
Single Side Service	X			
Single Zone Variable Air Volume (SZ VAV)		X		
Stainless Steel Drain Pan		X		
Stainless Steel Heat Exchanger with 10 Year Warranty		X		
Standardized Components	X			
Supply and/or Return Air Smoke Detector		X		
Thermal Expansion Valve	X			
Through the Base Electrical Access		X		
Through the Base Electrical with Circuit Breaker		X		
Through the Base Electrical with Disconnect Switch		X		
Through the Base Gas Piping		X		
Tool-less Hail Guards			X	
U-shaped Airflow Pattern	X			
Variable Frequency Drive (Multispeed Indoor Fan, VAV, and Single Zone VAV)	X			
Ventilation Override Accessory				X

(a) Refer to model number description for option availability.
(b) Barometric relief comes standard with economizers.

Note: *Most Factory Installed Options (FIOPS) available for Downflow Air Discharge units only. Please verify with ordering system for availability.*

Standard Features

Anti-Short Cycle Timer

Provides a 3 minute minimum “ON” time and 3 minute “OFF” time for compressors to enhance compressor reliability by assuring proper oil return.

Barometric Relief

Designed to be used on downflow units, barometric relief is an unpowered means of relieving excess building pressure.

Colored and Numbered Wiring

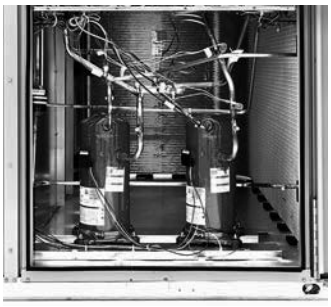
Save time and money tracing wires and diagnosing the unit.

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Voyager 2 Packaged Systems Features and Benefits

Compressors



Voyager contains the best compressor technology available to achieve the highest possible performance. Dual compressors are outstanding for humidity control, light load cooling conditions and system back-up applications. Dual compressors are available on all models and allow for efficient cooling utilizing three stages of compressor operation (high efficiency 12½–20 Tons models only). 25 tons high efficiency units have 4 stages of cooling with a single compressor and tandem set (similar to variable speed).

Controls—ReliaTel™

ReliaTel microprocessor controls provide unit control for heating, cooling and ventilating utilizing input from sensors that measure indoor and outdoor temperature and other zone sensors. ReliaTel also provides outputs for building automation systems and expanded diagnostics. For a complete list of ReliaTel offerings, refer to "Other Benefits," p. 17.

Conversionless Units

The dedicated design units (either downflow or horizontal) require no panel removal or alteration time to convert in the field — a major cost savings during installation. Horizontal units come complete with duct flanges so the contractor doesn't have to field fabricate them. These duct flanges are a time and cost saver.

Crankcase Heaters

These band or insertion heaters provide improved compressor reliability by warming the oil to prevent migration during off-cycles or low ambient conditions. These are standard on all Voyager models.

Discharge Line Thermostat

A bi-metal element discharge line thermostats installed as a standard feature on the discharge line of each system. This standard feature provides extra protection to the compressors against high discharge temperatures in case of loss of charge, extremely high ambient and other conditions which could drive the discharge temperature higher.

Efficiencies

Standard or High Efficiency Cooling available.

Easy Access Low Voltage Terminal Board

Foil Faced Insulation

Voyager 2 Packaged Systems Features and Benefits

Voyager's Low Voltage Terminal Board is external to the electrical control cabinet. It is extremely easy to locate and attach the thermostat wire and test operation of all unit functions. This is another cost and time saving installation feature.

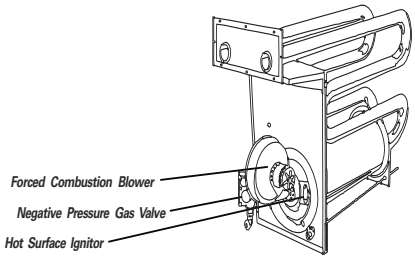
All panels in the evaporator section of the unit have cleanable foil-faced insulation. All edges are either captured or sealed to ensure no insulation fibers get into the airstream.

Fork Pocket Access

Voyager™ has the ability to be forked from 3 sides.

Heat Exchanger—Drum and Tube

The cabinet features a drum and tube heat exchanger (pictured right) that is manufactured using aluminized steel with stainless steel components for maximum durability.



The requirement for cycle testing of heat exchangers is 10,000 cycles by ANSI Z21.47. This is the standard required by both UL and AGA for cycle test requirements.

American Standard requires the design to be tested to 2½ times this current standard. The drum and tube design has been tested and passed over 150,000 cycles, which is over 15 times the current ANSI cycling requirements. The negative pressure gas valve is used in the standard furnaces. This is one of our unique safety features. Modulating heaters use a pressure switch to ensure that the blower motor is operating before the gas valve is allowed to open.

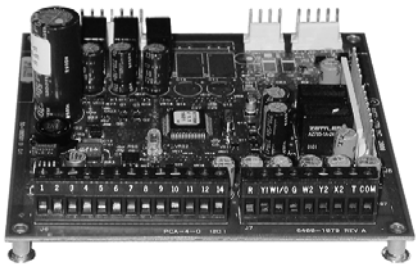
The forced combustion blower supplies pre-mixed fuel through a single stainless steel burner screen into a sealed drum where ignition takes place. It is more reliable to operate and maintain than a multiple burner system. Modulating furnaces contain a metal fiber material to ensure proper flame distribution at low fire. The hot surface ignitor is a gas ignition device which doubles as a safety device utilizing a continuous test to prove the flame. The design is cycle tested at the factory for quality and reliability. Our gas/electric rooftops exceed all California seasonal efficiency requirements and perform even better than the California NO_x emission requirements.

Low Ambient Cooling

All Voyager microprocessor units have cooling capabilities down to 0°F as standard.

Low Voltage Connections

The wiring of the low voltage connections to the unit and the zone sensors is as simple as 1-1, 2-2, and 3-3. This simplified system makes it easy for the installer to wire.



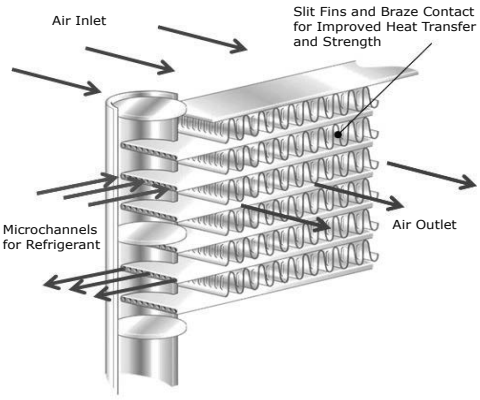
BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Voyager 2 Packaged Systems Features and Benefits

Microchannel Coils



Microchannel coils are all-aluminum coils with fully-brazed construction. This design reduces risk of leaks and provides increased coil rigidity — making them more rugged on the jobsite. Their flat streamlined tubes with small ports and metallurgical tube-to-fin bond allow for exceptional heat transfer.

Microchannel all-aluminum construction provides several additional benefits:

- Light weight (simplifies coil handling)
- Easy to recycle
- Minimize galvanic corrosion

Motors

All indoor fan motors are belt drive as standard.

Pressure Cutouts

Low and high pressure cutouts are standard on all Voyager models.

Phase Monitor

Voyager features a three-phase line monitor module that protects against phase loss, phase reversal and phase unbalance. It is intended to protect compressors from reverse rotation. It has an operating input voltage range of 190–600 Vac, and LED indicators for ON and FAULT. There are no field adjustments and the module will automatically reset from a fault condition.

Quick-Access Panels

Remove three or more screws for access to the standardized internal components and wiring.

Quick-Adjust Slider Plate

With the Quick-Adjust Slider Plate (pictured right), the belt and sheaves can be quickly adjusted without moving the mounted fan motor. The result is a major savings in time and money.

Single Point Power

A single electrical connection powers the unit.

Single Side Service

Single side service is standard on all units.

Sloped Drain Pans

Every Voyager unit has a non-corrosive, sloped drain pan made of pre-painted steel and standard on all units.

Standardized Components

Components are placed in the same location on all Voyager units. Familiarize yourself with one Voyager and you are familiar with every Voyager. Due to standardized components throughout the Voyager line, contractors/owners can stock fewer parts.

U-Shaped Airflow Pattern

The U-shaped airflow allows for improved static capabilities.

Variable Frequency Drives - VFD (Multispeed Indoor Fan, VAV, and SZ VAV Only)

Variable Frequency Drives are factory installed and tested to provide supply fan motor speed modulation. VFDs on the supply fan, as compared to inlet guide vanes or discharge dampers, are quieter, more efficient, and are eligible for utility rebates. All VFDs are designed to allow bypass if required. Bypass control will simply provide full nominal airflow in the event of drive failure. Bypass mode is indicated in the unit wiring manual. Modulating gas heat models with SZVAV allow tighter space temperature control with less temperature swing.

Variety of Options[1]

Factory Installed Options

American Standard® Air-Fi® Wireless

American Standard® Air-Fi® wireless communication is a reliable, flexible solution that frees you from the hassles associated with wired components for your building controls system. With Air-Fi® wireless, you get easy problem solving, efficient performance, and cost savings over the life of the equipment.

CO_2 Sensor Wiring

This is the unit wiring for field installed CO_2 sensors. Factory-installed CO_2 sensor wiring saves time and ensures proper unit connections for the field installed CO_2 sensor kits.

Complete Coat™ Condenser Coil

The cathodic epoxy type electrodisposition coating is formulated for high edge build to a number of different types of heat exchangers. The coating is selected to provide excellent resistance and durability to corrosive effects of alkalies, acids, alcohols, petroleum, seawater, salt air, and corrosive environments. This coating is available for microchannel coils only.

Circuit Breaker (Required with Through-the-Base Electrical)

This option is a factory installed thermal magnetic, molded case, HACR Circuit Breaker with provisions for through the base electrical connections. Available on all models.

Condensate Overflow Switch

A condensate overflow switch is available to shut the unit down in the event that the condensate drain line becomes clogged. This option protects the unit from water overflowing from the drain pan and entering the base of the units.

Dehumidification (Hot Gas Reheat)

This option allows for increased outdoor air ventilation. It reduces humidity levels while increasing comfort level in the air space. Cooling can operate without a demand for dehumidification. The hot gas reheat coil is designed to deliver maximum reheat temperature.

[1] Refer to "Model Number Description," p. 24 for option availability.

Voyager 2 Packaged Systems Features and Benefits

Disconnect Switch (Required with Through-the-Base Electrical)

Factory installed 3-pole, molded case, disconnect switch with provisions for through the base electrical connections are available. Available on all models.
Codes require a method of assured unit shutdown for servicing. Field-installed disconnects sometimes interfere with service access. Factory installation of unit disconnects reduces costs, assures proper mounting and provides the opportunity to upgrade to unit circuit breaker protection.

Fault Detection and Diagnostics (FDD)

This offering meets the mandatory requirement of CA Title 24 of fully configurable diagnostics allowing fault history and reading fault codes at the unit.This option provides detection of the following faults: Air temperature sensor failure/fault and notification of acceptable economizer mode.The FDD system shall be certified by the Energy Commission as meeting the requirements.

High Efficiency Filtration

Voyager units offer a variety of high efficiency filtration options. MERV 8 and MERV 13 filters provide additional filtration beyond the capabilities of typical 2-inch throwaway filters. Also, when MERV 8 or MERV 13 filters are ordered, units come equipped with a filter removal tool.

High Efficiency Motors

High efficiency motors are available with efficiency ratings from 86.5 up to 91.0. It is not available for all models.

High Short Circuit Current Rating (SCCR)

Voyager rooftop units now have an optional high short circuit current rated electrical subsystem for units with an MOP above 60A. This option is a perfect fit for applications that need protection against high potential fault currents. This option also includes individual over current protection for each compressor and the indoor fan, as well as a dedicated over current protection to the condenser fan motor(s). When the high SCCR is ordered, the control box will have components separated into two sections - high and low voltage components.

Hinged Access Doors

These doors permit easy access to the filter, fan/heat, and compressor/control sections. They reduce the potential roof damage from screws or sharp access door corners.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Voyager 2 Packaged Systems Features and Benefits

Human Interface

The 5 inch Color Touchscreen Human Interface provides an intuitive user interface to the rooftop unit that speeds up unit commissioning, shortens unit troubleshooting times, and enhances preventative maintenance measures. The human interface includes several features such as:

- Data trending capabilities by means of time series graphs
- Historical alarm messages
- Real-time sensor measurements
- On board system setpoints
- USB port that enables the downloading of component runtime information as well as trended historical sensor data
- Customizable reports

Modulating Gas Heat with a 2.5:1 Turndown Ratio

Upon receiving a call for heat, modulating gas heat units with a 2.5:1 turndown ratio light their burner at full fire (100%). After the burner is lit, the unit controls will monitor the discharge air temperature and modulate the input rate down to match the load.

Note: *Modulating gas heat units are equipped with a stainless steel heat exchanger as standard.*

Multi-Speed Indoor Fan System

Multi-speed indoor fan system is designed for use in applications for meeting the minimum requirement of CA Title 24. This system incorporates a multi-speed fan control to change the speed of the fan to 66% of full airflow based off compressor stages.

Multiple-Zone VAV Control

A multiple-zone VAV (MZVAV) system consists of a packaged rooftop unit that serves several individually controlled zones. Each zone is equipped with a VAV terminal unit that varies the quantity of air delivered to maintain the desired temperature in that zone. The rooftop unit controller varies the speed of the indoor fan to maintain the static pressure in the supply ductwork at a setpoint, ensuring that all zones receive the necessary quantity of air. In addition, cooling capacity is cycled to maintain the supply air temperature at the desired setpoint.

For decades, American Standard has been an industry leader in rooftop VAV systems. Now, multiple-zone VAV control is available in American Standard's light commercial rooftop platform (3-25 tons).

Novar Unit Controls

Novar 3051 and 2024 are available for Voyager Cooling and Gas/Electric models.

Powered or Unpowered Convenience Outlet

This option is a GFCI, 120V/15amp, 2-plug, convenience outlet, either powered or unpowered. This option can only be ordered when Through the Base Electrical with either the Disconnect Switch or Circuit Breaker option is ordered. This option is available on all models.

Single Zone VAV - One Zone Variable Air Volume Mode

Note: *Single Zone VAV is designed to be used with a zone sensor. If a unit is configured for Single Zone VAV operation but is connected to a thermostat, the control will revert to multi-speed (2-Speed) indoor fan control. (See "Multi-Speed Indoor Fan System" above.)*

Voyager 2 Packaged Systems Features and Benefits

Single zone VAV is designed for use in single zone applications like gymnasiums, auditoriums, manufacturing facilities, retail box stores, and any large open spaces, where there is a lot of diversity in the load profile. Single Zone VAV (SZ VAV) is an ideal replacement to "yesterday's" constant volume (CV) systems, by reducing operating costs while improving occupant comfort. SZ VAV systems combine American Standard application, control and system integration knowledge to exactly match fan speed with cooling and heating loads, regardless of the operating condition. American Standard algorithms meet/exceed ASHRAE 90.1- 2010, SZ VAV energy-saving recommendations, and those of CA Title 24. The result is an optimized balance between zone temperature control and system energy savings. Depending on your specific application, energy savings can be as much as 20%.

Note: *Building system modeling in energy simulation software like TRACE is recommended to evaluate performance improvements for your application.*

SZ VAV is fully integrated into the ReliaTel Control system and is available today. It provides the simplest and fastest commissioning in the industry through proven factory-installed, wired, and tested system controllers. All control modules, logic and sensors are factory installed, and tested to assure the highest quality and most reliable system available. This means no special programming of algorithms, or hunting at the jobsite for sensors, boards, etc. that need to be installed in the field. Single zone VAV is a quick and simple solution for many applications and is available from your most trusted rooftop VAV system solution provider- American Standard.

Stainless Steel Drain Pan

For excellent corrosion and oxidation resistance, the optional stainless steel drain pan provides a cleanable surface that complement other IAQ solutions such as high efficiency filtration (MERV 8 or 13), demand control ventilation (CO_2), and hot gas reheat.

Stainless Steel Heat Exchanger

The optional stainless steel heat exchanger is constructed of 439 stainless steel. It is resistant to corrosion and oxidation and easy to clean. The high strength to weight ratio allows for high ventilation rates with gas units and comes standard with a modulating gas heat option. With this option, a 10-year stainless steel heat exchanger warranty is standard.

Supply, Return, and Plenum Air Smoke Detector

With this option (pictured right) installed, if smoke is detected, all unit operation will be shut down. Reset will be manual at the unit. Return Air Smoke Detectors require minimum allowable airflow when used with certain models.

Supply and/or Return Smoke Detectors may not be used with the Plenum Smoke Detector.

Through-the-Base Electrical Utility Access

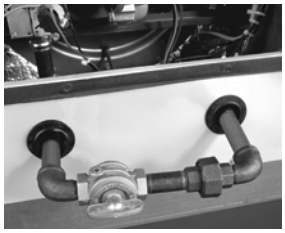
An electrical service entrance shall be provided allowing electrical access for both control and main power connections inside the curb and through the base of the unit. Option will allow for field installation of liquid-tight conduit and an external field installed disconnect switch.

Factory provided through the base openings simplify wiring and piping. Because these utility openings frequently minimize the number of roof penetrations, the integrity of roofing materials is enhanced.

Voyager 2 Packaged Systems Features and Benefits

Through-the-Base Gas Piping (Gas/Electric Only)

This option (pictured right) shall have all piping necessary including, black steel, manual gas shut-off valve, elbows, and union. This assembly will require minor field labor to install.



Factory or Field Installed Options[1]

BACnet® Communications Interface

The BACnet® communications interface allows the unit to communicate directly with a generic open protocol BACnet® MS/TP Network Building Automation System Controls.

Clogged Filter/Fan Failure Switch

A dedicated differential pressure switch is available to achieve active fan failure indication and/or clogged filter indication. These sensors allow a zone sensor service light or Integrated Comfort System to indicate a dirty filter or a fan that's not working. The field installation charges for these valuable feedback devices often eliminate them from consideration. Factory installation can make such features a good investment.

Discharge Air Temperature Sensing Kit

Provides true discharge air temperature sensing in heating models. The kit is functional only with the ReliaTel Options Module.

Economizer - Standard, Downflow

Economizers are equipped with either dry bulb, reference, or comparative enthalpy sensing. These economizers provide free cooling as the outdoor temperature and/or humidity decreases. Correctly installed, they offer a valuable energy savings. Factory-installed economizers save time and ensure proper installation.

Note: *Factory-installed economizers require some field set-up.*

Economizer - Low Leak, Downflow

This accessory meets low leak requirements for ASHRAE 90.1, IECC, and CA Title 24 standards (3 cfm/ft^2@1" wg exterior air, 4 cfm/ft^2@1" wg return air). This option allows 100% outdoor air supply from 0-100% modulating dampers and is standard with barometric relief. It can be paired with powered exhaust for additional building pressure relief. This option can be paired with or without Fault Detection and Diagnostics (FDD) to meet current mandatory CA Title 24 requirements. Available on downflow units only. The economizers come with three control options, dry bulb and reference or comparative enthalpy (optional).

Electric Heaters

Electric heat modules are available within the basic unit. If ordering the Through the Base Electrical option with an Electrical Heater, the heater must be factory installed.

Frostat™

A capillary bulb embedded in the face of the evaporator coil or a thermostat on the suction line monitors coil temperature to prevent evaporator icing and protect the compressor. Recommended for applications with low leaving air temperatures, low airflow and/or high latent load applications.

Note: *Frostat is standard on all Single-Zone VAV, Multiple-Zone VAV, and high efficiency units.*

[1] Refer to "Model Number Description," p. 24 for option availability.

Voyager 2 Packaged Systems Features and Benefits

Indoor Fan Motor Shaft Grounding Ring

Shaft grounding rings are used on all VFD driven motors to provide a conductive discharge path away from the motor bearings to ground. Bearing Protection Rings shall be maintenance free circumferential rings of conductive micro fibers that discharge voltages to ground.

LonTalk® Communications Interface

The LonTalk communications interface allows the unit to communicate as a Tracer™ LCI-V device or directly with generic LonTalk Network Building Automation System Controls.

Oversized Motors

Factory or field installed oversized motors are available for high static applications.

Reference or Comparative Enthalpy

Measures and communicates humidity while maximizing comfort control.

ReliaTel Options Module (RTOM)

The RTOM monitors the supply fan proving, clogged filter, supply air temperature, exhaust fan setpoint, dehumidification setpoint, supply air tempering, Frostat™ and smoke detector.

Note: *The RTOM is standard on high efficiency units.*

Tool-less Hail Guards

Tool-less, hail protection quality coil guards (pictured right) shall be either factory or field-installed for condenser coil protection. This option protects the condenser coil from vandalism and/or hail damage.

American Standard Communication Interface (TCI)

Available factory or field installed. This module when applied with the ReliaTel™ easily interfaces with American Standard's Integrated Comfort™ System.

Field Installed Options[1]

CO_2 Sensor - Demand Control Ventilation (DCV)

Demand-controlled ventilation (DCV) is a control strategy that responds to the actual demand (need) for ventilation by regulating the rate at which the HVAC system brings outdoor air into the building. A CO_2 sensor measures the concentration (parts per million, ppm) of CO_2 (Carbon Dioxide) in the air. As the CO_2 concentration changes, the outside air damper modulates to meet the current ventilation needs of the zone. The CO_2 sensor kit is available as a field installed accessory. Two field installed kits are offered; CO_2 sensor and wiring or CO_2 sensor only. The CO_2 sensor only kit should be ordered with factory installed CO_2 sensor wiring. Factory installed CO_2 sensor wiring saves set-up time and ensures proper unit connections for the CO_2 sensor.

Dampers

0–25 percent manual or 0–50 percent motorized outside air dampers are available.

Digital Display Zone Sensor

The Digital LCD (Liquid Crystal Display) zone sensor has the look and functionality of standard zone sensors.

[1] Refer to "Model Number Description," p. 24 for option availability.

Voyager 2 Packaged Systems Features and Benefits

Economizer - Standard, Horizontal

Economizers are equipped with either dry bulb or reference or comparative enthalpy sensing. These economizers provide free cooling as the outdoor temperature and/or humidity decreases. Correctly installed, they offer a valuable energy savings.

Economizer - Low Leak, Downflow and Horizontal

This accessory meets low leak requirements for ASHRAE 90.1, IECC, and CA Title 24 standards (3 cfm/ft^2@1" wg exterior air, 4 cfm/ft^2@1" wg return air). This option allows 100% outdoor air supply from 0-100% modulating dampers and is standard with barometric relief. It can be paired with powered exhaust for additional building pressure relief.

Humidity Sensor/Humidistat

Used in conjunction with our Dehumidification (Hot Gas Reheat) units to provide outstanding humidity control and comfort. Humidity sensors can be wall or duct mounted and set for levels between 40% and 60%.

LP Conversion Kit

Provided for field conversion of gas/electric units from natural gas to propane.

Outside Air Measuring/Monitoring Control (Traq Dampers)

Quantity of fresh air entering the unit will be measured and monitored via American Standard UC400 controller and series of pressure sensing rings mounted at the outside air intake.

Powered Exhaust

This option is available on downflow units and provides exhaust of the return air, when using a downflow economizer, to maintain proper building pressurization. Great for relieving most building overpressurization problems.

Remote Potentiometer

When properly installed in the economizer control circuitry, this accessory provides a remote variable resistance to enable the operator to adjust the minimum damper position.

Roof Curbs

Available for downflow units. Only two roof curbs for the entire Voyager line simplifies curb selection.

Static Drive Accessories

Available on many models, this high and low static drive accessories extend the capability of the standard motor. Avoid expensive motors and operating costs by installing this optimized sheave accessory.

Ventilation Override Accessory

With the Ventilation Override Accessory installed, the unit can be set to transition to up to 3 different pre-programmed sequences for Smoke Purge, Pressurization and Exhaust. The transition occurs when a binary input on the RTOM is closed (shorted). This would typically be a hard wired relay output from a smoke detector or fire control panel. The ventilation override kit is available as a field installed accessory.

Wireless Zone Sensor

LCD display that provides heat, cool, auto, or off. Includes two temperature setpoints and a lockable setting with °F or °C indicators.

Voyager 2 Packaged Systems Features and Benefits

Zone Sensors/Thermostats

Available in programmable, automatic and manual styles.

Note: *Zone sensors required for units configured for Single Zone VAV indoor fan system control to enable Single Zone VAV functionality.*

Other Benefits

Cabinet Integrity

For added water integrity, Voyager has a raised 1-1/8-inch lip around the supply and return of the downflow units to prevent water from blowing into the ductwork.

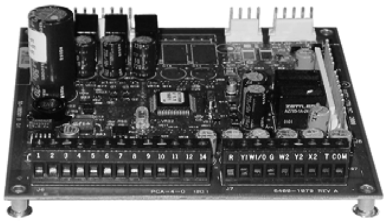
Easy to Install, Service and Maintain

Because today's owners are very cost-conscious when it comes to service and maintenance, Voyager was designed with direct input from service contractors. This valuable information helped to design a product that would get the serviceman off the job quicker and save the owner money. Voyager does this by offering outstanding standard features enhanced by a variety of factory and field installed options, multiple control options, rigorously tested proven designs and superior product and technical support.

Outstanding Airflow Distribution

Airflow is outstanding. The Voyager can replace an older machine with old ductwork and, in many cases, improve the comfort through better air distribution.

ReliaTel™ Controls Benefits



ReliaTel controls provide unit control for heating, cooling and ventilating by utilizing input from sensors that measure outdoor and indoor temperature.

Quality and Reliability are enhanced through ReliaTel control and logic:

- Prevents the unit from short cycling, considerably improving compressor life.
- Ensures the compressor will run for a specific amount of time which allows oil to return for better lubrication, enhancing the reliability of the compressor.

Voyager with ReliaTel reduces the number of components required to operate the unit, thereby reducing possibilities for component failure.

ReliaTel Makes Installing and Servicing Easy

ReliaTel eliminates the need for field installed anti-shortcycle timer and time delay relays.

ReliaTel controls provide these functions as an integral part of the unit. The contractor no longer has to purchase these controls as options and pay to install them. The wiring of the low voltage connections to the unit and the zone sensors is as easy as 1-1, 2-2, and 3-3. This simplified system makes wiring easier for the installer.

ReliaTel Makes Testing Easy

ReliaTel requires no special tools to run Voyager unit through its paces. Simply place a jumper between Test 1 and Test 2 terminals on the Low Voltage Terminal Board and the unit will walk through its operational steps automatically.

The unit automatically returns control to the zone sensor after stepping through the test mode a single time, even if the jumper is left on the unit.

Voyager 2 Packaged Systems Features and Benefits

As long as the unit has power and the "system on" LED is lit, ReliaTel is operational. The light indicates that the controls are functioning properly.
ReliaTel features expanded diagnostic capabilities when utilized with AmericanStandard Integrated Comfort™ Systems.
Some zone sensor options have central control panel lights which indicate the mode the unit is in and possible diagnostic information (dirty filters for example).

Other ReliaTel Benefits

The ReliaTel built-in anti-shortcycle timer, time delay relay and minimum "on" time control functions are factory tested to assure proper operation. ReliaTel softens electrical "spikes" by staging on fans, compressors and heaters. Intelligent Fallback is a benefit to the building occupant. If a component goes astray, the unit will continue to operate at predetermined temperature setpoint.

Intelligent Anticipation is a standard ReliaTel feature. It functions continuously as ReliaTel and zone sensor(s) work together in harmony to provide much tighter comfort control than conventional electro-mechanical thermostats.

The same ReliaTel Board fits all Packaged Gas/Electric, Cooling, and Heat Pump models. This provides standardization of parts for contractors. Less money is tied up in inventory with ReliaTel.

Rigorous Testing

All of Voyager's designs were rigorously rain tested at the factory to ensure water integrity. Voyager units incorporate either a one piece top or the AmericanStandard-Tite-Top (T3). Each part of the top (either two or three pieces) overlaps in such a way that water cannot leak into the unit. These overlapped edges are gasketed and sealed to ensure superior water integrity.

Actual shipping tests were performed to determine packaging requirements. Units were test shipped around the country to determine the best packaging. Factory shake and drop tests were used as part of the package design process to help assure that the unit arrives at the job site in top condition.

Rigging tests include lifting a unit into the air and letting it drop one foot, assuring that the lifting lugs and rails hold up under stress. For the microchannel coils, the supplier will perform the leak check at 450 psig. The completely assembled refrigerant system is leak tested at a minimum of 225 psig with a refrigerant and nitrogen mixture.

All parts are inspected at the point of final assembly. Sub-standard parts are identified and rejected immediately. Every unit receives a 100% unit run test before leaving the production line to make sure it lives up to rigorous AmericanStandard requirements.

Unmatched Support

American Standard Sales Representatives are a Support Group that can assist you with:

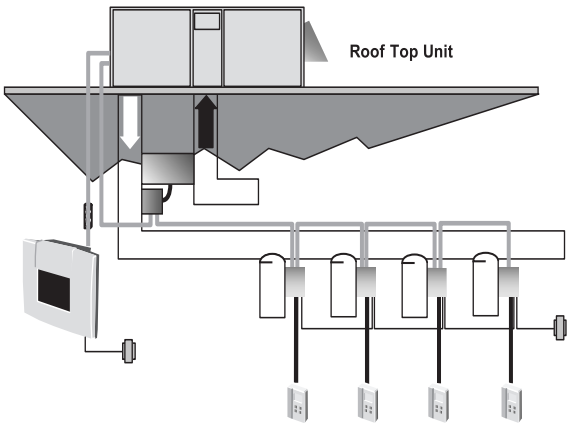
- Product
- Application
- Service
- Training
- Special Applications
- Specifications
- Computer Programs and much more

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Voyager 2 Packaged Systems Features and Benefits

VariTrac® – Changeover-Bypass System



A changeover-bypass system consists of a packaged rooftop unit that serves several individually controlled zones. Each zone is equipped with a damper that varies the quantity of air delivered to maintain the desired temperature in that zone. However, unlike a conventional multiple-zone VAV system, the fan inside the rooftop unit operates at a constant speed. Any unneeded air is diverted to the return air stream through a bypass damper.

The term “changeover” refers to how this system handles the cooling and heating requirements of the building. The central rooftop unit can provide either cooled or heated air, and it makes this decision by periodically “polling” the zones.

Voyager 2 Packaged Gas / Electric Application Considerations

Application of this product should be within the cataloged airflow and cooling considerations.

Air-Fi® Wireless

Please refer to Air-Fi® Network Design Installation, Operation, and Maintenance manual BAS-SVX55*-EN for additional details on applications with factory installed wireless.

