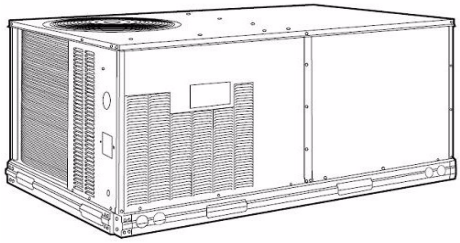
Carrier®

Product Data

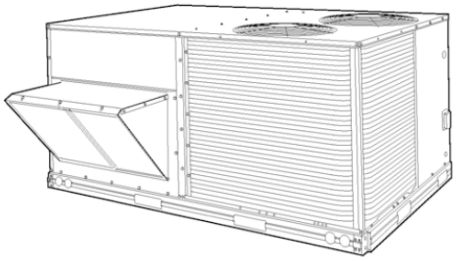
WEATHERMASTER® 48HJ004-028 48HE003-006 Single-Package Rooftop Units Gas Heating/Electric Cooling

2 to 25 Nominal Tons

WEATHERMASTER



48HE003-006
48HJ004-007



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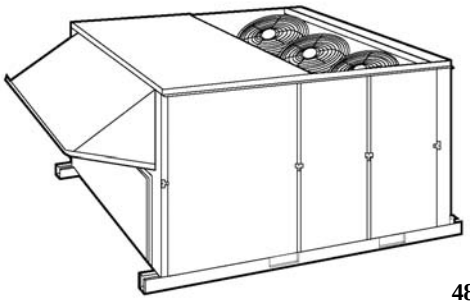
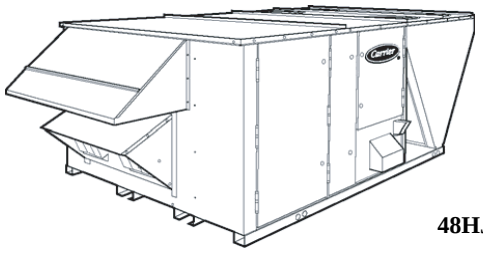


48HJ015,017



48HJ020-028

ASHRAE 90.1 COMPLIANT

High-Efficiency (HJ and HE) units well exceed ASHRAE 90.1 energy efficiency requirements. Gas heating with electric cooling rooftop units offer:

- A wide assortment of factory-installed options available, including high-static drives that provide additional performance range
- Optional factory-installed COBRA™ energy recovery unit (option on 48HE003-006 and 48HJ004-014 units only)
- Factory-installed PremierLink™ digital communicating controls
- Factory-installed optional gear driven EconoMi$er IV (vertical return for sizes 004-014 only) for use with standard rooftop unit controls (includes CO_2 sensor control capability)
- Factory-installed optional gear driven EconoMi$er2 (vertical return only) for use with PremierLink DDC controls (includes 4 to 20 mA actuator for demand control ventilation)
- Humidi-MiZer™ adaptive dehumidification system (48HE003-006 and 48HJ004-014)

Table of contents

Carrier Comfort System PremierLink

Features/Benefits

Every compact one-piece unit arrives fully assembled, charged, tested, and ready to run.

48 Series — gas heat models

All ignition components are contained in the compact IGC (integrated gas controller) which is easily accessible for servicing. The IGC control board, designed and manufactured exclusively for Carrier rooftop units, provides built-in diagnostic capability. An LED (light-emitting diode) simplifies troubleshooting by providing visual fault notification and system status confirmation.

The IGC also contains an exclusive anti-cycle protection for gas heat operation. After 4 continuous cycles on the unit high-temperature limit switch, the gas heat operation is disabled, and an error code is issued. This feature greatly improves reliability of the rooftop unit.

The IGC also contains burner control logic for accurate and dependable gas ignition. The LED is visible without removing the unit control box access panel. This LED fault-notification system reduces service person troubleshooting time and minimizes service costs. The IGC also maximizes heating efficiency by controlling evaporator-fan on and off delays.

Tubular, dimpled gas heat exchangers optimize heat transfer for improved efficiency. The tubular design permits hot gases to make multiple passes across the path of the supply air. The dimpled design creates a turbulent gas flow to maximize heating efficiency.

The efficient in-shot burners and all ignition components are contained in an easily removable, compact assembly.

The California Air Quality Management Districts NO_x requirement of 40 nanograms/joule or less is met on 004-006 size Low NO_x models.

The extra thick Alumagard™ heat exchanger coating provides corrosion resistance and ensures long life (optional stainless steel heat exchangers are available).

The unsightly appearance of flue stacks is eliminated and the effects of wind on heating operations are diminished by the induced draft combustion system. The inducer fan draws hot combustion gas through the heat exchanger at the optimum rate for the most effective heat

transfer. The heat exchanger operates under negative pressure, preventing flue gas leakage into the indoor supply air.

During the Heating mode, the evaporator-fan relay automatically starts the evaporator fan after the heat exchanger warms up to a suitable temperature. The 30-second fan delay prevents cold air from entering the supply duct system when the conditioned space is calling for heat to maximize efficiency.

The direct-spark ignition system saves operating expense when compared to pilot ignition systems. No crossover tube is required, therefore no sooting or pilot fouling problems can occur.

All standard units are designed for natural gas, but an accessory LP (liquid propane) conversion kit is available.

All units have a flame rectification sensor to quickly sense the burner flame and ignite burners almost immediately. Fast shutdown is a certainty since the sensor reacts quickly to any flame outage or system failure. In the event of a shutdown, an error code is issued at the IGC board.

Safety is also assured due to the heating safety controls which will shut down the unit if there is a problem. If excessive temperatures develop, limit switches shut off the gas valve. After 4 continuous short cycles of the high-temperature limit switch, the IGC board locks out the gas heat cycle to prevent any further short cycles. This safety feature is provided exclusively on Carrier rooftop units. The rollout switch also deenergizes the gas valve in the event of a flame rollout.

Quiet, efficient operation and dependable performance

Compressors have vibration isolators for quiet operation. Efficient fan and motor design permits operation at low sound levels.

Unit sizes 008-028 offer lower utility costs through part-load operation using 2 or 3 stages of cooling.

Quiet and efficient operation is provided by belt-driven evaporator fans (standard on all units over 5 tons). The belt-driven evaporator-fan is equipped with variable-pitch pulleys which allow adjustment within the rpm ranges of the factory-supplied pulleys.

Increased operating efficiency is achieved through computer-designed coils featuring staggered internally enhanced copper tubes. Fins are ripple-edged for strength, lanced, and double waved for higher heat transfer.

Durable, dependable construction

Designed for durability in any climate, the weather-resistant cabinets are constructed of galvanized steel and bonderized, and all exterior panels are coated with a prepainted baked enamel finish. The paint finish is non-chalking, and is capable of withstanding ASTM (American Society for Testing and Materials) B117 500-hour Salt Spray Test. All internal cabinet panels are primed, permitting longer life and a more attractive appearance for the entire unit.

In addition, all size 003-014 units are designed with a single, continuous top piece to eliminate any possible leaks at seams or gasketing. Totally enclosed condenser-fan motors and permanently lubricated bearings provide additional unit dependability.

Easy installation and conversion

All units are shipped in the vertical duct configuration for fit-up to standard roof curbs. The contractor can order and install the roof curb early in the construction stage, before decisions on size requirements are made.

All units feature a base rail design with forklift slots and rigging holes for easier maneuvering. Durable packaging protects all units during shipment and storage.

The units can be easily converted from a vertical to a horizontal duct configuration by relocating the panels supplied with the unit (size 003-014 only).

To convert 003-014 units from vertical to horizontal discharge, simply relocate 2 panels. The same basic unit can be used for a variety of applications and can be quickly modified at the job site.

To convert 015-028 units from vertical to horizontal discharge, use the optional horizontal supply/return adapter roof curb (48HJ015,017) or accessory conversion kit (48HJ020-028).

Convenient duct openings in the unit basepans permit side-by-side or concentric duct connections (see Application data section) without requiring internal unit modification.

NOTE: On units using horizontal supply and return, the accessory barometric relief or power exhaust MUST be installed on the return ductwork.

Thru-the-bottom service connection capability comes standard with the rooftop unit to allow power and control wiring and gas connections to be routed through the unit's basep an, thereby minimizing roof penetrations (to prevent water leaks). (003-014 units thru-the-bottom connection requires a thru-the-bottom accessory kit.) Power, gas and control connections are made on the same side of the unit to simplify installation.

The non-corrosive sloped condensate drain pan (size 003-014) permits either an external horizontal side condensate drain (outside the roof curb) or an internal vertical bottom drain (inside the roof curb). Both options require an external, field-supplied P-trap.

Standard 2-in. throwaway filters are easily accessed through a removable panel located above the air intake hood. No tools are required to change unit filters.

Belt-driven evaporator-fan motors allow maximum on-site flexibility without changing motors or drives.

Low voltage wiring connections are easily made thanks to the large terminal board which is located for quick, convenient access.

In addition, color-coded wires permit easy tracing and diagnostics.

Proven compressor reliability

Design techniques feature computer-programmed balance between compressor, condenser, and evaporator. Carrier-specified hermetic compressors are equipped with compressor overcurrent and overtemperature protection to ensure dependability.

Features/Benefits (cont)

All units have Carrier's exclusive Acutrol™ (003-014) or TXV (thermostatic expansion valve) metering device (015-028) which precisely controls refrigerant flow, preventing slugging and flood-back, while maintaining optimum unit performance. Refrigerant filter driers are standard.

Integrated economizers and outdoor-air dampers

Available as options or accessories, economizers and manual outdoor-air dampers introduce outdoor air which mixes with the conditioned air, improving indoor-air quality and often reducing energy consumption.

During a first stage call for cooling, if the outdoor-air temperature is below the economizer control changeover set point, the mixed-air sensor modulates the economizer outdoor-air damper open to take advantage of free cooling provided by the outside air. When second-stage cooling is called for, the compressor is energized in addition to the economizer. If the outdoor-air temperature is above the changeover set point, the first stage of compression is activated and the economizer damper stays at minimum position.

Accessory upgrade kits allow for control by differential dry-bulb temperature (outdoor vs return), outdoor air enthalpy changeover, or more precise differential enthalpy control.

Units can be equipped with different economizer options to meet specific controls applications. The factory-installed or field-installed EconoMi$er IV and EconoMi$er2 are available. The EconoMi$er IV is used with the standard rooftop unit controls and includes an industry standard, stand-alone, solid-state controller. The control can be used with a CO_2 sensor for DCV (demand control ventilation) operation. For direct digital control (DDC) applications, the EconoMi$er2 can be operated using PremierLink controls or a third party controller. The EconoMi$er2 includes 4 to 20 mA actuator capability for demand control ventilation applications.

All economizers incorporate a parallel blade, gear-driven damper system for efficient air mixing and reliable control. In addition, the standard damper actuator includes a spring return to provide reliable closure on power loss. The economizers for sizes 003-014 are equipped with up to 100% barometric relief capability for high outdoor airflow operations. Factory-installed economizers for unit sizes 003-014 are available for vertical return only. Economizers for unit sizes 015-028 are compatible for vertical or horizontal return. An optional field-installed barometric relief package is available for size 015-028 units.

In addition, single-stage power exhaust is available as a field-installed accessory for EconoMi$er IV to help maintain proper building pressure.

For units without economizer, year-round ventilation is enhanced by an optional manual outdoor-air damper. On 003-014 units, a 25% or 50% manual damper is available as a field-installed accessory. Unit sizes 015-028 are equipped with a manual 25% damper.

Service options (48HJ015-017 units only)

Servicing a rooftop unit has never been easier with the factory-installed service options for these rooftop units. These options include the following:

- Hinged access panels are provided for the filter/indoor-fan motor, compressors, evaporator fan, and control box areas. Quick access to major components is accomplished by simply unlatching and swinging open the various panels. Each hinged panel is permanently mounted to the unit, thereby eliminating the concern of a dropped or wind-blown panel puncturing delicate roof materials. The 4 extended access panels are also equipped with ''tie back'' retaining devices to hold the door in the open position while servicing the unit.
- An external, covered, 115-v Ground Fault Interrupt (GFI) receptacle is provided as a convenient power source for drills, lights, refrigerant recovery units, or other electrical service tools. A factory-supplied step down transformer is connected to the "load" side of the unit main power connection (size 003-014). For sizes 015, 017, connect the outlet to a field-supplied and properly fused branch circuit power supply.
- An integral non-fused disconnect switch within the rooftop unit reduces installation time, labor and material costs. Safety is assured by an interlock which prevents access to the control box unless the switch is in the OFF position. In addition, the externally mounted handle incorporates power lockout capability to further protect service personnel.

Carrier PremierLink™ controls add reliability, efficiency, and simplification

The PremierLink direct digital controls can be ordered as a factory-installed option (003-014 only) or as a field-installed accessory (003-028). Designed and manufactured exclusively by Carrier, the controls can be used to actively monitor and control all modes of operations, as well as monitor the following diagnostics and features: unit number, zone temperature, zone set point, zone humidity set point, discharge air temperatures, fan status, stages of heating, stages of cooling, damper position, outdoor-air temperature, outdoor humidity level, filter status, fire shutdown status, IAQ (indoor air quality) set point, enthalpy status, differential enthalpy status, heat/cool lockout, cfm set point, pre-occupancy purge, economizer controls and early morning warm-up.

This controller has a 38.4K baud communications capability and is compatible with *Comfort*Link™ controls, CCN (Carrier Comfort Network®) and ComfortVIEW™ software. The Scrolling Marquee and Navigator™ display are optional tools that can be used for programming and monitoring the unit for optimal performance. The addition of the Carrier CO_2 sensor in the conditioned space provides ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) 62-99 compliance and Demand Control Ventilation.

The PremierLink peer-to-peer, Internet ready communicating control is designed specifically for Constant Volume (CV) and Variable Volume and Temperature (VVT®) applications. This comprehensive controls system allows all Carrier 3 to 25 ton rooftops with a 3-wire communications bus to be daisy chained together on a roof to create a fully functional HVAC (heating, ventilation, and air conditioning) automation system.

Indoor-air quality (IAQ) begins with Carrier rooftops

Sloped condensate pans minimize biological growth in rooftop units in accordance with ASHRAE Standard 62. Two-inch filters with optional dirty filter indicator switch provide for greater particle reduction in the return air. The face-split evaporator coils improve the dehumidification capability of standard units, maximize building humidity control.

Optional proportional reacting CO_2 sensor is available with the Econo-Mi$er IV outdoor air damper option/accessory to aid the IAQ benefits.

Humidi-MiZer™ adaptive dehumidification system (003-014)

Carrier's Humidi-MiZer adaptive dehumidification system is an all-inclusive factory-installed option that can be ordered with any Weathermaster® 48HE003-006 and 48HJ004-014 rooftop unit to meet the demand for providing a flexible and high performing solution to accommodate all of these design related issues. This system expands the envelope of operation of Carrier's Weathermaster 48HJ004-014, 2-12.5 tons rooftop products to provide unprecedented flexibility to meet year-round comfort conditions. The Humidi-MiZer adaptive dehumidification system has the industry's only dual dehumidification mode setting. The Humidi-MiZer system includes two new modes of operation. The Weathermaster rooftop coupled with the Humidi-MiZer system is capable of operating in normal design cooling mode, subcooling mode, and hot gas reheat mode. Normal Design Cooling mode is when the unit will operate under its normal sequence of operation by cycling compressors to maintain comfort conditions. Subcooling mode will operate to satisfy part load type conditions when the space requires combined sensible and a higher proportion of latent load control. Hot Gas Reheat mode will operate when outdoor temperatures diminish and the need for latent capacity is required for sole humidity control. Hot Gas Reheat mode will provide neutral air for maximum dehumidification operation.The Humidi-MiZer™ option includes a low ambient controller and compressor crank case heaters.

COBRA™ energy recovery units (sizes 003-014 only)

Carrier's factory-installed optional COBRA units recover energy from the building exhaust air and pre-condition ventilation air for the rooftop unit during winter and summer operation. These units are designed to satisfy the higher ventilation requirements and other building codes while minimizing energy costs.

Factory installation of the 62AQ section provides the benefit of reduced field-installation time, single point power connections, and the assurance of a factory test for the complete COBRA unit. The COBRA energy recovery section requires less maintenance than other energy recovery systems and can be serviced by any qualified refrigeration technician.

The COBRA energy recovery units utilize Carrier's high-efficiency 48HE003-006 or 48HJ004-014 rooftop units and provide 2 to $12^1/_2$ tons of cooling capacity with the capability to pre-condition 600 to 3000 cfm of outdoor air.

Indoor-air quality (IAQ) generally refers to the level of pollutants inside a building. These pollutants include cigarette smoke, carbon dioxide exhaled by occupants, radon gas, car exhaust, paint fumes, and odors.

Concern over increased indoor air pollutants has been spurred by several issues: 1) changes in new building construction methods and retrofit of older buildings have reduced air infiltration rates; 2) Synthetic materials release airborne particles, odors, and chemicals; and 3) HVAC systems that bring in minimal fresh air.

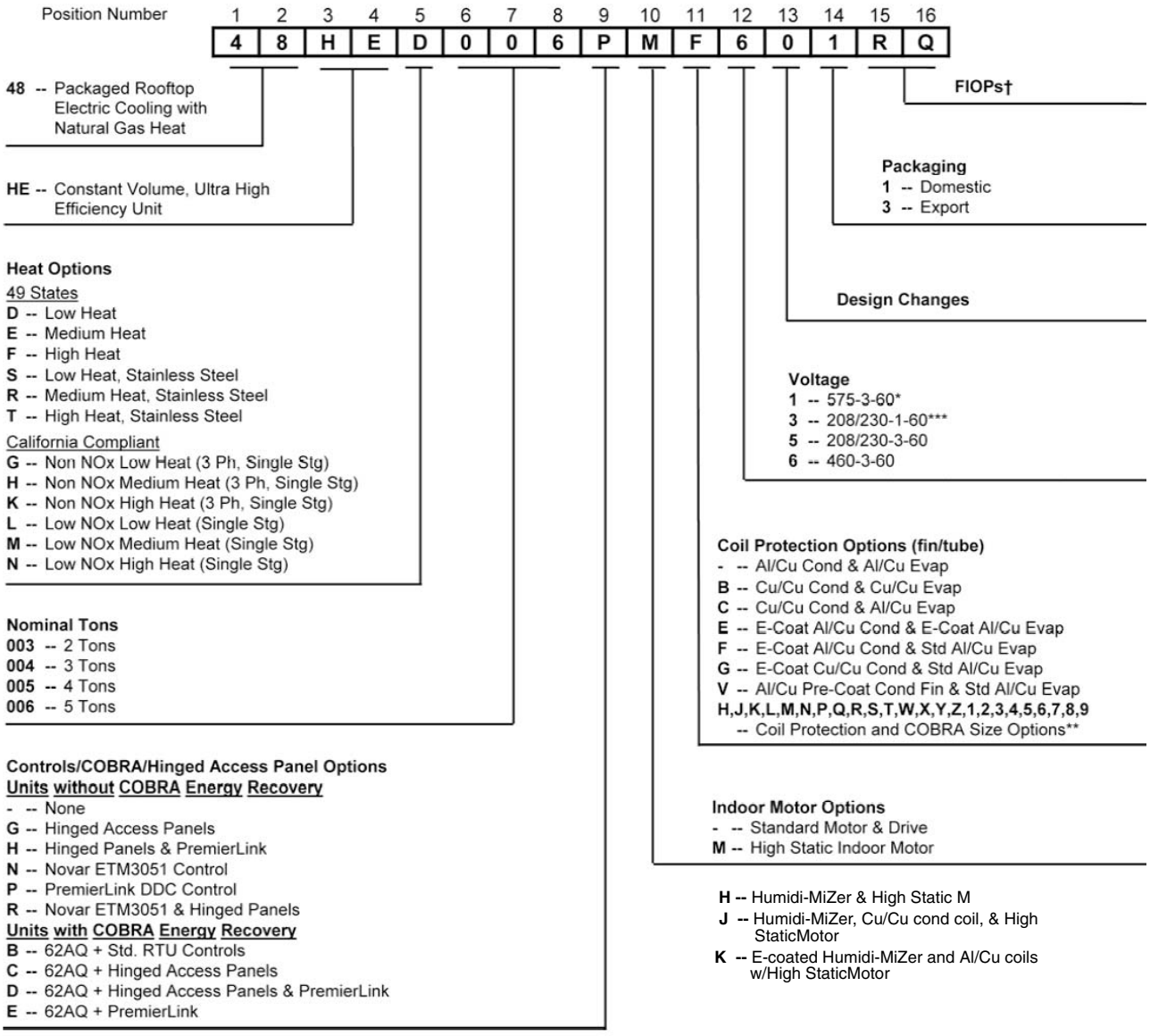
In 1989, IAQ concerns caused ASHRAE to recommend increased ventilation for all public buildings. Simply introducing fresh air into a building, however, is not always practical or cost effective. Additional ventilation can overload HVAC systems, increase energy costs and if not properly addressed can increase the indoor humidity levels.

Carrier's COBRA energy recovery unit solves this dilemma by providing increased fresh air while keeping increased costs to a minimum. In addition, the COBRA energy recovery unit helps reduce humidity levels, which helps to prevent deterioration of building materials and retards the growth of mold and mildew. Additionally, the COBRA unit can be combined with the Humidi-MiZer Adaptive Dehumidification system for maximum humidity control.

The COBRA energy recovery unit provides the best solution to retaining the energy-conserving benefits of today's tighter building construction while improving indoor-air quality.

Model number nomenclature

48HE003-006



LEGEND

Al — Aluminum
Cu — Copper
DDC — Direct Digital Controls
FIOP — Factory-Installed Option

NOTE: "COBRA" models are designated in the 9th and 11th position. The 9th position indicates if a FIOP 62AQ is required. The 11th position determines 62AQ size required.

ENERGY STAR PARTNER

Quality Assurance

Certified to ISO 9001:2000

48HE003-006 UNITS ARE ENERGY STAR QUALIFIED

48HJ004-014

Example: 48 HJ D 006 P M F 6 – – HA

48 – Packaged Rooftop Electric Cooling/ Natural Gas Heat

HJ – Constant Volume, High Efficiency

Heat Options:
49 States
D – Low Heat
E – Medium Heat
F – High Heat
S – Low Heat / Stainless Steel
R – Med Heat / Stainless Steel
T – High Heat / Stainless Steel

California Compliant
G – Non NOx Low Heat (3 Ph, Single Stg)
H – Non NOx Medium Heat (3 Ph, Single Stg)
K – Non NOx High Heat (3 Ph, Single Stg)
L – Low NOx Low Heat (Single Stg)
M – Low NOx Medium Heat (Single Stg)
N – Low NOx High Heat (Single Stg)

Nominal Capacity - Tons
004 – 3 Tons
005 – 4 Tons
006 – 5 Tons
007 – 6 Tons
008 – 7-1/2 Tons
009 – 8-1/2 Tons
012 – 10 Tons
014 – 12-1/2 Tons

Controls and Sensors*
Standard Unit
– – None
G – Hinged Access Panels
H – Hinged Panels & PremierLink™ Control
N – Novar ETM3051 Control*
P – PremierLink DDC Control
R – Novar ETM3051 & Hinged Panels*

COBRA™ Energy Recovery Unit
B – COBRA Unit & Std. RTU Controls
C – COBRA Unit & Hinged Access Panels
D – COBRA Unit & Hinged Panels & PremierLink Control
E – COBRA Unit & PremierLink Control

Voltage
1 – 575-3-60
3 – 208/230-1-60
5 – 208/230-3-60
6 – 460-3-60

Coil Protection Options (fin/tube)
Standard Unit
– – Al/Cu Cond & Al/Cu Evap
B – Cu/Cu Cond & Cu/Cu Evap
C – Cu/Cu Cond & Al/Cu Evap
E – E-Coat Al/Cu Cond & E-Coat Al/Cu Evap
F – E-Coat Al/Cu Cond & Al/Cu Evap
G – E-Coat Cu/Cu Cond & Al/Cu Evap
V – Al/Cu Pre-Coat Cond Fin & Al/Cu Evap

COBRA™ Energy Recovery Unit
H – 62AQ060 Al/Cu Supply & Exhaust / Al/Cu Cond & Evap
J – 62AQ100 Al/Cu Supply & Exhaust / Al/Cu Cond & Evap
K – 62AQ200 Al/Cu Supply & Exhaust / Al/Cu Cond & Evap
L – 62AQ300 Al/Cu Supply & Exhaust / Al/Cu Cond & Evap
M – 62AQ060 Cu/Cu Supply & Exhaust / Cu/Cu Cond & Evap
N – 62AQ100 Cu/Cu Supply & Exhaust / Cu/Cu Cond & Evap
P – 62AQ200 Cu/Cu Supply & Exhaust / Cu/Cu Cond & Evap
Q – 62AQ300 Cu/Cu Supply & Exhaust / Cu/Cu Cond & Evap
R – 62AQ060 Cu/Cu Supply & Exhaust / Al/Cu Cond & Evap
S – 62AQ100 Cu/Cu Supply & Exhaust / Al/Cu Cond & Evap
T – 62AQ200 Cu/Cu Supply & Exhaust / Al/Cu Cond & Evap
W – 62AQ300 Cu/Cu Supply & Exhaust / Al/Cu Cond & Evap
X – 62AQ060 E-Ctd Al/Cu Supply,Std. Al/Cu Exhaust / E-Ctd Al/Cu Cond & Std. Al/Cu Evap
Y – 62AQ100 E-Ctd Al/Cu Supply,Std. Al/Cu Exhaust / E-Ctd Al/Cu Cond & Std. Al/Cu Evap
Z – 62AQ200 E-Ctd Al/Cu Supply,Std. Al/Cu Exhaust / E-Ctd Al/Cu Cond & Std. Al/Cu Evap
1 – 62AQ300 E-Ctd Al/Cu Supply,Std. Al/Cu Exhaust / E-Ctd Al/Cu Cond & Std. Al/Cu Evap
2 – 62AQ060 E-Ctd Al/Cu Supply & Exhaust / E-Ctd Al/Cu Cond & Std. Al/Cu Eva
3 – 62AQ100 E-Ctd Al/Cu Supply & Exhaust / E-Ctd Al/Cu Cond & Std. Al/Cu Eva
4 – 62AQ200 E-Ctd Al/Cu Supply & Exhaust / E-Ctd Al/Cu Cond & Std. Al/Cu Eva
5 – 62AQ300 E-Ctd Al/Cu Supply & Exhaust / E-Ctd Al/Cu Cond & Std. Al/Cu Eva
6 – 62AQ060 E-Ctd Al/Cu Supply & Exhaust / E-Ctd Al/Cu Cond & Evap
7 – 62AQ100 E-Ctd Al/Cu Supply & Exhaust / E-Ctd Al/Cu Cond & Evap
8 – 62AQ200 E-Ctd Al/Cu Supply & Exhaust / E-Ctd Al/Cu Cond & Evap
9 – 62AQ300 E-Ctd Al/Cu Supply & Exhaust / E-Ctd Al/Cu Cond & Evap

Indoor Motor Options
– – Standard Motor & Drive
H – Humidi-MiZer™ & High Static Indoor Motor
J – Humidi-MiZer, Cu/Cu with High-Static Motor
K – E-coated Humidi-MiZer with High-Static Indoor Motor
M – High-Static Indoor Motor

LEGEND

Al — Aluminum
Cu — Copper
DDC — Direct Digital Controls
E-Ctd — E-Coated
FIOP — Factory-Installed Option

*Contact factory for availability and applications.
†Refer to 48HJ Price Pages, Quote Builder software or contact your local Carrier Representative for FIOP code table.

NOTE: Hinged Access Panels include: Filter Panel, Control Box Panel, Fan Motor Panel, Compressor Panel.

Quality Assurance

Certified to ISO 9001:2000

ENERGY STAR PARTNER

48HJ004-012 UNITS ARE ENERGY STAR QUALIFIED

Model number nomenclature (cont)

48HJ015,017

48 HJ D 017 G – C 6 – – YA

48 – Single Package Rooftop Units, Gas Heating/Electric Cooling

HJ – Constant Volume, High Efficiency

Heat Options
D – Low Heat
F – High Heat
M – Low Heat, Stainless Steel Heat Exchangers
N – High Heat, Stainless Steel Heat Exchangers

Nominal Capacity – Tons
015 – 12 Tons
017 – 15 Tons

Service/Control Options
– – Standard Controls
G – Service Option with 6 Hinged Access Panels, Non-Fused Disconnect, and Non-Powered 115-v GFI Convenience Outlet
J – Hinged Access Panels

Outdoor Air and Fan Drive Options
AA – EconoMi$er IV and High Fan Drive Static Capability
BA – Manual 25% Outside Air Damper and High Fan Drive Static Capability
QA – EconoMi$er IV and Low-Medium Fan Drive Static Capability
YA – Manual 25% Outside Air Damper and Low-Medium Fan Drive Static Capability

Voltage Description
1 – 575-3-60
5 – 208/230-3-60
6 – 460-3-60

Coil Protection Options (fin/tube)
– – Al/Cu Condenser and Evaporator
B – Cu/Cu Condenser and Evaporator
C – Cu/Cu Condenser and Al/Cu Evaporator
F – E-Coated Al/Cu Condenser and Al/Cu Evaporator
G – E-Coated Cu/Cu Condenser and Al/Cu Evaporator
V – Al/Cu Pre-Coated Condenser Fins

LEGEND
Al — Aluminum
Cu — Copper

ENERGY STAR PARTNER

48HJ015-017 UNITS ARE ENERGY STAR QUALIFIED

Quality Assurance

Certified to ISO 9001:2000

48HJ020-028

48HJ D 024 – A C 6 – – AA *

Factory-Installed Options

48HJ – Single Package Rooftop Units, Gas Heating/Electric Cooling, Constant Volume

Heating Options
D – Low Gas Heat with Aluminized Steel Heat Exchanger
E – Medium Gas Heat with Aluminized Steel Heat Exchanger
F – High Gas Heat with Aluminized Steel Heat Exchanger
K – Low Gas Heat with Stainless Steel Heat Exchanger
L – Medium Gas Heat with Stainless Steel Heat Exchanger
M – High Gas Heat with Stainless Steel Heat Exchanger

Voltage Description
1 – 575-3-60
5 – 208/230-3-60
6 – 460-3-60

Coil Protection Options (fin/tube)
– – Al/Cu Cond & Evap
A – Al/Cu Pre-Coat Cond & Al/Cu Evap
B – Al/Cu E-Coat Cond & Al/Cu Evap
C – Al/Cu E-Coat Cond & Evap
D – Cu/Cu Cond & Al/Cu Evap
E – Cu/Cu Cond & Evap
F – Cu/Cu E-Coat Cond & Al/Cu Evap
G – Cu/Cu E-Coat Cond & Cu/Cu Evap
H – Cu/Cu E-Coat Cond & Evap

Nominal Capacity – Tons
020 – 18 Tons
024 – 20 Tons
028 – 25 Tons

Service/Control Options
– – Mechanical Controls
U – Mechanical Controls with Return Smoke Detector
V – Mechanical Controls with Supply and Return Smoke Detectors

Indoor Motor Options
A – Low Range, Vertical Supply/Return
B – Mid-Low Range, Vertical Supply/Return
C – Mid-High Range, Vertical Supply/Return
D – High Range, Vertical Supply/Return
E – Low Range, Horizontal Supply/Return
F – Mid-Low Range, Horizontal Supply/Return
G – Mid-High Range, Horizontal Supply/Return
H – High Range, Horizontal Supply/Return
J – Low Range, Vertical Supply/Return with Hinged Panels
K – Mid-Low Range, Vertical Supply/Return with Hinged Panels
L – Mid-Range, Vertical Supply/Return with Hinged Panels
M – High Range, Vertical Supply/Return with Hinged Panels
N – Low Range, Horizontal Supply/Return with Hinged Panels
P – Mid-Low Range, Horizontal Supply/Return with Hinged Panels
Q – Mid-High Range, Horizontal Supply/Return with Hinged Panels
R – High Range, Horizontal Supply/Return with Hinged Panels

LEGEND
Al — Aluminum
Cu — Copper
FIOP — Factory-Installed Option

*Refer to 48HJ price pages or contact your local Carrier representative for FIOP code table.

Quality Assurance

Certified to ISO 9001:2000

ENERGY STAR PARTNER

48HJ020-028 UNITS ARE ENERGY STAR QUALIFIED

ARI* capacity ratings

****ARI* CAPACITY RATINGS — 48HE003-006**

UNIT 48HE	NOMINAL TONS	COOLING (Btuh)	TOTAL kW	SEER	EER	SOUND RATING (decibels)
003	2	24,000	3.2	14.1	12.0**	76
004	3	36,200	4.1	14.0	11.8**	76
005	4	46,000	5.5	14.0	11.7**	76
006	5	59,000	6.7	14.0	11.9	80

LEGEND

EER — Energy Efficiency Ratio
SEER — Seasonal Energy Efficiency Ratio

*Air-Conditioning & Refrigeration Institute.
**ARI does not require EER ratings for unit with capacity below 65,000 Btuh. For these units, the EER rating at ARI standard conditions is provided for information only.

NOTES:
1. Rated in accordance with ARI Standard 210-94 or 360-93.
2. Ratings are net values, reflecting the effects of circulating fan heat.
3. Ratings are based on:
   Cooling Standard: 80 F db, 67 wb indoor entering-air temperature and 95 F db outdoor entering-air temperature.
   IPLV Standard: 80 F db, 67 F wb indoor entering-air temperature and 80 F db outdoor entering-air temperature.

ARI Standard 210/240 UAC

4. All 48HE003-006 units are in compliance with ASHRAE 90.1 2001, 2004 Energy Standard for minimum SEER and EER requirements. Refer to state and local codes or visit the following website: http://bcap-energy.org to determine if compliance with this standard pertains to a given geographical area of the United States.

HEATING CAPACITIES AND EFFICIENCIES — 48HE003-006

208/230-1-60 — SINGLE-STAGE GAS HEAT

UNIT	INPUT CAPACITY		OUTPUT CAPACITY		TEMPERATURE	MINIMUM HEATING	EFFICIENCY	
48HE	1st Stage	2nd Stage	1st Stage	2nd Stage	RISE (°F)	AIRFLOW (CFM)	AFUE (%)	Steady State (%)
E/R003	50,000	—	40,500	—	25-65	575	81.00	81
E/R004	72,000	—	59,040	—	25-55	1004	82.80	82
F/T004	115,000	—	92,000	—	55-85	1002	80.00	80
D/S005	72,000	—	58,000	—	25-55	1004	82.80	82
E/R005	115,000	—	92,000	—	35-65	1320	81.00	81
F/T005	150,000	—	118,000	—	50-80	1396	80.40	80
D/S006	72,000	—	58,000	—	25-55	1004	82.80	82
E/R006	115,000	—	92,000	—	35-65	1327	81.00	81
F/T006	150,000	—	118,000	—	50-80	1314	80.40	80

208/230-1-60 — SINGLE-STAGE GAS HEAT — LOW NOx

UNIT	INPUT CAPACITY		OUTPUT CAPACITY		TEMPERATURE	MINIMUM HEATING	EFFICIENCY	
48HE	1st Stage	2nd Stage	1st Stage	2nd Stage	RISE (°F)	AIRFLOW (CFM)	AFUE (%)	Steady State (%)
M003	50,000	—	40,500	—	25-65	575	81.00	81
M004	60,000	—	50,000	—	20-50	930	80.20	81
N004	90,000	—	74,000	—	30-60	1150	81.00	81
L005	60,000	—	50,000	—	20-50	930	80.20	81
M005	90,000	—	74,000	—	30-60	1150	81.00	81
N005	120,000	—	101,000	—	40-70	1340	80.70	82
L006	60,000	—	50,000	—	20-50	930	80.20	81
M006	90,000	—	74,000	—	30-60	1150	81.00	81
N006	120,000	—	101,000	—	40-70	1340	80.70	82

AFUE — Annual Fuel Utilization Efficiency

NOTE: Capacities for stainless steel heat exchanger units (S/R/T) are the same as standard units (D/E/F).

HEATING CAPACITIES AND EFFICIENCIES — 48HE003-006 (cont)

208/230/460-3-60 — SINGLE-STAGE GAS HEAT — LOW NOx

UNIT	INPUT CAPACITY		OUTPUT CAPACITY		TEMPERATURE	MINIMUM HEATING	EFFICIENCY	
48HE	1st Stage	2nd Stage	1st Stage	2nd Stage	RISE (°F)	AIRFLOW (CFM)	AFUE (%)	Steady State (%)
M004	60,000	—	50,000	—	20-50	930	80.20	81
N004	90,000	—	74,000	—	30-60	1150	81.00	81
L005	60,000	—	50,000	—	20-50	930	80.20	81
M005	90,000	—	74,000	—	30-60	1150	81.00	81
N005	120,000	—	101,000	—	40-70	1340	80.70	82
L006	60,000	—	50,000	—	20-50	930	80.20	81
M006	90,000	—	74,000	—	30-60	1150	81.00	81
N006	120,000	—	101,000	—	40-70	1340	80.70	82

208/230/460-3-60 — SINGLE-STAGE GAS HEAT

UNIT	INPUT CAPACITY		OUTPUT CAPACITY		TEMPERATURE	MINIMUM HEATING	EFFICIENCY	
48HE	1st Stage	2nd Stage	1st Stage	2nd Stage	RISE (°F)	AIRFLOW (CFM)	AFUE (%)	Steady State (%)
H004	72,000	—	59,040	—	25-55	1000	82.00	82
K004	115,000	—	92,000	—	55-85	1020	80.00	81
G005	72,000	—	59,040	—	25-55	1000	82.00	82
H005	115,000	—	93,150	—	30-60	1440	81.00	81
K005	150,000	—	120,000	—	50-80	1390	80.00	80
G006	72,000	—	59,040	—	25-55	1220	82.00	82
H006	115,000	—	93,150	—	35-65	1330	81.00	81
K006	150,000	—	120,000	—	50-80	1390	80.00	80

208/230/460/575-3-60 — 2-STAGE GAS HEAT

UNIT	INPUT CAPACITY		OUTPUT CAPACITY		TEMPERATURE	MINIMUM HEATING	EFFICIENCY	
48HE	1st Stage	2nd Stage	1st Stage	2nd Stage	RISE (°F)	AIRFLOW (CFM)	AFUE (%)	Steady State (%)
E004	50,000	72,000	41,000	59,040	25-55	1004	82.80	82
F004	82,000	115,000	65,600	93,150	55-85	1002	80.00	80
D005	50,000	72,000	41,000	59,040	25-55	1094	82.80	82
E005	82,000	115,000	66,420	93,150	35-65	1330	81.00	81
F005	120,000	150,000	96,000	120,000	50-80	1390	80.40	80
D006	50,000	72,000	41,000	59,040	25-55	1004	82.80	82
E006	82,000	115,000	66,420	93,150	35-65	1330	81.00	81
F006	120,000	150,000	96,000	120,000	50-80	1370	80.40	80

AFUE — Annual Fuel Utilization Efficiency

NOTE: Capacities for stainless steel heat exchanger units (S/R/T) are the same as standard units (D/E/F).

ARI* capacity ratings (cont)

****ARI* CAPACITY RATINGS — 48HJ004-014**

UNIT 48HJ	NOMINAL TONS	COOLING (Btuh)	TOTAL kW	SEER†	EER	SOUND RATING (decibels)	IPLV††
004	3	36,000	3.2	13.0	11.2**	76	N/A
005	4	46,000	4.1	13.0	11.1**	76	N/A
006	5	61,000	5.5	13.0	11.0**	80	N/A
007	6	73,000	6.7	—	11.0	80	N/A
008	7 1/2	90,000	8.2	—	11.0	82	11.6
009	8 1/2	103,000	8.9	—	11.6	82	12.8
012	10	120,000	10.9	—	11.0	84	11.4
014	12.5	138,000	14.4	—	9.6	86	10.3

LEGEND

EER — Energy Efficiency Ratio
IPLV — Integrated Part-Load Value
SEER — Seasonal Energy Efficiency Ratio

*Air-Conditioning & Refrigeration Institute.
†Applies only to units with capacity of 65,000 Btuh or less.
**ARI does not require EER ratings for unit with capacity below 65,000 Btuh. For these units, the EER rating at ARI standard conditions is provided for information only.
††The IPLV is not applicable to single-compressor units.

NOTES:
1. Rated in accordance with ARI Standard 210-94 or 360-93.
2. Ratings are net values, reflecting the effects of circulating fan heat.
3. Ratings are based on:
   Cooling Standard: 80 F db, 67 wb indoor entering-air temperature and 95 F db outdoor entering-air temperature.
   IPLV Standard: 80 F db, 67 F wb indoor entering-air temperature and 80 F db outdoor entering-air temperature.

ARI Standard 210/240 UAC

4. All 48HJ004-014 units are in compliance with ASHRAE 90.1 2001, 2004 Energy Standard for minimum SEER and EER requirements. Refer to state and local codes or visit the following website: http://bcap-energy.org to determine if compliance with this standard pertains to a given geographical area of the United States.

HEATING CAPACITIES AND EFFICIENCIES — 48HJ004-014

208/230-1-60 — SINGLE-STAGE GAS HEAT

UNIT 48HJ	INPUT CAPACITY		OUTPUT CAPACITY		TEMPERATURE RISE (°F)	MINIMUM HEATING AIRFLOW (CFM)	EFFICIENCY	
	1st Stage	2nd Stage	1st Stage	2nd Stage			AFUE (%)	Steady State (%)
E/R004	72,000	—	58,000	—	25-55	1004	82.8%	82.0
F/T004	115,000	—	90,000	—	55-85	1002	80.0%	80.0
D/S005	72,000	—	58,000	—	25-55	1004	82.8%	82.0
E/R005	115,000	—	92,000	—	35-65	1320	81.0%	81.0
F/T005	150,000	—	118,000	—	50-80	1396	80.4%	80.0
D/S006	72,000	—	58,000	—	25-55	1004	82.8%	82.0
E/R006	115,000	—	92,000	—	35-65	1327	81.0%	81.0
F/T006	150,000	—	118,000	—	50-80	1314	80.4%	80.0

208/230-1-60 — SINGLE-STAGE GAS HEAT — LOW NOx

UNIT 48HJ	INPUT CAPACITY		OUTPUT CAPACITY		TEMPERATURE RISE (°F)	MINIMUM HEATING AIRFLOW (CFM)	EFFICIENCY	
	1st Stage	2nd Stage	1st Stage	2nd Stage			AFUE (%)	Steady State (%)
M004	60,000	—	50,000	—	20-50	930	80.2%	81.2
N004	90,000	—	74,000	—	30-60	1150	81.0%	81.4
L005	60,000	—	50,000	—	20-50	930	80.2%	81.2
M005	90,000	—	74,000	—	30-60	1150	81.0%	81.4
N005	120,000	—	101,000	—	40-70	1340	80.7%	82.4
L006	60,000	—	50,000	—	20-50	930	80.2%	81.2
M006	90,000	—	74,000	—	30-60	1150	81.0%	81.4
N006	120,000	—	101,000	—	40-70	1340	80.7%	82.4

AFUE — Annual Fuel Utilization Efficiency

NOTE: Capacities for stainless steel heat exchanger units (S/R/T) are the same as standard units (D/E/F).

HEATING CAPACITIES AND EFFICIENCIES — 48HJ004-014 (cont)

208/230/460-3-60 — SINGLE-STAGE GAS HEAT — LOW NOx

UNIT 48HJ	INPUT CAPACITY		OUTPUT CAPACITY		TEMPERATURE RISE (°F)	MINIMUM HEATING AIRFLOW (CFM)	EFFICIENCY	
	1st Stage	2nd Stage	1st Stage	2nd Stage			AFUE (%)	Steady State (%)
M004	60,000	—	50,000	—	20-50	930	80.2%	81.2
N004	90,000	—	74,000	—	30-60	1150	81.0%	81.4
L005	60,000	—	50,000	—	20-50	930	80.2%	81.2
M005	90,000	—	74,000	—	30-60	1150	81.0%	81.4
N005	120,000	—	101,000	—	40-70	1340	80.7%	82.4
L006	60,000	—	50,000	—	20-50	930	80.2%	81.2
M006	90,000	—	74,000	—	30-60	1150	81.0%	81.4
N006	120,000	—	101,000	—	40-70	1340	80.7%	82.4

208/230/460-3-60 — SINGLE-STAGE GAS HEAT

UNIT 48HJ	INPUT CAPACITY		OUTPUT CAPACITY		TEMPERATURE RISE (°F)	MINIMUM HEATING AIRFLOW (CFM)	EFFICIENCY	
	1st Stage	2nd Stage	1st Stage	2nd Stage			AFUE (%)	Steady State (%)
H004	72,000	—	59,040	—	25-55	1000	82.0%	82.0
K004	115,000	—	93,150	—	55-85	1020	80.0%	81.0
G005	72,000	—	59,040	—	25-55	1000	82.0%	82.0
H005	115,000	—	93,150	—	30-60	1440	81.0%	81.0
K005	150,000	—	120,000	—	50-80	1390	80.0%	80.0
G006	72,000	—	59,040	—	25-55	1220	82.0%	82.0
H006	115,000	—	93,150	—	35-65	1330	81.0%	81.0
K006	150,000	—	120,000	—	50-80	1390	80.0%	80.0

208/230/460/575-3-60 — 2-STAGE GAS HEAT

UNIT 48HJ	INPUT CAPACITY		OUTPUT CAPACITY		TEMPERATURE RISE (°F)	MINIMUM HEATING AIRFLOW (CFM)	EFFICIENCY	
	1st Stage	2nd Stage	1st Stage	2nd Stage			AFUE (%)	Steady State (%)
E004	50,000	72,000	41,000	59,040	25-55	1004	82.8%	82.0
F004	82,000	115,000	65,600	93,150	55-85	1002	80.0%	80.0
D005	50,000	72,000	41,000	59,040	25-55	1094	82.8%	82.0
E005	82,000	115,000	66,420	93,150	35-65	1330	81.0%	81.0
F005	120,000	150,000	96,000	120,000	50-80	1390	80.4%	80.0
D006	50,000	72,000	41,000	59,040	25-55	1004	82.8%	82.0
E006	82,000	115,000	66,420	93,150	35-65	1330	81.0%	81.0
F006	120,000	150,000	96,000	120,000	50-80	1370	80.4%	80.0
D007	50,000	72,000	41,000	59,040	25-55	1220	82.0%	82.0
E007	82,000	115,000	66,420	93,150	35-65	1330	81.0%	81.0
F007	120,000	150,000	96,000	120,000	50-80	1390	80.0%	80.0
D008	90,000	125,000	73,800	102,500	20-50	1900	82.0%	82.0
E008	120,000	180,000	98,400	147,600	35-65	2100	82.0%	82.0
F008	180,000	224,000	147,600	183,680	45-75	2230	82.0%	82.0
D009	90,000	125,000	73,800	102,500	20-50	1900	82.0%	82.0
E009	120,000	180,000	98,400	147,600	35-65	2100	82.0%	82.0
F009	180,000	224,000	147,600	183,680	45-75	2230	82.0%	82.0
D012	120,000	180,000	98,400	147,600	35-65	2100	82.0%	82.0
E012	180,000	224,000	147,600	183,680	35-65	2570	82.0%	82.0
F012	200,000	250,000	160,000	200,000	40-70	2650	80.0%	80.0
D014	180,000	224,000	147,600	183,680	35-65	2570	82.0%	82.0
E014	200,000	250,000	160,000	200,000	40-70	2650	80.0%	80.0

AFUE — Annual Fuel Utilization Efficiency

NOTE: Capacities for stainless steel heat exchanger units (S/R/T) are the same as standard units (D/E/F).

ARI* capacity ratings (cont

ARI* CAPACITY RATINGS — 48HJ015,017

UNIT 48HJD	NOMINAL TONS	CFM	NET COOLING CAPACITY (Btuh)	TOTAL WATTS	EER	SOUND RATING (decibels)	IPLV
015	12	3750	152,000	14,074	10.8	88	11.8
017	15	4500	176,000	16,296	10.8	88	11.7

UNIT 48HJF	NOMINAL TONS	CFM	NET COOLING CAPACITY (Btuh)	TOTAL WATTS	EER	SOUND RATING (decibels)	IPLV
015	12	3750	152,000	14,074	10.8	88	11.8
017	15	4500	176,000	16,296	10.8	88	11.7

LEGEND

db — Dry Bulb
EER — Energy Efficiency Ratio
IPLV — Integrated Part-Load Values
wb — Wet Bulb

*Air Conditioning and Refrigeration Institute.

NOTES:
1. Rated in accordance with ARI Standards 360-93 and 270-95.
2. ARI ratings are net values, reflecting the effects of circulating fan heat.
3. Ratings are based on:

ARI Standard 210/240 UAC

Cooling Standard: 80 F db, 67 F wb indoor entering-air temperature and 95 F db air entering outdoor unit.
IPLV Standard: 80 F db, 67 F wb indoor entering-air temperature and 80 F db outdoor entering-air temperature.

4. All 48HJ015,017 units are in compliance with ASHRAE 90.1 2001 Energy Standard for minimum EER requirements. Refer to state and local codes or visit the following website: http://bcap-energy.org to determine if compliance with this standard pertains to a given geographical area of the United States.

HEATING CAPACITIES AND EFFICIENCIES — 48HJ015,017

UNIT 48	HEATING INPUT (Btuh) Stage 2/Stage 1*	OUTPUT CAPACITY (Btuh)	TEMPERATURE RISE (F)	STEADY STATE EFFICIENCY (%)	MINIMUM HEATING CFM†
HJD/M015	230,000/172,000	186,000	15-45	81.0	3750
HJF/N015	300,000/225,000	243,000	30-60	81.0	3830
HJD/M017	275,000/206,000	223,000	15-45	81.0	4580
HJF/N017	360,000/270,000	292,000	20-50	81.0	5400

*All units are 2-stage heat.
†Minimum heating cfm must be maintained to ensure proper heating operation.

NOTE: Minimum allowable temperature of mixed air entering the heat exchanger during first stage heating is 45 F. There is no minimum mixed-air limitation during second-stage heating.

ARI* CAPACITY RATINGS — 48HJ020-028

UNIT 48HJ	NOMINAL TONS	CFM	NET COOLING CAPACITY (Btuh)	TOTAL kW	EER	SOUND RATING (dB)	IPLV†
020	18	5,500	200,000	18.5	10.8	81.7	12.0
024	20	6,000	234,000	21.7	10.8	81.7	11.9
028**	25	7,500	278,000	27.8	10.0	84.6	10.9

LEGEND

db — Dry Bulb
EER — Energy Efficiency Ratio
IPLV — Integrated Part-Load Values
wb — Wet Bulb

*Air Conditioning and Refrigeration Institute.
†IPLV values are calculated based on control configuration T.CTL = 2 (2 Stage Y1).
**Size 028 unit is not listed with ARI, but is tested to ARI standards.

NOTES:
1. Rated in accordance with ARI Standards 360-93 and 270-95.
2. ARI ratings are net values, reflecting the effects of circulating fan heat.
3. Ratings are based on:

ARI Standard 210/240 UAC

Cooling Standard: 80 F db, 67 F wb indoor entering-air temperature and 95 F db air entering outdoor unit.
IPLV Standard: 80 F db, 67 F wb indoor entering-air temperature and 80 F db outdoor entering-air temperature.
4. All 48HJ020-028 units are in compliance with ASHRAE 90.1 2001, 2004 Energy Standard for minimum EER requirements. Refer to state and local codes or visit the following website: http:///bcap-energy.org to determine if compliance with this standard pertains to a given geographical area of the United States.

HEATING CAPACITIES AND EFFICIENCIES — 48HJ020-028

VERTICAL SUPPLY — NATURAL GAS

UNIT 48HJ	HEATING INPUT (Btuh) Stage 2/Stage 1	OUTPUT CAPACITY (Btuh)	TEMPERATURE RISE (F)	STEADY-STATE EFFICIENCY %	MINIMUM HEATING CFM
D/L020	250,000/199,000	205,000	15-45	82%	4218
E/M020	365,000/281,000	296,000	25-55	81%	4977
F/N020	400,000/317,000	328,000	25-55	82%	5522
D/L024	250,000/199,000	205,000	15-45	82%	4218
E/M024	365,000/281,000	296,000	25-55	81%	4977
F/N024	400,000/317,000	328,000	25-55	82%	5522
D/L028	250,000/199,000	205,000	15-45	82%	4218
E/M028	365,000/281,000	296,000	25-55	81%	4977
F/N028	400,000/317,000	328,000	25-55	82%	5522

NOTE: All units are 2-stage gas heat.

HORIZONTAL SUPPLY — NATURAL GAS

UNIT 48HJ	HEATING INPUT (Btuh) Stage 2/Stage 1	OUTPUT CAPACITY (Btuh)	TEMPERATURE RISE (F)	STEADY-STATE EFFICIENCY %	MINIMUM HEATING CFM
D/L020	250,000/199,000	205,000	15-45	82%	4218
E/M020	365,000/281,000	296,000	25-55	81%	4977
F/N020	400,000/317,000	328,000	25-55	82%	5522
D/L024	250,000/199,000	205,000	15-45	82%	4218
E/M024	365,000/281,000	296,000	25-55	81%	4977
F/N024	400,000/317,000	328,000	25-55	82%	5522
D/L028	250,000/199,000	205,000	15-45	82%	4218
E/M028	365,000/281,000	296,000	25-55	81%	4977*
F/N028	400,000/317,000	325,000	25-55	82%	5522*

*7000 cfm minimum recommended above 1.0 in. wg external static pressure. NOTE: All units are 2-stage gas heat.

VERTICAL SUPPLY — PROPANE

UNIT 48HJ	HEATING INPUT (Btuh) Stage 2/Stage 1	OUTPUT CAPACITY (Btuh)	TEMPERATURE RISE (F)	STEADY-STATE EFFICIENCY %	MINIMUM HEATING CFM
D/L020	250,000/207,000	205,000	15-45	82%	4218
E/M020	365,000/291,000	296,000	25-55	81%	4480
F/N020	400,000/331,000	328,000	25-55	82%	5522
D/L024	250,000/207,000	205,000	15-45	82%	4218
E/M024	365,000/291,000	296,000	25-55	81%	4480
F/N024	400,000/331,000	328,000	25-55	82%	5522
D/L028	250,000/207,000	205,000	15-45	82%	4218
E/M028	365,000/291,000	296,000	25-55	81%	4480
F/N028	400,000/331,000	328,000	25-55	82%	5522

NOTE: All units are 2-stage gas heat.

HORIZONTAL SUPPLY — PROPANE

UNIT 48HJ	HEATING INPUT (Btuh) Stage 2/Stage 1	OUTPUT CAPACITY (Btuh)	TEMPERATURE RISE (F)	STEADY-STATE EFFICIENCY %	MINIMUM HEATING CFM
D/L020	225,000/207,000	185,000	15-45	82%	3807
E/M020	329,000/291,000	266,000	25-55	81%	4480
F/N020	356,000/331,000	292,000	25-55	82%	4916
D/L024	225,000/207,000	184,500	15-45	82%	3796
E/M024	329,000/291,000	266,000	25-55	81%	4480
F/N024	356,000/331,000	292,000	25-55	82%	4916
D/L028	225,000/207,000	185,000	15-45	82%	3807
E/M028	329,000/291,000	266,000	25-55	81%	4480*
F/N028	356,000/331,000	292,000	25-55	82%	4920*

*7000 cfm minimum recommended above 1.0 in. wg external static pressure. NOTE: All units are 2-stage gas heat.

Physical data — 48HE

BASE UNIT 48HE		HD/E/F003	HE/F/H/K/M/N004	H/E/F/G/H/K/L/M/N005	HD/E/F/G/H/K/L/M/N006
NOMINAL CAPACITY (tons)		2	3	4	5
OPERATING WEIGHT(lb)					
Base Unit**		530	540	560	635
COMPRESSOR				Scroll	
Quantity		1	1	1	1
Oil (oz)		25	42	56	53
REFRIGERANT TYPE				R-22	
Expansion Device Operating Charge (lb-oz)				Acutrol™ MeteringDevice	
Standard Unit		5---3	7---11	8---8	12---11
Unit With Humidi-Mizer Adaptive Dehumidification System		10---2	14---0	14---13	21---0
CONDENSER FAN				Propeller	
Quantity...Diameter (in.)		1...22	1...22	1...22	1...22
Nominal Cfm		3000	3500	3500	4100
Motor Hp...Rpm		1/8...825	1/8...825	1/8...825	1/4...1100
Watts Input (Total)		180	180	180	320
CONDENSER COIL				Enhanced Copper Tubes, Aluminum LancedFins	
Rows...Fins/in.		1...17	1...17	2...17	2...17
Total Face Area (sq ft)		14.6	14.6	16.5	16.5
EVAPORATOR COIL				Enhanced Copper Tubes, Aluminum Double-Wavy Fins	
Standard Unit					
Rows...Fins/in.		2...15	2...15	2...15	4...15
Total Face Area (sq ft)		4.2	5.5	5.5	5.5
Humidi-Mizer Coil Adaptive Dehumidification System					
Rows...Fins/in.		1...17	1...17	2...17	2...17
Total Face Area (sq ft)		3.5	3.9	3.9	3.9
EVAPORATOR FAN				Centrifugal Type, Belt Drive	
Quantity...Size (in.)		1...10 x 10	1...10 x 10	1...10 x 10	1...10 x 10
Nominal Cfm		800	1200	1600	2000
Maximum Continuous Bhp	**Std**	0.58	1.20	1.20	1.30/2.40*
	Hi-Static	2.40	2.40	2.40	2.90
Motor Frame Size	**Std**	48	48	48	48/56†
	Hi-Static		56	56	56
Motor Rpm	**Std**	1620	1620	1620	1725
	Hi-Static		1725	1725	1725
Fan Rpm Range	**Std**	400-1000	680-1044	770-1185	1035-1460
	Hi-Static		1075-1455	1075-1455	1300-1685
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Fan Rpm		1620	2100	2100	2100
Motor Pulley Pitch Diameter A/B (in.)	**Std**	2.4/3.2	1.9/2.9	1.9/2.0	2.4/3.4
	Hi-Static		2.8/3.8	2.8/3.8	3.4/4.4
Nominal Motor Shaft Diameter (in.)	**Std**	5/8	1/2	1/2	5/8
	Hi-Static	7/8	5/8	5/8	5/8
Fan Pulley Pitch Diameter (in.)	**Std**	4.0	4.5	4.0	4.0
	Hi-Static	4.5	4.5	4.0	4.5
Belt — Type...Length (in.)	**Std**	1...A...36	1...A...36	1....4...36	1...A...40
	Hi-Static	1...A...39	1...A...39	1...A...39	1...A...40
Pulley Center Line Distance (in.)		10.0 -12.4	10.0-12.4	10.0-12.4	14.7-15.5
Speed Change per Full Turn of Movable Pulley Flange (rpm)	**Std**	60	65	70	75
	Hi-Static		65	65	60
Movable Pulley Maximum Full Turns from Closed Position	**Std**	5	5	5	6
	Hi-Static		6	6	5
Factory Setting — Full Turns Open	**Std**	3	3	3	3
	Hi-Static		31/2	31/2	31/2
Factory Speed Setting(rpm)	**Std**	756	826	936	1248
	Hi-Static		1233	1233	1396
Fan Shaft Diameter at Pulley (in.)		5/8	5/8	5/8	5/8

LEGEND

Bhp — Brake Horsepower

*Single/three phase .
**Base unit weight does not include any options or accessaries. See Options and Accessary weight tables for additioinal weight information.
†Indicates automatic reset.