Barometric Relief

This product line offers a barometric relief damper for use in conjunction with economizer option. This accessory consists of gravity dampers which open with increased pressure. As the building air pressure increases, the pressure in the unit return air section also increases, opening the dampers and relieving the conditioned space.

Note: *The effectiveness of barometric relief damper during economizing operation is limited, depending on the pressure drop of the return-air path. For some applications, powered exhaust may be better suited for preventing over-pressurization when economizing.*

Clearance Requirements

The recommended clearances identified with unit dimensions should be maintained to ensure adequate serviceability, maximum capacity and peak operating efficiency. Actual clearances which appear inadequate should be reviewed with local American Standard sales personnel.

Complete Coat™ Microchannel Condenser Coil

The cathodic epoxy type electrodisposition coating is formulated for high edge build to a number of different types of heat exchangers. The coating is selected to provide excellent resistance and durability to corrosive effects of alkalies, acids, alcohols, petroleum, seawater, salt air, and corrosive environments. This coating shall be available on microchannel condenser coils.

Condensate Trap

The evaporator is a draw-through configuration. A trap must be field provided prior to start-up on the cooling cycle.

Dual Compressors — 3 Stages of Cooling (12½ to 20 Tons)

Using the ReliaTel™ microprocessor controls, the Voyager™ high efficiency line can provide three stages of cooling, allowing for a more efficient and comfortable cooling operation.

Important: *All high efficiency products will have intertwined evaporator coils as standard. No face split coils are allowed with 3 or 4 stages of cooling.*

Note: *Standard efficiency models do not have 3 stages of cooling operation.*

4 Stages of Cooling (25 Tons)

25 tons high efficiency units have 4 stages of cooling with a single compressor and tandem set (similar to variable speed).

Heating Operation

The heat exchanger is manufactured with aluminized steel. To prevent condensation within the heat exchanger, do not exceed 50 percent outside air or a minimum mixed air temperature of 40°F.

Optional Stainless Steel Heat Exchanger

The optional stainless steel heat exchanger is manufactured with 439 stainless steel. To prevent corrosion and prolong heat exchanger reliability, the minimum mixed air temperature allowed across the heat exchanger is 20°F. The stainless steel heat exchanger option is an excellent option that compliments the dehumidification package and is used in conjunction with the modulating heat option. Whenever high outside air or outside applications exist, these options should be utilized.

Voyager 2 Packaged Gas / Electric Application Considerations

Low Ambient Cooling

The Voyager line features, with ReliaTel™ microprocessor controls, low ambient cooling down to 0°F. A frostat needs to be included in the selection when Low Ambient Cooling is required. Contact your local American Standard Representative for more assistance with low ambient cooling applications.

Unit Pitch

These units have sloped condensate drain pans. Units must be installed level. Any unit slope must be toward access side of the unit.

Low Airflow

Unit applications designed for airflow below 320 cfm/ton are available on cooling only units and gas heat units equipped with modulating gas heat. Units must be high efficiency units with dehumidification (hot gas reheat) or TXV with Frostat and Crankcase heaters. Electric heat is restricted below 320 cfm/ton. Standard efficiency units are restricted below 250 cfm/ton. Multi-speed or single zone VAV applications are capable of running below 320 cfm/ton during low speed airflow operation, but "full" airflow must be set to 320 cfm/ton or higher.

VariTrac®

VariTrac is for Voyager units with constant-speed indoor fan control. It is not recommended for use with Multiple-Speed Indoor Fan Control, Single-Zone VAV Control, or Multiple-Zone VAV Control.

Voyager 2 Packaged Gas / Electric Selection Procedure

Cooling Capacity

Note: *Cooling Capacity Procedure is the same for cooling (T*) and gas/electric (Y*).*

Step 1.

Calculate the building's total and sensible cooling loads at design conditions. Use the following calculation methods or any other standard accepted method. Factors used in unit selection:

Total Cooling Load: 180 MBh
Sensible Cooling Load: 126 MBh
Airflow: 6000 cfm
Electrical Characteristics: 460/60/3
Summer Design Conditions: Entering Evaporator Coil: 80 DB, 67 WB Outdoor Ambient: 95 DB
External Static Pressure: 0.39 in. wg
Rooftop—downflow configuration
Accessories

- Roof curb
- Economizer
- Electric Heat

Step 2.

As a starting point, a rough determination must be made of the size of the unit. The final selection will be made after examining the performance at the given conditions. Divide the total cooling load by nominal Btu/h per ton (12 MBh per ton); then round up to the nearest unit size.

180 MBh / 12 MBh = 15.0 tons

Step 3.

Table 16, p. 39 shows that a TSD180F4 has a **gross** cooling capacity of 186.1 MBh and 139.1 MBh sensible capacity at 6000 cfm and 95 DB outdoor ambient with 80 DB, 67 WB air entering the evaporator.

To Find Capacity at Intermediate Conditions Not in the Table.

When the design conditions are between two numbers that are in the capacity table, interpolation is required to approximate the capacity.

Note: *Extrapolation outside of the table conditions is not recommended.*

Step 4.

In order to select the correct unit which meets the building's requirements, the fan motor heat must be deducted from the gross cooling capacity. The amount of heat that the fan motor generates is dependent on the effort by the motor—cfm and static pressure. To determine the total unit static pressure you add the external static pressure to the additional static related by the added features:

External Static Duct System	0.39 wg
Standard Filter 2 in. from Table 85, p. 115	0.06 wg
Economizer from Table 85, p. 115 (100% Return Air)	0.04 wg
Electric Heater Size 36 kW from Table 85, p. 115	0.07 wg
(Reference "Heating Capacity," p. 23 for determination of heater size.) No additional static add for gas/heat exchanger.	
Total Static Pressure	0.56 wg

Note: *The Evaporator Fan Performance Table 45, p. 78 has already accounted for the pressure drop for standard filters and wet coils (see note below Table 45). Therefore, the actual total static pressure is 0.56 - 0.06 (from Table 85, p. 115 = 0.50 wg).*

With 6000 cfm and 0.50 wg.
Table 45, p. 78 shows 1.95 bhp for this unit. Note below the table gives a formula to calculate Fan Motor Heat,
3.15 x bhp = MBh.
3.15 x 1.95 = 6.14 MBh.

Now subtract the fan motor heat from the gross cooling capacity of the unit:
Net Total Cooling Capacity = 186.1 MBh - 6.14 = 179.96 MBh.

Net Sensible Cooling Capacity = 139.1 MBh - 6.14 = 132.96 MBh.

Step 5.

If the performance will not meet the required load of the building—total or sensible cooling load, try a selection at the next higher size unit.

Heating Capacity

Note: *Heating capacity procedures DIFFER for cooling (T*) and gas/electric (Y*) units.*

Step 1.

Calculate the building heating load.

Step 2.

Size the system heating capacity to match the calculated building heating load. The following are building heating requirements:

T* cooling units:
460 volt/3 phase Power Supply
Total heating load of 115.0 MBh
6000 cfm

The electric heat accessory capacities are listed in Table 87, p. 117. From the table, a 36 kW heater will deliver 122.94 MBh at 480 volts. In order to determine capacity at 460 volts, the heater voltage correction factor from Table 88, p. 118 must be used. Therefore, 122.94 MBh x .94 (voltage correction factor) = 115.6 MBh.

Y* gas/electric: Fuel natural gas total heating load of 195 MBh. Table Table 86, p. 117 shows 250 MBh and 350 MBh input models. The output capacities of these furnaces are 203 MBh and 284 MBh respectively. The low heat model with 203 MBh output best matches the building requirements.

Air Delivery Selection

Note: *Air Delivery procedures is the same for cooling (T*) and gas/electric (Y*) units.*

External static pressure drop through the air distribution system has been calculated to be 0.50 inches of water. From Table 85, p. 115 static pressure drop through the economizer is 0.04 and the 36 kW heater is 0.07 inches of water (0.39 + 0.04 + 0.07). Enter Table 45, p. 78 for a TSD180F4 at 6000 cfm and 0.50 static pressure. The standard motor at 533 rpm will give the desired airflow at a rated bhp of 1.92.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Voyager 2 Packaged Gas / Electric Model Number Description

Digit 1 — Unit Type

T = Packaged Cooling, Electric Heat
Y = Packaged Cooling, Gas Heat

Digit 2 — Efficiency

S = Standard Efficiency
H = High Efficiency

Digit 3 — Airflow Configuration

D = Downflow
H = Horizontal

Digit 4, 5, 6 — Nominal Gross Cooling Capacity (MBh)

150 = 12½ Tons
180 = 15 Tons
210 = 17½ Tons, 60Hz DOE 2018
240 = 20 Tons
300 = 25 Tons, 60Hz DOE 2018

Digit 7 — Major Design Sequence

G = ASHRAE 90.1-2013 (Fan/Compressor Staging)[13] or Microchannel Type Evaporator and Condenser Coils

Digit 8 — Voltage Selection

3 = 208-230/60/3
4 = 460/60/3
W = 575/60/3
K = 380/60/3

Digit 9 — Unit Controls

R = Reliatel

Digit 10 — Heating Capacity

Note: *(Applicable to Digit 1 T models only)*

0 = No Heat
G = 18 kW Electric Heat
K = 27 kW Electric Heat
N = 36 kW Electric Heat
P = 54 kW Electric Heat
R = 72 kW Electric Heat

Note: *(Applicable to Digit 1 Y models only)*

H = Gas Heat - High
L = Gas Heat - Low
V = Gas Heat - SS Ht Ex - Modulating
X = Gas Heat - SS Ht Ex - Low
Z = Gas Heat - SS Ht Ex - High

Digit 11 — Minor Design Sequence

Digit 12, 13 — Service Sequence

00 = None
01 = 18mm Microchannel Condenser Coil

Note: *'01' only available on select models.*

Digit 14 — Fresh Air Selection

0 = No Fresh Air
D = Econ Dry Bulb w/ Barometric Relief[1]
F = Econ Reference Enthaply w/ Barometric Relief[1]
H = Econ Comparative Enthaply w/ Barometric Relief[1]
K = Low Leak Econ w/ Barometric Relief[1]
M = Low Leak Econ Reference Enthalpy w/ Barometric Relief[1]
P = Low Leak Econ Comparative Enthalpy w/ Barometric Relief[1]

Digit 15 — Supply Fan/Drive Type/Motor

0 = Standard Motor
1 = Oversized Motor[6]
3 = High Efficiency Motor[6]
6 = Single Zone Variable Air Volume Standard Motor
7 = Multi-Speed Standard Motor
8 = Single Zone Variable Air Volume Oversized Motor
9 = Multi-Speed Oversized Motor
A = Single Zone Variable Air Volume Standard Motor w/ Shaft Grounding Ring
B = Multi-Speed Standard Motor w/ Shaft Grounding Ring
C = Single Zone Variable Air Volume Oversized Motor w/ Shaft Grounding Ring
D = Multi-Speed Oversized Motor w/ Shaft Grounding Ring
E = VAV Supply Air Temperature Control - Standard Motor
F = VAV Supply Air Temperature Control - Oversized Motor
G = VAV Supply Air Temperature Control - Standard Motor w/ Shaft Grounding Ring
H = VAV Supply Air Temperature Control - Oversized Motor w/ Shaft Grounding Ring

Digit 16 — Hinged Service Access / Filters

0 = Standard Panels/Standard Filters[22]
A = Hinged Access/Standard Filters[22]
B = Standard Panels/MERV 8 Filters[6]
C = Hinged Access/MERV 8 Filters[6]
D = Standard Panels/MERV 13 Filters[6]
E = Hinged Access/MERV 13 Filters[6]

Digit 17 — Condenser Coil Protection

0 = Standard Coil
1 = Standard Coil With Hail Guard
4 = CompleteCoat™ Condenser Coil
5 = CompleteCoat™ Condenser Coil with Hail Guard

Digit 18 — Through The Base Provisions

Note: *Applicable to Digit 1, T or Y models.*

0 = No Through The Base Provisions
A = Through The Base Electric[12]

Note: *Applicable to Digit1, Y models only.*

B = Through The Base Gas
C = Through The Base Electric/Gas[12]
D = Through The Base Access

Digit 19 — Disconnect Switch/ Circuit Breaker[11]

0 = No Disconnect/circuit break
1 = Unit Mounted Non-Fused Disconnect Switch
2 = Unit Mounted Circuit Breaker

Digit 20 — Convenience Outlet Option

0 = Without Convenience Outlet
A = Unpowered Convenience Outlet[5]
B = Powered Convenience Outlet[5]

Digit 21 — Communications Options

0 = Without Communications Options
1 = American Standard Communications Interface[6, 15]
2 = Lontalk Communications Interface[6]
6 = Building Automation Control Network Communications Interface
7 = Air-Fi® Wireless Communications[24]

Digit 22 — Refrigeration System Option

0 = Standard refrigeration system
B = Dehumidification (Hot Gas Reheat)[4,13]

Digit 23 — Refrigeration Controls

0 = Without Refrigeration Controls
1 = Frostat[9, 18]

Digit 24 — Smoke Detector[2,10]

0 = Without Smoke Detector
A = Return Air Smoke Detector
B = Supply Air Smoke Detector
C = Return/Supply Air Smoke Detector
D = Plenum Smoke Detector[19]

Digit 25 — System Monitoring Controls

0 = No Monitoring Controls
1 = Clogged Filter Switch[9]
2 = Fan Failure Switch[9]
3 = Discharge Air Sensing[9]
4 = Clogged Filter Switch and Fan Failure switch[9]

Voyager 2 Packaged Gas / Electric Model Number Description

5 = Clogged Filter Switch and Discharge Air Sensing[9]
6 = Fan Failure Switch and Discharge Air Sensing[9]
7 = Clogged Filter Switch, Fan Failure Switch and Discharge Air Sensing[9]
A = Condensate Drain Pan Overflow Switch
B = Clogged Filter Switch and Condensate Drain Pan Overflow Switch[9]
C = Fan Failure Switch and Condensate Drain Pan Overflow Switch[9]
D = Discharge Air Sensing and Condensate Drain Pan Overflow Switch[9]
E = Clogged Filter Switch, Fan Failure Switch and Condensate Drain Pan Overflow Switch[9]
F = Clogged Filter Switch, Discharge Air Sensing Tube and Condensate Drain Pan Overflow Switch[9]
G = Fan Failure Switch, Discharge Air Sensing Tube and Condensate Drain Pan Overflow Switch[9]
H = Clogged Filter Switch, Fan Failure Switch, Discharge Air Sensing and Condensate Drain Pan Overflow Switch[9]

Digit 26 - System Monitoring Controls

0 = No Monitoring Controls
A = Demand Control Ventilation (CO_2)[17]
B = FDD (Fault Detection and Diagnostics)
C = FDD (Fault Detection Diagnostics) and Demand Control Ventilation (CO_2)[17]

Digit 27 - Unit Hardware Enhancements

0 = No Enhancements
1 = Stainless Steel Drain Pan

Digit 28 - Short Circuit Current Rating

0 = Standard SCCR
A = 65kA SCCR Option[20, 21]

Digit 31 - Advanced Unit Controls

0 = Standard Unit Controls
1 = Human Interface[23]

Note: *Most Factory Installed Options available for Downflow Air Discharge units only. Please verify with ordering system for availability.*

Model Number Notes

1. Some field set up required.
2. Requires ReliaTel Options Module.
3. Requires Economizer.
4. All 22nd digit model numbers for reheat coil (B) require additional factory installed options: Frostat, and 2-inch pleated filters.
5. Must be ordered with Through-the-Base Electrical option or Horizontal-Side Access and either Unit Mounted Disconnect or Circuit Breaker.
6. Available factory installed on downflow AND horizontal units. Verify with ordering system.
7. Cannot be fused.
8. Must be factory installed when using Through-the-Base Options.
9. ReliaTel Options Module is required when ordering the following accessories: 4 Stage Cooling, Clogged Filter Switch, Fan Fail Switch, Condensate Overflow Switch, Discharge Air Sensing Kit, Frostat, Ventilation Override, Smoke Detector, Dehumidification and Modulating Gas Heat Furnace.
10. Option cannot be ordered in conjunction with field installed economizer on downflow units. Must be factory installed. The return air smoke detector may not fit up or work properly on the Voyager units when used in conjunction with 3rd party accessories (such as bolt on heat wheels, economizers, and power exhaust). Do not order the return air smoke detectors when using this type of accessory.
11. Unit mounted disconnect and circuit breakers are mutually exclusive of each other.
12. Through-the-base electrical option or Horizontal-Side Access must be ordered with either unit mounted disconnect or circuit breaker. When adding heat, you must order American Standard Electric Heat.
13. Available on high efficiency units only.
14. All Factory Installed Options are Built-to-Order. Check order services for estimated production cycle.
15. TCI is for use with non-VariTrac systems and VariTrac systems.
16. For use with multi-speed and SZVAV units only.
17. Demand Control Ventilation Option includes wiring only. The CO_2 sensor is a field-installed only option.
18. Frostat is standard on VAV and high efficiency units.
19. Supply and/or return smoke detector may not be used with the plenum smoke detector.
20. Only available where MOP is above 60A.
21. 575 Vac option is 25kA.
22. Standard filters are not available with Low Leak Economizers.
23. Human Interface is standard with FDD (Fault Detection Diagnostics).
24. Must be used with BACnet® open protocol.

Voyager 2 Packaged Gas / Electric General Data

Table 3. General data—cooling 12½–15 tons standard efficiency

	12½ Tons Downflow and Horizontal Units		15 Tons Downflow and Horizontal Units	
	TS*150G3,4,W,K	**YS*150G3,4,W,K**	**TS*180G3,4,W,K**	**YS*180G3,4,W,K**
Cooling Performance[a]				
Gross Cooling Capacity	150,000	150,000	186,000	186,000
EER (Downflow/Horizontal)[b]	11	11	11	11
Nominal Airflow CFM / AHRI Rated CFM	5,000 / 4,000	5,000 / 4,000	6,000 / 5,400	6,000 / 5,400
AHRI Net Cooling Capacity	140,000	140,000	176,000	176,000
Integrated Energy Efficiency Ratio (IEER) (One Speed Fan / Multi or Variable Speed Fan)[c]	12.4/13.5	12.2/13.5	12.4/13.2	12.2/13.2
Percent Capacity @ part load (Stage 1/Stage 2)	66/100	66/100	67/100	67/100
System Power (kW)	12.73	12.73	16.00	16.00
Compressor				
Number/Type	2 / Scrolls	2 / Scrolls	2 / Scrolls	2 / Scrolls
Sound				
Outdoor Sound Rating (BELS)[d]	9.2	9.2	9.2	9.2
Outdoor Coil				
Type	Microchannel	Microchannel	Microchannel	Microchannel
Coil Width (in.)	0.71	0.71	0.71	0.71
Face Area (sq. ft.)	25.9	25.9	35.2	35.2
Rows/FPI (DF/HZ)	1/23	1/23	1/23	1/23
Indoor Coil				
Type	Microchannel	Microchannel	Microchannel	Microchannel
Coil Width (in.)	1.00	1.00	0.81	0.81
Face Area (sq. ft.)	17.30	17.30	23.00	23.00
Rows/FPI	2/16	2/16	2/16	2/16
Refrigerant Control	TXV	TXV	TXV	TXV
Drain Connection Number/Size (in.)	1/1.00 NPT	1/1.00 NPT	1/1.00 NPT	1/1.00 NPT
Outdoor Fan				
Type	Propeller	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	2 / 26	2 / 26	2 / 26	2 / 26
Drive Type/No. Speeds	Direct / 1	Direct / 1	Direct / 1	Direct / 1
cfm	11,000	11,000	11,000	11,000
Number Motors/hp	2 / 0.50	2 / 0.50	2 / 0.50	2 / 0.50
Motor rpm	1,100	1,100	1,100	1,100
Indoor Fan				
Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)	1 / 15x15	1 / 15x15	1 / 18x18	1 / 18x18
Drive Type/No. Speeds	Belt / 1	Belt / 1	Belt / 1	Belt / 1
Number Motors	1	1	1	1
Motor hp (Standard/Oversized)[e]	3.0 / 5.0	3.0 / 5.0	3.0 / 5.0 or 7.5[f]	3.0 / 5.0 or 7.5[f]
Motor rpm (Standard/Oversized)	1,740 / 3,450	1,740 / 3,450	1,740 / 3,450	1,740 / 3,450
Motor Frame Size (Standard/Oversized)	56HZ / 56HZ	56HZ / 56HZ	184TZ / 56HZ/184TZ	56HZ / 56HZ/184TZ

Voyager 2 Packaged Gas / Electric General Data

Table 3. General data—cooling 12½–15 tons standard efficiency (continued)

	12½ Tons Downflow and Horizontal Units		15 Tons Downflow and Horizontal Units	
	TS*150G3,4,W,K	YS*150G3,4,W,K	TS*180G3,4,W,K	YS*180G3,4,W,K
Filters				
Type Furnished(g)	Throwaway	Throwaway	Throwaway	Throwaway
Number Size Recommended				
Downflow	(2)20x20x2 (4)20x25x2	(2)20x20x2 (4)20x25x2	(4)20x20x2 (4)20x25x2	(4)20x20x2 (4)20x25x2
Horizontal	(2)20x20x2 (4)20x25x2	(2)20x20x2 (4)20x25x2	(8)20x25x2	(8)20x25x2
Refrigerant Charge (Pounds of R-410A)(h)				
Cir#1 / Cir#2 (DF)	8.1/5.1	8.1/5.1	9.0/5.0	9.0/5.0
Cir#1 / Cir#2 (HZ)	8.1/5.2	8.1/5.2	9.2/5.1	9.2/5.1

(a) Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Certified in accordance with the Unitary Large Equipment Certification Program, which is based on AHRI Standard 340/360.
(b) EER is rated at AHRI conditions and in accordance with AHRI Standard 210/240 or 340/360.
(c) Integrated Energy Efficiency Ratio (IEER) is rated in accordance with AHRI standard 210/240 or 340/360.
(d) Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270 or 370.
(e) For 380V/60Hz units, the oversized motor (Indoor Fan) is used as the standard motor. Refer to oversized motor data.
(f) Offered only as a field installed accessory.
(g) An optional 2-inch pleated filter is also available.
(h) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.
* Indicates both downflow and horizontal units.

Table 4. General data—heating—12½–15 tons standard efficiency

	12½ Tons Downflow and Horizontal Units			15 Tons Downflow and Horizontal Units		
	Heating Performance(a)(Gas/Electric Only)					
Heating Models	**Low**	**High**	**Modulating Turn Down = 2.5:1**	**Low**	**High**	**Modulating Turn Down = 2.5:1**
Heating Input (Btu/h)	150,000	250,000	350,000	250,000	350,000	350,000
1st Stage (Btu)	100,000	175,000	140,000	175,000	250,000	140,000
Heating Output (Btu/h)	120,000	200,000	280,000	200,000	280,000	280,000
1st Stage (Btu)	80,000	140,000	112,000	140,000	200,000	112,000
Steady State Efficiency%	80	80	80	80	80	80
No. Burners	1	1	1	1	1	1
No. Stages	2	2	N/A	2	2	N/A
Gas Supply Line Pressure (in. wc)	2.5/14.0	2.5/14.0	2.5/14.0	2.5/14.0	2.5/14.0	2.5/14.0
Natural or LP (minimum/maximum)	Natural or LP	Natural or LP	Natural Only	Natural or LP	Natural or LP	Natural Only
Gas Connection Pipe Size (in.)	1/2	1/2	3/4	1/2	3/4	3/4

(a) Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.

Voyager 2 Packaged Gas / Electric General Data

Table 5. General data—17½–20 tons standard efficiency

	17½ Tons Downflow and Horizontal Units		20 Tons Downflow and Horizontal Units	
	TS*210G3,4,W,K	**YS*210G3,4,W,K**	**TS*240G3,4,W,K**	**YS*240G3,4,W,K**
Cooling Performance[a]				
Gross Cooling Capacity	210,000	210,000	259,000	259,000
EER (Downflow/Horizontal)[b]	11	11	10	10
Nominal Airflow CFM / AHRI Rated CFM	7,000 / 6,125	7,000 / 6,125	8,000 / 6,400	8,000 / 6,400
AHRI Net Cooling Capacity	196,000	196,000	240,000	240,000
Integrated Energy Efficiency Ratio (IEER) (One Speed Fan / Multi or Variable Speed Fan)[c]	12.4/13.2	12.2/13.2	11.6/12.4	11.4/12.4
Percent Capacity @ part load (Stage 1/Stage 2)	67/100	67/100	67/100	67/100
System Power (kW)	17.82	17.82	24.00	24.00
Compressor				
Number/Type	2 / Scrolls	2 / Scrolls	2 / Scrolls	2 / Scrolls
Sound				
Outdoor Sound Rating (BELS)[d]	9.4	9.4	9.4	9.4
Outdoor Coil				
Type	Microchannel	Microchannel	Microchannel	Microchannel
Coil Width (in.)	1.00	1.00	1.0	1.0
Face Area (sq. ft.)	35.2	35.2	35.2	35.2
Rows/FPI (DF/HZ)	1/20	1/20	1/23 / 1/20	1/23 / 1/20
Indoor Coil				
Type	Microchannel	Microchannel	Microchannel	Microchannel
Tube Size (in.) ID	1.00	1.00	1.00	1.00
Face Area (sq. ft.)	23.00	23.00	23.00	23.00
Rows/FPI	2 / 16	2 / 16	2 / 16	2 / 16
Refrigerant Control	TXV	TXV	TXV	TXV
Drain Connection Number/Size (in.)	1/1.00 NPT	1/1.00 NPT	1/1.00 NPT	1/1.00 NPT
Outdoor Fan				
Type	Propeller	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	2 / 26	2 / 26	2 / 26	2 / 26
Drive Type/No. Speeds	Direct / 1	Direct / 1	Direct / 1	Direct / 1
cfm	14,500	14,500	15,500	15,500
Number Motors/hp	2 / 1.0	2 / 1.0	2 / 1.0	2 / 1.0
Motor rpm	1125	1125	1125	1125
Indoor Fan				
Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)	1 / 18x18	1 / 18x18	1 / 18x18	1 / 18x18
Drive Type/No. Speeds	Belt / 1	Belt / 1	Belt / 1	Belt / 1
Number Motors	1	1	1	1
Motor hp (Standard/Oversized)[e]	5.0 / 7.5	5.0 / 7.5	5.0 / 7.5	5.0 / 7.5
Motor rpm (Standard/Oversized)	3,450 / 3,470	3,450 / 3,470	3,450 / 3,470	3,450 / 3,470
Motor Frame Size (Standard/Oversized)	56HZ / 184T	56HZ / 184T	56HZ / 184T	56HZ / 184T

Voyager 2 Packaged Gas / Electric General Data

Table 5. General data—17½–20 tons standard efficiency (continued)

	17½ Tons Downflow and Horizontal Units		20 Tons Downflow and Horizontal Units	
	TS*210G3,4,W,K	YS*210G3,4,W,K	TS*240G3,4,W,K	YS*240G3,4,W,K
Filters				
Type Furnished(f)	Throwaway	Throwaway	Throwaway	Throwaway
Number Size Recommended				
Downflow	(4)20x20x2 (4)20x25x2	(4)20x20x2 (4)20x25x2	(4)20x20x2 (4)20x25x2	(4)20x20x2 (4)20x25x2
Horizontal	(8)20x25x2	(8)20x25x2	(8)20x25x2	(8)20x25x2
Refrigerant Charge (Pounds of R-410A)				
Cir#1/Cir#2 (DF)	12.6/6.8	12.6/6.8	12.4/7.2	12.4/7.2
Cir#1/Cir#2 (HZ)	12.0/6.8	12.0/6.8	11.7/6.8	11.7/6.8

(a) Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Certified in accordance with the Unitary Large Equipment Certification Program, which is based on AHRI Standard 340/360.
(b) EER is rated at AHRI conditions and in accordance with AHRI Standard 210/240 or 340/360.
(c) Integrated Energy Efficiency Ratio (IEER) is rated in accordance with AHRI standard 210/240 or 340/360.
(d) Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270 or 370.
(e) For 380V/60Hz units, the oversized motor (Indoor Fan) is used as the standard motor. Refer to oversized motor data.
(f) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.
* Indicates both downflow and horizontal units.

Table 6. General data—heating—17½–20 tons standard efficiency

	17½ Tons Downflow and Horizontal Units			20 Tons Downflow and Horizontal Units		
	Heating Performance(a) (Gas/Electric Only)					
Heating Models	**Low**	**High**	**Modulating Turn Down = 2.5:1**	**Low**	**High**	**Modulating Turn Down = 2.5:1**
Heating Input (Btu/h)	250,000	350,000	350,000	250,000	400,000	350,000
1st Stage (Btu)	175,000	250,000	140,000	175,000	300,000	140,000
Heating Output (Btu/h)	200,000	280,000	280,000	200,000	320,000	280,000
1st Stage (Btu)	140,000	200,000	112,000	140,000	240,000	112,000
Steady State Efficiency%	80	80	80	80	80	80
No. Burners	1	1	1	1	1	1
No. Stages	2	2	N/A	2	2	N/A
Gas Supply Line Pressure (in. wc)	2.5/14.0	2.5/14.0	2.5/14.0	2.5/14.0	2.5/14.0	2.5/14.0
Natural or LP (minimum/maximum)	Natural or LP	Natural or LP	Natural Only	Natural or LP	Natural or LP	Natural Only
Gas Connection Pipe Size (in.)	1/2	3/4	3/4	1/2	3/4	3/4

(a) Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.

Voyager 2 Packaged Gas / Electric General Data

Table 7. General data—25 tons standard efficiency

	25 Tons Downflow and Horizontal Units	
	TS*300G3,4,W,K	**YS*300G3,4,W,K**
Cooling Performance[a]		
Gross Cooling Capacity	285,300	285,300
EER (Downflow/Horizontal)[b]	10	10
Nominal Airflow CFM / AHRI Rated CFM	10,000 / 8,000	10,000 / 8,000
AHRI Net Cooling Capacity	266,000	266,000
Integrated Energy Efficiency Ratio (IEER) (One Speed Fan / Multi or Variable Speed Fan)[c]	11.6/12.4	11.4/12.4
Percent Capacity @ part load (Stage 1/Stage 2)	66/100	66/100
System Power (kW)	27	27
Compressor		
Number/Type	2 / Scrolls	2 / Scrolls
Sound		
Outdoor Sound Rating (BELS)[d]	9.4	9.4
Outdoor Coil		
Type	Microchannel	Microchannel
Coil Width (in.)	1.0	1.0
Face Area (sq. ft.)	35.2	35.2
Rows/FPI (DF/HZ)	1/23 / 1/20	1/23 / 1/20
Indoor Coil		
Type	Microchannel	Microchannel
Tube Size (in.) ID	1.00	1.00
Face Area (sq. ft.)	23.00	23.00
Rows/FPI	2 / 16	2 / 16
Refrigerant Control	TXV	TXV
Drain Connection Number/Size (in.)	1/1.00 NPT	1/1.00 NPT
Outdoor Fan		
Type	Propeller	Propeller
Number Used/Diameter (in.)	2 / 28	2 / 28
Drive Type/No. Speeds	Direct / 1	Direct / 1
cfm	16,100	16,100
Number Motors/hp	2 / 1.0	2 / 1.0
Motor rpm	1125	1125
Indoor Fan		
Type	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)	1 / 18x18	1 / 18x18
Drive Type/No. Speeds	Belt / 1	Belt / 1
Number Motors	1	1
Motor hp (Standard/Oversized)	7.5 / N/A	7.5 / N/A
Motor rpm (Standard/Oversized)	3,470 / N/A	3,470 / N/A
Motor Frame Size (Standard/Oversized)	184T / N/A	184T / N/A

Voyager 2 Packaged Gas / Electric General Data

Table 7. General data—25 tons standard efficiency (continued)

	25 Tons Downflow and Horizontal Units	
	TS*300G3,4,W,K	**YS*300G3,4,W,K**
Filters		
Type Furnished[e]	Throwaway	Throwaway
Number Size Recommended		
Downflow	(4)20x20x2 (4)20x25x2	(4)20x20x2 (4)20x25x2
Horizontal	(8)20x25x2	(8)20x25x2
Refrigerant Charge (Pounds of R-410A)[f]		
Cir#1/Cir#2 (DF)	12.5/6.7	12.5/6.7
Cir#1/Cir#2 (HZ)	11.7/6.7	11.7/6.7

(a) Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Certified in accordance with the Unitary Large Equipment Certification Program, which is based on AHRI Standard 340/360.
(b) EER is rated at AHRI conditions and in accordance with AHRI Standard 210/240 or 340/360.
(c) Integrated Energy Efficiency Ratio (IEER) is rated in accordance with AHRI standard 210/240 or 340/360.
(d) Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270 or 370.
(e) An optional 2-inch pleated filter is also available.
(f) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.
* Indicates both downflow and horizontal units.

Table 8. General data—heating—25 tons

	25 Tons Downflow and Horizontal Units		
	Heating Performance[a] (Gas/Electric Only)		
Heating Models	**Low**	**High**	**Modulating Turn Down = 2.5:1**
Heating Input (Btu/h)	250,000	400,000	350,000
1st Stage (Btu)	175,000	300,000	140,000
Heating Output (Btu/h)	200,000	320,000	280,000
1st Stage (Btu)	140,000	240,000	112,000
Steady State Efficiency%	80	80	80
No. Burners	1	1	1
No. Stages	2	2	N/A
Gas Supply Line Pressure (in. wc)	2.5 / 14.0	2.5 / 14.0	2.5 / 14.0
Natural or LP (minimum/maximum)	Natural or LP	Natural or LP	Natural Only
Gas Connection Pipe Size (in.)	½	¾	¾

(a) Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.

Voyager 2 Packaged Gas / Electric General Data

Table 9. General data—12½–15 tons high efficiency

	12½ Tons Downflow and Horizontal Units		15 Tons Downflow and Horizontal Units	
	TH*150G3,4,W	**YH*150G3,4,W**	**TH*180G3,4,W**	**YH*180G3,4,W**
Cooling Performance[a]				
Gross Cooling Capacity	152,400	152,400	180,500	180,500
EER[b]	12.1	12.1	12.1	12.1
Nominal CFM / AHRI Rated CFM	5,000 / 4,000	5,000 / 4,000	6,000 / 5,250	6,000 / 5,250
AHRI Net Cooling Capacity	144,000	144,000	174,000	174,000
Integrated Energy Efficiency Ratio (IEER) (One Speed Fan / Multi or Variable Speed Fan)[c]	13.5/15.0	13.5/15.0	14.0/15.0	14.0/15.0
Percent Capacity @ part load (Stage 1/Stage 2/Stage 3)[d]	30/70/100	30/70/100	32/68/100	32/68/100
System Power (kW)	11.90	11.90	14.38	14.38
Compressor				
Number/Type	2 / Scrolls	2 / Scrolls	2 / Scrolls	2 / Scrolls
Sound				
Outdoor Sound Rating (BELS)[e]	9.2	9.2	9.2	9.2
Outdoor Coil				
Type	Microchannel	Microchannel	Microchannel	Microchannel
Coil Width (in.)	1.0	1.0	1.0	1.0
Face Area (sq. ft.)	35.2	35.2	42.6	42.6
Rows/FPI	1 / 20	1 / 20	1 / 20	1 / 20
Indoor Coil				
Type	Hi-Performance	Hi-Performance	Hi-Performance	Hi-Performance
Tube Size (in.) ID	0.3125	0.3125	0.3125	0.3125
Face Area (sq. ft.)	26.00	26.00	31.42	31.42
Rows/FPI	4 / 15	4 / 15	4 / 15	4 / 15
Refrigerant Control	TXV	TXV	TXV	TXV
Drain Connection Number/Size (in.)	1/1.00 NPT	1/1.00 NPT	1/1.00 NPT	1/1.00 NPT
Outdoor Fan				
Type	Propeller	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	2 / 26	2 / 26	2 / 26	2 / 26
Drive Type/No. Speeds	Direct / 1	Direct / 1	Direct / 1	Direct / 1
cfm	11,400	11,400	11,700	11,700
Number Motors/hp	2 / 0.50	2 / 0.50	2 / 0.50	2 / 0.50
Motor rpm	1,100	1,100	1,100	1,100
Indoor Fan				
Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)	1 / 18x18	1 / 18x18	1 / 18x18	1 / 18x18
Drive Type/No. Speeds	Belt / 1	Belt / 1	Belt / 1	Belt / 1
Number Motors	1	1	1	1
Motor hp (Standard/Oversized)	3.0 / 5.0	3.0 / 5.0	3.0 / 5.0	3.0 / 5.0
Motor rpm (Standard/Oversized)	1,740 / 3,450	1,740 / 3,450	1,740 / 3,450	1,740 / 3,450
Motor Frame Size (Standard/Oversized)	145T / 145T	145T / 145T	145T / 145T	145T / 145T

Voyager 2 Packaged Gas / Electric General Data

Table 9. General data—12½–15 tons high efficiency (continued)

	12½ Tons Downflow and Horizontal Units		15 Tons Downflow and Horizontal Units	
	TH*150G3,4,W	**YH*150G3,4,W**	**TH*180G3,4,W**	**YH*180G3,4,W**
Filters				
Type Furnished(f)	Throwaway	Throwaway	Throwaway	Throwaway
Number Size Recommended				
Downflow	(4)20x20x2 (4)20x25x2	(4)20x20x2 (4)20x25x2	(8)20x20x2 (4)20x16x2	(8)20x20x2 (4)20x16x2
Horizontal	(8)20x25x2	(8)20x25x2	(12)20x20x2	(12)20x20x2
Refrigerant Charge (Pounds of R-410A) (g)				
Downflow and Horizontal (Cir#1/Cir#2)	12.5/7.1	12.5/7.1	13.0/8.5	13.0/8.5
Optional Hot Gas Reheat Coil (Cir#1/Cir#2)	9.2 / 6.9	9.2 / 6.9	10.9 / 8.9	10.9 / 8.9

(a) Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Certified in accordance with the Unitary Large Equipment Certification Program, which is based on AHRI Standard 340/360.
(b) EER is rated at AHRI conditions and in accordance with AHRI Standard 210/240 or 340/360.
(c) Integrated Energy Efficiency Ratio (IEER) is rated in accordance with AHRI standard 210/240 or 340/360.
(d) 3 stages not available with Reheat models.
(e) Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270 or 370.
(f) An optional 2 inch pleated filter is also available.
(g) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.
* Indicates both downflow and horizontal units.

Table 10. General data—heating—12½-15 tons high efficiency

	12½ Tons Downflow and Horizontal Units			15 Tons Downflow and Horizontal Units		
	Heating Performance(a) (Gas/Electric Only)					
Heating Models	**Low**	**High**	**Modulating Turn Down = 2.5:1**	**Low**	**High**	**Modulating Turn Down = 2.5:1**
Heating Input (Btu/h)	150,000	250,000	350,000	250,000	350,000	350,000
1st Stage (Btu)	100,000	175,000	140,000	175,000	250,000	140,000
Heating Output (Btu/h)	120,000	200,000	280,000	200,000	280,000	280,000
1st Stage (Btu)	80,000	140,000	112,000	140,000	200,000	112,000
Steady State Efficiency%	80	80	80	80	80	80
No. Burners	1	1	1	1	1	1
No. Stages	2	2	N/A	2	2	N/A
Gas Supply Line Pressure (in. wc)	2.5 / 14.0	2.5 / 14.0	2.5 / 14.0	2.5 / 14.0	2.5 / 14.0	2.5 / 14.0
Natural or LP (minimum/maximum)			Natural Only			Natural Only
Gas Connection Pipe Size (in.)	½	½	¾	½	¾	¾

(a) Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.

Voyager 2 Packaged Gas / Electric General Data

Table 11. General data—17½–20 tons high efficiency

	17½ Tons Downflow and Horizontal Units		20 Tons Downflow and Horizontal Units	
	TH*210G3,4,W	**YH*210G3,4,W**	**TH*240G3,4,W**	**YH*240G3,4,W**
Cooling Performance[a]				
Gross Cooling Capacity	214,800	214,800	248,500	248,500
EER[b]	11.8	11.8	11.0	11.0
Nominal CFM / AHRI Rated CFM	7,000 / 5,600	7,000 / 5,600	8,000 / 6,400	8,000 / 6,400
AHRI Net Cooling Capacity	204,000	204,000	234,000	234,000
Integrated Energy Efficiency Ratio (IEER) (One Speed Fan / Multi or Variable Speed Fan)[c]	13.0/14.0	13.0/14.0	12.4/14.0	12.4/14.0
Percent Capacity @ part load (Stage 1/Stage 2/Stage 3)[d]	31/69/100	31/69/100	30/70/100	30/70/100
System Power (kW)	17.29	17.29	21.27	21.27
Compressor				
Number/Type	2 / Scrolls	2 / Scrolls	2 / Scrolls	2 / Scrolls
Sound				
Outdoor Sound Rating (BELS)[e]	9.2	9.2	9.4	9.4
Outdoor Coil				
Type	Microchannel	Microchannel	Microchannel	Microchannel
Coil Width (in.)	1.0	1.0	1.0	1.0
Face Area (sq. ft.)	42.6	42.6	42.6	42.6
Rows/FPI	1 / 20	1 / 20	1 / 20	1 / 20
Indoor Coil				
Type	Hi-Performance	Hi-Performance	Hi-Performance	Hi-Performance
Tube Size (in.) ID	0.3125	0.3125	0.3125	0.3125
Face Area (sq. ft.)	31.42	31.42	31.42	31.42
Rows/FPI	4 / 15	4 / 15	4 / 15	4 / 15
Refrigerant Control	TXV	TXV	TXV	TXV
Drain Connection Number/Size (in.)	1/1.00 NPT	1/1.00 NPT	1/1.00 NPT	1/1.00 NPT
Outdoor Fan				
Type	Propeller	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	2 / 26	2 / 26	2 / 28	2 / 28
Drive Type/No. Speeds	Direct / 1	Direct / 1	Direct / 1	Direct / 1
cfm	15,800	15,800	16,500	16,500
Number Motors/hp	2 / 1.0	2 / 1.0	2 / 1.0	2 / 1.0
Motor rpm	1,125	1,125	1,125	1,125
Indoor Fan				
Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)	1 / 18x18	1 / 18x18	1 / 18x18	1 / 18x18
Drive Type/No. Speeds	Belt / 1	Belt / 1	Belt / 1	Belt / 1
Number Motors	1	1	1	1
Motor hp (Standard/Oversized)	5.0 / 7.5	5.0 / 7.5	5.0 / 7.5	5.0 / 7.5
Motor rpm (Standard/Oversized)	3,450 / 3,470	3,450 / 3,470	3,450 / 3,470	3,450 / 3,470
Motor Frame Size (Standard/Oversized)	145T / 184T	145T / 184T	145T / 184T	145T / 184T

Voyager 2 Packaged Gas / Electric General Data

Table 11. General data—17½–20 tons high efficiency (continued)

	17½ Tons Downflow and Horizontal Units		20 Tons Downflow and Horizontal Units	
	TH*210G3,4,W	**YH*210G3,4,W**	**TH*240G3,4,W**	**YH*240G3,4,W**
Filters				
Type Furnished(f)	Throwaway	Throwaway	Throwaway	Throwaway
Number Size Recommended				
Downflow	(8)20x20x2 (4)20x16x2	(8)20x20x2 (4)20x16x2	(8)20x20x2 (4)20x16x2	(8)20x20x2 (4)20x16x2
Horizontal	(12)20x20x2	(12)20x20x2	(12)20x20x2	(12)20x20x2
Refrigerant Charge (Pounds of R-410A)(g)				
Downflow and Horizontal (Cir#1/Cir#2)	14.0 / 7.3	14.0 / 7.3	15.5 / 7.5	15.5 / 7.5
Optional Hot Gas Reheat Coil (Cir#1/Cir#2)	12.2/8.9	12.2/8.9	11.9 / 9.6	11.9 / 9.6

(a) Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Certified in accordance with the Unitary Large Equipment Certification Program, which is based on AHRI Standard 340/360.
(b) EER is rated at AHRI conditions and in accordance with AHRI Standard 210/240 or 340/360.
(c) Integrated Energy Efficiency Ratio (IEER) is rated in accordance with AHRI standard 210/240 or 340/360.
(d) 3 stages not available with Reheat models.
(e) Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270 or 370.
(f) An optional 2 inch pleated filter is also available.
(g) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.
* Indicates both downflow and horizontal units.

Table 12. General data—heating—17½–20 tons high efficiency

	17½ Tons Downflow and Horizontal Units			20 Tons Downflow and Horizontal Units		
	Heating Performance(a) (Gas/Electric Only)					
Heating Models	**Low**	**High**	**Modulating Turn Down = 2.5:1**	**Low**	**High**	**Modulating Turn Down = 2.5:1**
Heating Input (Btu/h)	250,000	350,000	350,000	250,000	400,000	350,000
1st Stage (Btu)	175,000	250,000	140,000	175,000	300,000	140,000
Heating Output (Btu/h)	200,000	280,000	280,000	200,000	320,000	280,000
1st Stage (Btu)	140,000	200,000	112,000	140,000	240,000	112,000
Steady State Efficiency%	80	80	80	80	80	80
No. Burners	1	1	1	1	1	1
No. Stages	2	2	N/A	2	2	N/A
Gas Supply Line Pressure (in. wc)	2.5 / 14.0	2.5 / 14.0	2.5/14.0	2.5 / 14.0	2.5 / 14.0	2.5/14.0
Natural or LP (minimum/maximum)			Natural Only			Natural Only
Gas Connection Pipe Size (in.)	½	¾	¾	½	¾	¾

(a) Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.

Voyager 2 Packaged Gas / Electric General Data

Table 13. General data—25 tons high efficiency

	25 Tons Downflow and Horizontal Units	
	TH*300G3,4,W	**YH*300G3,4,W**
Cooling Performance[a]		
Gross Cooling Capacity	292,300	292,300
EER[b]	10.6	10.6
Nominal CFM / AHRI Rated CFM	10,000 / 8,000	10,000 / 8,000
AHRI Net Cooling Capacity	274,000	274,000
Integrated Energy Efficiency Ratio (IEER) (One Speed Fan / Multi or Variable Speed Fan)[c]	12.4/15.0	12.4/15.0
Percent Capacity @ part load (Stage 1/Stage 2/Stage 3/Stage 4)[d]	25/50/75/100	25/50/75/100
System Power (kW)	25.85	25.85
Compressor		
Number[e]/Type	3 / Scrolls	3 / Scrolls
Sound		
Outdoor Sound Rating (BELS)[f]	9.4	9.4
Outdoor Coil		
Type	Microchannel	Microchannel
Coil Width (in.)	1.0	1.0
Face Area (sq. ft.)	42.58	42.58
Rows/FPI	1 / 20	1 / 20
Indoor Coil		
Type	Hi-Performance	Hi-Performance
Tube Size (in.) ID	0.3125	0.3125
Face Area (sq. ft.)	31.42	31.42
Rows/FPI	4 / 15	4 / 15
Refrigerant Control	TXV	TXV
Drain Connection Number/Size (in.)	1/1.00 NPT	1/1.00 NPT
Outdoor Fan		
Type	Propeller	Propeller
Number Used/Diameter (in.)	2 / 28	2 / 28
Drive Type/No. Speeds	Direct / 1	Direct / 1
cfm	16,500	16,500
Number Motors/hp	2 / 1.0	2 / 1.0
Motor rpm	1,125	1,125
Indoor Fan		
Type	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)	1 / 18x18	1 / 18x18
Drive Type/No. Speeds	Belt / 1	Belt / 1
Number Motors	1	1
Motor hp (Standard)	7.5	7.5
Motor rpm (Standard)	3,470	3,470
Motor Frame Size (Standard)	184T	184T

Voyager 2 Packaged Gas / Electric General Data

Table 13. General data—25 tons high efficiency (continued)

	25 Tons Downflow and Horizontal Units	
	TH*300G3,4,W	**YH*300G3,4,W**
Filters		
Type Furnished[g]	Throwaway	Throwaway
Number Size Recommended		
Downflow	(8)20x20x2 (4)20x16x2	(8)20x20x2 (4)20x16x2
Horizontal	(12)20x20x2	(12)20x20x2
Refrigerant Charge (Pounds of R-410A)[h]		
Downflow and Horizontal (Cir#1/Cir#2)	11.8 / 10.6	11.8 / 10.6
Optional Hot Gas Reheat Coil (Cir#1/Cir#2)	12.7 / 11.4	12.7 / 11.4

(a) Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Certified in accordance with the Unitary Large Equipment Certification Program, which is based on AHRI Standard 340/360.
(b) EER is rated at AHRI conditions and in accordance with AHRI Standard 210/240 or 340/360.
(c) Integrated Energy Efficiency Ratio (IEER) is rated in accordance with AHRI standard 210/240 or 340/360.
(d) 3 and 4 stages not available with Reheat models.
(e) 2 compressors for Reheat Model
(f) Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270 or 370.
(g) An optional 2-inch pleated filter is also available.
(h) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.
* Indicates both downflow and horizontal units.

Table 14. General data—heating—25 tons high efficiency

	25 Tons Downflow and Horizontal Units		
	Heating Performance[a] (Gas/Electric Only)		
Heating Models	**Low**	**High**	**Modulating Turn Down = 2.5:1**
Heating Input (Btu/h)	250,000	400,000	350,000
1st Stage (Btu)	175,000	300,000	140,000
Heating Output (Btu/h)	200,000	320,000	280,000
1st Stage (Btu)	140,000	240,000	112,000
Steady State Efficiency%	80	80	80
No. Burners	1	1	1
No. Stages	2	2	N/A
Gas Supply Line Pressure (in. wc)	2.5 / 14.0	2.5 / 14.0	2.5/14.0
Natural or LP (minimum/maximum)			Natural Only
Gas Connection Pipe Size (in.)	½	¾	¾

(a) Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.

Voyager 2 Packaged Heat Pumps Application Considerations

Application of this product should be within the catalogued airflow and cooling considerations.

Air-Fi® Wireless

Please refer to Air-Fi Network Design Installation, Operation, and Maintenance manual BAS-SVX55*-EN for additional details on applications with factory installed wireless.

Low Ambient Cooling

This Voyager line features, as a standard, low ambient cooling down to 0°F. Contact your local American Standard Representative for more assistance with low ambient cooling applications.

Barometric Relief

This product line offers an optional barometric relief damper included in the downflow economizer accessory. This accessory consists of gravity dampers which open with increased pressure. As the building air pressure increases, the pressure in the unit return air section also increases, opening the dampers and relieving the conditioned space.

Important: *THE EFFECTIVENESS OF BAROMETRIC RELIEF DAMPER DURING ECONOMIZING OPERATION IS SYSTEM RELATED. PRESSURE DROP OF THE RETURN AIR SYSTEM SHOULD BE CONSIDERED TO CONTROL BUILDING PRESSURIZATION.*

Power Exhaust Accessory

The power exhaust accessory is available on all downflow units. This accessory can be field installed and will assist in relieving a building's pressurization.

Condensate Trap

The evaporator is a draw-thru configuration. A trap must be field provided prior to start-up on the cooling cycle.

Clearance Requirements

The recommended clearances identified with unit dimensions should be maintained to assure adequate serviceability, maximum capacity and peak operating efficiency. Actual clearances which appear inadequate should be reviewed with the local American Standard sales personnel.

Unit Pitch

These units have sloped condensate drain pans. Units must be installed level, any unit slope must be toward access side of unit.

VariTrac

Varitrac is not recommended for SZ VAV and Multi-speed indoor fan applications.

Voyager 2 Packaged Heat Pumps Selection Procedure

Cooling Capacity

Step 1

Calculate the building's total and sensible cooling loads at design conditions. Use the American Standard calculation form or any other standard accepted method.

Step 2

Given the following building requirements:

A. Electrical Characteristics: 460/60/3

B. Summer Design Conditions: Entering Evaporator Coil: 80 DB/ 67 WB
Outdoor Ambient: 95 DB

C. Total Cooling Load: 172 MBh

D. Sensible Cooling Load: 122 MBh

E. Airflow: 6000 cfm

F. External Static Pressure: 0.50 in. w.g.

G. Rooftop - downflow configuration.

H. Accessories, Economizer, Supplementary Electric Heat

I. Heating Capacity 100 MBh
460 volt/3 phase Electric Supplemental Heat - at 6000 cfm

Size the equipment using Table 5, p. 24. As a starting point, a rough determination of the size of the unit must be made. This selection will then be confirmed after examining the performance at the given conditions. Divide the total cooling load by nominal BTUH per ton (12 MBh per ton); then round up to the nearest unit size. 172 MBh/12 MBh = 14.33 (approx. 15 tons.)

Step 3

Table 5, p. 24 shows that a WSD180E4 has a gross cooling capacity of 186.2 MBh and 138.9 MBh sensible capacity at 95°F ambient and 6000 cfm with 80 DB/67 WB air entering the evaporator.

To Find Capacity at Intermediate Conditions

When the design conditions are between two numbers that are in the capacity table, interpolation is required to approximate the capacity.

Note: *Extrapolation outside of the table conditions is not recommended.*

Step 4

Verify that there will be enough capacity by determining net capacity. In order to select the correct unit which meets the building's requirements, the fan motor heat must be deducted from the gross cooling capacity. The amount of heat that the fan motor generates is dependent on the effort by the motor CFM and static pressure. To determine the total unit static pressure, add the following:

External Static: 0.50 in.

Standard Filter 1 in: 0.05 in. (from Table 14, p. 29)

Economizer Return Air: 0.04 in. (from Table 14, p. 29)

Electric Heater Size 18 kW: 0.06 in.

Total Static Pressure: 0.65 in.

Note: *The Evaporator Fan Performance Table 8, p. 27 has already accounted for the pressure drop for standard filters and wet coils.*

Therefore, the actual Total Static Pressure is 0.65 - 0.05 = 0.6. With 6000 CFM and 0.60 inches, Table 8, p. 27 shows 2.17 Bhp.

The note below Table 8, p. 27 gives a formula to calculate Fan Motor Heat:

3.15 x bhp = MBh
3.15 x 2.17 = 6.835 MBh

Now subtracting the fan motor heat from the gross cooling capacity of the unit:

Net Total Cooling Capacity =

186.2 - 6.835 = 179.36 MBh

Net Sensible Cooling Capacity =

138.9 - 6.385 = 132.065 MBh

Step 5

If the performance will not meet the required load of the building, try a selection at the next higher size unit.

Heating Capacity

Step 1

Calculate the building heating load using the American Standard calculation form or other standard accepted method.

Step 2

Size the equipment using Table 16, p. 31 to match the heating loads at design conditions.

A. Total Heating Load: 100 MBh

B. Outdoor Ambient (Winter) 17 DB

C. Indoor Return Temperature: 70 DB

D . Airflow: 6000 CFM

Use the integrated portion of Table 16, p. 31 for the WSD180E4 to determine capacity at winter design conditions. The mechanical heating portion of the heat pump will provide 85.4 MBh.

Step 3

Because 45 MBh is less than the building's required heating capacity at winter design conditions, a supplementary heater must be selected.

100.0 - 85.54 = 14.46 MBh

From Table 19, p. 32, at 480 volts, the 18 kW Heater will be adequate to do the job.

18 kW 61 MBh

From Table 19, p. 32 select heater AYDHTRK418A (18 kW 460/60/3).

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Voyager 2 Packaged Heat Pumps Model Number Description

Digit 1 — Unit Type
W = Packaged Heat Pump, Electric Heat

Digit 2 — Efficiency
S = Standard Efficiency

Digit 3 — Airflow Configuration
D = Downflow
H = Horizontal

Digit 4, 5, 6 — Nominal Gross Cooling Capacity (MBh)
150 = 12½ Tons
180 = 15 Tons
240 = 20 Tons

Digit 7 — Major Design Sequence
E = R-410A Refrigerant

Digit 8 — Voltage Selection
3 = 208-230/60/3
4 = 460/60/3
W = 575/60/3

Digit 9 — Unit Controls
R = Reliatel

Digit 10 — Heating Capacity
0 = No Heat
G = 18 kW Electric Heat
N = 36 kW Electric Heat
P = 54 kW Electric Heat
R = 72 kW Electric Heat

Digit 11 — Minor Design Sequence

Digit 12, 13 — Service Sequence

Digit 14 — Fresh Air Selection
0 = No Fresh Air
D = Econ Dry Bulb w/ Barometric Relief[1]
F = Econ Reference Enthaply w/ Barometric Relief[1]
H = Econ Comparative Enthaply w/ Barometric Relief[1]
K = Low Leak Econ w/ Barometric Relief[1]
M = Low Leak Econ Reference Enthalpy w/ Barometric Relief[1]
P = Low Leak Econ Comparative Enthalpy w/ Barometric Relief[1]

Digit 15 — Supply Fan/Drive Type/Motor
0 = Standard Motor
1 = Oversized Motor[5]
3 = High Efficiency Motor[5]
6 = Single Zone Variable Air Volume Standard Motor
7 = Multi-Speed Standard Motor
8 = Single Zone Variable Air Volume Oversized Motor
9 = Multi-Speed Oversized Motor
A = Single Zone Variable Air Volume Standard Motor w/ Shaft Ground Ring
B = Multi-Speed Standard Motor w/ Shaft Ground Ring
C = Single Zone Variable Air Volume Oversized Motor w/ Shaft Ground Ring
D = Multi-Speed Oversized Motor w/ Shaft Ground Ring

Digit 16 — Hinged Service Access / Filters[5]
0 = Standard Panels/Standard Filters[17]
A = Hinged Access/Standard Filters[17]
B = Standard Panels/2" MERV 8 Filters
C = Hinged Access/2" MERV 8 Filters
D = Standard Panels/MERV 13 Filters
E = Hinged Access/MERV 13 Filters

Digit 17 — Condenser Coil Protection
0 = Standard Coil
1 = Standard Coil With Hail Guard
2 = Black Epoxy Pre-Coated Coil
3 = Black Epoxy Pre-Coated Coil with Hail Guard

Digit 18 — Through The Base Provisions
0 = No Through The Base Provisions
A = Through The Base Electric[11]
D = Through The Base Utilities Access

Digit 19 — Disconnect Switch/ Circuit Breaker[10]
0 = No Disconnect/circuit break
1 = Unit Mounted Non-Fused Disconnect Switch
2 = Unit Mounted Circuit Breaker

Digit 20 — Convenience Outlet Option
0 = Without Convenience Outlet
A = Unpowered Convenience Outlet[4]
B = Powered Convenience Outlet[4]

Digit 21 — Communications Options
0 = Without Communications Options
1 = American Standard Communications Interface[5, 13]
2 = LonTalk Communications Interface[5]
6 = Building Automation Control Network Communications Interface
7 = Air-Fi® Wireless Communications[19]

Digit 22 — Refrigeration System Option
0 = Standard refrigeration system

Digit 23 — Refrigeration Controls
0 = Without Refrigeration Controls
1 = Frostat™

Digit 24 — Smoke Detector[2,9]
0 = Without Smoke Detector
A = Return Air Smoke Detector
B = Supply Air Smoke Detector
C = Return/Supply Air Smoke Detector
D = Plenum Smoke Detector

Digit 25 — System Monitoring Controls[2]
0 = No Monitoring Controls
1 = Clogged Filter Switch
2 = Fan Failure Switch
3 = Discharge Air Sensing
4 = Clogged Filter Switch and Fan Failure
5 = Clogged Switch and Discharge Air Sensing
6 = Fan Failure Switch and Discharge Air Sensing
7 = Clogged Filter Switch, Fan Failure Switch and Discharge Air Sensing
A = Condensate Drain Pan Overflow Switch
B = Clogged Filter Switch and Condensate Drain Pan Overflow Switch
C = Fan Failure Switch and Condensate Drain Pan Overflow Switch
D = Discharge Air Sensing and Condensate Drain Pan Overflow Switch
E = Clogged Filter Switch, Fan Failure Switch and Condensate Drain Pan Overflow Switch
F = Clogged Filter Switch, Discharge Air Sensing Tube and Condensate Drain Pan Overflow Switch
G = Fan Failure Switch, Discharge Air Sensing Tube and Condensate Drain Pan Overflow Switch
H = Clogged Filter Switch, Fan Failure Switch, Discharge Air Sensing and Condensate Drain Pan Overflow Switch

Digit 26 - System Monitoring Controls
0 = No Monitoring Controls
A = Demand Control Ventilation (CO_2)[15]
B = FDD (Fault Detection and Diagnostics)
C = FDD (Fault Detection Diagnostics) & Demand Control Ventilation (CO_2)[15]

Voyager 2 Packaged Heat Pumps Model Number Description

Digit 27 - Unit Hardware Enhancements

0 = No Enhancements
1 = Stainless Steel Drain Pan

Digit 28 - Short Circuit Current Rating

0 = Standard SCCR
A = 65kA SCCR Option[16]

Digit 31 - Advanced Unit Controls

0 = Standard Unit Controls
1 = Human Interface[18]

Note: *Most Factory Installed Options available for Downflow Air Discharge units only. Please verify with ordering system for availability.*

Model Number Notes

1. Some field set up required.
2. Requires ReliaTel Options Module.
3. Requires Economizer.
4. Must be ordered with Through-the-Base Electrical option or Horizontal-Side Access and either Unit Mounted Disconnect or Circuit Breaker.
5. Available factory installed on downflow AND horizontal units. Verify with ordering system.
6. Cannot be fused.
7. Must be factory installed when using Through-the-Base Options.
8. ReliaTel Options Module is required when ordering the following accessories: Clogged Filter Switch, Fan Fail Switch, Condensate Overflow Switch, Discharge Air Sensing Kit, Frostat, Ventilation Override, and Smoke Detector.
9. Option cannot be ordered in conjunction with field installed economizer on downflow units. Must be factory installed. The return air smoke detector may not fit up or work properly on the Voyager units when used in conjunction with 3rd party accessories (such as bolt on heat wheels, economizers, and power exhaust). Do not order the return air smoke detectors when using this type of accessory.
10. Unit mounted disconnect and circuit breakers are mutually exclusive of each other.
11. Through-the-base electrical option or Horizontal-Side Access must be ordered with either unit mounted disconnect or circuit breaker. When adding heat, you must order American Standard Electric Heat.
12. All Factory Installed Options are Built-to-Order. Check order services for estimated production cycle.
13. TCI is for use with non-VariTrac systems and VariTrac systems.
14. For use with multi-speed and SZVAV units only.
15. Demand Control Ventilation Option includes wiring only. The $C0_2$ sensor is a field-installed only option.
16. 575 VAC option is 25kA.
17. Standard filters are not available with Low Leak Economizers.
18. Human Interface is standard with FDD (Fault Detection Diagnostics).
19. Must be used with BACnet® open protocol.