Physical data — 48HE (cont)

BASE UNIT 48HE	HD/E/F003	HE/F/H/K/M/N004	HD/E/F/G/H/K/L/M/N005	HD/E/F/G/H/K/L/M/N006
FURNACE SECTION				
Rollout Switch Cutout Temp(F)†	195	195	195	195
Burner Orifice Diameter (in....drill size)**				
Natural Gas—Std*		**HJE** .113...33	**HJD** .113...33	**HJD** .113...33
	HEE .089...43	**HJF** .113...33	**HJE** .113...33	**HJE** .113...33
		—	**HJF** .129...30	**HJF** .129...30
	—	**HJH** .113...33	**HJG** .113...33	**HJG** .113...33
	—	**HJK** .113...33	**HJH** .113...33	**HJH** .113...33
	—	—	**HJK** .129...30	**HJK** .129...30
	HEM .089...43	**HJM** .102...38	**HJL** .102...38	**HJL** .102...38
	—	**HJN** .102...38	**HJM** .102...38	**HJM** .102...38
	—	—	**HJN** .116...32	**HJN** .116...32
Liquid Propane—Alt††	**HEE** .073...49	**HJE** .089...43	**HJD** .089...43	**HJD** .089...43
		HJF .089...43	**HJE** .089...43	**HJE** .089...43
		—	**HJF** .104...37	**HJF** .104...37
	—	**HJH** .089...43	**HJG** .089...43	**HJG** .089...43
	—	**HJK** .089...43	**HJH** .089...43	**HJH** .089...43
	—	—	**HJK** .102...37	**HJK** .104...37
	—			
	—			
	—			
	—			
Thermostat Heat Anticipator Setting (amps)				
208/230/460/575v				
First Stage	0.14	0.14	0.14	0.14
Second Stage	0.14	0.14	0.14	0.14
Gas Input (Btuh)				
First Stage/Second Stage	**HEE** 50,000/—	**HEE** || 50,000/72,000	**HED** || 50,000/72,000	**HED** || 50,000/72,000
		HEF || 82,000/115,000	**HEE** || 82,000/115,000	**HEE** || 82,000/115,000
		—	**HEF** || 120,000/150,000	**HEF** || 120,000/150,000
	—	**HEH***** —/72,000	**HEG***** —/72,000	**HEG** *** —/72,000
	—	**HJK***** —/115,000	**HEH***** —/115,000	**HEH** *** —/115,000
	—	—	**HEK***** —/150,000	**HEK** *** —/150,000
	—	**HEM**††† —/60,000	**HEL**††† —/60,000	**HEL**††† —/60,000
	—	**HEN**††† —/90,000	**HEM**††† —/90,000	**HEM**††† —/90,000
	—	—	**HEN**††† —/120,000	**HEN**††† —/120,000
Efficiency (Steady State) (%)	**HEE** 81	**HEE** 82.8	**HED** 82.8	**HED** 82.8
		HEF 80	**HEE** 81	**HEE** 81
		—	**HEF** 80.4	**HEF** 80.4
	—	**HEH** 82	**HEG** 82	**HEG** 82
	—	**HEK** 80	**HEH** 81	**HEH** 81
	—	—	**HEK** 80	**HEK** 80
	—	**HEM** 80.2	**HEL** 80.2	**HEL** 80.2
	HEM 81	**HEN** 81	**HEM** 81	**HEM** 81
	—	—	**HEN** 80.7	**HEN** 80.7
Temperature Rise Range		**HEE** 25-55	**HED** 25-25	**HED** 25-55
	HEE 25-65	**HEF** 55-85	**HEE** 35-65	**HEE** 35-65
		—	**HEF** 50-80	**HEF** 50-80
	—	**HEG** 25-55	**HEG** 25-55	**HEG** 25-55
	—	**HEK** 55-85	**HEH** 35-65	**HEH** 35-65
	—	—	**HEK** 50-80	**HEK** 50-80
	—	**HEM** 20-50	**HEL** 20-50	**HEL** 20-50
	—	**HEN** 30-60	**HEM** 30-60	**HEM** 30-60
	—	—	**HEN** 40-70	**HEN** 40-70
Manifold Pressure (in.wg)				
Natural Gas—Std	3.5	3.5	3.5	3.5
Liquid Propane—Alt††	3.5	3.5	3.5	3.5
Gas Valve Quanity	1	1	1	1
Gas Valve Pressure (line pressure)				
psig	0.180-0.469	0.180-0.469	0.180-0.469	0.180-0.469
in wg	5.0-13.0	5.0-13.0	5.0-13.0	5.0-13.0
Field Gas Connection Size (in.)	1/2	1/2	1/2	1/2
HIGH-PRESSURE SWITCH (psig)				
Standard CompressorInternal Relief			450±50	
Cutout			428	
Reset (Auto.)			320	
LOSS-OF-CHARGE SWITCH (LiquidLIne) (psig)				
Cutout			7±3	
Reset(Auto.)			22±5	
FREEZE PROTECTION THERMOSTAT				
Opens(F)			30±5	
Closes(F)			45±5	
OUTDOOR-AIR INLET SCREENS			Cleanable Screen quantity and size varies with option selected.	
RETURN-AIRFILTERS			Throw away	
Quantity...Size (in.)			2...16x25x2	

LEGEND

Bhp — Brake Horsepower

*Single phase/three phase. Stainless steel models use the same orifices as equivalent standard heat exchangers.

†Indicates automatic reset.

**60,000 and ≤72,000 Btuh heat input units have 2 burners. 90,000 and 120,000 Btuh heat input units have 3 burners. 115,000 Btuh heat input units and 150,000 Btuh Heat input units have 3 burners.

††An LP kit is available as an accessory. If an LP kit is used with Low NOx units, the Low NOx baffle must be removed and the units will no longer be classified as Low NOx units.

||Three-phase standard models have heating inputs as shown. Single-phase standard models have one-stage heating with heating input values as follows:
HJD005-006,HJE004 — 72,000 Btuh
HJE005-006,HJF004 — 115,000 Btuh
HJF005-006 — 150,000 Btuh (shown in heating capicty tables)

***California compliant three-phase models.

†††California SCAQMD compliant low NO_x models have combustion products that are controlled to 40 nanograms per joule or less.

NOTE: Capacities for stainless steel heat exchanger units (S/R/T) are the same as standard units (D/E/F).

Physical data — 48HJ

BASE UNIT 48HJ		HJE/F/H/K/M/N004	HJD/E/F/G/H/K/L/M/N005	HJD/E/F/G/H/K/L/M/N006	HJD/E/F007
NOMINAL CAPACITY (tons)		3	4	5	6
OPERATING WEIGHT (lb)					
Base Unit**		530	540	560	635
COMPRESSOR			Scroll		
Quantity		1	1	1	1
Oil (oz)		42	53	50	60
REFRIGERANT TYPE			R-22		
Expansion Device Operating Charge (lb-oz)			Acutrol™ MeteringDevice		
Standard Unit		5-8	10-2	10-0	12-8
Unit With Humidi-Mizer Adaptive Dehumidification System		12-5	18-8	20-5	23-14
CONDENSER FAN			Propeller		
Quantity...Diameter (in.)		1...22	1...22	1...22	1...22
Nominal Cfm		3500	3500	4100	4100
Motor Hp...Rpm		1/8...825	1/8...825	1/4...1100	1/4...1100
Watts Input (Total)		180	180	320	320
CONDENSER COIL			Enhanced Copper Tubes, Aluminum LancedFins		
Rows...Fins/in.		1...17	2...17	2...17	2...17
Total Face Area (sq ft)		14.6	16.5	16.5	21.3
EVAPORATOR COIL Standard Unit			Enhanced Copper Tubes, Aluminum Double-Wavy Fins		
Rows...Fins/in.		2...15	2...15	4...15	4...15
Total Face Area (sq ft)		5.5	5.5	5.5	7.3
Humidi-Mizer Coil Adaptive Dehumidification System					
Rows...Fins/in.		1...17	2...17	2...17	2...17
Total Face Area (sq ft)		3.9	3.9	3.9	5.2
EVAPORATOR FAN			Centrifugal Type, Belt Drive		
Quantity...Size (in.)		1...10 x 10	1...10 x 10	1...10 x 10	1...10 x 10
Nominal Cfm		1200	1600	2000	2400
Maximum Continuous Bhp	**Std**	1.20	1.20	1.30/2.40*	2.40
	Hi-Static	2.40	2.40	2.90	2.90
Motor RPM	**Std**	1620	1620	1725	1725
	Hi-Static	1725	1725	1725	1725
Motor Frame Size	**Std**	48	48	48/56†	56
	Hi-Static	56	56	56	56
Fan Rpm Range	**Std**	680-1044	770-1185	1035-1460	1119-1585
	Hi-Static		1075-145	1300-1685	1300-1685
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Fan Rpm		2100	2100	2100	2100
Motor Pulley Pitch Diameter A/B (in.)	**Std**	1.9/2.9	1.9/2.0	2.4/3.4	2.4/3.4
	Hi-Static	2.8/3.8	2.8/3.8	3.4/4.4	3.4/3.4
Nominal Motor Shaft Diameter (in.)	**Std**	1/2	1/2	5/8	5/8
	Hi-Static	5/8	5/8	5/8	7/8
Fan Pulley Pitch Diameter (in.)	**Std**	4.5	4.0	4.0	4.0
	Hi-Static	4.5	4.0	4.5	4.5
Belt — Type...Length (in.)	**Std**	1...A...36	1...A...36	1...A...39	1...A...38
	Hi-Static	1...A...39	1...A...39	1...A...40	1...A...40
Pulley Center Line Distance (in.)		10.0-12.4	10.0-12.4	14.7-15.5	14.7-15.5
Speed Change per Full Turn of Movable	**Std**	65			
Pulley Flange (rpm)			70	75	95
	Hi-Static	65	65	60	60
Movable Pulley Maximum Full Turns	**Std**	5			
from Closed Position			5	6	5
	Hi-Static	6	6	5	5
Factory Setting — Full Turns Open	**Std**	3	3	3	3
	Hi-Static	31/2	31/2	31/2	31/2
Factory Speed Setting(rpm)	**Std**	826	936	1248	1305
	Hi-Static	1233	1233	1396	1396
Fan Shaft Diameter at Pulley (in.)		5/8	5/8	5/8	5/8

LEGEND

Bhp — Brake Horsepower

*Single phase/three phase.
†Indicates automatic reset.
**Base unit weight does not include any options or accessaries. See Options and Accessary weight tables for additioinal weight information.

BASE UNIT 48HJ	HJE/F/H/K/M/N004	HJD/E/F/G/H/K/L/M/N005	HJD/E/F/G/H/K/L/M/N006	HJD/E/F007
FURNACE SECTION				
Rollout Switch Cutout Temp(F)†	195	195	195	195
Burner Orifice Diameter (in. ...drill size)**				
Natural Gas — Std*	**HJE** .113...33	**HJD** .113...33	**HJD** .113...33	**HJD** .113...33
	HJF.113...33	**HJE** .113...33	**HJE** .113...33	**HJE** .113...33
	—	**HJF**.129...30	**HJF**.129...30	**HJF**.129...30
	HJH .113...33	**HJG** .113...33	**HJG** .113...33	—
	HJK.113...33	**HJH** .113...33	**HJH** .113...33	—
	—	**HJK**.129...30	**HJK**.129...30	—
	HJM .102...38	**HJL** .102...38	**HJL** .102...38	—
	HJN.102...38	**HJM** .102...38	**HJM** .102...38	—
	—	**HJN**.116...32	**HJN**.116...32	—
Liquid Propane — Alt††	**HJE** .089...43	**HJD** .089...43	**HJD** .089...43	**HJD** .089...43
	HJF.089...43	**HJE** .089...43	**HJE** .089...43	**HJE** .089...43
	—	**HJF**.104...37	**HJF**.104...37	**HJF**.104...37
	HJH .089...43	**HJG** .089...45	**HJG** .089...43	—
	HJK.089...43	**HJH** .089...45	**HJH** .089...43	—
	—	**HJK**.102...38	**HJK**.104...37	—
	HJM .082...45	**HJL** .082...45	**HJL** .082...45	—
	HJN.082...45	**HJM** .082...45	**HJM** .082...45	—
	—	**HJN**.094...42	**HJN**.094...42	—
Thermostat Heat Anticipator Setting (amps)				
208/230/460/575 v				
First Stage	.14	.14	.14	.14
SecondStage	.14	.14	.14	.14
Gas Input (Btuh)				
First Stage/Second Stage	**HJE**‖50,000/ 72,000	**HJD**‖ 50,000/ 72,000	**HJD**‖ 50,000/ 72,000	**HJD** 50,000/ 72,000
	HJF‖82,000/115,000	**HJE**‖ 82,000/115,000	**HJE**‖ 82,000/115,000	**HJE** 82,000/115,000
	—	**HJF**‖120,000/150,000	**HJF**‖120,000/150,000	**HJF** 120,000/150,000
	HJH* —/ 72,000	**HJG*** —/ 72,000	**HJG*** —/ 72,000	—
	HJK*—/115,000	**HJH*** —/115,000	**HJH*** —/115,000	—
	—	**HJK*** —/150,000	**HJK*** —/150,000	—
	**HJM††† —/ 60,000	**HJL††† —/ 60,000	**HJL††† —/ 60,000	—
	**HJN††† —/ 90,000	**HJM††† —/ 90,000	**HJM†††—/ 90,000	—
	—	**HJN††† —/120,000	**HJN††† —/120,000	—
Efficiency (Steady State)(%)	**HJE** 82.8	**HJD** 82.8	**HJD** 82.8	**HJD** 82
	HJF 80	**HJE** 81	**HJE** 81	**HJE** 81
	—	**HJF** 80.4	**HJF** 80.4	**HJF** 80
	HJH 82	**HJG** 82	**HJG** 82	—
	HJK 80	**HJH** 81	**HJH** 81	—
	—	**HJK** 80	**HJK** 80	—
	HJM 80.2	**HJL** 80.2	**HJL** 80.2	—
	HJN 81	**HJM** 81	**HJM** 81	—
	—	**HJN** 80.7	**HJN** 80.7	—
Temperature Rise Range	**HJE** 25-55	**HJD** 25-25	**HJD** 25-55	**HJD** 25-55
	HJF 55-85	**HJE** 35-65	**HJE** 35-65	**HJE** 35-65
	—	**HJF** 50-80	**HJF** 50-80	**HJF** 50-80
	HJH 25-55	**HJG** 25-55	**HJG** 25-55	—
	HJK 55-85	**HJH** 35-65	**HJH** 35-65	—
	—	**HJK** 50-80	**HJK** 50-80	—
	HJM 20-50	**HJL** 20-50	**HJL** 20-50	—
	HJN 30-60	**HJM** 30-60	**HJM** 30-60	—
	—	**HJN** 40-70	**HJN** 40-70	—
Manifold Pressure (in. wg)				
Natural Gas — Std	3.5	3.5	3.5	3.5
Liquid Propane — Alt††	3.5	3.5	3.5	3.5
Gas Valve Quanity	1	1	1	1
Gas Valve Pressure (line pressure)				
psig	0.180-0.469	0.180-0.469	0.180-0.469	0.180-0.469
in wg	5.0-13.0	5.0-13.0	5.0-13.0	5.0-13.0
Field Gas Connection Size (in.)	1/2	1/2	1/2	1/2
HIGH-PRESSURE SWITCH (psig)				
Standard Compressor Internal Relief	450 ± 50			
Cutout	428			
Reset (Auto.)	320			
LOSS-OF-CHARGE SWITCH/LOW-PRESSURE				
(LiquidLIne) (psig)				
Cutout	7 ± 3			
Reset (Auto.)	22 ± 5			
FREEZE PROTECTIONTHERMOSTAT				
Opens (F)	30 ± 5			
Closes (F)	45 ± 5			
OUTDOOR-AIR INLET SCREENS	Cleanable. Screen quantity and size varies with option selected.			
RETURN-AIR FILTERS	Throwaway			
Quantity...Size (in.)	2...16 x 25 x 2			4...16 x 16 x 2

LEGEND

Bhp — Brake Horsepower

*Single phase/three phase. Stainless steel models use the same orifices as equivalent standard heat exchangers.

†Indicates automatic reset.

**60,000 and ≤72,000 Btuh heat input units have 2 burners. 90,000 and 120,000 Btuh heat input units have 3 burners. 115,000 Btuh heat input units and 150,000 Btuh Heat input units have 3 burners.

††An LP kit is available as an accessory. If an LP kit is used with Low NOx units, the Low NOx baffle must be removed and the units will no longer be classified as Low NOx units.

‖Three-phase standard models have heating inputs as shown. Single-phase standard models have one-stage heating with heating input values as follows:
HJD005-006,HJE004 — 72,000 Btuh
HJE005-006,HJF004 — 115,000 Btuh
HJF005-006 — 150,000 Btuh (shown in heating capicty tables)

***California compliant three-phase models.

†††California SCAQMD compliant low NO_x models have combustion products that are controlled to 40 nanograms per joule or less.

NOTE: Capacities for stainless steel heat exchanger units (S/R/T) are the same as standard units (D/E/F).

Physical data — 48HJ (cont)

UNIT SIZE 48HJ		D/E/F/S/R/T008	D/E/F/S/R/T009	D/E/F/S/R/T012	D/E/S/R014
NOMINAL CAPACITY (tons)		7 1/2	8 1/2	10	12 1/2
OPERATING WEIGHT (lb)					
Base Unit**		870	1015	1035	1050
COMPRESSOR		Scroll			
Quantity		2	2	2	2
Oil (oz) (each compressor)		53	50	50	60
REFRIGERANT TYPE		R-22			
Expansion Device		Acutrol™ Metering Device			
Operating Charge (lb-oz)					
Standard Unit					
Circuit 1		7-10	9- 8	9-6	9-8
Circuit 2		8- 2	8-13	10-9	9-5
Unit with Humidi-MiZer Adaptive Dehumidification System					
Circuit 1		13-0	16-0	16-8	15-3
Circuit 2		13-6	16-8	17-8	16-6
CONDENSER FAN		Propeller			
Quantity...Diameter (in.)		2...22	2...22	2...22	2...22
Nominal Cfm		6500	6500	7000	7000
Motor Hp...Rpm		1/4...1100	1/4...1100	1/4...1100	1/4...1100
Watts Input (Total)		650	650	650	650
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins			
Rows...Fins/in.		2...17	2...17	2...17	2...17
Total Face Area (sq ft)		20.5	25.0	25.0	25.0
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Face-Split			
Standard Unit					
Rows...Fins/in.		3...15	4...15	4...15	4...15
Total Face Area (sq ft)		8.9	11.1	11.1	11.1
Humidi-MiZer Coil Adaptive Dehumidification System					
Rows...Fins/in.		2...17	2...17	2...17	2...17
Total Face Area (sq ft)		6.3	8.4	8.4	8.4
EVAPORATOR FAN		Centrifugal			
Size (in.)		15 x 15	15 x 15	15 x 15	15 x 15
Type Drive		Belt	Belt	Belt	Belt
Nominal Cfm		3000	3400	4000	5000
Maximum Continuous Bhp	**Std**	2.90	2.90	3.70	5.25
	Hi-Static	4.20	4.20	5.25	—
Motor Frame		56	56	56	56
Fan Rpm Range	**Std**	840-1085	840-1085	860-1080	830-1130
	Hi-Static	860-1080	860-1080	830-1130	—
Motor RPM	**Std**	1725	1725	1725	1740
	Hi-Static	1725	1725	1740	—
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Fan Rpm		2100	2100	2100	2100
Motor Pulley Pitch Diameter	**Std**	3.4/4.4	3.4/4.4	4.0/5.0	2.8/3.8
A/B (in.)	**Hi-Static**	4.0/5.0	4.0/5.0	2.8/3.8	—
Nominal Motor Shaft Diameter (in.)		7/8	7/8	7/8	7/8
Fan Pulley Pitch Diameter (in.)	**Std**	7.0	7.0	8.0	5.8
	Hi-Static	8.0	8.0	5.8	—
Belt — Type...Length (in.)	**Std**	A...48	A...51	A...51	BX...46
	Hi-Static	A...55	A...55	BX...46	—
Pulley Center Line Distance (in.)		16.75-19.25	16.75-19.25	15.85-17.50	15.85-17.50
Speed Change per Full Turn of	**Std**	50	50	45	60
Movable Pulley Flange (rpm)	**Hi-Static**	60	60	60	—
Movable Pulley Maximum Full	**Std**	5	5	5	6
Turns from Closed Position	**Hi-Static**	5	5	6	—
Factory Setting — Full Turns Open	**Std**	5	5	5	5
	Hi-Static	5	5	5	—
Factory Speed Setting (rpm)	**Std**	840	840	860	887
	Hi-Static	860	860	890	—
Fan Shaft Diameter at Pulley (in.)		1	1	1	1

LEGEND

Bhp — Brake Horsepower

*Indicates automatic reset.
**Base unit weight does not include any options or accessaries. See Options and Accessary weight tables for additioinal weight information.
†An LP kit is available as an accessory.

UNIT SIZE 48HJ	D/E/F/S/R/T008	D/E/F/S/R/T009	D/E/F/S/R/T012	D/E/S/R014
FURNACE SECTION				
Rollout Switch Cutout Temp (F)*	195	195	195	195
Burner Orifice Diameter (in. ...drill size)				
Natural Gas — Std	**HJD** .120...31 **HJE** .120...31 **HJF** .120...31	**HJD** .120...31 **HJE** .120...31 **HJF** .120...31	**HJD** .120...31 **HJE** .120...31 **HJF** .129...30	**HJD** .120...31 **HJE** .129...30
Liquid Propane — Alt†	**HJD** .096...41 **HJE** .096...41 **HJF** .096...41	**HJD** .096...41 **HJE** .096...41 **HJF** .096...41	**HJD** .096...41 **HJE** .096...41 **HJF** .102...38	**HJD** .096...41 **HJE** .102...38
Thermostat Heat Anticipator Setting (amps)				
Stage 1	**HJD** .14 **HJE** .14 **HJF** .14	**HJD** .14 **HJE** .14 **HJF** .14	**HJD** .14 **HJE** .14 **HJF** .14	**HJD** .14 **HJE** .14
Stage 2	**HJD** .14 **HJE** .20 **HJF** .20	**HJD** .14 **HJE** .20 **HJF** .20	**HJD** .20 **HJE** .20 **HJF** .20	**HJD** .20 **HJE** .20
Gas Input (Btuh) Stage 1	**HJD** 90,000 **HJE** 120,000 **HJF** 180,000	**HJD** 90,000 **HJE** 120,000 **HJF** 180,000	**HJD** 120,000 **HJE** 180,000 **HJF** 200,000	**HJD** 180,000 **HJE** 200,000
Stage 2	**HJD** 125,000 **HJE** 180,000 **HJF** 224,000	**HJD** 125,000 **HJE** 180,000 **HJF** 224,000	**HJD** 180,000 **HJE** 224,000 **HJF** 250,000	**HJD** 224,000 **HJE** 250,000
Efficiency (Steady State) (%)	**HJD** 82 **HJE** 82 **HJF** 82	**HJD** 82 **HJE** 82 **HJF** 82	**HJD** 82 **HJE** 82 **HJF** 80	**HJD** 82 **HJE** 80
Temperature Rise Range	**HJD** 20-50 **HJE** 35-65 **HJF** 45-75	**HJD** 20-50 **HJE** 35-65 **HJF** 45-75	**HJD** 35-65 **HJE** 35-65 **HJF** 40-70	**HJD** 35-65 **HJE** 40-70
Manifold Pressure (in. wg)				
Natural Gas — Std	3.5	3.5	3.5	3.5
Liquid Propane — Alt†	3.5	3.5	3.5	3.5
Gas Valve Quanity	1	1	1	1
Gas Valve Pressure (line pressure)				
psig	0.180-0.469	0.180-0.469	0.180-0.469	0.180-0.469
in wg	5.0-13.0	5.0-13.0	5.0-13.0	5.0-13.0
Field Gas Connection Size (in.)	**HJD** .50 **HJE** .75 **HJF** .75	**HJD** .50 **HJE** .75 **HJF** .75	**HJD** .75 **HJE** .75 **HJF** .75	**HJD** .75 **HJE** .75
HIGH-PRESSURE SWITCH (psig)				
Standard Compressor Internal Relief	450 ± 50			
Cutout	428			
Reset (Auto.)	320			
LOSS-OF-CHARGE SWITCH (Liquid LIne) (psig)				
Cutout	7 ± 3			
Reset (Auto.)	22 ± 7			
FREEZE PROTECTION THERMOSTAT				
Opens (F)	30 ± 5			
Closes (F)	45 ± 5			
OUTDOOR-AIR INLET SCREENS	Cleanable. Screen quantity and size varies with option selected.			
RETURN-AIR FILTERS	Throwaway			
Quantity...Size (in.)	4...16 x 20 x 2	4...20 x 20 x 2	4...20 x 20 x 2	4...20 x 20 x 2

LEGEND

Bhp — Brake Horsepower
LP — Liquid Propane

*Indicates automatic reset.
†An LP kit is available as an accessory.

Physical data — 48HJ (cont)

UNIT 48HJ		015D/F			017D/F		
		208/230	460	575	208/230	460	575
NOMINAL CAPACITY (tons)			12			15	
OPERATING WEIGHT (lb)							
Base Unit*			1875			1950	
COMPRESSOR							
Quantity...Model (Ckt 1, Ckt 2)			2...ZR72KC			1...ZR94KC, 1...ZR72KC	
Number of Refrigerant Circuits			2			2	
Loading (% of full capacity)			0,53,100			0,60,100	
Crankcase Heater Watts			70			70	
Oil (oz) (Ckt 1, Ckt 2)			60,60			85,60	
REFRIGERANT TYPE			R-22				
Expansion Device			TXV				
Operating Charge (lb)							
Circuit 1**			20.7			19.5	
Circuit 2			13.4			13.45	
CONDENSER FAN			Propeller Type				
Nominal Cfm			10,500			10,500	
Quantity...Diameter (in.)			3...22			3...22	
Motor Hp...Rpm			1/2...1050			1/2...1050	
Watts Input (Total)			1100			1100	
CONDENSER COIL			Cross-Hatched 3/8-in. Copper Tubes, Aluminum Lanced, Aluminum Pre-Coated, or Copper Plate Fins				
Rows...Fins/in.			4...15			4...15	
Total Face Area (sq ft)			21.7			21.7	
EVAPORATOR FAN			Centrifugal Type				
Quantity...Size (in.)			2...12 X 12			2...12 x 12	
Type Drive			Belt			Belt	
Nominal Cfm			5200			6000	
Std Motor Hp		2.9		3.0		5	
Opt Motor Hp		3.7		N/A		N/A	
Motor Nominal Rpm			1725			1745	
Std Maximum Continuous Bhp		3.13		3.38		6.13	
Opt Maximum Continuous Bhp		4.26		N/A			
Motor Frame Size			56H			184T	
Fan Rpm Range	Low-Medium Static	895-1147		895-1147		873-1021	
	High Static	1040-1315		N/A		1025-1200	
Motor Bearing Type			Ball			Ball	
Maximum Allowable Rpm			1550			1550	
Motor Pulley Pitch Dia.	Low-Medium Static	3.1/4.1		3.1/4.1		4.9/5.9	
	High Static	3.7/4.7		N/A		4.9/5.9	
Nominal Motor Shaft Diameter (in.)		7/8		7/8		1 1/8	
Fan Pulley Pitch Diameter (in.)	Low-Medium Static	6.0		6.0		9.4	
	High Static	6.0		6.0		8.0	
Nominal Fan Shaft Diameter (in.)		1 3/16		1 3/16		1 7/16	
Belt, Quantity...Type... Length (in.)	Low-Medium Static	1...BX...45		1...BX...45		1...BX...50	
	High Static	1...BX...45		1...BX...45		1...BX...48	
Pulley Center Line Distance (in.)		14.5-16.0		14.5-16.0		13.3-14.8	
Speed Change per Full Turn of Movable							
Pulley Flange (Rpm)	Low-Medium Static	45		45		37	
	High Static	45		N/A		44	
Movable Pulley Maximum							
Full Turns From Closed Position			6	6		4††	
Factory Speed			3.5	3.5		3.5	
Factory Speed Setting (Rpm)	Low-Medium Static		987	987		965	
	High Static		1155	N/A		1134	
EVAPORATOR COIL			Cross-Hatched 3/8-in. Copper Tubes, Aluminum Lanced or Copper Plate Fins, Face Split				
Rows...Fins/in.			4...15			4...15	
Total Face Area (sq ft)			17.5			17.5	
FURNACE SECTION							
Rollout Switch Cutout Temp (F)***			190			190	
Burner Orifice Diameter (in...drill size)							
Natural Gas	Std		0.1285...30/ 0.136...29			0.1285...30/ 0.136...29	
Liquid Propane†††	Alt		0.1065...36/0.1065...36			0.1065...36/0.1065...36	
Thermostat Heat Anticipator Setting							
208/230/460/575 v							
Stage 1 (amps)		0.98	0.8	0.98	0.98	0.8	0.98
Stage 2 (amps)		0.44	0.44	0.44	0.44	0.44	0.44
Gas Input (Btuh) Stage 1			172,000/230,000			206,000/270,000	
Stage 2			225,000/300,000			275,000/360,000	
Efficiency (Steady State) (%)			81			81	
Temperature Rise Range			15-45/30-60			15-45/20-50	
Manifold Pressure (in. wg)							
Natural Gas	Std		3.3			3.3	
Liquid Propane†††	Alt		3.3			3.3	
Gas Valve Quantity			1			1	
Gas Valve Pressure Range (Min-Max Allowable) (in. wg)			5.5-13.5			5.5-13.5	
(psig)			.235-.487			.235-.487	
Field Gas Connection Size (in.-FPT)			3/4			3/4	
HIGH-PRESSURE SWITCH (psig)							
Cutout			426				
Reset (Auto.)			320				
LOW-PRESSURE SWITCH (psig)							
Cutout			27				
Reset (Auto.)			44				
FREEZE PROTECTION THERMOSTAT (F)							
Opens			30 ± 5				
Closes			45 ± 5				
OUTDOOR-AIR INLET SCREENS			Cleanable				
Quantity...Size (in.)			2...20 x 25 x 1				
			1...20 x 20 x 1				
RETURN-AIR FILTERS			Throwaway				
Quantity...Size (in.)			4...20 x 20 x 2				
			4...16 x 20 x 2				

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper
TXV — Thermostatic Expansion Valve

*Evaporator coil fin material/condenser coil fin material. Base unit weight does not include any options or accessaries. See Options and Accessary weight tables for additioinal weight information.
†Weight of 14-in. roof curb.

**Circuit 1 uses the lower portion of condenser coil and lower portion of evaporator coils, and Circuit 2 uses the upper portion of both coils.
††Due to belt and pulley style, moveable pulley cannot be set to 0 to 1/2 turns open.
***Rollout switch is manual reset.
†††A Liquid Propane kit is available as an accessory.

UNIT 48HJ		020	024	028
NOMINAL CAPACITY (tons)		18	20	25
OPERATING WEIGHT (lb)				
Al/Cu base unit*		2224	2272	2526
COMPRESSOR				
Quantity		3	3	2
Number of Refrigerant Circuits		3	3	2
Oil (ounces) Ckt A...Ckt B...Ckt C		68...68...90	90...90...90	110...110...NA
REFRIGERANT TYPE				
Expansion Device		TXV	TXV	TXV
Operating Charge (lb)				
Circuit A		13.1	13.8	21.8
Circuit B		12.7	13.9	20.3
Circuit C		15.2	15.5	NA
CONDENSER FAN				
Nominal Cfm (Total, all fans)		14,000	14,000	21,000
Quantity...Diameter (in.)		4...22	4...22	6...22
Motor Hp...Rpm		1/4...1100	1/4...1100	1/4...1100
Watts Input (Total)		1400	1400	2100
CONDENSER COIL				
Rows...Fins/in.		2...17	2...17	2...17
Total Face Area (sq ft)		57.78	57.78	66.67
EVAPORATOR FAN				
Quantity...Size		2...15x11	2...15x11	2...15x11
Type Drive		Belt	Belt	Belt
Nominal Cfm		7000	8000	10,000
Motor Bearing Type		Ball	Ball	Ball
Maximum Allowable Fan Rpm		1400	1400	1400
EVAPORATOR COIL				
Rows...Fins/in.		3...15	4...15	4...15
Total Face Area (sq ft)		23.33	23.33	27.22
FURNACE SECTION				
Rollout Switch Cutout Temp (F)		225	225	225
Burner Orifice Diameter (in. ...drill size)		0.136...29	0.136...29	0.136...29
Gas		Natural	Natural	Natural
Thermostat Heat Anticipator Setting				
Stage 1 (amps)		0.98	0.98	0.98
Stage 2 (amps)		0.44	0.44	0.44
Gas Input (Btuh) HIGH HEAT	**Stage 1**	317,000	317,000	317,000
	Stage 2	400,000	400,000	400,000
Efficiency (Steady State) %	**Vertical**	82	82	82
Temperature Rise Range		25-55	25-55	25-55
Gas Input (Btuh) MEDIUM HEAT	**Stage 1**	281,000	281,000	281,000
	Stage 2	365,000	365,000	365,000
Efficiency (Steady State) %	**Vertical**	81	81	81
Temperature Rise Range		25-55	25-55	25-55
Gas Input (Btuh) LOW HEAT	**Stage 1**	199,000	199,000	199,000
	Stage 2	250,000	250,000	250,000
Efficiency (Steady State) %	**Vertical**	82	82	82
Temperature Rise Range (F)		15-45	15-45	15-45
Manifold Pressure				
Natural Gas (in. wg)	**Vertical**	3.00	3.00	3.00
Natural Gas (in. wg)	**Horizontal**	2.95	2.95	2.95
Gas Valve Quantity		1	1	1
Gas Valve Pressure Range (line pressure)	**(in. wg)**	5.5-13.0	5.5-13.0	5.5-13.0
Min-Max Allowable	**(psig)**	.235-.469	.235-.469	.235-.469
Field Gas Connection Size (in. FPT)		3/4	3/4	3/4
HIGH-PRESSURE SWITCH (psig)				
Cutout		426	426	426
Reset (Auto)		320	320	320
OUTDOOR-AIR INLET SCREENS				
Quantity...Size (in.)		3...20x25	3...20x25	3...20x25
RETURN-AIR FILTERS				
Quantity...Size (in.)		9...16x25	9...16x25	9...20x25

LEGEND

TXV — Thermostatic Expansion Valve

*Base unit weight does not include any options or accessaries. See Options and Accessary weight tables for additioinal weight information

Physical data — 48HJ (cont

EVAPORATOR FAN DATA — 48HJ020-028 VERTICAL SUPPLY/RETURN UNITS

48HJ	020		024		028	
	203/230 and 460 V	575 V	203/230 and 460 V	575 V	203/230 and 460 V	575 V
LOW RANGE						
Motor Hp	N/A	N/A	3.7	5	5	5
Motor Nominal Rpm	N/A	N/A	1725	1745	1745	1745
Maximum Continuous Bhp	N/A	N/A	4.25	5.75	5.75	5.75
Maximum Continuous Watts	N/A	N/A	3698	4900	4900	4900
Motor Frame Size	N/A	N/A	56HZ	184T	S184T	184T
Motor Shaft Diameter (in.)	N/A	N/A	7/8	1 1/8	1 1/8	1 1/8
Fan Rpm Range	N/A	N/A	685-939	751-954	687-873	687-873
Motor Pulley Min. Pitch Diameter (in.)	N/A	N/A	2.7	3.7	3.7	3.7
Motor Pulley Max. Pitch Diameter (in.)	N/A	N/A	3.7	4.7	4.7	4.7
Blower Pulley Pitch Diameter (in.)	N/A	N/A	6.8	8.6	9.4	9.4
Blower Pulley Shaft Diameter (in.)	N/A	N/A	1.1875	1.1875	1.1875	1.1875
Blower Pulley Type	N/A	N/A	Fixed	Fixed	Fixed	Fixed
Pulley Center Line Distance (in.)	N/A	N/A	11.293-13.544	9.81-13.055	9.81-13.055	9.81-13.055
Belt, Quantity...Type...Length (in.)	N/A	N/A	1...BX...38	1...BX...40	1...BX...41	1...BX...41
Speed Change Per Turn — Moveable Pulley (rpm)	N/A	N/A	51	41	37	37
Moveable Pulley Maximum Full Turns	N/A	N/A	6	6	6	6
Factory Speed Setting (rpm)	N/A	N/A	812	853	780	780
MID-LOW RANGE						
Motor Hp	3.7	3	5	5	5	5
Motor Nominal RPM	1725	1725	1745	1745	1745	1745
Maximum Continuous Bhp	4.25	3.45	5.75	5.75	5.75	5.75
Maximum Continuous Watts	3698	3149	4900	4900	4900	4900
Motor Frame Size	56HZ	56HZ	S184T	184T	S184T	184T
Motor Shaft Diameter (in.)	7/8	7/8	1 1/8	1 1/8	1 1/8	1 1/8
Fan Rpm Range	647-886	810-1072	949-1206	949-1206	805-1007	805-1007
Motor Pulley Min. Pitch Diameter (in.)	2.7	3.1	3.7	3.7	4.8	4.8
Motor Pulley Max. Pitch Diameter (in.)	3.7	4.1	4.7	4.7	6.0	6.0
Blower Pulley Pitch Diameter (in.)	7.2	6.6	6.8	6.8	10.4	10.4
Blower Pulley Shaft Diameter (in.)	1.1875	1.1875	1.1875	1.1875	1.1875	1.1875
Blower Pulley Type	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Pulley Center Line Distance (in.)	11.293-13.544	11.286-14.475	9.81-13.055	9.81-13.055	9.81-13.055	9.81-13.055
Belt, Quantity...Type...Length (in.)	1...BX...38	1...BX...38	1...BX...38	1...BX...38	1...BX...45	1...BX...45
Speed Change Per Turn — Moveable Pulley (rpm)	48	52	51	51	40	40
Moveable Pulley Maximum Full Turns	6	6	6	6	6	6
Factory Speed Setting (rpm)	767	941	1078	1078	906	906
MID-HIGH RANGE						
Motor Hp	5	5	7.5	7.5	7.5	7.5
Motor Nominal Rpm	1745	1745	1745	1745	1745	1745
Maximum Continuous Bhp	5.75	5.75	8.63	8.63	8.63	8.63
Maximum Continuous Watts	4900	4900	7267	7267	7267	7267
Motor Frame Size	S184T	184T	S213T	S213T	S213T	S213T
Motor Shaft diameter (in.)	1 1/8	1 1/8	1 3/8	1 3/8	1 3/8	1 3/8
Fan Rpm Range	897-1139	873-1108	941-1176	941-1176	941-1176	941-1176
Motor Pulley Min. Pitch Diameter (in.)	3.7	3.7	4.8	4.8	4.8	4.8
Motor Pulley Max. Pitch Diameter (in.)	4.7	4.7	6.0	6.0	6.0	6.0
Blower Pulley Pitch Diameter (in.)	7.2	7.4	8.9	8.9	8.9	8.9
Blower Pulley Shaft Diameter (in.)	1.1875	1.1875	1.1875	1.1875	1.1875	1.1875
Blower Pulley Type	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Pulley Center Line Distance (in.)	9.81-13.055	9.81-13.055	9.025-12.179	9.025-12.179	9.025-12.179	9.025-12.179
Belt, Quantity...Type...Length (in.)	1...BX...38	1...BX...38	1...BX...42	1...BX...42	1...BX...42	1...BX...42
Speed Change Per Turn — Moveable Pulley (rpm)	48	47	47	47	47	47
Moveable Pulley Maximum Full Turns	6	6	6	6	6	6
Factory Speed Setting (rpm)	1018	991	1059	1059	1059	1059
HIGH RANGE						
Motor Hp	7.5	7.5	10	10	10	10
Motor Nominal Rpm	1745	1745	1745	1745	1745	1745
Maximum Continuous Bhp	8.63	8.63	11.5	11.5	11.5	11.5
Maximum Continuous Watts	7267	7267	9582	9582	9582	9582
Motor Frame Size	S213T	S213T	S215T	S215T	S215T	S215T
Motor Shaft Diameter (in.)	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8
Fan Rpm Range	1078-1274	1078-1274	1014-1297	1014-1297	1014-1297	1014-1297
Motor Pulley Min. Pitch Diameter (in.)	5.5	5.5	4.3	4.3	4.3	4.3
Motor Pulley Max. Pitch Diameter (in.)	6.5	6.5	5.5	5.5	5.5	5.5
Blower Pulley Pitch Diameter (in.)	8.9	8.9	7.4	7.4	7.4	7.4
Blower Pulley Shaft Diameter (in.)	1.1875	1.1875	1.1875	1.1875	1.1875	1.1875
Blower Pulley Type	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Pulley Center Line Distance (in.)	9.025-12.179	9.025-12.179	9.025-12.179	9.025-12.179	9.025- 2.179	9.025-12.179
Belt, Quantity...Type...Length (in.)	1...BX...42	1...BX...42	2...BX...38	2...BX...38	2...BX...38	2...BX...38
Speed Change Per Turn — Moveable Pulley (rpm)	39	39	57	57	57	57
Moveable Pulley Maximum Full Turns	6	6	6	6	6	6
Factory Speed Setting (rpm)	1176	1176	1156	1156	1156	1156

LEGEND

Bhp — Brake Horsepower

EVAPORATOR FAN DATA — 48HJ020-028 HORIZONTAL SUPPLY/RETURN UNITS

48HJ	020		024		028	
	203/230 and 460 V	575 V	203/230 and 460 V	575 V	203/230 and 460 V	575 V
LOW RANGE						
Motor Hp	N/A	N/A	N/A	N/A	5	5
Motor Nominal Rpm	N/A	N/A	N/A	N/A	1745	1745
Maximum Continuous Bhp	N/A	N/A	N/A	N/A	5.75	5.75
Maximum Continuous Watts	N/A	N/A	N/A	N/A	4900	4900
Motor Frame Size	N/A	N/A	N/A	N/A	S184T	184T
Motor Shaft Diameter (in.)	N/A	N/A	N/A	N/A	1 1/8	1 1/8
Fan Rpm Range	N/A	N/A	N/A	N/A	687-873	687-873
Motor Pulley Min. Pitch Diameter (in.)	N/A	N/A	N/A	N/A	3.7	3.7
Motor Pulley Max. Pitch Diameter (in.)	N/A	N/A	N/A	N/A	4.7	4.7
Blower Pulley Pitch Diameter (in.)	N/A	N/A	N/A	N/A	9.4	9.4
Blower Pulley Shaft Diameter (in.)	N/A	N/A	N/A	N/A	1.1875	1.1875
Blower Pulley Type	N/A	N/A	N/A	N/A	Fixed	Fixed
Pulley Center Line Distance (in.)	N/A	N/A	N/A	N/A	9.81-13.055	9.81-13.055
Belt, Quantity...Type...Length (in.)	N/A	N/A	N/A	N/A	1...BX...41	1...BX...41
Speed Change Per Turn — Moveable Pulley (rpm)	N/A	N/A	N/A	N/A	37	37
Moveable Pulley Maximum Full Turns	N/A	N/A	N/A	N/A	6	6
Factory Speed Setting (rpm)	N/A	N/A	N/A	N/A	780	780
MID-LOW RANGE						
Motor Hp	3.7	3	3.7	5	5	5
Motor Nominal Rpm	1725	1725	1725	1745	1745	1745
Maximum Continuous Bhp	4.25	3.45	4.25	5.75	5.75	5.75
Maximum Continuous Watts	3698	3149	3698	4900	4900	4900
Motor Frame Size	56HZ	56HZ	56HZ	184T	S184T	184T
Motor Shaft Diameter (in.)	7/8	7/8	7/8	1 1/8	1 1/8	1 1/8
Fan Rpm Range	896-1227	863-1141	896-1227	873-1108	805-1007	805-1007
Motor Pulley Min. Pitch Diameter (in.)	2.7	3.1	2.7	3.7	4.8	4.8
Motor Pulley Max. Pitch Diameter (in.)	3.7	4.1	3.7	4.7	6.0	6.0
Blower Pulley Pitch Diameter (in.)	5.2	6.2	5.2	7.4	10.4	10.4
Blower Pulley Shaft Diameter (in.)	1.1875	1.1875	1.1875	1.1875	1.1875	1.1875
Blower Pulley Type	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Pulley Center Line Distance (in.)	11.293-13.544	11.286-14.475	11.293-13.544	9.81-13.055	9.81-13.055	9.81-13.055
Belt, Quantity...Type...Length (in.)	1...BX...35	1...BX...38	1...BX...35	1...BX...38	1...BX...45	1...BX...45
Speed Change Per Turn — Moveable Pulley (rpm)	66	56	66	47	40	40
Moveable Pulley Maximum Full Turns	6	6	6	6	6	6
Factory Speed Setting (rpm)	1062	1002	1062	991	906	906
MID-HIGH RANGE						
Motor Hp	5	5	5	5	7.5	7.5
Motor Nominal Rpm	1745	1745	1745	1745	1745	1745
Maximum Continuous Bhp	5.75	5.75	5.75	5.75	8.63	8.63
Maximum Continuous Watts	4900	4900	4900	4900	7267	7267
Motor Frame Size	S184T	184T	S184T	184T	S213T	S213T
Motor Shaft Diameter (in.)	1 1/8	1 1/8	1 1/8	1 1/8	1 3/8	1 3/8
Fan Rpm Range	1113-1414	1042-1285	1113-1414	1113-1414	941-1176	941-1176
Motor Pulley Min. Pitch Diameter (in.)	3.7	4.3	3.7	3.7	4.8	4.8
Motor Pulley Max. Pitch Diameter (in.)	4.7	5.3	4.7	4.7	6.0	6.0
Blower Pulley Pitch Diameter (in.)	5.8	7.2	5.8	5.8	8.9	8.9
Blower Pulley Shaft Diameter (in.)	1.1875	1.1875	1.1875	1.1875	1.1875	1.1875
Blower Pulley Type	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Pulley Center Line Distance (in.)	9.81-13.055	9.81-13.055	9.81-13.055	9.81-13.055	9.025-12.179	9.025-12.179
Belt, Quantity...Type...Length (in.)	1...BX...35	1...BX...38	1...BX...35	1...BX...35	1...BX...42	1...BX...42
Speed Change Per Turn — Moveable Pulley (rpm)	60	48	60	60	47	47
Moveable Pulley Maximum Full Turns	6	6	6	6	6	6
Factory Speed Setting (rpm)	1264	1164	1264	1264	1059	1059
HIGH RANGE						
Motor Hp	7.5	7.5	7.5	7.5	10	10
Motor Nominal Rpm	1745	1745	1745	1745	1745	1745
Maximum Continuous Bhp	8.63	8.63	8.63	8.63	11.5	11.5
Maximum Continuous Watts	7267	7267	7267	7267	9582	9582
Motor Frame Size	S213T	S213T	S213T	S213T	S215T	S215T
Motor Shaft Diameter (in.)	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8
Fan Rpm Range	1096-1339	1096-1339	1096-1339	1096-1339	1014-1297	1014-1297
Motor Pulley Min. Pitch Diameter (in.)	5.4	5.4	5.4	5.4	4.3	4.3
Motor Pulley Max. Pitch Diameter (in.)	6.6	6.6	6.6	6.6	5.5	5.5
Blower Pulley Pitch Diameter (in.)	8.6	8.6	8.6	8.6	7.4	7.4
Blower Pulley Shaft Diameter (in.)	1.1875	1.1875	1.1875	1.1875	1.1875	1.1875
Blower Pulley Type	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Pulley Center Line Distance (in.)	9.025-12.179	9.025-12.179	9.025-12.179	9.025-12.179	9.025-12.179	9.025-12.179
Belt, Quantity...Type...Length (in.)	1...BX...42	1...BX...42	1...BX...42	1...BX...42	1...BX...38	1...BX...38
Speed Change Per Turn — Moveable Pulley (rpm)	49	49	49	49	57	57
Moveable Pulley Maximum Full Turns	6	6	6	6	6	6
Factory Speed Setting (rpm)	1218	1218	1218	1218	1156	1156

LEGEND

Bhp — Brake Horsepower

Options and accessories

OPTIONS AND ACCESSORIES — 48HE003-006 and 48HJ004-014
(Weight Adders)

Option / Accessory	OPTION/ACCESSORY WEIGHTS																	
	003		004		005		006		007		008		009		012		014	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
Humidi-MiZer Adaptive Dehumidification System	13	6	15	7	23	10	25	11	29	13	44	20	51	23	51	23	51	23
Power Exhaust - vertical	50	23	50	23	50	23	50	23	50	23	75	34	75	34	75	34	75	34
Power Exhaust - horizontal	30	14	30	14	30	14	30	14	30	14	30	14	30	14	30	14	30	14
EconoMi$er (IV or 2)	50	23	50	23	50	23	50	23	50	23	75	34	75	34	75	34	75	34
Two Position damper (25%)	22	10	22	10	22	10	22	10	22	10	32	15	32	15	32	15	32	15
Two Position damper (100%)	39	18	39	18	39	18	39	18	39	18	58	26	58	26	58	26	58	26
Manual Dampers	12	5	12	5	12	5	12	5	18	8	18	8	18	8	18	8	18	8
Hail Guard (louvered)	16	7	16	7	16	7	16	7	16	7	34	15	34	15	34	15	34	15
Hail Guard (standard hood assembly)	25	11	25	11	25	11	25	11	25	11	38	17	50	23	50	23	50	23
Cu/Cu Condenser Coil	5	2	6	3	13	6	13	6	15	7	12	5	23	10	23	10	23	10
Cu/Cu Condenser and Evaporator Coils	10	5	12	5	19	9	21	10	26	12	25	11	49	22	49	22	49	22
Roof Curb (14-in. curb)	115	52	115	52	115	52	115	52	115	52	143	65	143	65	143	65	143	65
Roof Curb (24-in. curb)	197	89	197	89	197	89	197	89	197	89	245	111	245	111	245	111	245	111

LEGEND

Cu — Copper

OPTIONS AND ACCESSORIES — 48HJ015,017
(Weight Adders)

Option / Accessory	OPTION/ACCESSORY WEIGHTS			
	015		017	
	lb	kg	lb	kg
Barometric Relief Damper	50	23	50	23
Power Exhaust	85	39	85	39
EconoMi$er (IV or 2)	90	41	90	41
Two Position (motorized) Damper	120	54	120	54
Hail Guard	60	27	60	27
Cu/Cu evaporator	130	59	130	59
Cu/Cu Condenser Coil	150	68	150	68
Cu/Cu Condenser and Evaporator Coils	280	127	280	127
Roof Curb (14-in. curb)	170	77	170	77
Roof Curb (24-in. curb)	343	156	286	130
Horizontal Adapter Roof Curb (Preassembled)	250	113	250	113
Horizontal Adapter Roof Curb (Field-assembled)	343	156	343	156

LEGEND

Cu — Copper

OPTIONS AND ACCESSORIES — 48HJ020-028
(Weight Adders)

OPTION/ ACCESSORY	OPTION/ACCESSORY WEIGHTS					
	48HJ020		48HJ024		48HJ028	
	lb	kg	lb	kg	lb	kg
Barometric Relief Damper	50	23	50	23	50	23
Power Exhaust	125	57	125	57	125	57
Economizer	170	77	170	77	195	88
Cu/Cu Condenser Coil*	162	73	162	73	202	92
Cu/Cu Condenser and Evaporator Coils*	316	143	290	132	365	166
5-Cell Gas Heat Assembly	85	39	85	39	85	39
8-Cell Gas Heat Assembly	113	51	113	51	113	51
Roof Curb (14 inch)	210	95	210	95	210	95
Optional Indoor Motor	28	13	28	13	20	9
Two-Position Damper	45	20	45	20	45	20
Hail Guard	85	39	85	39	100	45
Horizontal Airflow	90	41	90	41	90	41
CO_2 Sensor	5	2	5	2	5	2
Return Smoke Detector	5	2	5	2	5	2
Supply Smoke Detector	5	2	5	2	5	2
Non-Fused Disconnect	15	7	15	7	15	7
Non-Powered Convenience Outlet	20	9	20	9	20	9
Enthalpy Sensor	2	1	2	1	2	1
Differential Enthalpy Sensor	3	1	3	1	3	1
Drip Edge	5	2	5	2	5	2
Manual Damper	25	11	25	11	25	11

LEGEND

Cu — Copper

HACR — Heating, Air Conditioning and Refrigeration

*Base units contain Al/Cu (tubes/fins) condensor and evaporator coils.

48HE003-006 and 48HJ004-014

Category	ITEM	OPTION*	ACCESSORY†
Cabinet	Hinged Access Panels	X	
	Hinged Panel Kit for Economizer		X
	Thru-the-Bottom Connections (gas, power, controls, conv outlet)		X
Coil Options	Copper Fins - condenser coil	X	
	Copper Fins - evaporator and condenser coil	X	
	E-Coat outdoor coil (Al / Cu) and indoor coil (Al / Cu)	X	
	E-Coat outdoor coil (Al / Cu)	X	
	E-Coat outdoor coil (Cu / Cu)	X	
	Pre-Coated Aluminum condenser fins	X	
Condenser Protection	Condenser Coil Grille		X
	Condenser Coil Hail Guard (louvered)	X	
	Condenser Coil Hail Guard (standard hood assembly)		X
Dehumidification & IAQ	Humidi-MiZer™ Adaptive Dehumidification Package	X	
	Demand Control Ventilation CO2 Sensors		X
	UV Lights		X
Economizers & Outdoor Air	EconoMi$er IV (for Electro-Mech unit, includes barometric relief)	X	X
	EconoMi$er 2 (for DDC unit, includes barometric relief)	X	X
	100% Two-Position Damper (motorized)		X
	25% Two-Position Damper (motorized)		X
	Manual Outdoor-Air Damper		X
	Power Exhaust (prop fan)		X
Economizer Sensors	Return Air Temperature Sensor		X
	Return Air Enthalpy Sensor		X
	Outdoor Air Differential Temperature Sensor		X
	Outdoor Air Differential Enthalpy Sensor		X
	Return Air CO2 Sensor (duct mounted)		X
	Space CO2 Sensor (wall mounted)		X
Electrical & Controls	PremierLink™ DDC Communicating Controller	X	X
	Novar 3051 Controller	X	
	Convenience Outlet (Load Side powered)	X	
	Unit-Mounted Non-Fused Disconnect	X	
	Time Guard II Compressor Cycle Delay		X
	Fan/Filter Status switches		X
Energy Recovery	Energy Recovery Ventilator (62M)		X
	Energy Recovery heatpump (COBRA™)	X	
	Energy Recovery heatpump (62AQ Energy$Recycler™)		X
Gas Heat Exchanger	Stainless Steel Heat exchanger	X	
	Flue Discharge Deflector		X
	Low NOx heat exchanger (003-006)	X	
	LP (Liquid Propane) Conversion Kit		X
Indoor Motor & Drive	Standard Static Motor and Drive	X	
	High-Static Motor and Drive	X	
Low Ambient Control	Motormaster® Head Pressure Controller (Kit)		X
Roof Curbs	Roof Curbs 14" (Vertical or Horizontal Supply/Return)		X
	Roof Curbs 24" (Vertical or Horizontal Supply/Return)		X
	62M Full Perimeter curb		X
	COBRA Full Perimeter Roof Curb		X
	COBRA or 62AQ Sleeper Rail (for use with Standard Unit Roof Curb)		X
Thermostats	Light Commercial Thermidistat™ Device		X
	Humidistat		X
	Communicating Thermostat		X
	Non-communicating Thermostat		X

*Factory-installed.
†Field-installed.

NOTES:
1. Refer to unit price pages or contact your local representative for accessory and option package information.
2. Some options may increase product lead times.

Options and accessories (cont)

48HJ015,017

Category	ITEM	OPTION*	ACCESSORY†
Cabinet	Hinged Access Panels	X	
	Service Option with (6) Hinged Access Panels, Non-Fused Disconnect and Non-Powered 115 v GFI Convenience Outlet	X	
Coil Options	Copper Fins - condenser coil	X	
	Copper Fins - evaporator and condenser coil	X	
	E-Coat outdoor coil (Al / Cu)	X	
	E-Coat outdoor coil (Cu / Cu)	X	
	Pre-Coat aluminum Fins on outdoor coil	X	
Condenser Protection	Condenser Coil Hail Guard (standard hood assembly)		X
Dehumidification & IAQ	Demand Control Ventilation CO2 Sensors		X
	UV Lights		X
Economizers & Outdoor Air	EconoMi$er IV (for Electro-Mech unit)	X	X
	EconoMi$er 2 (for DDC unit)	X	X
	Barometric Relief		X
	25% Two-Position Damper (motorized)		X
	25% Manual Outdoor-Air Damper	X	
	Power Exhaust (prop fan)		X
Economizer Sensors	Return Air Temperature Sensor		X
	Return Air Enthalpy Sensor		X
	Outdoor Air Differential Temperature Sensor		X
	Outdoor Air Differential Enthalpy Sensor		X
	Return Air CO2 Sensor (duct mounted)		X
	Space CO2 Sensor (wall mounted)		X
Electrical & Controls	PremierLink™ DDC Communicating Controller	X	X
	Convenience Outlet (non-powered)		X
Energy Recovery	Energy Recovery Ventilator (62M)		X
Gas Heat Exchanger	Stainless Steel Heat exchanger		X
	LP (Liquid Propane) Conversion Kit		X
Indoor Motor & Drive	Low-Medium Static Fan Drive	X	
	High-Static Fan Drive	X	
Low Ambient Control	Motormaster® Head Pressure Controller (Kit		X
Roof Curbs	Roof Curbs 14" (Vertical Supply & Return)		X
	Roof Curbs 24" (Vertical Supply & Return)		X
	Horizontal Adapter Curb (Horizontal Supply & Return)		X
	62M Full Perimeter curb		X
Thermostats	Light Commercial Thermidistat™ Device		X
	Humidistat		X
	Communicating Thermostat		X
	Non-communicating Thermostat		X

*Factory-installed.
†Field-installed.
**Available as a special order only.

NOTES:
1. Refer to unit price pages or contact your local representative for accessory and option package information.
2. Some options may increase product lead times.

48HJ020-028

Category	ITEM	OPTION*	ACCESSORY†
Cabinet	Hinged Access Panels	X	
	Drip Edge Kit		X
	Horizontal Conversion Kit (not required on 020 & 024)	X	X
Coil Options	Copper Fins - condenser coil	X	
	Copper Fins - evaporator and condenser coil	X	
	E-Coat outdoor coil (Al / Cu) and indoor coil (Al / Cu)	X	
	E-Coat outdoor coil (Al / Cu)	X	
	E-Coat outdoor coil (Cu / Cu)	X	
	E-Coat outdoor coil and indoor coil (Cu / Cu)	X	
	Pre-Coat aluminum Fins on outdoor coil	X	
Condenser Protection	Condenser Coil Hail Guard	X	X
Dehumidification & IAQ	Demand Control Ventilation CO2 Sensors		X
	UV Lights		X
Economizers & Outdoor Air	EconoMi$er IV (for Electro-Mech unit)	X	X
	EconoMi$er 2 (for DDC unit)		X
	Barometric Relief	X	X
	Two-Position Damper (motorized)	X	X
	Manual Outdoor-Air Damper	X	X
	Power Exhaust (prop fan)	X	X
Economizer Sensors	Return Air Temperature Sensor		X
	Return Air Enthalpy Sensor		X
	Outdoor Air Differential Temperature Sensor		X
	Outdoor Air Differential Enthalpy Sensor		X
	Return Air CO2 Sensor (duct mounted)		X
	Space CO2 Sensor (wall mounted)		X
Electrical & Controls	PremierLink™ DDC Communicating Controller		X
	Non-Fused Disconnect	X	
	Convenience Outlet (line-side powered)	X	
	Convenience Outlet (non-powered)	X	
	Return and Supply Smoke Detector	X	
	Return Smoke Detector	X	X
	Supply Smoke Detector		X
	Condensate Overflow Switch		X
	Phase Loss Detection		X
Energy Recovery	Energy Recovery Ventilator (62M)		X
Gas Heat Exchanger	Stainless Steel Heat exchanger		X
	LP (Liquid Propane) Conversion Kit		X
Indoor Motor & Drive	Low Range Drive	X	
	Mid-Low Range Drive	X	
	Mid-High Range Drive	X	
	High Range Drive	X	
Roof Curbs	Roof Curbs 14" (Vertical or Horizontal Supply & Return)		X
	Roof Curbs 24" (Vertical or Horizontal Supply & Return)		X
	62M Full Perimeter curb		X
Thermostats	Light Commercial Thermidistat™ Device		X
	Humidistat		X
	Communicating Thermostat		X
	Non-communicating Thermostat		X

*Factory-installed.
†Field-installed.

NOTES:
1. Refer to unit price pages or contact your local representative for accessory and option package information.
2. Some options may increase product lead times.

Options and accessories (cont)

Carrier PremierLink™ controls are available as a factory-installed option or as a field-installed accessory. The controls can be used to actively monitor and control all modes of operations.

Roof curbs (horizontal and vertical) permit installation and securing of ductwork to curb prior to mounting unit on the curb. Both 14-in. and 24-in. roof curbs are available as field-installed accessories.

EconoMi$er IV is available as a factory-installed option in vertical supply/return configuration only for unit sizes 003-014. Vertical or horizontal configuration is available for unit sizes 015-028. (The EconoMi$er IV is available as a field-installed accessory for horizontal and/or vertical supply return configurations.) The EconoMi$er IV is provided with an industry standard, stand-alone, solid-state controller that is easy to configure and troubleshoot. The EconoMi$er IV is compatible with non-DDC applications. The EconoMi$er IV is equipped with a barometric relief damper capable of relieving up to 100% return air (for unit sizes 003-014 only). Dry bulb outdoor-air temperature sensor is provided as standard. The return air sensor, indoor enthalpy sensor, and outdoor enthalpy sensor are provided as field-installed accessories to provide enthalpy control, differential enthalpy control, and differential dry bulb temperature control.

EconoMi$er2 is available as a factory-installed option in vertical supply/return configuration only. (The Econo-Mi$er2 is available as a field-installed accessory for horizontal and/or vertical supply return configurations.) The EconoMi$er2 is provided without a controller for use with factory-installed PremierLink controls or field-installed third-party controls. The EconoMi$er2 is equipped with a barometric relief damper capable of relieving up to 100% return air. Dry bulb outdoor-air temperature sensor is provided as standard. The enthalpy, differential temperature (adjustable), and differential enthalpy control are provided as field-installed accessories. The EconoMi$er2 is capable of control from a 4 to 20 mA signal through optional 4 to 20 mA design without microprocessor control (required for PremierLink™ or third party control interface).

Manual outdoor-air damper can be preset to admit up to 50% outdoor air for year round ventilation and is available as a field-installed accessory.

Two-position damper package is available as an accessory. Both 25% or 100% outdoor air dampers are available.

Head pressure control (Motormaster) accessory package maintains condensing temperature between 90 F and 110 F at outdoor ambient temperatures down to –20 F by condenser-fan speed modulation or condenser-fan cycling and wind baffles.

Unit-mounted, non-fused disconnect switch provides unit power shutoff. The switch is accessible from outside the unit, provides power off lockout capability and is available as a factory-installed option.

Convenience outlet is factory-installed and internally mounted with easily accessible 115-v female receptacle for temporary use of service tools. The device connects to the load-side of the disconnect. For a line-side convenience outlet, contact your local Carrier representative.