Voyager 2 Packaged Heat Pumps General Data

Table 3. General data — 12½ - 20 tons

	12½ Tons Downflow & Horizontal Units	15 Tons Downflow & Horizontal Units	20 Tons Downflow & Horizontal Units
	WS*150E3,4,W	**WS*180E3,4,W**	**WS*240E3,4,W**
Cooling Performance[a]			
Gross Cooling Capacity	148,000	177,000	249,000
EER[b]	10.6	10.6	9.7
Nominal Airflow/AHRI Rated Airflow (CFM)	5000	6000 / 5300	8000 / 6400
AHRI Net Cooling Capacity	146,000	170,000	240,000
IEER[c] (One Speed Fan / Two or Variable Speed Fan)	12/13.5	12/13.5	11.5/12.0
System Power (kW)	13.77	16.04	25.47
Heating Performance[a]			
High Temp. Btuh Rating	136,000	170,000	210,000
COP	3.2	3.2	3.2
System Power (kW)	12.46	15.57	19.23
Low Temp. Btuh Rating	75,000	90,000	120,000
COP	2.1	2.1	2.1
System Power (kW)	10.47	12.56	16.75
Compressor			
Number/Type	2 / Scrolls	2 / Scrolls	2 / Scrolls
AHRI Sound Rating (BELS)[d]	9.2	9.2	9.4
Outdoor Coil — Type	Hi-Performance	Hi-Performance	Hi-Performance
Refrigerant Control	Expansion Valve	Expansion Valve	Expansion Valve
Tube Size (in.) OD	0.3125	0.3125	0.3125
Face Area (sq. ft.)	35.20	35.20	42.53
Rows/FPI	3 / 16	3 / 16	3 / 16
Indoor Coil — Type	Hi-Performance	Hi-Performance	Hi-Performance
Tube Size (in.) ID	0.3125	0.3125	0.3125
Face Area (sq. ft.)	26.00	26.00	31.42
Rows/FPI	3 / 15	4 / 15	4 / 15
Refrigerant Control	Short Orifice	Short Orifice	Short Orifice
Drain Connection Number/Size (in.)	1/1.00 NPT	1/1.00 NPT	1/1.00 NPT
Outdoor Fan — Type	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	2 / 26	2 / 26	2 / 28
Drive Type/No. Speeds	Direct / 1	Direct / 1	Direct / 1
CFM	11,100	10,800	14,800
Number Motors/HP	2 / 0.5	2 / 0.5	2 / 1.0
Motor RPM	1,100	1,100	1,125

Voyager 2 Packaged Heat Pumps General Data

Table 3. General data — 12½ - 20 tons (continued)

	12½ Tons Downflow & Horizontal Units	15 Tons Downflow & Horizontal Units	20 Tons Downflow & Horizontal Units
	WS*150E3,4,W	**WS*180E3,4,W**	**WS*240E3,4,W**
Indoor Fan - Type	FC Centrifugal	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)	1 / 18x18	1 / 18x18	1 / 18x18
Drive Type/No. Speeds	Belt / 1	Belt / 1	Belt / 1
Number Motors	1	1	1
Motor HP (Standard/Oversized)	3.0 / 5.0	3.0 / 5.0 or 7.5(e)	5.0 / 7.5
Motor RPM (Standard/Oversized)	1740 / 3,450	1740 / 3,450	3450 / 3,470
Motor Frame Size (Standard/Oversized)	56HZ / 56HZ	184TZ / 56HZ or 184TZ	56HZ / 184T
Filters - Type Furnished	Throwaway	Throwaway	Throwaway
Number Size Recommended			
Downflow	(4)20x20x2 (4)20x25x2	(4)20x20x2 (4)20x25x2	(8)20x20x2 (4)20x16x2
Horizontal	(8)20x25x2	(8)20x25x2	(12)20x20x2
Refrigerant Charge Pounds of R-410A(f)			
Downflow	14 / 14.5	16.5 / 15.9	20.0 / 20.7
Horizontal	13.2 / 13.3	17 / 15.9	

(a) Cooling Performance is rated at 35°C (95°F) ambient, 26.7°C (80°F) entering dry bulb, 19.4°C (67°F) entering wet bulb. Heating Performance is rated at 20°C (68°F) ambient, 8.3°C (47°F) entering dry bulb, 6.1°C (43°F) entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal airflow. Rated in accordance with AHRI Standard 210/240 or 340/360.
(b) EER is rated at AHRI conditions and in accordance with DOE test procedures.
(c) Integrated Energy Efficiency Ratio (IEER) is rated in accordance with AHRI standard 210/240 or 360.
(d) Sound Rating shown is tested in accordance with ARI Standard 270 or 370.
(e) Offered only as a field installed accessory.
(f) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Light Commercial Foundation Packaged Systems

3-5 Ton Cooling and Gas

15-25 Ton Cooling and Gas

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Foundation 3-5 Ton Cooling & Gas Features and Benefits

Foundation™ has features and benefits that make it first class in the light commercial rooftop market. Designed with input from field contractors and technicians, its convertible airflow and ease of installation are outstanding.

Standard and Optional Features at a Glance

Standard Features

- 2-inch throwaway filters
- 5kA SCCR (Short Circuit Current Rating)
- 5 year Limited Compressor Warranty
- 5 year Limited Heat Exchanger
- 1 year Limited Parts Warranty
- Belt Drive Motors
- Cleanable Condensate Drain Pan
- Colored and Numbered Wiring
- Convertible Airflow
- Cooling to 45°F
- Discharge Line Thermostat
- Electromechanical Controls
- Easy Access Low Voltage Terminal Board (LTB)
- Foil-Faced and Edge Captured Insulation
- High Pressure Cutout
- Liquid Line Refrigerant Drier
- Locking Safety Device with Anti-Short Cycle Timer
- Microchannel Type Condenser and Evaporator Coils
- Operating Charge of R-410A
- Phase Monitor
- Provisions for Through-the-Base Electrical
- Quick Access Panels
- Quick Adjust Fan Motor Mounting Plate
- Single Point Power
- Single Side Service
- Standardized Components
- Tubular Aluminized Steel heat Exchanger

Factory Installed Options

- Complete Coat™ Microchannel Condenser Coil
- Stainless Steel Heat Exchanger with 10 Year Warranty

Factory or Field Installed Options

- Barometric Relief[1] (Downflow Low Leak Economizer Only)
- Condensate Overflow Switch
- Economizer (Downflow)[1]
- Electric Heaters
- Low Leak Economizer with Fault Detection and Diagnostics and 5 Year Limited Warranty - Downflow
- Manual Outside Air Dampers
- Motorized Outside Air Dampers
- Oversized Motor
- Reference or Comparative Enthalpy Economizer

Foundation 3-5 Ton Cooling & Gas Features and Benefits

- Through the Base Electrical Access
- Through the Base Gas Piping
- Unit Mounted Non-Fused Disconnect Switch[2]
- 2-inch MERV 13 throwaway Filters

Field Installed Options

- Barometric Relief (Standard and Low Leak Economizer, Downflow and Horizontal Configuration)
- Crankcase Heater
- Demand Control Ventilation with CO_2 Sensor
- Economizer (Horizontal)
- Frostat™
- Low Ambient Kit
- Low Leak Economizer with Fault Detection and Diagnostics and 5 Year Limited Warranty - Horizontal
- LP Conversion Kit
- Powered Exhaust
- Remote Potentiometer
- Roof Curb
- Thermostat
- Tool-less Hail Guard

Note: *Explanation of Notes located in "Model Number Description," p. 15.*

Other Benefits

- Cabinet Design Ensures Water Integrity
- Convertible Airflow - Downflow to Horizontal Airflow Configuration
- Ease of Service, Installation and Maintenance
- Mixed Model Build Enables "Fastest in the Industry" Ship Cycle Times
- Rigorous Testing
- Unmatched Product Support

Outstanding Standard Features

Colored and Numbered Wiring

Save time and money tracing wires and diagnosing the unit.

Compressor

Foundation™ contains the best compressor technology available to achieve the highest possible performance.

Controls—Electromechanical

This 24-volt control includes the control transformer and contactor pressure lugs for power wiring.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Foundation 3-5 Ton Cooling & Gas Features and Benefits

Convertible Units

Foundation 3-5 tons units ship in downflow configuration. Their convertible design makes it easy to convert them to a horizontal airflow configuration without any kit or tool.

Discharge Line Thermostat

A bi-metal element discharge line thermostats installed as a standard feature on the discharge line of each system. This standard feature provides extra protection to the compressors against high discharge temperatures in case of loss of charge, extremely high ambient and other conditions which could drive the discharge temperature higher.

Efficiency

Product efficiencies meet the requirements of ASHRAE 90.1 - 2016.

Easy Access Low Voltage Terminal Board

Foundation™ Low Voltage Terminal Board is mounted outside the main electrical control cabinet. It is extremely easy to locate and attach the thermostat control wiring and also test operation of all unit functions. This is another cost and time saving installation feature.

Foil Faced Insulation

All panels in the evaporator section of the unit have cleanable foil-faced insulation. All edges are either captured or sealed to ensure no insulation fibers get into the airstream.

Heat Exchanger

The cabinet features a tubular heat exchanger in low and medium heat capacities. The heat exchanger is fabricated using aluminized steel burners and corrosion-resistant aluminized steel tubes as standard on all models. As part of the heat exchanger assembly, an induced draft blower is used to pull the gas mixture through the burner tubes. A direct spark ignition system, which doubles as a safety device to prove the flame, is used to ignite the gas mixture.

Locking Safety Device with Anti-Short Cycle Timer

This device monitors compressor safety switch trips to prevent short cycling, protecting the compressor. A manual reset is required after a fourth safety switch trip within a 6 hour period.

Low Ambient Cooling

All Foundation units have cooling capabilities down to 45°F as standard.

Low Voltage Connections

The wiring of the low voltage connections to the unit and the thermostat is as simple as R-R, G-G, Y-Y, and W-W. This simplified system makes it easy for the installer to wire.

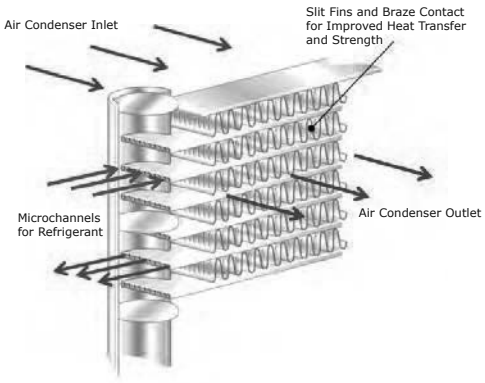
BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Foundation 3-5 Ton Cooling & Gas Features and Benefits

Microchannel Coils



Microchannel coils are all-aluminum coils with fully-brazed construction. This design reduces risk of leaks and provides increased coil rigidity — making them more rugged on the jobsite. Their flat streamlined tubes with small ports and metallurgical tube-to-fin bond allow for exceptional heat transfer.

Microchannel all-aluminum construction provides several additional benefits:

- Light weight (simplifies coil handling)
- Easy to recycle
- Minimize galvanic corrosion

Motors

All indoor fan motors are belt drive as standard.

Pressure Cutouts

Low and high pressure cutouts are standard on all Foundation™ models.

Phase Monitor

Foundation features a three-phase line monitor module that protects against phase loss, phase reversal and phase unbalance. It is intended to protect compressors from reverse rotation. It has an operating input voltage range of 190–600 Vac, and LED indicators for ON and FAULT. There are no field adjustments and the module will automatically reset from a fault condition.

Quick-Access Panels

Remove four or less screws for access to the standardized internal components and wiring.

Quick-Adjust Fan Motor Mounting Plate

With the quick-adjust slider plate, the belt and sheaves can be quickly adjusted without moving the mounted fan motor. This results in reduced time spent on routine maintenance.

Single Point Power

A single electrical connection powers the unit and all on-board options.

Single Side Service

Single side service is standard on all units.

Sloped Drain Pans

Every Foundation™ unit has a non-corrosive, sloped drain pan made of rigid PVC - standard on all units - that is removable for easy cleaning.

Standardized Components

Components are placed in the same location on all Foundation units. Familiarize yourself with one Foundation and you are familiar with every Foundation. Due to standardized components throughout the Foundation line, contractors/owners can stock fewer parts.

Foundation 3-5 Ton Cooling & Gas Features and Benefits

Variety of Options[1]

Factory Installed Options

Complete Coat™ Condenser Coil

The cathodic epoxy type electrodisposition coating is formulated for high edge build to a number of different types of heat exchangers. The coating is selected to provide excellent resistance and durability to corrosive effects of alkalies, acids, alcohols, petroleum, seawater, salt air, and corrosive environments.

Stainless Steel Heat Exchanger

The optional stainless steel heat exchanger is constructed of 409 stainless steel tubes and 439 stainless steel burners. It is resistant to corrosion and oxidation and easy to clean. The high strength to weight ratio allows for high ventilation rates with gas units and comes standard with a modulating gas heat option. With this option, a 10-year stainless steel heat exchanger warranty is standard.

Factory or Field Installed Options

Barometric Relief

Barometric relief is an unpowered means of relieving excess building pressure.

Note: *The factory installed barometric relief is for downflow low leak economizer units only.*

Condensate Overflow Switch

A condensate overflow switch is available to shut the unit down in the event that the condensate drain line becomes clogged. This option protects the unit from water overflowing from the drain pan and entering the base of the units.

Disconnect Switch

This accessory can be utilized as a convenient way to stock standard product without a disconnect and have the ability to use the through the base/disconnect offering. The standard disconnect is non-fused, 3-pole, case molded switch.

Economizer - Downflow

Economizers are equipped with either dry bulb, reference, or comparative enthalpy sensing. These economizers provide free cooling as the outdoor temperature and/or humidity decreases. Correctly installed, they offer valuable energy savings. Factory-installed economizers save time and ensure proper installation.

Note: *Factory-installed economizers require some field set-up.*

Electric Heat

Electric heat is available as a factory or field installed option.

Note: *For EBC036-060 cooling only units.*

Low Leak Economizer with Fault Detection and Diagnostics - Downflow

This economizer meets the damper leakage requirements for ASHRAE 90.1, IECC, and California Title 24 standards (3 cfm/ft^2 at 1.0 in. w.g. for outside air dampers and 4 cfm/ft^2 for return dampers). Also, Fault Detection and Diagnostic information per California Title 24 is provided with this option. Barometric relief must be field installed with this option. Horizontal airflow configurations may only be field installed.

[1] Refer to "Model Number Description," p. 15 for option availability.

Foundation 3-5 Ton Cooling & Gas Features and Benefits

Manual Outside Air Damper

A 0–50 percent manual air damper is available.

Motorized Outside Air Damper

A 0–50 percent motorized outside air dampers is available.

Oversized Motors

Factory or field installed oversized motors are available for high static applications.

Reference or Comparative Enthalpy

Measures and communicates humidity while maximizing comfort control.

Through-the-Base Electrical Utility Access

An electrical service entrance shall be provided allowing access for both control and main power connections inside the curb and through the base of the unit. This option will allow for field installation of liquid-tight conduit and an external field installed disconnect switch.

Factory provided through the base openings simplify wiring and piping. Because these utility openings frequently minimize the number of roof penetrations, the integrity of roofing materials is enhanced.

Through-the-Base Gas Piping (Gas Heat Units Only)

This option shall have all piping necessary including, black steel, manual gas shut-off valve, elbows, and union. This assembly will require minor field labor to install.

Field Installed Options

Barometric Relief

Designed to be used on downflow and horizontal configuration for both standard and low leak economizer units, barometric relief is an unpowered means of relieving excess building pressure.

CO_2 Sensor - Demand Control Ventilation (DCV)

Demand-controlled ventilation (DCV) is a control strategy that responds to the actual demand (need) for ventilation by regulating the rate at which the HVAC system brings outdoor air into the building. A CO_2 sensor measures the concentration (parts per million, ppm) of CO_2 in the air. As the CO_2 concentration changes, the outside air damper modulates to meet the current ventilation needs of the zone. DCV is a passive system; direct control of the indoor fan is not possible with standard or low leak economizers. The CO_2 sensor kit is available as a field installed accessory.

Crankcase Heaters

These band heaters provide improved compressor reliability by warming the oil to prevent migration during off-cycles or low ambient conditions.

Economizer - Horizontal

Economizers are equipped with either dry bulb or reference or comparative enthalpy sensing. These economizers provide free cooling as the outdoor temperature and/or humidity decreases. Correctly installed, they offer a valuable energy savings.

Frostat™

This switch, attached to the tube of the evaporator coil, monitors coil temperature to prevent evaporator icing and protect the compressor. Recommended for applications with low leaving air temperatures, low airflow and/or high latent load applications.

Foundation 3-5 Ton Cooling & Gas Features and Benefits

Low Ambient Kit

Allows system to operate in cooling below 45 degree by maintaining head pressure by cycling the outdoor fan motor allowing safe system operation without indoor coil icing.

Low Leak Economizer with Fault Detection and Diagnostics - Horizontal

This economizer meets the damper leakage requirements for ASHRAE 90.1, IECC, and California Title 24 standards (3 cfm/ft^2 at 1.0 in. w.g. for outside air dampers and 4 cfm/ft^2 for return dampers). Also, Fault Detection and Diagnostic information per California Title 24 is provided with this option. Barometric relief must be field installed with this option. Horizontal airflow configurations may only be field installed.

LP Conversion Kit

Provided for field conversion of gas heat units from natural gas to propane.

Power Exhaust

This option is available on downflow units and provides exhaust of the return air, when using a downflow economizer, to maintain proper building pressurization. This is an excellent option for relieving most building overpressurization problems.

Remote Potentiometer

When installed in the economizer control circuitry, this accessory provides a method to remotely adjust the minimum damper position.

Roof Curbs

Available for downflow units.

Thermostats

Available in programmable and non-programmable.

Tool-less Hail Guards

Tool-less, hail protection quality coil guards shall be field-installed for condenser coil protection. This option protects the condenser coil from vandalism and/or hail damage.

Other Benefits

Cabinet Integrity

For added water integrity, Foundation has a raised 1-1/8” lip around the supply and return of the downflow units to prevent water from blowing into the ductwork.

Easy to Install, Service and Maintain

Because today’s owners are very cost-conscious when it comes to service and maintenance, Foundation was designed with direct input from service contractors. This valuable information helped to design a product that would get the service technician off the job quicker and save the owner money. Foundation does this by offering outstanding standard features enhanced by a variety of factory and field installed options, multiple control options, rigorously tested proven designs and superior product and technical support.

Outstanding Adaptability

The Foundation 3-5 Tons units match the footprint of specific Carrier WeatherMaker units.

Rigorous Testing

All of Foundation’s designs were rigorously rain tested at the factory to ensure water integrity. Foundation units incorporate either a one piece top or the American Standard-Tite-Top (T3). Each part of the top

Foundation 3-5 Ton Cooling & Gas Features and Benefits

overlaps in such a way that water cannot leak into the unit. These overlapped edges are gasketed and sealed to ensure superior water integrity.

Actual shipping tests were performed to determine packaging requirements. Units were test shipped around the country to determine the best packaging. Factory shake and drop tests were used as part of the package design process to help assure that the unit arrives at the job site in top condition.

Rigging tests include lifting a unit into the air and letting it drop one foot, assuring that the lifting lugs and rails hold up under stress. For the microchannel coils, the supplier will perform the leak check at 450 psig. The completely assembled refrigerant system is leak tested at a minimum of 225 psig with a refrigerant and nitrogen mixture.

All parts are inspected at the point of final assembly. Sub-standard parts are identified and rejected immediately. Every unit receives a 100% unit run test before leaving the production line to make sure it lives up to rigorous American Standard requirements.

Unmatched Support

American Standard Sales Representatives are a Support Group that can assist you with:

- Product
- Application
- Service
- Training
- Special Applications
- Specifications
- Computer Programs and much more

Foundation 3-5 Ton Cooling & Gas Application Considerations

Application of this product should be within the cataloged airflow and cooling considerations.

Barometric Relief

This product line offers an optional barometric relief damper for use in conjunction with economizer option. This accessory consists of gravity dampers which open with increased pressure. As building pressure increases, the pressure in the unit return air section also increases, opening the dampers and relieving the conditioned space.

Notes:

- *The effectiveness of barometric relief damper during economizing operation is system related.*
- *Pressure drop of the return air system should be considered to control building pressurization.*

Clearance Requirements

The recommended clearances identified with unit dimensions should be maintained to ensure adequate serviceability, maximum capacity and peak operating efficiency. Actual clearances which appear inadequate should be reviewed with local American Standard sales personnel.

Complete Coat™ Microchannel Condenser Coil

The cathodic epoxy type electrodisposition coating is formulated for high edge build to a number of different types of heat exchangers. The coating is selected to provide excellent resistance and durability to corrosive effects of alkalies, acids, alcohols, petroleum, seawater, salt air, and corrosive environments. This coating shall be available on microchannel condenser coils.

Condensate Trap

The evaporator is a draw-through configuration. A trap must be field provided prior to start-up on the cooling cycle.

Heating Operation

The heat exchanger is manufactured with aluminized steel. To prevent condensation within the heat exchanger, do not exceed 50 percent outside air or a minimum mixed air temperature of 40°F.

Optional Stainless Steel Heat Exchanger

The optional stainless steel heat exchanger is manufactured with 409 stainless steel. To prevent corrosion and prolong heat exchanger reliability, the minimum mixed air temperature allowed across the heat exchanger is 40°F. The stainless steel heat exchanger option is an excellent option that compliments the dehumidification package and is used in conjunction with the modulating heat option. Whenever high outside air or outside applications exist, these options should be utilized.

Low Ambient Cooling

The Foundation line features low ambient cooling down to 45°F. The following options need to be included/considered when low ambient applications are required: continuous fan operation, crankcase heaters, or low pressure bypass timer. Contact your local American Standard Representative for more assistance with low ambient cooling applications.

Unit Pitch

These units have sloped condensate drain pans. Units must be installed level. Any unit slope must be toward access side of the unit.

Foundation 3-5 Ton Cooling & Gas Selection Procedure

Cooling Capacity

Note: *Cooling Capacity Procedure is the same for cooling (E) and gas/electric (G).*

Step 1

Calculate the building's total and sensible cooling loads at design conditions. Use the following calculation methods or any other standard accepted method. Factors used in unit selection:

- Total Cooling Load: 61MBh
- Sensible Cooling Load: 45 MBh
- Airflow: 2000 cfm
- Electrical Characteristics: 460/60/3
- Summer Design Conditions: Entering Evaporator Coil: 80 DB, 67 WB Outdoor Ambient: 95 DB
- External Static Pressure: 0.36 in. wg
- Rooftop: downflow configuration
- Accessories:
  - Roof curb
  - Economizer
  - Electric Heat

Step 2

As a starting point, a rough determination must be made of the size of the unit. The final selection will be made after examining the performance at the given conditions. Divide the total cooling load by nominal Btu/h per ton (12 MBh per ton); then round up to the nearest unit size.

61MBh / 12 MBh = 5.0 tons

Step 3

Table 5, p. 20 shows that a EBC060A has a **gross** cooling capacity of 60.8 MBh and 47.8 MBh sensible capacity at 2000 cfm and 95 DB outdoor ambient with 80 DB, 67 WB air entering the evaporator.

To Find Capacity at Intermediate Conditions Not in the Table

When the design conditions are between values that are identified in the capacity table, interpolation is required to approximate the capacity.

Note: *Extrapolation outside of the table conditions is not recommended.*

Step 4

In order to select the correct unit which meets the building's requirements, the fan motor heat must be deducted from the gross cooling capacity. The amount of heat that the fan motor generates is dependent on the effort by the motor—cfm and static pressure. To determine the total unit static pressure you add the external static pressure to the additional static related by the added features:

External Static Duct System: 0.36 in. wg

Standard Filter from Table 26, p. 39: 0.06 in. wg

Economizer from Table 26, p. 39 (100% Return Air): 0.07 in. wg

Electric Heater Size kW from Table 26, p. 39: 0.07 in. wg

(Reference "Heating Capacity," p. 14 for determination of heater size.) No additional static add for gas/heat exchanger.

Foundation 3-5 Ton Cooling & Gas Selection Procedure

Total Static Pressure: 0.56 in. wg

Note: *The Evaporator Fan Performance Table 18, p. 33 has already accounted for the pressure drop for standard filters and wet coils (see note below that table). Therefore, the actual total static pressure is 0.56 - 0.06 (from Table 26, p. 39) = 0.50 in. wg.*

With 2000 cfm and 0.50 wg.

Table 18, p. 33 shows 0.81 bhp for this unit. Note below the table gives a formula to calculate Fan Motor Heat: 2.8328 x Fan bhp + 0.4714.

2.8328 x 0.81+ 0.4714 = 2.76MBh

Now subtract the fan motor heat from the gross cooling capacity of the unit:

Net Total Cooling Capacity = 60.8 MBh - 2.76 = 58.04 MBh.

Net Sensible Cooling Capacity = 47.8 MBh - 2.76 = 45.04 MBh.

Step 5

If the performance will not meet the required load of the building—total or sensible cooling load, try a selection at the next higher size unit.

Heating Capacity

Note: *Heating capacity procedures DIFFER for cooling (E) and gas/electric (G) units.*

Step 1

Calculate the building heating load.

Step 2

Size the system heating capacity to match the calculated building heating load.

The electric heat accessory capacities are listed in Table 28, p. 40. From the table, a 10 kW heater will deliver 34.14 MBh at 480 volts. In order to determine capacity at 460 volts, the heater voltage correction factor from Table 29, p. 41 must be used. Therefore, 34.14 MBh x 0.92 (voltage correction factor) = 31.41 MBh.

Air Delivery Selection

Note: *Air Delivery procedures is the same for cooling (E) and gas/electric (G) units.*

External static duct pressure drop through the air distribution system has been calculated to be 0.36 inches of water. From Table 26, p. 39 static pressure drop through the economizer is 0.07 and the 10kW heater is 0.07 inches of water.
Therefore the total static pressure is 0.36 + 0.07 + 0.07= 0.50 inches.

Enter *Table 18, p. 33* for a EBC060A4 at 2000 cfm and 0.50 static pressure. The standard motor at 948 rpm will give the desired airflow at a rated bhp of 0.81.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Foundation 3-5 Ton Cooling & Gas Model Number Description

-

Digit 1 — Unit Type

E = Packaged Cooling, Electric Heat
G = Packaged Cooling, Gas Heat

Digit 2 — Efficiency

B = ASHRAE 90.1 - 2016

Digit 3 — Airflow Configuration

C = Convertible

Digit 4, 5, 6 — Nominal Gross Cooling Capacity (MBh)

036 = 3 Tons
048 = 4 Tons
060 = 5 Tons

Digit 7 — Major Design Sequence

A

Digit 8 — Voltage Selection

3 = 208-230/60/3
4 = 460/60/3
W = 575/60/3
K = 380/60/3[6, 7]

Digit 9 — Unit Controls

E = Electromechanical

Digit 10 — Heating Capacity

Note: *(Applicable to Digit 1 = E models only)*

0 = No Heat
A = 4.7 kW Electric Heat
B = 7.5 kW Electric Heat
C = 10 kW Electric Heat
D = 14.4 kW Electric Heat
E = 20 kW Electric Heat
F = 25 kW Electric Heat

Note: *(Applicable to Digit 1 = G models only)*

L = Gas Heat - Low
M = Gas Heat - Medium
X = Gas Heat - SS Ht Ex - Low
Y = Gas Heat - SS Ht Ex - Medium

Digit 11 — Minor Design Sequence

Digit 12, 13 — Service Sequence

00 = None

Digit 14 — Fresh Air Selection[3]

0 = No Fresh Air
A = Manual Outside Air Damper 0-50%
B = Motorized Outside Air Damper 0-50%
C = Economizer, Dry Bulb 0-100% without Barometric Relief[4]
E = Economizer, Reference Enthalpy 0-100% without Barometric Relief[4]
G = Economizer, Comparative Enthalpy 0-100% without Barometric Relief[4]
J = Downflow Low Leak Economizer, Dry Bulb w/o Barometric Relief[4]
L = Downflow Low Leak Economizer, Reference Enthalpy w/o Barometric Relief[4]
N = Downflow Low Leak Economizer, Comparative Enthalpy w/o Barometric Relief[4]

Digit 15 — Supply Fan/Drive Type/Motor

0 = Standard Motor
1 = Oversized Motor

Digit 16 — Not Used

Digit 17 — Condenser Coil Protection

0 = Standard Coil
4 = CompleteCoat™ Condenser Coil

Digit 18 — Through The Base Provisions

Note: *Applicable to Digit 1, E models.*

0 = No Through The Base Provisions
A = Through The Base Electric

Note: *Applicable to Digit 1, G models only.*

0 = No Through The Base Provisions
A = Through-The-Base Electric
B = Through-The-Base Gas[1]
C = Through-The-Base Electric/Gas

Digit 19 — Disconnect Switch

0 = No Disconnect
1 = Unit Mounted Non-Fused Disconnect Switch[2]

Digit 20— Not Used

Digit 21— Not Used

Digit 22— Not Used

Digit 23— Not Used

Digit 24— Not Used

Digit 25 - System Monitoring Controls

0 = No Monitoring Controls
A = Condensate Drain Pan Overflow Switch

Digit 26 - System Monitoring Controls

0 = No Economizer Fault Detection and Diagnostics (FDD)
B = Economizer Fault Detection and Diagnostics (FDD)[5]

Model Number Notes

1. Some field set up required.
2. Must be ordered with Through-the-Base Electrical option.
3. All Factory Installed Options are Built-to-Order. Check order services for estimated production cycle.
4. Factory installed economizers only available in downflow configuration.
5. Fault Detection and Diagnostics (FDD) is available on Low Leak Economizers only.
6. Available on Digit 1 = E units only.
7. Unit will operate reliably at 400V.

Foundation 3-5 Ton Cooling & Gas General Data

Table 1. General data — 3-5 tons

	3 Tons	4 Tons	5 Tons
	E/GBC036	E/GBC048	E/GBC060
Cooling Performance[a]			
Gross Cooling Capacity	37,000	51,100	59,000
EER[b]	12	12	12
Nominal Airflow CFM / AHRI Rated CFM	1200 / 1200	1600 / 1600	2000 / 1600
AHRI Net Cooling Capacity	36,000	49,500	57,500
Seasonal Energy Efficiency Ratio (SEER)[c]	14	14	14
System Power (kW)	3.00	4.13	4.79
Compressor			
Number/Type	1 / Scroll	1 / Scroll	1 / Scroll
Sound			
Outdoor Sound Rating (dBA)[d]	79	80	81
Outdoor Coil			
Type	Microchannel	Microchannel	Microchannel
Coil Width (in.)	0.63	0.63	1.0
Face Area (sq. ft.)	11.33	13.46	15.92
Rows/FPI	1 / 23	1 / 23	1 / 23
Indoor Coil			
Type	Microchannel	Microchannel	Microchannel
Coil Width (in.)	0.63	0.63	0.81
Face Area (sq. ft.)	6.44	6.44	6.44
Rows/FPI	2 / 16	2 / 16	2 / 16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection Number/Size (in.)	1 / ¾-14 NPT female	1 / ¾-14 NPT female	1 / ¾-14 NPT female
Outdoor Fan			
Type	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	1 / 23	1 / 23	1 / 23
Drive Type/No. Speeds	Direct / 1	Direct / 1	Direct / 1
cfm	4,000	4,000	4,000
Number Motors/hp	1 / 0.33	1 / 0.33	1 / 0.33
Motor rpm	1100	1100	1100
Indoor Fan			
Type	FC Centrifugal	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)	1 / 11x11	1 / 11x11	1 / 11x11
Drive Type/No. Speeds	Belt / 1	Belt / 1	Belt / 1
Number Motors	1	1	1
Motor hp (Standard/Oversized)	1.0 / 2.0	1.0 / 2.0	1.0 / 2.0
Motor rpm (Standard/Oversized)	1750 / 1750	1750 / 1750	1750 / 1750
Motor Frame Size (Standard/Oversized)	56 / 56	56 / 56	56 / 56
Filters			
Type Furnished	Throwaway	Throwaway	Throwaway
Number Size Recommended	(4) 16x16x2	(4) 16x16x2	(4) 16x16x2
Refrigerant Charge (Pounds of R-410A)[e]			
Circuit 1	3.5	3.7	5.0

(a) Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. ARI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Certified in accordance with the Unitary Air-Conditioner Equipment Certification Program, which is based on AHRI Standard 210/240.
(b) EER is rated at AHRI conditions and in accordance with AHRI Standard 210/240.
(c) Seasonal Energy Efficiency Ratio (SEER) is rated in accordance with AHRI standard 210/240 and DOE test procedures.
(d) Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.
(e) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

Foundation 3-5 Ton Cooling & Gas General Data

Table 2. General data—heating performance – 3-5 tons

	Heating Performance[a]					
	3 Tons		4 Tons		5 Tons	
Heating Models	**Low**	**Medium**	**Low**	**Medium**	**Low**	**Medium**
Heating Input (Btu/h)	72,000	100,000	72,000	115,000	72,000	115,000
1st Stage (Btu)		80,000		92,000		92,000
Heating Output (Btu/h)	57,600	80,000	57,600	92,000	57,600	92,000
1st Stage (Btu)		64,000		73,600		73,600
Steady State Efficiency%	80%	80%	80%	80%	80%	80%
No. Burners	2	3	2	3	2	3
No. Stages	1	2	1	2	1	2
Gas Supply Line Pressure (in. wc)	4.0 / 14.0	4.0 / 14.0	4.0 / 14.0	4.0 / 14.0	4.0 / 14.0	4.0 / 14.0
Natural Gas (minimum/maximum)	11.0 / 14.0	11.0 / 14.0	11.0 / 14.0	11.0 / 14.0	11.0 / 14.0	11.0 / 14.0
Gas Connection Pipe Size (in.)	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"

(a) Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards (ANSI). Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Foundation 15-25 Ton Cooling & Gas Features and Benefits

Foundation™ has features and benefits that make it first class in the light commercial rooftop market. Designed with input from field contractors and technicians, its convertible airflow and ease of installation are outstanding.

Standard and Optional Features at a Glance

Standard Features

- 2-inch throwaway filters
- 5kA SCCR (Short Circuit Current Rating)
- 5 year Limited Compressor Warranty
- 5 year Limited Heat Exchanger (15–17½ ton); 1 Year on 20 and 25 Tons
- 1 year Limited Parts Warranty
- All Heat Capacities Available in Vertical and Horizontal Discharge Configurations
- Belt Drive Motors
- Cleanable Condensate Drain Pan
- Colored and Numbered Wiring
- Convertible Airflow
- Cooling to 45°F
- Crankcase Heater (15–20 Tons)
- Discharge Line Thermostat
- Electromechanical Controls
- Easy Access Low Voltage Terminal Board (LTB)
- Foil-Faced and Edge Captured Insulation
- Frostat™
- High Pressure Cutout
- Liquid Line Refrigerant Drier
- Locking Safety Device with Anti-Short Cycle Timer
- Low Pressure Cutout
- Microchannel Type Condenser Coils
- Operating Charge of R-410A
- Phase Monitor
- Provisions for Through-the-Base Electrical
- Quick Access Panels
- Quick Adjust Fan Motor Mounting Plate
- Single Point Power
- Single Side Service
- Standardized Components
- Tubular Aluminized Steel heat Exchanger

Factory Installed Options

- Complete Coat™ Microchannel Condenser Coil
- Multi-Speed Indoor Fans (utilizing VFD)
- Stainless Steel Heat Exchanger with 10 Year Warranty
- Third Side Fork Access (Condenser)

Factory or Field Installed Options

- Barometric Relief[1]
- Condensate Overflow Switch
- Economizer (Downflow)[1]
- Electric Heaters

Foundation 15-25 Ton Cooling & Gas Features and Benefits

- Low Leak Economizer with Fault Detection and Diagnostics and 5 Year Limited Warranty - Downflow
- Manual Outside Air Dampers
- Motorized Outside Air Dampers
- Oversized Motor[8]
- Reference or Comparative Enthalpy Economizer
- Through the Base Electrical Access
- Through the Base Gas Piping
- Unit Mounted Non-Fused Disconnect Switch[2]

Field Installed Options

- 2-inch MERV 13 Throwaway Filters
- Crankcase Heater (25 Tons)
- Demand Control Ventilation with CO_2 Sensor
- Economizer (Horizontal)
- Hail Guard
- High Altitude Kit
- High and Low Static Drive Kits
- Low Ambient Kit
- Low Leak Economizer with Fault Detection and Diagnostics and 5 Year Limited Warranty - Horizontal
- LP Conversion Kit
- Powered Exhaust
- Remote Potentiometer
- Roof Curb
- Thermostat

Note: *Explanation of Notes located in "Model Number Description," p. 15.*

Other Benefits

- Cabinet Design Ensures Water Integrity
- Convertible Airflow - Downflow to Horizontal Airflow Configuration
- Ease of Service, Installation and Maintenance
- Mixed Model Build Enables "Fastest in the Industry" Ship Cycle Times
- Rigorous Testing
- Unmatched Product Support

Outstanding Standard Features

Colored and Numbered Wiring

Save time and money tracing wires and diagnosing the unit.

Compressors

Foundation™ contains the best compressor technology available to achieve the highest possible performance. Dual stages from manifold compressors are outstanding for humidity control and part load cooling conditions.

Controls—Electromechanical

This 24-volt control includes the control transformer and contactor pressure lugs for power wiring.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Foundation 15-25 Ton Cooling & Gas Features and Benefits

Convertible Units

Foundation units ship in the downflow configuration. A horizontal conversion kit, consisting of two downflow duct covers, is needed to convert the unit from a downflow to a horizontal airflow configuration. Units come complete with horizontal duct flanges so the contractor doesn't have to field fabricate them. These duct flanges are a time and cost saver. Units also have the ability to fit American Standard and other competitors roof curbs (Carrier). In a matter of minutes, you can go from the American Standard configuration to the Carrier configuration by simply changing the return air opening plate. This design allows for easy field conversion and eliminates the need for costly adapter curbs.

Crankcase Heaters (15 - 20 Tons)

These band heaters provide improved compressor reliability by warming the oil to prevent migration during off-cycles or low ambient conditions.

Discharge Line Thermostat

A bi-metal element discharge line thermostats installed as a standard feature on the discharge line of each compressor. This standard feature provides extra protection to the compressors against high discharge temperatures in case of loss of charge, extremely high ambient and other conditions which could drive the discharge temperature higher.

Efficiency

Product efficiencies meet the requirements of ASHRAE 90.1.

Easy Access Low Voltage Terminal Board

Foundation™ Low Voltage Terminal Board is mounted outside the main electrical control cabinet. It is extremely easy to locate and attach the thermostat control wiring and also test operation of all unit functions. This is another cost and time saving installation feature.

Foil Faced Insulation

All panels in the evaporator section of the unit have cleanable foil-faced insulation. All edges are either captured or sealed to ensure no insulation fibers get into the airstream.

Frostat™

This switch monitors coil temperature to prevent evaporator icing and protect the compressor.

Heat Exchanger

The cabinet features a tubular heat exchanger in, low, medium and high heat capacities, all of which are available for both vertical as well as horizontal discharge directions. The heat exchanger is fabricated using aluminized steel burners and corrosion-resistant aluminized steel tubes as standard on all models. As part of the heat exchanger assembly, an induced draft blower is used to pull the gas mixture through the burner tubes. A direct spark ignition system, which doubles as a safety device to prove the flame, is used to ignite the gas mixture.

Foundation 15-25 Ton Cooling & Gas Features and Benefits

Locking Safety Device with Anti-Short Cycle Timer

This device monitors compressor safety switch trips to prevent short cycling, protecting the compressor. A manual reset is required after a fourth safety switch trip.

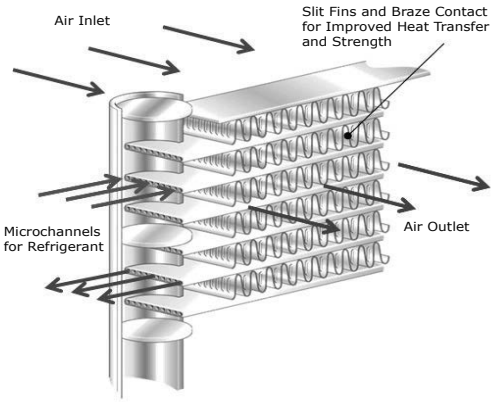
Low Ambient Cooling

All Foundation units have cooling capabilities down to 45°F as standard.

Low Voltage Connections

The wiring of the low voltage connections to the unit and the thermostat is as simple as R-R, G-G, Y-Y, and W-W. This simplified system makes it easy for the installer to wire.

Microchannel Coils



Microchannel coils are all-aluminum coils with fully-brazed construction. This design reduces risk of leaks and provides increased coil rigidity — making them more rugged on the jobsite. Their flat streamlined tubes with small ports and metallurgical tube-to-fin bond allow for exceptional heat transfer.
Microchannel all-aluminum construction provides several additional benefits:

- Light weight (simplifies coil handling)
- Easy to recycle
- Minimize galvanic corrosion

Motors

All indoor fan motors are belt drive as standard.

Pressure Cutouts

Low and high pressure cutouts are standard on all Foundation™ models.

Phase Monitor

Foundation features a three-phase line monitor module that protects against phase loss, phase reversal and phase unbalance. It is intended to protect compressors from reverse rotation. It has an operating input voltage range of 180–632 Vac, and LED indicators for ON and FAULT. There are no field adjustments and the module will automatically reset from a fault condition.

Quick-Access Panels

Remove three or less screws for access to the standardized internal components and wiring.

Quick-Adjust Fan Motor Mounting Plate

With the quick-adjust slider plate, the belt and sheaves can be quickly adjusted without moving the mounted fan motor. This results in reduced time spent on routine maintenance.

Single Point Power

A single electrical connection powers the unit and all on-board options.

Single Side Service

Single side service is standard on all units.

Foundation 15-25 Ton Cooling & Gas Features and Benefits

Sloped Drain Pans

Every Foundation™ unit has a non-corrosive, sloped drain pan made of rigid PVC - standard on all units - that is removable for easy cleaning.

Standardized Components

Components are placed in the same location on all Foundation units. Familiarize yourself with one Foundation and you are familiar with every Foundation. Due to standardized components throughout the Foundation line, contractors/owners can stock fewer parts.

Variety of Options[1]

Factory Installed Options

Complete Coat™ Condenser Coil

The cathodic epoxy type electrodisposition coating is formulated for high edge build to a number of different types of heat exchangers. The coating is selected to provide excellent resistance and durability to corrosive effects of alkalies, acids, alcohols, petroleum, seawater, salt air, and corrosive environments.

Multi-Speed Indoor Fan System

Multi-speed indoor fan system is designed for use in applications for meeting the minimum requirement of CA Title 24. This system incorporates a multi-speed fan control to change the speed of the fan to 67% of full airflow based off compressor stages.

Stainless Steel Heat Exchanger

The optional stainless steel heat exchanger is constructed of 304 stainless steel tubes and 439 stainless steel burners. It is resistant to corrosion and oxidation and easy to clean. The high strength to weight ratio allows for high ventilation rates with gas units and comes standard with a modulating gas heat option. With this option, a 10-year stainless steel heat exchanger warranty is standard.

Third Side Fork Access

This option adds fork openings on the condenser end of the unit for ease of maneuvering the unit through narrow openings.

Factory or Field Installed Options

Barometric Relief

Designed to be used on downflow units, barometric relief is an unpowered means of relieving excess building pressure.

Condensate Overflow Switch

A condensate overflow switch is available to shut the unit down in the event that the condensate drain line becomes clogged. This option protects the unit from water overflowing from the drain pan and entering the base of the units.

Disconnect Switch

This accessory can be utilized as a convenient way to stock standard product without a disconnect and have the ability to use the through the base/disconnect offering. The standard disconnect is non-fused, 3-pole, case molded switch.

[1] Refer to "Model Number Description," p. 15 for option availability.

Foundation 15-25 Ton Cooling & Gas Features and Benefits

Economizer - Downflow

Economizers are equipped with either dry bulb, reference, or comparative enthalpy sensing. These economizers provide free cooling as the outdoor temperature and/or humidity decreases. Correctly installed, they offer valuable energy savings. Factory-installed economizers save time and ensure proper installation.

Note: *Factory-installed economizers require some field set-up.*

Electric Heaters

Electric heat modules are available within the basic unit. If ordering the Through the Base Electrical option with an Electrical Heater, the heater must be factory installed.

Low Leak Economizer with Fault Detection and Diagnostics - Downflow

This economizer meets the damper leakage requirements for ASHRAE 90.1, IECC, and California Title 24 standards (3 cfm/ft^2 at 1.0 in. w.g. for outside air dampers and 4 cfm/ft^2 for return dampers). Also, included as required per California Title 24:

- Fault Detection and Diagnostics system - provides detection of economizer faults. Barometric relief must be field installed with this option.
- Occupant Controlled Smart Thermostat (OCST) Connection - user-provided thermostat allows remote monitoring of economizer faults, and also provides the capability to receive load shedding commands from the utility company.

Manual Outside Air Damper

A 0–25 percent manual air damper is available.

Motorized Outside Air Damper

A 0–50 percent motorized outside air dampers is available.

Oversized Motors

Factory or field installed oversized motors are available for high static applications.

Note: *Field installed oversized motor is not available with multispeed option.*

Note: *10 hp oversized motor is factory installed only.*

Reference or Comparative Enthalpy

Measures and communicates humidity while maximizing comfort control.

Through-the-Base Electrical Utility Access

An electrical service entrance shall be provided allowing access for both control and main power connections inside the curb and through the base of the unit. This option will allow for field installation of liquid-tight conduit and an external field installed disconnect switch.

Factory provided through the base openings simplify wiring and piping. Because these utility openings frequently minimize the number of roof penetrations, the integrity of roofing materials is enhanced.

Through-the-Base Gas Piping (Gas Heat Units Only)

This option shall have all piping necessary including, black steel, manual gas shut-off valve, elbows, and union. This assembly will require minor field labor to install.

Field Installed Options

CO_2 Sensor - Demand Control Ventilation (DCV)

Demand-controlled ventilation (DCV) is a control strategy that responds to the actual demand (need) for ventilation by regulating the rate at which the HVAC system brings outdoor air into the

Foundation 15-25 Ton Cooling & Gas Features and Benefits

building. A CO_2 sensor measures the concentration (parts per million, ppm) of CO_2 in the air. As the CO_2 concentration changes, the outside air damper modulates to meet the current ventilation needs of the zone. DCV is a passive system; direct control of the indoor fan is not possible with standard or low leak economizers. The CO_2 sensor kit is available as a field installed accessory.

Crankcase Heaters (25 Tons)

These band heaters provide improved compressor reliability by warming the oil to prevent migration during off-cycles or low ambient conditions.

Economizer - Horizontal

Economizers are equipped with either dry bulb or reference or comparative enthalpy sensing. These economizers provide free cooling as the outdoor temperature and/or humidity decreases. Correctly installed, they offer a valuable energy savings.

High Altitude Kit

Requirement for units applies above 2000 feet. Derate gas orifices by 10%.

Low Leak Economizer with Fault Detection and Diagnostics - Horizontal

This economizer meets the damper leakage requirements for ASHRAE 90.1, IECC, and California Title 24 standards (3 cfm/ft^2 at 1.0 in. w.g. for outside air dampers and 4 cfm/ft^2 for return dampers). Also, included as required per California Title 24:

- Fault Detection and Diagnostics system - provides detection of economizer faults. Barometric relief must be field installed with this option.
- Occupant Controlled Smart Thermostat (OCST) Connection - user-provided thermostat allows remote monitoring of economizer faults, and also provides the capability to receive load shedding commands from the utility company.

LP Conversion Kit

Provided for field conversion of gas heat units from natural gas to propane.

Power Exhaust

This option is available on downflow units and provides exhaust of the return air, when using a downflow economizer, to maintain proper building pressurization. This is an excellent option for relieving most building overpressurization problems.

Remote Potentiometer

When installed in the economizer control circuitry, this accessory provides a method to remotely adjust the minimum damper position.

Roof Curbs

Available for downflow units. Only one roof curb for the entire Foundation™ line simplifies curb selection.

Static Drive Accessories

Available on many models, this high and low static drive accessories extend the capability of the standard motor. Avoid expensive motors by installing this optimized sheave accessory.

Thermostats

Available in programmable and non-programmable.

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Foundation 15-25 Ton Cooling & Gas Features and Benefits

Tool-less Hail Guards

Tool-less, hail protection quality coil guards (pictured right) shall be field-installed for condenser coil protection. This option protects the condenser coil from vandalism and/or hail damage.

Other Benefits

Cabinet Integrity

For added water integrity, Foundation has a raised 1-1/8 inch lip around the supply and return of the downflow units to prevent water from blowing into the ductwork.

Easy to Install, Service and Maintain

Because today's owners are very cost-conscious when it comes to service and maintenance, Foundation was designed with direct input from service contractors. This valuable information helped to design a product that would get the service technician off the job quicker and save the owner money. Foundation does this by offering outstanding standard features enhanced by a variety of factory and field installed options, multiple control options, rigorously tested proven designs and superior product and technical support.

Outstanding Flexibility

The Foundation unit has the ability to adapt to specific Carrier WeatherMaker™ models without costly adapter curbs. This will save contractors money and make the installation an ease.

Rigorous Testing

All of Foundation's designs were rigorously rain tested at the factory to ensure water integrity. Foundation units incorporate either a one piece top or the American Standard-Tite-Top (T3). Each part of the top overlaps in such a way that water cannot leak into the unit. These overlapped edges are gasketed and sealed to ensure superior water integrity.

Actual shipping tests were performed to determine packaging requirements. Units were test shipped around the country to determine the best packaging. Factory shake and drop tests were used as part of the package design process to help assure that the unit arrives at the job site in top condition.

Rigging tests include lifting a unit into the air and letting it drop one foot, assuring that the lifting lugs and rails hold up under stress. For the microchannel coils, the supplier will perform the leak check at 450 psig. The completely assembled refrigerant system is leak tested at a minimum of 225 psig with a refrigerant and nitrogen mixture.

All parts are inspected at the point of final assembly. Sub-standard parts are identified and rejected immediately. Every unit receives a 100% unit run test before leaving the production line to make sure it lives up to rigorous American Standard requirements.

Unmatched Support

American Standard Sales Representatives are a Support Group that can assist you with:

- Product
- Application
- Service
- Training
- Special Applications
- Specifications
- Computer Programs and much more

Foundation 15-25 Ton Cooling & Gas Application Considerations

Application of this product should be within the cataloged airflow and cooling considerations.

Barometric Relief

This product line offers an optional barometric relief damper for use in conjunction with economizer option. This accessory consists of gravity dampers which open with increased pressure. As building pressure increases, the pressure in the unit return air section also increases, opening the dampers and relieving the conditioned space.

Notes:

- *The effectiveness of barometric relief damper during economizing operation is system related.*
- *Pressure drop of the return air system should be considered to control building pressurization.*

Clearance Requirements

The recommended clearances identified with unit dimensions should be maintained to ensure adequate serviceability, maximum capacity and peak operating efficiency. Actual clearances which appear inadequate should be reviewed with local American Standard sales personnel.

Complete Coat™ Microchannel Condenser Coil

The cathodic epoxy type electrodisposition coating is formulated for high edge build to a number of different types of heat exchangers. The coating is selected to provide excellent resistance and durability to corrosive effects of alkalies, acids, alcohols, petroleum, seawater, salt air, and corrosive environments. This coating shall be available on microchannel condenser coils.

Condensate Trap

The evaporator is a draw-through configuration. A trap must be field provided prior to start-up on the cooling cycle.

Heating Operation

The heat exchanger is manufactured with aluminized steel. To prevent condensation within the heat exchanger, do not exceed 50 percent outside air or a minimum mixed air temperature of 40°F.

Optional Stainless Steel Heat Exchanger

The optional stainless steel heat exchanger is manufactured with 304 stainless steel tubes and 439 stainless steel burners. To prevent corrosion and prolong heat exchanger reliability, the minimum mixed air temperature allowed across the heat exchanger is 40°F. Whenever high outside air or outside applications exist, this option should be utilized.

Low Ambient Cooling

The Foundation line features low ambient cooling down to 45°F. The following options need to be included/considered when low ambient applications are required: continuous fan operation, crankcase heaters, frostat. Contact your local American Standard Representative for more assistance with low ambient cooling applications.

Unit Pitch

These units have sloped condensate drain pans. Units must be installed level. Any unit slope must be toward access side of the unit.

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Foundation 15-25 Ton Cooling & Gas Selection Procedure

Cooling Capacity

Note: *Cooling Capacity Procedure is the same for cooling (E) and gas/electric (G).*

Step 1.

Calculate the building's total and sensible cooling loads at design conditions. Use the following calculation methods or any other standard accepted method. Factors used in unit selection:

Total Cooling Load: 180 MBh
Sensible Cooling Load: 126 MBh
Airflow: 6000 cfm
Electrical Characteristics: 460/60/3
Summer Design Conditions: Entering Evaporator Coil: 80 DB, 67 WB Outdoor Ambient: 95 DB
External Static Pressure: 0.38 in. wg
Rooftop—downflow configuration
Accessories

- Roof curb
- Economizer
- Electric Heat

Step 2.

As a starting point, a rough determination must be made of the size of the unit. The final selection will be made after examining the performance at the given conditions. Divide the total cooling load by nominal Btu/h per ton (12 MBh per ton); then round up to the nearest unit size.

180 MBh / 12 MBh = 15.0 tons

Step 3.

Table 3, p. 18 shows that a EBC180A4 has a **gross** cooling capacity of 187.2 MBh and 143 MBh sensible capacity at 6000 cfm and 95 DB outdoor ambient with 80 DB, 67 WB air entering the evaporator.

To Find Capacity at Intermediate Conditions Not in the Table.

When the design conditions are between values that are identified in the capacity table, interpolation is required to approximate the capacity.

Note: *Extrapolation outside of the table conditions is not recommended.*

Step 4.

In order to select the correct unit which meets the building's requirements, the fan motor heat must be deducted from the gross cooling capacity. The amount of heat that the fan motor generates is dependent on the effort by the motor—cfm and static pressure. To determine the total unit static pressure you add the external static pressure to the additional static related by the added features:

External Static Duct System	0.38 wg
Standard Filter 2 in. from Table 31, p. 43	0.05 wg
Economizer from Table 31, p. 43 (100% Return Air)	0.04 wg
Electric Heater Size 36 kW from Table 31, p. 43	0.07 wg
(Reference "Heating Capacity," p. 14 for determination of heater size.) No additional static add for gas/heat exchanger.	
Total Static Pressure	0.55 wg

Note: *The Evaporator Fan Performance Table 9, p. 24 has already accounted for the pressure drop for standard filters and wet coils (see note below Table 9). Therefore, the actual total static pressure is 0.55 - 0.05 (from Table 31, p. 43 = 0.50 wg).*

Foundation 15-25 Ton Cooling & Gas Selection Procedure

With 6000 cfm and 0.50 wg.
Table 9, p. 24 shows 1.37 bhp for this unit. Note below the table gives a formula to calculate Fan Motor Heat,
3.15 x bhp = MBh.
3.15 x 1.37 = 4.32 MBh.

Now subtract the fan motor heat from the gross cooling capacity of the unit:
Net Total Cooling Capacity
= 187.2 MBh - 4.32= 182.88 MBh.

Net Sensible Cooling Capacity
= 143 MBh - 4.32 = 138.68 MBh.

Step 5.

If the performance will not meet the required load of the building—total or sensible cooling load, try a selection at the next higher size unit.

Heating Capacity

Note: *Heating capacity procedures DIFFER for cooling (E) and gas/electric (G) units.*

Step 1.

Calculate the building heating load.

Step 2.

Size the system heating capacity to match the calculated building heating load. The following are building heating requirements:

460 volt/3 phase Power Supply
Total heating load of 115.0 MBh
6000 cfm

The electric heat accessory capacities are listed in Table 33, p. 44. From the table, a 36 kW heater will deliver 122.94 MBh at 480 volts. In order to determine capacity at 460 volts, the heater voltage correction factor from Table 34, p. 44 must be used. Therefore, 122.94 MBh x 0.94 (voltage correction factor) = 115.6 MBh.

Gas/electric: Fuel natural gas total heating load of 195 MBh. Table Table 32, p. 43 shows 250 MBh and 350 MBh input models. The output capacities of these furnaces are 203 MBh and 284 MBh respectively. The low heat model with 203 MBh output best matches the building requirements.

Air Delivery Selection

Note: *Air Delivery procedures is the same for cooling (E) and gas/electric (G) units.*

External static pressure drop through the air distribution system has been calculated to be 0.50 inches of water. From Table 31, p. 43 static pressure drop through the economizer is 0.04 and the 36 kW heater is 0.07 inches of water (0.38 + 0.04 + 0.07). Enter Table 9, p. 24 for a EBC180A4 at 6000 cfm and 0.50 static pressure. The standard motor with the low static drive accessory at 622 rpm will give the desired airflow at a rated bhp of 1.37.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Foundation 15-25 Ton Cooling & Gas Model Number Description

Digit 1 — Unit Type

E = Packaged Cooling, Electric Heat
G = Packaged Gas/Electric

Digit 2 — Efficiency

B = ASHRAE 90.1 - 2013

Digit 3 — Airflow Configuration

C = Convertible

Digit 4, 5, 6 — Nominal Gross Cooling Capacity (MBh)

180 = 15 Tons
210 = 17½ Tons
240 = 20 Tons
300 = 25 Tons

Digit 7 — Major Design Sequence

A

Digit 8 — Voltage Selection

3 = 208-230/60/3
4 = 460/60/3
W = 575/60/3
K = 380/60/3[6, 7]

Digit 9 — Unit Controls

E = Electromechanical

Digit 10 — Heating Capacity

Note: *(Applicable to Digit 1 = E models only)*

0 = No Heat
G = 18 kW Electric Heat
N = 36 kW Electric Heat
P = 54 kW Electric Heat
R = 72 kW Electric Heat

Note: *(Applicable to Digit 1 = G models only)*

H = Gas Heat - High
L = Gas Heat - Low
M = Gas Heat - Medium
X = Gas Heat - SS Ht Ex - Low
Y = Gas Heat - SS Ht Ex - Medium
Z = Gas Heat - SS Ht Ex - High

Digit 11 — Minor Design Sequence

Digit 12, 13 — Service Sequence

00 = None

Digit 14 — Fresh Air Selection[3]

0 = No Fresh Air
A = Manual Outside Air Damper 0-25%
B = Motorized Outside Air Damper 0-50%
C = Economizer, Dry Bulb 0-100% without Barometric Relief[4]
D = Economizer, Dry Bulb 0-100% with Barometric Relief[1, 4]
E = Economizer, Reference Enthalpy 0-100% without Barometric Relief[4]
F = Economizer, Reference Enthalpy 0-100% with Barometric Relief[1, 4]
G = Economizer, Comparative Enthalpy 0-100% without Barometric Relief[4]
H = Economizer, Comparative Enthalpy 0-100% with Barometric Relief[1, 4]
J = Downflow Low Leak Economizer, Dry Bulb w/o Barometric Relief[4]
L = Downflow Low Leak Economizer, Reference Enthalpy w/o Barometric Relief[4]
N = Downflow Low Leak Economizer, Comparative Enthalpy w/o Barometric Relief[4]

Digit 15 — Supply Fan/Drive Type/Motor

0 = Standard Motor
1 = Oversized Motor[8]
7 = Multi-Speed Standard Motor
9 = Multi-Speed Oversized Motor

Digit 16 — Access

0 = Standard Fork Access
F = Third Side Condenser Fork Access (15-25 Ton)

Digit 17 — Condenser Coil Protection

0 = Standard Coil
4 = CompleteCoat™ Condenser Coil

Digit 18 — Through The Base Provisions

Note: *Applicable to Digit 1, E models.*

0 = No Through The Base Provisions
A = Through The Base Electric

Note: *Applicable to Digit 1, G models only.*

0 = No Through The Base Provisions
A = Through The Base Electric
B = Through-the-Base Gas[1]
C = Through-the-Base Electric/Gas

Digit 19 — Disconnect Switch

0 = No Disconnect
1 = Unit Mounted Non-Fused Disconnect Switch[2]

Digit 20— Not Used

Digit 21— Not Used

Digit 22— Not Used

Digit 23— Not Used

Digit 24— Not Used

Digit 25 - System Monitoring Controls

0 = No Monitoring Controls
A = Condensate Drain Pan Overflow Switch

Digit 26

B = Economizer Fault Detection and Diagnostics (FDD)[5]

Model Number Notes

1. Some field set up required.
2. Must be ordered with Through-the-Base Electrical option.
3. All Factory Installed Options are Built-to-Order. Check order services for estimated production cycle.
4. Factory installed economizers only available in downflow configuration.
5. Fault Detection and Diagnostics (FDD) is available on Low Leak Economizers only.
6. Available on Digit 1 = E units only.
7. Unit will operate reliably at 400V.
8. 10 hp oversized motor is factory installed only.