Compressor cycle delay (Time Guard II) accessory prevents unit from restarting for minimum of 5 minutes after shutdown.

Thru-the-bottom utility connectors permit electrical connections to be brought to the unit through the basepan. Only required on 003-014 models. Connectors are available as field-installed accessories.

Fan/filter status switch accessory provides status of indoor (evaporator) fan (ON/OFF) or filter (CLEAN/DIRTY).

62AQ Energy$Recycler™ heat pump unit recovers energy from building exhaust air and pre-conditions ventilation air to allow higher ventilation requirements and minimizing energy cost. Energy$Recycler unit is a field-installed accessory.

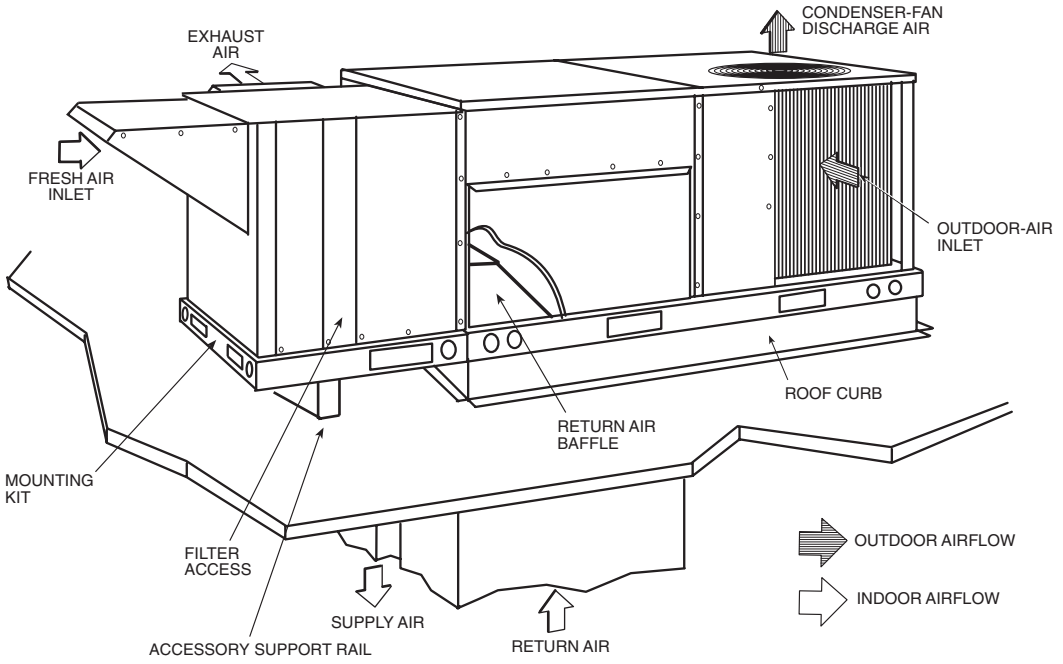
62M Energy Recovery Ventilator is a wheel device that recovers energy from the building exhaust air and pre-conditions ventilation air. The 62M is a field-installed accessory.

Power exhaust accessory will provide system exhaust of up to 100% of return air (vertical only). The power exhaust is a field-installed accessory (separate vertical and horizontal design).

Ultraviolet germicidal lamps eliminate odor causing mold and fungus that may develop in the wet area of the evaporator section of the unit. The high output, low temperature germicidal lamps are field installed in the evaporator section of the unit, aimed at the evaporator coil and condensate pan (UV light option not compatable with the Humidi-MiZer option).

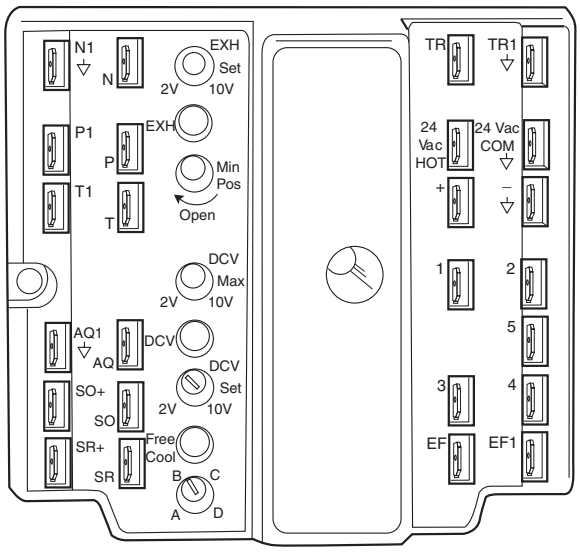
Hinged panel option provides hinged access panels for the filter, compressor, evaporator fan, and control box areas. Filter hinged panels permit tool-less entry for changing filters. Each hinged panel is permanently attached to the rooftop unit. Hinged panels are a factory-installed option.

ACCESSORY ENERGY$RECYLER™ UNIT (3 TO 12 1/2 TON UNITS ONLY)

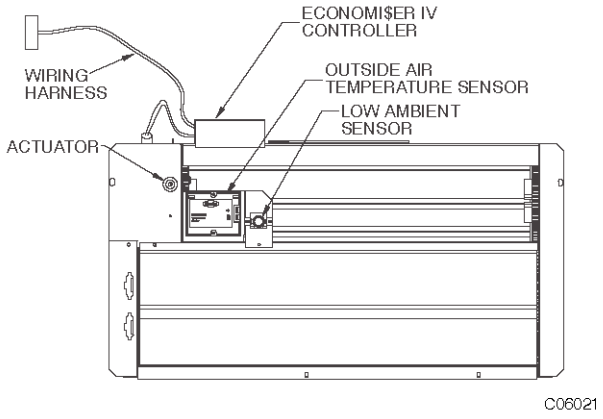


(Required when standard roof curb is used)

ECONOMI$ER IV CONTROLLER

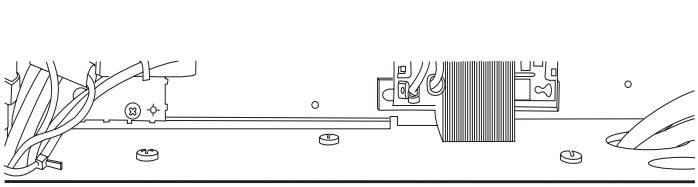


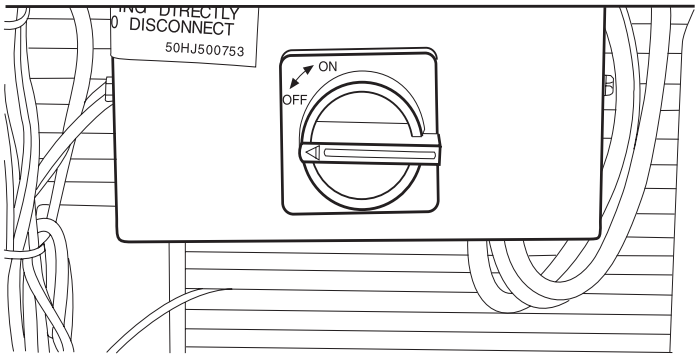
GEAR-DRIVEN ECONOMI$ER IV COMPONENT PARTS

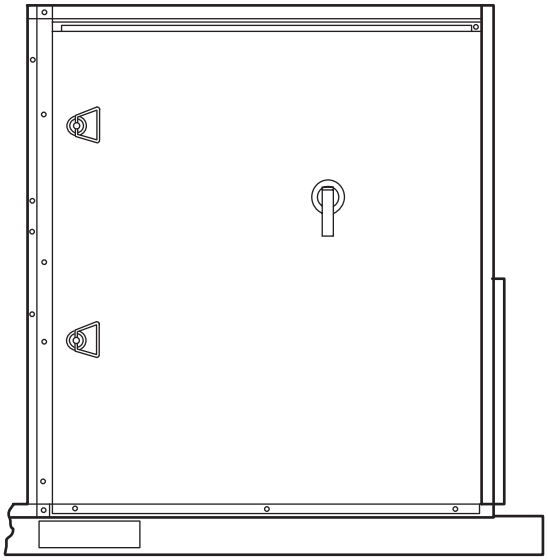


Options and accessories (cont)

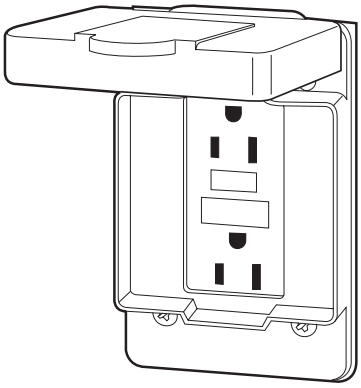
UNIT-MOUNTED DISCONNECT (Sizes 004-012)

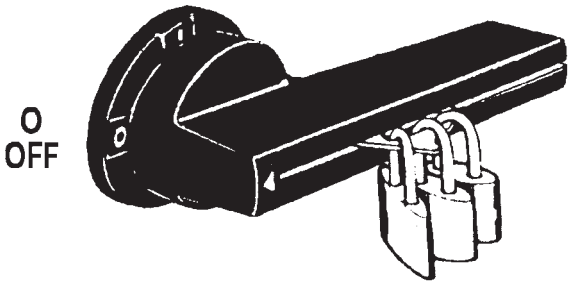






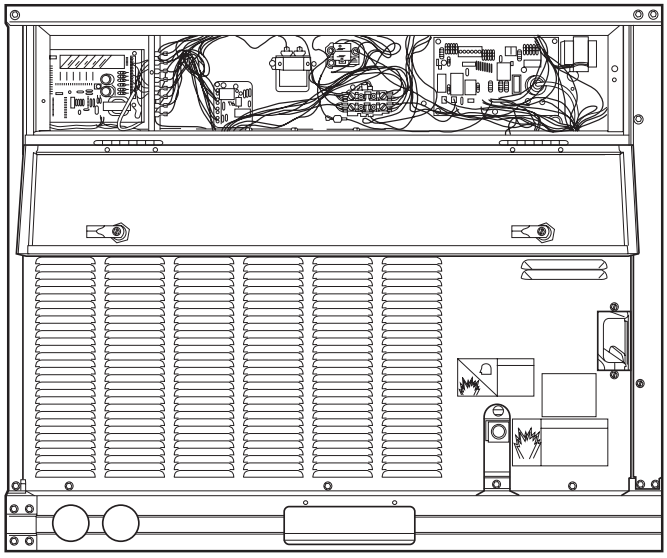
CONVENIENCE OUTLET



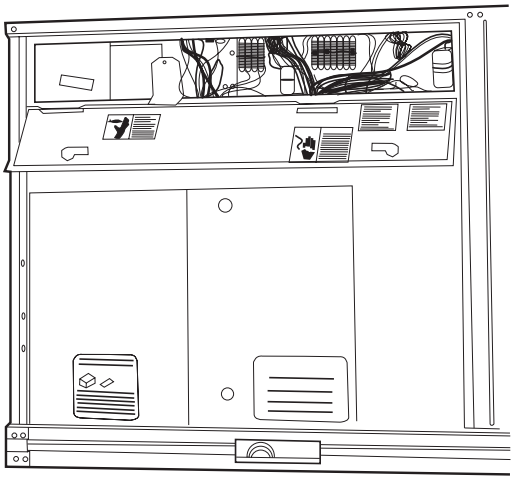


UNIT-MOUNTED DISCONNECT (Sizes 014, 016)

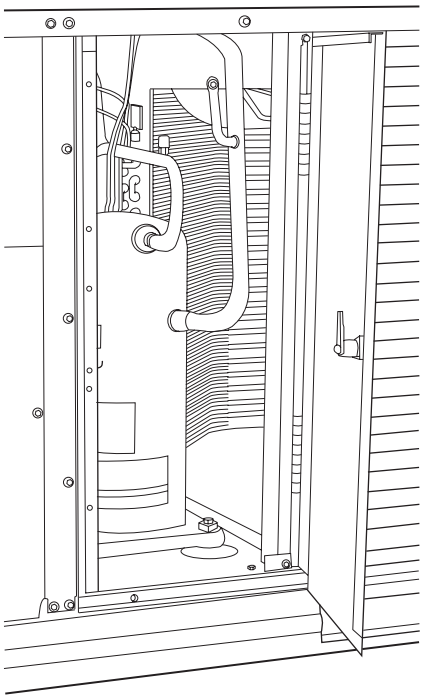
CONTROL BOX HINGED PANEL OPTION
48HJ004-007 UNITS SHOWN



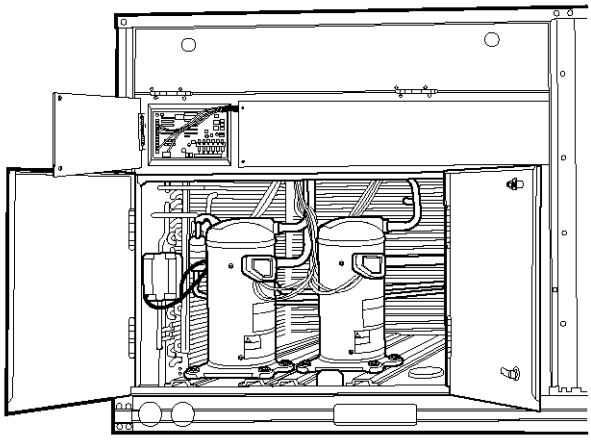
CONTROL BOX HINGED PANEL OPTION
48HJ008-0014 UNITS SHOWN



COMPRESSOR HINGED PANEL OPTION
48HJ004-006 UNITS SHOWN

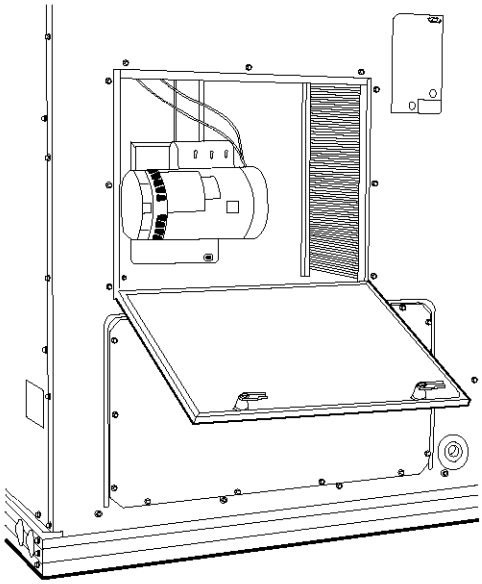


COMPRESSOR HINGED PANEL OPTION
48HJ008-014 UNITS SHOWN

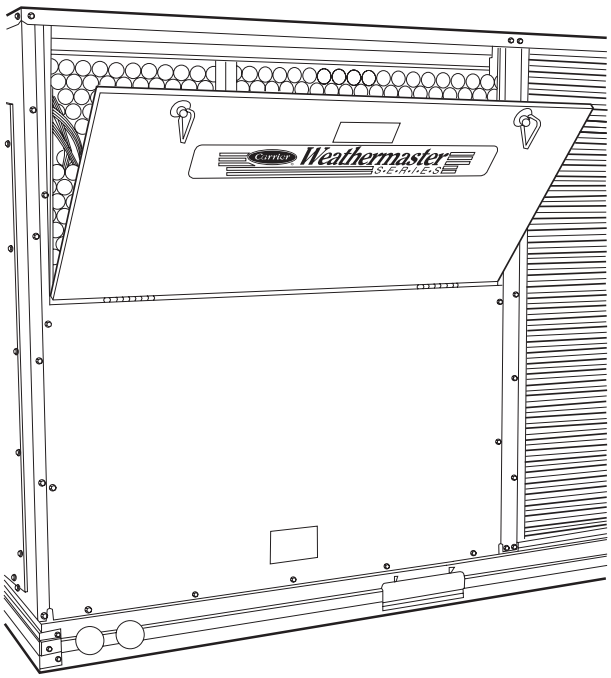


Options and accessories (cont)

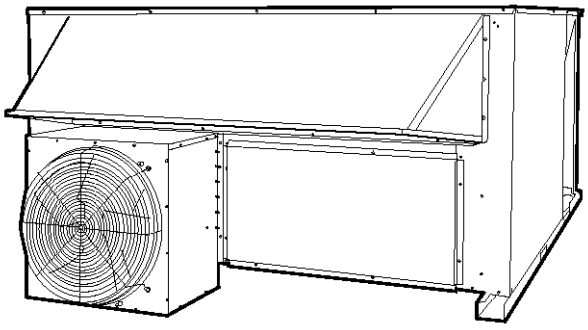
EVAPORATOR-FAN HINGED PANEL OPTION



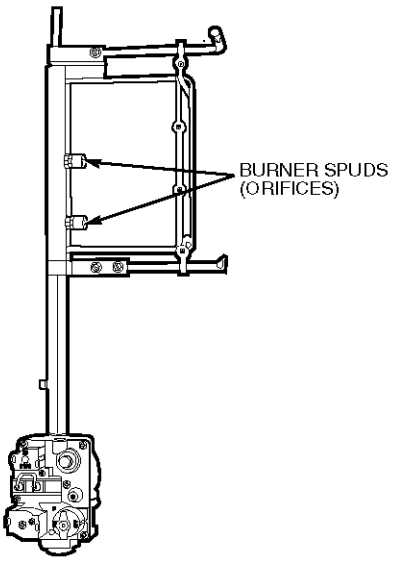
FILTER HINGED PANEL OPTION



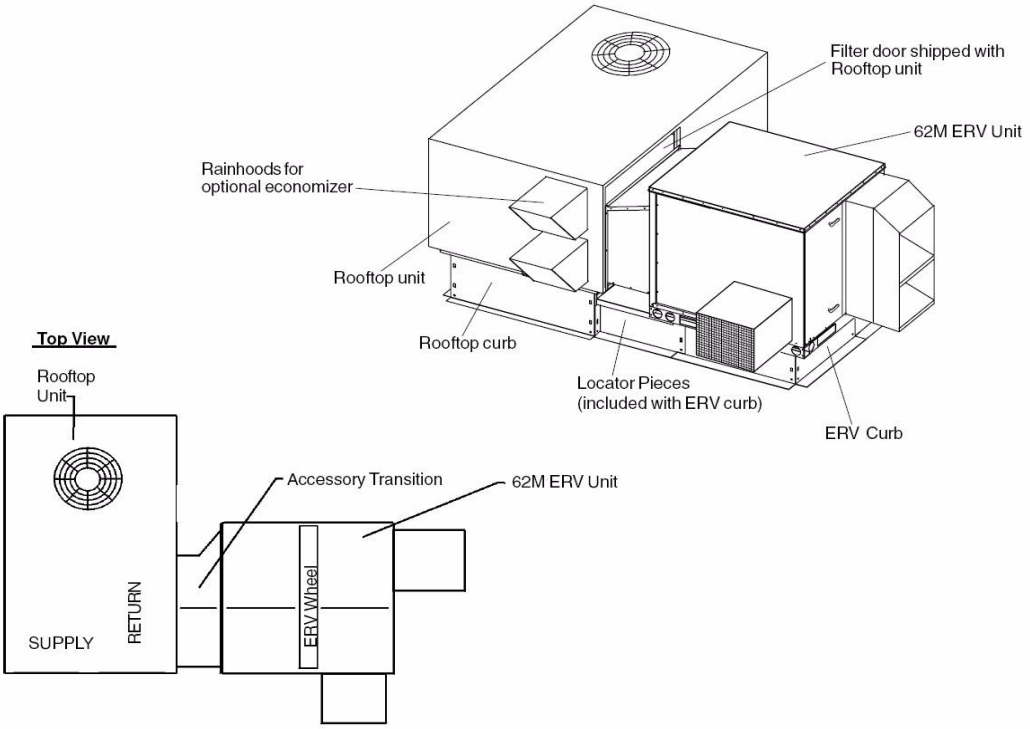
BAROMETRIC RELIEF OR POWER EXHAUST (015-028 Shown)



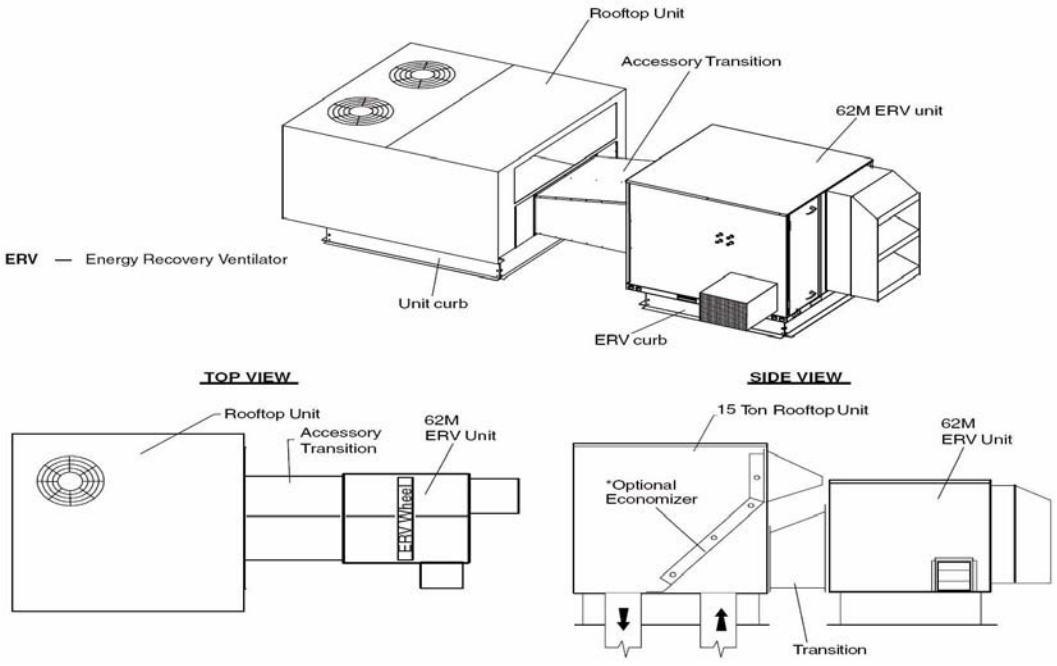
LP CONVERSION KIT



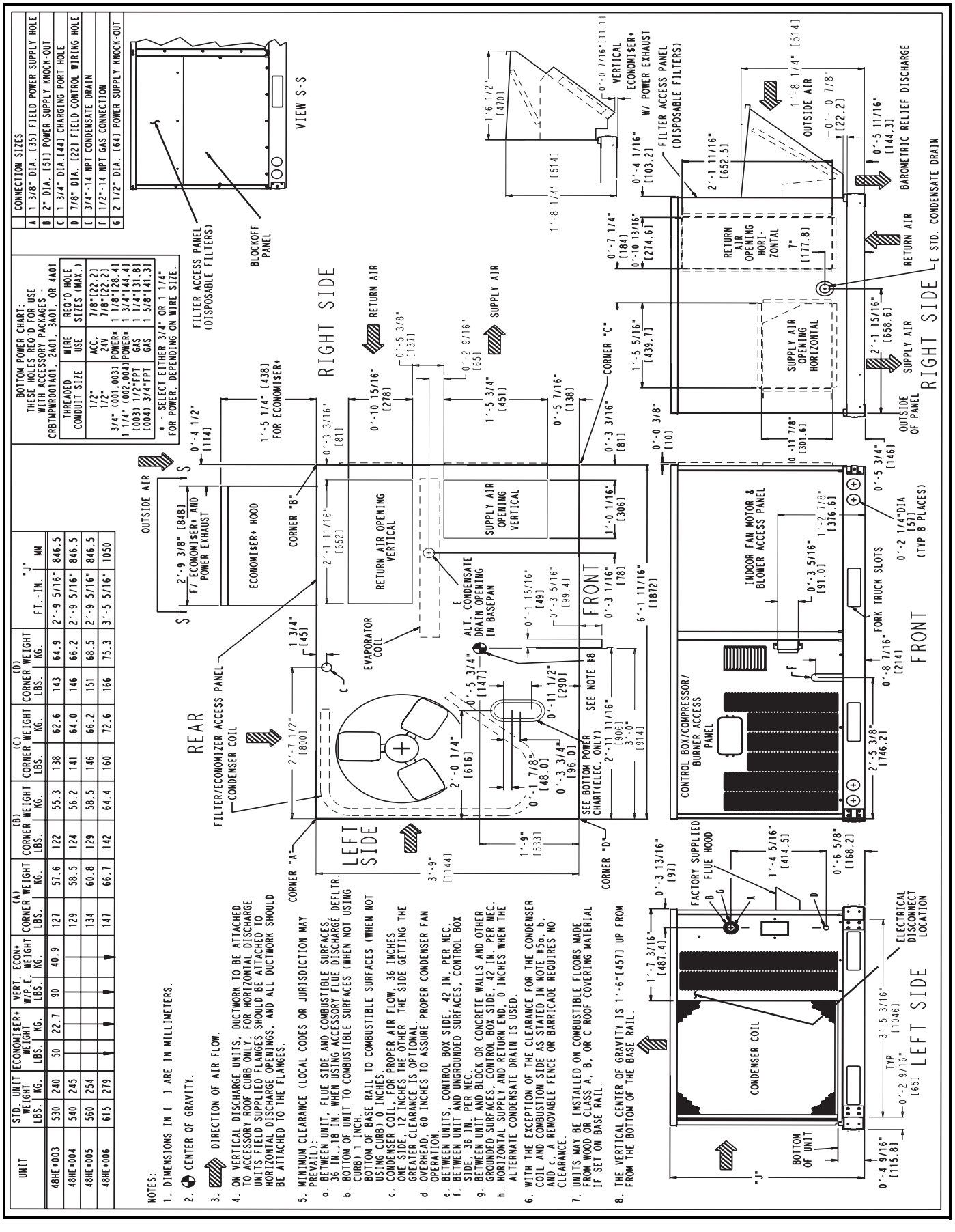
62M MATED WITH 48HJ004-014



62M MATED WITH 48HJ017

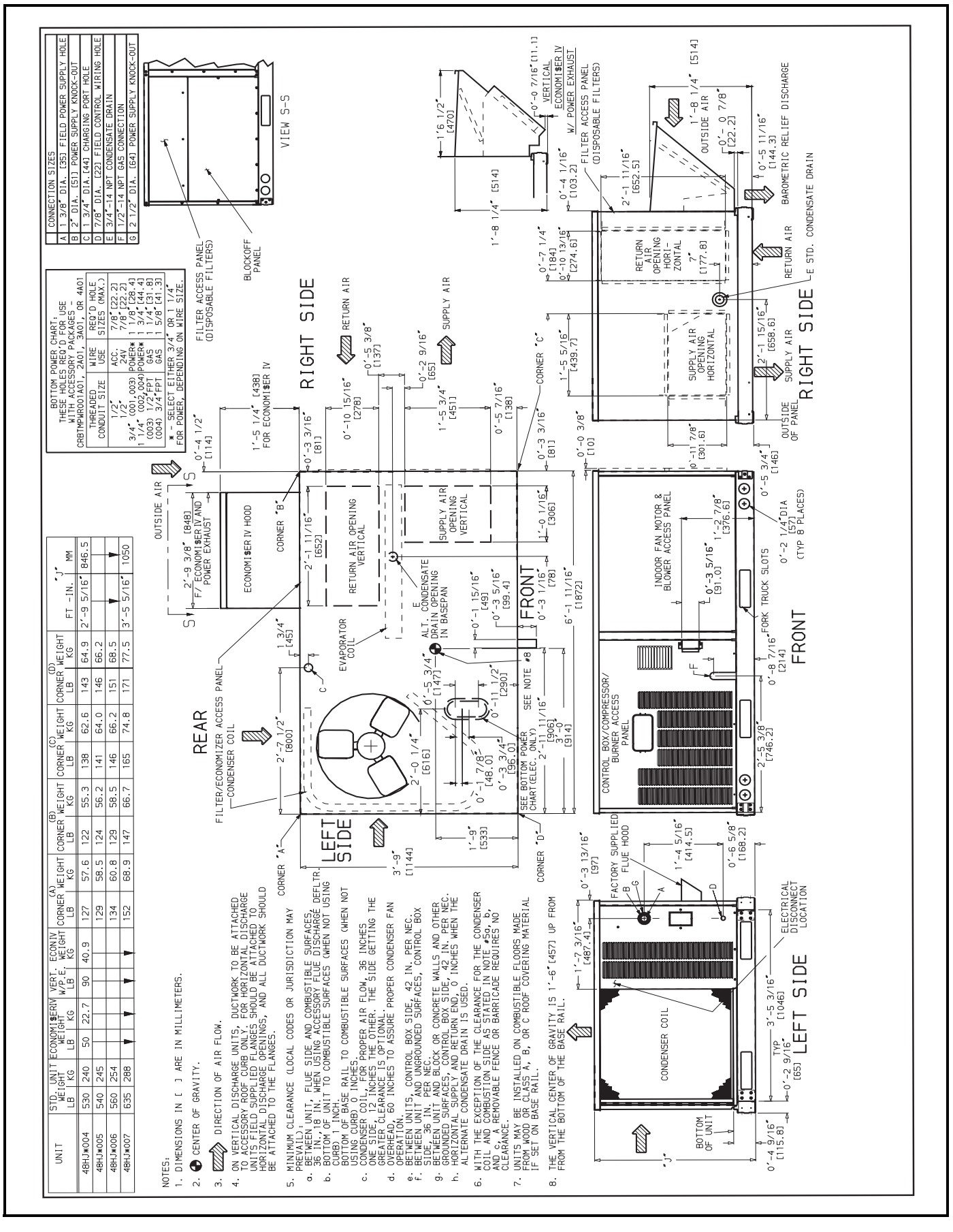


Base unit dimensions — 48HE003-006



UNIT	STD. UNIT WEIGHT LBS.	STD. UNIT WEIGHT KG.	ECONOMI$ER+ WEIGHT LBS.	ECONOMI$ER+ WEIGHT KG.	VERT. ECON+ W/P.E. WEIGHT LBS.	VERT. ECON+ W/P.E. WEIGHT KG.	(A) CORNER WEIGHT LBS.	(A) CORNER WEIGHT KG.	(B) CORNER WEIGHT LBS.	(B) CORNER WEIGHT KG.	(C) CORNER WEIGHT LBS.	(C) CORNER WEIGHT KG.	(D) CORNER WEIGHT LBS.	(D) CORNER WEIGHT KG.	"J" FT.-IN.	"J" MM
48HE*003	530	240	50	22.7	90	40.9	127	57.6	122	55.3	138	62.6	143	64.9	2'-9 5/16"	846.5
48HE*004	540	245					129	58.5	124	56.2	141	64.0	146	66.2	2'-9 5/16"	846.5
48HE*005	560	254					134	60.8	129	58.5	146	66.2	151	68.5	2'-9 5/16"	846.5
48HE*006	615	279					147	66.7	142	64.4	160	72.6	166	75.3	3'-5 5/16"	1050

Base unit dimensions — 48HJ004-007



UNIT	STD. UNIT WEIGHT LB	STD. UNIT WEIGHT KG	ECONOMI$ER IV W/P.E. WEIGHT LB	ECONOMI$ER IV W/P.E. WEIGHT KG	VERT. ECONIV WEIGHT LB	VERT. ECONIV WEIGHT KG	(A) CORNER WEIGHT LB	(A) CORNER WEIGHT KG	(B) CORNER WEIGHT LB	(B) CORNER WEIGHT KG	(C) CORNER WEIGHT LB	(C) CORNER WEIGHT KG	(D) CORNER WEIGHT LB	(D) CORNER WEIGHT KG	"J" FT -IN.	"J" MM
48HJ*004	530	240	50	22.7	90	40.9	127	57.6	122	55.3	138	62.6	143	64.9	2'-9 5/16"	846.5
48HJ*005	540	245					129	58.5	124	56.2	141	64.0	146	66.2		
48HJ*006	560	254					134	60.8	129	58.5	146	66.2	151	68.5		
48HJ*007	635	288					152	68.9	147	66.7	165	74.8	171	77.5	3'-5 5/16"	1050

BOTTOM POWER CHART: THESE HOLES REQ'D FOR USE WITH ACCESSORY PACKAGES - CRBTMPWR001A01, 2A01, 3A01, OR 4A01			
THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)	
1/2" (001, 002, 003) 3/4" (004)	ACC. 24V POWER* GAS	7/8" [22.2] 7/8" [22.2] 1 3/4" [44.4]	1 1/4" [31.8] 1 5/8" [41.3]
1 1/4" FPT 1/2" FPT 3/4" FPT			

	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2" DIA. [51] POWER SUPPLY KNOCK-OUT
C	1 3/4" DIA. [44] CHARGING PORT HOLE
D	7/8" DIA. [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONNECTION
G	2 1/2" DIA. [64] POWER SUPPLY KNOCK-OUT

Base unit dimensions — 48HJ008-014

UNIT	STD UNIT WEIGHT		ECONOMISER IV WEIGHT		VERT. ECON IV W/P.E. WEIGHT		(A) CORNER WEIGHT		(B) CORNER WEIGHT		(C) CORNER WEIGHT		(D) CORNER WEIGHT		"H"		"J"		"K"		"L"	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm
48HJ008	870	395	75	34.1	145	65.9	189	86	161	73	239	109	280	127	2-0$^{7}/_{8}$	632	3-5$^{5}/_{16}$	1050	2-9$^{11}/_{16}$	856	2- 2$^{7}/_{16}$	672
48HJ009	1015	460	75	34.1	145	65.9	223	101	188	85	279	126	327	148	1-2$^{7}/_{8}$	378	4-1$^{5}/_{16}$	1253	3-0$^{3}/_{8}$	924	2-10$^{7}/_{16}$	875
48HJ012	1035	469	75	34.1	145	65.9	225	102	192	87	285	129	333	151	1-2$^{7}/_{8}$	378	4-1$^{5}/_{16}$	1253	3-0$^{3}/_{8}$	924	2-10$^{7}/_{16}$	875
48HJ014	1050	476	75	34.1	145	65.9	228	103	195	88	289	131	338	153	1-2$^{7}/_{8}$	378	4-1$^{5}/_{16}$	1253	3-0$^{3}/_{8}$	924	2-10$^{7}/_{16}$	875

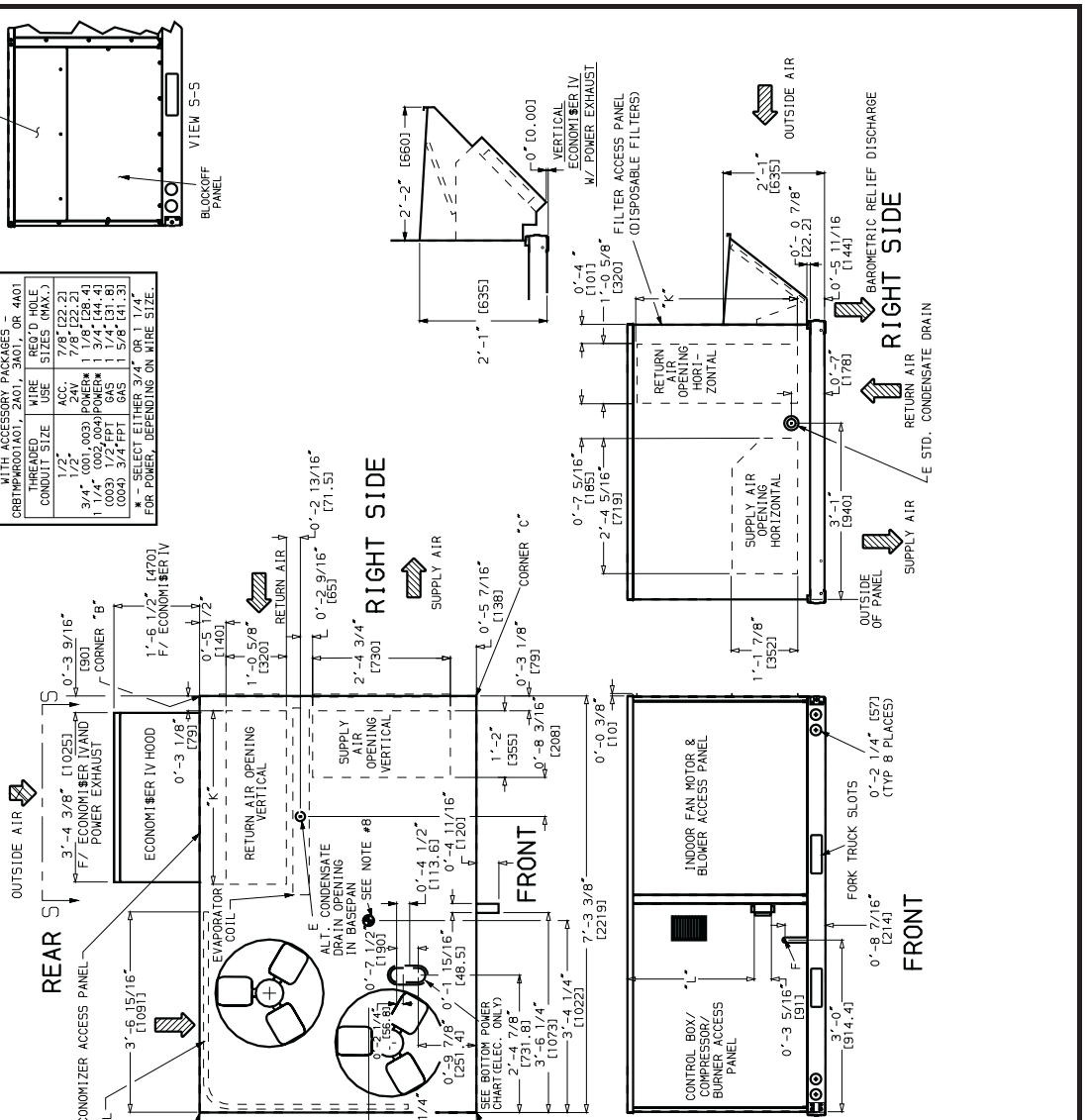
NOTES:
1. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. ⊕ CENTER OF GRAVITY.
3. ⇨ DIRECTION OF AIR FLOW.
4. ON VERTICAL DISCHARGE UNITS, DUCTWORK TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY. FOR HORIZONTAL DISCHARGE UNITS, FIELD SUPPLIED FLANGES SHOULD BE ATTACHED TO HORIZONTAL DISCHARGE OPENINGS, AND ALL DUCTWORK SHOULD BE ATTACHED TO THE FLANGES.
5. MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BETWEEN UNIT, FLUE SIDE AND COMBUSTIBLE SURFACES, 48 INCHES. 18 INCHES WHEN USING ACCESSORY FLUE DISCHARGE DEFLECTOR.
   b. BOTTOM OF UNIT TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 0 INCHES.
      BOTTOM OF BASE RAIL TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 0 INCHES.
   c. CONDENSER COIL, FOR PROPER AIR FLOW, 36 INCHES ONE SIDE, 12 INCHES THE OTHER. THE SIDE GETTING THE GREATER CLEARANCE IS OPTIONAL.
   d. OVERHEAD, 60 INCHES TO ASSURE PROPER CONDENSER FAN OPERATION.
   e. BETWEEN UNITS, CONTROL BOX SIDE, 42 IN. PER NEC.
   f. BETWEEN UNIT AND UNGROUNDED SURFACES, CONTROL BOX SIDE, 36 IN. PER NEC.
   g. BETWEEN UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, CONTROL BOX SIDE, 42 IN. PER NEC.
   h. HORIZONTAL SUPPLY AND RETURN END, 0 INCHES WHEN THE ALTERNATE CONDENSATE DRAIN IS USED.
6. WITH THE EXCEPTION OF THE CLEARANCE FOR THE CONDENSER COIL AND COMBUSTION SIDE AS STATED IN NOTE #5a, b, AND c, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
7. UNITS MAY BE INSTALLED ON COMBUSTIBLE FLOORS MADE FROM WOOD OR CLASS A, B, OR C ROOF COVERING MATERIAL IF SET ON BASE RAIL.
8. THE VERTICAL CENTER OF GRAVITY IS 1'-7" [483] FOR SIZE 008, 1'-8" [508] FOR SIZES 009, 012, AND 014 UP FROM THE BOTTOM OF THE BASE RAIL.

	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2 1/2" DIA. [64] POWER SUPPLY KNOCK-OUT
C	1 3/4" DIA. [44] CHARGING PORT HOLE
D	7/8" DIA. [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONN; 48HJD008,009; 3/4"-14 NPT GAS CONN; 48HJF008,009; 48HJD/A/E/012,014; 48HJF/012;
G	2" DIA [51] POWER SUPPLY KNOCK-OUT

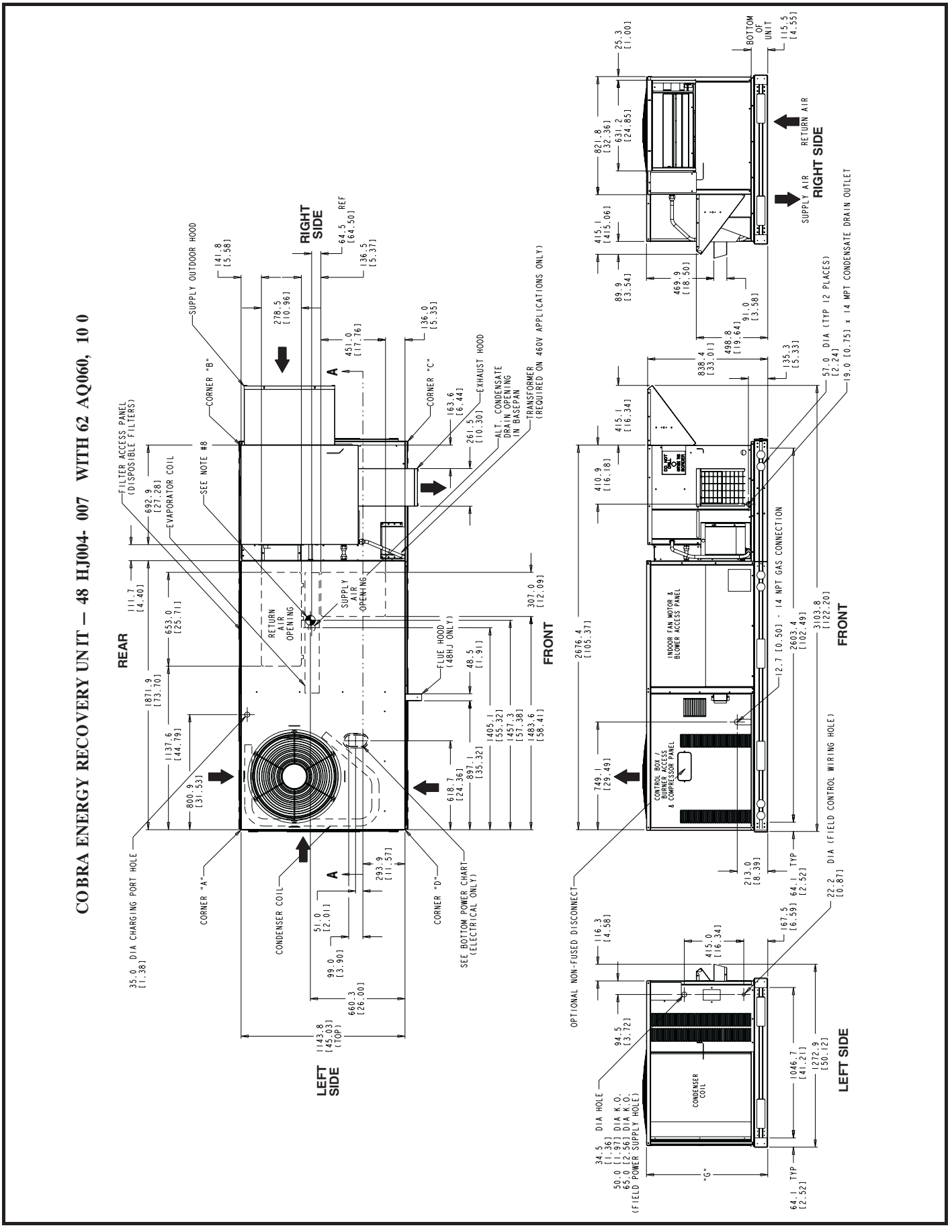
BOTTOM POWER CHART.
THESE HOLES REQ'D FOR USE WITH ACCESSORY PACKAGES CRBTMPWRO01A01, 2A01, 3A01, OR 4A01

THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
1/2"	ACC.	7/8" [22.2]
1/2"	24V	7/8" [22.2]
3/4" (001, 003)	POWER*	1 1/8" [28.4]
1 1/4" (002, 004)	POWER*	1 3/4" [44.4]
(003) 1/2" FPT	GAS	1 1/4" [31.8]
(004) 3/4" FPT	GAS	5/8" [41.3]

* – SELECT EITHER 3/4" OR 1 1/4" FOR POWER, DEPENDING ON WIRE SIZE.



Base unit dimensions — COBRA™ units



COBRA ENERGY RECOVERY UNIT — 48 HJ004 -007 W ITH 62 AQ060, 100 (cont)

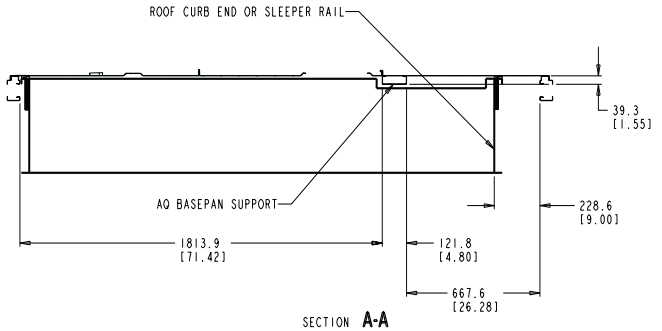
SINGLE ZONE ELECTRIC COOLING WITH GAS HEAT													
UNIT	ELECTRICAL CHARACTERISTICS	UNIT WEIGHT		CORNER WEIGHT "A"		CORNER WEIGHT "B"		CORNER WEIGHT "C"		CORNER WEIGHT "D"		UNIT HEIGHT "G"	
		LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	IN	MM
48HJ*004 w/62AQ060	208/230-1-60, 208/230-3-60, 460-3-60	890	404	234	106	280	127	205	93	171	78	33.33	846.5
48HJ*004 w/62AQ100	208/230-1-60, 208/230-3-60, 460-3-60	905	411	238	108	284	129	208	94	174	79	33.33	846.5
48HJ*005 w/62AQ060	208/230-1-60, 208/230-3-60, 460-3-60	900	409	237	107	283	128	207	94	173	79	33.33	846.5
48HJ*005 w/62AQ100	208/230-1-60, 208/230-3-60, 460-3-60	915	415	241	109	288	130	211	96	176	80	33.33	846.5
48HJ*006 w/62AQ060	208/230-1-60, 208/230-3-60, 460-3-60	920	418	242	110	289	131	212	96	177	80	33.33	846.5
48HJ*006 w/62AQ100	208/230-1-60, 208/230-3-60, 460-3-60	935	425	246	112	294	133	215	98	180	82	33.33	846.5
48HJ*007 w/62AQ060	208/230-3-60, 460-3-60	995	452	262	119	313	142	229	104	192	87	41.24	1047.4
48HJ*007 w/62AQ100	208/230-3-60, 460-3-60	1010	459	266	120	317	144	232	105	194	88	41.24	1047.4

NOTES:
1. DIMENSIONS IN [ ] ARE IN INCHES.
2. ⊕ CENTER OF GRAVITY.
3. ➡ DIRECTION OF AIR FLOW.
4. DUCTWORK TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY.
5. HJ - MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BETWEEN UNIT, FLUE SIDE AND COMBUSTIBLE SURFACES, 48 INCHES. 18 INCHES WHEN USING ACCESSORY FLUE DISCHARGE DEFLECTOR.
   b. BOTTOM OF UNIT TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 1 INCH. BOTTOM OF BASE RAIL TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 0 INCHES.
   c. CONDENSER COIL, FOR PROPER AIR FLOW, 36 INCHES ONE SIDE, 12 INCHES THE OTHER. THE SIDE GETTING THE GREATER CLEARANCE IS OPTIONAL.
   d. OVERHEAD, 60 INCHES TO ASSURE PROPER CONDENSER FAN OPERATION.
   e. BETWEEN UNITS, CONTROL BOX SIDE, 42 IN. PER NEC.
   f. BETWEEN UNIT AND UNGROUNDED SURFACES, CONTROL BOX SIDE, 36 IN. PER NEC.
   g. BETWEEN UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, CONTROL BOX SIDE, 42 IN. PER NEC.
   h. HORIZONTAL SUPPLY AND RETURN END, 0 INCHES WHEN THE ALTERNATE CONDENSATE DRAIN IS USED.
   AQ - MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BETWEEN UNIT (CONTROL/EXHAUST SIDE) AND UNDGROUNDED SURFACES, 36 INCHES AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES.
   b. FILTER ACCESS SIDE, 30 INCHES.
      SUPPLY AIR INTAKE, 36 INCHES.
      UNIT TOP, 0 INCHES.
      EXHAUST AIR SIDE 36 INCHES.
6. WITH THE EXCEPTION OF THE CLEARANCE FOR THE CONDENSER COIL AND COMBUSTION SIDE AS STATED IN NOTE #5a, b AND c, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
7. UNITS MAY BE INSTALLED ON COMBUSTIBLE FLOORS MADE FROM WOOD OR CLASS A, B, OR C ROOF COVERING MATERIAL IF SET ON BASE RAIL.
8. THE VERTICAL CENTER OF GRAVITY IS 1'-6" [457] UP FROM THE BOTTOM OF THE BASE RAIL.
9. THIS DRAWING IS NOT APPLICABLE FOR ACCESSORY 62AQ UNITS.

BOTTOM POWER CHART:
THESE HOLES REQ'D FOR USE
WITH ACCESSORY PACKAGES -
CRBTMPWR001A00, 3A00 12.7 [0.50], 19.0 [0.75]
OR
CRBTMPWR002A00, 4A00 12.7 [0.50], 31.8 [1.25]

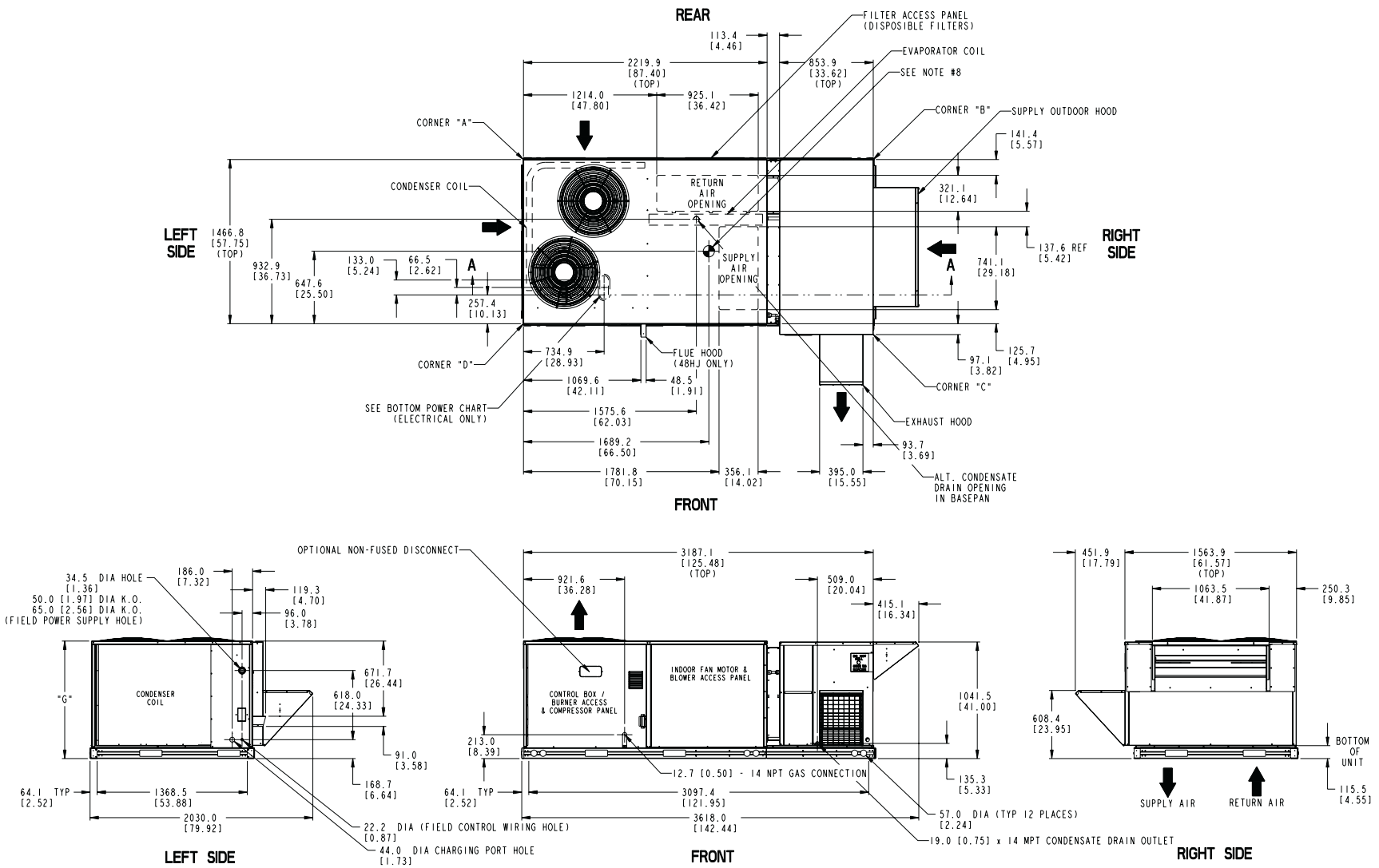
THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
12.7 [0.50]	24V	22.2 [0.88]
19.0 [0.75]	POWER *	28.4 [1.12]
31.7 [1.25]	POWER *	44.4 [1.75]
(003) 12.7 [0.50] FPT	GAS	31.8 [1.25]
(004) 19.0 [0.75] FPT	GAS	41.3 [1.62]

* - SELECT EITHER 19.0 [0.75] OR 31.8 [1.25] FOR POWER, DEPENDING ON WIRE SIZE.



SECTION **A-A**
(VIEW FOR CURB/SLEEPER RAIL)

COBRA™ ENERGY RECOVERY UNIT — 48 HJ008 -014 W ITH 62 AQ200, 300



COBRA ENERGY RECOVERY UNIT — 48H J008- 014 W ITH 62 AQ200,300 (cont)

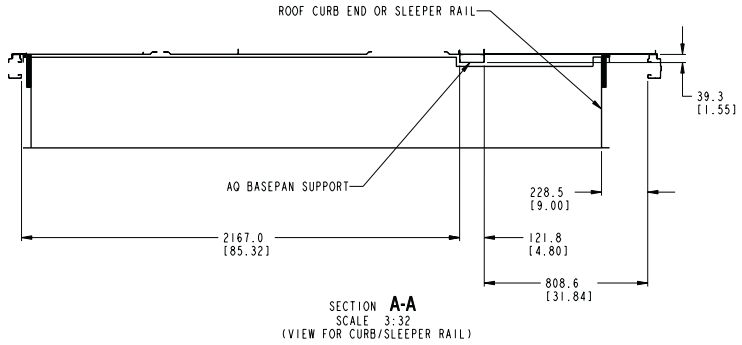
SINGLE ZONE ELECTRIC COOLING WITH GAS HEAT													
UNIT	ELECTRICAL CHARACTERISTICS	UNIT WEIGHT		CORNER WEIGHT "A"		CORNER WEIGHT "B"		CORNER WEIGHT "C"		CORNER WEIGHT "D"		UNIT HEIGHT "G"	
		LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	IN	MM
48HJ*008 w/62AQ200	208/230-3-60, 460-3-60	1310	595	272	123	307	139	388	176	344	156	42.12	1070
48HJ*008 w/62AQ300	208/230-3-60, 460-3-60	1355	616	281	128	317	144	401	182	356	161	42.12	1070
48HJ*009 w/62AQ200	208/230-3-60, 460-3-60	1315	597	273	124	308	140	389	177	345	157	42.12	1070
48HJ*009 w/62AQ300	208/230-3-60, 460-3-60	1360	618	282	128	318	144	403	183	357	162	42.12	1070
48HJ*012 w/62AQ200	208/230-3-60, 460-3-60	1400	636	291	132	328	149	414	188	367	167	50.12	1273
48HJ*012 w/62AQ300	208/230-3-60, 460-3-60	1445	657	300	136	338	153	428	194	379	172	50.12	1273
48HJ*014 w/62AQ200	208/230-3-60, 460-3-60	1440	655	299	136	337	153	426	193	378	171	50.12	1273
48HJ*014 w/62AQ300	208/230-3-60, 460-3-60	1485	675	308	140	347	158	440	199	390	177	50.12	1273

NOTES:
1. DIMENSIONS IN [ ] ARE IN INCHES.
2. ⊕ CENTER OF GRAVITY.
3. ➡ DIRECTION OF AIR FLOW.
4. DUCTWORK TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY.
5. HJ - MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BETWEEN UNIT, FLUE SIDE AND COMBUSTIBLE SURFACES, 48 INCHES. 18 INCHES WHEN USING ACCESSORY FLUE DISCHARGE DEFLECTOR.
   b. BOTTOM OF UNIT TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 1 INCH. BOTTOM OF BASE RAIL TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 0 INCHES.
   c. CONDENSER COIL, FOR PROPER AIR FLOW, 36 INCHES ONE SIDE, 12 INCHES THE OTHER. THE SIDE GETTING THE GREATER CLEARANCE IS OPTIONAL.
   d. OVERHEAD, 60 INCHES TO ASSURE PROPER CONDENSER FAN OPERATION.
   e. BETWEEN UNITS, CONTROL BOX SIDE, 42 IN. PER NEC.
   f. BETWEEN UNIT AND UNGROUNDED SURFACES, CONTROL BOX SIDE, 36 IN. PER NEC.
   g. BETWEEN UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, CONTROL BOX SIDE, 42 IN. PER NEC.
   h. HORIZONTAL SUPPLY AND RETURN END, 0 INCHES WHEN THE ALTERNATE CONDENSATE DRAIN IS USED.
   AQ - MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BETWEEN UNIT (CONTROL/EXHAUST SIDE) AND UNDGROUNDED SURFACES, 36 INCHES AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES.
   b. FILTER ACCESS SIDE, 30 INCHES. SUPPLY AIR INTAKE, 36 INCHES. UNIT TOP, 0 INCHES. EXHAUST AIR SIDE 36 INCHES.
6. WITH THE EXCEPTION OF THE CLEARANCE FOR THE CONDENSER COIL AND COMBUSTION SIDE AS STATED IN NOTE #5a, b AND c, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
7. UNITS MAY BE INSTALLED ON COMBUSTIBLE FLOORS MADE FROM WOOD OR CLASS A, B, OR C ROOF COVERING MATERIAL IF SET ON BASE RAIL.
8. THE VERTICAL CENTER OF GRAVITY IS 1'-6" [457] UP FROM THE BOTTOM OF THE BASE RAIL.
9. THIS DRAWING IS NOT APPLICABLE FOR ACCESSORY 62AQ UNITS.

BOTTOM POWER CHART:
THESE HOLES REQ'D FOR USE
WITH ACCESSORY PACKAGES -
CRBTMPWR001A00, 3A00 12.7 [0.50], 19.0 [0.75]
OR
CRBTMPWR002A00, 4A00 12.7 [0.50], 31.8 [1.25]

THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
12.7 [0.50]	24V	22.2 [0.88]
19.0 [0.75]	POWER *	28.4 [1.12]
31.7 [1.25]	POWER *	44.4 [1.75]
(003) 12.7 [0.50] FPT	GAS	31.8 [1.25]
(004) 19.0 [0.75] FPT	GAS	41.3 [1.62]

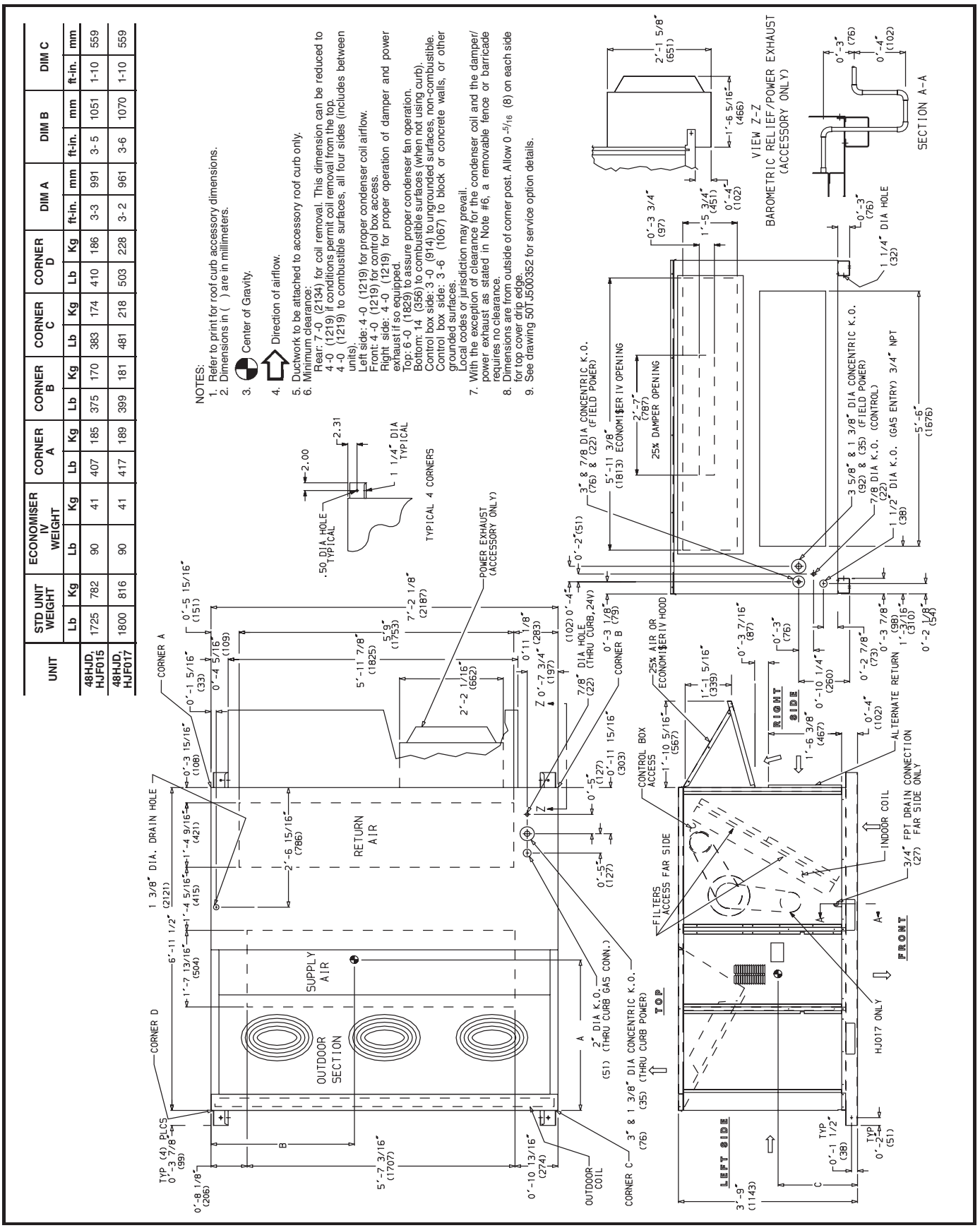
* - SELECT EITHER 19.0 [0.75] OR 31.8 [1.25] FOR POWER, DEPENDING ON WIRE SIZE.