For complete equipment / combination selections, installation instructions and warranty information, please refer to Product Data/Ratings and/or Installers Guides and Limited Warranty Handbooks.

Effective 1/1/22
14-1011-39

Foundation 15-25 Ton Cooling & Gas General Data

Table 1. General data — 15-25 tons

	15 Ton	17½ Ton	20 Ton	25 Ton	
	E/GBC180	E/GBC210	E/GBC240	EBC300	GBC300
Cooling Performance[a]					
Gross Cooling Capacity	180,000	212,000	256,000	284,000	284,000
EER (Downflow/Horizontal)	11	11	10	10	9.8
Nominal Airflow CFM / AHRI Rated CFM	6000 / 4800	7000 / 6650	8000 / 7000	10,000 / 8000	10,000 / 8000
AHRI Net Cooling Capacity	176,000	206,000	244,000	268,000	268,000
Integrated Energy Efficiency Ratio (IEER) (One Speed Fan / Multi Speed Fan)	12.4 / 13.2	12.4 / 13.2	11.6 / 12.4	11.6 / 12.4	11.4 / 12.4
Percent Capacity @ part load (Stage 1/Stage 2)	53 / 100	50 / 100	54 / 100	53 / 100	53 / 100
System Power (kW)	16.00	18.73	24.4	26.8	27.35
Compressor					
Number/Type	2 / Scrolls	2 / Scrolls	2 / Scrolls	2 / Scrolls	2 / Scrolls
Sound					
Outdoor Sound Rating (BELS)	9.5	9.5	9.5	9.5	9.5
Outdoor Coil					
Type	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel
Coil Width (in.)	0.71	1.0	1.0	1.0	1.0
Face Area (sq. ft.)	34.74	34.74	34.74	34.74	34.74
Rows/FPI	1 / 23	1 / 21	1 / 23	1 / 23	1 / 23
Indoor Coil					
Type	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel
Tube Size (in.) ID	1	1	1	1	1
Face Area (sq. ft.)	26.00	26.00	26.00	26.00	26.00
Rows/FPI	2 / 18	2 / 18	2 / 18	4 / 15	4 / 15
Refrigerant Control	TXV	TXV	TXV	TXV	TXV
Drain Connection Number/Size (in.)	1 / 1.00 PVC Pipe Female	1 / 1.00 PVC Pipe Female	1 / 1.00 PVC Pipe Female	1 / 1.00 PVC Pipe Female	1 / 1.00 PVC Pipe Female
Outdoor Fan					
Type	Propeller	Propeller	Propeller	Propeller	Propeller
Number Used/Diameter (in.)	2 / 28	2 / 28	2 / 28	2 / 28	2 / 28
Drive Type/No. Speeds	Direct / 1	Direct / 1	Direct / 1	Direct / 1	Direct / 1
cfm	15,900	15,900	15,900	15,900	15,900
Number Motors/hp	2 / 1.0	2 / 1.0	2 / 1.0	2 / 1.0	2 / 1.0
Motor rpm	1125	1125	1125	1125	1125
Indoor Fan					
Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)	2 / 15x15	2 / 15x15	2 / 15x15	2 / 15x15	2 / 15x15
Drive Type/No. Speeds	Belt / 1	Belt / 1	Belt / 1	Belt / 1	Belt / 1
Number Motors	1	1	1	1	1
Motor hp (Standard/Oversized)	3.0[b] / 5.0	5.0 / 7.5	5.0 / 7.5	7.5 / 10.0[c]	7.5 / 10.0[c]
Motor rpm (Standard/Oversized)	1750 (380V = 3450)/ 3450	3450 / 3450 (380V = 3470)	3450 / 3450 (380V = 3470)	3450 (380V = 3470) / 1750	3450 (380V = 3470) / 1750
Motor Frame Size (Standard/Oversized)	145T / 145T	145T / 184T	145T / 184T	184T / 215T	184T / 215T

Foundation 15-25 Ton Cooling & Gas General Data

Table 1. General data — 15-25 tons (continued)

	15 Ton	17½ Ton	20 Ton	25 Ton	
	E/GBC180	E/GBC210	E/GBC240	EBC300	GBC300
Filters					
Type Furnished[d]	Throwaway	Throwaway	Throwaway	Throwaway	Throwaway
Number Size Recommended	(8) 20x25x2	(8) 20x25x2	(8) 20x25x2	(8) 20x25x2	(8) 20x25x2
Refrigerant Charge (Pounds of R-410A)[e]					
Circuit 1	14.6	15.2	16.5	17.8	17.8

(a) Units are AHRI Certified to AHRI Standard 340-360 (I-P). Rating conditions are 95F outdoor air temperature, 80F entering dry bulb, 67F entering wet bulb with minimum external static pressure as determined by rating standard.
(b) 3.0hp motor is not available on 380V units.
(c) 10.0hp oversized motor is not available on 380V units.
(d) Optional field-installed MERV 13 filters available.
(e) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

Table 2. General data—heating performance – 15-25 tons

	Heating Performance[a]					
	15 Tons			17½ - 25 Tons		
Heating Models	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
Heating Input (Btu/h)	240,000	320,000	350,000	240,000	320,000	400,000
1st Stage (Btu)	168,000	224,000	245,000	168,000	224,000	280,000
Heating Output (Btu/h)	192,000	256,000	280,000	192,000	256,000	320,000
1st Stage (Btu)	134,500	179,200	196,000	134,500	179,200	224,000
Steady State Efficiency%	80%	80%	80%	80%	80%	80%
No. Burners	6	8	8	6	8	8
No. Stages	2	2	2	2	2	2
Gas Supply Line Pressure (in. wc)						
Natural Gas (minimum/maximum)	4.5 / 14.0 in. wc.	4.5 / 14.0 in. wc.	5.0 / 14.0 in. wc.	4.5 / 14.0 in. wc.	4.5 / 14.0 in. wc.	5.5 / 14.0 in. wc.
LP (minimum/maximum)	11.0/14.0 in. wc.	11.0/14.0 in. wc.	11.0/14.0 in. wc.	11.0/14.0 in. wc.	11.0/14.0 in. wc.	11.0/14.0 in. wc.
Gas Connection Pipe Size (in.)	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"

(a) Heating Performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards (ANSI). Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level.

BUILT TO A HIGHER STANDARD™

American Standard®

HEATING & AIR CONDITIONING

Light Commercial Odyssey Split Systems

Split System Cooling

Split System Heat Pumps

For complete equipment / combination selections, installation instructions and warranty information, please refer to Product Data/Ratings and/or Installers Guides and Limited Warranty Handbooks.

Effective 1/1/22
14-1011-39

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Systems Features and Benefits

Unlike typical split systems on the market, Odyssey offers easy servicing, built-in reliability, ease of installation and outstanding customer service. And because today's owners are very cost-conscious when it comes to service and maintenance, the Odyssey Split System was designed with direct input from service contractors. This valuable information helped to design a product that would get the service person off the job quicker and save the owner money.

Flexible Applications

Odyssey offers outstanding standard features enhanced by a variety of factory and field installed options, multiple control options, rigorously tested proven designs and superior product and technical support. Because of this, Odyssey offers ultimate flexibility. Units are built to order in our standard "shortest in the industry" ship cycle time. Odyssey is available with single, dual and manifolded compressor options. Single compressor outdoor units feature a single refrigeration circuitry, lowering job installation costs by requiring only one set of refrigerant lines.

Equally important, Odyssey offers single refrigerant circuit/capacity unloading models. The unloading units feature dual manifolded scroll compressors with two stages of capacity modulation and a single refrigeration circuit. Dual compressor/dual circuit models give true stand-by protection - if one compressor fails, the second will automatically start-up. Also, the first compressor can be serviced without shutting down the unit since the refrigerant circuits are independent. Dual compressor models also save on energy costs. During light load conditions, only one compressor will operate to save energy.

On select air handlers, a factory installed variable frequency drive (VFD) is available. These 2–Speed and Single Zone VAV (SZVAV) solutions, combined with condensing units that have multiple compressors, provide increased part load performance (IEER) when conditions are not at the max design condition. Additionally, some states have adopted codes that require this type of performance. Odyssey units are built with installation in mind. With a smaller footprint, the outdoor unit takes up less space and weighs less, making its installation more efficient and economical. Our indoor air handlers are built to be installed in confined spaces, fitting through standard doorways and freight elevators.

Unmatched Product Support

One of our finest assets, American Standard Sales Representatives are a support group that can assist you with:

- Product
- Application
- Service
- Training
- Special Applications
- Specifications
- Computer Programs and much more

Rigorous Testing

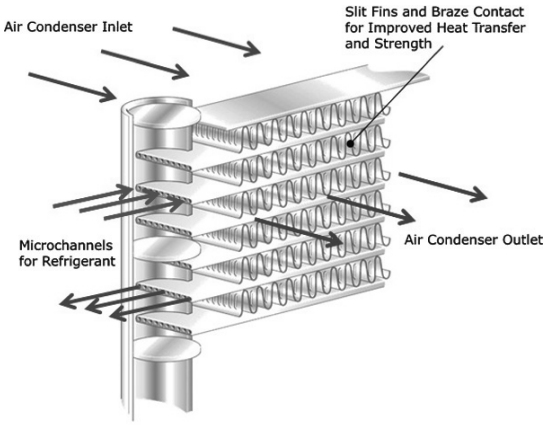
Our units are rigorously rain tested to ensure water integrity. Actual shipping tests are performed to determine packaging requirements. Units are test shipped around the country to determine the best packaging. Factory shake and drop tests are used as part of the package design process to help assure that the unit arrives at the job site in top condition. Rigging tests include lifting a unit into the air and letting it drop one foot, assuring that the lifting lugs and rails hold up under stress. A 100% coil leak test is performed at the factory. The condenser coils are leak tested at 660 psig and evaporators to 450 psig. All parts are inspected at the point of final assembly. Sub-standard parts are identified and rejected immediately. Every unit receives a 100% unit run test before leaving the production line to ensure it lives up to rigorous American Standard requirements.

Odyssey Split Systems Features and Benefits

Microchannel Condenser Coil

Microchannel condensing coils are all-aluminum coils with fully-brazed construction. This design reduces risk of leaks and provides increased coil rigidity — making them more rugged on the jobsite. Their flat streamlined tubes with small ports and metallurgical tube-to-fin bond allow for exceptional heat transfer. Microchannel all-aluminum construction provides several additional benefits:

- Light weight (simplifies coil handling)
- Easy to recycle
- Minimize galvanic corrosion



Standard and Optional Features

Figure 1. Compressors

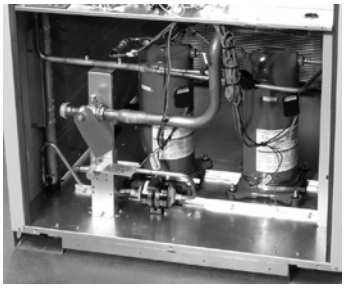
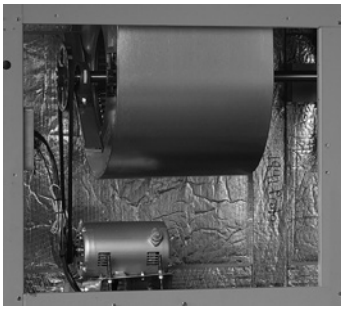


Figure 2. Belt drive motor



2-Speed VFD — A variable frequency drive is used to reduce the supply fan motor speed to 66% of its full capacity during part load cooling conditions.

Airflow Distribution — Odyssey can replace an older machine with old ductwork and, in many cases, improve the comfort through better air distribution.

Anti-Short Cycle Timing — The Symbio™ 700 controller provides a 3 minute minimum "ON" time and 3 minute "OFF" time for compressors to enhance compressor reliability by assuring proper oil return.

Belt Drive Motors — For additional static requirements, Odyssey Split Systems offer standard belt drive motors to meet and exceed a wide range of airflow needs.

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Systems Features and Benefits

Colored Connectors and Wiring — Interconnecting wiring between components is standardized using colored and keyed connectors and colored wires, helping to save time and money tracing wires and diagnosing the unit.

Compressors — Odyssey Split Systems contain the best compressor technology available to achieve the highest possible performance. Dual compressors perform very well under part load cooling conditions and system back- up applications. Dual compressors are available on 6-25 ton models and allow for efficient cooling utilizing 2-stages of compressor operation.

Complete Coat™ Microchannel Condenser Coil — This cathodic, epoxy-type electro-disposition coating is formulated for high edge builds and provides excellent resistance and durability in potentially corrosive environments due to alkalies, acids, alcohols, petroleum, seawater, salty air, etc. Available for Microchannel units only.

Convertible Units — The air handlers ship in a horizontal configuration. They can be easily converted to vertical by simply repositioning the drain pan.

Crankcase Heaters — These band heaters provide improved compressor reliability by warming the oil to prevent migration during off-cycles or low ambient conditions.

Dual Sloped Drain Pans— Every Odyssey unit has a non-corrosive, removable, double sloped drain pan that's easy to clean and reversible to allow installation of drain trap in two positions on either side of the unit.

Duct flanges — An optional field installed kit that can save time and money.

Easy Access Low Voltage Connections — Thermostat and other low voltage control wiring connections are made directly to the Symbio 700 and other boards in the system. Screw-type pressure connectors are detachable from the boards for easy connection of control wires – saving cost and time.

Electric Heaters — Electric heat modules are available in a variety of voltages and capacities.

Foil Faced Insulation — All internal air handler surfaces have cleanable foil-faced insulation. All edges are either captured or sealed to ensure insulation fibers do not get into the airstream.

Hail/Vandal Guards — These coil guards shall be either factory or field installed for condenser coil protection. This feature protects the condenser coil from vandalism and/or hail damage. When ordered factory installed, it also adds additional shipping protection.

High Static Motor — Available on many models, this high static motor accessory extends the capability of the standard unit.

High and Low Voltage Control Panel — High voltage components and connections are isolated from low voltage and covered with a sheet metal panel. This allows setup and test parameters at the Symbio™ 700 display and the VFD keypad display to be safely viewed and adjusted in the low voltage section of the control panel.

High Pressure Control — All units include High Pressure Control as standard.

Low Ambient Cooling — All Odyssey units have cooling capabilities down to 0°F as standard. At temperatures below 50°F, some reduction in cooling capacity can be expected. When the optional Low Ambient Accessory kit is field installed, the full capacity of the unit is available down to 0°F.

Low Voltage Connections — Low voltage wiring connects directly to the control boards in the unit via detachable connectors. This makes it easy for the installer to attach the wires and then snap the connectors into place.

Phase Monitor/Reversal Protection — Phase monitor shall provide 100% protection for motors and compressors against problems caused by phase loss, phase imbalance, and phase reversal. Phase monitors are equipped with an LED that provides an ON or FAULT indicator.

Quick-Access Panels — Remove a few screws for access to the standardized internal components and wiring.

Single Point Power — A single electrical connection powers the unit.

Single Side Service — Single side service is standard on all units.

Single Zone Variable Air Volume (SZVAV) — A variable frequency drive is used in conjunction with the Symbio™ 700 to provide supply fan motor speed modulation. For SZVAV control, the drive will accelerate or decelerate as required to meet the Zone Cooling demand. In order to

Odyssey Split Systems Features and Benefits

maximize energy savings, the VFD will be held at minimum speed until the load in the zone requires the speed to increase. The supply fan speed will be reduced to a minimum of 58%[1] during ventilation and part load cooling demands, and 80% during full load cooling demands with the ability to fully modulate. The commissioning maximum and minimum airflow points can be easily set by programming these parameters at the display on the Symbio control board.

Standardized Components — Components are placed in the same location on all Odyssey units. Because of these standardized components throughout the Odyssey line, contractors/ owners can stock fewer parts.

Symbio™ 700 — Standard on Odyssey condensers, the Symbio™ 700 controller provides exceptional machine control with a focus on system reliability and application flexibility. The Symbio controller provides direct access to the Symbio Service and Installation mobile application for easy setup and troubleshooting with no special tools. A wide range of system integration options (Non-communicating, BACnet®, LonTalk®, etc.) provide options to meet the needs of your application.

Thermal Expansion Valve with Bypass Check Valves — This feature is standard on all indoor units.

Unit Cabinet — The compact cabinet takes up less room and is less costly to ship. The design also ensures water integrity.

[1] *64% for part load and 83% for full load if a max speed of less than 44.5 Hz is desired.*

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Systems Features and Benefits

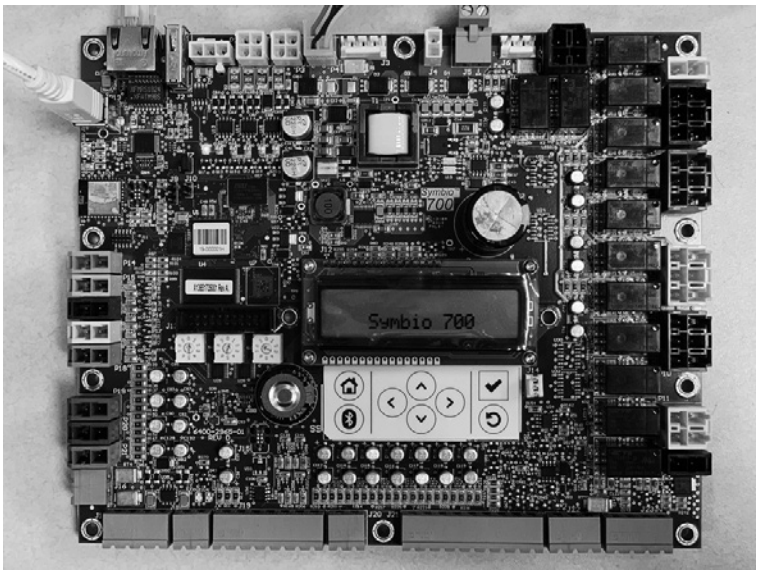
	Standard Features	Options[a]	
		Factory Installed	Field Installed
1-year Limited Parts Warranty	X		
5-year Limited Compressor Warranty	X		
2–Speed Variable Frequency Drive		X	
Belt Drive Motors	X		
Colored Connectors and Wiring	X		
Complete Coat™ Microchannel Condenser Coil		X	
Compressor Discharge Temperature Limit (DTL)	X		
Convertible Airflow	X		
Crankcase Heaters	X		
Easy Access Low Voltage Connections	X		
Electric Heaters			X
Filters	X		
Filters – 2″ MERV 13			X
Foil-Faced and Edge Captured Insulation	X		
Hail/Vandal Guards		X	X
High Pressure Control	X		
High Static Motor Kit[b]			X
Hot Gas Bypass			X
IAQ Dual Sloped and Removable Drain Pans	X		
Low Ambient Cooling			X
Liquid Line Refrigerant Drier	X		
Low Pressure Control	X		
Low Static Motor Kit[b]			X
Low Voltage Circuit Protection	X		
Phase Loss/Reversal Monitor	X		
Quick Access Panels	X		
Scroll Compressors	X		
Single Point Power	X		
Single Side Service	X		
Single Zone Variable Air Volume (SZVAV / 2–Speed Fan)		X	
Standardized Components	X		
Symbio™ Controls	X		
Thermal Expansion Valve	X		
Vibration Isolators			X

[a] Refer to model number description for option availability or contact Product Support.
[b] Available on constant volume units only. See Accessories chapter for more information.

Odyssey Split Systems Features and Benefits

Symbio™ 700 Controls

Figure 3. Symbio 700 board



Symbio 700 controls provide unit control for heating, cooling, and ventilating, utilizing input from sensors that measure outdoor and indoor temperature. Symbio also provides outputs for building automation systems and expanded diagnostics. Quality and reliability are enhanced through Symbio control and logic:

- Prevents the unit from short cycling, considerably improving compressor life.
- Ensures the compressor will run for a specific amount of time which allows oil to return for better lubrication, enhancing the reliability of the compressor.
- Reduces the number of components required to operate the unit, reducing possibilities for component failure.

Installation and Service

The Symbio™ 700 control platform provides a user-friendly, onboard interface that makes setup and continued operation easy – or users can take advantage of the Symbio™ Service and Installation Mobile App for setup, troubleshooting, and operation. Both the Symbio onboard user interface and mobile app simplify troubleshooting by displaying active alarms. Symbio eliminates the need for field-installed, anti-short cycle timer and time delay relays. The wiring of the low voltage connections to the unit and zone sensors is simple, making installation easy.

Testing

Symbio™ 700 requires no special tools to run the unit through its paces. Simply navigate to the 'Service' section of the user interface or the 'Utilities' section of the Symbio™ Service and Installation Mobile App and enter the test section. Here the unit can be placed in the desired operating condition for a pre-determined amount of time supporting troubleshooting efforts in the field. The Symbio 700 will return to normal control when the user exits test mode or when the pre-determined, user-selected Service Test time has expired.

Other Benefits

- Symbio™ 700 built-in anti-shortcycle timer, time delay relay and minimum "on" time control functions are factory tested to assure proper operation.
- Symbio 700 softens electrical "spikes" by staging on fans, compressors and heaters.
- Intelligent Fallback is a benefit to the building occupant. If a component goes astray, the unit will continue to operate at predetermined temperature setpoint.

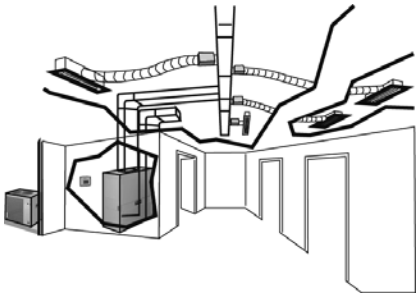
BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Systems Features and Benefits

- Intelligent Anticipation is a standard feature. It functions continuously as Symbio 700 and zone sensor(s) work together in harmony to provide much tighter comfort control than conventional electromechanical thermostats.
- The Symbio 700 design is standardized across the board, ensuring a lower cost to owners.

Additional Controls

VariTrac® Building Automation System — When American Standard's changeover VAV System for light commercial applications is coupled with the unit, it provides the latest in technological advances for comfort management systems and can allow thermostat control in every zone served by VariTrac.



Frostat™ — This control (a standard feature on all air handlers) utilizes a capillary bulb embedded in the face of the evaporator coil which monitors coil temperature to inhibit evaporator icing and protect the compressor. Useful for applications with low leaving air temperatures, low airflow and/or high latent load applications.

LonTalk® Communications Interface — The LonTalk communications interface allows the unit to communicate as a Tracer LON® device or directly with generic LonTalk Network Building Automation System Controls.

BACnet® Communication Interface (BCI) — The BACnet Communication Interface allows the unit to communicate directly with a generic open protocol BACnet MS/TP or IP Network Building Automation Control System.

Zone Sensors/Thermostats— Available in programmable, automatic and manual styles.

Table 2. Odyssey control options – standard and optional

	Standard Features	Options[a]	
		Factory Installed	Field Installed
BACnet® Communication Interface (BCI)		X	
Froststat™ - Evaporator Defrost Control (EDC)	X		
LonTalk® Communications Interface (LCI)		X	
Symbio™ 700 Microprocessor Controls	X		
Thermostat			X
Zone Sensor			X

[a] Refer to model number description for option availability or contact Product Support.

Odyssey Split Systems Accessories

Cooling Condenser

Table 3. TTA Accessories

Model	Used With
Coil (Hail/Vandal) Guard	
BAYGARD063*	TTA072, TTA090
BAYGARD064*	TTA120
BAYGARD065*	TTA150
BAYGARD066*	TTA180, TTA240
BAYGARD067*	TTA300
Universal Hot Gas Bypass Kit	
BAYHGBP010*	All models
Rubber Isolators	
BAYISLT004* (blue)	TTA072, TTA090
BAYISLT005* (black)	TTA120
BAYISLT009* (red)	TTA150, TTA180
BAYISLT010* (green)	TTA240, TTA300
Steel Spring Isolators	
BAYISLT023* (red)	TTA072, TTA090, TTA120**A
BAYISLT024* (black)	TTA120**C/D, TTA150, TTA180
BAYISLT025* (yellow)	TTA240, TTA300
Service Valve Kit	
BAYVALV001*	TTA0724*A, TTA0904*A, TTA1204*A/C
BAYVALV003*	TTA0724*D, TTA0904*D, TTA1204*D
BAYVALV004*	TTA1504*D
BAYVALV005*	TTA1804*D, TTA2404*D
BAYVALV007*	TTA1804*C, TTA2404*C
BAYVALV008*	TTA3004*C
Low Ambient — On/Off Fan Control[a] [b]	
BAYLOAMS10* (External Mount, small cabinets)[c]	(all voltages) TTA072, TTA090, TTA120, TTA150
BAYLOAMS20* (Internal mount, large cabinets)	(all voltages) TTA180, TTA240, TTA300
Transducer Kit for Head Pressure Control (BAYLOAMS10*)	
BAYLOTR001*[d]	TTA072**D, TTA090**D, TTA120**D, TTA150**D
LonTalk Communications Interface[e]	
BAYLTCI005*	All Models
Expansion Module Kit	
BAYMODU002* (XM30)	All Models
BAYMODU004* (XM32)	All Models

[a] Cycles fan on/off (no modulating).
[b] When BAYLOAM is used, the Evaporator Defrost Control (EDC) must be disabled in the Symbio 700 controller configuration.
[c] Kit mounts external to the outdoor unit and operates by sensing ambient temperature and discharge pressure.
[d] BAYLOTR001* required when BAYLOAMS10* kits are used with units that have 2 compressors (dual circuit) and 1 condenser fan.
[e] Field installed LonTalk interface requires installation of Symbio control board with Advanced Diagnostics (not included).