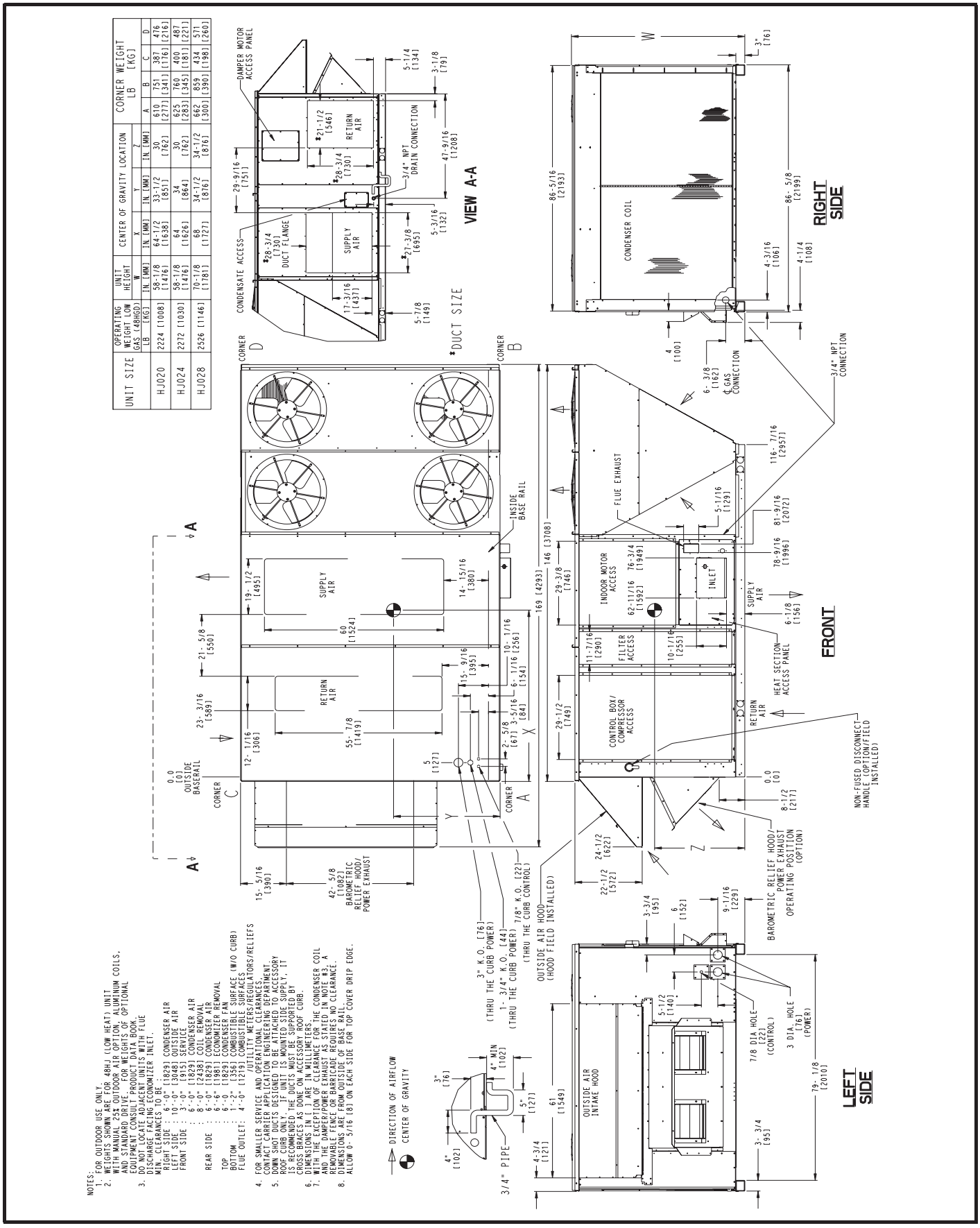
SECTION **A-A**
SCALE 3:32
(VIEW FOR CURB/SLEEPER RAIL)

Base unit dimensions — 48HJ015, 017

UNIT	STD UNIT WEIGHT		ECONOMISER IV WEIGHT		CORNER A		CORNER B		CORNER C		CORNER D		DIM A		DIM B		DIM C	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	ft-in.	mm	ft-in.	mm	ft-in.	mm
48HJD, HJF015	1725	782	90	41	407	185	375	170	383	174	410	186	3-3	991	3- 5	1051	1-10	559
48HJD, HJF017	1800	816	90	41	417	189	399	181	481	218	503	228	3-2	961	3-6	1070	1-10	559



Base unit dimensions — 48HJ020, 028



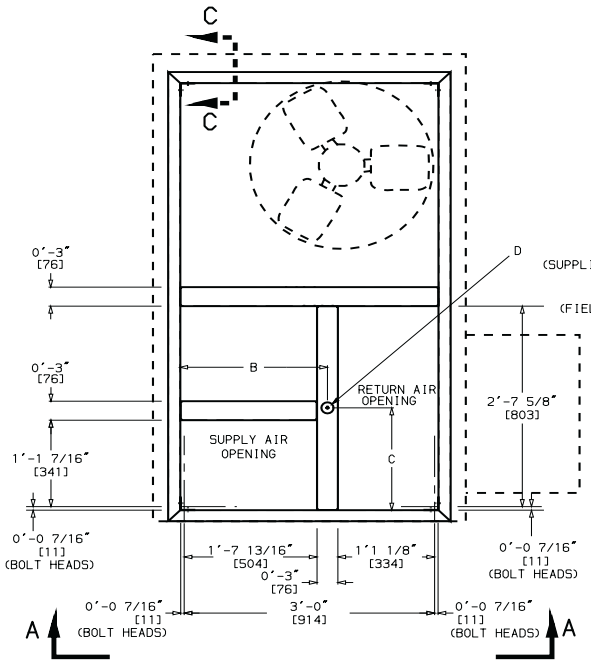
UNIT SIZE	OPERATING WEIGHT LOW GAS (48HGD) LB [KG]	UNIT HEIGHT W IN. [MM]	CENTER OF GRAVITY LOCATION X IN. [MM]	Y IN. [MM]	Z IN. [MM]	CORNER WEIGHT LB [KG] A	B	C	D
HJ020	2224 [1008]	58-1/8 [1476]	64-1/2 [1638]	33-1/2 [851]	30 [762]	610 [277]	751 [341]	387 [176]	476 [216]
HJ024	2272 [1030]	58-1/8 [1476]	64 [1626]	34 [864]	30 [762]	625 [283]	760 [345]	400 [181]	487 [221]
HJ028	2526 [1146]	70-1/8 [1781]	68 [1727]	34-1/2 [876]	34-1/2 [876]	662 [300]	859 [390]	434 [198]	571 [260]

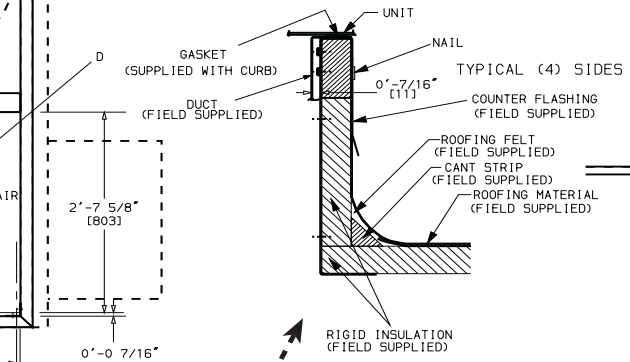
Accessory dimensions — 48HJ004-007

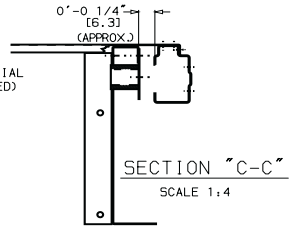
CONNECTOR PKG. ACCY.	B	C	D ALT DRAIN HOLE	GAS	POWER	CONTROL	ACCESSORY POWER
CRBTMPWR001A01	1 -9 11/16 [551]	1 -4 [406]	1 3/4 [44.5]	3/4 [19] NPT	3/4 [19] NPT	1/2 [12.7]	1/2 [12.7]
CRBTMPWR002A01					1 1/4 [31.7]		
CRBTMPWR003A01				1/2 [12.7] NPT	3/4 [19] NPT		
CRBTMPWR004A01				3/4 [19] NPT	1 1/4 [31.7]		

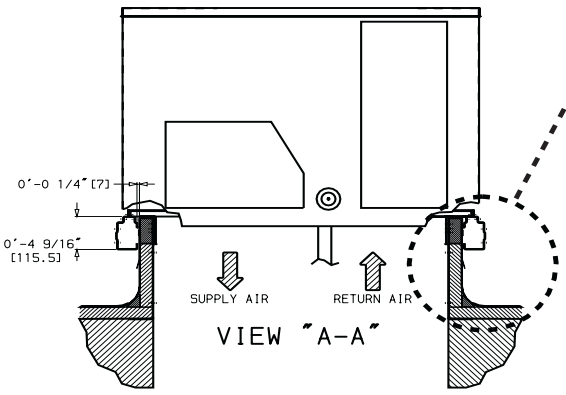
ROOF CURB ACCESSORY	A	UNIT SIZE
CRRFCURB001A01	1 -2 [356]	48HJ004-007
CRRFCURB002A01	2 -0 [610]	48HE003-006

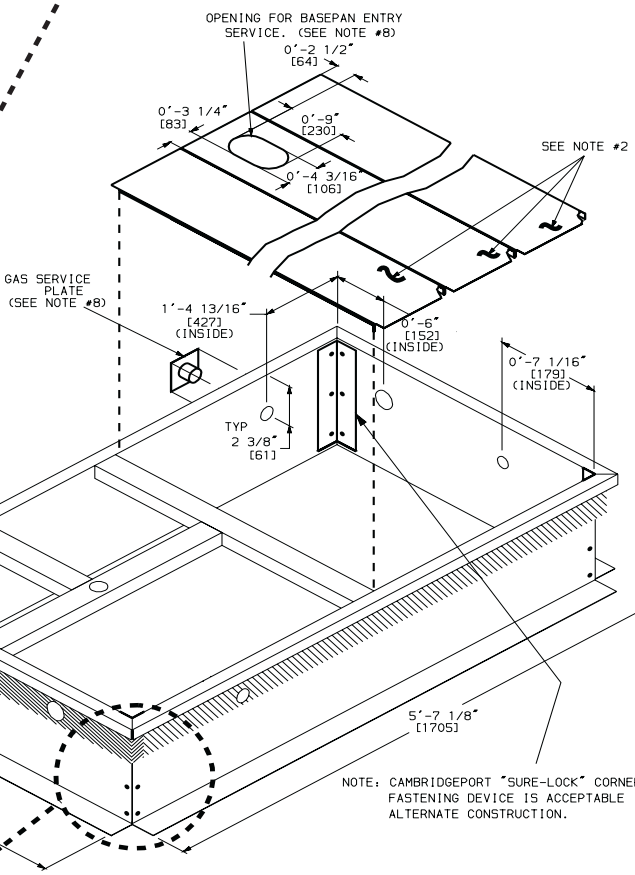
NOTES:
1. Roof curb accessory is shipped disassembled.
2. Insulated panels.
3. Dimensions in [ ] are in millimeters.
4. Roof curb: galvanized steel.
5. Attach ductwork to curb (flanges of duct rest on curb).
6. Service clearance: 4 ft on each side.
7. Direction of airflow.
8. Connector packages CRBTMPWR001A01 and 002A01 are for thru-the-curb type gas. Packages CRBTMPWR003A01 and 004A01 are for thru-the-bottom type gas connections.

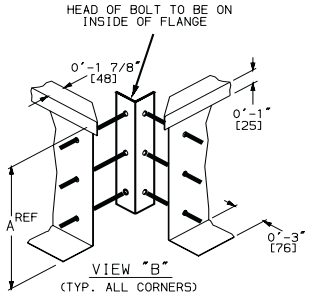




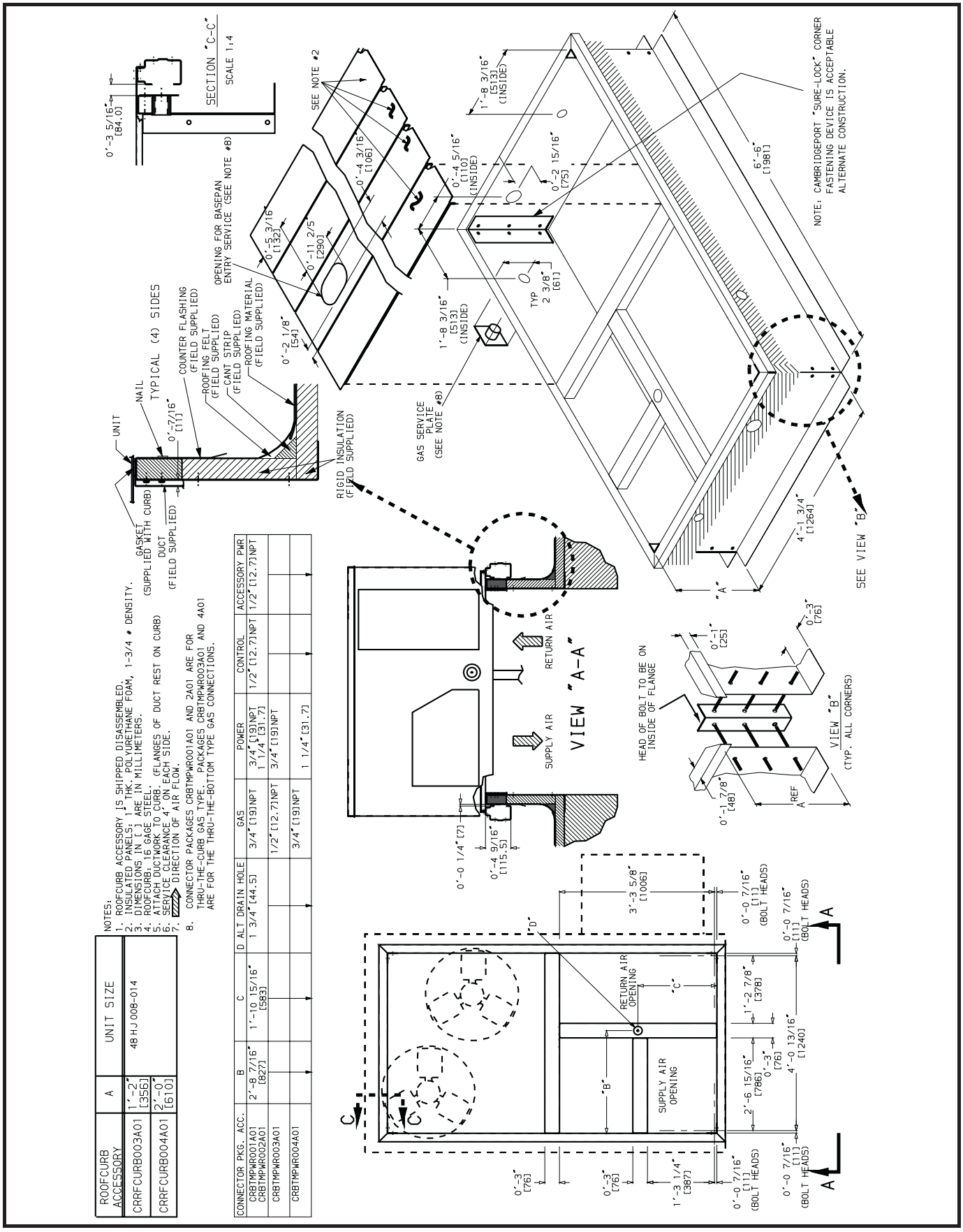








Accessory dimensions — 48HJ008-014



ROOFCURB ACCESSORY	A	UNIT SIZE
CRRFCURB003A01	1'-2" [356]	48HJ008-014
CRRFCURB004A01	2'-0" [610]	

CONNECTOR PKG. ACC.	B	C	D ALT DRAIN HOLE	GAS	POWER	CONTROL	ACCESSORY PWR
CRBTMPWR001A01 CRBTMPWR002A01	2'-8 7/16" [827]	1'-10 15/16" [583]	1 3/4" [44.5]	3/4" [19] NPT	3/4" [19] NPT 1 1/4" [31.7]	1/2" [12.7] NPT	1/2" [12.7] NPT
CRBTMPWR003A01				1/2" [12.7] NPT	3/4" [19] NPT		
CRBTMPWR004A01				3/4" [19] NPT	1 1/4" [31.7]		

Accessory dimensions — 48HJ004-014

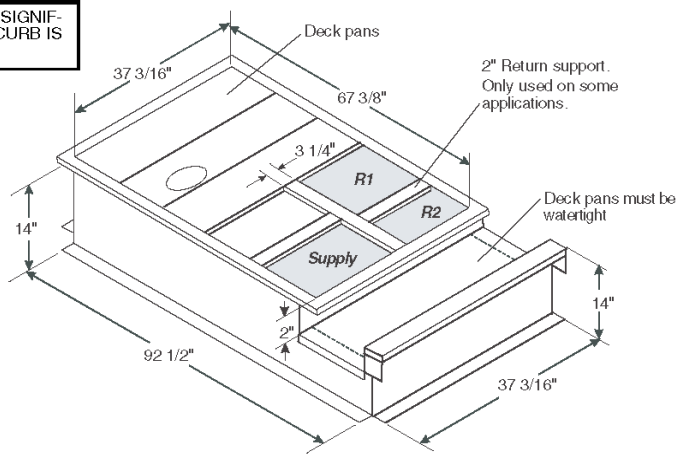
COBRA™ ENERGY RECOVERY UNIT FULL-PERIMETER ROOF CURB — 48HJ004-007 WITH 62AQ060,100

⚠ CAUTION

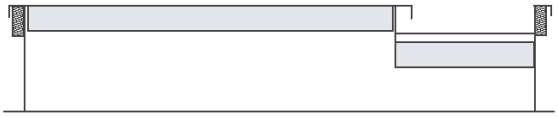
DO NOT USE THIS DRAWING TO FIELD-FABRICATE A CURB! SIGNIFICANT PROBLEMS CAN OCCUR IF A CARRIER APPROVED CURB IS NOT USED.

DUCT OPENING SIZES
Supply = 13 7/8" x 20 1/4" R1 = 13 5/8" x 17 3/4" R2 = 13 5/8" x 12 5/16"

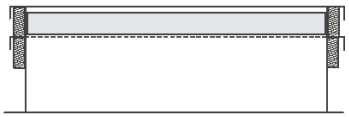
R1 = Return from building to HVAC
R2 = Return from building to 62AQ



SIDE VIEW



END VIEW



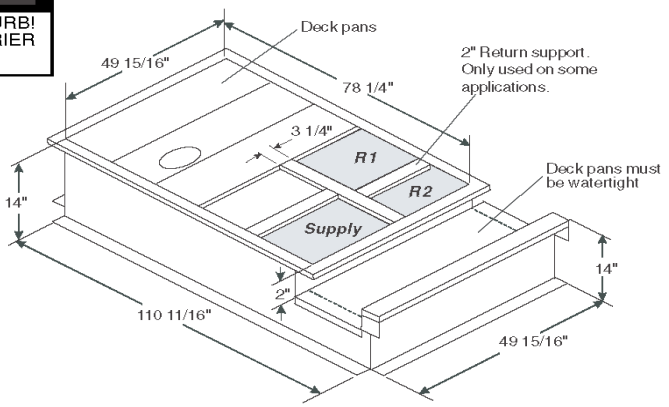
COBRA ENERGY RECOVERY UNIT FULL-PERIMETER ROOF CURB — 48HJ008-014 WITH 62AQ200,300

⚠ CAUTION

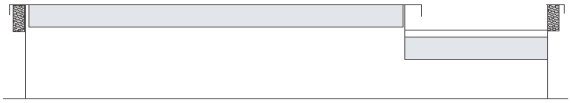
DO NOT USE THIS DRAWING TO FIELD-FABRICATE A CURB! SIGNIFICANT PROBLEMS CAN OCCUR IF A CARRIER APPROVED CURB IS NOT USED.

DUCT OPENING SIZES
Supply = 15 11/16" x 31 3/8" R1 = 15 5/16" x 29 1/16" R2 = 15 5/16" x 9"

R1 = Return from building to HVAC
R2 = Return from building to 62AQ



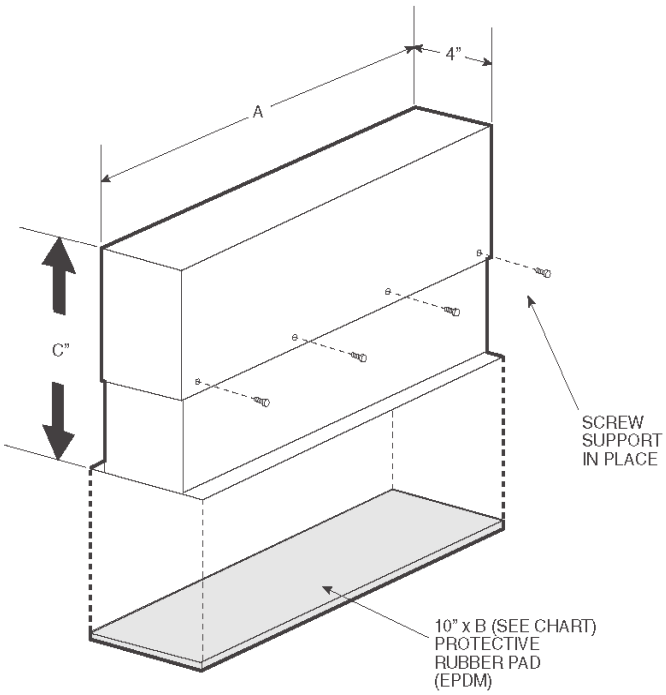
SIDE VIEW



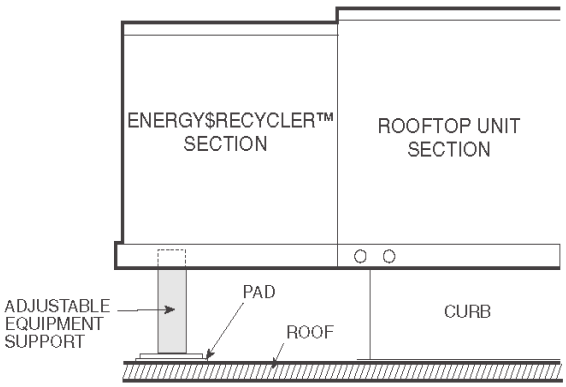
END VIEW

Accessory dimensions — 48HJ004-014 (cont)

SUPPLEMENTAL ENERGY RECOVERY SECTION EQUIPMENT SUPPORT
(Required on a COBRA or Field Installed 62AQ unit when a standard roofcurb is used)



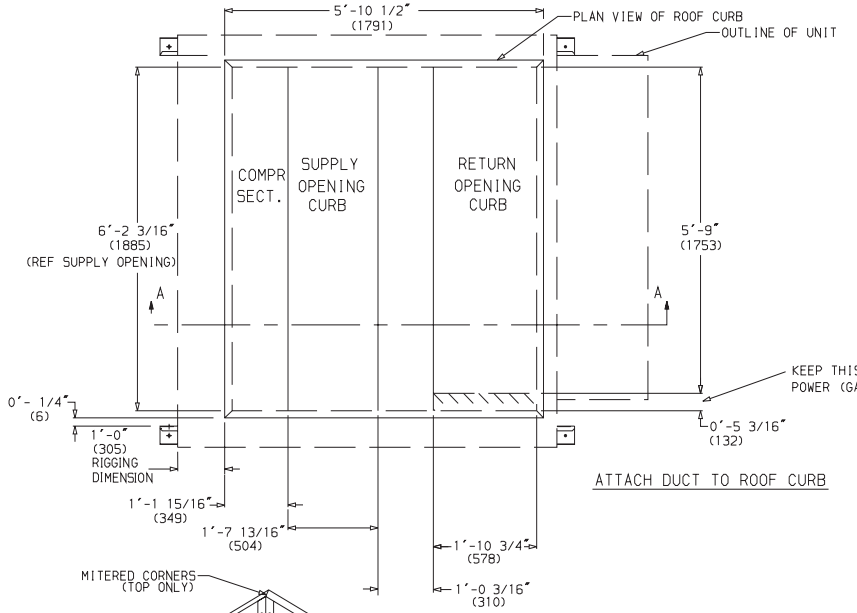
UNIT SIZE	EQUIPMENT SUPPORT PART NUMBER	DIMENSIONS (in.)		
		A	B	C
3-6 Ton	CRAQSUPT001A00	36.9	40	8 to 14
	CRAQSUPT002A00	36.9	40	14 to 24
7 1/2-12 1/2 Ton	CRAQSUPT003A00	49.7	54	8 to 14
	CRAQSUPT004A00	49.7	54	14 to 24



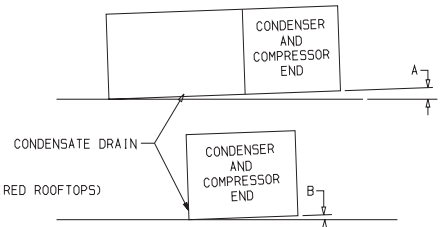
48H J015, 017

PKG. NO. REF.	CURB HEIGHT	DESCRIPTION
CRRFCURB010A00	1 -2 (305)	Standard Curb 14 High
CRRFCURB011A00	2 -0 (610)	Standard Curb for Units Requiring High Installation
CRRFCURB012A00	2 -0 (610)	Side Supply and Return Curb for High Installation

NOTES:
1. Roof curb accessory is shipped disassembled.
2. Insulated panels: 1 thick neoprene coated 1½ lb density.
3. Dimensions in ( ) are in millimeters.
4. ⇨ Direction of airflow.
5. Roof curb: 16 ga. (VA03-56) stl.
6. **A 90 degree elbow must be installed on the supply ductwork below the unit discharge for units equipped with electric heaters.**
7. To prevent the hazard of stagnant water build-up in the drain pan of the indoor section, unit can only be pitched as shown.



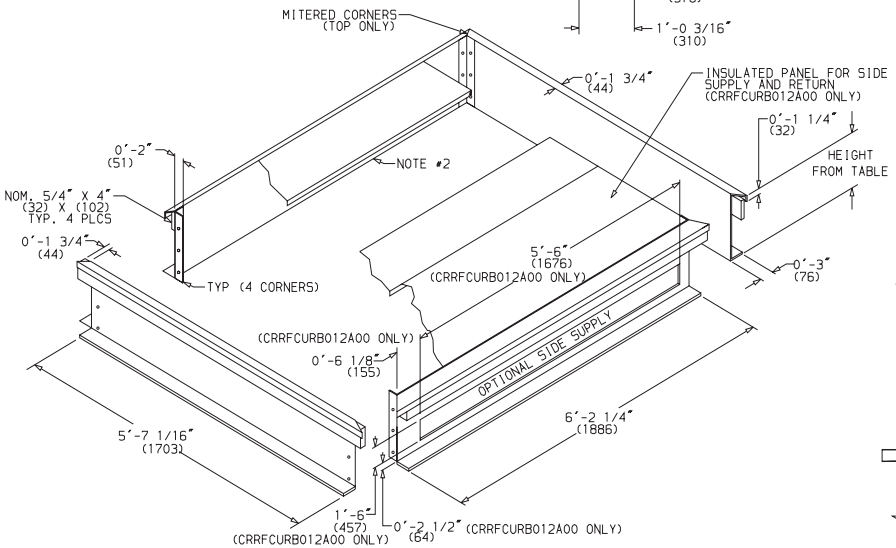
ATTACH DUCT TO ROOF CURB

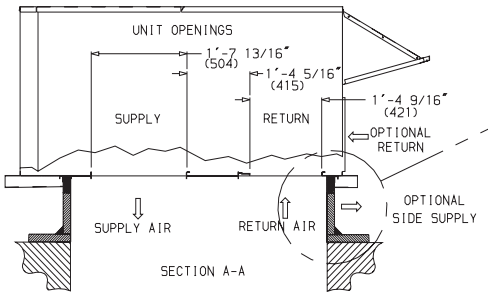


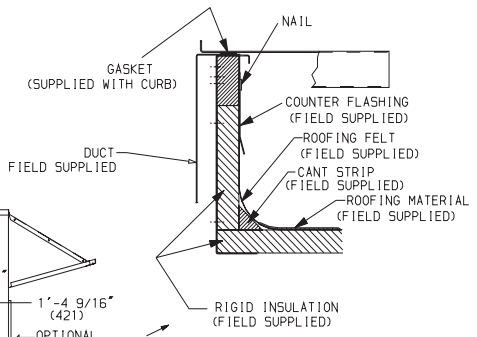
DIMENSIONS* (degrees and inches)

UNIT	A		B	
	Deg.	in.	Deg.	in.
ALL	.28	.45	.28	.43

UNIT LEVELING TOLERANCES
*From edge of unit to horizontal.

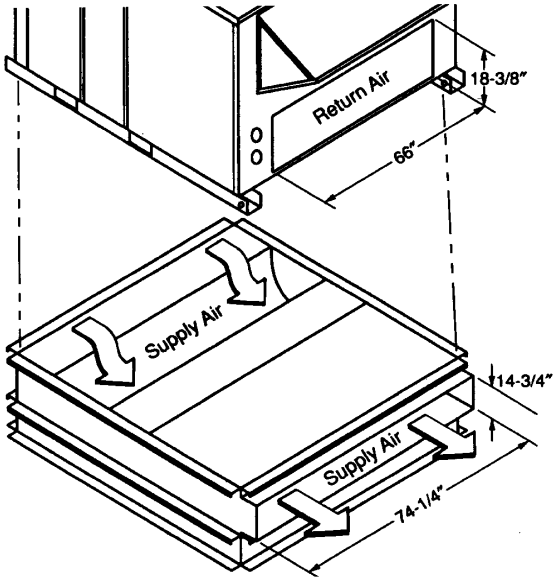


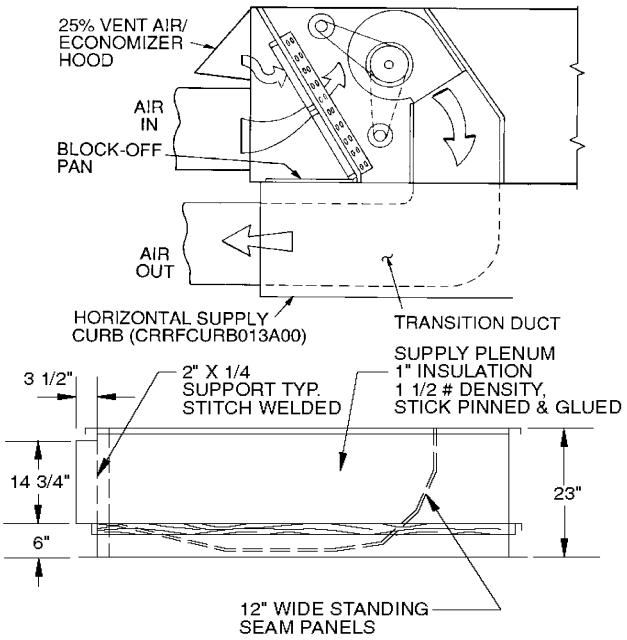




Accessory dimensions — 48HJ015, 017 (cont)

HORIZONTAL SUPPLY/RETURN ADAPTER INSTALLATION — (48HJ015,017)



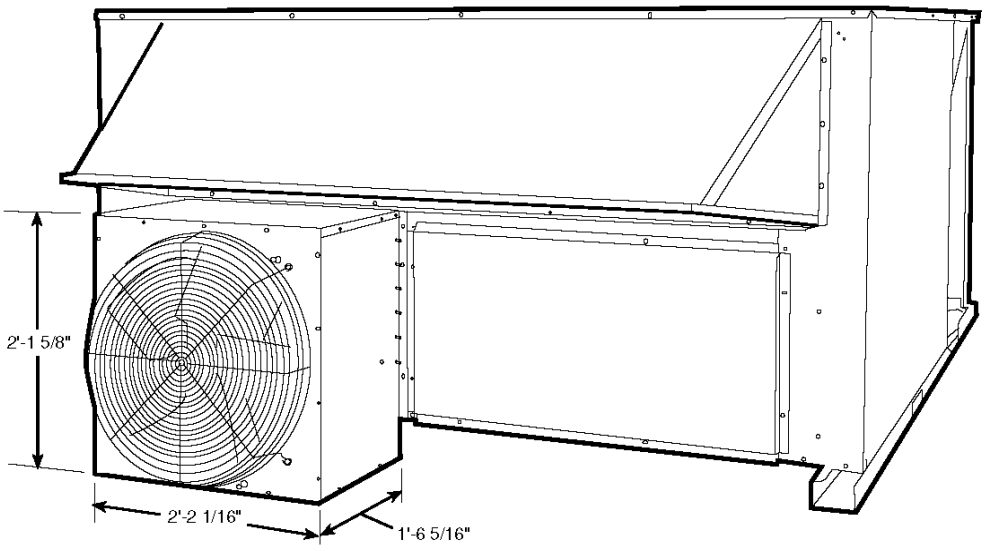


NOTES: CRRFCURB013A00 is fully preassembled horizontal adapter and includes an insulated transition duct. The pressure drop through the adapter curb is negligible.

For horizontal return applications: The power exhaust and barometric relief dampers must be installed in the return air duct.

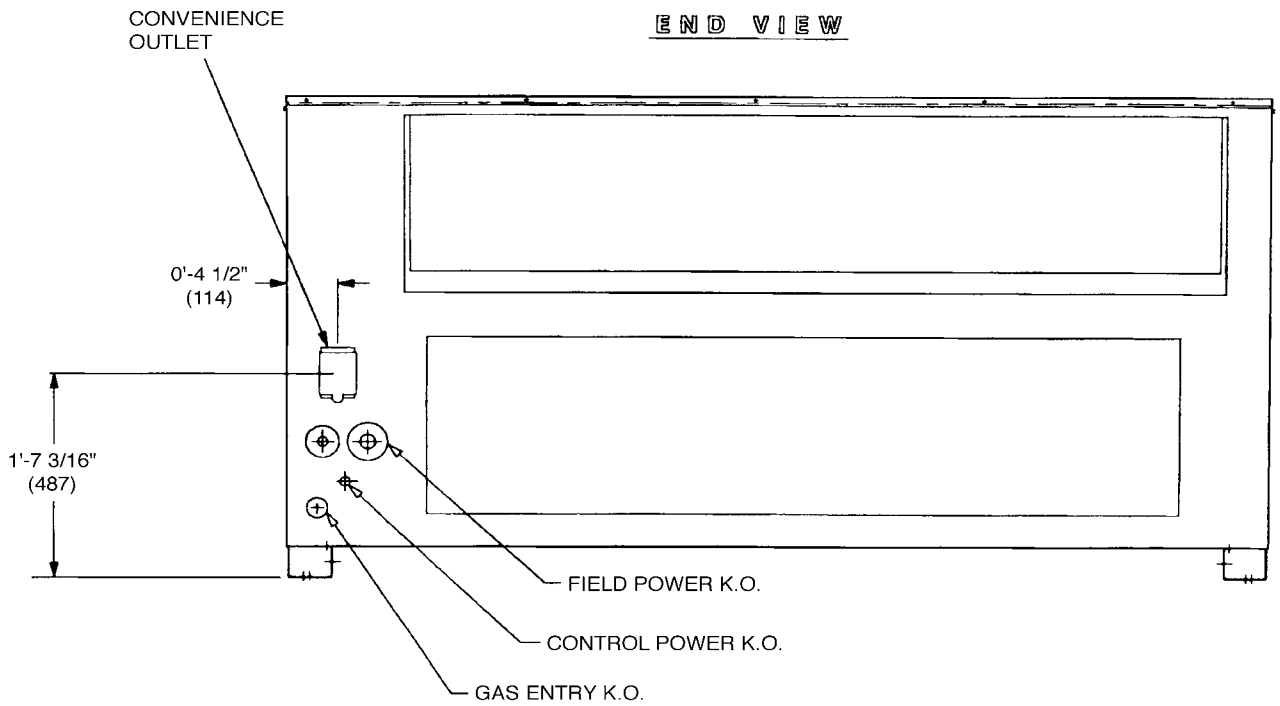
ACCESSORY PACKAGE NO.	CURB HEIGHT	DESCRIPTION
CRRFCURB013A00	1′-11″ (584)	Pre-Assembled, Horizontal Adapter Roof Curb

BAROMETRIC RELIEF/POWER EXHAUST — (48HJ015,017)

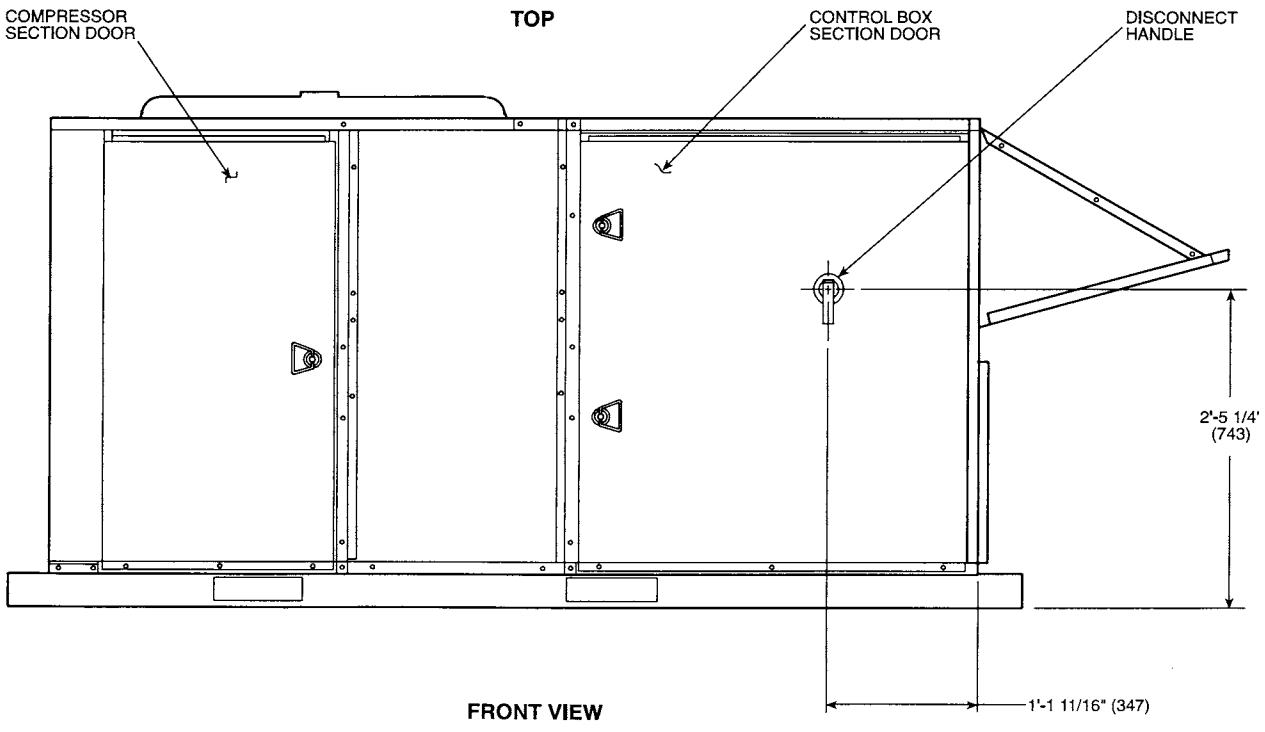


48HJ

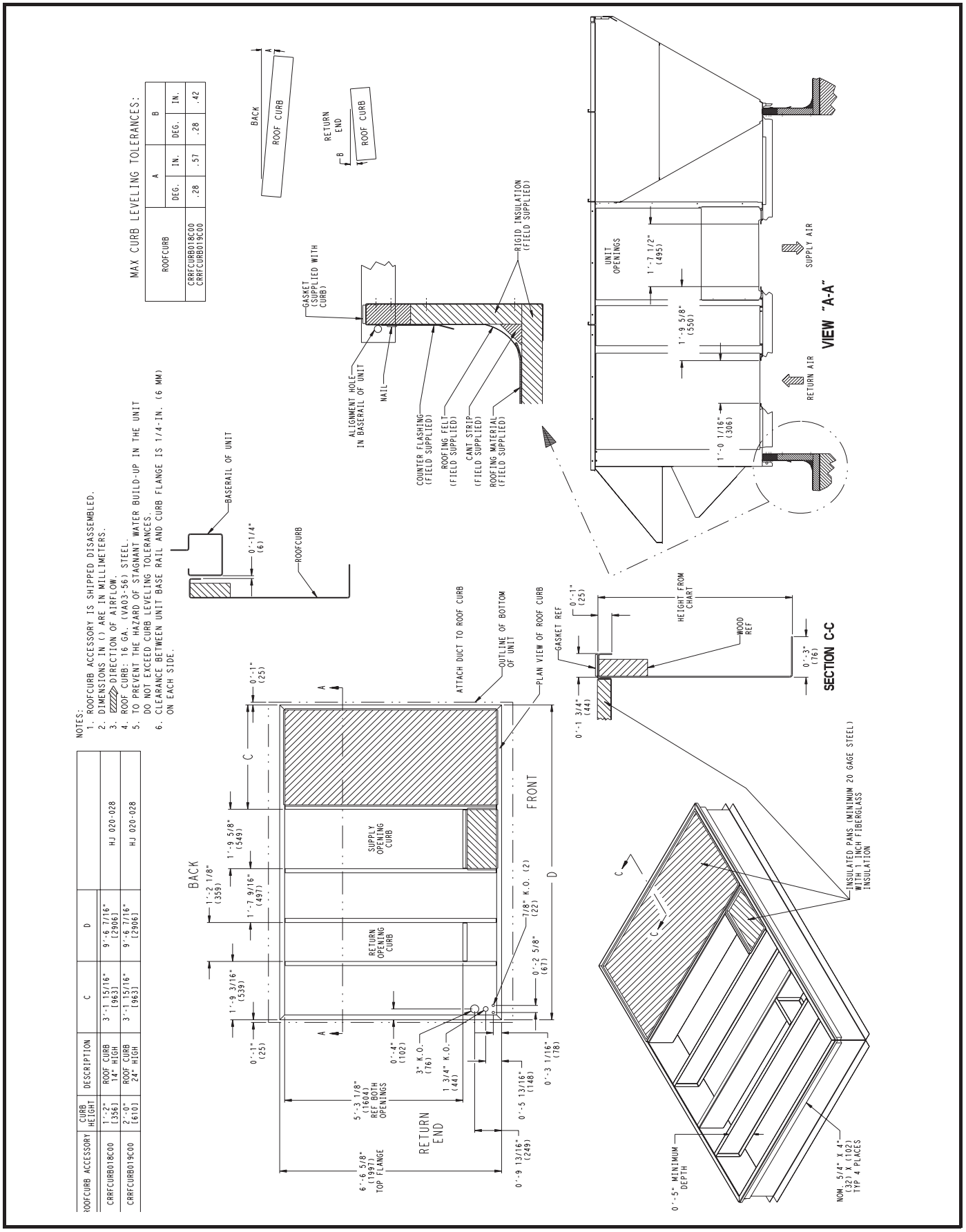
FACTORY-INSTALLED CONVENIENCE OUTLET — 48HJ015,017



FACTORY-INSTALLED NON-FUSED DISCONNECT — 48HJ015,017



Accessory dimensions — 48HJ020-028



Selection procedure (with 48HJ006 example)

I Determine cooling and heating loads at design conditions.

Given:

Required Cooling Capacity (TC)	67,000 Btuh
Sensible Heat Capacity (SHC)	46,000 Btuh
Required Heating Capacity	85,000 Btuh
Outdoor Entering-Air Temperature db	95 F
Outdoor Entering-Air Temperature wb	75 F
Outdoor-Air Entering Airflow Cfm	450 cfm
Outdoor-Air Winter Design Temperature	0° F
Indoor-Air Winter Design Temperature	70 F
Air to room including outdoor air	2000 cfm
External Static Pressure	Supply — 0.60 in. wg Return — 0.2 in. wg
Indoor-Air Temperature db (room air)	78 F
Indoor-Air Temperature wb (room air)	65 F
Indoor-Air Exhaust Cfm	450 cfm
Electrical Characteristics (V-Ph-Hz)	230-3-60

Vertical discharge unit with Energy$Recycler™ device required.

II Determine fan speed and power requirements at design conditions.

Before entering the Fan Performance tables, calculate the total static pressure required based on unit component. From the given find:

External static pressure supply	0.6 in. wg
External static pressure return	0.2 in. wg
Accessory static — None	0.0 in. wg
Total Static	0.8 in. wg

Enter the Fan Performance table for vertical discharge, standard motor, 48HJ006 at 0.80 in. wg and 2000 cfm. The rpm is 1326 and bhp is 1.37.

NOTE: Convert bhp to Fan Heat and Watts using the formula found in the note following the Evaporator-Fan Motor Efficiency table on page 214.

For this example:

Watts = (746 x Bhp)/(motor efficiency)

Watts = (746 x 1.37)/(0.74) = 1381 watts

Indoor Fan Heat = watts x 3.413 Btuh/watt
= 1381 x 3.413 = 4713 Btuh

III Select Energy$Recycler device based on outdoor entering cfm (optional).

Using Energy$Recycler cooling rating tables found in the Energy$Recycler Product Data choose 62AQ060 unit.

Using 450 cfm outdoor supply airflow, 95 F OD db, and 75 F OD wb find performance of the 62AQ060 at these conditions:

Energy$Recycler Gross Cooling Capacity is	13,000 Btuh
Energy$Recycler Gross Sensible Capacity is	10,100 Btuh
Compressor power is	1.06 kW
Energy$Recycler Leaving db is	73 F
Energy$Recycler Leaving wb is	66.9 F

IV Using the simplified* method below, calculate the approximate mixed air temperature for the Small Rooftop (SRT) evaporator coil.

Using the outdoor air entering cfm, the room cfm and the room exhaust airflow with their respective db and wb temperatures determine the db and wb entering the rooftop evaporator coil.

a) Estimate the mixed air db to the evaporator coil.

t mix db = ((cfm oa x t oa db) + ((cfm ra – cfm exh) x t rm db)) / ((cfm oa + (cfm ra – cfm exh)))

= ((450 cfm x 73.0 F) + ((2000 cfm – 450 cfm) x 78 F)) / ((450 cfm + (2000 cfm – 450 cfm)))

= 76.9 F mixed air into the rooftop evaporator coil

b) Estimate the mixed air wb to the evaporator coil.

t mix wb* = ((cfm oa x t oa wb) + ((cfm ra – cfm exh) x t rm wb)) / ((cfm oa + (cfm ra – cfm exh)))

= ((450 cfm x 66.9 F) + ((2000 cfm – 450 cfm) x 65 F)) / ((450 cfm + (2000 cfm – 450 cfm)))

= 65.4 F wb mixed air temperature into the rooftop evaporator

*Simplified method of determining wet bulb (wb) temperature of mixture. This approximation is used because the wb lines in the area of the psychrometric chart used in the calculation is relatively linear, providing a close approximation. A more accurate solution can be found using the E-Cat program.

LEGEND

cfm	—	cubic feet per minute of air
db	—	dry bulb
exh	—	Energy$Recycler discharge
mix	—	mixture of outdoor + return air
oa	—	outside air leaving Energy$Recycler
ra	—	return air
sa	—	supply air at coil (sa = oa + ra – exh)
t	—	temperature
TC	—	total capacity gross
SHC	—	sensible capacity
wb	—	wet bulb

V Determine the cooling load requirement for the rooftop unit.

Required Cooling Capacity is	67,000 Btuh
Less Cooling Capacity supplied by the Energy$Recycler device	–13,000 Btuh
Rooftop cooling load required is	54,000 Btuh

VI Select the rooftop unit based on mixed air entering conditions and cooling load.

Enter cooling capacity table at outdoor entering temperature 95 F, mixed air entering evaporator at 2000 cfm, 76.9 F db, and 65.4 F wb.

The 48HJ006 will provide a total gross cooling capacity of 59,420 Btuh and sensible cooling of 43,420 Btuh.

Because these values were not at 80 F entering db, they were calculated based on the notes following the Cooling Capacity tables.

NOTE: Unit ratings are gross capacities and do not include the effect of evaporator-fan motor heat. To calculate net capacities see Steps VII and VIII.

VII Select net heating capacity of unit to meet design condition requirements.

Enter the 62AQ060 Heating Rating table found in the Energy$Recycler™ Product Data. At 450 cfm, 70° F and 0° F find the heating value for the Energy$Recycler device to be 15.2 Btuh. Since the Energy$Recycler device uses room air, the instantaneous heat is also the Integrated Heat Rating.

The customer heat requirement is 85,000 Btuh.

Fan heat from Step II	4,713 Btuh
Energy$Recycler Heat Capacity	15,200 Btuh
add Energy$Recycler optional supply fan heat if supplied	+ 0 Btuh
Total Unit heat with Energy$Recycler	19,913 Btuh

Determine additional electric heat capacity in kW.

The required heating capacity is 85,000 Btuh. Therefore, 65,087 Btuh (85,000 – 19,913) additional heat is required.

The output capacity for the 48HJE006 is 93,150 Btuh, which is sufficient.

Total unit net heating capacity is 113,063 Btuh (93,150 + 19,913).

VIII Determine net cooling capacity.

Cooling capacities are gross capacities and do not include indoor (evaporator) or optional Energy$Recycler supply fan heat.

Determine net cooling capacity using the following formula:

Net Capacity = (Gross Capacity Rooftop Unit + Gross Capacity Energy$Recycler) – (IFM Heat + Optional Energy$Recycler Supply Fan motor heat)

Gross Total Cooling	
Rooftop unit	59,420 Btuh
Energy$Recycler	13,000 Btuh
Total	72,420 Btuh
Less	
IFM heat (from Step II)	–4,713 Btuh
Optional Energy$Recycler Supply Fan Motor Heat	none
Net Total Capacity	67,707 Btuh
Gross Sensible Cooling	
Rooftop unit	43,420 Btuh
Energy$Recycler	10,090 Btuh
Total	53,510 Btuh
Less	
IFM heat (from Step II)	–4,713 Btuh
Optional Energy$Recycler Supply Fan Motor Heat	none
Net Sensible Capacity	48,797 Btuh

IX Determine the operating watts of the unit.

a) Cooling with Energy$Recycler device in operation:

Rooftop unit:

Compressor watts from cooling capacity tables . . . . . .4,440 watts

Indoor fan motor from Step II† . . . . . .1,381 watts

Outdoor fan motor from Physical Data table find 1/4 hp†.

Assume OD motor efficiency is 0.75.

Watts = (746 x hp)/(motor Eff)
= (746 x 1/4)/(0.75)
= 249 watts

†Dual circuit units will have two indoor and two outdoor fans, double values.

b) Energy$Recycler:

Compressor watts from Energy$Recycler Product Data	1,060 watts
Optional supply fan from Energy$Recycler Product Data fan curves	none
Exhaust fan, from Energy$Recycler Product Data fan curve at 450 cfm, 0.2 in. wg Static	110 watts
Total watts for the unit in operation at design conditions	7,240 watts

X Electrical data RLA, FLA, LRA, MCA and MOCP.

Separate Power Supply:

If the 62AQ is wired for separate power see the Electrical Data table.

Single Power Supply with Unit:

The unit is 230-3-60 Hz. Look up the 48JH006 without convenience outlet in the Electrical Data Table. Find unit electrical data. For the rooftop unit the data is MCA = 28.9 amps, MOCP = 35 amps, Min Unit Disconnect Size FLA = 28, and LRA = 168.

From the Table of "X" and "Y" values in the Energy$Recycler Product Data literature, find 230 v, for 62AQ060300, "X" = 8.1 amps and "Y" = 9.3 amps.

Add "X" amps to the MCA and MOCP and add "Y" amps to the minimum disconnect size.

	MCA	MOCP	FLA	LRA
SRT	28.9	35	28	168
62AQ	8.1	8.1	9.3	31.7
Total	37.0 amps	43.1** amps	37.3 amps	199.7 amps

**The calculated MOCP is 43.1 amps; it is rounded down to 40 amps. Compare it to MCA; it must be larger than the MCA of 37.0 amps, so it is acceptable as is.

Selection procedure (with 48HJ006 example) (cont)

The wiring of the unit must be suitable for the MCA calculated above, and the Maximum Overcurrent Protection (MOCP) device must be selected to meet the calculated MOCP.

If the overcurrent protective device for the combination load is equal to or less than 60 amps, a single disconnect may be used for BOTH the main unit and the 62AQ unit provided that the wire ampacity supplying the 62AQ unit is sized for a minimum of 33% larger than the overcurrent protection device value (i.e., 60 amps x 0.33 = 20 amps), no further subfusing would be required.

If the overcurrent protection device is greater than 60 amps and the old overcurrent protection device was less than 60 amps, a FUSED disconnect no greater than 60 amps must be provided for the main unit and a SEPARATE FUSED disconnect must be provided for the 62AQ unit.

If the old overcurrent protection device is greater than 60 amps, a disconnect is required for the MAIN UNIT as well as a FUSED DISCONNECT for the 62AQ unit.

Performance data — 48HE

COOLING CAPACITIES — 48HE003-006 STANDARD UNITS

48HE003 (2 Tons)

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator -- CFM/BF											
		600/0.12				800/0.14				1000/0.18			
		Air Entering Evaporator -- Ewb (F)											
		57	62	67	72	57	62	67	72	57	62	67	72
75	TCG	22.6	24.3	26.7	29	25	25.7	28.1	30.2	26.6	26.8	29	30.9
	SHG	21.7	19.5	16.4	13	24	22.9	18.6	14.1	25.6	25.4	20.6	15.1
	CMP	1.18	1.19	1.2	1.21	1.19	1.19	1.2	1.21	1.19	1.2	1.21	1.22
85	TCG	21.3	23	25.7	28	24.2	24.7	27.2	29.6	25.9	25.9	27.9	30.2
	SHG	20.5	19	16	12.7	23.3	22.4	18.4	14.1	24.9	24.9	20.3	15.1
	CMP	1.36	1.37	1.38	1.39	1.38	1.38	1.39	1.4	1.38	1.38	1.39	1.4
95	TCG	19.9	21	24.7	27.2	23.1	23.3	26	28.6	25	24.9	26.9	29.3
	SHG	19.1	18.2	15.7	12.4	22.2	21.9	18.1	13.9	24	24	20.2	15.1
	CMP	1.56	1.57	1.59	1.6	1.58	1.58	1.59	1.61	1.59	1.59	1.6	1.61
105	TCG	18.4	18.8	23.2	26	21.3	21.3	24.8	27.4	23.9	23.9	25.6	28.2
	SHG	17.7	17.3	15.1	12	20.5	20.5	17.7	13.5	23	23	19.9	14.8
	CMP	1.78	1.78	1.81	1.82	1.8	1.8	1.82	1.83	1.81	1.81	1.82	1.84
115	TCG	16.6	16.5	20.5	24.7	19.7	19.7	22.4	26	22	22	24.1	26.7
	SHG	16	15.9	14.1	11.6	19	19	16.9	13.1	21.1	21.1	19.5	14.5
	CMP	2.01	2.01	2.05	2.08	2.05	2.05	2.06	2.08	2.06	2.06	2.07	2.09
125	TCG	15	15	17.7	22.2	17.7	17.7	19.6	24.4	19.7	19.8	20.5	25.2
	SHG	14.5	14.5	13.2	10.8	17	17	16	12.7	19	19	18.3	14.1
	CMP	2.27	2.27	2.3	2.34	2.3	2.3	2.32	2.35	2.32	2.32	2.33	2.36

48HE004 (3 Tons)

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator -- CFM/BF											
		900/0.10				1200/0.13				1500/0.16			
		Air Entering Evaporator -- Ewb (F)											
		57	62	67	72	57	62	67	72	57	62	67	72
75	TCG	32	34.5	38.9	42.8	35.1	37.1	40.9	44.9	38.1	38.5	42.2	45.9
	SHG	32	28.9	25	20.4	35.1	33.6	28.3	22.3	38.1	37.4	31.2	23.9
	CMP	1.94	1.96	1.98	2	1.96	1.97	1.99	2.01	1.98	1.98	2	2.02
85	TCG	30.9	33.2	37.5	41.4	33.8	34.9	39.4	43.3	36.9	37	40.5	44.3
	SHG	30.9	28.3	24.5	19.8	33.8	32.5	27.8	21.8	36.9	36.7	30.7	23.3
	CMP	2.19	2.21	2.24	2.26	2.22	2.23	2.25	2.27	2.24	2.24	2.26	2.28
95	TCG	29.5	31.4	35.4	39.7	31.8	32.3	37.7	41.5	35.1	35.2	38.8	42.5
	SHG	29.5	27.3	23.6	19.2	31.8	31.2	27.2	21.2	35	35.2	30	22.8
	CMP	2.47	2.49	2.52	2.54	2.5	2.51	2.54	2.56	2.53	2.53	2.54	2.56
105	TCG	28	29.5	33	38	29.5	29.5	34.7	39.7	32.3	32.2	36.8	40.8
	SHG	28	26.4	22.6	18.6	29.4	29.4	26	20.7	32.3	32.2	29.5	22.5
	CMP	2.78	2.79	2.83	2.86	2.81	2.81	2.85	2.87	2.84	2.84	2.86	2.88
115	TCG	26.3	27.1	30.7	35.2	27.6	27.6	31.1	37.6	29.6	29.5	32.9	38.5
	SHG	26.3	25.3	21.7	17.7	27.6	27.6	24.5	20	29.6	29.5	27.8	21.9
	CMP	3.1	3.11	3.16	3.2	3.15	3.15	3.18	3.22	3.17	3.17	3.2	3.23
125	TCG	24.4	24.7	28.1	32.1	25.5	25.5	27.5	33.7	27	27	28.5	35.8
	SHG	24.4	24.1	20.7	16.6	25.5	25.4	22.9	18.8	27	27	26	21.2
	CMP	3.45	3.46	3.51	3.56	3.51	3.51	3.53	3.59	3.53	3.53	3.55	3.6

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
COMP — Compressor Power kw
SHG — Gross Sensible Capacity (1000 Btuh)
TCG — Compressor Cooling Capicity (1000 Btuh)

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

Performance data — 48HE (cont)

COOLING CAPACITIES — 48HE003-006 STANDARD UNITS (cont)

48HE005 (4 Tons)										
Temp (F)		Air Entering Evaporator -- CFM/BF								
Air Ent		1200/0.05			1600/0.07			2000/0.09		
Condenser		Air Entering Evaporator -- Ewb (F)								
(Edb)		62	67	72	62	67	72	62	67	72
75	TCG	46.3	51.1	55.7	48.8	53.5	58	50.7	54.9	59.1
	SHG	39.9	33.8	27.1	46.3	38.6	29.8	50.6	42.7	32
	CMP	2.36	2.37	2.38	2.37	2.38	2.39	2.37	2.38	2.39
85	TCG	42.9	49	54	46.2	51.5	56.4	49.2	52.8	57.4
	SHG	38.5	33	26.6	45.2	37.9	29.4	49.1	42.2	31.7
	CMP	2.69	2.71	2.72	2.71	2.72	2.74	2.72	2.72	2.74
95	TCG	38.7	45.8	51.9	42.6	48.8	54.2	46.8	50.4	55.5
	SHG	36.5	31.8	25.9	42.5	37.1	28.9	46.8	41.6	31.4
	CMP	3.05	3.08	3.11	3.07	3.1	3.12	3.1	3.11	3.12
105	TCG	34.4	41.1	49.1	39	43.8	51.5	43.3	46.3	52.8
	SHG	34.3	30	24.9	39	35.3	28.2	43.3	40.4	30.9
	CMP	3.42	3.48	3.53	3.47	3.5	3.54	3.5	3.52	3.54
115	TCG	31.4	36.3	44.7	35.8	38.4	47.3	39.2	40.6	49.5
	SHG	31.4	28.1	23.5	35.8	33.3	26.9	39.2	38.1	30.1
	CMP	3.85	3.9	3.96	3.9	3.92	3.98	3.93	3.94	4
125	TCG	28.2	31.1	39.8	31.9	33	41.6	35.3	35.4	43.9
	SHG	28.1	26.2	21.8	31.9	31.1	25.1	35.3	35.4	28.4
	CMP	4.31	4.35	4.42	4.36	4.37	4.44	4.4	4.4	4.46

48HE006 (5 Tons)																	
Temp (F)		Indoor Entering Air -- CFM/BF															
Outdoor		1500/0.26				1750/.31				2000/.35				2500/.45			
Air Ent		Indoor Entering Air -- Ewb (F)															
(Edb)		57	62	67	72	57	62	67	72	57	62	67	72	57	62	67	72
75	TCG	57	60.2	66.5	72	60.3	62.3	68.5	73.8	63.2	64.1	69.7	75.6	67.4	67.4	71.8	77.6
	SHG	55.3	50.5	42.4	33.5	58.6	55.2	45.7	35.4	61.3	59.5	48.6	37.4	65.5	65.5	54.4	40.7
	CMP	3.1	3.11	3.12	3.14	3.11	3.12	3.13	3.15	3.11	3.12	3.13	3.16	3.12	3.12	3.14	3.17
85	TCG	54.1	56.9	64	70.2	58.3	59.7	65.9	72	60.9	61.4	67.3	73.4	65.3	65.2	69.6	75.3
	SHG	52.6	49.1	41.4	33	56.6	54.1	44.8	35	59.2	58.4	48	36.9	63.4	63.4	54.4	40.4
	CMP	3.5	3.52	3.54	3.56	3.52	3.53	3.54	3.57	3.53	3.54	3.54	3.58	3.54	3.54	3.56	3.59
95	TCG	50.2	53	61.1	67.5	55	55.6	62.9	69.3	58.6	58.6	64.3	70.6	62.8	62.8	66.4	72.7
	SHG	48.8	47.4	40.3	32.2	53.4	52.3	43.8	34.2	56.9	56.8	47.2	36.1	61	61	53.4	40
	CMP	3.94	3.95	3.99	4.02	3.97	3.97	4.01	4.03	3.99	3.99	4.02	4.03	4.01	4.01	4.02	4.05
105	TCG	47.4	47.9	56.5	64.3	50.9	51	59.5	66.1	54.7	54.8	60.9	67.4	59.9	60	62.9	69
	SHG	46	45.2	38.7	31.1	49.5	49.5	42.6	33.2	53.1	53.2	45.9	35.2	58.2	58.3	52.4	38.8
	CMP	4.42	4.42	4.48	4.51	4.44	4.44	4.5	4.53	4.47	4.47	4.51	4.54	4.5	4.5	4.52	4.54
115	TCG	43.1	43.2	50.3	60.8	47.3	47.3	52.6	62.6	50.1	50.1	55.6	63.9	56	55.9	58.2	65.4
	SHG	41.8	42	36.4	30	45.9	45.9	40.2	32.1	48.7	48.7	44.1	34.2	54.4	54.3	50.8	37.9
	CMP	4.92	4.92	4.98	5.05	4.96	4.96	5	5.07	4.98	4.98	5.02	5.08	5.03	5.03	5.05	5.08
125	TCG	39	39	43.9	55.7	42.3	42.3	46.9	58.5	46.1	46.1	48.2	59.7	50.9	50.9	51.3	61.4
	SHG	37.9	37.9	34.1	28.3	41.1	41	38.2	30.8	44.8	44.8	41.6	32.9	49.4	49.4	48.2	36.9
	CMP	5.47	5.46	5.52	5.62	5.51	5.51	5.55	5.64	5.54	5.54	5.56	5.66	5.59	5.59	5.59	5.66

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
COMP — Compressor Power kw
SHG — Gross Sensible Capacity (1000 Btuh)
TCG — Compressor Cooling Capicity (1000 Btuh)

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

Performance data — 48HJ

COOLING CAPACITIES — 48HJ004-006 STANDARD UNITS

48HJ004 (3 TONS)

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF								
		900/0.14			1200/0.17			1500/0.20		
		Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	41.9	38.7	35.7	43.5	40.8	37.7	44.8	41.8	39.0
	SHC	20.4	25.2	29.7	21.8	28.2	33.8	23.3	30.7	37.0
	kW	2.19	2.16	2.12	2.21	2.18	2.15	2.23	2.19	2.16
85	TC	40.7	37.5	34.5	42.1	39.3	36.4	43.5	40.4	37.6
	SHC	19.9	24.7	29.2	21.5	27.7	33.2	23.2	30.3	36.4
	kW	2.46	2.42	2.39	2.47	2.44	2.41	2.50	2.45	2.42
95	TC	39.3	36.1	33.1	40.8	37.8	34.9	42.0	38.9	36.1
	SHC	19.5	24.1	28.4	21.1	27.2	32.5	22.8	29.9	35.6
	kW	2.75	2.71	2.66	2.77	2.73	2.69	2.79	2.74	2.71
105	TC	37.7	34.6	31.7	39.3	36.2	33.4	40.1	37.2	34.7
	SHC	18.8	23.5	27.8	20.7	26.6	31.8	22.1	29.3	34.7
	kW	3.06	3.02	2.98	3.09	3.04	3.01	3.10	3.06	3.03
115	TC	36.0	33.0	29.7	37.4	34.5	31.5	38.1	35.5	33.2
	SHC	18.3	22.9	26.7	19.9	26.1	30.9	21.3	28.7	33.2
	kW	3.41	3.36	3.31	3.43	3.39	3.34	3.44	3.41	3.37
125	TC	34.2	31.3	27.8	35.6	32.7	29.4	36.3	33.6	31.9
	SHC	17.6	22.2	25.8	19.4	25.4	29.4	20.8	28.0	31.8
	kW	3.78	3.73	3.66	3.80	3.76	3.71	3.81	3.78	3.75

Standard Ratings

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
   Below 80 F edb, subtract (corr factor x cfm) from SHC.
   Above 80 F edb, add (corr factor x cfm) to SHC.
   Correction Factor = 1.10 x (1 – BF) x (edb – 80).

48HJ005 (4 TONS)

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF											
		1200/0.17			1450/0.19			1600/0.21			2000/0.24		
		Air Entering Evaporator — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	54.0	50.7	44.2	55.9	52.2	47.7	56.4	52.8	49.1	58.1	54.5	50.6
	SHC	26.1	32.7	37.5	27.6	35.1	41.8	28.2	36.2	43.8	30.2	39.5	47.5
	kW	2.81	2.80	2.76	2.83	2.81	2.78	2.83	2.80	2.79	2.84	2.82	2.79
85	TC	52.2	48.9	41.9	54.1	50.4	45.9	54.5	51.0	47.2	55.3	52.3	48.7
	SHC	25.4	32.0	36.4	26.9	34.5	40.8	27.5	35.7	42.8	28.6	38.5	46.6
	kW	3.20	3.19	3.15	3.22	3.20	3.17	3.22	3.20	3.18	3.22	3.20	3.18
95	TC	50.7	46.9	39.5	51.9	48.4	43.5	52.5	48.9	45.2	53.9	50.1	46.7
	SHC	24.9	31.1	35.0	26.1	33.6	39.6	26.8	34.7	41.8	28.8	37.5	45.6
	kW	3.64	3.61	3.57	3.65	3.62	3.60	3.65	3.62	3.60	3.67	3.63	3.61
105	TC	48.8	44.5	36.7	49.8	46.2	40.7	50.2	46.7	42.1	51.5	48.2	44.7
	SHC	24.3	30.2	33.6	25.3	32.8	38.2	26.0	33.9	40.3	27.9	37.4	44.4
	kW	4.12	4.09	4.03	4.12	4.09	4.06	4.12	4.09	4.07	4.14	4.11	4.08
115	TC	46.5	41.1	34.3	47.7	43.3	37.0	48.0	44.4	38.5	48.9	45.7	42.0
	SHC	23.4	28.9	32.4	24.9	31.8	36.3	25.4	33.4	38.3	27.1	36.9	42.0
	kW	4.64	4.59	4.53	4.65	4.62	4.55	4.64	4.63	4.56	4.65	4.63	4.60
125	TC	43.8	37.5	32.4	45.1	39.0	33.8	45.3	40.1	35.4	46.3	42.6	38.8
	SHC	22.5	27.4	31.5	24.1	30.2	33.7	24.7	31.9	35.4	26.5	35.9	38.8
	kW	5.19	5.13	5.05	5.20	5.15	5.09	5.19	5.17	5.11	5.20	5.19	5.15

48HJ006 (5 TONS)

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF											
		1500/0.08			1750/0.09			2000/0.11			2500/0.13		
		Air Entering Evaporator — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	70.8	65.4	58.5	72.5	67.3	61.1	73.0	68.4	62.8	74.8	70.3	64.8
	SHC	34.1	42.7	49.9	35.7	45.5	54.2	36.8	48.0	57.8	39.6	53.0	63.4
	kW	3.53	3.49	3.44	3.55	3.50	3.46	3.55	3.51	3.47	3.57	3.54	3.48
85	TC	68.9	63.2	55.3	70.5	65.1	57.9	72.2	66.4	60.2	73.2	68.1	62.9
	SHC	33.5	41.8	48.4	35.0	44.8	52.8	37.0	47.6	56.8	39.3	52.5	62.4
	kW	3.98	3.94	3.87	4.00	3.96	3.90	4.03	3.97	3.92	4.04	3.99	3.94
95	TC	66.8	60.6	52.4	68.3	62.5	54.3	69.3	63.8	56.6	71.2	65.6	60.6
	SHC	32.8	40.7	47.0	34.5	43.8	51.1	36.0	46.7	55.0	39.1	51.8	60.5
	kW	4.48	4.43	4.35	4.50	4.45	4.37	4.51	4.46	4.40	4.55	4.48	4.44
105	TC	64.3	57.7	49.9	65.9	59.8	51.7	66.9	61.1	54.1	68.4	62.8	58.4
	SHC	32.0	39.6	45.8	33.7	42.8	49.7	35.3	45.7	53.5	38.4	51.0	58.4
	kW	5.03	4.96	4.87	5.05	4.99	4.90	5.06	5.00	4.93	5.08	5.02	4.98
115	TC	61.5	54.8	47.3	62.8	56.7	49.1	64.0	58.2	51.6	65.4	59.9	56.1
	SHC	31.0	38.4	44.5	32.5	41.6	48.2	34.4	44.6	51.6	37.4	50.0	56.1
	kW	5.61	5.55	5.46	5.62	5.58	5.49	5.65	5.60	5.52	5.67	5.61	5.57
125	TC	58.7	51.6	44.5	59.9	53.4	46.2	60.8	54.9	49.0	62.2	56.8	53.5
	SHC	30.0	37.2	43.1	31.7	40.4	46.2	33.3	43.4	48.9	36.4	48.9	53.4
	kW	6.27	6.19	6.09	6.28	6.21	6.13	6.29	6.24	6.17	6.31	6.27	6.22

COOLING CAPACITIES — 48HJ007-009 STANDARD UNITS (cont)

48HJ007 (6 TONS)

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF											
		1800/0.05			2100/0.06			2400/0.06			3000/0.08		
		Air Entering Evaporator — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	86.7	80.7	74.4	88.8	82.7	76.6	90.5	84.4	78.2	92.6	86.3	81.0
	SHC	43.0	53.7	63.8	45.0	57.4	68.9	47.2	61.2	73.6	51.2	67.4	80.7
	kW	4.58	4.46	4.33	4.63	4.50	4.38	4.67	4.55	4.41	4.72	4.58	4.47
85	TC	84.1	78.2	72.0	86.4	80.3	74.1	88.2	81.7	75.7	90.2	84.0	78.8
	SHC	42.0	52.6	62.7	44.5	56.6	68.0	46.8	60.2	72.5	50.6	67.4	78.7
	kW	5.10	4.97	4.85	5.16	5.03	4.90	5.21	5.06	4.93	5.26	5.12	4.99
95	TC	81.3	75.3	69.2	83.4	77.3	71.3	85.1	78.9	72.9	87.2	80.6	76.2
	SHC	41.0	51.4	61.4	43.4	55.3	66.6	45.8	59.2	71.2	50.2	65.8	76.2
	kW	5.65	5.52	5.39	5.71	5.57	5.44	5.77	5.62	5.48	5.83	5.66	5.55
105	TC	77.9	72.0	66.1	80.0	73.8	68.0	81.6	75.3	69.6	83.4	77.1	73.2
	SHC	39.7	50.2	60.0	42.2	54.0	65.2	44.6	57.8	69.3	49.0	64.5	73.2
	kW	6.22	6.08	5.94	6.29	6.13	6.00	6.34	6.17	6.04	6.40	6.22	6.12
115	TC	74.7	68.4	61.8	75.9	70.0	64.1	77.6	71.3	66.5	78.7	73.0	70.1
	SHC	38.7	48.8	58.1	40.8	52.6	63.2	43.3	56.4	66.4	46.9	63.2	70.0
	kW	6.84	6.68	6.49	6.87	6.71	6.56	6.93	6.75	6.63	6.96	6.80	6.72
125	TC	70.3	63.6	57.2	71.8	65.5	59.1	72.9	66.8	61.9	74.0	68.6	66.4
	SHC	37.2	47.0	55.8	39.5	51.0	59.1	41.7	55.0	61.9	45.4	61.8	66.3
	kW	7.43	7.25	7.03	7.48	7.30	7.13	7.51	7.35	7.22	7.54	7.41	7.33

48HJ008 (7½ TONS)

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF								
		2250/0.10			3000/0.11			3750/0.14		
		Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	105.5	96.9	87.6	107.3	99.6	90.7	110.3	101.9	93.8
	SHC	50.6	63.6	75.7	53.3	69.2	83.7	58.0	76.6	92.2
	kW	5.15	5.07	5.04	5.16	5.11	5.06	5.20	5.13	5.07
85	TC	102.5	93.6	83.6	105.1	96.5	87.5	107.7	99.0	90.6
	SHC	49.7	62.4	73.9	52.8	68.4	82.2	57.3	75.9	90.0
	kW	5.86	5.79	5.73	5.89	5.82	5.77	5.93	5.86	5.78
95	TC	98.9	90.1	79.3	101.6	92.9	83.5	103.8	95.3	87.4
	SHC	48.5	61.2	71.9	51.9	67.2	80.2	56.2	74.9	87.3
	kW	6.65	6.58	6.49	6.69	6.61	6.53	6.72	6.64	6.57
105	TC	95.3	86.2	75.7	97.6	88.8	79.6	100.0	91.0	84.1
	SHC	47.3	59.6	70.2	50.7	65.9	78.0	55.3	73.6	84.1
	kW	7.51	7.44	7.31	7.55	7.48	7.36	7.59	7.50	7.41
115	TC	91.0	82.0	71.6	93.2	84.5	75.4	95.6	86.6	80.7
	SHC	45.9	58.0	68.1	49.3	64.2	75.3	54.2	72.1	80.7
	kW	8.43	8.33	8.20	8.46	8.37	8.27	8.52	8.42	8.34
125	TC	86.2	77.8	68.1	88.3	80.0	71.9	90.0	81.9	77.2
	SHC	44.1	56.4	66.3	47.5	62.6	71.8	52.1	70.1	77.2
	kW	9.38	9.29	9.14	9.43	9.34	9.24	9.47	9.38	9.32

Standard Ratings

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

48HJ009 (8½ TONS)

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF																
		2550/0.11				3000/0.12				3400/0.13				4250/0.17				
		Air Entering Evaporator — Ewb (F)																
		57	62	67	72	57	62	67	57	62	67	72	57	62	67	72	57	
75	TC	94.6	101.0	110.0	119.2	100.4	104.4	113.4	121.8	104.2	106.8	115.8	123.4	109.8	111.0	119.0	125.8	
	SHC	94.6	84.4	69.4	54.4	100.4	92.4	75.0	57.2	104.2	99.0	80.0	59.8	109.8	110.4	89.4	64.2	
	kW	5.72	5.76	5.76	5.82	5.74	5.76	5.80	5.86	5.74	5.76	5.82	5.88	5.76	5.78	5.84	5.90	
85	TC	91.0	97.4	106.8	115.8	97.4	101.0	110.0	119.6	101.2	103.0	112.0	121.6	108.0	108.0	116.0	123.4	
	SHC	91.0	83.0	68.8	53.2	97.4	91.2	74.2	57.0	101.2	97.6	78.8	59.6	108.0	108.0	89.4	64.2	
	kW	6.46	6.5	6.52	6.58	6.50	6.52	6.54	6.60	6.50	6.52	6.54	6.64	6.54	6.54	6.60	6.64	
95	TC	85.2	91.4	103.0	112.8	93.4	96.6	106.2	116.0	98.2	99.2	108.4	117.8	104.6	104.6	111.6	121.2	
	SHC	85.2	80.4	67.2	52.6	93.4	89.4	73.0	55.8	98.2	96.2	78.2	58.8	104.6	104.6	88.0	64.6	
	kW	7.24	7.28	7.36	7.42	7.30	7.32	7.38	7.44	7.34	7.36	7.4	7.46	7.36	7.36	7.42	7.50	
105	TC	80.0	82.2	98.6	108.6	87.0	87.8	101.6	111.8	93.4	93.6	103.8	114.0	101.0	100.8	106.8	116.6	
	SHC	80.0	76.6	65.6	51.2	87.0	85.6	71.6	54.8	93.4	93.2	76.6	57.8	101.0	100.8	86.8	63.6	
	kW	8.08	8.12	8.26	8.32	8.16	8.16	8.28	8.36	8.20	8.20	8.3	8.38	8.28	8.28	8.30	8.40	
115	TC	73.6	74.6	89.4	103.4	81.0	81.2	95.2	106.4	86.2	86.2	98.4	108.4	96.4	96.4	101.6	111.8	
	SHC	73.6	73.0	62.2	49.6	81.0	81.2	69.4	53.0	86.2	86.2	75.0	56.4	96.4	96.4	85.4	62.8	
	kW	9.00	9.00	9.16	9.28	9.08	9.08	9.22	9.30	9.14	9.14	9.26	9.34	9.22	9.22	9.30	9.38	
125	TC	68.6	68.6	80.2	98.2	74.4	74.4	84.0	101.0	79.2	79.2	86.8	102.8	88.0	88.0	93.8	105.6	
	SHC	68.6	68.6	59.0	48.0	74.4	74.4	65.4	51.6	79.2	79.2	71.0	54.6	88.0	88.0	82.8	61.0	
	kW	9.98	9.98	10.14	10.32	10.06	10.06	10.18	10.36	10.14	10.14	10.22	10.38	10.24	10.24	10.28	10.42	

Performance data — 48HJ (cont)

COOLING CAPACITIES — 48HJ012, 014 STANDARD UNITS (cont)

48HJ012 (10 TONS)

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF											
		3000/0.03			3200/0.03			4000/0.04			5000/0.04		
		Air Entering Evaporator — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	140.3	129.4	115.0	141.2	130.4	118.1	145.2	134.0	122.1	147.5	136.6	125.3
	SHC	65.6	82.2	97.4	66.7	84.4	101.5	71.3	93.1	113.5	77.9	103.7	124.7
	kW	7.35	7.21	7.12	7.37	7.23	7.13	7.46	7.31	7.17	7.51	7.37	7.22
85	TC	137.7	125.3	110.0	138.9	126.6	113.6	142.6	130.6	117.7	144.6	133.3	122.3
	SHC	65.0	81.2	95.2	66.3	83.6	99.7	71.0	92.8	112.0	76.9	103.1	122.2
	kW	8.29	8.13	8.02	8.32	8.16	8.03	8.40	8.24	8.09	8.45	8.31	8.16
95	TC	133.8	120.7	103.0	135.1	121.9	107.2	138.8	125.8	112.8	141.7	128.5	118.5
	SHC	63.9	79.6	92.2	65.2	82.0	97.0	70.6	91.5	109.7	76.9	102.5	118.4
	kW	9.33	9.16	8.98	9.35	9.18	9.00	9.44	9.27	9.07	9.51	9.33	9.19
105	TC	128.7	115.4	96.5	129.8	116.6	99.7	133.7	120.3	107.1	136.7	122.8	114.5
	SHC	62.3	77.6	89.4	63.6	80.2	93.5	69.4	89.6	106.8	76.0	100.6	114.3
	kW	10.46	10.28	10.00	10.47	10.30	10.07	10.57	10.38	10.21	10.66	10.43	10.31
115	TC	123.2	109.1	90.8	124.3	110.3	92.2	127.9	114.4	100.8	130.9	116.8	110.1
	SHC	60.4	75.1	86.6	61.9	77.8	90.0	67.6	87.6	100.7	74.6	98.7	109.9
	kW	11.66	11.47	11.20	11.68	11.51	11.25	11.77	11.60	11.41	11.89	11.66	11.58
125	TC	117.5	101.8	86.2	118.5	103.0	87.4	121.6	107.1	96.0	124.1	110.3	104.8
	SHC	58.5	72.5	84.5	60.0	75.0	87.3	65.8	85.1	96.0	72.5	96.9	104.8
	kW	12.99	12.77	12.50	13.02	12.81	12.55	13.10	12.92	12.74	13.19	13.01	12.91

48HJ014 (12$^1/_2$ TONS)

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF											
		3750/0.08			4300/0.09			5000/0.11			6250/0.13		
		Air Entering Evaporator — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	167.1	154.3	142.0	169.8	157.7	144.8	173.5	160.6	148.4	176.5	164.5	153.3
	SHC	82.5	103.5	123.6	85.8	109.7	132.0	90.3	117.7	141.9	98.2	130.7	153.1
	kW	9.44	9.18	8.95	9.50	9.26	9.01	9.60	9.33	9.07	9.68	9.43	9.17
85	TC	162.3	149.3	135.6	165.1	152.5	139.5	168.8	155.3	143.5	172.1	159.2	149.3
	SHC	80.9	101.4	120.9	84.4	107.9	129.9	89.6	115.8	139.8	97.6	129.3	149.1
	kW	10.49	10.18	9.97	10.55	10.27	10.02	10.67	10.32	10.11	10.75	10.43	10.21
95	TC	156.5	143.7	126.3	159.6	146.8	131.3	162.3	149.8	136.5	166.5	153.2	144.5
	SHC	79.1	99.5	116.5	83.0	106.1	126.0	87.6	114.2	135.8	95.8	127.7	144.4
	kW	11.60	11.30	11.01	11.69	11.39	11.10	11.75	11.47	11.20	11.87	11.56	11.35
105	TC	150.0	136.2	115.7	153.0	139.3	120.9	155.6	142.5	138.5	158.8	145.9	138.8
	SHC	76.5	96.7	111.2	80.8	103.5	120.0	85.7	112.3	128.4	93.6	125.9	138.7
	kW	12.76	12.42	12.09	12.83	12.52	12.20	12.91	12.62	12.32	12.96	12.72	12.52
115	TC	141.8	122.2	104.4	144.3	126.1	110.8	147.7	129.4	118.9	150.7	135.2	130.1
	SHC	73.6	91.2	104.2	77.9	98.5	110.8	83.4	107.3	118.4	91.8	121.9	129.9
	kW	13.85	13.55	13.22	13.94	13.64	13.35	14.05	13.73	13.50	14.15	13.86	13.70
125	TC	132.5	108.6	93.9	134.8	111.4	100.7	137.6	114.4	106.6	140.3	122.9	120.1
	SHC	70.9	85.7	93.8	74.8	92.9	100.7	80.2	101.4	106.5	89.0	116.3	120.1
	kW	15.04	14.66	14.44	15.14	14.75	14.55	15.23	14.85	14.72	15.29	14.94	14.84

Standard Ratings

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

COOLING CAPACITIES — 48HJ015 STANDARD UNITS (cont)

48HJ015 (12 Tons)

Temp (F) Air Ent Cond		Evap Air — Cfm/BF																			
		3600/0.01							4375/0.01							5000/0.01						
		Evap Air — Ewb (F)																				
		54	58	62	67	72	76	80	54	58	62	67	72	76	80	54	58	62	67	72	76	80
60	TC	152	156	161	174	189	201	213	161	164	167	180	195	207	218	169	171	172	184	199	211	222
	SHC	152	144	135	114	92.9	75.4	57.5	161	156	150	125	99.6	78.7	57.5	169	166	162	134	105	81.3	57.4
	kW	7.56	7.65	7.74	8.01	8.33	8.6	8.86	7.76	7.82	7.88	8.14	8.46	8.72	8.97	7.92	7.95	7.98	8.24	8.55	8.82	9.06
70	TC	148	152	156	169	183	195	206	157	160	162	174	189	200	211	165	166	167	179	193	204	214
	SHC	148	141	133	112	90.6	73.2	55.4	157	153	148	123	97.3	76.5	55.3	165	162	160	132	103	79.1	55.3
	kW	8.5	8.58	8.67	8.97	9.26	9.53	9.8	8.7	8.75	8.81	9.07	9.39	9.66	9.91	8.86	8.89	8.91	9.16	9.49	9.76	9.99
75	TC	146	150	154	166	181	192	204	155	158	160	172	186	197	208	163	164	164	176	189	201	212
	SHC	146	139	132	111	89.7	72.2	54.6	155	151	146	122	96.2	75.5	54.6	163	161	158	131	101	78.1	54.5
	kW	9.02	9.1	9.18	9.45	9.8	10.1	10.4	9.22	9.27	9.31	9.58	9.91	10.2	10.5	9.39	9.41	9.43	9.68	9.99	10.3	10.6
85	TC	142	145	149	161	175	186	196	151	153	154	166	179	190	200	158	159	159	170	183	194	203
	SHC	142	136	129	109	87.4	70	52.4	151	147	144	119	93.9	73.2	52.3	158	157	155	128	99.1	75.8	52.2
	kW	10.1	10.2	10.3	10.6	10.9	11.2	11.5	10.3	10.4	10.4	10.7	11	11.3	11.6	10.5	10.5	10.5	10.8	11.1	11.4	11.7
95	TC	138	141	143	155	168	179	189	147	148	149	160	173	183	192	153	153	154	164	177	187	195
	SHC	138	133	127	106	85	67.7	50.1	147	144	141	117	91.6	70.9	50	153	153	152	126	96.9	73.5	49.9
	kW	11.4	11.4	11.5	11.8	12.2	12.4	12.7	11.6	11.6	11.6	11.9	12.3	12.6	12.8	11.8	11.8	11.8	12	12.4	12.7	12.9
105	TC	134	136	138	149	162	172	181	141	142	143	153	166	176	184	148	148	148	157	169	179	186
	SHC	134	129	124	104	82.4	65.3	47.7	141	139	137	114	89	68.4	47.5	148	148	148	123	94.3	70.9	47.4
	kW	12.7	12.8	12.8	13.2	13.5	13.8	14.1	12.9	13	13	13.3	13.6	13.9	14.2	13.1	13.1	13.1	13.4	13.7	14	14.3
115	TC	129	130	132	143	155	164	172	136	137	138	146	158	168	175	142	142	142	149	161	171	177
	SHC	129	125	121	101	79.8	62.7	45.1	136	135	133	111	86.3	65.9	45	142	142	142	120	91.6	68.4	45
	kW	14.2	14.2	14.3	14.6	15	15.3	15.6	14.4	14.4	14.5	14.7	15.1	15.5	15.7	14.6	14.6	14.6	14.8	15.2	15.6	15.7
125	TC	124	125	126	136	147	156	163	131	131	132	140	150	159	165	136	136	136	142	153	162	167
	SHC	124	121	118	98.2	77	60.1	42.5	131	130	128	109	83.5	63.2	42.5	136	136	136	117	88.7	65.7	42.4
	kW	15.8	15.8	15.9	16.2	16.6	17	17.2	16.1	16.1	16.1	16.4	16.7	17.1	17.3	16.3	16.2	16.2	16.4	16.8	17.2	17.4

48HJ015 (12 Tons) (cont)

Temp (F) Air Ent Cond		Evap Air — Cfm/BF													
		5625/0.02							6250/0.02						
		Evap Air — Ewb (F)													
		54	58	62	67	72	76	80	54	58	62	67	72	76	80
60	TC	175	175	176	187	202	214	224	180	180	180	190	204	216	226
	SHC	175	173	171	142	110	83.8	57.3	180	180	180	151	115	86.2	57.2
	kW	8.03	8.05	8.07	8.3	8.61	8.87	9.1	8.14	8.15	8.16	8.36	8.66	8.93	9.14
70	TC	170	171	171	181	195	207	216	175	176	176	184	198	209	218
	SHC	170	169	168	140	108	81.5	55.2	175	176	176	148	113	84	55.1
	kW	8.98	8.99	9.01	9.23	9.55	9.81	10	9.09	9.1	9.11	9.3	9.61	9.87	10.1
75	TC	168	168	169	179	192	203	213	173	173	173	181	195	206	215
	SHC	168	167	166	139	107	80.5	54.4	173	173	173	147	112	83	54.3
	kW	9.5	9.51	9.52	9.75	10.1	10.3	10.6	9.62	9.62	9.62	9.81	10.1	10.4	10.6
85	TC	163	163	164	172	185	196	205	168	168	168	175	188	198	206
	SHC	163	162	162	136	104	78.2	52.2	168	168	168	145	109	80.6	52.1
	kW	10.6	10.6	10.6	10.9	11.2	11.5	11.7	10.7	10.7	10.8	10.9	11.2	11.5	11.8
95	TC	158	158	158	166	178	189	196	162	162	162	168	180	190	197
	SHC	158	157	157	134	102	75.9	49.8	162	162	162	142	107	78.3	49.7
	kW	11.9	11.9	11.9	12.1	12.4	12.7	12.9	12	12	12	12.1	12.5	12.8	13
105	TC	152	152	152	159	171	181	187	157	157	157	161	173	182	188
	SHC	152	152	152	131	99.3	73.3	47.4	157	157	157	139	104	75.7	47.4
	kW	13.2	13.2	13.2	13.4	13.8	14.1	14.3	13.4	13.4	13.4	13.5	13.9	14.2	14.4
115	TC	146	146	146	151	163	172	177	150	150	150	153	165	174	178
	SHC	146	146	146	128	96.6	70.7	44.9	150	150	150	136	102	73.1	44.8
	kW	14.7	14.7	14.7	14.9	15.3	15.6	15.8	14.9	14.9	14.9	14.9	15.4	15.7	15.8
125	TC	140	140	140	144	155	163	167	144	144	144	146	156	164	168
	SHC	140	140	140	125	93.7	67.9	42.4	144	144	144	133	98.7	70.2	42.3
	kW	16.4	16.4	16.4	16.5	16.9	17.2	17.4	16.5	16.5	16.5	16.6	17	17.3	17.4

LEGEND

BF — Bypass Factor
Edb — Entering Dry-Bulb
Ewb — Entering Wet-Bulb
kW — Compressor Motor Power Input
ldb — Leaving Dry-Bulb
lwb — Leaving Wet-Bulb
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

3. The SHC is based on 80 F edb temperature of air entering evaporator coil. Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.

BYPASS FACTOR (BF)	ENTERING AIR DRY-BULB TEMP (F)					
	79	78	77	76	75	under 75
	81	*82*	*83*	*84*	*85*	*over 85*
	Correction Factor					
.05	1.04	2.07	3.11	4.14	5.18	
.10	.98	1.96	2.94	3.92	4.90	Use formula
.20	.87	1.74	2.62	3.49	4.36	shown below.
.30	.76	1.53	2.29	3.05	3.82	

Interpolation is permissible.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

4. Use chart below for bypass factor.

CFM	ENTERING WET-BULB (F)						
	54	58	62	67	72	76	80
	Bypass Factor						
3600	0.355	0.158	0.054	0.038	0.049	0.000	0.000
4375	0.439	0.255	0.112	0.043	0.057	0.000	0.000
5000	0.486	0.314	0.126	0.054	0.037	0.000	0.000
5625	0.525	0.360	0.174	0.066	0.073	0.000	0.000
6250	0.551	0.410	0.202	0.080	0.079	0.000	0.000

Performance data — 48HJ (cont)

COOLING CAPACITIES — 48HJ017 STANDARD UNITS (cont)

48HJ017 (15 Tons)

Temp (F) Air Ent Cond		Evap Air — Cfm/BF: 4500/0.01							5250/0.01							6000/0.01						
		Evap Air — Ewb (F): 54	58	62	67	72	76	80	54	58	62	67	72	76	80	54	58	62	67	72	76	80
60	TC	180.5	184.6	188.7	203.5	219.9	233.7	247	189.3	191.7	194.2	208.7	224.1	238	251	198.1	198.8	199.6	212.9	229.3	242	255
	SHC	180.5	172.4	159.4	132.3	104.7	87.9	65.7	189.3	183.2	173.2	142.8	110.4	91	65.5	198.1	195.1	185.1	153.1	116.7	94	65.4
	kW	9.41	9.49	9.58	9.87	10.19	10.47	10.78	9.58	9.63	9.68	9.97	10.29	10.57	10.87	9.75	9.77	9.79	10.07	10.39	10.67	10.95
70	TC	176.7	180.5	184.4	199	215.1	227.8	242	185.3	187.5	189.8	203	219.2	231.8	245	193	194.5	195.1	208.1	224.3	237	248
	SHC	176.7	169	155.8	129.4	102.4	86	63.9	185.3	179.7	169.3	138.9	108	89.1	63.8	193	191.4	181	149.7	114.2	92.2	63.7
	kW	10.5	10.57	10.64	10.96	11.35	11.62	11.95	10.68	10.72	10.76	11.06	11.45	11.72	12.04	10.85	10.87	10.89	11.17	11.55	11.82	12.13
75	TC	174.7	177.5	181	196	213	224.2	238	182.3	184.4	186	201	217	229.2	242	190.9	191.3	189	204	219	233.1	246
	SHC	174.7	167.2	147	124	99	84.9	62.9	182.3	177.9	160	133	105	88	62.8	190.9	189.5	173	143	113	91	62.7
	kW	11.07	11.14	11.2	11.6	12	12.23	12.57	11.25	11.3	11.3	11.7	12.1	12.33	12.66	11.45	11.45	11.4	11.8	12.1	12.44	12.75
85	TC	169.6	172.2	175	190	205	218.1	230.8	177.2	179	180	194	209	221.9	233.3	185.6	185.9	183	198	212	225.7	237
	SHC	169.6	163.3	145	121	97	82.5	60.7	177.2	174.1	157	130	102	85.6	60.5	185.6	184.7	168	139	106	88.6	60.4
	kW	12.29	12.35	12.3	12.7	13.1	13.5	13.86	12.47	12.51	12.5	12.8	13.2	13.61	13.96	12.67	12.68	12.6	12.9	13.3	13.71	14.05
95	TC	164.3	166.5	168	182	197	209.8	221.2	171.7	172.6	172	187	201	213.4	224.6	179.1	179.3	176	190	203	217.1	228
	SHC	164.3	158.9	142	118	93	79.8	57.9	171.7	168.8	154	127	98	82.8	57.9	179.1	178.7	164	136	102	86	57.8
	kW	13.59	13.65	13.5	13.9	14.3	14.85	15.23	13.8	13.82	13.6	14	14.4	14.96	15.32	14	14	13.8	14.1	14.5	15.07	15.43
105	TC	158.1	159.8	161	174	188	200.3	212.4	165.2	166	165	178	191	203.8	214.6	172.3	172.3	169	181	193	207.3	216.8
	SHC	158.1	154.2	138	115	91	76.8	55.2	165.2	163.1	150	124	95	79.9	55.1	172.3	172.2	158	132	98	83	54.9
	kW	14.97	15.02	14.8	15.2	15.6	16.28	16.69	15.19	15.21	14.9	15.3	15.7	16.39	16.77	15.41	15.4	15.1	15.4	15.7	16.5	16.86
115	TC	151.8	152.8	152	165	179	190.6	201.3	158.4	158.8	157	168	180	194	204.5	165	164.9	161	171	181	197.3	206.6
	SHC	151.8	149.1	134	111	87	73.7	52.1	158.4	157	145	120	91	76.7	52.1	165	164.9	151	128	94	79.8	51.9
	kW	16.45	16.48	16.1	16.5	16.9	17.79	18.21	16.68	16.68	16.2	16.6	17	17.91	18.3	16.89	16.88	16.4	16.7	17	18.01	18.39
125	TC	144.7	145.4	146	157.1	170.5	180.7	191.1	150.8	151.1	151.5	160.2	172.9	183.9	192	156.8	156.9	157	163.2	175.4	186.2	193.9
	SHC	144.7	143.5	123.4	102.2	81.16	70.4	48.9	150.8	150.2	135.2	109.6	85.15	73.4	48.8	156.8	156.9	145.6	117.4	89.3	76.4	48.7
	kW	17.96	18.01	18.05	18.49	18.99	19.44	19.85	18.18	18.22	18.25	18.6	19.11	19.5	19.89	18.42	18.44	18.46	18.72	19.14	19.65	19.93

48HJ017 (15 Tons) (cont)

Temp (F) Air Ent Cond		Evap Air — Cfm/BF: 6750/0.01							7500/0.02						
		Evap Air — Ewb (F): 54	58	62	67	72	76	80	54	58	62	67	72	76	80
60	TC	203.8	204.2	204.6	216.3	231.7	244	257	209.5	209.5	209.6	218.8	235	248	259
	SHC	203.8	201.8	191.2	164.1	124.1	97	65.4	209.5	209.5	196.6	173.7	138.1	100	65.2
	kW	9.88	9.88	9.89	10.13	10.45	10.72	11	9.99	9.99	9.99	10.19	10.51	10.78	11.05
70	TC	199.6	199.8	200.1	210.5	226.5	239	250	205.2	205.1	205.1	213.8	228.8	241	252
	SHC	199.6	197.8	187	159.7	121.3	95.2	63.5	205.2	205.1	192.4	169.8	134.5	98.2	63.5
	kW	10.99	10.99	11	11.24	11.6	11.88	12.18	11.12	11.11	11.11	11.31	11.65	11.94	12.22
75	TC	196.4	196.6	194	206	220	235	247	201.9	201.9	198	208	223	237	249
	SHC	196.4	195.7	181	153	120	94	62.5	201.9	201.9	186	163	163	97.1	62.5
	kW	11.58	11.58	11.6	11.9	12.2	12.5	12.8	11.71	11.7	11.7	11.9	11.9	12.56	12.84
85	TC	191	191.1	188	200	213	227.8	239	196.4	196.4	192	202	214	229.8	241
	SHC	191	190.5	175	148	115	91.6	60.2	196.4	196.4	180	157	119	94.6	60.2
	kW	12.81	12.81	12.7	13	13.3	13.77	14.1	12.96	12.95	12.8	13.1	13.4	13.84	14.13
95	TC	184.4	184.5	181	192	205	219.1	229.7	189.7	189.7	185	194	206	221.1	230.5
	SHC	184.4	184.2	170	144	108	88.9	57.7	189.7	189.7	174	153	113	91.9	57.6
	kW	14.15	14.15	13.9	14.2	14.6	15.14	15.47	14.29	14.29	14	14.3	14.6	15.2	15.51
105	TC	176.7	176.7	173	182	194	209.2	218.5	181.9	181.9	177	184	194	211.1	220.1
	SHC	176.7	176.7	162	140	103	86	54.9	181.9	181.9	166	148	107	88.9	54.7
	kW	15.55	15.55	15.2	15.5	15.8	16.57	16.9	15.7	15.7	15.3	15.5	15.8	16.64	16.94
115	TC	169.5	169.4	166	172	183	198.2	207.1	173.9	173.8	169	174	183	200	208.6
	SHC	169.5	169.4	155	136	98	82.7	51.8	173.9	173.8	158	142	101	85.6	51.7
	kW	17.05	17.04	16.6	16.8	17.1	18.08	18.42	17.2	17.2	16.7	16.9	17.1	18.15	18.45
125	TC	160.9	161.1	161.2	165.6	177.4	187.9	195.4	165.1	165.2	165.4	167.8	179.2	188.6	196
	SHC	160.9	161.1	150.7	125.6	95.04	79.4	48.7	165.1	165.2	155.2	133.2	105.3	82.3	48.6
	kW	18.57	18.59	18.62	18.81	19.18	19.68	20.06	18.72	18.75	18.78	18.91	19.33	19.71	20.09

LEGEND

BF — Bypass Factor
Edb — Entering Dry-Bulb
Ewb — Entering Wet-Bulb
kW — Compressor Motor Power Input
ldb — Leaving Dry-Bulb
lwb — Leaving Wet-Bulb
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

3. The SHC is based on 80 F edb temperature of air entering evaporator coil. Below 80 F edb, subtract (corr factor x cfm) from SHC. *Above 80 F edb, add (corr factor x cfm) to SHC.*

BYPASS FACTOR (BF)	ENTERING AIR DRY-BULB TEMP (F): 79	78	77	76	75	under 75
	81	*82*	*83*	*84*	*85*	*over 85*
	Correction Factor					
.05	1.04	2.07	3.11	4.14	5.18	
.10	.98	1.96	2.94	3.92	4.90	Use formula
.20	.87	1.74	2.62	3.49	4.36	shown below.
.30	.76	1.53	2.29	3.05	3.82	

Interpolation is permissible.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

4. Use chart below for bypass factor.

CFM	ENTERING WET-BULB (F): 54	58	62	67	72	76	80
	Bypass Factor						
4500	0.396	0.193	0.054	0.053	0.067	0.000	0.000
5250	0.455	0.272	0.077	0.065	0.077	0.000	0.000
6000	0.504	0.337	0.121	0.077	0.088	0.000	0.000
6750	0.544	0.390	0.193	0.094	0.100	0.000	0.000
7500	0.578	0.436	0.244	0.108	0.114	0.000	0.000

COOLING CAPACITIES — 48HJ020 STANDARD UNITS (cont)

48HJ020 (18 Tons)

Temp (F) Air Ent Cond		Evap Air — Cfm/BF																				
		5400/0.05							6300/0.06							7200/0.07						
		Evap Air — Ewb (F)																				
		54	58	62	67	72	76	80	54	58	62	67	72	76	80	54	58	62	67	72	76	80
60	TC	202	206	211	229	248	263	279	212	215	218	235	254	269	285	220	221	223	239	259	273	289
	SHC	202	193	184	155	124	99.3	74.7	212	205	199	166	131	103	74.9	220	216	213	177	138	106	75
	kW	10.2	10.3	10.4	10.6	10.8	11	11.2	10.4	10.4	10.4	10.7	10.9	11.1	11.3	10.5	10.5	10.5	10.7	11	11.2	11.4
70	TC	197	202	206	223	242	256	272	207	209	212	228	247	262	277	215	216	217	233	252	267	282
	SHC	197	189	181	152	122	97	72.5	207	202	196	163	129	101	72.7	215	212	210	174	135	104	72.8
	kW	11.4	11.5	11.5	11.8	12	12.2	12.5	11.6	11.6	11.6	11.9	12.1	12.3	12.6	11.7	11.7	11.7	11.9	12.2	12.4	12.6
75	TC	195	199	203	219	238	253	268	204	206	209	225	244	258	273	212	213	214	229	248	263	277
	SHC	195	187	180	150	120	95.8	71.3	204	199	195	162	127	99.3	71.4	212	210	208	173	134	103	71.5
	kW	12.1	12.2	12.2	12.5	12.7	13	13.2	12.3	12.3	12.3	12.6	12.8	13	13.3	12.4	12.4	12.4	12.6	12.9	13.1	13.3
85	TC	190	193	196	213	231	246	260	199	201	202	218	236	251	264	206	207	208	222	240	255	268
	SHC	190	183	177	148	118	93.4	68.8	199	195	191	159	125	96.9	68.9	206	205	204	170	131	100	69
	kW	13.5	13.5	13.6	13.8	14.1	14.4	14.6	13.6	13.7	13.7	13.9	14.2	14.5	14.7	13.7	13.8	13.8	14	14.3	14.5	14.8
95	TC	184	187	190	205	222	236	250	193	194	195	210	227	241	254	200	200	201	214	231	245	258
	SHC	184	179	173	144	114	90.2	65.9	193	190	187	156	121	93.7	66.1	200	199	199	167	128	97.1	66.2
	kW	15	15	15.1	15.4	15.7	15.9	16.2	15.1	15.2	15.2	15.5	15.8	16	16.3	15.3	15.3	15.3	15.5	15.8	16.1	16.3
105	TC	178	180	182	197	213	228	240	186	187	188	201	217	232	244	193	193	193	205	221	235	247
	SHC	178	173	169	141	111	87.3	62.9	186	184	183	152	118	90.8	63.1	193	193	193	163	124	94.1	63.2
	kW	16.6	16.7	16.7	17	17.3	17.7	17.9	16.8	16.8	16.8	17.1	17.4	17.8	18	16.9	16.9	16.9	17.2	17.5	17.8	18
115	TC	171	172	174	188	203	217	228	179	179	179	192	207	221	232	185	185	185	195	210	224	235
	SHC	171	168	165	137	107	83.6	59.6	179	178	178	149	114	87.1	59.7	185	185	185	159	121	90.4	59.9
	kW	18.4	18.4	18.4	18.8	19.1	19.4	19.7	18.6	18.6	18.6	18.9	19.2	19.5	19.8	18.7	18.7	18.7	19	19.3	19.6	19.9
125	TC	164	165	165	178	192	205	216	171	171	171	182	196	208	219	177	177	177	185	199	211	222
	SHC	164	162	160	134	104	79.8	56.1	171	171	171	145	110	83.2	56.3	177	177	177	155	117	86.5	56.4
	kW	20.2	20.3	20.3	20.6	21	21.3	21.6	20.4	20.4	20.4	20.8	21.1	21.4	21.7	20.6	20.6	20.6	20.8	21.2	21.5	21.8

48HJ020 (18 Tons) (cont)

Temp (F) Air Ent Cond		Evap Air — Cfm/BF													
		8100/0.08							9000/0.09						
		Evap Air — Ewb (F)													
		54	58	62	67	72	76	80	54	58	62	67	72	76	80
60	TC	227	227	228	243	262	277	293	233	233	233	246	265	280	295
	SHC	227	226	224	187	144	109	75.1	233	233	233	198	151	113	75.1
	kW	10.5	10.6	10.6	10.7	11	11.2	11.4	10.6	10.6	10.6	10.8	11	11.3	11.5
70	TC	222	222	222	236	255	271	284	228	228	227	239	258	272	287
	SHC	222	221	221	185	142	107	72.8	228	228	227	195	148	110	72.9
	kW	11.8	11.8	11.8	12	12.2	12.5	12.7	11.9	11.9	11.8	12	12.3	12.5	12.7
75	TC	219	219	219	232	251	266	280	225	224	224	235	254	268	282
	SHC	219	218	218	183	140	106	71.6	225	224	224	193	147	109	71.7
	kW	12.5	12.5	12.5	12.7	12.9	13.2	13.4	12.6	12.5	12.5	12.7	13	13.2	13.4
85	TC	213	213	213	225	243	258	271	218	218	218	228	245	260	273
	SHC	213	213	213	180	138	103	69.1	218	218	218	190	144	107	69.2
	kW	13.8	13.8	13.8	14.1	14.3	14.6	14.8	13.9	13.9	13.9	14.1	14.4	14.6	14.8
95	TC	206	206	206	217	234	248	260	211	211	211	220	236	250	262
	SHC	206	206	206	177	134	100	66.3	211	211	211	187	141	103	66.4
	kW	15.4	15.4	15.4	15.6	15.9	16.1	16.4	15.5	15.5	15.5	15.6	15.9	16.2	16.4
105	TC	199	199	199	208	224	238	249	203	203	204	210	226	240	251
	SHC	199	199	199	173	131	97.2	63.2	203	203	204	183	137	100	63.4
	kW	17	17.1	17.1	17.3	17.6	17.9	18.1	17.2	17.2	17.2	17.3	17.6	17.9	18.1
115	TC	191	191	191	198	213	226	237	195	195	195	201	215	228	238
	SHC	191	191	191	169	127	93.5	60	195	195	195	179	133	96.6	60
	kW	18.8	18.8	18.8	19	19.3	19.7	19.9	18.9	18.9	18.9	19.1	19.4	19.7	19.9
125	TC	182	182	182	188	201	213	224	186	186	186	190	203	215	225
	SHC	182	182	182	165	123	89.6	56.5	186	186	186	174	129	92.6	56.6
	kW	20.7	20.7	20.7	20.9	21.2	21.6	21.9	20.9	20.9	20.9	21	21.3	21.6	21.9

LEGEND

BF — Bypass Factor
Edb — Entering Dry-Bulb
Ewb — Entering Wet-Bulb
kW — Compressor Motor Power Input
ldb — Leaving Dry-Bulb
lwb — Leaving Wet-Bulb
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

3. The SHC is based on 80 F edb temperature of air entering evaporator coil. Below 80 F edb, subtract (corr factor x cfm) from SHC. *Above 80 F edb, add (corr factor x cfm) to SHC.*

BYPASS FACTOR (BF)	ENTERING AIR DRY-BULB TEMP (F)					
	79	78	77	76	75	under 75
	81	*82*	*83*	*84*	*85*	*over 85*
	Correction Factor					
.05	1.04	2.07	3.11	4.14	5.18	
.10	.98	1.96	2.94	3.92	4.90	Use formula
.20	.87	1.74	2.62	3.49	4.36	shown below.
.30	.76	1.53	2.29	3.05	3.82	

Interpolation is permissible.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

4. Use chart below for bypass factor.

CFM	ENTERING WET-BULB (F)						
	54	58	62	67	72	76	80
	Bypass Factor						
5400	0.424	0.238	0.125	0.120	0.138	0.000	0.000
6300	0.478	0.304	0.153	0.132	0.145	0.000	0.000
7200	0.525	0.364	0.190	0.144	0.153	0.000	0.000
8100	0.562	0.414	0.231	0.156	0.162	0.000	0.000
9000	0.594	0.456	0.281	0.168	0.170	0.000	0.000

Performance data — 48HJ (cont)

COOLING CAPACITIES — 48HJ024 STANDARD UNITS (cont)

48HJ024 (20 Tons)

Temp (F) Air Ent Cond		Evap Air — Cfm/BF: 6,000/0.04							7,000/0.05							8,000/0.05						
		Evap Air — Ewb (F)																				
		54	58	62	67	72	76	80	54	58	62	67	72	76	80	54	58	62	67	72	76	80
60	TC	235	242	248	267	288	306	323	247	251	256	274	296	312	330	257	259	262	279	300	317	333
	SHC	235	224	212	178	143	115	86.6	247	238	230	191	151	119	87	257	251	246	204	159	123	86.7
	kW	11.5	11.6	11.7	12	12.4	12.7	13	11.7	11.8	11.8	12.1	12.5	12.8	13.1	11.9	11.9	11.9	12.2	12.6	12.9	13.1
70	TC	231	237	242	261	282	300	316	242	246	250	268	289	305	323	252	254	256	273	293	310	326
	SHC	231	220	209	175	141	113	84.5	242	234	227	189	149	117	84.9	252	247	243	201	156	120	84.6
	kW	13.1	13.2	13.3	13.6	14	14.3	14.6	13.3	13.3	13.4	13.7	14.1	14.4	14.8	13.4	13.5	13.5	13.8	14.2	14.5	14.8
75	TC	228	234	239	257	278	295	311	239	243	246	264	285	301	318	249	250	252	269	290	305	322
	SHC	228	218	208	174	139	112	83.1	239	232	225	187	147	115	83.6	249	245	241	199	155	119	83.5
	kW	13.9	14	14.1	14.5	14.9	15.2	15.6	14.1	14.2	14.2	14.6	15	15.3	15.7	14.3	14.3	14.4	14.7	15.1	15.4	15.8
85	TC	223	227	231	250	270	287	303	234	236	238	256	277	292	310	243	244	245	261	282	296	314
	SHC	223	213	204	171	136	109	80.5	234	227	221	184	144	112	80.9	243	240	236	196	152	116	81.3
	kW	15.6	15.7	15.8	16.2	16.6	17.1	17.4	15.8	15.9	15.9	16.3	16.8	17.2	17.6	16	16.1	16.1	16.5	16.9	17.3	17.7
95	TC	216	219	223	241	260	277	292	226	228	230	247	267	282	298	235	235	236	251	272	285	303
	SHC	216	208	200	167	132	105	77.2	226	221	217	180	141	109	77.7	235	233	231	192	148	112	78
	kW	17.4	17.5	17.6	18.1	18.6	19	19.4	17.7	17.7	17.8	18.2	18.7	19.1	19.6	17.9	17.9	17.9	18.3	18.9	19.2	19.7
105	TC	208	211	214	231	249	265	279	218	219	220	236	256	270	285	226	226	226	241	260	273	290
	SHC	208	202	195	163	129	101	73.6	218	215	212	176	137	105	74	226	226	225	188	145	108	74.4
	kW	19.3	19.4	19.5	20	20.6	21	21.5	19.6	19.6	19.7	20.2	20.8	21.2	21.6	19.9	19.9	19.9	20.3	20.9	21.3	21.8
115	TC	200	202	204	220	237	253	266	209	210	210	225	243	257	271	217	217	217	229	248	260	275
	SHC	200	195	190	158	124	97.2	69.5	209	207	206	171	132	101	70	217	217	217	183	140	104	70.4
	kW	21.3	21.4	21.5	22	22.7	23.2	23.6	21.7	21.7	21.7	22.2	22.9	23.3	23.8	21.9	21.9	21.9	22.4	23	23.4	23.9
125	TC	191	192	193	208	224	239	251	199	199	200	212	230	243	255	207	207	206	216	232	245	257
	SHC	191	188	185	153	120	92.8	65.3	199	199	199	166	128	96.4	65.7	207	207	206	178	135	99.8	65.5
	kW	23.5	23.5	23.6	24.2	24.8	25.4	25.9	23.8	23.8	23.8	24.4	25	25.5	26	24.1	24.1	24.1	24.5	25.1	25.7	26.1

48HJ024 (20 Tons) (cont)

Temp (F) Air Ent Cond		Evap Air — Cfm/BF: 9,000/0.06							10,000/0.07						
		Evap Air — Ewb (F)													
		54	58	62	67	72	76	80	54	58	62	67	72	76	80
60	TC	265	266	267	284	305	321	338	272	272	272	287	307	325	340
	SHC	265	262	260	216	166	126	87	272	271	271	227	173	130	86.7
	kW	12	12	12	12.3	12.7	12.9	13.2	12.1	12.1	12.1	12.4	12.7	13	13.3
70	TC	260	261	261	277	298	315	331	266	267	267	281	301	317	333
	SHC	260	258	256	213	164	124	85	266	267	267	225	171	127	84.7
	kW	13.6	13.6	13.6	13.9	14.3	14.6	14.9	13.7	13.7	13.7	14	14.3	14.6	15
75	TC	256	257	258	273	294	310	326	263	263	263	277	296	312	327
	SHC	256	255	254	211	162	123	83.7	263	263	263	223	169	126	83.4
	kW	14.5	14.5	14.5	14.8	15.2	15.5	15.8	14.6	14.6	14.6	14.9	15.2	15.6	15.9
85	TC	250	250	250	265	285	301	316	257	256	256	268	287	303	317
	SHC	250	250	249	208	159	120	81	257	256	256	220	166	123	80.7
	kW	16.2	16.2	16.2	16.5	17	17.4	17.7	16.4	16.4	16.4	16.6	17	17.4	17.7
95	TC	242	242	242	255	274	288	304	248	248	248	258	276	292	306
	SHC	242	242	242	204	155	116	77.8	248	248	248	215	162	120	77.6
	kW	18.1	18.1	18.1	18.4	18.9	19.3	19.7	18.3	18.3	18.2	18.5	19	19.4	19.7
105	TC	233	233	233	244	263	275	291	239	239	239	247	264	279	291
	SHC	233	233	233	200	152	112	74.2	239	239	239	211	158	116	73.9
	kW	20.1	20.1	20.1	20.4	21	21.4	21.8	20.3	20.2	20.2	20.5	21	21.5	21.8
115	TC	223	223	223	232	250	262	276	229	228	228	235	251	263	276
	SHC	223	223	223	195	147	108	70.2	229	228	228	206	154	111	69.9
	kW	22.2	22.1	22.1	22.5	23.1	23.5	24	22.3	22.3	22.3	22.6	23.1	23.6	24
125	TC	213	212	212	219	234	247	258	218	217	217	222	235	248	259
	SHC	213	212	212	189	142	103	65.4	218	217	217	200	148	106	65.2
	kW	24.3	24.3	24.3	24.6	25.2	25.7	26.2	24.5	24.5	24.5	24.7	25.3	25.8	26.2

LEGEND

BF — Bypass Factor
Edb — Entering Dry-Bulb
Ewb — Entering Wet-Bulb
kW — Compressor Motor Power Input
ldb — Leaving Dry-Bulb
lwb — Leaving Wet-Bulb
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

3. The SHC is based on 80 F edb temperature of air entering evaporator coil. Below 80 F edb, subtract (corr factor x cfm) from SHC. *Above 80 F edb, add (corr factor x cfm) to SHC.*

BYPASS FACTOR (BF)	ENTERING AIR DRY-BULB TEMP (F)					
	79	78	77	76	75	under 75
	81	*82*	*83*	*84*	*85*	*over 85*
	Correction Factor					
.05	1.04	2.07	3.11	4.14	5.18	
.10	.98	1.96	2.94	3.92	4.90	Use formula
.20	.87	1.74	2.62	3.49	4.36	shown below.
.30	.76	1.53	2.29	3.05	3.82	

Interpolation is permissible.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

4. Use chart below for bypass factor.

CFM	ENTERING WET-BULB (F)						
	54	58	62	67	72	76	80
	Bypass Factor						
6,000	0.386	0.197	0.108	0.109	0.134	0.000	0.000
7,000	0.444	0.260	0.131	0.121	0.138	0.000	0.000
8,000	0.492	0.321	0.163	0.133	0.145	0.000	0.000
9,000	0.532	0.375	0.205	0.146	0.154	0.000	0.000
10,000	0.566	0.420	0.245	0.158	0.164	0.000	0.000

COOLING CAPACITIES — 48HJ028 STANDARD UNITS (cont)

48HJ028 (25 Tons)

Temp (F) Air Ent Cond		Evap Air — Cfm/BF																				
		7,500/0.05							8,250/0.06							9,500/0.07						
		Evap Air — Ewb (F)																				
		54	58	62	67	72	76	80	54	58	62	67	72	76	80	54	58	62	67	72	76	80
60	TC	287	296	304	331	359	385	408	297	304	310	336	367	390	414	311	315	319	345	375	398	421
	SHC	287	274	261	220	178	145	110	297	285	273	229	185	148	110	311	303	294	246	194	152	111
	kW	15.5	15.7	15.9	16.5	17.3	17.9	18.6	15.7	15.9	16	16.7	17.4	18.1	18.7	16	16.1	16.2	16.9	17.6	18.3	19
70	TC	279	286	293	318	345	367	392	288	293	298	323	350	372	397	301	303	306	329	357	381	403
	SHC	279	267	255	214	173	139	105	288	278	268	224	178	142	105	301	294	287	239	188	147	105
	kW	17	17.2	17.3	18	18.7	19.3	20	17.2	17.3	17.5	18.1	18.8	19.4	20.1	17.5	17.6	17.7	18.3	19	19.7	20.3
75	TC	275	281	287	311	338	360	383	283	288	293	316	343	365	388	296	298	300	323	349	372	394
	SHC	275	264	252	212	170	136	102	283	274	265	221	176	139	103	296	290	284	237	185	144	103
	kW	17.9	18.1	18.2	18.8	19.5	20.1	20.8	18.1	18.2	18.4	18.9	19.7	20.3	20.9	18.4	18.5	18.5	19.1	19.8	20.5	21.1
85	TC	267	272	277	299	324	345	366	274	278	282	304	329	350	370	286	287	289	311	334	355	375
	SHC	267	257	247	207	165	131	97.3	274	267	259	216	171	134	97.3	286	282	278	232	180	139	97.3
	kW	19.8	19.9	20	20.6	21.2	21.8	22.4	20	20.1	20.1	20.7	21.4	22	22.6	20.2	20.3	20.3	20.9	21.5	22.1	22.7
95	TC	259	263	267	288	311	331	350	267	270	273	293	315	335	354	278	279	281	299	322	340	358
	SHC	259	251	242	202	160	126	92.5	267	261	255	212	166	129	92.5	278	276	273	227	175	134	92.4
	kW	22.1	22.2	22.3	22.8	23.4	23.9	24.5	22.3	22.4	22.5	22.9	23.5	24	24.6	22.6	22.6	22.6	23.1	23.6	24.2	24.7
105	TC	253	256	260	279	301	318	335	260	262	264	282	304	322	338	269	270	270	287	308	326	342
	SHC	253	246	239	198	156	122	87.9	260	255	250	207	162	125	87.8	269	268	267	222	171	129	87.7
	kW	24.9	25	25.1	25.4	25.9	26.4	26.9	25.1	25.1	25.1	25.5	26	26.5	26.9	25.2	25.2	25.2	25.6	26.1	26.6	27.1
115	TC	246	249	252	270	291	305	320	253	255	256	274	294	309	323	262	262	262	277	298	312	328
	SHC	246	240	235	195	152	118	83.5	253	250	246	204	158	121	83.4	262	261	261	218	167	125	83.9
	kW	28.1	28.2	28.3	28.6	29	29.3	29.6	28.3	28.3	28.3	28.6	29	29.4	29.7	28.4	28.4	28.4	28.7	29.1	29.4	29.9
125	TC	238	240	242	259	279	293	305	245	246	246	262	281	295	310	253	253	253	266	284	298	313
	SHC	238	234	230	190	148	114	79.2	245	243	240	199	153	116	79.7	253	253	253	214	162	120	79.9
	kW	31.6	31.7	31.7	32	32.4	32.6	32.9	31.8	31.8	31.8	32.1	32.4	32.7	33	31.9	31.9	31.9	32.1	32.5	32.7	33.1

48HJ028 (25 Tons) (cont)

Temp (F) Air Ent Cond		Evap Air — Cfm/BF													
		10,750/0.08							12,000/0.09						
		Evap Air — Ewb (F)													
		54	58	62	67	72	76	80	54	58	62	67	72	76	80
60	TC	322	324	327	351	380	404	429	332	333	334	357	386	410	432
	SHC	322	317	313	260	203	157	111	332	330	329	276	212	162	111
	kW	16.3	16.4	16.4	17	17.8	18.5	19.2	16.6	16.6	16.6	17.2	18	18.6	19.2
70	TC	311	312	314	336	364	386	408	320	320	321	341	368	392	414
	SHC	311	308	305	255	198	151	105	320	320	319	269	206	156	106
	kW	17.8	17.8	17.9	18.4	19.2	19.8	20.5	18	18	18	18.5	19.3	20	20.6
75	TC	306	307	308	329	356	378	398	315	315	315	333	360	383	404
	SHC	306	304	302	252	195	149	103	315	314	314	266	203	153	103
	kW	18.7	18.7	18.7	19.3	20	20.6	21.3	18.9	18.9	18.9	19.4	20.1	20.8	21.4
85	TC	295	296	297	315	340	362	379	303	303	303	319	344	365	385
	SHC	295	295	294	246	189	144	97.3	303	303	303	260	198	148	97.9
	kW	20.5	20.5	20.5	21	21.7	22.3	22.8	20.7	20.7	20.7	21.1	21.8	22.4	23
95	TC	286	286	286	303	327	344	364	293	293	294	307	330	347	366
	SHC	286	286	286	241	185	138	93	293	293	294	255	193	142	92.8
	kW	22.7	22.7	22.7	23.1	23.8	24.3	24.9	22.9	22.9	22.9	23.2	23.9	24.4	24.9
105	TC	277	277	277	290	312	329	347	284	284	285	295	314	331	352
	SHC	277	277	277	236	179	133	88.3	284	284	285	250	188	137	88.7
	kW	25.4	25.4	25.4	25.7	26.2	26.7	27.2	25.5	25.6	25.6	25.8	26.3	26.7	27.3
115	TC	268	269	269	281	300	315	332	274	274	275	283	303	317	333
	SHC	268	269	269	232	176	129	84.4	274	274	275	245	184	133	84
	kW	28.5	28.5	28.5	28.7	29.2	29.5	30	28.6	28.6	28.6	28.8	29.2	29.5	30
125	TC	260	259	259	269	287	300	316	265	265	264	271	289	302	318
	SHC	260	259	259	227	171	125	80	265	265	264	240	179	129	80.1
	kW	32	32	32	32.1	32.5	32.8	33.2	32.1	32.1	32.1	32.2	32.5	32.8	33.3

LEGEND

BF — Bypass Factor
Edb — Entering Dry-Bulb
Ewb — Entering Wet-Bulb
kW — Compressor Motor Power Input
ldb — Leaving Dry-Bulb
lwb — Leaving Wet-Bulb
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

3. The SHC is based on 80 F edb temperature of air entering evaporator coil. Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.