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Systems Accessories

Air Handler

Table 4. TWE Accessories

Model	Used With
Base (Subbase)	
BAYBASE009*	TWE060
BAYBASE0010*	TWE072, TWE090
BAYBASE0011*	TWE120
BAYBASE0012*	TWE150, TWE180
BAYBASE0013*	TWE240, TWE300
Drip Kit	
BAYDRKT006*	TWE060
BAYDRKT007*	TWE072, TWE090
BAYDRKT008*	TWE120
BAYDRKT009*	TWE150, TWE180
BAYDRKT010*	TWE240, TWE300
Duct Flange Kit	
BAYDUCT010*	TWE051, TWE060, TWE072, TWE076, TWE090, TWE101, TWE120
BAYDUCT020*	TWE126, TWE150, TWE156, TWE180, TWE201, TWE240, TWE251, TWE300
Filters – 2" MERV 13	
BAYFILT001*	TWE060
BAYFILT002*	TWE072, TWE090
BAYFILT003*	TWE120
BAYFILT004*	TWE150, TWE180
BAYFILT005*	TWE240, TWE300
High Static Motor Kits[(a)]	
BAYHSMT104* — 1.5HP (230/1) with Motor Sheave, Fan Sheave and Belt	TWE060*1A/B
BAYHSMT105* — 1.5HP (230-460/3) with Motor Sheave, Fan Sheave and Belt	TWE060*3A/B, TWE060*4A/B
BAYHSMT106* — 1.5HP (575/3) with Motor Sheave, Fan Sheave and Belt	TWE060*WA
BAYHSMT107* — 2 HP (230/1) with Motor Sheave, Fan Sheave and Belt	TWE090*1A/B
BAYHSMT108* — 2HP (230-460/3) with Motor Sheave, Fan Sheave and Belt	TWE072*3B, TWE090*3A/B
BAYHSMT109* — 2 HP (575/3) with Motor Sheave, Fan Sheave and Belt	TWE072*WB, TWE090*WA/B
BAYHSMT110* — 3HP (230/460/3) with Motor Sheave, Fan Sheave and Belt	TWE072*3B, TWE090*3A/B
BAYHSMT111* — 3 HP (575/3) with Motor Sheave, Fan Sheave and Belt	TWE072*WB, TWE090*WA/B
BAYHSMT112* — 3HP (230/460/3) with Motor Sheave, Fan Sheave and Belt	TWE120*3A/B
BAYHSMT113* — 3 HP (575/3) with Motor Sheave, Fan Sheave and Belt	TWE120*WA/B
BAYHSMT114* — 3HP (230/460/3) with Motor Sheave, Fan Sheave and Belt	TWE150*3B
BAYHSMT115* — 3 HP (575/3) with Motor Sheave, Fan Sheave and Belt	TWE150*WB
BAYHSMT116* — 5 HP (230/3) with Motor Sheave, Fan Sheave and Belt	TWE150*3B
BAYHSMT117* — 5HP (460/3) with Motor Sheave, Fan Sheave and Belt	TWE150*3B
BAYHSMT118* — 5 HP (575/3) with Motor Sheave, Fan Sheave and Belt	TWE150*WB
BAYHSMT119* — 5 HP (208-230/3) with Motor Sheave and Fan Sheave (Stock Belt used)	TWE180*3B
BAYHSMT120* — 5HP (460/380–415/3) with Motor Sheave and Fan Sheave (Stock Belt used)	TWE180*3B
BAYHSMT121* — 5 HP (575/3) with Motor Sheave and Fan Sheave (Stock Belt used)	TWE180*WB
BAYHSMT124* — 7.5 HP (230/3) with Motor Sheave, Fan Sheave and Belt	TWE240*3B
BAYHSMT126* — 7.5 HP (460/3) with Motor Sheave, Fan Sheave and Belt	TWE240*4B
BAYHSMT123* — 7.5 HP (575/3) with Motor Sheave, Fan Sheave and Belt	TWE240*WB

Odyssey Split Systems Accessories

Table 4. TWE Accessories (continued)

Model	Used With
Rubber Isolators[b] [c] [d]	
BAYISLT004* (Floor — Blue)	TWE060, TWE072, TWE090, TWE120
BAYISLT009* (Floor — Red)[e]	TWE150, TWE180
BAYISLT010* (Floor — Green)[e][b]	TWE240, TWE300
BAYISLT012* (Suspended —Red/Green)	TWE150, TWE180
BAYISLT013* (Suspended —Red/Green)[d]	TWE060
BAYISLT014* (Suspended — Green)[d]	TWE072, TWE090
BAYISLT015* (Suspended — Green/Black)[d]	TWE120
BAYISLT016* (Suspended —Red/Green)	TWE240 , TWE300
Steel Spring Isolators[c]	
BAYISLT019* (Floor — Red)[e][b]	TWE060, TWE072, TWE090, TWE120
BAYISLT021* (Floor — Black)[e][b]	TWE150, TWE180
BAYISLT032* (Floor — Black/Yellow)[e][b]	TWE240, TWE300
BAYISLT028* (Suspended — Tan)	TWE060
BAYISLT029* (Suspended — Red)	TWE072, TWE090, TWE120
BAYISLT030* (Suspended — Black)	TWE150, TWE180
BAYISLT031* (Suspended — Black/Yellow)	TWE240, TWE300
Low Static Drive Kit[a]	
BAYLSMT001*	TWE240*3, TWE240*4
Plenum[f]	
BAYPLNM015* (Discharge Plenum & Grille)[f]	TWE060
BAYPLNM016* (Discharge Plenum & Grille)[f]	TWE072, TWE090
BAYPLNM017* (Discharge Plenum & Grille)[f]	TWE120
BAYPLNM018* (Discharge Plenum/Hydronic Coil Plenum & Grille)[f]	TWE150, TWE180
BAYPLNM019* (Discharge Plenum/Hydronic Coil Plenum & Grille)[f]	TWE240, TWE300
BAYPLNM020* (Hydronic Coil Discharge Plenum & Grille)[f]	TWE060
BAYPLNM021* (Hydronic Coil Discharge Plenum & Grille)[f]	TWE072, TWE090
BAYPLNM022* (Hydronic Coil Discharge Plenum & Grille)[f]	TWE120
BAYPLNM030* (Electric Heat Discharge Plenum & Grille)[f]	TWE060
BAYPLNM031* (Electric Heat Discharge Plenum & Grille)[f]	TWE072, TWE090
BAYPLNM032* (Electric Heat Discharge Plenum & Grille)[f]	TWE120
BAYPLNM033* (Electric Heat Discharge Plenum & Grille)[f]	TWE150, TWE180
BAYPLNM034* (Electric Heat Discharge Plenum & Grille)[f]	TWE240, TWE300
Return Air Grille	
BAYGRLE001*	TWE060
BAYGRLE002*	TWE072, TWE090
BAYGRLE003*	TWE120
BAYGRLE004*	TWE150, TWE180
BAYGRLE005*	TWE240, TWE300
Symbio™ Options Module Kit	
BAYMODU001*	All TWE units with Digit 15 = 1 and Electric heater installed
Transformer	
BAYTFMR014* - 100 VA Transfomer (208-230V)	All TWE072 – TWE300, 208-230V units
BAYTFMR015* - 100 VA Transfomer (460V)	All TWE072 – TWE120, 460V units
BAYTFMR016* - 100 VA Transfomer (575V)	All TWE072 – TWE120, 460V units
BAYTFMR017* - 100 VA Transformer (400 V)	All TWE072 – TWE120 380V/60 Hz unit
Water Kits	
BAYWATR022* (Steam Coil Enclosure)[f]	TWE060
BAYWATR023* (Steam Coil Enclosure)[f]	TWE072, TWE090

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Systems Accessories

Table 4. TWE Accessories (continued)

Model	Used With
BAYWATR024* (Steam Coil Enclosure)(f)	TWE120
BAYWATR025* (Steam Coil Enclosure)(f)	TWE150, TWE180
BAYWATR026* (Steam Coil Enclosure)(f)	TWE240, TWE300
BAYWATR027* (Hot Water Coil Enclosure)(f)	TWE060
BAYWATR028* (Hot Water Coil Enclosure)(f)	TWE072, TWE090
BAYWATR029* (Hot Water Coil Enclosure)(f)	TWE120
BAYWATR030* (Hot Water Coil Enclosure)(f)	TWE150, TWE180
BAYWATR031* (Hot Water Coil Enclosure)(f)	TWE240, TWE300
Wire Kit — 180° Blower Discharge Reversal Kit(g)	
BAYWRKT002*	TWE060, TWE072, TWE090, TWE120

(a) Used on constant volume air handlers only.
(b) Requires use of subbase accessory.
(c) In units with steam or hot water coils applied vertically or horizontally, check IOM for proper Isolator Kit selection.
(d) Do not use if blower will operate less than 600 RPM.
(e) When the air handler is in the vertical position and close proximity trapping of condensate is required, use of subbase is required.
(f) When installed horizontally, plenum/water coil must be self-supported. When adding vibration isolators, see Isolator Installation Guide (ACC-SVN92*-EN) for isolator and location matrix.
(g) Cannot be used on TWE150-300, due to motor mount location.

Electric Heaters

Table 5. Electric heaters

Model	Used With
6–10 Ton Electric Heater Selection	
BAYHTRN106* — 4.33/5.76 kW Heater 208/240/1 Phase	TWE060*1, TWE090*1, TWE120*1
BAYHTRR112* — 8.65/11.52 kW Heater 208/240/1 Phase	TWE060*1, TWE090*1, TWE120*1
BAYHTRS117* — 12.98/17.28 kW Heater 208/240/1 Phase	TWE060*1, TWE090*1, TWE120*1
BAYHTRR123* — 17.31/23.04 kW Heater 208/240/1 Phase	TWE060*1, TWE090*1, TWE120*1
BAYHTRN129* — 21.63/28.80 kW Heater 208/240/1 Phase	TWE090*1, TWE120*1
BAYHTRN305* — 3.76/5.00 kW Heater 208/240/3 Phase	TWE060*3, TWE072*3B, TWE090*3, TWE120*3 (CV, VFD, & OS MTR)
BAYHTRR310* — 7.48/9.96 kW Heater 208/240/3 Phase	TWE060*3, TWE072*3B, TWE090*3, TWE120*3 (CV, VFD, & OS MTR)
BAYHTRR315* — 11.24/14.96 kW Heater 208/240/3 Phase	TWE060*3, TWE072*3B, TWE090*3, TWE120*3 (CV, VFD, & OS MTR)
BAYHTRN325* — 18.72/24.92 kW Heater 208/240/3 Phase	TWE060*3, TWE072*3B, TWE090*3, TWE120*3 (CV, VFD, & OS MTR)
BAYHTRN335* — 26.20/34.88 kW Heater 208/240/3 Phase	TWE090*3, TWE120*3 (CV, VFD, & OS MTR)
BAYHTRN405* — 5.00 kW Heater 460/3 Phase(a)	TWE060*4, TWE072*3******0, TWE072*4******A/B, TWE090*3******0, TWE090*4B*****A/B, TWE120*3******0, TWE120*4******A/B
BAYHTRR410* — 9.96 kW Heater 460/3 Phase(a)	TWE060*4, TWE072*3******0, TWE072*4******A/B, TWE090*3******0, TWE090*4B*****A/B, TWE120*3******0, TWE120*4******A/B
BAYHTRR415* — 14.96 kW Heater 460/3 Phase(a)	TWE060*4, TWE072*3******0, TWE072*4******A/B, TWE090*3******0, TWE090*4B*****A/B, TWE120*3******0, TWE120*4******A/B
BAYHTRN425* — 24.92 kW Heater 460/3 Phase(a)	TWE060*4, TWE072*3******0, TWE072*4******A/B, TWE090*3******0, TWE090*4B*****A/B, TWE120*3******0, TWE120*4******A/B
BAYHTRN435* — 34.88 kW Heater 460/3 Phase(a)	TWE090*3******0, TWE090*4B*****A/B, TWE120*3******0, TWE120*4******A/B
BAYHTRNW05* — 5 kW Heater 575/3 Phase	TWE060*W, TWE072*W, TWE090*W, TWE120*W (CV, VFD, & OS MTR)
BAYHTRRW10* — 9.96 kW Heater 575/3 Phase	TWE060*W, TWE072*W, TWE090*W, TWE120*W (CV, VFD, & OS MTR)
BAYHTRRW15* — 14.96 kW Heater 575/3 Phase	TWE060*W, TWE072*W, TWE090*W, TWE120*W (CV, VFD, & OS MTR)
BAYHTRNW25* — 24.92 kW Heater 575/3 Phase	TWE060*W, TWE072*W, TWE090*W, TWE120*W (CV, VFD, & OS MTR)
BAYHTRNW35* — 34.88 kW Heater 575/3 Phase	TWE090*W, TWE120*W (CV, VFD, & OS MTR)
12.5–25 Ton Electric Heater Selection	
BAYHTRP310* — 7.51/10.0 kW Heater 208/230 3 Phase	TWE150*3, TWE180*3, TWE240*3 , TWE300*3 (CV, VFD, & OS MTR)

Odyssey Split Systems Accessories

Table 5. Electric heaters (continued)

Model	Used With
BAYHTRP320* — 14.96/19.92 kW Heater 208/230 3 Phase	TWE150*3, TWE180*3, TWE240*3 , TWE300*3 (CV, VFD, & OS MTR)
BAYHTRP330* — 22.47/29.92 kW Heater 208/230 3 Phase	TWE150*3, TWE180*3, TWE240*3 , TWE300*3 (CV, VFD, & OS MTR)
BAYHTRP350* — 37.44/49.84 kW Heater 208/230 3 Phase	TWE150*3, TWE180*3, TWE240*3 , TWE300*3 (CV, VFD, & OS MTR)
BAYHTRP410* — 10.0 kW Heater 460/3 Phase[a]	TWE150*3******0, TWE150*4******A/B, TWE180*3******0, TWE180*4******A/B, TWE240*4 (CV, VFD, & OS MTR), TWE300*4 (CV & VFD)
BAYHTRP420* — 19.92 kW Heater 460/3 Phase[a]	TWE150*3******0, TWE150*4******A/B, TWE180*3******0, TWE180*4******A/B, TWE240*4 (CV, VFD, & OS MTR), TWE300*4 (CV & VFD)
BAYHTRP430* — 29.92 kW Heater 460/3 Phase[a]	TWE150*3******0, TWE150*4******A/B, TWE180*3******0, TWE180*4******A/B, TWE240*4 (CV, VFD, & OS MTR), TWE300*4 (CV & VFD)
BAYHTRP450* — 49.84 kW Heater 460/3 Phase[a]	TWE150*3******0, TWE150*4******A/B, TWE180*3******0, TWE180*4******A/B, TWE240*4 (CV, VFD, & OS MTR), TWE300*4 (CV & VFD)
BAYHTRPW10* — 10.0 kW Heater 575/3 Phase	TWE150*W, TWE180*W, TWE240*W , TWE300*W(CV, VFD, & OS MTR)
BAYHTRPW20* — 19.92 kW Heater 575/3 Phase	TWE150*W, TWE180*W, TWE240*W , TWE300*W(CV, VFD, & OS MTR)
BAYHTRPW30* — 29.92 kW Heater 575/3 Phase	TWE150*W, TWE180*W, TWE240*W , TWE300*W(CV, VFD, & OS MTR)
BAYHTRPW50* — 49.84 kW Heater 575/3 Phase	TWE150*W, TWE180*W, TWE240*W , TWE300*W(CV, VFD, & OS MTR)

Note: Electric Heaters not available for 380/60hz

[a] BAYHTR*4 & BAYHTRP4* heaters are available for 230V units that have been field-converted to 460V.

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Systems Application Considerations

Application of this product should be within the cataloged airflow and performance considerations.

Clearance Requirements

The recommended clearances identified with unit dimensions should be maintained to assure adequate serviceability, maximum capacity and peak operating efficiency. Actual clearances which appear inadequate should be reviewed with the local representative.

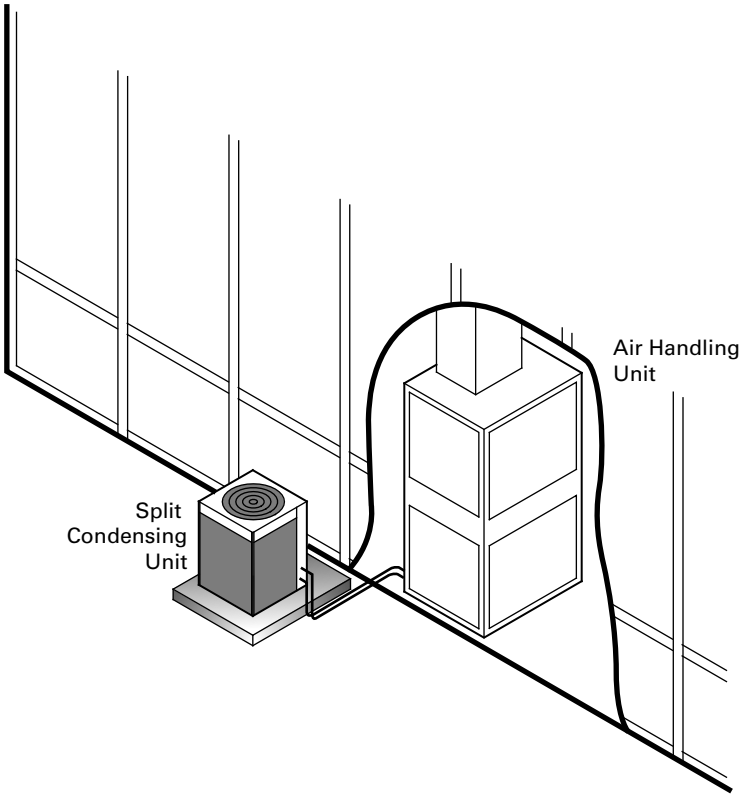
180° Blower Rotation

The 5, 6, 7.5, and 10 ton standard air handler blower section can be rotated 180° to change the discharge pattern. This modification must be done in the field and requires an additional kit. See unit installation guide.

Low Ambient Cooling

As manufactured, all Odyssey units have cooling capabilities down to 0°F. At temperatures below 50°F, some reduction in cooling capacity can be expected. When the optional Low Ambient Accessory kit is field installed, the full capacity of the unit is available down to 0°F. When using these units with control systems such as bypass changeover Variable Air Volume, make sure to consider the requirement for a head pressure control to allow low ambient cooling.

Figure 4. Typical split system application



Odyssey Split Systems Application Considerations

Figure 5. Typical horizontal air handler application

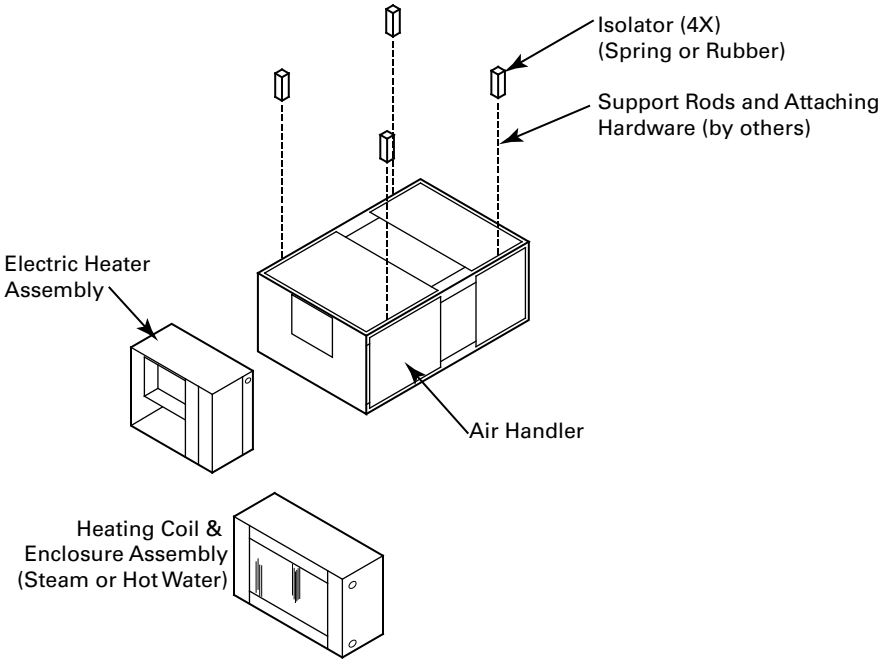
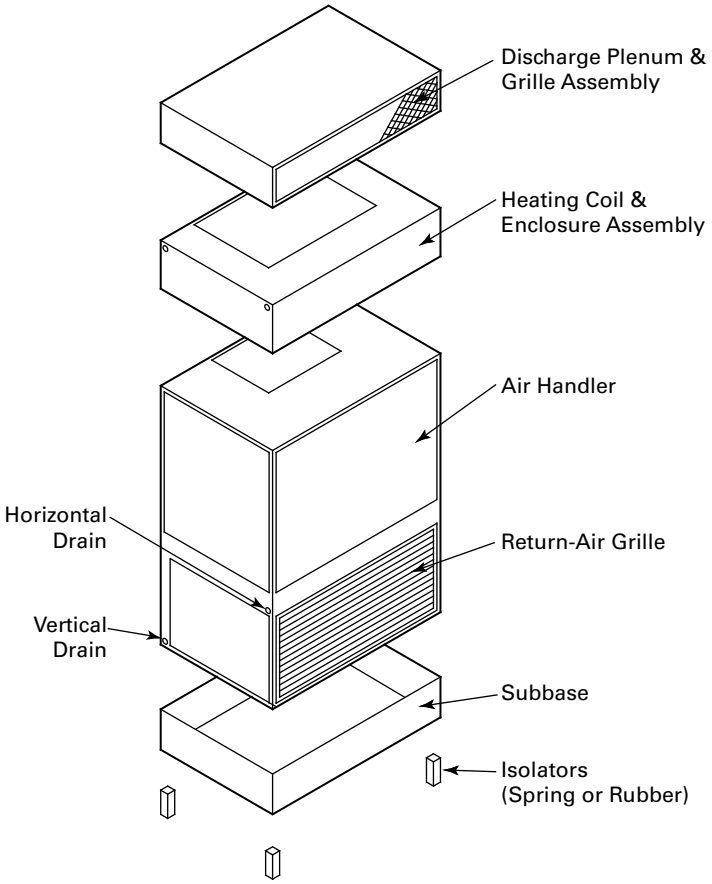


Figure 6. Typical vertical air handler application



BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Cooling Selection Procedure

Cooling Capacity

1. Calculate the building's total and sensible cooling loads at design conditions, using standardized calculation methods.
2. Size the equipment using the gross cooling capacity tables. Match the cooling loads at design conditions. For example, if the following specifies the building cooling requirements:
   Electrical Characteristics: 460/60/3
   Summer Design Conditions: Entering Evap Coil—80°F DB/67°F WB , Outdoor Ambient—95°F
   Total Cooling Load: 86 MBh
   Sensible Cooling Load: 60 MBh
   Airflow: 3000 cfm
   External Static Pressure: 0.77 inches of water gauge
3. Use Table 15, p. 32 to determine that TTA09043A with TWE09043A has a gross cooling capacity of 97.7 MBh and 74.6 MBh sensible capacity at 95°F DB ambient and 3000 cfm with 80°F DB/67° F WB air entering the evaporator.
4. To find the net cooling capacities, fan motor heat must be subtracted. Determine the total unit static pressure:
   External Static Duct System: 0.77
   Standard Filter: 0.10 in.
   Supplementary Electric Heat: 0.23 in.
   Total Static Pressure: 1.10 in.
   Notes:
   - *The Evaporator Fan Performance Table has included the effect of a 1 in. filter already. Therefore, the actual Total Static Pressure is 1.10 - 0.10 = 1.00 in. . With 3000 cfm and 1.00 in., Table 50, p. 67 shows 1.97 Bhp (high static drive kit required).*
   - *This formula can be used to calculate Fan Motor Heat:*
     3.15 X Bhp = MBh
     3.15 X 1.97 = 6.2 MBh
     Net Total Cooling Capacity = 97.7 MBh - 6.2 MBh = 91.5 MBh
     Net Sensible Cooling Capacity = 74.6 MBh - 6.2 MBh = 68.4 MBh

Heating Capacity

5. Calculate the building heating load using the American Standard calculation form or any other standard accepted method.
6. Size the equipment using Table 68, p. 84 to match the heating loads at design conditions. For example, if the following specifies the building heating requirements:
   Total Heating Load: 97.0 MBh
   Airflow: 2625 cfm
   Supplementary Electric Heaters
7. Use Table 69, p. 85 to determine that the 34.88 kW heater has a capacity of 119,045 Btuh.
8. From the Electrical Characteristics table, p. 98, the 34.88 kW heater at 460V indicates the heater model is BAYHTRN435A.

Odyssey Split Cooling Selection Procedure

Air Delivery

1. The external static pressure drop through the air distribution system is 0.77 inches of water gauge, use Table 68, p. 84 to determine that the static pressure drop through the electric heater is 0.23 inches of water (0.77 + 0.23 = 1.00 in.).
2. Enter Table 50, p. 67 for TWE09043A at 2625 cfm and 1.00 static pressure. The high static motor at 995 RPM gives the desired airflow.

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Cooling Model Number Description

Cooling Condenser

Digit 1, 2, 3— Unit Function

TTA = Split System Cooling

Digit 4, 5, 6 — Tonnage

072 = 6 Tons (60 Hz)
090 = 7.5 Tons (60 Hz)
120 = 10 Tons (60 Hz)
150 = 12.5 Tons (60 Hz)
180 = 15 Tons (60 Hz)
240 = 20 Tons (60 Hz)
300 = 25 Tons (60Hz)

Digit 7 — Refrigerant

4 = R-410A

Digit 8 — Voltage

3 = 208-230 Vac - 3 PH (60Hz)
4 = 460 Vac - 3 PH (60Hz)
W = 575 Vac - 3 PH (60Hz)
K = 380 Vac - 3 PH (60Hz)

Digit 9 — Refrigeration Circuit/Stage

A = 1 Compressor/1 Line/1 Stage (Single)
C = 2 Compressors/1 Line/2 Stage (Manifold)
D = 2 Compressors/2 Line/2 Stage (Dual)

Digit 10 — Major Design Sequence

A = Rev A

Digit 11 — Minor Design Sequence

A = Rev A

Digit 12, 13 — Service Digits

**

Digit 14 — Efficiency Generation

A = Generation A

Digit 15 — Controls

S = Symbio™

Digit 16 — None

0 = None

Digit 17 — Coil Protection

0 = Standard Coil
1 = Standard Coil w/ Hail Guard
4 = Complete Coat Condenser Coil (MCHE)
5 = Complete Coat Condenser Coil with Hail Guard (MCHE)

Digit 18, 19, 20 — None

0 = None

Digit 21 — Communications Options

0 = No Option
1 = Advanced Diagnostics and BACnet® BAS
2 = Advanced Diagnostics and LonTalk® Communications Interface (LCI)

Digit 22 to 40 — None

0 = None

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Cooling Model Number Description

Air Handler

Digit 1, 2, 3 — Unit Function

TWE = Air Handler

Digit 4, 5, 6— Tonnage

060 = 5 Tons (60 Hz)
072 = 6 Tons (60Hz)
090 = 7.5 Tons (60 Hz)
120 = 10 Tons (60 Hz)
150 = 12.5 Tons (60 Hz)
180 = 15 Tons (60 Hz)
240 = 20 Tons (60 Hz)
300 = 25 Tons (60 Hz)

Digit 7 — Refrigerant

4 = R-410A

Digit 8 — Voltage

1 = 208-230 Vac - 1 PH (60 Hz)
3 = 208-230 Vac - 3 PH (60 Hz)
4 = 460 Vac - 3 PH (60 Hz)
W = 575 Vac - 3 PH (60 Hz)
K = 380 Vac - 3 PH (60Hz)

Digit 9 — Refrigeration Circuit/Stage

A = Single Circuit
B = Dual Circuit

Digit 10 — Major Design Sequence

A = Rev A

Digit 11 — Minor Design Sequence

A = Rev A

Digit 12, 13 — Service Digits

**

Digit 14 — Efficiency Generation

A = Generation A (2018 DOE)

Digit 15 — Controls

1 = Constant Volume
C = 2 Stage Airflow (Electromechanical Cond Only)
D = 2 Stage Airflow/Single Zone VAV (Symbio Cond Only)

Digit 16 — Indoor Fan Sizes

0 = Standard Motor
4 = High Static – (Oversized Motor for VFD Units)

Digit 17 to 40 — None

0 = None

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Cooling General Data

Table 6. General data — 6-7.5 tons (TTA0724*A*-TTA0904*D*) condensing units — 60 Hz

	6 Tons	6 Tons	7.5 Tons	7.5 Tons
	Single Compressor TTA0724*A*	Dual Compressor TTA0724*D*	Single Compressor TTA0904*A*	Dual Compressor TTA0904*D*
Cooling Performance - Gross Cooling Capacity				
Matched Air Handler	TWE0904*A*	TWE0724*B*	TWE0904*A*	TWE0904*B*
AHRI Rated Airflow	2,400	2,400	3,000	2,625
Gross Cooling Capacity - System	78,000	76,000	98,000	92,000
Condensing Unit Only	69,000	68,000	91,000	88,000
AHRI Net Cooling Capacity	76,000	75,000	95,000	91,000
Efficiency				
Matched Air Handler (EER)	11.5	11.4	11.5	11.4
Condensing Unit Only (EER)	13.6	12.0	12.7	12.8
System (IEER)	13.1	12.9	13.1	12.9
System kW/Condensing Unit kW	5.7 / 5.1	5.9 / 5.6	7.8 / 7.1	7.4 / 6.9
Compressor				
Type	Scroll	Scroll	Scroll	Scroll
No./Tons	1 / 5.1	2 / 2.4	1 / 6.8	2 / 3.3
System Data				
No. Refrigerant Circuits[a]	1	2	1	2
Suction Line Connection (in.) OD[a]	1 1/8	7/8	1 3/8	1 1/8
Liquid Line Connection (in.) OD[a]	1/2	1/2	1/2	1/2
Outdoor Coil				
Type	MCHE	MCHE	MCHE	MCHE
Tube Size OD/Coil Width MCHE (in.)	0.8	0.8	0.8	0.8
Face Area (sq ft)	18.5	17.4	18.5	17.4
Rows/FPI (Fins per inch)	1/23	1/23	1/23	1/23
Outdoor Fan				
Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter (in.)	1/26	1/26	1/26	1/26
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM	5,100	5,100	5,100	5,100
No. Motor/HP	1/0.5	1/0.5	1/0.5	1/0.5
Motor RPM	1,100	1,100	1,100	1,100
Refrigerant Charge (Field Supplied)				
lbs of R-410A	10.0	7.0 / 7.0	11.3	7.3 / 7.3
Shipping Dimensions				
HxWxD (in.)	45" x 45" x 38"	45" x 45" x 38"	45" x 45" x 38"	45" x 45" x 38"

Notes:

1. 6 - 10 ton and 20 -25 ton condensing units are tested in accordance with AHRI Standard 365.
2. 12.5 and 15 ton condensing units are AHRI Certified to AHRI Standard 365.
3. 6 - 20 ton units are AHRI Certified to AHRI Standard 340-360 (I-P)-2007. Rating conditions are 95°F outdoor air temperature, 80°F entering dry bulb, 67°F entering wet bulb with 25ft of interconnecting refrigerant piping with minimum external static pressure as determined by rating standard.
4. 25 ton units are tested in accordance with AHRI Standard 340-360.

[a] Refer to refrigerant piping applications manual for line sizing and line length.

Odyssey Split Cooling General Data

Table 7. General data — 10-12.5 tons (TTA1204*D*-TTA1504*D*) condensing units — 60 Hz

	10 Tons	10 Tons	12.5 Tons
	Dual Compressor TTA1204*D*	**Manifolded Compressor TTA1204*C***	**Dual Compressor TTA1504*D***
Cooling Performance - Gross Cooling Capacity			
Matched Air Handler	TWE1204*B*	TWE1204*B*	TWE1504*B*
AHRI Rated Airflow	4,000	4,000	4,625
Gross Cooling Capacity - System	119,000	126,000	156,000
Condensing Unit Only	110,000	116,000	156,000
AHRI Net Cooling Capacity	116,000	122,000	154,000
Efficiency			
Matched Air Handler (EER)	11.4	11.3	11.0
Condensing Unit Only (EER)	12.7	12.5	11.3
System (IEER)	12.9	13.3	12.4
System kW/Condensing Unit kW	9.9 / 9.2	10.3 / 9.3	14.2 / 13.9
Compressor			
Type	Scroll	Manifolded Scrolls	Scroll
No./Tons	2 / 4.3	2 / 4.3	2 / 6.1
System Data			
No. Refrigerant Circuits[a]	2	1	2
Suction Line Connection (in.) OD[a]	1 1/8	1 3/8	1 1/8
Liquid Line Connection (in.) OD[a]	1/2	1/2	1/2
Outdoor Coil			
Type	MCHE	MCHE	MCHE
Tube Size OD/Coil Width MCHE (in.)	0.8	0.8	1.0
Face Area (sq ft)	22.7	23.8	27.0
Rows/FPI (Fins per inch)	1/23	1/23	1/23
Outdoor Fan			
Type	Propeller	Propeller	Propeller
No. Used/Diameter (in.)	1/28	1/28	1/28
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1
CFM	7,800	7,800	7,800
No. Motor/HP	1/1	1/1	1/1
Motor RPM	1,125	1,125	1,125
Refrigerant Charge (Field Supplied)			
lbs of R-410A	8.2 / 8.4	13.1	10.1/9.8
Shipping Dimensions			
HxWxD (in.)	45" x 55" x 42"	45" x 55" x 42"	52.1" x 55" x 42"

Notes:

1. 6 - 10 ton and 20 -25 ton condensing units are tested in accordance with AHRI Standard 365.
2. 12.5 and 15 ton condensing units are AHRI Certified to AHRI Standard 365.
3. 6 - 20 ton units are AHRI Certified to AHRI Standard 340-360 (I-P)-2007. Rating conditions are 95°F outdoor air temperature, 80°F entering dry bulb, 67°F entering wet bulb with 25ft of interconnecting refrigerant piping with minimum external static pressure as determined by rating standard.
4. 25 ton units are tested in accordance with AHRI Standard 340-360.

[a] Refer to refrigerant piping applications manual for line sizing and line length.