BYPASS FACTOR (BF)	ENTERING AIR DRY-BULB TEMP (F)					
	79	78	77	76	75	under 75
	81	*82*	*83*	*84*	*85*	*over 85*
	Correction Factor					
.05	1.04	2.07	3.11	4.14	5.18	
.10	.98	1.96	2.94	3.92	4.90	Use formula
.20	.87	1.74	2.62	3.49	4.36	shown below.
.30	.76	1.53	2.29	3.05	3.82	

Interpolation is permissible.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

4. Use chart below for bypass factor.

CFM	ENTERING WET-BULB (F)						
	54	58	62	67	72	76	80
	Bypass Factor						
7,500	0.407	0.208	0.097	0.104	0.123	0.000	0.000
8,250	0.443	0.256	0.110	0.112	0.128	0.000	0.000
9,500	0.494	0.324	0.138	0.123	0.136	0.000	0.000
10,750	0.536	0.380	0.181	0.134	0.145	0.000	0.000
12,000	0.571	0.427	0.232	0.145	0.154	0.000	0.000

Performance data — 48HJ (cont)

COOLING CAPACITIES — UNITS WITH HUMIDI-MIZER™ ADAPTIVE DEHUMIDIFICATION SYSTEM OPTION

48HJ004 (3 TONS) — SUBCOOLING MODE

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF								
		900/0.14			1200/0.17			1500/0.20		
		Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	41.3	37.3	34.3	43.5	39.2	35.9	45.5	41.6	38.2
	SHC	17.5	22.4	26.7	19.6	25.5	31.2	21.5	28.5	35.2
	kW	2.19	2.14	2.10	2.21	2.16	2.14	2.24	2.19	2.16
85	TC	38.6	34.4	31.6	41.3	37.5	33.3	43.5	38.6	35.5
	SHC	15.2	20.1	25.1	17.1	23.2	29.0	18.9	26.3	32.9
	kW	2.46	2.40	2.37	2.47	2.43	2.40	2.51	2.45	2.42
95	TC	35.9	31.4	28.8	39.2	35.9	30.6	41.3	35.7	32.9
	SHC	13.0	17.9	23.3	14.5	21.1	26.9	16.1	24.2	30.6
	kW	2.74	2.68	2.63	2.76	2.74	2.67	2.80	2.75	2.71
105	TC	33.8	29.7	27.4	36.3	32.2	28.7	38.1	32.8	30.4
	SHC	10.9	15.8	21.0	12.5	18.9	24.6	14.0	21.7	28.1
	kW	3.05	3.00	2.97	3.09	3.04	2.99	3.12	3.07	3.03
115	TC	31.8	28.0	25.5	33.2	28.7	26.5	34.9	30.0	27.9
	SHC	9.0	13.7	18.4	10.3	16.8	22.3	11.9	19.3	25.2
	kW	3.40	3.36	3.31	3.45	3.38	3.32	3.48	3.41	3.37
125	TC	28.7	26.3	23.4	29.7	25.5	22.9	31.3	27.1	25.5
	SHC	6.9	12.2	17.3	7.9	14.5	20.6	9.2	17.3	22.3
	kW	3.78	3.73	3.66	3.84	3.77	3.71	3.87	3.79	3.75

48HJ004 (3 TONS) — HOT GAS REHEAT MODE

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (55% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator — Cfm								
		900	1200	1500	900	1200	1500	900	1200	1500
80	TC	12.83	15.84	18.20	13.24	16.31	18.73	13.58	16.72	19.18
	SHC	4.06	5.69	6.98	2.21	3.83	5.12	.59	2.20	3.50
	kW	2.12	2.12	2.12	2.13	2.13	2.13	2.14	2.14	2.14
75	TC	**13.61**	**16.44**	**18.67**	**14.03**	**16.93**	**19.20**	**14.39**	**17.34**	**19.67**
	SHC	**4.62**	**6.16**	**7.37**	**2.89**	**4.43**	**5.65**	**1.40**	**2.93**	**4.15**
	kW	**2.11**	**2.11**	**2.11**	**2.12**	**2.12**	**2.12**	**2.14**	**2.14**	**2.14**
70	TC	14.39	17.05	19.14	14.82	17.54	19.68	15.19	17.96	20.15
	SHC	5.17	6.62	7.77	3.58	5.03	6.18	2.20	3.65	4.80
	kW	2.10	2.10	2.10	2.12	2.12	2.12	2.13	2.13	2.13
60	TC	15.95	18.26	20.08	16.40	18.77	20.63	16.79	19.21	21.11
	SHC	6.27	7.55	8.56	4.95	6.23	7.24	3.81	5.09	6.10
	kW	2.09	2.09	2.09	2.11	2.11	2.11	2.12	2.12	2.12
50	TC	17.50	19.48	21.02	17.98	20.00	21.58	18.40	20.45	22.07
	SHC	7.37	8.47	9.35	6.32	7.43	8.30	5.42	6.52	7.39
	kW	2.07	2.07	2.07	2.10	2.10	2.10	2.12	2.12	2.12
40	TC	19.06	20.69	21.07	19.56	21.23	22.54	20.00	21.70	23.03
	SHC	8.47	9.40	10.13	7.71	8.63	9.36	7.02	7.95	8.69
	kW	2.06	2.06	2.06	2.08	2.08	2.08	2.11	2.11	2.11

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

COOLING CAPACITIES — UNITS WITH HUMIDI-MIZER™ ADAPTIVE DEHUMIDIFICATION SYSTEM OPTION (cont)

48HJ005 (4 TONS) — SUBCOOLING MODE

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF											
		1200/0.17			1450/0.19			1600/0.21			2000/0.24		
		Air Entering Evaporator — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	52.9	47.5	41.5	55.7	50.9	47.5	57.0	51.7	48.1	60.5	55.6	52.1
	SHC	22.7	28.4	33.4	26.1	34.1	38.9	25.9	33.7	41.6	29.4	39.1	47.5
	kW	2.87	2.86	2.82	2.89	2.87	2.84	2.89	2.86	2.85	2.90	2.88	2.85
85	TC	49.2	43.8	37.1	52.1	47.2	43.6	52.9	47.9	43.7	55.4	51.4	47.0
	SHC	19.8	25.5	30.4	22.2	29.5	35.8	22.4	31.1	38.7	24.2	36.0	44.3
	kW	3.26	3.25	3.21	3.28	3.26	3.23	3.28	3.26	3.24	3.28	3.26	3.24
95	TC	45.8	40.1	32.8	48.2	43.6	39.4	48.8	44.0	39.3	51.7	47.4	43.0
	SHC	17.2	22.5	27.3	18.4	24.8	32.6	19.0	28.1	35.9	20.7	33.0	41.0
	kW	3.71	3.68	3.64	3.72	3.69	3.67	3.72	3.69	3.67	3.74	3.70	3.68
105	TC	41.6	37.0	29.7	43.2	38.9	35.4	43.9	39.7	34.7	46.5	41.4	37.5
	SHC	13.5	19.5	23.9	14.7	21.7	29.2	15.0	23.7	30.6	16.4	27.8	35.1
	kW	4.20	4.17	4.11	4.20	4.17	4.14	4.20	4.17	4.15	4.22	4.19	4.16
115	TC	37.2	33.2	27.1	38.4	34.0	30.8	39.4	35.5	30.0	41.3	35.2	31.9
	SHC	9.9	16.4	20.7	11.3	18.5	25.6	11.2	19.7	25.4	12.4	22.4	28.6
	kW	4.73	4.68	4.62	4.74	4.71	4.64	4.73	4.72	4.65	4.74	4.72	4.69
125	TC	32.4	28.1	24.9	33.8	28.1	27.4	35.3	30.5	26.6	36.1	32.0	28.7
	SHC	7.2	12.9	18.3	8.4	14.5	21.9	16.8	21.1	21.2	9.5	18.3	24.1
	kW	5.29	5.23	5.15	5.30	5.25	5.19	5.29	5.27	5.21	5.30	5.29	5.25

48HJ005 (4 TONS) — HOT GAS REHEAT MODE*

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (55% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator — Cfm								
		1200	1450	1600	1200	1450	1600	1200	1450	1600
80	TC	12.13	14.30	15.43	14.98	17.20	18.36	17.44	19.71	20.90
	SHC	1.01	1.60	1.90	-0.18	0.41	0.72	-1.20	-0.61	-0.30
	kW	2.76	2.76	2.76	2.75	2.75	2.75	2.74	2.74	2.74
75	**TC**	**13.25**	**15.28**	**16.34**	**15.96**	**18.05**	**19.14**	**18.31**	**20.44**	**21.56**
	SHC	**1.60**	**2.14**	**2.43**	**0.50**	**1.05**	**1.34**	**-0.45**	**0.11**	**0.40**
	kW	**7.54**	**7.54**	**7.57**	**7.61**	**7.64**	**7.66**	**7.66**	**7.70**	**7.71**
70	TC	14.37	16.27	17.26	16.94	18.90	19.92	19.17	21.17	22.22
	SHC	2.18	2.69	2.96	1.17	1.69	1.96	0.30	0.82	1.10
	kW	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
60	TC	16.60	18.24	19.10	18.91	20.60	21.48	20.91	22.64	23.54
	SHC	3.35	3.79	4.03	2.52	2.97	3.21	1.80	2.25	2.50
	kW	2.64	2.64	2.64	2.65	2.65	2.65	2.65	2.65	2.65
50	TC	18.83	20.22	20.94	20.87	22.30	23.04	22.65	24.10	24.86
	SHC	4.51	4.89	5.09	3.86	4.25	4.45	3.30	3.69	3.89
	kW	2.59	2.59	2.59	2.60	2.60	2.60	2.61	2.61	2.61
40	TC	21.06	22.19	22.78	22.84	24.00	24.61	24.38	25.57	26.19
	SHC	5.68	5.99	6.16	5.21	5.53	5.69	4.80	5.12	5.29
	kW	2.53	2.53	2.53	2.55	2.55	2.55	2.57	2.57	2.57

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

*Negative SHC value indicates that the air entering the coil is being heated.

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

Performance data — 48HJ (cont)

COOLING CAPACITIES — UNITS WITH HUMIDI-MIZER™ ADAPTIVE DEHUMIDIFICATION SYSTEM OPTION (cont)

48HJ006 (5 TONS) — SUBCOOLING MODE

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF											
		1500/0.08			1750/0.09			2000/0.11			2500/0.13		
		Air Entering Evaporator — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	69.9	62.7	56.2	74.7	67.3	61.0	78.5	71.2	64.8	81.7	75.5	69.3
	SHC	29.0	36.9	43.9	31.7	40.5	51.2	34.5	44.2	55.4	37.8	52.0	62.8
	kW	3.61	3.55	3.51	3.64	3.58	3.49	3.65	3.60	3.51	3.62	3.58	3.51
85	TC	65.9	59.1	51.7	70.6	63.2	56.3	75.5	66.8	60.7	78.1	70.8	65.1
	SHC	25.3	34.0	41.9	27.5	37.6	48.0	30.7	41.6	52.0	33.8	47.4	58.0
	kW	4.05	3.97	3.91	4.07	4.01	3.92	4.11	4.00	3.95	4.08	4.02	3.96
95	TC	61.9	55.2	47.7	66.5	58.8	51.3	70.4	61.9	55.7	74.2	65.9	60.6
	SHC	21.6	31.1	40.0	23.5	34.5	44.6	26.0	38.6	47.9	30.0	42.8	52.6
	kW	4.53	4.43	4.35	4.55	4.47	4.37	4.56	4.42	4.41	4.58	4.49	4.44
105	TC	57.7	51.1	44.9	61.8	54.5	47.7	65.1	57.2	50.8	68.4	60.3	56.1
	SHC	18.1	27.8	35.7	20.0	31.2	40.1	22.1	34.3	43.5	26.1	38.9	48.5
	kW	5.05	4.93	4.84	5.09	4.97	4.88	5.11	4.96	4.92	5.11	5.03	4.98
115	TC	53.4	47.2	42.0	56.6	50.0	44.2	59.6	52.5	46.2	62.6	54.9	51.6
	SHC	14.7	24.6	31.5	16.5	27.8	35.7	18.2	30.0	39.0	22.1	34.9	44.3
	kW	5.60	5.49	5.40	5.64	5.52	5.45	5.69	5.55	5.48	5.69	5.61	5.57
125	TC	48.7	42.0	36.9	51.3	45.0	39.0	54.1	46.8	40.9	56.9	49.2	45.9
	SHC	10.9	19.6	28.0	12.5	22.2	31.5	13.5	24.0	34.0	16.5	28.0	38.8
	kW	6.26	6.12	6.02	6.28	6.18	6.09	6.33	6.18	6.13	6.33	6.27	6.22

48HJ006 (5 TONS) — HOT GAS REHEAT MODE*

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (55% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator — Cfm								
		1500	1750	2000	1500	1750	2000	1500	1750	2000
80	TC	17.67	19.23	20.59	17.51	19.09	20.48	17.37	18.98	20.39
	SHC	-0.39	0.07	0.46	-1.61	-1.15	-0.75	-2.67	-2.21	-1.80
	kW	3.45	3.45	3.45	3.48	3.48	3.48	3.50	3.50	3.50
75	**TC**	**18.55**	**20.03**	**21.32**	**18.45**	**19.95**	**21.27**	**18.36**	**19.89**	**21.23**
	SHC	**0.28**	**0.71**	**1.09**	**-0.85**	**-0.42**	**-0.04**	**-1.83**	**-1.39**	**-1.01**
	kW	**3.43**	**3.43**	**3.43**	**3.46**	**3.46**	**3.46**	**3.49**	**3.49**	**3.49**
70	TC	19.44	20.83	22.06	19.39	20.81	22.06	19.35	20.80	22.07
	SHC	0.95	1.36	1.71	-0.09	0.32	0.68	-0.99	-0.58	-0.22
	kW	3.42	3.42	3.42	3.45	3.45	3.45	3.48	3.48	3.48
60	TC	21.20	22.44	23.53	21.27	22.54	23.65	21.33	22.62	23.75
	SHC	2.30	2.65	2.95	1.44	1.80	2.11	0.70	1.06	1.37
	kW	3.38	3.38	3.38	3.42	3.42	3.42	3.46	3.46	3.46
50	TC	22.96	24.05	25.00	23.15	24.26	25.23	23.31	24.43	25.42
	SHC	3.64	3.94	4.20	2.97	3.27	3.53	2.39	2.69	2.96
	kW	3.35	3.35	3.35	3.40	3.40	3.40	3.43	3.43	3.43
40	TC	24.73	25.66	26.48	25.03	25.98	26.81	25.28	26.25	27.10
	SHC	4.99	5.23	5.45	4.50	4.75	4.96	4.07	4.32	4.54
	kW	3.32	3.32	3.32	3.37	3.37	3.37	3.41	3.41	3.41

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

*Negative SHC value indicates that the air entering the coil is being heated.

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

48HJ007 (6 TONS) — SUBCOOLING MODE

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF											
		1800/0.05			2100/0.06			2400/0.06			3000/0.08		
		Air Entering Evaporator — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	82.6	75.6	68.5	84.9	78.0	70.9	85.9	79.5	73.5	89.1	82.7	77.0
	SHC	36.0	44.8	55.4	37.5	49.1	59.7	38.8	51.1	64.0	41.8	58.1	70.2
	kW	4.60	4.52	4.36	4.67	4.57	4.46	4.70	4.57	4.45	4.77	4.61	4.51
85	TC	78.2	71.6	64.5	80.9	73.4	65.8	82.0	74.4	67.9	85.8	78.2	72.3
	SHC	31.4	41.2	51.7	33.0	44.7	55.8	34.7	47.4	60.1	37.6	54.3	66.7
	kW	5.16	5.03	4.89	5.22	5.11	4.96	5.26	5.09	4.97	5.32	5.17	5.04
95	TC	73.8	67.4	60.2	76.3	68.3	60.5	77.5	69.3	62.3	82.0	72.8	67.5
	SHC	27.0	37.6	47.9	28.2	40.0	51.6	30.2	43.7	56.2	33.6	49.2	62.9
	kW	5.75	5.60	5.44	5.80	5.66	5.48	5.84	5.68	5.53	5.90	5.73	5.60
105	TC	68.4	62.6	55.9	71.4	64.3	56.2	72.1	64.6	58.3	75.7	67.0	62.4
	SHC	22.3	33.5	43.5	23.4	36.5	48.0	25.4	38.4	50.2	29.1	45.2	56.2
	kW	6.37	6.22	6.06	6.45	6.27	6.10	6.46	6.29	6.16	6.53	6.36	6.24
115	TC	63.4	57.8	50.7	66.0	60.1	51.5	66.4	59.6	54.5	68.8	60.8	57.5
	SHC	18.1	29.5	38.9	18.8	32.9	44.1	20.7	33.3	43.8	24.3	41.4	49.7
	kW	7.04	6.89	6.68	7.10	6.91	6.74	7.12	6.95	6.83	7.16	7.01	6.92
125	TC	55.5	49.6	45.8	58.4	52.4	46.1	57.6	52.1	49.5	59.2	52.8	53.1
	SHC	15.3	24.0	35.2	15.7	27.5	39.0	17.5	27.5	38.4	20.9	34.6	44.4
	kW	7.80	7.61	7.38	7.83	7.67	7.49	7.89	7.72	7.58	7.92	7.78	7.70

48HJ007 (6 TONS) — HOT GAS REHEAT MODE*

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (55% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator — Cfm								
		1800	2100	2400	1800	2100	2400	1800	2100	2400
80	TC	27.41	28.12	28.75	27.25	27.98	28.62	27.12	27.86	28.51
	SHC	5.74	7.61	9.25	1.68	3.52	5.14	-1.85	-0.03	1.58
	kW	4.40	4.39	4.39	4.44	4.44	4.44	4.49	4.49	4.49
75	**TC**	**27.98**	**28.66**	**29.24**	**27.89**	**28.58**	**29.18**	**27.81**	**28.52**	**29.13**
	SHC	**5.73**	**7.48**	**9.02**	**1.92**	**3.65**	**5.18**	**-1.38**	**0.34**	**1.85**
	kW	**4.45**	**4.45**	**4.45**	**4.50**	**4.50**	**4.50**	**4.55**	**4.55**	**4.55**
70	TC	28.55	29.19	29.74	28.53	29.18	29.74	28.51	29.17	29.74
	SHC	5.71	7.35	8.79	2.17	3.79	5.22	-0.91	0.70	2.12
	kW	4.51	4.51	4.51	4.57	4.57	4.57	4.62	4.62	4.62
60	TC	29.70	30.25	30.74	29.80	30.37	30.86	29.89	30.47	30.97
	SHC	5.67	7.09	8.34	2.65	4.06	5.29	0.04	1.43	2.65
	kW	4.62	4.62	4.62	4.69	4.69	4.69	4.75	4.75	4.75
50	TC	30.84	31.32	31.73	31.07	31.56	31.98	31.27	31.77	32.20
	SHC	5.63	6.83	7.89	3.14	4.33	5.37	0.98	2.15	3.19
	kW	4.74	4.74	4.74	4.82	4.82	4.82	4.89	4.89	4.89
40	TC	31.99	32.38	32.73	32.35	32.75	33.12	32.66	33.07	33.43
	SHC	5.60	6.57	7.43	3.63	4.59	5.44	1.92	2.88	3.72
	kW	4.86	4.86	4.86	4.95	4.95	4.95	5.02	5.02	5.02

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

*Negative SHC value indicates that the air entering the coil is being heated.

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

Performance data — 48HJ (cont)

COOLING CAPACITIES — UNITS WITH HUMIDI-MIZER™ ADAPTIVE DEHUMIDIFICATION SYSTEM OPTION (cont)

48/50HJ008 (7 1/2 TONS) — SUBCOOLING MODE

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF								
		2250/0.10			3000/0.11			3750/0.14		
		Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	98.4	99.1	81.1	103.7	97.8	91.8	105.8	101.3	94.1
	SHC	44.5	55.4	67.0	50.4	65.4	80.5	54.5	72.4	89.5
	kW	5.05	4.96	4.87	5.09	5.04	4.97	5.16	5.04	4.99
85	TC	94.2	85.8	76.9	100.3	92.4	85.2	103.5	96.8	89.0
	SHC	39.7	51.3	62.7	46.2	58.3	75.7	50.6	68.2	84.3
	kW	5.74	5.65	5.55‘	5.81	5.75	5.64	5.89	5.74	5.70
95	TC	89.9	80.5	72.6	96.9	86.8	78.6‘	101.1	92.2	83.8
	SHC	34.8	47.2	58.3	41.9	51.2	71.0	46.6	63.9	79.1
	kW	6.42	6.33	6.22	6.52	6.45	6.31	6.62	6.43	6.40
105	TC	84.6	75.3	68.0	91.6	81.3	73.4	94.5	86.3	78.4
	SHC	30.0	42.5	53.9	36.9	49.3	66.4	41.4	59.2	73.8
	kW	7.26	7.16	7.05	7.36	7.25	7.15	7.46	7.29	7.23
115	TC	79.2	70.1	63.3	86.2	75.8	68.1	87.9	80.3	72.9
	SHC	25.2	37.8	49.4	31.9	47.4	61.9	36.1	54.4	68.5
	kW	8.10	7.99	7.87	8.20	8.05	7.98	8.30	8.14	8.05
125	TC	7.28	64.5	57.2	78.0	69.8	62.3	81.6	73.2	69.2
	SHC	20.1	33.4	44.1	25.4	42.5	56.5	31.1	48.9	64.7
	kW	9.10	8.94	8.83	9.23	9.05	8.95	9.26	9.10	8.99

48HJ008 (7 1/2 TONS) — HOT GAS REHEAT MODE*

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (55% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator — Cfm								
		2250	3000	3750	2250	3000	3750	2250	3000	3750
80	TC	37.74	40.54	42.68	38.48	41.35	43.55	39.12	42.05	44.29
	SHC	10.67	15.63	19.63	5.01	9.84	13.74	0.10	4.82	8.63
	kW	4.92	4.92	4.92	4.97	4.97	4.97	5.01	5.01	5.01
75	**TC**	**37.34**	**39.95**	**41.95**	**38.08**	**40.75**	**42.81**	**38.72**	**41.45**	**43.55**
	SHC	**9.83**	**14.48**	**18.24**	**4.52**	**9.05**	**12.70**	**-0.09**	**4.34**	**7.91**
	kW	**5.19**	**5.19**	**5.19**	**5.25**	**5.25**	**5.25**	**5.30**	**5.30**	**5.30**
70	TC	36.93	39.36	41.22	37.67	40.16	42.07	38.31	40.85	42.80
	SHC	8.99	13.33	16.84	4.02	8.26	11.67	-0.28	3.86	7.19
	kW	5.46	5.46	5.46	5.52	5.52	5.52	5.58	5.58	5.58
60	TC	36.13	38.18	39.75	36.87	38.97	40.58	37.51	39.66	41.31
	SHC	7.31	11.04	14.04	3.04	6.67	9.60	-0.66	2.89	5.75
	kW	5.99	5.99	5.99	6.08	6.08	6.08	6.15	6.15	6.15
50	TC	35.32	37.00	38.29	36.06	37.78	39.10	36.75	38.46	39.81
	SHC	5.63	8.74	11.25	2.06	5.09	7.53	-1.03	1.93	4.32
	kW	6.52	6.52	6.52	6.63	6.63	6.63	6.73	6.73	6.73
40	TC	34.52	35.82	36.82	35.26	36.60	37.62	35.90	37.27	38.32
	SHC	3.94	6.44	8.45	1.08	3.51	5.47	-1.41	0.97	2.88
	kW	7.05	7.05	7.05	7.18	7.18	7.18	7.30	7.30	7.30

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

*Negative SHC value indicates that the air entering the coil is being heated.

Standard Ratings

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

COOLING CAPACITIES — UNITS WITH HUMIDI-MIZER™ ADAPTIVE DEHUMIDIFICATION SYSTEM OPTION (cont)

48HJ009 (8 1/2 TONS) — SUBCOOLING MODE

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF											
		2550/0.08			3000/0.09			3400/0.11			4250/0.13		
		Air Entering Evaporator — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	114.1	104.1	97.8	116.3	108.5	103.4	117.6	111.9	108.0	122.2	118.9	111.4
	SHC	49.8	64.2	81.2	52.6	70.8	89.0	55.4	76.9	95.4	62.0	87.0	107.2
	kW	5.57	5.46	5.44	5.59	5.50	5.44	5.60	5.51	5.44	5.62	5.62	5.69
85	TC	107.3	98.4	92.6	111.0	101.8	98.0	113.0	104.2	102.0	117.1	111.4	106.1
	SHC	42.2	58.3	76.0	47.1	64.5	83.5	51.2	70.2	89.2	57.3	81.2	101.2
	kW	6.32	6.30	6.15	6.32	6.27	6.18	6.34	6.22	6.20	6.30	6.31	6.45
95	TC	101.9	92.4	86.8	105.3	95.5	92.8	107.4	97.7	96.5	112.1	103.7	100.3
	SHC	35.4	51.9	70.3	40.1	58.5	77.9	44.9	64.9	83.7	52.1	74.0	94.8
	kW	7.06	7.13	6.93	7.06	7.06	6.95	7.06	6.99	6.98	7.01	7.04	7.17
105	TC	94.5	85.4	77.0	97.6	88.3	82.4	99.9	90.6	88.0	104.1	96.1	94.0
	SHC	29.7	45.7	63.2	33.9	52.2	70.1	38.0	58.3	75.7	44.4	67.6	88.5
	kW	7.99	8.00	7.81	8.01	7.97	7.85	8.02	7.94	7.89	7.96	7.96	8.08
115	TC	86.4	75.0	68.3	89.3	80.2	74.1	91.4	83.2	78.4	96.5	88.4	87.1
	SHC	24.0	38.7	56.4	27.4	45.6	62.9	31.1	51.9	67.0	37.0	60.8	81.8
	kW	8.91	8.83	8.66	8.93	8.86	8.76	8.97	8.86	8.84	8.91	8.93	8.90
125	TC	78.6	65.5	60.2	81.3	68.9	64.7	83.3	71.6	68.2	88.5	78.8	78.9
	SHC	18.3	32.0	48.8	21.2	38.0	53.5	24.1	44.1	57.5	29.4	53.3	73.8
	kW	9.81	9.65	9.53	9.86	9.68	9.64	9.89	9.71	9.75	9.90	9.72	9.88

48HJ009 (8 1/2 TONS) — HOT GAS REHEAT MODE

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Ewb (F)											
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)				75 Dry Bulb 64 Wet Bulb (55% Relative)				75 Dry Bulb 65.3 Wet Bulb (60% Relative)			
		Air Entering Evaporator — Cfm											
		2550	3000	3400	4250	2550	3000	3400	4250	2550	3000	3400	4250
80	TC	43.44	46.26	48.45	52.38	45.26	48.15	50.39	54.43	46.84	49.79	52.08	56.20
	SHC	12.34	16.78	20.29	26.74	5.79	10.15	13.60	19.93	0.11	4.40	7.80	14.03
	kW	6.31	6.31	6.31	6.31	6.05	6.05	6.05	6.05	5.83	5.83	5.83	5.83
75	**TC**	**44.33**	**47.00**	**49.06**	**52.78**	**46.12**	**48.85**	**50.97**	**54.78**	**47.67**	**50.46**	**52.63**	**56.52**
	SHC	**12.92**	**17.12**	**20.44**	**26.54**	**6.81**	**10.94**	**14.20**	**20.20**	**1.51**	**5.58**	**8.79**	**14.70**
	kW	**6.38**	**6.38**	**6.8**	**6.38**	**6.15**	**6.15**	**6.15**	**6.15**	**5.95**	**5.95**	**5.95**	**5.95**
70	TC	45.22	47.73	49.68	53.18	46.98	49.55	51.55	55.14	48.51	51.14	53.18	56.84
	SHC	13.50	17.47	20.59	26.34	7.83	11.73	14.81	20.46	2.92	6.76	9.79	15.36
	kW	6.46	6.46	6.46	6.46	6.25	6.25	6.25	6.25	6.07	6.07	6.07	6.07
60	TC	46.99	49.19	50.90	53.97	48.70	50.96	52.71	55.86	50.18	52.49	54.27	57.49
	SHC	14.67	18.15	20.90	25.95	9.88	13.31	16.01	20.99	5.73	9.11	11.78	16.68
	kW	6.60	6.60	6.60	6.60	6.45	6.45	6.45	6.45	6.32	6.32	6.32	6.32
50	TC	48.77	50.66	52.13	54.77	50.42	52.36	53.87	56.57	51.85	53.83	55.37	58.14
	SHC	15.83	18.83	21.20	25.56	11.93	14.89	17.22	21.51	8.55	11.47	13.77	18.01
	kW	6.74	6.74	6.74	6.74	6.64	6.64	6.64	6.64	6.56	6.56	6.56	6.56
40	TC	50.54	52.13	53.35	55.56	52.14	53.76	55.02	57.29	53.53	55.18	56.47	58.78
	SHC	17.00	19.52	21.51	25.16	13.98	16.47	18.43	22.04	11.36	13.82	15.76	19.33
	kW	6.88	6.88	6.88	6.88	6.84	6.84	6.84	6.84	6.81	6.81	6.81	6.81

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

Performance data — 48HJ (cont)

COOLING CAPACITIES — UNITS WITH HUMIDI-MIZER™ ADAPTIVE DEHUMIDIFICATION SYSTEM OPTION (cont)

48HJ012 (10 TONS) — SUBCOOLING MODE

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF											
		3000/0.03			3200/0.03			4000/0.04			5000/0.04		
		Air Entering Evaporator — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	134.3	122.5	111.4	135.8	124.3	113.0	138.4	129.5	123.5	143.3	136.5	130.2
	SHC	60.0	76.1	93.7	61.3	79.1	97.4	68.0	89.5	109.4	75.2	100.9	123.3
	kW	7.03	6.84	6.72	7.01	6.89	6.77	7.10	6.92	6.77	7.15	7.03	6.88
85	TC	127.6	115.4	104.6	128.9	118.1	107.0	132.5	121.5	116.6	137.2	128.0	122.9
	SHC	51.5	68.8	87.2	53.9	72.0	91.2	61.0	82.7	102.4	68.6	93.6	115.9
	kW	7.96	7.86	7.59	7.94	7.78	7.51	8.02	7.84	7.69	8.02	7.94	7.79
95	TC	120.9	108.3	97.8	121.9	111.8	101.0	126.5	113.4	109.7	131.1	119.4	115.5
	SHC	43.0	61.5	80.6	46.5	64.8	84.9	53.9	75.9	95.4	62.0	86.2	108.4
	kW	8.88	8.87	8.46	8.86	8.66	8.26	8.94	8.76	8.60	8.89	8.85	8.69
105	TC	112.0	99.9	90.4	113.1	103.2	93.4	117.2	105.0	100.7	122.1	110.5	105.9
	SHC	36.1	54.1	73.8	38.8	57.8	78.9	45.6	68.2	86.8	53.0	78.3	99.7
	kW	10.0	10.0	9.6	10.0	9.8	9.5	10.1	9.9	9.8	10.1	10.0	9.9
115	TC	103.0	91.5	83.1	104.3	94.6	85.9	107.8	96.7	91.7	113.0	101.6	96.4
	SHC	29.2	46.7	66.9	31.2	50.7	72.9	37.3	60.6	78.3	44.0	70.3	90.9
	kW	11.2	11.1	10.8	11.2	11.0	10.7	11.3	11.1	11.0	11.3	11.2	11.1
125	TC	94.1	83.1	75.7	95.5	86.0	78.3	98.5	88.3	82.7	104.0	92.7	86.8
	SHC	22.3	39.3	60.1	23.5	43.7	66.8	29.0	52.9	69.7	35.0	62.4	82.2
	kW	12.35	12.15	11.94	12.38	12.13	11.92	12.48	12.27	12.25	12.53	12.30	12.28

48HJ012 (10 TONS) — HOT GAS REHEAT MODE*

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Ewb (F)											
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)				75 Dry Bulb 64 Wet Bulb (55% Relative)				75 Dry Bulb 65.3 Wet Bulb (60% Relative)			
		Air Entering Evaporator — Cfm											
		3000	3200	4000	5000	3000	3200	4000	5000	3000	3200	4000	5000
80	TC	49.15	50.16	53.80	57.72	51.04	52.08	55.86	59.94	52.67	53.74	57.65	61.86
	SHC	9.58	12.02	20.74	29.89	2.88	5.29	13.88	22.89	-2.92	-0.55	7.93	16.83
	kW	7.39	7.38	7.38	7.37	7.45	7.45	7.44	7.43	7.50	7.50	7.49	7.49
75	**TC**	**49.60**	**50.61**	**54.30**	**58.28**	**51.45**	**52.50**	**56.33**	**60.45**	**53.05**	**54.14**	**58.09**	**62.34**
	SHC	**10.07**	**12.38**	**20.60**	**29.23**	**3.82**	**6.09**	**14.20**	**22.70**	**-1.60**	**0.64**	**8.65**	**17.05**
	kW	**7.56**	**7.56**	**7.55**	**7.55**	**7.63**	**7.63**	**7.62**	**7.62**	**7.69**	**7.69**	**7.69**	**7.68**
70	TC	50.04	51.07	54.81	58.83	51.86	52.92	56.80	60.96	53.43	54.53	58.52	62.82
	SHC	10.56	12.73	20.47	28.58	4.75	6.89	14.52	22.52	-0.28	1.83	9.36	17.26
	kW	7.73	7.73	7.72	7.72	7.81	7.81	7.81	7.80	7.89	7.88	7.88	7.87
60	TC	50.93	51.98	55.81	59.93	52.68	53.77	57.73	61.99	54.20	55.32	59.39	63.77
	SHC	11.54	13.44	20.19	27.28	6.62	8.49	15.16	22.15	2.36	4.21	10.79	17.70
	kW	8.07	8.07	8.07	8.06	8.18	8.18	8.17	8.17	8.27	8.27	8.26	8.26
50	TC	51.82	52.90	56.81	61.03	53.50	54.62	58.66	63.01	54.96	56.10	60.26	64.73
	SHC	12.53	14.14	19.92	25.98	8.50	10.09	15.80	21.78	5.00	6.58	12.22	18.14
	kW	8.42	8.42	8.41	8.41	8.54	8.54	8.54	8.54	8.66	8.65	8.65	8.65
40	TC	52.71	53.81	57.82	62.13	54.32	55.46	59.59	64.04	55.72	56.89	61.13	65.69
	SHC	13.51	14.85	19.64	24.67	10.37	11.70	16.43	21.41	7.64	8.96	13.65	18.58
	kW	8.76	8.76	8.76	8.75	8.91	8.91	8.91	8.90	9.04	9.04	9.04	9.03

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

*Negative SHC value indicates that the air entering the coil is being heated.

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

COOLING CAPACITIES — UNITS WITH HUMIDI-MIZER™ ADAPTIVE DEHUMIDIFICATION SYSTEM OPTION (cont)

48HJ014 (12½ TONS) — SUBCOOLING MODE

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Cfm/BF											
		3750/0.08			4300/0.09			5000/0.11			6250/0.13		
		Air Entering Evaporator — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	156.3	144.2	132.3	160.0	148.4	136.2	162.8	150.6	138.2	169.0	157.5	145.6
	SHC	66.6	87.6	112.1	72.5	94.8	121.3	76.9	99.6	127.5	87.0	115.5	142.7
	kW	9.28	8.98	8.59	9.35	9.08	8.80	9.40	9.18	8.9	9.43	9.18	8.93
85	TC	147.6	136.2	123.7	150.7	140.1	127.2	154.1	140.8	127.9	161.1	148.0	135.4
	SHC	58.7	80.0	103.8	63.5	86.5	112.2	68.7	91.0	118.1	77.7	107.8	133.2
	kW	10.29	9.93	9.58	10.36	10.08	9.77	10.40	10.34	10.03	10.45	10.18	9.88
95	TC	138.9	128.2	115.1	141.4	131.8	118.3	145.3	131.0	117.6	153.1	138.4	125.1
	SHC	50.8	72.3	95.5	54.4	78.1	103.2	60.5	82.3	108.7	68.5	100.0	123.7
	kW	11.29	10.87	10.57	11.37	11.08	10.74	11.40	11.50	11.1	11.46	11.17	10.83
105	TC	129.1	117.8	105.8	131.7	121.0	108.7	134.8	119.9	107.7	140.9	126.9	115.9
	SHC	42.1	63.5	86.5	45.4	69.0	93.9	51.2	74.2	101.3	57.7	90.2	113.6
	kW	12.59	12.14	11.82	12.67	12.34	11.96	12.70	12.67	12.28	12.79	12.46	12.08
115	TC	119.2	107.3	96.4	122.1	110.2	99.0	124.2	108.8	97.8	128.7	115.3	106.7
	SHC	33.5	54.8	77.5	36.4	59.8	84.7	41.9	66.1	93.8	46.8	80.5	103.5
	kW	13.90	13.40	13.08	13.98	13.59	13.18	14.00	13.83	13.41	14.11	13.75	13.33
125	TC	109.4	96.9	87.1	112.4	99.4	89.3	113.7	97.7	87.8	116.5	103.8	97.5
	SHC	24.8	46.0	68.5	27.4	50.7	75.5	32.6	58.0	86.4	36.0	70.7	93.5
	kW	15.20	14.67	14.33	15.28	14.85	14.40	15.30	15.00	14.54	15.44	15.04	14.58

48HJ014 (12½ TONS) — HOT GAS REHEAT MODE*

Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator — Ewb (F)											
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)				75 Dry Bulb 64 Wet Bulb (55% Relative)				75 Dry Bulb 65.3 Wet Bulb (60% Relative)			
		Air Entering Evaporator — Cfm											
		3750	4300	5000	6250	3750	4300	5000	6250	3750	4300	5000	6250
80	TC	43.54	45.21	47.05	49.78	45.46	47.16	49.05	51.85	47.11	48.86	50.78	53.64
	SHC	-4.36	0.76	6.50	15.20	-9.51	-4.35	1.45	10.22	-13.97	-8.77	-2.93	5.90
	kW	8.70	8.70	8.70	8.70	8.82	8.82	8.82	8.82	8.92	8.92	8.92	8.92
75	**TC**	**44.45**	**46.02**	**47.75**	**50.32**	**46.33**	**47.94**	**49.71**	**52.34**	**47.96**	**49.60**	**51.41**	**54.10**
	SHC	**-3.84**	**0.96**	**6.36**	**14.53**	**-8.66**	**-3.81**	**1.63**	**9.86**	**-12.84**	**-7.96**	**-2.48**	**5.82**
	kW	**8.90**	**8.90**	**8.90**	**8.90**	**9.03**	**9.03**	**9.03**	**9.03**	**9.14**	**9.14**	**9.14**	**9.14**
70	TC	45.36	46.82	48.45	50.86	47.20	48.71	50.37	52.84	48.80	50.34	52.04	54.55
	SHC	-3.32	1.17	6.21	13.85	-7.81	-3.28	1.80	9.50	-11.71	-7.14	-2.02	5.74
	kW	9.10	9.10	9.10	9.10	9.24	9.24	9.24	9.24	9.36	9.36	9.36	9.36
60	TC	47.17	48.44	49.84	51.93	48.95	50.25	51.69	53.83	50.49	51.82	53.29	55.47
	SHC	-2.28	1.59	5.93	12.50	-6.12	-2.22	2.16	8.79	-9.45	-5.52	-1.11	5.57
	kW	9.51	9.51	9.51	9.51	9.66	9.66	9.66	9.66	9.80	9.80	9.80	9.80
50	TC	48.98	50.05	51.24	53.00	50.70	51.80	53.01	54.82	52.18	53.31	54.55	56.39
	SHC	-1.24	2.00	5.64	11.15	-4.43	-1.15	2.52	8.07	-7.18	-3.89	-0.19	5.41
	kW	9.91	9.91	9.91	9.91	10.09	10.09	10.09	10.09	10.24	10.24	10.24	10.24
40	TC	50.79	51.67	52.64	54.07	52.44	53.34	54.33	55.80	53.87	54.79	55.80	57.30
	SHC	-0.20	2.41	5.35	9.80	-2.73	-.019	2.87	7.36	-4.92	-2.26	0.72	5.24
	kW	10.31	10.31	10.31	10.31	10.51	10.51	10.51	10.51	10.68	10.68	10.68	10.68

LEGEND

BF — Bypass Factor
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

*Negative SHC value indicates that the air entering the coil is being heated.

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 – BF) x (edb – 80).

Performance data — 48HE/HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS

48HE003 (2 Tons) - STANDARD MOTOR (BELT DRIVE)

AIRFLOW (Cfm)	EXTERNALSTATIC PRESSURE (in. wg)											
	0.1		0.2		0.4		0.6		0.8		1.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
600	**500**	**0.08**	**531**	**0.08**	**607**	0.14	713	0.21	788	0.29	878	0.37
700	**529**	**0.09**	**567**	0.09	633	0.16	739	0.24	816	0.32	**902**	0.41
800	**547**	**0.1**	**592**	0.12	660	0.19	761	0.27	845	0.37	**937**	0.47
900	**570**	**0.13**	**620**	0.14	691	0.22	793	0.32	**870**	**0.42**	**957**	0.53
1000	**599**	**0.15**	650	0.16	717	0.26	818	0.36	894	0.47	981	0.58

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 680 to 1044 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS

48HE/HJ004 (3 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**567**	**0.15**	**145**	688	0.22	222	786	0.30	296	871	0.37	368	947	0.44	437
1000	**599**	**0.18**	**177**	717	0.27	265	814	0.35	349	897	0.43	430	972	0.51	509
1100	**632**	**0.22**	**215**	747	0.31	313	842	0.41	407	925	0.50	498	999	0.59	587
1200	**666**	**0.26**	**257**	778	0.37	367	871	0.47	471	952	0.57	572	1025	0.67	670
1300	701	0.31	306	810	0.43	426	901	0.54	540	981	0.65	651	**1053**	**0.76**	**760**
1400	737	0.36	361	842	0.49	491	931	0.62	616	1010	0.74	738	**1081**	**0.86**	**856**
1500	773	0.42	422	875	0.57	564	963	0.70	699	1040	0.84	831	**1110**	**0.96**	**960**

48HE/HJ004 (3 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	1016	0.51	505	**1080**	**0.57**	**572**	**1139**	**0.64**	**637**	**1195**	**0.71**	**702**	**1249**	**0.77**	**765**
1000	1041	0.59	587	**1104**	**0.67**	**662**	**1163**	**0.74**	**737**	**1219**	**0.81**	**811**	**1272**	**0.89**	**883**
1100	**1066**	**0.68**	**674**	**1129**	**0.76**	**759**	**1188**	**0.85**	**843**	**1243**	**0.93**	**925**	**1296**	**1.01**	**1007**
1200	**1093**	**0.77**	**767**	**1155**	**0.87**	**861**	**1213**	**0.96**	**955**	**1268**	**1.05**	**1047**	**1321**	**1.14**	**1137**
1300	**1119**	**0.87**	**866**	**1181**	**0.98**	**970**	**1239**	**1.08**	**1073**	**1294**	**1.18**	**1175**	—	—	—
1400	**1147**	**0.98**	**972**	**1208**	**1.09**	**1086**	—	—	—	—	—	—	—	—	—
1500	**1175**	**1.09**	**1086**	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 680 to 1044 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.

48HE/HJ004 (3 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**567**	**0.15**	**145**	**688**	**0.22**	**222**	**786**	**0.30**	**296**	**871**	**0.37**	**368**	**947**	**0.44**	**437**
1000	**599**	**0.18**	**177**	**717**	**0.27**	**265**	**814**	**0.35**	**349**	**897**	**0.43**	**430**	**972**	**0.51**	**509**
1100	**632**	**0.22**	**215**	**747**	**0.31**	**313**	**842**	**0.41**	**407**	**925**	**0.50**	**498**	**999**	**0.59**	**587**
1200	**666**	**0.26**	**257**	**778**	**0.37**	**367**	**871**	**0.47**	**471**	**952**	**0.57**	**572**	**1025**	**0.67**	**670**
1300	**701**	**0.31**	**306**	**810**	**0.43**	**426**	**901**	**0.54**	**540**	**981**	**0.65**	**651**	**1053**	**0.76**	**760**
1400	**737**	**0.36**	**361**	**842**	**0.49**	**491**	**931**	**0.62**	**616**	**1010**	**0.74**	**738**	1081	0.86	856
1500	**773**	**0.42**	**422**	**875**	**0.57**	**564**	**963**	**0.70**	**699**	**1040**	**0.84**	**831**	1110	0.96	960

48HE/HJ004 (3 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**1016**	**0.51**	**505**	1080	0.57	572	1139	0.64	637	1195	0.71	702	1249	0.77	765
1000	**1041**	**0.59**	**587**	1104	0.67	662	1163	0.74	737	1219	0.81	811	1272	0.89	883
1100	**1066**	**0.68**	**674**	1129	0.76	759	1188	0.85	843	1243	0.93	925	1296	1.01	1007
1200	1093	0.77	767	1155	0.87	861	1213	0.96	955	1268	1.05	1047	1321	1.14	1137
1300	1119	0.87	866	1181	0.98	970	1239	1.08	1073	1294	1.18	1175	1346	1.28	1275
1400	1147	0.98	972	1208	1.09	1086	1265	1.21	1199	1320	1.32	1310	1371	1.43	1419
1500	1175	1.09	1086	1235	1.22	1209	1292	1.34	1332	1346	1.46	1452	1397	1.58	1572

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1075 to 1455 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 163 for general fan performance notes.

Performance data — 48HE/HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HE/HJ005 (4 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	**666**	**0.26**	**257**	778	0.37	367	871	0.47	471	952	0.57	572	1025	0.67	670
1300	**701**	**0.31**	**306**	810	0.43	426	901	0.54	540	981	0.65	651	1053	0.76	760
1400	**737**	**0.36**	**361**	842	0.49	491	931	0.62	616	1010	0.74	738	1081	0.86	856
1500	773	0.42	422	875	0.57	564	963	0.70	699	1040	0.84	831	1110	0.96	960
1600	810	0.49	491	909	0.65	643	994	0.79	790	1070	0.94	932	1140	1.08	1070
1700	847	0.57	567	943	0.73	730	1027	0.89	888	1101	1.05	1040	1170	1.20	1189
1800	885	0.66	652	978	0.83	826	1060	1.00	994	1133	1.16	1157	—	—	—
1900	923	0.75	745	1014	0.94	930	1093	1.11	1109	—	—	—	—	—	—
2000	962	0.85	847	1049	1.05	1043	—	—	—	—	—	—	—	—	—

48HE/HJ005 (4 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1093	0.77	767	1155	0.87	861	**1213**	**0.96**	**955**	**1268**	**1.05**	**1047**	**1321**	**1.14**	**1137**
1300	1119	0.87	866	1181	0.98	970	**1239**	**1.08**	**1073**	**1294**	**1.18**	**1175**	—	—	—
1400	1147	0.98	972	**1208**	**1.09**	**1086**	—	—	—	—	—	—	—	—	—
1500	1175	1.09	1086	—	—	—	—	—	—	—	—	—	—	—	—
1600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 770 to 1185 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.

48HE/HJ005 (4 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	**666**	**0.26**	**257**	**778**	**0.37**	**367**	**871**	**0.47**	**471**	**952**	**0.57**	**572**	**1025**	**0.67**	**670**
1300	**701**	**0.31**	**306**	**810**	**0.43**	**426**	**901**	**0.54**	**540**	**981**	**0.65**	**651**	**1053**	**0.76**	**760**
1400	**737**	**0.36**	**361**	**842**	**0.49**	**491**	**931**	**0.62**	**616**	**1010**	**0.74**	**738**	1081	0.86	856
1500	**773**	**0.42**	**422**	**875**	**0.57**	**564**	**963**	**0.70**	**699**	**1040**	**0.84**	**831**	1110	0.96	960
1600	**810**	**0.49**	**491**	**909**	**0.65**	**643**	**994**	**0.79**	**790**	**1070**	**0.94**	**932**	1140	1.08	1070
1700	**847**	**0.57**	**567**	**943**	**0.73**	**730**	**1027**	**0.89**	**888**	1101	1.05	1040	1170	1.20	1189
1800	**885**	**0.66**	**652**	**978**	**0.83**	**826**	**1060**	**1.00**	**994**	1133	1.16	1157	1200	1.32	1316
1900	**923**	**0.75**	**745**	**1014**	**0.94**	**930**	1093	1.11	1109	1165	1.29	1283	1231	1.46	1453
2000	**962**	**0.85**	**847**	**1049**	**1.05**	**1043**	1127	1.24	1233	1198	1.42	1417	1263	1.61	1598

48HE/HJ005 (4 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1093	0.77	767	1155	0.87	861	1213	0.96	955	1268	1.05	1047	1321	1.14	1137
1300	1119	0.87	866	1181	0.98	970	1239	1.08	1073	1294	1.18	1175	1346	1.28	1275
1400	1147	0.98	972	1208	1.09	1086	1265	1.21	1199	1320	1.32	1310	1371	1.43	1419
1500	1175	1.09	1086	1235	1.22	1209	1292	1.34	1332	1346	1.46	1452	1397	1.58	1572
1600	1204	1.21	1207	1263	1.35	1340	1320	1.48	1472	1373	1.61	1603	1424	1.74	1732
1700	1233	1.34	1336	1292	1.49	1480	1348	1.63	1622	1401	1.77	1762	1451	1.91	1901
1800	1262	1.48	1473	1321	1.64	1627	1376	1.79	1779	1428	1.94	1930	**1479**	**2.09**	**2078**
1900	1293	1.63	1620	1350	1.79	1784	1405	1.96	1946	**1457**	**2.12**	**2106**	**1506**	**2.28**	**2265**
2000	1323	1.79	1776	1380	1.96	1950	1434	2.13	2123	**1486**	**2.31**	**2293**	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1075 to 1455 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HE/HJ006 (5 TONS) — STANDARD MOTOR (BELT DRIVE)* — SINGLE-PHASE UNITS

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**848**	**0.42**	**371**	**968**	**0.55**	**486**	1069	0.68	600	1158	0.80	715	1238	0.94	831
1600	**887**	**0.49**	**433**	**1004**	**0.63**	**556**	1103	0.76	678	1190	0.90	800	1269	1.04	922
1700	**927**	**0.57**	**502**	1040	0.71	633	1137	0.86	763	1223	1.00	892	1302	1.15	1022
1800	**967**	**0.65**	**579**	1077	0.81	718	1172	0.96	856	1257	1.12	993	1334	1.27	1130
1900	**1007**	**0.75**	**663**	1115	0.91	811	1208	1.08	957	1291	1.24	1101	—	—	—
2000	1048	0.85	757	1153	1.03	913	1244	1.20	1066	—	—	—	—	—	—
2100	1090	0.97	859	1191	1.15	1023	—	—	—	—	—	—	—	—	—
2200	1131	1.09	970	1230	1.29	1143	—	—	—	—	—	—	—	—	—
2300	1173	1.23	1091	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HE/HJ006 (5 TONS) — STANDARD MOTOR (BELT DRIVE)* — SINGLE-PHASE UNITS (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1312	1.07	948	1380	1.20	1067	—	—	—	—	—	—	—	—	—
1600	1342	1.18	1047	—	—	—	—	—	—	—	—	—	—	—	—
1700	1374	1.30	1153	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1035 to 1460 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.30.