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Odyssey Split Cooling General Data

Table 8. General data — 15-25 tons (TTA1804*D*-TTA3004*C*) condensing units — 60 Hz

	15 Tons	15 Tons	20 Tons	20 Tons	25 Ton
	Dual Compressor TTA1804*D*	Manifolded Compressor TTA1804*C*	Dual Compressor TTA2404*D*	Manifolded Compressor TTA2404*C*	Manifolded Compressor TTA3004*C*
Cooling Performance - Gross Cooling Capacity					
Matched Air Handler	TWE1804*B*	TWE1804*B*	TWE2404*B*	TWE2404*B*	TWE3004*B*
AHRI Rated Airflow	5,550	6,000	8,000	8,000	8,750
Gross Cooling Capacity - System	192,000	192,000	248,000	258,000	306,000
Condensing Unit Only	184,000	184,000	250,000	272,000	318,000
AHRI Net Cooling Capacity	186,000	186,000	244,000	250,000	296,000
Efficiency					
Matched Air Handler (EER)	11.2	11.1	10.2	10.1	10.1
Condensing Unit Only (EER)	13.0	13.1	12.5	12.1	11.7
System (IEER)	12.4	12.8	11.6	12.0	12.0
System kW/Condensing Unit kW	15.4 / 14.1	15.4 / 14.1	21.8 / 20	24.1 / 22.6	29.3 / 27.2
Compressor					
Type	Scroll	Manifolded Scrolls	Scroll	Manifolded Scroll	Manifolded Scrolls
No./Tons	2 / 6.8	2 / 6.8	1/8.7, 1/10.2	2 / 10.0	2 / 12.0
System Data					
No. Refrigerant Circuits[a]	2	1	2	1	1
Suction Line Connection (in.) OD[a]	1 3/8	1 5/8	1 3/8	1 5/8	2 1/8
Liquid Line Connection (in.) OD[a]	1/2	5/8	1/2	5/8	5/8
Outdoor Coil					
Type	MCHE	MCHE	MCHE	MCHE	MCHE
Tube Size OD/Coil Width MCHE (in.)	0.8	0.8	0.8	0.8	1.0
Face Area (sq ft)	44.3	44.3	44.3	44.3	51.3
Rows/FPI (Fins per inch)	1/23	1/23	1/23	1/23	1/23
Outdoor Fan					
Type	Propeller	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter (in.)	2/28	2/28	2/28	2/28	2/28
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1	Direct/1
CFM	15,500	15,500	15,500	15,500	15,500
No. Motor/HP	2/1	2/1	2/1	2/1	2/1
Motor RPM	1,125	1,125	1,125	1,125	1,125
Refrigerant Charge (Field Supplied)					
lbs of R-410A	11.2/11.3	22.0	11.2 / 11.2	23.8	29.8
Shipping Dimensions					
HxWxD (in.)	51.1" x 96" x 48"	51.1" x 96" x 48"	51.1" x 96" x 48"	51.1" x 96" x 48"	57.1" x 96" x 48"

Notes:

1. 6 - 10 ton and 20 -25 ton condensing units are tested in accordance with AHRI Standard 365.
2. 12.5 and 15 ton condensing units are AHRI Certified to AHRI Standard 365.
3. 6 - 20 ton units are AHRI Certified to AHRI Standard 340-360 (I-P)-2007. Rating conditions are 95°F outdoor air temperature, 80°F entering dry bulb, 67°F entering wet bulb with 25ft of interconnecting refrigerant piping with minimum external static pressure as determined by rating standard.
4. 25 ton units are tested in accordance with AHRI Standard 340-360.

[a] Refer to refrigerant piping applications manual for line sizing and line length.

Odyssey Split Cooling General Data

Table 9. General data — 5-7.5 tons (TWE0604*A*-TWE0904*B*) constant volume air handler — 60 Hz

	5 Tons	5 Tons	6 Tons	7.5 Tons	7.5 Tons
	Single Circuit TWE0604*A*	**Dual Circuit TWE0604*B***	**Dual Circuit TWE0724*B***	**Single Circuit TWE0904*A***	**Dual Circuit TWE0904*B***
System Data					
No. Refrigerant Circuits	1	2	2	1	2
Suction Line Connection (in.) OD	1-1/8	1-1/8	1-1/8	1-3/8	1-1/8
Liquid Line Connection (in.) OD	1/2	1/2	1/2	1/2	1/2
Indoor Coil					
Type	Lanced/Intertwined	Lanced/Intertwined	Lanced/Intertwined	Lanced/Intertwined	Lanced/Intertwined
Tube Size (in.)	0.375	0.375	0.375	0.375	0.375
Face Area (sq. ft.)	5	5	8.1	8.1	8.1
Rows/FPI (Fins per inch)	4/14	4/14	4/14	4/14	4/14
Refrigerant Control	Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve
Drain Connection Size (in.)	1 PVC	1 PVC	1 PVC	1 PVC	1 PVC
Indoor Fan					
Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
No. Used/Diameter x Width (in.)	1/12 x 12	1/12 x 12	1/15 x 15	1/15 x 15	1/15 x 15
Drive Type/No. Speeds	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable
CFM (Nominal)	2,000	2,000	2,400	3,000	3,000
No. Motors	1	1	1	1	1
Motor HP - Standard/Oversized	0.75/1.5	0.75/1.5	1.5/2.0/3.0	1.5/2.0/3.0	1.5/2.0/3.0
Motor RPM	1725	1725	1725	1725	1725
Motor Frame Size	56	56	56 H	56 H	56 H
Filters[a]					
Type/Furnished	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes
(No.)/Size Recommended	(1) 16 x 20 x 1 (1) 20 x 20 x 1	(1) 16 x 20 x 1 (1) 20 x 20 x 1	(3) 16 X 25 X 1	(3) 16 X 25 X 1	(3) 16 X 25 X 1
MERV 13 (No.)/Size Recommended	(1) 16 x 20 x 2 (1) 20 x 20 x 2	(1) 16 x 20 x 2 (1) 20 x 20 x 2	(3) 16 x 25 x 2	(3) 16 x 25 x 2	(3) 16 x 25 x 2
Shipping Dimensions					
HxWxD (in.)	55.1" x 27.5" x 43.5"	55.1" x 27.5" x 43.5"	61.2" x 30.5" x 53"	61.2" x 30.5" x 53"	61.2" x 30.5" x 53"

Notes:

1. Constant volume 6-15 ton ships wired for 208/230V, field convertible 460V.
2. Oversized motor not available on 41A/B and 4KA/B models.

(a) One inch, throw-away filters shall be standard on TWE060, TWE072, TWE090, TWE120 model air handlers from the factory. The filter rack can be field converted to two inch capability. Two inch, throw-away filters shall be standard on TWE1804*B and TWE2404*B models.

Odyssey Split Cooling
General Data

Table 10. General data — 10-25 tons (TWE1204*A*-TWE3004*B*) constant volume air handler — 60 Hz

	10 Tons	10 Tons	12.5 Tons	15 Tons	20 Tons	25 Tons
	Single Circuit TWE1204*A*	**Dual Circuit TWE1204*B***	**Dual Circuit TWE1504*B***	**Dual Circuit TWE1804*B***	**Dual Circuit TWE2404*B***	**Dual Circuit TWE3004*B***
System Data						
No. Refrigerant Circuits	1	2	2	2	2	2
Suction Line Connection (in.) OD	1-3/8	1-1/8	1-3/8	1-3/8	1-3/8	1-3/8
Liquid Line Connection (in.) OD	1/2	1/2	1/2	1/2	1/2	5/8
Indoor Coil						
Type	Lanced/Intertwined	Lanced/Intertwined	Lanced/Intertwined	Lanced/Intertwined	Lanced/Intertwined	Lanced/Face Split
Tube Size (in.)	0.375	0.375	0.375	0.375	0.375	0.375
Face Area (sq. ft.)	11.2	11.2	16.3	16.3	21.7	21.7
Rows/FPI (Fins per inch)	4/14	4/14	4/14	4/14	3/14	4/14
Refrigerant Control	Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve
Drain Connection Size (in.)	1 PVC	1 PVC	1 PVC	1 PVC	1 PVC	1 PVC
Indoor Fan						
Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
No. Used/Diameter x Width (in.)	1/15 x 15	1/15 x 15	2/15 x 15	2/15 x 15	2/15 x 15	2/15 x 15
Drive Type/No. Speeds	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable
CFM (Nominal)	4,000	4,000	5,000	6,000	8,000	10,000
No. Motors	1	1	1	1	1	1
Motor HP - Standard/Oversized	2.0/3.0	2.0/3.0	2.0/3.0/5.0	3.0/5.0	3.0/5.0/7.5	7.5
Motor RPM	1725	1725	1755	1,728/1,750	1,750/3,470	3490
Motor Frame Size	56 Hz	56 Hz	145T	56 Hz	184T	184T
Filters[a]						
Type/Furnished	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes
(No.)/Size Recommended	(4) 16 X 25 X 1	(4) 16 X 25 X 1	(8) 15 X 20 X 2	(8) 15 X 20 X 2	(4) 16 X 25 X 2 (4) 16 X 20 X 2	(4) 16 X 25 X 2 (4) 16 X 20 X 2
MERV 13 (No.)/Size Recommended	(4) 16 x 25 x 2	(4) 16 x 25 x 2	(8) 15 x 20 x 2	(8) 15 x 20 x 2	(4) 16 x 25 x 2 (4) 16 x 20 x 2	(4) 16 x 25 x 2 (4) 16 x 20 x 2
Shipping Dimensions						
HxWxD (in.)	61.2" x 30.5" x 69"	61.2" x 30.5" x 69"	76.3" x 33.3" x 85"	76.3" x 33.3" x 85"	79.1" x 35.8" x 95"	79.1" x 35.8" x 95"

Notes:

1. Constant volume 6-15 ton ships wired for 208/230V, field convertible 460V.
2. Oversized motor not available on 41A/B and 4KA/B models.

[a] One inch, throw-away filters shall be standard on TWE060, TWE072, TWE090, TWE120 model air handlers from the factory. The filter rack can be field converted to two inch capability. Two inch, throw-away filters shall be standard on TWE1804*B and TWE2404*B models.

Odyssey Split Cooling General Data

Table 11. General data — 6-10 tons (TWE072*** - TWE120*****) SZVAV and 2–speed VFD air handler — 60 Hz**

	6 Tons	7.5 Tons	10 Tons	10 Tons
	Dual Circuit TWE07243B*, 4B*, WB*	Dual Circuit TWE09043B*, 4B*, WB*	Single Circuit TWE12043A*, 4A*, WA*	Dual Circuit TWE12043B*, 4B*, WB*
Indoor Fan				
Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
No. Used/Diameter x Width (in.)	1/15 x 15	1/15 x 15	1/15 x 15	1/15 x 15
Drive Type/No. Speeds	Belt/VFD Variable	Belt/VFD Variable	Belt/VFD Variable	Belt/VFD Variable
CFM (Nominal)	2,400	3,000	4,000	4,000
No. Motors	1	1	1	1
Motor HP - Standard/Oversized	2.0/3.0	2.0/3.0	2.0/3.0	2.0/3.0
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56 Hz	56 Hz	56 Hz	56 Hz

Table 12. General data — 12.5-25 tons (TWE150*** - TWE300*****) SZVAV and 2–speed VFD air handler — 60 Hz**

	12.5 Tons	15 Tons	20 Tons	25 Tons
	Dual Circuit, TWE15043B*, 4B*, WB*	Dual Circuit, TWE18043B*, 4B*, WB*	Dual Circuit, TWE24043B*, 4B*, WB*	Dual Circuit, TWE30043B*, 4B*, WB*
Indoor Fan				
Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
No. Used/Diameter x Width (in.)	2/15 x 15	2/15 x 15	2/15 x 15	2/15 x 15
Drive Type/No. Speeds	Belt/VFD Variable	Belt/VFD Variable	Belt/VFD Variable	Belt/VFD Variable
CFM (Nominal)	5,000	6,000	8,000	10,000
No. Motors	1	1	1	1
Motor HP - Standard/Oversized	2.0/5.0	3.0/5.0	5.0/7.5	7.5[a]
Motor RPM	1755/3450	1725/3450	3450/3470	3470
Motor Frame Size	56HZ	56HZ	56HZ/184T	184T

[a] Standard motor only

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split System Heat Pumps Selection Procedure

Cooling Capacity

1. Calculate the building's total and sensible cooling loads at design conditions, using standardized calculation methods.
2. Size the equipment using the gross cooling capacity tables. Match the cooling loads at design conditions. For example, if the following specifies the building cooling requirements:
   Electrical Characteristics: 460/60/3
   Summer Design Conditions: Entering Evap Coil—80°F DB/67°F WB , Outdoor Ambient—95°F
   Total Cooling Load: 82 MBh
   Sensible Cooling Load: 60 MBh
   Airflow: 3000 cfm
   External Static Pressure: 0.77 inches of water gauge
3. Use Table 13, p. 30 to determine that TWA09043A with TWE09043A has a gross cooling capacity of 94.7 and 75.6 sensible capacity at 95°F DB ambient and 3000 cfm with 80°F DB/67°F WB air entering the evaporator.
4. To find the net cooling capacities, fan motor heat must be subtracted. Determine the total unit static pressure:
   External Static Duct System: 0.77
   Standard Filter: 0.10 in.
   Supplementary Electric Heat: 0.23 in.
   Total Static Pressure: 1.10 in.
   Notes:
   - *The Evaporator Fan Performance Table has included the effect of a 1 in. filter already. Therefore, the actual Total Static Pressure is 1.10 - 0.10 = 1.00 in. . With 3000 cfm and 1.00 in., Table 38, p. 51 shows 1.97 Bhp (high static drive kit required).*
   - *This formula can be used to calculate Fan Motor Heat:*
     3.15 X Bhp = MBh
     3.15 X 1.97 = 6.2 MBh
     Net Total Cooling Capacity = 94.7 MBh - 6.2 MBh = 93.2 MBh
     Net Sensible Cooling Capacity = 75.6 MBh - 6.2 MBh = 75.6 MBh

Heating Capacity

5. Calculate the building heating load using the American Standard calculation form or any other standard accepted method.
6. Size the equipment using Table 52, p. 63 to match the heating loads at design conditions. For example, if the following specifies the building heating requirements:
   Total Heating Load: 95.0 MBh
   Outdoor Ambient (Winter): 17°F DB
   Indoor Return Temperature: 70°F DB
   Airflow: 2625 cfm
7. Table 29, p. 45 indicates the mechanical heating portion of the heat pump will provide 54.3 MBh for the winter design conditions. Full heat load must be carried by the supplementary heater in the unlikely event the heat pump malfunctions. From Table 53, p. 63, the 34.88 kW heater at 460V has a capacity of 119,045. From , p. 73, the 34.88 kW heater at 460V indicates the heater model is BAYHTRL435.

Odyssey Split System Heat Pumps Selection Procedure

Air Delivery

1. The external static pressure drop through the air distribution system is 0.77 inches of water gauge, use Table 52, p. 63 to determine that the static pressure drop through the electric heater is 0.23 inches of water (0.77 + 0.23 = 1.00 in.).
2. Enter Table 38, p. 51 for TWE09043A at 2625 cfm and 1.00 static pressure. The high static motor at 995 RPM gives the desired airflow.

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split System Heat Pumps Model Number Description

Heat Pump Condenser

Digit 1, 2, 3— Unit Function

TWA = Split System Heat Pump

Digit 4, 5, 6 — Tonnage

072 = 6 Tons (60 Hz)
090 = 7.5 Tons (60 Hz)
120 = 10 Tons (60 Hz)
180 = 15 Tons (60 Hz)
240 = 20 Tons (60 Hz)

Digit 7 — Refrigerant

4 = R-410A

Digit 8 — Voltage

3 = 208-230 Vac - 3 PH (60Hz)
4 = 460 Vac - 3 PH (60Hz)
W = 575 Vac - 3 PH (60Hz)
K = 380 Vac - 3 PH (60Hz)

Digit 9 — Refrigeration Circuit/Stage

A = 1 Compressor/1 Line/1 Stage (Single)
D = 2 Compressors/2 Line/2 Stage (Dual)

Digit 10 — Major Design Sequence

A = Rev A

Digit 11 — Minor Design Sequence

A = Rev A

Digit 12, 13 — Service Digits

**

Digit 14 — Efficiency Generation

A = Generation A

Digit 15 — Controls

S = Symbio™

Digit 16 — None

0 = None

Digit 17 — Coil Protection

0 = Standard Coil
1 = Standard Coil w/ Hail Guard
2 = Black Epoxy Pre-Coated Condenser Coil (FIN/TUBE)
3 = Black Epoxy Pre-Coated Condenser Coil with Hail Guard (FIN/TUBE)

Digit 18, 19, 20 — None

0 = None

Digit 21 — Communications Options

0 = No Option
1 = Advanced Diagnostics and BACnet® BAS
2 = Advanced Diagnostics and LonTalk® Communications Interface (LCI)

Digit 22 to 40 — None

0 = None

Odyssey Split System Heat Pumps Model Number Description

Air Handler

Digit 1, 2, 3 — Unit Function

TWE = Air Handler

Digit 4, 5, 6— Tonnage

060 = 5 Tons (60 Hz)
072 = 6 Tons (60Hz)
090 = 7.5 Tons (60 Hz)
120 = 10 Tons (60 Hz)
180 = 15 Tons (60 Hz)
240 = 20 Tons (60 Hz)

Digit 7 — Refrigerant

4 = R-410A

Digit 8 — Voltage

1 = 208-230 Vac - 1 PH (60 Hz)
3 = 208-230 Vac - 3 PH (60 Hz)
4 = 460 Vac - 3 PH (60 Hz)
W = 575 Vac - 3 PH (60 Hz)
K = 380 Vac - 3 PH (60Hz)

Digit 9 — Refrigeration Circuit/Stage

A = Single Circuit
B = Dual Circuit

Digit 10 — Major Design Sequence

A = Rev A

Digit 11 — Minor Design Sequence

A = Rev A

Digit 12, 13 — Service Digits

**

Digit 14 — Efficiency Generation

A = Generation A (2018 DOE)

Digit 15 — Controls

1 = Constant Volume
C = 2 Stage Airflow (Electromechanical Cond Only)
D = 2 Stage Airflow/Single Zone VAV (Symbio Cond Only)

Digit 16 — Indoor Fan Sizes

0 = Standard Motor
4 = High Static – (Oversized Motor for VFD Units)

Digit 17 to 40 — None

0 = None

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split System Heat Pumps
General Data

Table 6. General data for 6 - 7.5 ton (TWA0724*A*-TWA0904*D*) heat pump units, 60 Hz

	6 Tons	6 Tons	7.5 Tons	7.5 Tons
	Single Comp TWA0724*A*	Dual Comp TWA0724*D*	Single Comp TWA0904*A*	Dual Comp TWA0904*D*
Cooling Performance - Gross Cooling Capacity				
Matched Air Handler	TWE0904*A*	TWE0724*B*	TWE0904*A*	TWE0904*B*
AHRI Rated Airflow	2,400	2,400	3,000	3,000
Gross Cooling Capacity - System	82,000	78,000	95,000	96,000
Condensing Unit Only	76,000	71,000	88,000	88,000
AHRI Net Cooling Capacity	80,000	77,000	92,000	93,000
Efficiency				
Matched Air Handler (EER)	11.3	11.2	11.3	11.2
Condensing Unit Only (EER)	13.0	12.7	11.0	12.8
System (IEER)	12.4	12.2	12.4	12.2
System kW/Condensing Unit kW	6.4 / 5.9	6.1 / 5.6	8.0 / 7.3	7.6 / 6.8
Heating Performance - AHRI Htg/Matched AH				
High Temperature Capacity	72,000	64,000	87,000	82,000
System kW/COP	5.79 / 3.3	5.08 / 3.3	6.49 / 3.3	6.36 / 3.3
Low Temperature Capacity	46,000	38,000	45500	51,500
System kW/COP	5.38 / 2.25	4.69 / 2.25	6.32 / 2.2	6.04 / 2.25
Compressor				
Type	Scroll	Scroll	Scroll	Scroll
No./Tons	1/5.6	2/2.6	1/6.8	2/3.25
System Data				
No. Refrigerant Circuits[a]	1	2	1	2
Suction Line Connection (in.) OD[a]	1 3/8	7/8	1 3/8	1 1/8
Liquid Line Connection (in.) OD[a]	1/2	1/2	1/2	1/2
Outdoor Coil				
Type / Tube Size (in.) OD	Lanced / 0.375	Lanced / 0.375	Lanced / 0.375	Lanced / 0.375
Face Area (sq ft)	19.24	19.24	19.24	23.96
Rows/FPI (Fins per inch)	2/18	2/18	2/18	2/18
Outdoor Fan				
Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter (in.)	1/26	1/26	1/26	1/26
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM	6,530	6,530	6,530	6,530
No. Motor/HP	1/0.5	1/0.5	1/0.5	1/0.5
Motor RPM	1,100	1,100	1,100	1,100
Refrigerant Charge (Field Supplied)				
lbs of R-410A	20.4	11.0/11.0	19.0	11.8/11.8
Shipping Dimensions				
HxWxD (in.)	45" x 45" x 38"	45" x 55" x 42"	45" x 45" x 38"	45" x 55" x 42"

[a] Refer to refrigerant piping applications manual for line sizing and line length.

Odyssey Split System Heat Pumps General Data

Table 7. General data for 10 - 20 ton (TWA1204*A*-TWA2404*D*) heat pump units, 60 Hz

	10 Tons	10 Tons	15 Tons	20 Tons
	Single Comp TWA1204*A*	Dual Comp TWA1204*D*	Dual Comp TWA1804*D*	Dual Comp TWA2404*D*
Cooling Performance - Gross Cooling Capacity				
Matched Air Handler	TWE1204*A*	TWE1204*B*	TWE1804*B*	TWE2404*B*
AHRI Rated Airflow	4,000	3,500	6,000	8,000
Gross Cooling Capacity - System	127,000	120,000	194,000	258,000
Condensing Unit Only	117,000	115,000	176,000	276,000
AHRI Net Cooling Capacity	123,000	118,000	188,000	248,000
Efficiency				
Matched Air Handler (EER)	11.3	11.2	10.8	10.0
Condensing Unit Only (EER)	12.5	12.6	11.9	12.8
System (IEER)	12.4	12.2	11.6	10.6
System kW/Condensing Unit kW	10.6 / 9.4	9.9 / 9.1	17 / 14.8	24 / 21.6
Heating Performance - AHRI Htg/Matched AH				
High Temperature Capacity	120,000	112,000	178,000	238,000
System kW/COP	9.92 / 3.3	8.98 / 3.3	15.67 / 3.2	21.5 / 3.2
Low Temperature Capacity	76,000	71,000	117,000	148,000
System kW/COP	9.30 / 2.25	8.29 / 2.25	14.21 / 2.05	19.1 / 2.05
Compressor				
Type	Scroll	Scroll	Scroll	Scroll
No./Tons	1/8.6	2/4.3	2/6.9	2/10.1
System Data				
No. Refrigerant Circuits[a]	1	2	2	2
Suction Line Connection (in.) OD[a]	1 3/8	1 1/8	1 1/8	1 3/8
Liquid Line Connection (in.) OD[a]	1/2	1/2	1/2	5/8
Outdoor Coil				
Type / Tube Size (in.) OD	Lanced / 0.375	Lanced / 0.375	Lanced / 0.375	Lanced / 0.375
Face Area (sq ft)	29.02	29.02	52.60	52.60
Rows/FPI (Fins per inch)	2/18	2/18	2/18	2/18
Outdoor Fan				
Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter (in.)	1/28	1/28	2/28	2/28
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM	9,800	9,800	19,500	19,500
No. Motor/HP	1/1	1/1	2/1	2/1
Motor RPM	1,125	1,125	1,125	1,125
Refrigerant Charge (Field Supplied)				
lbs of R-410A	34.7	14.0/14.0	27.2/24.5	23.5/23.5
Shipping Dimensions				
HxWxD (in.)	52.1" x 55" x 42"	52.1" x 55" x 42"	51.1" x 96" x 48"	51.1" x 96" x 48"

[a] Refer to refrigerant piping applications manual for line sizing and line length.

BUILT TO A HIGHER STANDARD™

American Standard®
HEATING & AIR CONDITIONING

Odyssey Split System Heat Pumps
General Data

Table 8. General data — 5-7.5 tons (TWE0604*A*-TWE0904*B*) standard air handler — 60 Hz

	5 Tons	5 Tons	6 Tons	7.5 Tons	7.5 Tons
	Single Circuit TWE0604*A*	**Dual Circuit TWE0604*B***	**Dual Circuit TWE0724*B***	**Single Circuit TWE0904*A***	**Dual Circuit TWE0904*B***
System Data					
No. Refrigerant Circuits	1	2	2	1	2
Suction Line Connection (in.) OD	1-1/8	1-1/8	1-1/8	1-3/8	1-1/8
Liquid Line Connection (in.) OD	1/2	1/2	1/2	1/2	1/2
Indoor Coil					
Type	Lanced/Intertwined	Lanced/Intertwined	Lanced/Intertwined	Lanced/Intertwined	Lanced/Intertwined
Tube Size (in.)	0.375	0.375	0.375	0.375	0.375
Face Area (sq. ft.)	5	5	8.1	8.1	8.1
Rows/FPI (Fins per inch)	4/14	4/14	4/14	4/14	4/14
Refrigerant Control	Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve
Drain Connection Size (in.)	1 PVC	1 PVC	1 PVC	1 PVC	1 PVC
Indoor Fan					
Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
No. Used/Diameter x Width (in.)	1/12 x 12	1/12 x 12	1/15 x 15	1/15 x 15	1/15 x 15
Drive Type/No. Speeds	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable
CFM (Nominal)	2,000	2,000	2,400	3,000	3,000
No. Motors	1	1	1	1	1
Motor HP - Standard/Oversized	0.75/1.5	0.75/1.5	1.5/2.0/3.0	1.5/2.0/3.0	1.5/2.0/3.0
Motor RPM	1725	1725	1725	1725	1725
Motor Frame Size	56	56	56 H	56 H	56 H
Filters[a]					
Type/Furnished	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes
(No.)/Size Recommended	(1) 16 x 20 x 1 (1) 20 x 20 x 1	(1) 16 x 20 x 1 (1) 20 x 20 x 1	(3) 16 X 25 X 1	(3) 16 X 25 X 1	(3) 16 X 25 X 1
MERV 13 (No.)/Size Recommended	(1) 16 x 20 x 2 (1) 20 x 20 x 2	(1) 16 x 20 x 2 (1) 20 x 20 x 2	(3) 16 x 25 x 2	(3) 16 x 25 x 2	(3) 16 x 25 x 2
Shipping Dimensions					
HxWxD (in.)	55.1" x 27.5" x 43.5"	55.1" x 27.5" x 43.5"	61.2" x 30.5" x 53"	61.2" x 30.5" x 53"	61.2" x 30.5" x 53"

Notes:

1. Constant volume 6-15 ton ships wired for 208/230V, field convertible 460V.
2. Oversized motor not available on 41A/B and 4KA/B models.

[a] One inch, throw-away filters shall be standard on TWE060, TWE072, TWE090, TWE120 model air handlers from the factory. The filter rack can be field converted to two inch capability. Two inch, throw-away filters shall be standard on TWE1804*B and TWE2404*B models.

Odyssey Split System Heat Pumps
General Data

Table 9. General data — 10-20 tons (TWE1204*A*-TWE2404*B*) standard air handler — 60 Hz

	10 Tons	10 Tons	15 Tons	20 Tons
	Single Circuit TWE1204*A*	**Dual Circuit TWE1204*B***	**Dual Circuit TWE1804*B***	**Dual Circuit TWE2404*B***
System Data				
No. Refrigerant Circuits	1	2	2	2
Suction Line Connection (in.) OD	1-3/8	1-1/8	1-3/8	1-3/8
Liquid Line Connection (in.) OD	1/2	1/2	1/2	1/2
Indoor Coil				
Type	Lanced/Intertwined	Lanced/Intertwined	Lanced/Intertwined	Lanced/Intertwined
Tube Size (in.)	0.375	0.375	0.375	0.375
Face Area (sq. ft.)	11.2	11.2	16.3	21.7
Rows/FPI (Fins per inch)	4/14	4/14	4/14	3/14
Refrigerant Control	Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve
Drain Connection Size (in.)	1 PVC	1 PVC	1 PVC	1 PVC
Indoor Fan				
Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
No. Used/Diameter x Width (in.)	1/15 x 15	1/15 x 15	2/15 x 15	2/15 x 15
Drive Type/No. Speeds	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable	Belt/Adjustable
CFM (Nominal)	4,000	4,000	6,000	8,000
No. Motors	1	1	1	1
Motor HP - Standard/Oversized	2.0/3.0	2.0/3.0	3.0/5.0	3.0/5.0/7.5
Motor RPM	1725	1725	1,728/1,750	1,750/3,470
Motor Frame Size	56 Hz	56 Hz	56 Hz	184T
Filters[a]				
Type/Furnished	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes	Throwaway/Yes
(No.)/Size Recommended	(4) 16 X 25 X 1	(4) 16 X 25 X 1	(8) 15 X 20 X 2	(4) 16 X 25 X 2 (4) 16 X 20 X 2
MERV 13 (No.)/Size Recommended	(4) 16 x 25 x 2	(4) 16 x 25 x 2	(8) 15 x 20 x 2	(4) 16 x 25 x 2 (4) 16 x 20 x 2
Shipping Dimensions				
HxWxD (in.)	61.2" x 30.5" x 69"	61.2" x 30.5" x 69"	76.3" x 33.3" x 85"	79.1" x 35.8" x 95"

Notes:

1. Constant volume 6-15 ton ships wired for 208/230V, field convertible 460V.
2. Oversized motor not available on 41A/B and 4KA/B models.

(a) One inch, throw-away filters shall be standard on TWE060, TWE072, TWE090, TWE120 model air handlers from the factory. The filter rack can be field converted to two inch capability. Two inch, throw-away filters shall be standard on TWE1804*B and TWE2404*B models.

BUILT TO A HIGHER STANDARD™
American Standard®
HEATING & AIR CONDITIONING

Odyssey Split System Heat Pumps
General Data

Table 10. General data — 6-20 tons (TWE0724*B* - TWE2404*B*) SZVAV and 2–speed VFD air handler — 60 Hz

	6 Tons	7.5 Tons	10 Tons	10 Tons	15 Tons	20 Tons
	Dual Circuit TWE07243B*, 4B*, WB*	**Dual Circuit TWE09043B*, 4B*, WB***	**Single Circuit TWE12043A*, 4A*, WA***	**Dual Circuit TWE12043B*, 4B*, WB***	**Dual Circuit, TWE18043B*, 4B*, WB***	**Dual Circuit, TWE24043B*, 4B*, WB***
Indoor Fan						
Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
No. Used/Diameter x Width (in.)	1/15 x 15	1/15 x 15	1/15 x 15	1/15 x 15	2/15 x 15	2/15 x 15
Drive Type/No. Speeds	Belt/VFD Variable	Belt/VFD Variable	Belt/VFD Variable	Belt/VFD Variable	Belt/VFD Variable	Belt/VFD Variable
CFM (Nominal)	2,400	3,000	4,000	4,000	6,000	8,000
No. Motors	1	1	1	1	1	1
Motor HP - Standard/Oversized	2.0/3.0	2.0/3.0	2.0/3.0	2.0/3.0	3.0/5.0	5.0/7.5
Motor RPM	1725	1725	1725	1725	1725/3450	3450/3470
Motor Frame Size	56 Hz	56 Hz	56 Hz	56 Hz	56 Hz	56 Hz/184T