48HE/HJ006 (5 TONS) — STANDARD MOTOR (BELT DRIVE)* — THREE-PHASE UNITS

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**848**	**0.42**	**371**	**968**	**0.55**	**486**	1069	0.68	600	1158	0.80	715	1238	0.94	831
1600	**887**	**0.49**	**433**	**1004**	**0.63**	**556**	1103	0.76	678	1190	0.90	800	1269	1.04	922
1700	**927**	**0.57**	**502**	1040	0.71	633	1137	0.86	763	1223	1.00	892	1302	1.15	1022
1800	**967**	**0.65**	**579**	1077	0.81	718	1172	0.96	856	1257	1.12	993	1334	1.27	1130
1900	**1007**	**0.75**	**663**	1115	0.91	811	1208	1.08	957	1291	1.24	1101	1368	1.40	1246
2000	1048	0.85	757	1153	1.03	913	1244	1.20	1066	1326	1.37	1219	1401	1.54	1371
2100	1090	0.97	859	1191	1.15	1023	1281	1.33	1185	1361	1.51	1345	1435	1.69	1505
2200	1131	1.09	970	1230	1.29	1143	1318	1.48	1313	1397	1.67	1481	**1470**	**1.86**	**1649**
2300	1173	1.23	1091	1269	1.43	1273	1355	1.63	1451	1433	1.83	1627	**1505**	**2.03**	**1803**
2400	1215	1.38	1223	1309	1.59	1413	1393	1.80	1600	**1470**	**2.01**	**1784**	**1540**	**2.21**	**1967**
2500	1258	1.54	1365	1349	1.76	1564	1431	1.98	1759	**1506**	**2.20**	**1951**	—	—	—

48HE/HJ006 (5 TONS) — STANDARD MOTOR (BELT DRIVE)* — THREE-PHASE UNITS (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1312	1.07	948	1380	1.20	1067	1445	1.34	1189	**1506**	**1.48**	**1312**	**1564**	**1.62**	**1437**
1600	1342	1.18	1047	1411	1.32	1173	**1474**	**1.46**	**1300**	**1535**	**1.61**	**1429**	**1593**	**1.76**	**1560**
1700	1374	1.30	1153	1441	1.45	1286	**1505**	**1.60**	**1420**	**1565**	**1.75**	**1555**	**1622**	**1.91**	**1692**
1800	1406	1.43	1268	**1473**	**1.58**	**1407**	**1535**	**1.74**	**1548**	**1595**	**1.90**	**1690**	**1652**	**2.06**	**1833**
1900	1438	1.57	1391	**1504**	**1.73**	**1537**	**1567**	**1.90**	**1685**	**1626**	**2.06**	**1833**	**1682**	**2.23**	**1983**
2000	**1471**	**1.72**	**1523**	**1536**	**1.89**	**1677**	**1598**	**2.06**	**1831**	**1657**	**2.24**	**1986**	—	—	—
2100	**1504**	**1.87**	**1665**	**1569**	**2.06**	**1825**	**1630**	**2.24**	**1986**	—	—	—	—	—	—
2200	**1538**	**2.04**	**1816**	**1602**	**2.23**	**1984**	—	—	—	—	—	—	—	—	—
2300	**1572**	**2.23**	**1978**	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1035 to 1460 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

Performance data — 48HE/HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HE/HJ006 (5 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**848**	**0.42**	**371**	**968**	**0.55**	**486**	**1069**	**0.68**	**600**	**1158**	**0.80**	**715**	**1238**	**0.94**	**831**
1600	**887**	**0.49**	**433**	**1004**	**0.63**	**556**	**1103**	**0.76**	**678**	**1190**	**0.90**	**800**	**1269**	**1.04**	**922**
1700	**927**	**0.57**	**502**	**1040**	**0.71**	**633**	**1137**	**0.86**	**763**	**1223**	**1.00**	**892**	1302	1.15	1022
1800	**967**	**0.65**	**579**	**1077**	**0.81**	**718**	**1172**	**0.96**	**856**	**1257**	**1.12**	**993**	1334	1.27	1130
1900	**1007**	**0.75**	**663**	**1115**	**0.91**	**811**	**1208**	**1.08**	**957**	**1291**	**1.24**	**1101**	1368	1.40	1246
2000	**1048**	**0.85**	**757**	**1153**	**1.03**	**913**	**1244**	**1.20**	**1066**	1326	1.37	1219	1401	1.54	1371
2100	**1090**	**0.97**	**859**	**1191**	**1.15**	**1023**	**1281**	**1.33**	**1185**	1361	1.51	1345	1435	1.69	1505
2200	**1131**	**1.09**	**970**	**1230**	**1.29**	**1143**	1318	1.48	1313	1397	1.67	1481	1470	1.86	1649
2300	**1173**	**1.23**	**1091**	**1269**	**1.43**	**1273**	1355	1.63	1451	1433	1.83	1627	1505	2.03	1803
2400	**1215**	**1.38**	**1223**	1309	1.59	1413	1393	1.80	1600	1470	2.01	1784	1540	2.21	1967
2500	**1258**	**1.54**	**1365**	1349	1.76	1564	1431	1.98	1759	1506	2.20	1951	1576	2.41	2142

48HE/HJ006 (5 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1312	1.07	948	1380	1.20	1067	1445	1.34	1189	1506	1.48	1312	1564	1.62	1437
1600	1342	1.18	1047	1411	1.32	1173	1474	1.46	1300	1535	1.61	1429	1593	1.76	1560
1700	1374	1.30	1153	1441	1.45	1286	1505	1.60	1420	1565	1.75	1555	1622	1.91	1692
1800	1406	1.43	1268	1473	1.58	1407	1535	1.74	1548	1595	1.90	1690	1652	2.06	1833
1900	1438	1.57	1391	1504	1.73	1537	1567	1.90	1685	1626	2.06	1833	1682	2.23	1983
2000	1471	1.72	1523	1536	1.89	1677	1598	2.06	1831	1657	2.24	1986	**1713**	**2.41**	**2142**
2100	1504	1.87	1665	1569	2.06	1825	1630	2.24	1986	**1688**	**2.42**	**2149**	**1744**	**2.60**	**2312**
2200	1538	2.04	1816	1602	2.23	1984	1663	2.42	2152	**1720**	**2.61**	**2321**	**1775**	**2.81**	**2491**
2300	1572	2.23	1978	1635	2.42	2153	**1695**	**2.62**	**2328**	**1753**	**2.82**	**2504**	—	—	—
2400	1607	2.42	2150	1669	2.63	2332	**1729**	**2.83**	**2515**	—	—	—	—	—	—
2500	1642	2.63	2333	**1704**	**2.84**	**2523**	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1300 to 1685 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

48HJ007 (6 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	**967**	**0.63**	**563**	**1075**	**0.80**	**715**	1170	0.97	861	1255	1.13	1002	1333	1.28	1139
1900	**1008**	**0.72**	**643**	**1112**	**0.91**	**805**	1205	1.08	960	1289	1.25	1111	1366	1.42	1258
2000	**1049**	**0.82**	**731**	1151	1.02	903	1241	1.20	1068	1323	1.38	1228	1399	1.56	1384
2100	**1091**	**0.93**	**827**	1189	1.14	1008	1278	1.33	1183	1358	1.52	1353	1433	1.71	1519
2200	1133	1.05	933	1229	1.26	1123	1315	1.47	1308	1393	1.67	1487	1467	1.87	1662
2300	1176	1.18	1047	1268	1.40	1247	1352	1.62	1441	1429	1.84	1630	1501	2.04	1815
2400	1218	1.32	1170	1308	1.55	1380	1390	1.78	1584	1466	2.01	1782	1537	2.23	1977
2500	1261	1.47	1304	1349	1.72	1523	1429	1.96	1736	1503	2.19	1945	—	—	—
2600	1305	1.63	1448	1390	1.89	1677	1468	2.14	1900	1540	2.38	2117	—	—	—
2700	1348	1.80	1602	1431	2.07	1841	1507	2.33	2073	—	—	—	—	—	—
2800	1392	1.99	1768	1472	2.27	2016	—	—	—	—	—	—	—	—	—
2900	1435	2.19	1945	—	—	—	—	—	—	—	—	—	—	—	—
3000	1479	2.40	2135	—	—	—	—	—	—	—	—	—	—	—	—

48HJ007 (6 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	1406	1.43	1273	1475	1.58	1403	1540	1.72	1531	**1601**	**1.87**	**1657**	**1660**	**2.00**	**1780**
1900	1438	1.58	1401	1505	1.73	1541	1569	1.89	1678	**1630**	**2.04**	**1813**	**1689**	**2.19**	**1945**
2000	1470	1.73	1537	1537	1.90	1686	**1600**	**2.06**	**1833**	**1660**	**2.23**	**1977**	**1718**	**2.38**	**2118**
2100	1502	1.89	1681	1568	2.07	1840	**1631**	**2.25**	**1996**	—	—	—	—	—	—
2200	1535	2.06	1834	**1600**	**2.25**	**2002**	—	—	—	—	—	—	—	—	—
2300	1569	2.25	1996	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1119 to 1585 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJ007 (6 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	**967**	**0.63**	**563**	**1075**	**0.80**	**715**	**1170**	**0.97**	**861**	**1255**	**1.13**	**1002**	1333	1.28	1139
1900	**1008**	**0.72**	**643**	**1112**	**0.91**	**805**	**1205**	**1.08**	**960**	**1289**	**1.25**	**1111**	1366	1.42	1258
2000	**1049**	**0.82**	**731**	**1151**	**1.02**	**903**	**1241**	**1.20**	**1068**	1323	1.38	1228	1399	1.56	1384
2100	**1091**	**0.93**	**827**	**1189**	**1.14**	**1008**	**1278**	**1.33**	**1183**	1358	1.52	1353	1433	1.71	1519
2200	**1133**	**1.05**	**933**	**1229**	**1.26**	**1123**	1315	1.47	1308	1393	1.67	1487	1467	1.87	1662
2300	**1176**	**1.18**	**1047**	**1268**	**1.40**	**1247**	1352	1.62	1441	1429	1.84	1630	1501	2.04	1815
2400	**1218**	**1.32**	**1170**	1308	1.55	1380	1390	1.78	1584	1466	2.01	1782	1537	2.23	1977
2500	**1261**	**1.47**	**1304**	1349	1.72	1523	1429	1.96	1736	1503	2.19	1945	1572	2.42	2149
2600	1305	1.63	1448	1390	1.89	1677	1468	2.14	1900	1540	2.38	2117	1608	2.62	2331
2700	1348	1.80	1602	1431	2.07	1841	1507	2.33	2073	1578	2.59	2301	1645	2.84	2524
2800	1392	1.99	1768	1472	2.27	2016	1547	2.54	2258	1616	2.81	2495	—	—	—
2900	1435	2.19	1945	1514	2.48	2203	1587	2.76	2455	—	—	—	—	—	—
3000	1479	2.40	2135	1556	2.70	2402	—	—	—	—	—	—	—	—	—

48HJ007 (6 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	1406	1.43	1273	1475	1.58	1403	1540	1.72	1531	1601	1.87	1657	1660	2.00	1780
1900	1438	1.58	1401	1505	1.73	1541	1569	1.89	1678	1630	2.04	1813	**1689**	**2.19**	**1945**
2000	1470	1.73	1537	1537	1.90	1686	1600	2.06	1833	1660	2.23	1977	**1718**	**2.38**	**2118**
2100	1502	1.89	1681	1568	2.07	1840	1631	2.25	1996	**1690**	**2.42**	**2149**	**1747**	**2.59**	**2300**
2200	1535	2.06	1834	1600	2.25	2002	1662	2.44	2167	**1721**	**2.62**	**2330**	**1778**	**2.80**	**2490**
2300	1569	2.25	1996	1633	2.45	2174	**1694**	**2.64**	**2348**	**1752**	**2.84**	**2520**	—	—	—
2400	1603	2.44	2167	1666	2.65	2355	**1727**	**2.86**	**2539**	—	—	—	—	—	—
2500	1638	2.64	2349	**1700**	**2.87**	**2546**	—	—	—	—	—	—	—	—	—
2600	1673	2.86	2541	—	—	—	—	—	—	—	—	—	—	—	—
2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1300 to 1685 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

Performance data — 48HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJ008 (7 1/2 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**513**	**0.54**	**505**	**595**	**0.76**	**713**	**665**	**1.01**	**940**	**728**	**1.27**	**1187**	**786**	**1.56**	**1453**
2300	**521**	**0.57**	**531**	**601**	**0.79**	**741**	**671**	**1.04**	**972**	**734**	**1.31**	**1222**	**791**	**1.60**	**1489**
2400	**535**	**0.63**	**584**	**615**	**0.86**	**802**	**684**	**1.11**	**1038**	**745**	**1.39**	**1293**	**802**	**1.68**	**1566**
2500	**551**	**0.69**	**642**	**628**	**0.93**	**866**	**696**	**1.19**	**1109**	**757**	**1.47**	**1369**	**813**	**1.77**	**1647**
2550	**558**	**0.72**	**673**	**635**	**0.97**	**900**	**702**	**1.23**	**1146**	**763**	**1.51**	**1409**	**818**	**1.81**	**1689**
2600	**566**	**0.76**	**705**	**642**	**1.00**	**935**	**709**	**1.27**	**1183**	**769**	**1.55**	**1450**	**824**	**1.86**	**1732**
2700	**582**	**0.83**	**771**	**656**	**1.08**	**1008**	**721**	**1.35**	**1263**	**781**	**1.65**	**1535**	**835**	**1.95**	**1823**
2800	**597**	**0.90**	**842**	**670**	**1.16**	**1086**	**734**	**1.44**	**1347**	**793**	**1.74**	**1625**	847	2.06	1917
2900	**613**	**0.98**	**918**	**684**	**1.25**	**1169**	**748**	**1.54**	**1436**	**805**	**1.84**	**1720**	859	2.16	2019
3000	**629**	**1.07**	**999**	**699**	**1.35**	**1256**	**761**	**1.64**	**1530**	**818**	**1.95**	**1820**	871	2.28	2125
3100	**645**	**1.16**	**1085**	**713**	**1.45**	**1349**	**775**	**1.75**	**1630**	**831**	**2.06**	**1925**	883	2.40	2235
3200	**662**	**1.26**	**1176**	**728**	**1.55**	**1448**	**788**	**1.86**	**1734**	844	2.18	2036	895	2.52	2352
3300	**678**	**1.36**	**1272**	**743**	**1.66**	**1551**	**802**	**1.98**	**1845**	857	2.31	2152	908	2.65	2475
3400	**694**	**1.47**	**1374**	**758**	**1.78**	**1660**	**816**	**2.10**	**1961**	870	2.44	2275	920	2.79	2603
3500	**711**	**1.59**	**1482**	**773**	**1.90**	**1775**	**831**	**2.23**	**2082**	884	2.58	2402	—	—	—
3600	**727**	**1.71**	**1596**	**789**	**2.03**	**1896**	845	2.37	2210	897	2.72	2537	—	—	—
3700	**744**	**1.84**	**1716**	**804**	**2.17**	**2023**	860	2.51	2343	911	2.87	2677	—	—	—
3750	**752**	**1.91**	**1778**	**812**	**2.24**	**2089**	867	2.59	2413	—	—	—	—	—	—

48HJ008 (7 1/2 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**839**	**1.86**	**1735**	889	2.18	2032	935	2.52	2345	980	2.87	2673	—	—	—
2300	844	1.90	1773	893	2.22	2073	940	2.56	2389	—	—	—	—	—	—
2400	854	1.99	1855	903	2.32	2159	950	2.66	2478	—	—	—	—	—	—
2500	865	2.08	1940	913	2.41	2249	959	2.76	2573	—	—	—	—	—	—
2550	870	2.13	1985	918	2.46	2296	964	2.81	2622	—	—	—	—	—	—
2600	875	2.18	2031	923	2.51	2344	969	2.87	2673	—	—	—	—	—	—
2700	886	2.28	2126	934	2.62	2445	—	—	—	—	—	—	—	—	—
2800	897	2.39	2227	944	2.73	2550	—	—	—	—	—	—	—	—	—
2900	908	2.50	2333	955	2.85	2661	—	—	—	—	—	—	—	—	—
3000	920	2.62	2443	—	—	—	—	—	—	—	—	—	—	—	—
3100	931	2.75	2560	—	—	—	—	—	—	—	—	—	—	—	—
3200	943	2.88	2682	—	—	—	—	—	—	—	—	—	—	—	—
3300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

48HJ008 (7 1/2 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**513**	**0.54**	**505**	**595**	**0.76**	**713**	**665**	**1.01**	**940**	**728**	**1.27**	**1187**	**786**	**1.56**	**1453**
2300	**521**	**0.57**	**531**	**601**	**0.79**	**741**	**671**	**1.04**	**972**	**734**	**1.31**	**1222**	**791**	**1.60**	**1489**
2400	**535**	**0.63**	**584**	**615**	**0.86**	**802**	**684**	**1.11**	**1038**	**745**	**1.39**	**1293**	**802**	**1.68**	**1566**
2500	**551**	**0.69**	**642**	**628**	**0.93**	**866**	**696**	**1.19**	**1109**	**757**	**1.47**	**1369**	**813**	**1.77**	**1647**
2550	**558**	**0.72**	**673**	**635**	**0.97**	**900**	**702**	**1.23**	**1146**	**763**	**1.51**	**1409**	**818**	**1.81**	**1689**
2600	**566**	**0.76**	**705**	**642**	**1.00**	**935**	**709**	**1.27**	**1183**	**769**	**1.55**	**1450**	**824**	**1.86**	**1732**
2700	**582**	**0.83**	**771**	**656**	**1.08**	**1008**	**721**	**1.35**	**1263**	**781**	**1.65**	**1535**	**835**	**1.95**	**1823**
2800	**597**	**0.90**	**842**	**670**	**1.16**	**1086**	**734**	**1.44**	**1347**	**793**	**1.74**	**1625**	**847**	**2.06**	**1917**
2900	**613**	**0.98**	**918**	**684**	**1.25**	**1169**	**748**	**1.54**	**1436**	**805**	**1.84**	**1720**	**859**	**2.16**	**2019**
3000	**629**	**1.07**	**999**	**699**	**1.35**	**1256**	**761**	**1.64**	**1530**	**818**	**1.95**	**1820**	871	2.28	2125
3100	**645**	**1.16**	**1085**	**713**	**1.45**	**1349**	**775**	**1.75**	**1630**	**831**	**2.06**	**1925**	883	2.40	2235
3200	**662**	**1.26**	**1176**	**728**	**1.55**	**1448**	**788**	**1.86**	**1734**	**844**	**2.18**	**2036**	895	2.52	2352
3300	**678**	**1.36**	**1272**	**743**	**1.66**	**1551**	**802**	**1.98**	**1845**	**857**	**2.31**	**2152**	908	2.65	2475
3400	**694**	**1.47**	**1374**	**758**	**1.78**	**1660**	**816**	**2.10**	**1961**	870	2.44	2275	920	2.79	2603
3500	**711**	**1.59**	**1482**	**773**	**1.90**	**1775**	**831**	**2.23**	**2082**	884	2.58	2402	933	2.93	2737
3600	**727**	**1.71**	**1596**	**789**	**2.03**	**1896**	**845**	**2.37**	**2210**	897	2.72	2537	946	3.09	2877
3700	**744**	**1.84**	**1716**	**804**	**2.17**	**2023**	860	2.51	2343	911	2.87	2677	959	3.24	3023
3750	**752**	**1.91**	**1778**	**812**	**2.24**	**2089**	867	2.59	2413	918	2.95	2750	966	3.32	3100

48HJ008 (7 1/2 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**839**	**1.86**	**1735**	889	2.18	2032	935	2.52	2345	980	2.87	2673	1022	3.23	3015
2300	**844**	**1.90**	**1773**	893	2.22	2073	940	2.56	2389	984	2.91	2718	1027	3.28	3062
2400	**854**	**1.99**	**1855**	903	2.32	2159	950	2.66	2478	993	3.02	2812	1035	3.39	3159
2500	865	2.08	1940	913	2.41	2249	959	2.76	2573	1003	3.12	2911	1044	3.50	3261
2550	870	2.13	1985	918	2.46	2296	964	2.81	2622	1008	3.18	2962	1049	3.55	3315
2600	875	2.18	2031	923	2.51	2344	969	2.87	2673	1012	3.23	3014	1054	3.61	3370
2700	886	2.28	2126	934	2.62	2445	979	2.98	2777	1022	3.35	3123	1063	3.74	3483
2800	897	2.39	2227	944	2.73	2550	989	3.10	2888	1032	3.47	3238	1073	3.86	3601
2900	908	2.50	2333	955	2.85	2661	1000	3.22	3003	1042	3.60	3358	**1083**	**4.00**	**3725**
3000	920	2.62	2443	966	2.98	2777	1010	3.35	3123	1052	3.74	3484	**1093**	**4.14**	**3856**
3100	931	2.75	2560	977	3.11	2899	1021	3.49	3250	1063	3.88	3615	—	—	—
3200	943	2.88	2682	989	3.25	3026	1032	3.63	3383	1074	4.02	3752	—	—	—
3300	955	3.01	2810	1000	3.39	3159	1043	3.78	3521	**1084**	**4.18**	**3896**	—	—	—
3400	967	3.16	2945	1012	3.54	3299	1055	3.93	3667	—	—	—	—	—	—
3500	980	3.31	3084	1024	3.69	3445	1066	4.09	3817	—	—	—	—	—	—
3600	992	3.46	3230	1036	3.86	3596	—	—	—	—	—	—	—	—	—
3700	1005	3.63	3383	1048	4.03	3755	—	—	—	—	—	—	—	—	—
3750	1011	3.71	3462	1054	4.11	3836	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 4.20.

Performance data — 48HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJ009 (8 1/2 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2500	**541**	**0.50**	**467**	**624**	**0.66**	**614**	**701**	**0.83**	**771**	**771**	**1.00**	**936**	**837**	**1.19**	**1109**
2600	**556**	**0.55**	**513**	**637**	**0.71**	**665**	**711**	**0.89**	**827**	**781**	**1.07**	**996**	845	1.26	1173
2700	**571**	**0.60**	**562**	**650**	**0.77**	**720**	**722**	**0.95**	**885**	**790**	**1.14**	**1059**	854	1.33	1241
2800	**586**	**0.66**	**615**	**663**	**0.83**	**777**	**734**	**1.02**	**948**	**800**	**1.21**	**1126**	863	1.41	1312
2900	**601**	**0.72**	**672**	**676**	**0.90**	**839**	**745**	**1.09**	**1014**	**811**	**1.28**	**1197**	872	1.49	1387
3000	**616**	**0.79**	**732**	**689**	**0.97**	**904**	**757**	**1.16**	**1083**	**821**	**1.36**	**1271**	882	1.57	1465
3100	**632**	**0.85**	**796**	**703**	**1.04**	**972**	**769**	**1.24**	**1157**	**832**	**1.45**	**1349**	892	1.66	1548
3200	**648**	**0.93**	**864**	**717**	**1.12**	**1045**	**782**	**1.32**	**1235**	843	1.53	1431	902	1.75	1635
3300	**663**	**1.00**	**936**	**731**	**1.20**	**1122**	**795**	**1.41**	**1316**	855	1.63	1517	912	1.85	1725
3400	**679**	**1.09**	**1012**	**745**	**1.29**	**1203**	**808**	**1.50**	**1402**	867	1.72	1608	923	1.95	1820
3500	**695**	**1.17**	**1092**	**760**	**1.38**	**1288**	**821**	**1.60**	**1492**	879	1.83	1703	934	2.06	1920
3600	**711**	**1.26**	**1177**	**774**	**1.48**	**1379**	**834**	**1.70**	**1587**	891	1.93	1802	945	2.17	2024
3700	**728**	**1.36**	**1266**	**789**	**1.58**	**1473**	848	1.81	1686	904	2.04	1906	957	2.29	2132
3800	**744**	**1.46**	**1361**	**804**	**1.69**	**1572**	861	1.92	1790	916	2.16	2015	969	2.41	2246
3900	**760**	**1.57**	**1460**	**819**	**1.80**	**1676**	875	2.04	1899	929	2.28	2128	981	2.53	2364
4000	**777**	**1.68**	**1563**	**834**	**1.91**	**1785**	889	2.16	2012	942	2.41	2247	993	2.67	2487
4100	**793**	**1.79**	**1672**	850	2.04	1899	904	2.29	2132	956	2.54	2371	1006	2.80	2615
4200	**810**	**1.92**	**1786**	865	2.16	2018	918	2.42	2255	969	2.68	2499	—	—	—
4300	**826**	**2.04**	**1906**	880	2.30	2142	932	2.56	2385	983	2.82	2633	—	—	—

48HJ009 (8 1/2 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2500	900	1.38	1289	959	1.58	1476	1015	1.79	1669	1069	2.00	1868	**1121**	**2.22**	**2073**
2600	907	1.46	1357	965	1.66	1548	1021	1.87	1745	1074	2.09	1948	**1125**	**2.31**	**2158**
2700	914	1.53	1429	972	1.74	1624	1027	1.96	1825	1079	2.18	2032	**1130**	**2.41**	**2245**
2800	922	1.61	1505	979	1.83	1704	1033	2.05	1909	1085	2.27	2120	**1135**	**2.51**	**2337**
2900	931	1.70	1584	986	1.92	1787	1040	2.14	1996	**1091**	**2.37**	**2211**	**1141**	**2.61**	**2432**
3000	939	1.79	1667	994	2.01	1874	1047	2.24	2087	**1098**	**2.47**	**2307**	**1147**	**2.71**	**2532**
3100	948	1.88	1753	1002	2.11	1965	1054	2.34	2183	**1105**	**2.58**	**2406**	**1153**	**2.83**	**2635**
3200	957	1.98	1844	1011	2.21	2060	1062	2.45	2283	**1112**	**2.69**	**2510**	—	—	—
3300	967	2.08	1939	1020	2.32	2160	1070	2.56	2386	**1119**	**2.81**	**2618**	—	—	—
3400	977	2.19	2039	1029	2.43	2264	1079	2.67	2494	—	—	—	—	—	—
3500	987	2.30	2143	1038	2.54	2372	**1088**	**2.80**	**2607**	—	—	—	—	—	—
3600	998	2.41	2251	1048	2.66	2485	—	—	—	—	—	—	—	—	—
3700	1008	2.54	2364	1058	2.79	2602	—	—	—	—	—	—	—	—	—
3800	1019	2.66	2482	—	—	—	—	—	—	—	—	—	—	—	—
3900	1031	2.79	2605	—	—	—	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJ009 (8 1/2 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2500	**541**	**0.50**	**467**	**624**	**0.66**	**614**	**701**	**0.83**	**771**	**771**	**1.00**	**936**	**837**	**1.19**	**1109**
2600	**556**	**0.55**	**513**	**637**	**0.71**	**665**	**711**	**0.89**	**827**	**781**	**1.07**	**996**	**845**	**1.26**	**1173**
2700	**571**	**0.60**	**562**	**650**	**0.77**	**720**	**722**	**0.95**	**885**	**790**	**1.14**	**1059**	**854**	**1.33**	**1241**
2800	**586**	**0.66**	**615**	**663**	**0.83**	**777**	**734**	**1.02**	**948**	**800**	**1.21**	**1126**	863	1.41	1312
2900	**601**	**0.72**	**672**	**676**	**0.90**	**839**	**745**	**1.09**	**1014**	**811**	**1.28**	**1197**	872	1.49	1387
3000	**616**	**0.79**	**732**	**689**	**0.97**	**904**	**757**	**1.16**	**1083**	**821**	**1.36**	**1271**	882	1.57	1465
3100	**632**	**0.85**	**796**	**703**	**1.04**	**972**	**769**	**1.24**	**1157**	**832**	**1.45**	**1349**	892	1.66	1548
3200	**648**	**0.93**	**864**	**717**	**1.12**	**1045**	**782**	**1.32**	**1235**	**843**	**1.53**	**1431**	902	1.75	1635
3300	**663**	**1.00**	**936**	**731**	**1.20**	**1122**	**795**	**1.41**	**1316**	**855**	**1.63**	**1517**	912	1.85	1725
3400	**679**	**1.09**	**1012**	**745**	**1.29**	**1203**	**808**	**1.50**	**1402**	867	1.72	1608	923	1.95	1820
3500	**695**	**1.17**	**1092**	**760**	**1.38**	**1288**	**821**	**1.60**	**1492**	879	1.83	1703	934	2.06	1920
3600	**711**	**1.26**	**1177**	**774**	**1.48**	**1379**	**834**	**1.70**	**1587**	891	1.93	1802	945	2.17	2024
3700	**728**	**1.36**	**1266**	**789**	**1.58**	**1473**	**848**	**1.81**	**1686**	904	2.04	1906	957	2.29	2132
3800	**744**	**1.46**	**1361**	**804**	**1.69**	**1572**	861	1.92	1790	916	2.16	2015	969	2.41	2246
3900	**760**	**1.57**	**1460**	**819**	**1.80**	**1676**	875	2.04	1899	929	2.28	2128	981	2.53	2364
4000	**777**	**1.68**	**1563**	**834**	**1.91**	**1785**	889	2.16	2012	942	2.41	2247	993	2.67	2487
4100	**793**	**1.79**	**1672**	**850**	**2.04**	**1899**	904	2.29	2132	956	2.54	2371	1006	2.80	2615
4200	**810**	**1.92**	**1786**	865	2.16	2018	918	2.42	2255	969	2.68	2499	1018	2.95	2748
4300	**826**	**2.04**	**1906**	880	2.30	2142	932	2.56	2385	983	2.82	2633	1031	3.10	2888

48HJ009 (8 1/2 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2500	900	1.38	1289	959	1.58	1476	1015	1.79	1669	1069	2.00	1868	**1121**	**2.22**	**2073**
2600	907	1.46	1357	965	1.66	1548	1021	1.87	1745	1074	2.09	1948	**1125**	**2.31**	**2158**
2700	914	1.53	1429	972	1.74	1624	1027	1.96	1825	1079	2.18	2032	**1130**	**2.41**	**2245**
2800	922	1.61	1505	979	1.83	1704	1033	2.05	1909	**1085**	**2.27**	**2120**	**1135**	**2.51**	**2337**
2900	931	1.70	1584	986	1.92	1787	1040	2.14	1996	**1091**	**2.37**	**2211**	**1141**	**2.61**	**2432**
3000	939	1.79	1667	994	2.01	1874	1047	2.24	2087	**1098**	**2.47**	**2307**	**1147**	**2.71**	**2532**
3100	948	1.88	1753	1002	2.11	1965	1054	2.34	2183	**1105**	**2.58**	**2406**	**1153**	**2.83**	**2635**
3200	957	1.98	1844	1011	2.21	2060	1062	2.45	2283	**1112**	**2.69**	**2510**	**1160**	**2.94**	**2743**
3300	967	2.08	1939	1020	2.32	2160	1070	2.56	2386	**1119**	**2.81**	**2618**	**1167**	**3.06**	**2855**
3400	977	2.19	2039	1029	2.43	2264	1079	2.67	2494	**1127**	**2.93**	**2730**	**1174**	**3.19**	**2971**
3500	987	2.30	2143	1038	2.54	2372	**1088**	**2.80**	**2607**	**1135**	**3.05**	**2847**	**1181**	**3.32**	**3092**
3600	998	2.41	2251	1048	2.66	2485	**1097**	**2.92**	**2724**	**1144**	**3.18**	**2968**	**1189**	**3.45**	**3218**
3700	1008	2.54	2364	1058	2.79	2602	**1106**	**3.05**	**2846**	**1152**	**3.32**	**3094**	**1198**	**3.59**	**3348**
3800	1019	2.66	2482	1068	2.92	2725	**1116**	**3.19**	**2972**	**1162**	**3.46**	**3226**	**1206**	**3.74**	**3484**
3900	1031	2.79	2605	1079	3.06	2852	**1126**	**3.33**	**3104**	**1171**	**3.61**	**3362**	**1215**	**3.89**	**3624**
4000	1042	2.93	2733	**1090**	**3.20**	**2984**	**1136**	**3.48**	**3241**	**1180**	**3.76**	**3503**	**1224**	**4.04**	**3770**
4100	1054	3.07	2866	**1101**	**3.35**	**3122**	**1146**	**3.63**	**3383**	**1190**	**3.91**	**3649**	**1233**	**4.20**	**3921**
4200	1066	3.22	3004	**1112**	**3.50**	**3264**	**1157**	**3.79**	**3530**	**1200**	**4.08**	**3801**	—	—	—
4300	1078	3.38	3148	**1123**	**3.66**	**3413**	**1167**	**3.95**	**3683**	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 4.20.

Performance data — 48HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJ012 (10 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	**616**	**0.79**	**732**	**689**	**0.97**	**904**	**757**	**1.16**	**1083**	**821**	**1.36**	**1271**	882	1.57	1465
3100	**632**	**0.85**	**796**	**703**	**1.04**	**972**	**769**	**1.24**	**1157**	**832**	**1.45**	**1349**	892	1.66	1548
3200	**648**	**0.93**	**864**	**717**	**1.12**	**1045**	**782**	**1.32**	**1235**	**843**	**1.53**	**1431**	902	1.75	1635
3300	**663**	**1.00**	**936**	**731**	**1.20**	**1122**	**795**	**1.41**	**1316**	**855**	**1.63**	**1517**	912	1.85	1725
3400	**679**	**1.09**	**1012**	**745**	**1.29**	**1203**	**808**	**1.50**	**1402**	867	1.72	1608	923	1.95	1820
3500	**695**	**1.17**	**1092**	**760**	**1.38**	**1288**	**821**	**1.60**	**1492**	879	1.83	1703	934	2.06	1920
3600	**711**	**1.26**	**1177**	**774**	**1.48**	**1379**	**834**	**1.70**	**1587**	891	1.93	1802	945	2.17	2024
3700	**728**	**1.36**	**1266**	**789**	**1.58**	**1473**	**848**	**1.81**	**1686**	904	2.04	1906	957	2.29	2132
3800	**744**	**1.46**	**1361**	**804**	**1.69**	**1572**	861	1.92	1790	916	2.16	2015	969	2.41	2246
3900	**760**	**1.57**	**1460**	**819**	**1.80**	**1676**	875	2.04	1899	929	2.28	2128	981	2.53	2364
4000	**777**	**1.68**	**1563**	**834**	**1.91**	**1785**	889	2.16	2012	942	2.41	2247	993	2.67	2487
4100	**793**	**1.79**	**1672**	**850**	**2.04**	**1899**	904	2.29	2132	956	2.54	2371	1006	2.80	2615
4200	**810**	**1.92**	**1786**	865	2.16	2018	918	2.42	2255	969	2.68	2499	1018	2.95	2748
4300	**826**	**2.04**	**1906**	880	2.30	2142	932	2.56	2385	983	2.82	2633	1031	3.10	2888
4400	**843**	**2.18**	**2031**	896	2.44	2272	947	2.70	2520	996	2.97	2773	1044	3.25	3032
4500	860	2.32	2161	912	2.58	2408	962	2.85	2660	1010	3.13	2918	1057	3.41	3182
4600	876	2.46	2297	927	2.73	2549	977	3.01	2807	1024	3.29	3070	1070	3.58	3338
4700	893	2.62	2439	943	2.89	2696	992	3.17	2958	1038	3.46	3226	—	—	—
4800	910	2.77	2587	959	3.06	2849	1007	3.34	3116	1053	3.63	3390	—	—	—
4900	927	2.94	2741	975	3.23	3008	1022	3.52	3280	—	—	—	—	—	—
5000	944	3.11	2901	991	3.40	3173	1037	3.70	3451	—	—	—	—	—	—

48HJ012 (10 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	939	1.79	1667	994	2.01	1874	1047	2.24	2087	**1098**	**2.47**	**2307**	**1147**	**2.71**	**2532**
3100	948	1.88	1753	1002	2.11	1965	1054	2.34	2183	**1105**	**2.58**	**2406**	**1153**	**2.83**	**2635**
3200	957	1.98	1844	1011	2.21	2060	1062	2.45	2283	**1112**	**2.69**	**2510**	**1160**	**2.94**	**2743**
3300	967	2.08	1939	1020	2.32	2160	1070	2.56	2386	**1119**	**2.81**	**2618**	**1167**	**3.06**	**2855**
3400	977	2.19	2039	1029	2.43	2264	1079	2.67	2494	**1127**	**2.93**	**2730**	**1174**	**3.19**	**2971**
3500	987	2.30	2143	1038	2.54	2372	**1088**	**2.80**	**2607**	**1135**	**3.05**	**2847**	**1181**	**3.32**	**3092**
3600	998	2.41	2251	1048	2.66	2485	**1097**	**2.92**	**2724**	**1144**	**3.18**	**2968**	**1189**	**3.45**	**3218**
3700	1008	2.54	2364	1058	2.79	2602	**1106**	**3.05**	**2846**	**1152**	**3.32**	**3094**	**1198**	**3.59**	**3348**
3800	1019	2.66	2482	1068	2.92	2725	**1116**	**3.19**	**2972**	**1162**	**3.46**	**3226**	—	—	—
3900	1031	2.79	2605	1079	3.06	2852	**1126**	**3.33**	**3104**	**1171**	**3.61**	**3362**	—	—	—
4000	1042	2.93	2733	**1090**	**3.20**	**2984**	**1136**	**3.48**	**3241**	—	—	—	—	—	—
4100	1054	3.07	2866	**1101**	**3.35**	**3122**	**1146**	**3.63**	**3383**	—	—	—	—	—	—
4200	1066	3.22	3004	**1112**	**3.50**	**3264**	—	—	—	—	—	—	—	—	—
4300	1078	3.38	3148	**1123**	**3.66**	**3413**	—	—	—	—	—	—	—	—	—
4400	**1090**	**3.54**	**3297**	—	—	—	—	—	—	—	—	—	—	—	—
4500	**1103**	**3.70**	**3451**	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 3.70.

48HJ012 (10 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	**616**	**0.79**	**732**	**689**	**0.97**	**904**	**757**	**1.16**	**1083**	**821**	**1.36**	**1271**	882	1.57	1465
3100	**632**	**0.85**	**796**	**703**	**1.04**	**972**	**769**	**1.24**	**1157**	832	1.45	1349	892	1.66	1548
3200	**648**	**0.93**	**864**	**717**	**1.12**	**1045**	**782**	**1.32**	**1235**	843	1.53	1431	902	1.75	1635
3300	**663**	**1.00**	**936**	**731**	**1.20**	**1122**	**795**	**1.41**	**1316**	855	1.63	1517	912	1.85	1725
3400	**679**	**1.09**	**1012**	**745**	**1.29**	**1203**	**808**	**1.50**	**1402**	867	1.72	1608	923	1.95	1820
3500	**695**	**1.17**	**1092**	**760**	**1.38**	**1288**	**821**	**1.60**	**1492**	879	1.83	1703	934	2.06	1920
3600	**711**	**1.26**	**1177**	**774**	**1.48**	**1379**	834	1.70	1587	891	1.93	1802	945	2.17	2024
3700	**728**	**1.36**	**1266**	**789**	**1.58**	**1473**	848	1.81	1686	904	2.04	1906	957	2.29	2132
3800	**744**	**1.46**	**1361**	**804**	**1.69**	**1572**	861	1.92	1790	916	2.16	2015	969	2.41	2246
3900	**760**	**1.57**	**1460**	**819**	**1.80**	**1676**	875	2.04	1899	929	2.28	2128	981	2.53	2364
4000	**777**	**1.68**	**1563**	834	1.91	1785	889	2.16	2012	942	2.41	2247	993	2.67	2487
4100	**793**	**1.79**	**1672**	850	2.04	1899	904	2.29	2132	956	2.54	2371	1006	2.80	2615
4200	**810**	**1.92**	**1786**	865	2.16	2018	918	2.42	2255	969	2.68	2499	1018	2.95	2748
4300	**826**	**2.04**	**1906**	880	2.30	2142	932	2.56	2385	983	2.82	2633	1031	3.10	2888
4400	843	2.18	2031	896	2.44	2272	947	2.70	2520	996	2.97	2773	1044	3.25	3032
4500	860	2.32	2161	912	2.58	2408	962	2.85	2660	1010	3.13	2918	1057	3.41	3182
4600	876	2.46	2297	927	2.73	2549	977	3.01	2807	1024	3.29	3070	1070	3.58	3338
4700	893	2.62	2439	943	2.89	2696	992	3.17	2958	1038	3.46	3226	1084	3.75	3500
4800	910	2.77	2587	959	3.06	2849	1007	3.34	3116	1053	3.63	3390	1098	3.93	3668
4900	927	2.94	2741	975	3.23	3008	1022	3.52	3280	1067	3.82	3558	1111	4.12	3841
5000	944	3.11	2901	991	3.40	3173	1037	3.70	3451	1082	4.00	3733	1125	4.31	4021

48HJ012 (10 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	939	1.79	1667	994	2.01	1874	1047	2.24	2087	1098	2.47	2307	**1147**	**2.71**	**2532**
3100	948	1.88	1753	1002	2.11	1965	1054	2.34	2183	1105	2.58	2406	**1153**	**2.83**	**2635**
3200	957	1.98	1844	1011	2.21	2060	1062	2.45	2283	1112	2.69	2510	**1160**	**2.94**	**2743**
3300	967	2.08	1939	1020	2.32	2160	1070	2.56	2386	1119	2.81	2618	**1167**	**3.06**	**2855**
3400	977	2.19	2039	1029	2.43	2264	1079	2.67	2494	1127	2.93	2730	**1174**	**3.19**	**2971**
3500	987	2.30	2143	1038	2.54	2372	1088	2.80	2607	**1135**	**3.05**	**2847**	**1181**	**3.32**	**3092**
3600	998	2.41	2251	1048	2.66	2485	1097	2.92	2724	**1144**	**3.18**	**2968**	**1189**	**3.45**	**3218**
3700	1008	2.54	2364	1058	2.79	2602	1106	3.05	2846	**1152**	**3.32**	**3094**	**1198**	**3.59**	**3348**
3800	1019	2.66	2482	1068	2.92	2725	1116	3.19	2972	**1162**	**3.46**	**3226**	**1206**	**3.74**	**3484**
3900	1031	2.79	2605	1079	3.06	2852	1126	3.33	3104	**1171**	**3.61**	**3362**	**1215**	**3.89**	**3624**
4000	1042	2.93	2733	1090	3.20	2984	**1136**	**3.48**	**3241**	**1180**	**3.76**	**3503**	**1224**	**4.04**	**3770**
4100	1054	3.07	2866	1101	3.35	3122	**1146**	**3.63**	**3383**	**1190**	**3.91**	**3649**	**1233**	**4.20**	**3921**
4200	1066	3.22	3004	1112	3.50	3264	**1157**	**3.79**	**3530**	**1200**	**4.08**	**3801**	**1243**	**4.37**	**4077**
4300	1078	3.38	3148	1123	3.66	3413	**1167**	**3.95**	**3683**	**1210**	**4.24**	**3958**	**1252**	**4.54**	**4238**
4400	1090	3.54	3297	**1135**	**3.82**	**3566**	**1179**	**4.12**	**3841**	**1221**	**4.42**	**4121**	**1262**	**4.72**	**4405**
4500	1103	3.70	3451	**1147**	**4.00**	**3726**	**1190**	**4.29**	**4005**	**1232**	**4.60**	**4289**	**1273**	**4.91**	**4578**
4600	1115	3.87	3612	**1159**	**4.17**	**3891**	**1201**	**4.48**	**4175**	**1243**	**4.79**	**4464**	**1283**	**5.10**	**4757**
4700	1128	4.05	3778	**1171**	**4.36**	**4062**	**1213**	**4.67**	**4350**	**1254**	**4.98**	**4644**	—	—	—
4800	**1141**	**4.24**	**3951**	**1183**	**4.55**	**4239**	**1225**	**4.86**	**4532**	**1265**	**5.18**	**4830**	—	—	—
4900	**1154**	**4.43**	**4130**	**1196**	**4.74**	**4422**	**1237**	**5.06**	**4720**	—	—	—	—	—	—
5000	**1167**	**4.63**	**4314**	**1209**	**4.95**	**4611**	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 830 to 1130 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 5.25.

Performance data — 48HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJ014 (12½ TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	**728**	**1.36**	**1266**	**789**	**1.58**	**1473**	848	1.81	1686	904	2.04	1906	957	2.29	2132
3800	**744**	**1.46**	**1361**	**804**	**1.69**	**1572**	861	1.92	1790	916	2.16	2015	969	2.41	2246
3900	**760**	**1.57**	**1460**	**819**	**1.80**	**1676**	875	2.04	1899	929	2.28	2128	981	2.53	2364
4000	**777**	**1.68**	**1563**	834	1.91	1785	889	2.16	2012	942	2.41	2247	993	2.67	2487
4100	**793**	**1.79**	**1672**	850	2.04	1899	904	2.29	2132	956	2.54	2371	1006	2.80	2615
4200	**810**	**1.92**	**1786**	865	2.16	2018	918	2.42	2255	969	2.68	2499	1018	2.95	2748
4300	**826**	**2.04**	**1906**	880	2.30	2142	932	2.56	2385	983	2.82	2633	1031	3.10	2888
4400	843	2.18	2031	896	2.44	2272	947	2.70	2520	996	2.97	2773	1044	3.25	3032
4500	860	2.32	2161	912	2.58	2408	962	2.85	2660	1010	3.13	2918	1057	3.41	3182
4600	876	2.46	2297	927	2.73	2549	977	3.01	2807	1024	3.29	3070	1070	3.58	3338
4700	893	2.62	2439	943	2.89	2696	992	3.17	2958	1038	3.46	3226	1084	3.75	3500
4800	910	2.77	2587	959	3.06	2849	1007	3.34	3116	1053	3.63	3390	1098	3.93	3668
4900	927	2.94	2741	975	3.23	3008	1022	3.52	3280	1067	3.82	3558	1111	4.12	3841
5000	944	3.11	2901	991	3.40	3173	1037	3.70	3451	1082	4.00	3733	1125	4.31	4021
5100	961	3.29	3068	1007	3.59	3345	1053	3.89	3627	1096	4.20	3915	**1139**	**4.51**	**4208**
5200	978	3.48	3241	1024	3.78	3523	1068	4.09	3811	1111	4.40	4103	**1153**	**4.72**	**4400**
5300	995	3.67	3420	1040	3.98	3707	1084	4.29	4000	1126	4.61	4298	**1168**	**4.93**	**4600**
5400	1012	3.87	3606	1056	4.18	3899	1099	4.50	4196	**1141**	**4.82**	**4499**	**1182**	**5.15**	**4806**
5500	1029	4.07	3799	1073	4.39	4097	1115	4.72	4400	**1156**	**5.05**	**4707**	—	—	—
5600	1046	4.29	3999	1089	4.61	4302	**1131**	**4.94**	**4610**	—	—	—	—	—	—
5700	1063	4.51	4207	1105	4.84	4515	**1146**	**5.18**	**4827**	—	—	—	—	—	—
5800	1080	4.74	4420	1122	5.08	4734	—	—	—	—	—	—	—	—	—
5900	1098	4.98	4642	—	—	—	—	—	—	—	—	—	—	—	—
6000	1115	5.22	4872	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJ014 (12½ TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	1008	2.54	2364	1058	2.79	2602	1106	3.05	2846	**1152**	**3.32**	**3094**	**1198**	**3.59**	**3348**
3800	1019	2.66	2482	1068	2.92	2725	1116	3.19	2972	**1162**	**3.46**	**3226**	**1206**	**3.74**	**3484**
3900	1031	2.79	2605	1079	3.06	2852	1126	3.33	3104	**1171**	**3.61**	**3362**	**1215**	**3.89**	**3624**
4000	1042	2.93	2733	1090	3.20	2984	**1136**	**3.48**	**3241**	**1180**	**3.76**	**3503**	**1224**	**4.04**	**3770**
4100	1054	3.07	2866	1101	3.35	3122	**1146**	**3.63**	**3383**	**1190**	**3.91**	**3649**	**1233**	**4.20**	**3921**
4200	1066	3.22	3004	1112	3.50	3264	**1157**	**3.79**	**3530**	**1200**	**4.08**	**3801**	**1243**	**4.37**	**4077**
4300	1078	3.38	3148	1123	3.66	3413	**1167**	**3.95**	**3683**	**1210**	**4.24**	**3958**	**1252**	**4.54**	**4238**
4400	1090	3.54	3297	**1135**	**3.82**	**3566**	**1179**	**4.12**	**3841**	**1221**	**4.42**	**4121**	**1262**	**4.72**	**4405**
4500	1103	3.70	3451	**1147**	**4.00**	**3726**	**1190**	**4.29**	**4005**	**1232**	**4.60**	**4289**	**1273**	**4.91**	**4578**
4600	1115	3.87	3612	**1159**	**4.17**	**3891**	**1201**	**4.48**	**4175**	**1243**	**4.79**	**4464**	**1283**	**5.10**	**4757**
4700	1128	4.05	3778	**1171**	**4.36**	**4062**	**1213**	**4.67**	**4350**	**1254**	**4.98**	**4644**	—	—	—
4800	**1141**	**4.24**	**3951**	**1183**	**4.55**	**4239**	**1225**	**4.86**	**4532**	**1265**	**5.18**	**4830**	—	—	—
4900	**1154**	**4.43**	**4130**	**1196**	**4.74**	**4422**	**1237**	**5.06**	**4720**	—	—	—	—	—	—
5000	**1167**	**4.63**	**4314**	**1209**	**4.95**	**4611**	—	—	—	—	—	—	—	—	—
5100	**1181**	**4.83**	**4505**	**1221**	**5.16**	**4808**	—	—	—	—	—	—	—	—	—
5200	**1194**	**5.04**	**4703**	—	—	—	—	—	—	—	—	—	—	—	—
5300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 830 to 1130 rpm. All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 5.25.

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJD015 (12 TONS) WITH STANDARD MOTOR (Low Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	597	895	0.84	692	967	1.07	781	1150	1.33	858	1342	1.59	928	1527	1.85
4000	625	1014	0.98	714	1097	1.21	800	1292	1.48	876	1495	1.75	945	1689	2.03
4250	653	1141	1.13	737	1236	1.36	820	1442	1.64	895	1656	1.93	963	1859	2.22
4500	682	1274	1.29	761	1382	1.54	840	1599	1.82	914	1824	2.11	982	2037	2.42
4750	711	1415	1.48	786	1538	1.73	861	1765	2.01	934	2001	2.32	1001	2224	2.63
5000	740	1563	1.68	812	1702	1.94	884	1940	2.22	954	2188	2.53	1020	2419	2.86
5250	769	1719	1.89	839	1875	2.16	907	2125	2.45	974	2384	2.77	1039	2625	3.10
5500	799	1884	2.13	867	2060	2.41	931	2321	2.70	996	2592	3.02	1059	2841	3.36
5750	828	2058	2.38	894	2256	2.67	956	2528	2.97	1018	2810	3.29	1080	3069	3.64
6000	857	2243	2.64	923	2464	2.96	982	2748	3.26	1041	3042	3.59	1101	3308	3.94
6250	885	2438	2.93	951	2687	3.27	1008	2981	3.58	1065	3286	3.91	1122	3559	4.26

48HJD015 (12 TONS) WITH STANDARD MOTOR (Low Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	992	1756	2.12	1053	1988	2.40	1112	2236	2.68	1169	2497	2.97	1224	2769	3.27
4000	1009	1931	2.31	1069	2173	2.59	1126	2431	2.88	1181	2702	3.18	1234	2984	3.48
4250	1026	2114	2.51	1085	2366	2.80	1141	2634	3.10	1194	2914	3.40	1246	3206	3.72
4500	1044	2304	2.72	1102	2566	3.02	1157	2844	3.33	1209	3133	3.65	1260	3433	3.97
4750	1062	2504	2.95	1120	2775	3.26	1174	3062	3.58	1226	3360	3.91	1275	3666	4.23
5000	1081	2712	3.19	1138	2993	3.52	1191	3288	3.85	1242	3592	4.18	1291	3905	4.52
5250	1100	2931	3.44	1156	3220	3.79	1209	3523	4.13	1260	3832	4.47	1308	4148	4.82
5500	1119	3160	3.72	1175	3457	4.07	1228	3765	4.43	1278	4077	4.78	1326	4395	5.14
5750	1138	3399	4.00	1194	3702	4.37	1246	4014	4.74	1296	4328	5.11	1343	4644	5.48
6000	1158	3649	4.31	1213	3957	4.69	1265	4270	5.07	1315	4581	5.45	—	—	—
6250	1179	3910	4.64	1233	4219	5.02	1284	4531	5.41	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Standard low-medium static drive range is 895 to 1147 rpm. Other rpms require a field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:

1. Field-supplied motor required.
2. Maximum continuous bhp for the standard motor is 3.13 (for 208/230 and 460-v units) or 3.38 (for 575-v units). The maximum continuous watts is 2700 (for 208/230 and 460-v units) or 3065 (for 575-v units). Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm. See Evaporator Fan Motor Data tables for more information.
3. Fan performance is identical for horizontal discharge applications using Carrier horizontal adapter curb.

48HJD015 (12 TONS) WITH OPTIONAL MOTOR (Low Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	597	895	0.84	692	967	1.07	781	1150	1.33	858	1342	1.59	928	1527	1.85
4000	625	1014	0.98	714	1097	1.21	800	1292	1.48	876	1495	1.75	945	1689	2.03
4250	653	1141	1.13	737	1236	1.36	820	1442	1.64	895	1656	1.93	963	1859	2.22
4500	682	1274	1.29	761	1382	1.54	840	1599	1.82	914	1824	2.11	982	2037	2.42
4750	711	1415	1.48	786	1538	1.73	861	1765	2.01	934	2001	2.32	1001	2224	2.63
5000	740	1563	1.68	812	1702	1.94	884	1940	2.22	954	2188	2.53	1020	2419	2.86
5250	769	1719	1.89	839	1875	2.16	907	2125	2.45	974	2384	2.77	1039	2625	3.10
5500	799	1884	2.13	867	2060	2.41	931	2321	2.70	996	2592	3.02	1059	2841	3.36
5750	828	2058	2.38	894	2256	2.67	956	2528	2.97	1018	2810	3.29	1080	3069	3.64
6000	857	2243	2.64	923	2464	2.96	982	2748	3.26	1041	3042	3.59	1101	3308	3.94
6250	885	2438	2.93	951	2687	3.27	1008	2981	3.58	1065	3286	3.91	1122	3559	4.26

48HJD015 (12 TONS) WITH OPTIONAL MOTOR (Low Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	992	1756	2.12	1053	1988	2.40	1112	2236	2.68	1169	2497	2.97	1224	2769	3.27
4000	1009	1931	2.31	1069	2173	2.59	1126	2431	2.88	1181	2702	3.18	1234	2984	3.48
4250	1026	2114	2.51	1085	2366	2.80	1141	2634	3.10	1194	2914	3.40	1246	3206	3.72
4500	1044	2304	2.72	1102	2566	3.02	1157	2844	3.33	1209	3133	3.65	1260	3433	3.97
4750	1062	2504	2.95	1120	2775	3.26	1174	3062	3.58	1226	3360	3.91	1275	3666	4.23
5000	1081	2712	3.19	1138	2993	3.52	1191	3288	3.85	1242	3592	4.18	1291	3905	4.52
5250	1100	2931	3.44	1156	3220	3.79	1209	3523	4.13	1260	3832	4.47	1308	4148	4.82
5500	1119	3160	3.72	1175	3457	4.07	1228	3765	4.43	1278	4077	4.78	1326	4395	5.14
5750	1138	3399	4.00	1194	3702	4.37	1246	4014	4.74	1296	4328	5.11	1343	4644	5.48
6000	1158	3649	4.31	1213	3957	4.69	1265	4270	5.07	1315	4581	5.45	—	—	—
6250	1179	3910	4.64	1233	4219	5.02	1284	4531	5.41	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Alternate high-static drive range is 1040 to 1315 (for 208/230 and 460-v units). The alternate high-static drive is not available for 575-v units. Other rpms require a field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:

1. Field-supplied motor required.
2. Maximum continuous bhp for the optional motor is 4.26. Maximum continuous watts for the optional motor is 3610. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm. See Evaporator Fan Motor Data tables for more information.
3. Fan performance is identical for horizontal discharge applications using Carrier horizontal adapter curb.

Performance data — 48HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJF015 (12 TONS) WITH STANDARD MOTOR (High Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	622	888	0.89	713	1027	1.13	795	1234	1.37	869	1454	1.63	936	1584	1.89
4000	652	1015	1.04	738	1168	1.28	818	1388	1.54	890	1620	1.80	956	1756	2.07
4250	682	1151	1.20	763	1317	1.45	841	1550	1.72	911	1793	1.99	976	1937	2.27
4500	713	1295	1.38	790	1474	1.63	864	1719	1.91	934	1973	2.20	997	2126	2.49
4750	744	1448	1.58	817	1641	1.84	889	1896	2.12	956	2159	2.42	1019	2326	2.72
5000	776	1610	1.80	845	1817	2.06	914	2081	2.35	979	2353	2.66	1041	2536	2.97
5250	808	1783	2.04	874	2003	2.31	940	2277	2.60	1003	2556	2.91	1064	2757	3.24
5500	840	1967	2.29	903	2200	2.57	966	2482	2.87	1028	2768	3.19	1087	2991	3.52
5750	872	2163	2.57	933	2410	2.86	993	2699	3.16	1053	2990	3.49	1110	3237	3.83
6000	905	2373	2.87	963	2634	3.16	1021	2929	3.47	1078	3225	3.81	1134	3497	4.15
6250	937	2596	3.19	994	2872	3.49	1049	3172	3.81	1105	3473	4.15	1159	3769	4.50

48HJF015 (12 TONS) WITH STANDARD MOTOR (High Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	999	1829	2.15	1059	2091	2.42	1117	2343	2.70	1174	2521	2.99	1228	2801	3.29
4000	1017	2010	2.35	1076	2279	2.63	1132	2540	2.91	1186	2738	3.21	1239	3023	3.51
4250	1036	2198	2.56	1093	2474	2.85	1148	2743	3.14	1201	2962	3.44	1253	3251	3.75
4500	1056	2395	2.78	1112	2675	3.08	1166	2951	3.39	1217	3194	3.70	1267	3487	4.01
4750	1077	2601	3.03	1132	2885	3.34	1184	3168	3.65	1235	3435	3.97	1284	3731	4.29
5000	1098	2816	3.29	1152	3104	3.61	1204	3392	3.93	1253	3683	4.26	1301	3981	4.59
5250	1120	3042	3.56	1173	3332	3.90	1224	3626	4.23	1273	3940	4.57	1320	4239	4.91
5500	1142	3279	3.86	1195	3570	4.20	1245	3870	4.55	1293	4203	4.89	1339	4501	5.24
5750	1165	3528	4.18	1217	3819	4.53	1266	4125	4.88	1313	4471	5.24	—	—	—
6000	1188	3789	4.51	1239	4080	4.88	1288	4389	5.24	—	—	—	—	—	—
6250	1212	4062	4.87	1262	4351	5.24	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Standard low-medium static drive range is 895 to 1147 rpm. Other rpms require a field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:

1. Field-supplied motor required.
2. Maximum continuous bhp for the standard motor is 3.13 (for 208/230 and 460-v units) or 3.38 (for 575-v units). The maximum continuous watts is 2700 (for 208/230 and 460-v units) or 3065 (for 575-v units). Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm. See Evaporator Fan Motor Data tables for more information.
3. Fan performance is identical for horizontal discharge applications using Carrier horizontal adapter curb.

48HJF015 (12 TONS) WITH OPTIONAL MOTOR (High Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	622	888	0.89	713	1027	1.13	795	1234	1.37	869	1454	1.63	936	1584	1.89
4000	652	1015	1.04	738	1168	1.28	818	1388	1.54	890	1620	1.80	956	1756	2.07
4250	682	1151	1.20	763	1317	1.45	841	1550	1.72	911	1793	1.99	976	1937	2.27
4500	713	1295	1.38	790	1474	1.63	864	1719	1.91	934	1973	2.20	997	2126	2.49
4750	744	1448	1.58	817	1641	1.84	889	1896	2.12	956	2159	2.42	1019	2326	2.72
5000	776	1610	1.80	845	1817	2.06	914	2081	2.35	979	2353	2.66	1041	2536	2.97
5250	808	1783	2.04	874	2003	2.31	940	2277	2.60	1003	2556	2.91	1064	2757	3.24
5500	840	1967	2.29	903	2200	2.57	966	2482	2.87	1028	2768	3.19	1087	2991	3.52
5750	872	2163	2.57	933	2410	2.86	993	2699	3.16	1053	2990	3.49	1110	3237	3.83
6000	905	2373	2.87	963	2634	3.16	1021	2929	3.47	1078	3225	3.81	1134	3497	4.15
6250	937	2596	3.19	994	2872	3.49	1049	3172	3.81	1105	3473	4.15	1159	3769	4.50

48HJF015 (12 TONS) WITH OPTIONAL MOTOR (High Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	999	1829	2.15	1059	2091	2.42	1117	2343	2.70	1174	2521	2.99	1228	2801	3.29
4000	1017	2010	2.35	1076	2279	2.63	1132	2540	2.91	1186	2738	3.21	1239	3023	3.51
4250	1036	2198	2.56	1093	2474	2.85	1148	2743	3.14	1201	2962	3.44	1253	3251	3.75
4500	1056	2395	2.78	1112	2675	3.08	1166	2951	3.39	1217	3194	3.70	1267	3487	4.01
4750	1077	2601	3.03	1132	2885	3.34	1184	3168	3.65	1235	3435	3.97	1284	3731	4.29
5000	1098	2816	3.29	1152	3104	3.61	1204	3392	3.93	1253	3683	4.26	1301	3981	4.59
5250	1120	3042	3.56	1173	3332	3.90	1224	3626	4.23	1273	3940	4.57	1320	4239	4.91
5500	1142	3279	3.86	1195	3570	4.20	1245	3870	4.55	1293	4203	4.89	1339	4501	5.24
5750	1165	3528	4.18	1217	3819	4.53	1266	4125	4.88	1313	4471	5.24	—	—	—
6000	1188	3789	4.51	1239	4080	4.88	1288	4389	5.24	—	—	—	—	—	—
6250	1212	4062	4.87	1262	4351	5.24	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Alternate high-static drive range is 1040 to 1315. Other rpms require a field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:

1. Field-supplied motor required.
2. Maximum continuous bhp for the optional motor is 4.26. The maximum continuous watts is 3610. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm. See Evaporator Fan Motor Data tables for more information.
3. Fan performance is identical for horizontal discharge applications using Carrier horizontal adapter curb.

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJD017 (15 TONS) (Low Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	753	1307	1.53	761	1330	1.56	840	1572	1.84	912	1822	2.14	980	2080	2.44
4800	747	1384	1.62	790	1515	1.78	866	1765	2.07	936	2023	2.37	1002	2289	2.68
5100	741	1465	1.72	820	1718	2.01	893	1977	2.32	961	2243	2.63	1025	2516	2.95
5700	810	1911	2.24	882	2182	2.56	950	2459	2.88	1014	2741	3.21	1075	3029	3.55
6000	844	2164	2.54	914	2444	2.87	980	2730	3.20	1042	3021	3.54	1100	3317	3.89
6300	879	2439	2.86	947	2729	3.20	1010	3023	3.55	1070	3322	3.90	1127	3626	4.25
6600	915	2737	3.21	980	3035	3.56	1041	3338	3.91	1099	3645	4.28	1155	3957	4.64
6900	950	3057	3.59	1013	3364	3.95	1072	3675	4.31	1129	3991	4.68	1183	4311	5.06
7200	986	3401	3.99	1047	3717	4.36	1104	4037	4.74	1159	4361	5.11	1211	4689	5.50
7500	1022	3770	4.42	1081	4095	4.80	1136	4423	5.19	1189	4755	5.58	1241	5091	5.97

48HJD017 (15 TONS) (Low Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	1044	2345	2.75	1105	2619	3.07	1163	2899	3.40	1218	3187	3.74	1271	3481	4.08
4800	1065	2561	3.00	1124	2841	3.33	1180	3127	3.67	1235	3420	4.01	1287	3720	4.36
5100	1086	2795	3.28	1144	3082	3.61	1199	3375	3.96	1252	3674	4.31	1304	3979	4.67
5700	1132	3324	3.90	1187	3624	4.25	1240	3929	4.61	1291	4241	4.97	1341	4558	5.35
6000	1157	3619	4.24	1210	3925	4.60	1262	4239	4.97	1312	4557	5.34	1361	4880	5.72
6300	1182	3935	4.62	1234	4249	4.98	1285	4569	5.36	1334	4894	5.74	—	—	—
6600	1208	4274	5.01	1259	4595	5.39	1309	4922	5.77	—	—	—	—	—	—
6900	1235	4636	5.44	1285	4964	5.82	—	—	—	—	—	—	—	—	—
7200	1262	5021	5.89	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJD017 (15 TONS) (Low Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	2.2			2.4			2.6			2.8			3.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	1322	3781	4.43	1372	4088	4.79	1419	4400	5.16	1466	4719	5.53	1511	5042	5.91
4800	1337	4025	4.72	1386	4337	5.09	1433	4655	5.46	1479	4978	5.84	—	—	—
5100	1353	4290	5.03	1401	4607	5.40	1448	4930	5.78	—	—	—	—	—	—
5700	1388	4881	5.72	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

*Standard low-medium static drive range is 873 to 1021 rpm. Alternate high-static drive range is 1025 to 1200. Other rpms require a field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:
1. Maximum continuous bhp for the standard motor is 6.13. The maximum continuous watts is 5180. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm. See Evaporator Fan Motor Data tables for more information.
2. Fan performance is identical for horizontal discharge applications using Carrier horizontal adapter curb.

Performance data — 48HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJF017 (15 TONS) (High Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	753	1307	1.53	786	1404	1.65	861	1644	1.93	932	1893	2.22	997	2150	2.52
4800	747	1384	1.62	818	1603	1.88	890	1852	2.17	958	2108	2.47	1022	2373	2.78
5100	775	1571	1.84	850	1822	2.14	920	2079	2.44	986	2344	2.75	1048	2616	3.07
5700	849	2054	2.41	918	2323	2.73	982	2598	3.05	1044	2879	3.38	1102	3166	3.71
6000	886	2329	2.73	952	2607	3.06	1015	2891	3.39	1074	3180	3.73	1130	3474	4.08
6300	924	2628	3.08	987	2915	3.42	1047	3207	3.76	1105	3504	4.11	1160	3807	4.46
6600	962	2951	3.46	1023	3246	3.81	1081	3547	4.16	1136	3853	4.52	1190	4163	4.88
6900	1000	3298	3.87	1059	3603	4.23	1115	3912	4.59	1168	4225	4.96	1220	4543	5.33
7200	1038	3672	4.31	1095	3986	4.67	1149	4303	5.05	1201	4625	5.42	1251	4950	5.81
7500	1077	4072	4.78	1131	4394	5.15	1184	4720	5.54	1234	5050	5.92	—	—	—

48HJF017 (15 TONS) (High Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	1060	2414	2.83	1119	2685	3.15	1175	2964	3.48	1230	3250	3.81	1282	3542	4.15
4800	1082	2644	3.10	1140	2922	3.43	1195	3207	3.76	1248	3498	4.10	1299	3795	4.45
5100	1106	2894	3.39	1163	3178	3.73	1216	3470	4.07	1268	3767	4.42	1319	4071	4.77
5700	1157	3459	4.06	1211	3757	4.41	1262	4061	4.76	1312	4371	5.13	1360	4686	5.50
6000	1184	3774	4.43	1236	4080	4.79	1287	4391	5.15	1335	4707	5.52	1382	5029	5.90
6300	1212	4114	4.83	1263	4427	5.19	1312	4745	5.57	1359	5067	5.94	—	—	—
6600	1241	4478	5.25	1290	4798	5.63	1338	5122	6.01	—	—	—	—	—	—
6900	1270	4866	5.71	—	—	—	—	—	—	—	—	—	—	—	—
7200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJF017 (15 TONS) (High Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	2.2			2.4			2.6			2.8			3.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	1332	3841	4.50	1381	4145	4.86	1428	4456	5.23	1473	4772	5.60	1518	5095	5.98
4800	1349	4100	4.81	1397	4409	5.17	1443	4725	5.54	1488	5046	5.92	—	—	—
5100	1367	4380	5.14	1414	4695	5.51	1460	5016	5.88	—	—	—	—	—	—
5700	1407	5007	5.87	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Standard low-medium static drive range is 873 to 1021 rpm. Alternate high-static drive range is 1025 to 1200. Other rpms require a field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTES:

1. Maximum continuous bhp for the standard motor is 6.13. The maximum continuous watts is 5180. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm. See Evaporator Fan Motor Data tables for more information.
2. Fan performance is identical for horizontal discharge applications using Carrier horizontal adapter curb.

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJD020 (18 TONS) (Low Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3500	460	591	0.68	548	774	0.89	623	951	1.09	692	1126	1.29	755	1301	1.50
4000	499	774	0.89	581	976	1.12	653	1170	1.35	717	1361	1.56	777	1551	1.78
4500	538	990	1.14	617	1212	1.39	685	1423	1.64	746	1630	1.88	803	1835	2.11
5000	579	1243	1.43	654	1485	1.71	719	1715	1.97	778	1938	2.23	832	2158	2.48
5500	621	1536	1.77	693	1798	2.07	755	2045	2.35	811	2285	2.63	864	2520	2.90
6000	664	1871	2.15	732	2152	2.48	792	2417	2.78	846	2673	3.07	897	2925	3.36
6500	707	2250	2.59	772	2550	2.93	830	2834	3.26	883	3106	3.57	932	3373	3.88
7000	751	2676	3.08	813	2994	3.44	869	3295	3.79	920	3585	4.12	967	3868	4.45
7500	795	3150	3.62	855	3487	4.01	909	3805	4.38	958	4112	4.73	1004	4411	5.07
8000	839	3676	4.23	897	4029	4.63	949	4366	5.02	997	4689	5.39	1042	5004	5.75
8500	884	4253	4.89	940	4625	5.32	990	4978	5.73	1037	5318	6.12	1080	5649	6.50

48HJD020 (18 TONS) (Low Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3500	814	1476	1.70	871	1650	1.90	924	1825	2.10	975	1999	2.30	1023	2173	2.50
4000	834	1740	2.00	888	1930	2.22	939	2119	2.44	988	2308	2.65	1035	2497	2.87
4500	857	2039	2.35	909	2243	2.58	958	2446	2.81	1005	2650	3.05	1051	2853	3.28
5000	884	2376	2.73	933	2594	2.98	980	2811	3.23	1026	3028	3.48	1070	3244	3.73
5500	913	2753	3.17	960	2984	3.43	1006	3215	3.70	1049	3445	3.96	1092	3674	4.23
6000	945	3172	3.65	990	3417	3.93	1034	3662	4.21	1076	3905	4.49	1117	4147	4.77
6500	978	3636	4.18	1022	3895	4.48	1064	4153	4.78	1104	4409	5.07	1144	4665	5.37
7000	1012	4145	4.77	1055	4419	5.08	1095	4691	5.39	1135	4960	5.70	1173	5229	6.01
7500	1047	4703	5.41	1089	4992	5.74	1128	5277	6.07	1167	5561	6.40	1204	5842	6.72
8000	1084	5311	6.11	1124	5615	6.46	1163	5915	6.80	1200	6211	7.14	1236	6506	7.48
8500	1121	5972	6.87	1160	6290	7.23	1198	6604	7.60	1234	6914	7.95	1269	7223	8.31

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: Not Used
Mid-Low Range: 647-886 (208/230 and 460-v), 810-1072 (575-v)
Mid-High Range: 897-1139 (208/230 and 460-v), 873-1108 (575-v)
High Range: 1078-1274
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: Not Used
Mid-Low Range: 4.25 (208/230 and 460-v), 3.45 (575-v)
Mid-High Range: 5.75
High Range: 8.63

Performance data — 48HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJE020 (18 TONS) (Medium Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3500	470	611	0.70	556	791	0.91	630	967	1.11	697	1141	1.31	760	1314	1.51
4000	511	802	0.92	591	1001	1.15	661	1194	1.37	725	1383	1.59	784	1572	1.81
4500	553	1029	1.18	629	1248	1.44	695	1458	1.68	756	1663	1.91	812	1866	2.15
5000	597	1297	1.49	669	1534	1.76	732	1761	2.03	789	1982	2.28	843	2201	2.53
5500	641	1606	1.85	709	1862	2.14	770	2106	2.42	825	2343	2.70	876	2577	2.96
6000	686	1961	2.26	751	2234	2.57	809	2495	2.87	862	2749	3.16	911	2997	3.45
6500	732	2363	2.72	794	2653	3.05	849	2931	3.37	900	3201	3.68	948	3465	3.99
7000	779	2815	3.24	837	3122	3.59	891	3416	3.93	940	3702	4.26	986	3981	4.58
7500	826	3320	3.82	882	3642	4.19	933	3953	4.55	980	4254	4.89	1025	4549	5.23
8000	873	3879	4.46	926	4217	4.85	975	4542	5.22	1021	4860	5.59	1065	5169	5.95
8500	921	4495	5.17	972	4847	5.57	1019	5189	5.97	1063	5521	6.35	1105	5846	6.72

48HJE020 (18 TONS) (Medium Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3500	818	1488	1.71	874	1661	1.91	927	1835	2.11	978	2008	2.31	1026	2182	2.51
4000	840	1760	2.02	893	1948	2.24	943	2136	2.46	992	2324	2.67	1039	2512	2.89
4500	865	2068	2.38	915	2270	2.61	964	2472	2.84	1011	2673	3.07	1056	2876	3.31
5000	893	2417	2.78	942	2632	3.03	988	2848	3.28	1033	3063	3.52	1076	3278	3.77
5500	925	2808	3.23	971	3037	3.49	1016	3266	3.76	1059	3494	4.02	1100	3721	4.28
6000	958	3243	3.73	1003	3486	4.01	1045	3728	4.29	1087	3970	4.57	1127	4210	4.84
6500	993	3725	4.28	1036	3982	4.58	1077	4238	4.87	1117	4492	5.17	1156	4745	5.46
7000	1029	4256	4.90	1071	4528	5.21	1111	4797	5.52	1150	5064	5.82	1187	5330	6.13
7500	1067	4838	5.56	1107	5124	5.89	1146	5407	6.22	1184	5688	6.54	1220	5967	6.86
8000	1106	5474	6.30	1145	5774	6.64	1182	6071	6.98	1219	6365	7.32	1254	6657	7.66
8500	1145	6165	7.09	1183	6479	7.45	1220	6790	7.81	1255	7098	8.16	1290	7403	8.51

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: Not Used
Mid-Low Range: 647-886 (208/230 and 460-v), 810-1072 (575-v)
Mid-High Range: 897-1139 (208/230 and 460-v), 873-1108 (575-v)
High Range: 1078-1274
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: Not Used
Mid-Low Range: 4.25 (208/230 and 460-v), 3.45 (575-v)
Mid-High Range: 5.75
High Range: 8.63

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJF020 (18 TONS) (High Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3500	470	611	0.70	556	791	0.91	630	967	1.11	697	1141	1.31	760	1314	1.51
4000	511	802	0.92	591	1001	1.15	661	1194	1.37	725	1383	1.59	784	1572	1.81
4500	553	1029	1.18	629	1248	1.44	695	1458	1.68	756	1663	1.91	812	1866	2.15
5000	597	1297	1.49	669	1534	1.76	732	1761	2.03	789	1982	2.28	843	2201	2.53
5500	641	1606	1.85	709	1862	2.14	770	2106	2.42	825	2343	2.70	876	2577	2.96
6000	686	1961	2.26	751	2234	2.57	809	2495	2.87	862	2749	3.16	911	2997	3.45
6500	732	2363	2.72	794	2653	3.05	849	2931	3.37	900	3201	3.68	948	3465	3.99
7000	779	2815	3.24	837	3122	3.59	891	3416	3.93	940	3702	4.26	986	3981	4.58
7500	826	3320	3.82	882	3642	4.19	933	3953	4.55	980	4254	4.89	1025	4549	5.23
8000	873	3879	4.46	926	4217	4.85	975	4542	5.22	1021	4860	5.59	1065	5169	5.95
8500	921	4495	5.17	972	4847	5.57	1019	5189	5.97	1063	5521	6.35	1105	5846	6.72

48HJF020 (18 TONS) (High Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3500	818	1488	1.71	874	1661	1.91	927	1835	2.11	978	2008	2.31	1026	2182	2.51
4000	840	1760	2.02	893	1948	2.24	943	2136	2.46	992	2324	2.67	1039	2512	2.89
4500	865	2068	2.38	915	2270	2.61	964	2472	2.84	1011	2673	3.07	1056	2876	3.31
5000	893	2417	2.78	942	2632	3.03	988	2848	3.28	1033	3063	3.52	1076	3278	3.77
5500	925	2808	3.23	971	3037	3.49	1016	3266	3.76	1059	3494	4.02	1100	3721	4.28
6000	958	3243	3.73	1003	3486	4.01	1045	3728	4.29	1087	3970	4.57	1127	4210	4.84
6500	993	3725	4.28	1036	3982	4.58	1077	4238	4.87	1117	4492	5.17	1156	4745	5.46
7000	1029	4256	4.90	1071	4528	5.21	1111	4797	5.52	1150	5064	5.82	1187	5330	6.13
7500	1067	4838	5.56	1107	5124	5.89	1146	5407	6.22	1184	5688	6.54	1220	5967	6.86
8000	1106	5474	6.30	1145	5774	6.64	1182	6071	6.98	1219	6365	7.32	1254	6657	7.66
8500	1145	6165	7.09	1183	6479	7.45	1220	6790	7.81	1255	7098	8.16	1290	7403	8.51

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: Not Used
Mid-Low Range: 647-886 (208/230 and 460-v), 810-1072 (575-v)
Mid-High Range: 897-1139 (208/230 and 460-v), 873-1108 (575-v)
High Range: 1078-1274
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: Not Used
Mid-Low Range: 4.25 (208/230 and 460-v), 3.45 (575-v)
Mid-High Range: 5.75
High Range: 8.63

Performance data — 48HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJD024 (20 TONS) (Low Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
5,000	590	1276	1.47	663	1516	1.74	727	1745	2.01	786	1968	2.26	840	2189	2.52
5,500	633	1579	1.82	703	1838	2.11	764	2084	2.40	820	2324	2.67	872	2560	2.94
6,000	677	1925	2.21	744	2203	2.53	803	2467	2.84	857	2723	3.13	907	2974	3.42
6,500	722	2317	2.67	786	2614	3.01	842	2896	3.33	894	3167	3.64	942	3434	3.95
7,000	767	2758	3.17	828	3073	3.53	883	3371	3.88	933	3660	4.21	979	3942	4.53
7,500	813	3250	3.74	871	3582	4.12	924	3897	4.48	972	4202	4.83	1017	4500	5.18
8,000	859	3795	4.36	915	4143	4.77	966	4475	5.15	1012	4797	5.52	1056	5110	5.88
8,500	906	4394	5.05	959	4759	5.47	1008	5107	5.87	1053	5445	6.26	1096	5774	6.64
9,000	952	5051	5.81	1004	5432	6.25	1051	5797	6.67	1095	6150	7.07	1136	6494	7.47
9,500	999	5767	6.63	1049	6163	7.09	1094	6544	7.53	1137	6913	7.95	1177	7272	8.36
10,000	1047	6544	7.53	1094	6956	8.00	1138	7352	8.46	1180	7736	8.90	1219	8111	9.33

48HJD024 (20 TONS) (Low Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
5,000	891	2408	2.77	940	2625	3.02	987	2843	3.27	1032	3060	3.52	1076	3277	3.77
5,500	921	2792	3.21	968	3024	3.48	1014	3255	3.74	1057	3485	4.01	1099	3716	4.27
6,000	954	3221	3.70	999	3467	3.99	1042	3711	4.27	1084	3955	4.55	1125	4198	4.83
6,500	988	3696	4.25	1032	3956	4.55	1073	4214	4.85	1114	4470	5.14	1153	4726	5.44
7,000	1024	4219	4.85	1066	4493	5.17	1106	4764	5.48	1145	5034	5.79	1183	5303	6.10
7,500	1060	4792	5.51	1101	5080	5.84	1140	5365	6.17	1178	5649	6.50	1215	5930	6.82
8,000	1098	5417	6.23	1138	5719	6.58	1176	6018	6.92	1213	6315	7.26	1249	6610	7.60
8,500	1137	6096	7.01	1175	6413	7.38	1212	6726	7.74	1248	7036	8.09	1283	7344	8.45
9,000	1176	6831	7.86	1214	7163	8.24	1250	7490	8.61	1285	7814	8.99	1319	8135	9.36
9,500	1216	7624	8.77	1253	7970	9.17	1288	8312	9.56	1322	8649	9.95	1355	8984	10.33
10,000	1256	8478	9.75	1292	8838	10.16	1327	9193	10.57	1360	9545	10.98	1393	9893	11.38

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: 685-939 (208/230 and 460-v), 751-954 (575-v)
Mid-Low Range: 949-1206
Mid-High Range: 941-1176
High Range: 1014-1297
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: 4.25 (208/230 and 460-v), 5.75 (575-v)
Mid-Low Range: 5.75
Mid-High Range: 8.63
High Range: 11.50

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJE024 (20 TONS) (Medium Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
5,000	607	1329	1.53	677	1565	1.80	740	1791	2.06	797	2013	2.31	850	2231	2.57
5,500	652	1648	1.90	719	1902	2.19	779	2145	2.47	833	2382	2.74	884	2616	3.01
6,000	699	2013	2.32	763	2285	2.63	819	2545	2.93	872	2798	3.22	921	3046	3.50
6,500	746	2428	2.79	807	2716	3.12	861	2993	3.44	911	3262	3.75	958	3525	4.05
7,000	794	2895	3.33	851	3198	3.68	904	3491	4.02	952	3776	4.34	998	4055	4.66
7,500	842	3415	3.93	897	3735	4.30	947	4043	4.65	994	4343	5.00	1038	4637	5.33
8,000	891	3992	4.59	943	4327	4.98	991	4650	5.35	1036	4966	5.71	1079	5274	6.07
8,500	940	4628	5.32	990	4977	5.72	1036	5316	6.11	1080	5646	6.49	1121	5970	6.87
9,000	990	5325	6.12	1037	5688	6.54	1082	6042	6.95	1124	6386	7.35	1163	6724	7.73
9,500	1039	6085	7.00	1085	6462	7.43	1128	6829	7.85	1168	7188	8.27	1207	7541	8.67
10,000	1089	6911	7.95	1133	7301	8.40	1174	7682	8.83	1213	8055	9.26	1251	8421	9.69

48HJE024 (20 TONS) (Medium Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
5,000	900	2448	2.82	949	2664	3.06	995	2879	3.31	1040	3095	3.56	1083	3310	3.81
5,500	933	2847	3.27	979	3077	3.54	1023	3305	3.80	1066	3534	4.06	1108	3762	4.33
6,000	967	3292	3.79	1011	3535	4.07	1054	3778	4.35	1095	4019	4.62	1135	4260	4.90
6,500	1003	3785	4.35	1046	4043	4.65	1087	4298	4.94	1127	4553	5.24	1165	4806	5.53
7,000	1041	4330	4.98	1082	4601	5.29	1122	4870	5.60	1160	5138	5.91	1197	5404	6.22
7,500	1079	4926	5.67	1119	5212	5.99	1158	5495	6.32	1195	5776	6.64	1231	6055	6.96
8,000	1119	5578	6.42	1158	5878	6.76	1195	6174	7.10	1231	6468	7.44	1267	6761	7.78
8,500	1160	6288	7.23	1198	6601	7.59	1234	6912	7.95	1269	7219	8.30	1303	7524	8.65
9,000	1202	7056	8.12	1238	7384	8.49	1273	7708	8.87	1308	8029	9.23	1341	8347	9.60
9,500	1244	7887	9.07	1279	8228	9.46	1314	8566	9.85	1347	8900	10.24	1379	9231	10.62
10,000	1287	8781	10.10	1321	9137	10.51	1355	9488	10.91	1387	9836	11.31	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: 685-939 (208/230 and 460-v), 751-954 (575-v)
Mid-Low Range: 949-1206
Mid-High Range: 941-1176
High Range: 1014-1297
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: 4.25 (208/230 and 460-v), 5.75 (575-v)
Mid-Low Range: 5.75
Mid-High Range: 8.63
High Range: 11.50

Performance data — 48HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJF024 (20 TONS) (High Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
5,000	607	1329	1.53	677	1565	1.80	740	1791	2.06	797	2013	2.31	850	2231	2.57
5,500	652	1648	1.90	719	1902	2.19	779	2145	2.47	833	2382	2.74	884	2616	3.01
6,000	699	2013	2.32	763	2285	2.63	819	2545	2.93	872	2798	3.22	921	3046	3.50
6,500	746	2428	2.79	807	2716	3.12	861	2993	3.44	911	3262	3.75	958	3525	4.05
7,000	794	2895	3.33	851	3198	3.68	904	3491	4.02	952	3776	4.34	998	4055	4.66
7,500	842	3415	3.93	897	3735	4.30	947	4043	4.65	994	4343	5.00	1038	4637	5.33
8,000	891	3992	4.59	943	4327	4.98	991	4650	5.35	1036	4966	5.71	1079	5274	6.07
8,500	940	4628	5.32	990	4977	5.72	1036	5316	6.11	1080	5646	6.49	1121	5970	6.87
9,000	990	5325	6.12	1037	5688	6.54	1082	6042	6.95	1124	6386	7.35	1163	6724	7.73
9,500	1039	6085	7.00	1085	6462	7.43	1128	6829	7.85	1168	7188	8.27	1207	7541	8.67
10,000	1089	6911	7.95	1133	7301	8.40	1174	7682	8.83	1213	8055	9.26	1251	8421	9.69

48HJF024 (20 TONS) (High Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
5,000	900	2448	2.82	949	2664	3.06	995	2879	3.31	1040	3095	3.56	1083	3310	3.81
5,500	933	2847	3.27	979	3077	3.54	1023	3305	3.80	1066	3534	4.06	1108	3762	4.33
6,000	967	3292	3.79	1011	3535	4.07	1054	3778	4.35	1095	4019	4.62	1135	4260	4.90
6,500	1003	3785	4.35	1046	4043	4.65	1087	4298	4.94	1127	4553	5.24	1165	4806	5.53
7,000	1041	4330	4.98	1082	4601	5.29	1122	4870	5.60	1160	5138	5.91	1197	5404	6.22
7,500	1079	4926	5.67	1119	5212	5.99	1158	5495	6.32	1195	5776	6.64	1231	6055	6.96
8,000	1119	5578	6.42	1158	5878	6.76	1195	6174	7.10	1231	6468	7.44	1267	6761	7.78
8,500	1160	6288	7.23	1198	6601	7.59	1234	6912	7.95	1269	7219	8.30	1303	7524	8.65
9,000	1202	7056	8.12	1238	7384	8.49	1273	7708	8.87	1308	8029	9.23	1341	8347	9.60
9,500	1244	7887	9.07	1279	8228	9.46	1314	8566	9.85	1347	8900	10.24	1379	9231	10.62
10,000	1287	8781	10.10	1321	9137	10.51	1355	9488	10.91	1387	9836	11.31	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: 685-939 (208/230 and 460-v), 751-954 (575-v)
Mid-Low Range: 949-1206
Mid-High Range: 941-1176
High Range: 1014-1297
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: 4.25 (208/230 and 460-v), 5.75 (575-v)
Mid-Low Range: 5.75
Mid-High Range: 8.63
High Range: 11.50

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJD028 (25 TONS) (Low Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,500	750	2,468	2.84	806	2,767	3.18	854	3,031	3.49	898	3,298	3.79	943	3,584	4.12
7,000	797	2,942	3.38	853	3,276	3.77	899	3,557	4.09	941	3,832	4.41	982	4,118	4.74
7,500	845	3,468	3.99	900	3,840	4.42	945	4,142	4.76	985	4,430	5.09	1024	4,721	5.43
8,000	892	4,045	4.65	948	4,462	5.13	991	4,789	5.51	1030	5,092	5.86	1067	5,391	6.20
8,500	939	4,677	5.38	995	5,141	5.91	1038	5,497	6.32	1076	5,818	6.69	1112	6,129	7.05
9,000	986	5,364	6.17	1042	5,882	6.76	1085	6,269	7.21	1122	6,611	7.60	1157	6,936	7.98
9,500	1033	6,108	7.03	1090	6,684	7.69	1132	7,105	8.17	1169	7,470	8.59	1203	7,813	8.99
10,000	1079	6,911	7.95	1137	7,550	8.68	1180	8,007	9.21	1216	8,399	9.66	1249	8,761	10.08
10,500	1126	7,773	8.94	1184	8,480	9.75	1227	8,978	10.33	1263	9,399	10.81	1296	9,782	11.25
11,000	1172	8,696	10.00	1232	9,475	10.90	1274	10,017	11.52	1310	10,468	12.04	1342	10,876	12.51
11,500	1219	9,681	11.13	1279	10,539	12.12	1322	11,127	12.80	1357	11,611	13.35	—	—	—
12,000	1265	10,732	12.34	1326	11,669	13.42	—	—	—	—	—	—	—	—	—
12,500	1311	11,848	13.63	—	—	—	—	—	—	—	—	—	—	—	—

48HJD028 (25 TONS) (Low Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,500	988	3,900	4.49	1035	4,250	4.89	1082	4,634	5.33	1130	5,053	5.81	1177	5,499	6.32
7,000	1024	4,426	5.09	1066	4,760	5.48	1109	5,126	5.90	1153	5,524	6.35	1197	5,953	6.85
7,500	1063	5,026	5.78	1101	5,351	6.15	1141	5,702	6.56	1181	6,081	6.99	1222	6,490	7.46
8,000	1104	5,698	6.55	1140	6,020	6.92	1176	6,361	7.32	1213	6,727	7.74	1251	7,118	8.19
8,500	1146	6,443	7.41	1180	6,765	7.78	1214	7,103	8.17	1249	7,459	8.58	1283	7,837	9.01
9,000	1190	7,259	8.35	1222	7,586	8.73	1255	7,925	9.11	1287	8,276	9.52	1319	8,645	9.94
9,500	1235	8,148	9.37	1266	8,483	9.76	1296	8,824	10.15	1327	9,176	10.55	1357	9,541	10.97
10,000	1280	9,111	10.48	1310	9,456	10.88	1340	9,804	11.28	1369	10,158	11.68	1398	10,522	12.10
10,500	1326	10,147	11.67	1355	10,505	12.08	1384	10,862	12.49	—	—	—	—	—	—
11,000	1372	11,259	12.95	—	—	—	—	—	—	—	—	—	—	—	—
11,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: 687-873
Mid-Low Range: 805-1007
Mid-High Range: 941-1176
High Range: 1014-1297
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: 5.75
Mid-Low Range: 5.75
Mid-High Range: 8.63
High Range: 11.50

Performance data — 48HJ (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJE028 (25 TONS) (Medium Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,500	775	2,600	2.99	825	2,872	3.30	871	3,130	3.60	915	3,400	3.91	959	3,692	4.25
7,000	826	3,115	3.58	875	3,408	3.92	918	3,679	4.23	959	3,954	4.55	1000	4,245	4.88
7,500	878	3,690	4.24	925	4,006	4.61	966	4,292	4.94	1005	4,575	5.26	1043	4,868	5.60
8,000	929	4,326	4.98	975	4,667	5.37	1015	4,970	5.72	1052	5,265	6.06	1088	5,564	6.40
8,500	981	5,029	5.78	1026	5,395	6.20	1064	5,717	6.58	1100	6,025	6.93	1134	6,332	7.28
9,000	1033	5,799	6.67	1076	6,191	7.12	1114	6,533	7.51	1148	6,856	7.89	1181	7,173	8.25
9,500	1085	6,640	7.64	1128	7,058	8.12	1164	7,421	8.54	1198	7,761	8.93	1229	8,091	9.31
10,000	1137	7,553	8.69	1179	8,000	9.20	1214	8,385	9.64	1247	8,741	10.05	1278	9,086	10.45
10,500	1190	8,542	9.82	1230	9,016	10.37	1265	9,424	10.84	1297	9,799	11.27	1327	10,158	11.68
11,000	1242	9,609	11.05	1282	10,111	11.63	1316	10,542	12.12	1347	10,937	12.58	1376	11,311	13.01
11,500	1294	10,756	12.37	1333	11,287	12.98	1367	11,741	13.50	—	—	—	—	—	—
12,000	1347	11,985	13.78	—	—	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJE028 (25 TONS) (Medium Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,500	1004	4,016	4.62	1050	4,374	5.03	1098	4,769	5.48	1145	5,195	5.97	1192	5646	6.49
7,000	1041	4,559	5.24	1083	4,902	5.64	1126	5,277	6.07	1170	5,685	6.54	1214	6122	7.04
7,500	1081	5,179	5.96	1120	5,512	6.34	1159	5,872	6.75	1199	6,261	7.20	1240	6680	7.68
8,000	1124	5,875	6.76	1160	6,203	7.13	1196	6,553	7.54	1233	6,928	7.97	1270	7329	8.43
8,500	1168	6,647	7.64	1202	6,974	8.02	1235	7,318	8.42	1269	7,684	8.84	1304	8071	9.28
9,000	1214	7,495	8.62	1245	7,825	9.00	1277	8,168	9.39	1309	8,527	9.81	1341	8905	10.24
9,500	1260	8,421	9.69	1290	8,756	10.07	1320	9,100	10.47	1351	9,457	10.88	1381	9830	11.31
10,000	1308	9,425	10.84	1337	9,768	11.23	1365	10,116	11.63	1394	10,474	12.05	—	—	—
10,500	1356	10,510	12.09	1384	10,862	12.49	—	—	—	—	—	—	—	—	—
11,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: 687-873
Mid-Low Range: 805-1007
Mid-High Range: 941-1176
High Range: 1014-1297
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: 5.75
Mid-Low Range: 5.75
Mid-High Range: 8.63
High Range: 11.50

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJF028 (25 TONS) (High Heat Units)*

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,500	775	2,600	2.99	825	2,872	3.30	871	3,130	3.60	915	3,400	3.91	959	3,692	4.25
7,000	826	3,115	3.58	875	3,408	3.92	918	3,679	4.23	959	3,954	4.55	1000	4,245	4.88
7,500	878	3,690	4.24	925	4,006	4.61	966	4,292	4.94	1005	4,575	5.26	1043	4,868	5.60
8,000	929	4,326	4.98	975	4,667	5.37	1015	4,970	5.72	1052	5,265	6.06	1088	5,564	6.40
8,500	981	5,029	5.78	1026	5,395	6.20	1064	5,717	6.58	1100	6,025	6.93	1134	6,332	7.28
9,000	1033	5,799	6.67	1076	6,191	7.12	1114	6,533	7.51	1148	6,856	7.89	1181	7,173	8.25
9,500	1085	6,640	7.64	1128	7,058	8.12	1164	7,421	8.54	1198	7,761	8.93	1229	8,091	9.31
10,000	1137	7,553	8.69	1179	8,000	9.20	1214	8,385	9.64	1247	8,741	10.05	1278	9,086	10.45
10,500	1190	8,542	9.82	1230	9,016	10.37	1265	9,424	10.84	1297	9,799	11.27	1327	10,158	11.68
11,000	1242	9,609	11.05	1282	10,111	11.63	1316	10,542	12.12	1347	10,937	12.58	1376	11,311	13.01
11,500	1294	10,756	12.37	1333	11,287	12.98	1367	11,741	13.50	—	—	—	—	—	—
12,000	1347	11,985	13.78	—	—	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJF028 (25 TONS) (High Heat Units)* (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,500	1004	4,016	4.62	1050	4,374	5.03	1098	4,769	5.48	1145	5,195	5.97	1192	5646	6.49
7,000	1041	4,559	5.24	1083	4,902	5.64	1126	5,277	6.07	1170	5,685	6.54	1214	6122	7.04
7,500	1081	5,179	5.96	1120	5,512	6.34	1159	5,872	6.75	1199	6,261	7.20	1240	6680	7.68
8,000	1124	5,875	6.76	1160	6,203	7.13	1196	6,553	7.54	1233	6,928	7.97	1270	7329	8.43
8,500	1168	6,647	7.64	1202	6,974	8.02	1235	7,318	8.42	1269	7,684	8.84	1304	8071	9.28
9,000	1214	7,495	8.62	1245	7,825	9.00	1277	8,168	9.39	1309	8,527	9.81	1341	8905	10.24
9,500	1260	8,421	9.69	1290	8,756	10.07	1320	9,100	10.47	1351	9,457	10.88	1381	9830	11.31
10,000	1308	9,425	10.84	1337	9,768	11.23	1365	10,116	11.63	1394	10,474	12.05	—	—	—
10,500	1356	10,510	12.09	1384	10,862	12.49	—	—	—	—	—	—	—	—	—
11,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: 687-873
Mid-Low Range: 805-1007
Mid-High Range: 941-1176
High Range: 1014-1297
All other rpms require field-supplied drive.

Refer to this page for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: 5.75
Mid-Low Range: 5.75
Mid-High Range: 8.63
High Range: 11.50

GENERAL NOTES FOR FAN PERFORMANCE DATA TABLES

1. Static pressure losses (i.e., EconoMi$er IV) must be added to external static pressure before entering Fan Performance table.
2. Interpolation is permissible. Do not extrapolate.
3. Fan performance is based on wet coils, clean filters, and casing losses. See Accessory/FIOP Static Pressure table on page 216.
4. Extensive motor and drive testing on these units ensures that the full horsepower and watts range of the motor can be utilized with confidence. Using the fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
5. Use of a field-supplied motor may affect wire size. Contact your Carrier representative for details.
6. Field-supplied drive requires changing belt and motor pulley to meet desired air flow. See application data or contact your local Carrier representative for details.

Performance data — 48HE/HJ (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS

48HE003 (2Tons)

AIRFLOW (Cfm)	EXTERNALSTATIC PRESSURE (in. wg)											
	0.1		0.2		0.4		0.6		0.8		1.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
600	**490**	**0.08**	**521**	**0.08**	**597**	**0.14**	703	0.21	788	0.29	868	0.37
700	**519**	**0.09**	**557**	**0.09**	623	0.16	729	0.24	816	0.32	**892**	**0.41**
800	**537**	**0.1**	**582**	**0.12**	650	0.19	751	0.27	845	0.37	**927**	**0.47**
900	**560**	**0.13**	**610**	**0.14**	681	0.22	783	0.32	**870**	**0.42**	**947**	**0.53**
1000	**589**	**0.15**	640	0.16	707	0.26	808	0.36	**894**	**0.47**	**971**	**0.58**

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 680 to 1044 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS

48HE/HJ004 (3 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**553**	**0.14**	**134**	681	0.22	221	782	0.32	316	870	0.42	417	948	0.53	526
1000	**582**	**0.16**	**163**	707	0.26	257	807	0.36	358	894	0.47	466	971	0.58	580
1100	**612**	**0.20**	**196**	734	0.30	297	833	0.41	405	919	0.52	519	995	0.64	639
1200	**643**	**0.23**	**234**	762	0.34	343	859	0.46	458	944	0.58	579	1020	0.71	705
1300	**675**	**0.28**	**277**	790	0.40	394	886	0.52	517	969	0.65	644	1044	0.78	777
1400	707	0.33	326	819	0.45	452	913	0.58	581	996	0.72	716	**1070**	**0.86**	**855**
1500	740	0.38	382	849	0.52	515	941	0.66	653	1023	0.80	795	**1096**	**0.95**	**941**

48HE/HJ004 (3 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	1019	0.64	640	**1084**	**0.76**	**760**	**1146**	**0.89**	**885**	**1203**	**1.02**	**1016**	**1258**	**1.16**	**1152**
1000	1042	0.70	700	**1107**	**0.83**	**825**	**1168**	**0.96**	**956**	**1225**	**1.10**	**1091**	—	—	—
1100	**1065**	**0.77**	**765**	**1130**	**0.90**	**896**	**1190**	**1.04**	**1032**	**1247**	**1.18**	**1173**	—	—	—
1200	**1089**	**0.84**	**837**	**1153**	**0.98**	**974**	**1213**	**1.12**	**1115**	—	—	—	—	—	—
1300	**1113**	**0.92**	**915**	**1177**	**1.06**	**1058**	—	—	—	—	—	—	—	—	—
1400	**1138**	**1.01**	**1000**	**1201**	**1.15**	**1149**	—	—	—	—	—	—	—	—	—
1500	**1163**	**1.10**	**1092**	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 680 to 1044 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.

48HE/HJ004 (3 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**553**	**0.14**	**134**	**681**	**0.22**	**221**	**782**	**0.32**	**316**	**870**	**0.42**	**417**	**948**	**0.53**	**526**
1000	**582**	**0.16**	**163**	**707**	**0.26**	**257**	**807**	**0.36**	**358**	**894**	**0.47**	**466**	**971**	**0.58**	**580**
1100	**612**	**0.20**	**196**	**734**	**0.30**	**297**	**833**	**0.41**	**405**	**919**	**0.52**	**519**	**995**	**0.64**	**639**
1200	**643**	**0.23**	**234**	**762**	**0.34**	**343**	**859**	**0.46**	**458**	**944**	**0.58**	**579**	**1020**	**0.71**	**705**
1300	**675**	**0.28**	**277**	**790**	**0.40**	**394**	**886**	**0.52**	**517**	**969**	**0.65**	**644**	**1044**	**0.78**	**777**
1400	**707**	**0.33**	**326**	**819**	**0.45**	**452**	**913**	**0.58**	**581**	**996**	**0.72**	**716**	**1070**	**0.86**	**855**
1500	**740**	**0.38**	**382**	**849**	**0.52**	**515**	**941**	**0.66**	**653**	**1023**	**0.80**	**795**	1096	0.95	941

48HE/HJ004 (3 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**1019**	**0.64**	**640**	1084	0.76	760	1146	0.89	885	1203	1.02	1016	1258	1.16	1152
1000	**1042**	**0.70**	**700**	1107	0.83	825	1168	0.96	956	1225	1.10	1091	1279	1.24	1232
1100	**1065**	**0.77**	**765**	1130	0.90	896	1190	1.04	1032	1247	1.18	1173	1301	1.33	1319
1200	1089	0.84	837	1153	0.98	974	1213	1.12	1115	1270	1.27	1262	1324	1.42	1413
1300	1113	0.92	915	1177	1.06	1058	1237	1.21	1205	1293	1.36	1358	1347	1.52	1514
1400	1138	1.01	1000	1201	1.15	1149	1261	1.31	1303	1317	1.47	1461	1370	1.63	1623
1500	1163	1.10	1092	1226	1.25	1247	1285	1.41	1407	1341	1.58	1571	1394	1.75	1740

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1075 to 1455 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

Performance data — 48HE/HJ (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HE/HJ005 (4 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	**643**	**0.23**	**234**	**762**	**0.34**	**343**	859	0.46	458	944	0.58	579	1020	0.71	705
1300	**675**	**0.28**	**277**	790	0.40	394	886	0.52	517	969	0.65	644	1044	0.78	777
1400	**707**	**0.33**	**326**	819	0.45	452	913	0.58	581	996	0.72	716	1070	0.86	855
1500	**740**	**0.38**	**382**	849	0.52	515	941	0.66	653	1023	0.80	795	1096	0.95	941
1600	773	0.45	444	879	0.59	586	970	0.73	731	1050	0.88	880	1123	1.04	1034
1700	807	0.52	513	910	0.67	663	999	0.82	817	1078	0.98	973	1150	1.14	1134
1800	841	0.59	589	942	0.75	749	1029	0.91	910	1106	1.08	1074	—	—	—
1900	875	0.68	674	974	0.85	842	1059	1.02	1012	1135	1.19	1184	—	—	—
2000	910	0.77	767	1006	0.95	944	1090	1.13	1122	—	—	—	—	—	—

48HE/HJ005 (4 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1089	0.84	837	1153	0.98	974	**1213**	**1.12**	**1115**	—	—	—	—	—	—
1300	1113	0.92	915	1177	1.06	1058	—	—	—	—	—	—	—	—	—
1400	1138	1.01	1000	**1201**	**1.15**	**1149**	—	—	—	—	—	—	—	—	—
1500	1163	1.10	1092	—	—	—	—	—	—	—	—	—	—	—	—
1600	**1189**	**1.20**	**1191**	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 770 to 1185 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.

48HE/HJ005 (4 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	**643**	**0.23**	**234**	**762**	**0.34**	**343**	**859**	**0.46**	**458**	**944**	**0.58**	**579**	**1020**	**0.71**	**705**
1300	**675**	**0.28**	**277**	**790**	**0.40**	**394**	**886**	**0.52**	**517**	**969**	**0.65**	**644**	**1044**	**0.78**	**777**
1400	**707**	**0.33**	**326**	**819**	**0.45**	**452**	**913**	**0.58**	**581**	**996**	**0.72**	**716**	**1070**	**0.86**	**855**
1500	**740**	**0.38**	**382**	**849**	**0.52**	**515**	**941**	**0.66**	**653**	**1023**	**0.80**	**795**	1096	0.95	941
1600	**773**	**0.45**	**444**	**879**	**0.59**	**586**	**970**	**0.73**	**731**	**1050**	**0.88**	**880**	1123	1.04	1034
1700	**807**	**0.52**	**513**	**910**	**0.67**	**663**	**999**	**0.82**	**817**	1078	0.98	973	1150	1.14	1134
1800	**841**	**0.59**	**589**	**942**	**0.75**	**749**	**1029**	**0.91**	**910**	1106	1.08	1074	1177	1.25	1242
1900	**875**	**0.68**	**674**	**974**	**0.85**	**842**	**1059**	**1.02**	**1012**	1135	1.19	1184	1205	1.37	1360
2000	**910**	**0.77**	**767**	**1006**	**0.95**	**944**	1090	1.13	1122	1165	1.31	1302	1234	1.49	1485

48HE/HJ005 (4 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1089	0.84	837	1153	0.98	974	1213	1.12	1115	1270	1.27	1262	1324	1.42	1413
1300	1113	0.92	915	1177	1.06	1058	1237	1.21	1205	1293	1.36	1358	1347	1.52	1514
1400	1138	1.01	1000	1201	1.15	1149	1261	1.31	1303	1317	1.47	1461	1370	1.63	1623
1500	1163	1.10	1092	1226	1.25	1247	1285	1.41	1407	1341	1.58	1571	1394	1.75	1740
1600	1189	1.20	1191	1252	1.36	1353	1310	1.53	1520	1365	1.70	1690	1418	1.87	1865
1700	1216	1.31	1299	1277	1.48	1468	1335	1.65	1640	1390	1.83	1817	1442	2.01	1998
1800	1242	1.42	1414	1303	1.60	1590	1361	1.78	1770	1415	1.96	1953	**1467**	**2.15**	**2140**
1900	1270	1.55	1538	1330	1.73	1721	1387	1.92	1908	1441	2.11	2098	**1493**	**2.30**	**2292**
2000	1297	1.68	1672	1357	1.87	1862	1414	2.07	2055	**1467**	**2.26**	**2252**	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1075 to 1455 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

48HE/HJ006 (5 TONS) — STANDARD MOTOR (BELT DRIVE)* — SINGLE-PHASE UNITS

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**800**	**0.39**	**350**	**904**	**0.49**	**438**	**999**	**0.60**	**535**	1087	0.72	640	1169	0.85	753
1600	**839**	**0.46**	**412**	**938**	**0.57**	**505**	**1030**	**0.68**	**605**	1115	0.80	714	1195	0.93	829
1700	**879**	**0.54**	**483**	**974**	**0.65**	**580**	1062	0.77	684	1144	0.90	796	1221	1.03	914
1800	**919**	**0.63**	**561**	**1010**	**0.75**	**663**	1095	0.87	771	1174	1.00	886	1250	1.14	1008
1900	**960**	**0.73**	**648**	1047	0.85	754	1129	0.98	867	1206	1.11	986	1279	1.25	1111
2000	**1001**	**0.84**	**744**	1085	0.96	855	1163	1.09	972	1238	1.23	1095	—	—	—
2100	1043	0.96	850	1123	1.09	965	1199	1.22	1086	—	—	—	—	—	—
2200	1085	1.09	966	1162	1.22	1086	—	—	—	—	—	—	—	—	—
2300	1127	1.23	1092	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HE/HJ006 (5 TONS) — STANDARD MOTOR (BELT DRIVE)* — SINGLE-PHASE UNITS (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1247	0.98	873	1320	1.13	1002	1390	1.28	1137	—	—	—	—	—	—
1600	1270	1.07	952	1342	1.22	1083	—	—	—	—	—	—	—	—	—
1700	1295	1.17	1040	—	—	—	—	—	—	—	—	—	—	—	—
1800	1321	1.28	1137	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1035 to 1460 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.30.

48HE/HJ006 (5 TONS) — STANDARD MOTOR (BELT DRIVE)* — THREE-PHASE UNITS

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**800**	**0.39**	**350**	**904**	**0.49**	**438**	**999**	**0.60**	**535**	1087	0.72	640	1169	0.85	753
1600	**839**	**0.46**	**412**	**938**	**0.57**	**505**	**1030**	**0.68**	**605**	1115	0.80	714	1195	0.93	829
1700	**879**	**0.54**	**483**	**974**	**0.65**	**580**	1062	0.77	684	1144	0.90	796	1221	1.03	914
1800	**919**	**0.63**	**561**	**1010**	**0.75**	**663**	1095	0.87	771	1174	1.00	886	1250	1.14	1008
1900	**960**	**0.73**	**648**	1047	0.85	754	1129	0.98	867	1206	1.11	986	1279	1.25	1111
2000	**1001**	**0.84**	**744**	1085	0.96	855	1163	1.09	972	1238	1.23	1095	1309	1.38	1224
2100	1043	0.96	850	1123	1.09	965	1199	1.22	1086	1271	1.37	1213	1340	1.52	1346
2200	1085	1.09	966	1162	1.22	1086	1235	1.36	1211	1305	1.51	1342	1372	1.67	1479
2300	1127	1.23	1092	1201	1.37	1217	1272	1.52	1347	1340	1.67	1482	1405	1.83	1623
2400	1169	1.38	1229	1241	1.53	1359	1310	1.68	1493	1375	1.84	1633	1439	2.00	1778
2500	1212	1.55	1378	1281	1.70	1513	1348	1.86	1652	1412	2.02	1796	**1473**	**2.19**	**1945**

48HE/HJ006 (5 TONS) — STANDARD MOTOR (BELT DRIVE)* — THREE-PHASE UNITS (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1247	0.98	873	1320	1.13	1002	1390	1.28	1137	1457	1.44	1280	**1522**	**1.61**	**1430**
1600	1270	1.07	952	1342	1.22	1083	1411	1.37	1221	**1476**	**1.54**	**1365**	**1540**	**1.71**	**1517**
1700	1295	1.17	1040	1365	1.32	1173	1432	1.48	1313	**1497**	**1.64**	**1459**	**1559**	**1.82**	**1612**
1800	1321	1.28	1137	1390	1.43	1273	1455	1.59	1415	**1518**	**1.76**	**1563**	**1579**	**1.93**	**1718**
1900	1348	1.40	1243	1415	1.56	1381	**1479**	**1.72**	**1526**	**1541**	**1.89**	**1677**	**1601**	**2.06**	**1834**
2000	1377	1.53	1359	1442	1.69	1500	**1505**	**1.86**	**1648**	**1565**	**2.03**	**1801**	**1624**	**2.21**	**1961**
2100	1406	1.67	1485	**1470**	**1.83**	**1629**	**1531**	**2.00**	**1780**	**1591**	**2.18**	**1936**	**1648**	**2.36**	**2098**
2200	1437	1.83	1621	**1499**	**1.99**	**1769**	**1559**	**2.16**	**1923**	**1617**	**2.34**	**2082**	—	—	—
2300	**1468**	**1.99**	**1769**	**1529**	**2.16**	**1920**	**1587**	**2.34**	**2077**	—	—	—	—	—	—
2400	**1500**	**2.17**	**1928**	**1559**	**2.35**	**2083**	—	—	—	—	—	—	—	—	—
2500	**1533**	**2.36**	**2098**	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1035 to 1460 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

Performance data — 48HE/HJ (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HE/HJ006 (5 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**800**	**0.39**	**350**	**904**	**0.49**	**438**	**999**	**0.60**	**535**	**1087**	**0.72**	**640**	**1169**	**0.85**	**753**
1600	**839**	**0.46**	**412**	**938**	**0.57**	**505**	**1030**	**0.68**	**605**	**1115**	**0.80**	**714**	**1195**	**0.93**	**829**
1700	**879**	**0.54**	**483**	**974**	**0.65**	**580**	**1062**	**0.77**	**684**	**1144**	**0.90**	**796**	**1221**	**1.03**	**914**
1800	**919**	**0.63**	**561**	**1010**	**0.75**	**663**	**1095**	**0.87**	**771**	**1174**	**1.00**	**886**	**1250**	**1.14**	**1008**
1900	**960**	**0.73**	**648**	**1047**	**0.85**	**754**	**1129**	**0.98**	**867**	**1206**	**1.11**	**986**	**1279**	**1.25**	**1111**
2000	**1001**	**0.84**	**744**	**1085**	**0.96**	**855**	**1163**	**1.09**	**972**	**1238**	**1.23**	**1095**	1309	1.38	1224
2100	**1043**	**0.96**	**850**	**1123**	**1.09**	**965**	**1199**	**1.22**	**1086**	**1271**	**1.37**	**1213**	1340	1.52	1346
2200	**1085**	**1.09**	**966**	**1162**	**1.22**	**1086**	**1235**	**1.36**	**1211**	1305	1.51	1342	1372	1.67	1479
2300	**1127**	**1.23**	**1092**	**1201**	**1.37**	**1217**	**1272**	**1.52**	**1347**	1340	1.67	1482	1405	1.83	1623
2400	**1169**	**1.38**	**1229**	**1241**	**1.53**	**1359**	1310	1.68	1493	1375	1.84	1633	1439	2.00	1778
2500	**1212**	**1.55**	**1378**	**1281**	**1.70**	**1513**	1348	1.86	1652	1412	2.02	1796	1473	2.19	1945

48HE/HJ006 (5 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**1247**	**0.98**	**873**	1320	1.13	1002	1390	1.28	1137	1457	1.44	1280	1522	1.61	1430
1600	**1270**	**1.07**	**952**	1342	1.22	1083	1411	1.37	1221	1476	1.54	1365	1540	1.71	1517
1700	**1295**	**1.17**	**1040**	1365	1.32	1173	1432	1.48	1313	1497	1.64	1459	1559	1.82	1612
1800	1321	1.28	1137	1390	1.43	1273	1455	1.59	1415	1518	1.76	1563	1579	1.93	1718
1900	1348	1.40	1243	1415	1.56	1381	1479	1.72	1526	1541	1.89	1677	1601	2.06	1834
2000	1377	1.53	1359	1442	1.69	1500	1505	1.86	1648	1565	2.03	1801	1624	2.21	1961
2100	1406	1.67	1485	1470	1.83	1629	1531	2.00	1780	1591	2.18	1936	1648	2.36	2098
2200	1437	1.83	1621	1499	1.99	1769	1559	2.16	1923	1617	2.34	2082	1673	2.53	2246
2300	1468	1.99	1769	1529	2.16	1920	1587	2.34	2077	1644	2.52	2239	**1699**	**2.71**	**2406**
2400	1500	2.17	1928	1559	2.35	2083	1616	2.53	2243	1672	2.71	2408	**1726**	**2.90**	**2579**
2500	1533	2.36	2098	1591	2.54	2257	1647	2.73	2421	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1300 to 1685 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

48HJ007 (6 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	**913**	**0.64**	**569**	**1010**	**0.80**	**715**	**1098**	**0.98**	**869**	1178	1.16	1032	1252	1.35	1203
1900	**952**	**0.73**	**652**	**1046**	**0.91**	**805**	1131	1.09	965	1210	1.28	1134	1282	1.48	1311
2000	**992**	**0.84**	**744**	**1083**	**1.02**	**903**	1166	1.21	1070	1242	1.40	1245	1313	1.61	1427
2100	**1032**	**0.95**	**844**	1120	1.14	1010	1200	1.33	1184	1275	1.54	1365	1345	1.75	1553
2200	**1073**	**1.07**	**954**	1158	1.27	1127	1236	1.47	1307	1308	1.68	1495	1377	1.90	1689
2300	**1114**	**1.21**	**1074**	1196	1.41	1254	1272	1.62	1440	1343	1.84	1634	1409	2.07	1834
2400	1155	1.36	1204	1234	1.57	1391	1308	1.78	1584	1377	2.01	1784	1443	2.24	1990
2500	1196	1.51	1345	1273	1.73	1538	1345	1.96	1738	1412	2.19	1945	—	—	—
2600	1238	1.69	1497	1312	1.91	1697	1382	2.14	1904	1448	2.38	2117	—	—	—
2700	1280	1.87	1660	1352	2.10	1867	1420	2.34	2081	—	—	—	—	—	—
2800	1322	2.07	1835	1392	2.31	2050	—	—	—	—	—	—	—	—	—
2900	1364	2.28	2023	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJ007 (6 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	1322	1.56	1382	1388	1.77	1568	1451	1.98	1762	1510	2.21	1962	—	—	—
1900	1351	1.68	1495	1416	1.90	1686	1477	2.12	1885	1536	2.35	2090	—	—	—
2000	1380	1.82	1617	1444	2.04	1814	1505	2.27	2017	—	—	—	—	—	—
2100	1411	1.97	1748	1473	2.20	1950	—	—	—	—	—	—	—	—	—
2200	1441	2.13	1890	1503	2.36	2097	—	—	—	—	—	—	—	—	—
2300	1473	2.30	2041	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1119 to 1585 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

48HJ007 (6 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	**913**	**0.64**	**569**	**1010**	**0.80**	**715**	**1098**	**0.98**	**869**	**1178**	**1.16**	**1032**	**1252**	**1.35**	**1203**
1900	**952**	**0.73**	**652**	**1046**	**0.91**	**805**	**1131**	**1.09**	**965**	**1210**	**1.28**	**1134**	**1282**	**1.48**	**1311**
2000	**992**	**0.84**	**744**	**1083**	**1.02**	**903**	**1166**	**1.21**	**1070**	**1242**	**1.40**	**1245**	1313	1.61	1427
2100	**1032**	**0.95**	**844**	**1120**	**1.14**	**1010**	**1200**	**1.33**	**1184**	**1275**	**1.54**	**1365**	1345	1.75	1553
2200	**1073**	**1.07**	**954**	**1158**	**1.27**	**1127**	**1236**	**1.47**	**1307**	1308	1.68	1495	1377	1.90	1689
2300	**1114**	**1.21**	**1074**	**1196**	**1.41**	**1254**	**1272**	**1.62**	**1440**	1343	1.84	1634	1409	2.07	1834
2400	**1155**	**1.36**	**1204**	**1234**	**1.57**	**1391**	1308	1.78	1584	1377	2.01	1784	1443	2.24	1990
2500	**1196**	**1.51**	**1345**	**1273**	**1.73**	**1538**	1345	1.96	1738	1412	2.19	1945	1477	2.43	2157
2600	**1238**	**1.69**	**1497**	1312	1.91	1697	1382	2.14	1904	1448	2.38	2117	1511	2.63	2335
2700	**1280**	**1.87**	**1660**	1352	2.10	1867	1420	2.34	2081	1484	2.59	2300	1546	2.84	2526
2800	1322	2.07	1835	1392	2.31	2050	1458	2.56	2270	1521	2.81	2496	—	—	—
2900	1364	2.28	2023	1432	2.53	2245	1496	2.78	2472	—	—	—	—	—	—
3000	1406	2.50	2224	1472	2.76	2452	—	—	—	—	—	—	—	—	—

48HJ007 (6 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	1322	1.56	1382	1388	1.77	1568	1451	1.98	1762	1510	2.21	1962	1568	2.44	2169
1900	1351	1.68	1495	1416	1.90	1686	1477	2.12	1885	1536	2.35	2090	1593	2.59	2302
2000	1380	1.82	1617	1444	2.04	1814	1505	2.27	2017	1563	2.51	2227	1619	2.75	2443
2100	1411	1.97	1748	1473	2.20	1950	1533	2.43	2159	1590	2.67	2374	—	—	—
2200	1441	2.13	1890	1503	2.36	2097	1562	2.60	2311	1618	2.85	2532	—	—	—
2300	1473	2.30	2041	1533	2.54	2254	1591	2.79	2474	—	—	—	—	—	—
2400	1505	2.48	2203	1564	2.73	2422	—	—	—	—	—	—	—	—	—
2500	1537	2.68	2376	—	—	—	—	—	—	—	—	—	—	—	—
2600	1571	2.88	2560	—	—	—	—	—	—	—	—	—	—	—	—
2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

*Motor drive range: 1300 to 1686 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

Performance data — 48HJ (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJ008 (7 1/2 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**505**	**0.52**	**484**	**586**	**0.73**	**681**	**657**	**0.97**	**901**	**722**	**1.22**	**1142**	**782**	**1.50**	**1403**
2300	**513**	**0.55**	**509**	**592**	**0.76**	**708**	**663**	**1.00**	**931**	**727**	**1.26**	**1174**	**787**	**1.54**	**1437**
2400	**527**	**0.60**	**561**	**605**	**0.82**	**766**	**674**	**1.07**	**993**	**738**	**1.33**	**1241**	**796**	**1.62**	**1508**
2500	**543**	**0.66**	**617**	**618**	**0.89**	**828**	**686**	**1.14**	**1060**	**748**	**1.41**	**1312**	**806**	**1.70**	**1583**
2550	**550**	**0.69**	**647**	**625**	**0.92**	**860**	**692**	**1.17**	**1095**	**754**	**1.45**	**1349**	**811**	**1.74**	**1623**
2600	**558**	**0.73**	**677**	**632**	**0.96**	**894**	**698**	**1.21**	**1131**	**759**	**1.49**	**1388**	**816**	**1.78**	**1664**
2700	**574**	**0.80**	**742**	**645**	**1.03**	**964**	**710**	**1.29**	**1207**	**770**	**1.58**	**1469**	**826**	**1.88**	**1749**
2800	**589**	**0.87**	**811**	**659**	**1.11**	**1039**	**723**	**1.38**	**1287**	**782**	**1.67**	**1554**	**837**	**1.97**	**1839**
2900	**605**	**0.95**	**885**	**673**	**1.20**	**1119**	**736**	**1.47**	**1372**	**794**	**1.76**	**1644**	848	2.07	1933
3000	**621**	**1.03**	**963**	**688**	**1.29**	**1204**	**749**	**1.57**	**1463**	**806**	**1.87**	**1740**	859	2.18	2033
3100	**637**	**1.12**	**1046**	**702**	**1.39**	**1293**	**762**	**1.67**	**1558**	**818**	**1.97**	**1840**	871	2.29	2139
3200	**654**	**1.22**	**1135**	**717**	**1.49**	**1388**	**776**	**1.78**	**1658**	**831**	**2.09**	**1946**	882	2.41	2249
3300	**670**	**1.32**	**1228**	**732**	**1.60**	**1488**	**789**	**1.89**	**1764**	843	2.21	2057	894	2.54	2365
3400	**686**	**1.42**	**1328**	**747**	**1.71**	**1593**	**803**	**2.01**	**1876**	856	2.33	2174	907	2.67	2488
3500	**703**	**1.54**	**1433**	**762**	**1.83**	**1705**	**817**	**2.14**	**1993**	870	2.46	2297	919	2.81	2616
3600	**720**	**1.66**	**1543**	**777**	**1.95**	**1822**	**832**	**2.27**	**2116**	883	2.60	2425	—	—	—
3700	**736**	**1.78**	**1660**	**793**	**2.09**	**1944**	846	2.41	2245	896	2.75	2560	—	—	—
3750	**745**	**1.85**	**1721**	**801**	**2.15**	**2008**	853	2.48	2312	903	2.82	2630	—	—	—

48HJ008 (7 1/2 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**838**	**1.81**	**1683**	891	2.12	1981	941	2.46	2297	988	2.82	2629	—	—	—
2300	842	1.84	1719	895	2.17	2019	944	2.51	2336	992	2.86	2669	—	—	—
2400	851	1.92	1793	903	2.25	2097	952	2.59	2416	—	—	—	—	—	—
2500	860	2.01	1873	911	2.34	2180	960	2.68	2502	—	—	—	—	—	—
2550	865	2.05	1914	916	2.38	2223	964	2.73	2547	—	—	—	—	—	—
2600	869	2.10	1957	920	2.43	2267	968	2.78	2593	—	—	—	—	—	—
2700	879	2.19	2046	929	2.53	2360	976	2.88	2689	—	—	—	—	—	—
2800	889	2.29	2140	938	2.64	2458	—	—	—	—	—	—	—	—	—
2900	899	2.40	2239	948	2.75	2561	—	—	—	—	—	—	—	—	—
3000	910	2.51	2343	958	2.86	2670	—	—	—	—	—	—	—	—	—
3100	921	2.63	2453	—	—	—	—	—	—	—	—	—	—	—	—
3200	932	2.75	2569	—	—	—	—	—	—	—	—	—	—	—	—
3300	943	2.88	2690	—	—	—	—	—	—	—	—	—	—	—	—
3400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJ008 (7 1/2 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**505**	**0.52**	**484**	**586**	**0.73**	**681**	**657**	**0.97**	**901**	**722**	**1.22**	**1142**	**782**	**1.50**	**1403**
2300	**513**	**0.55**	**509**	**592**	**0.76**	**708**	**663**	**1.00**	**931**	**727**	**1.26**	**1174**	**787**	**1.54**	**1437**
2400	**527**	**0.60**	**561**	**605**	**0.82**	**766**	**674**	**1.07**	**993**	**738**	**1.33**	**1241**	**796**	**1.62**	**1508**
2500	**543**	**0.66**	**617**	**618**	**0.89**	**828**	**686**	**1.14**	**1060**	**748**	**1.41**	**1312**	**806**	**1.70**	**1583**
2550	**550**	**0.69**	**647**	**625**	**0.92**	**860**	**692**	**1.17**	**1095**	**754**	**1.45**	**1349**	**811**	**1.74**	**1623**
2600	**558**	**0.73**	**677**	**632**	**0.96**	**894**	**698**	**1.21**	**1131**	**759**	**1.49**	**1388**	**816**	**1.78**	**1664**
2700	**574**	**0.80**	**742**	**645**	**1.03**	**964**	**710**	**1.29**	**1207**	**770**	**1.58**	**1469**	**826**	**1.88**	**1749**
2800	**589**	**0.87**	**811**	**659**	**1.11**	**1039**	**723**	**1.38**	**1287**	**782**	**1.67**	**1554**	**837**	**1.97**	**1839**
2900	**605**	**0.95**	**885**	**673**	**1.20**	**1119**	**736**	**1.47**	**1372**	**794**	**1.76**	**1644**	**848**	**2.07**	**1933**
3000	**621**	**1.03**	**963**	**688**	**1.29**	**1204**	**749**	**1.57**	**1463**	**806**	**1.87**	**1740**	**859**	**2.18**	**2033**
3100	**637**	**1.12**	**1046**	**702**	**1.39**	**1293**	**762**	**1.67**	**1558**	**818**	**1.97**	**1840**	871	2.29	2139
3200	**654**	**1.22**	**1135**	**717**	**1.49**	**1388**	**776**	**1.78**	**1658**	**831**	**2.09**	**1946**	882	2.41	2249
3300	**670**	**1.32**	**1228**	**732**	**1.60**	**1488**	**789**	**1.89**	**1764**	**843**	**2.21**	**2057**	894	2.54	2365
3400	**686**	**1.42**	**1328**	**747**	**1.71**	**1593**	**803**	**2.01**	**1876**	**856**	**2.33**	**2174**	907	2.67	2488
3500	**703**	**1.54**	**1433**	**762**	**1.83**	**1705**	**817**	**2.14**	**1993**	870	2.46	2297	919	2.81	2616
3600	**720**	**1.66**	**1543**	**777**	**1.95**	**1822**	**832**	**2.27**	**2116**	883	2.60	2425	932	2.95	2750
3700	**736**	**1.78**	**1660**	**793**	**2.09**	**1944**	**846**	**2.41**	**2245**	896	2.75	2560	944	3.10	2889
3750	**745**	**1.85**	**1721**	**801**	**2.15**	**2008**	**853**	**2.48**	**2312**	903	2.82	2630	951	3.18	2962

48HJ008 (7 1/2 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**838**	**1.81**	**1683**	891	2.12	1981	941	2.46	2297	988	2.82	2629	1033	3.19	2976
2300	**842**	**1.84**	**1719**	895	2.17	2019	944	2.51	2336	992	2.86	2669	1037	3.24	3018
2400	**851**	**1.92**	**1793**	903	2.25	2097	952	2.59	2416	999	2.95	2752	1043	3.33	3104
2500	860	2.01	1873	911	2.34	2180	960	2.68	2502	1006	3.05	2842	1051	3.43	3196
2550	865	2.05	1914	916	2.38	2223	964	2.73	2547	1010	3.10	2888	1054	3.48	3243
2600	869	2.10	1957	920	2.43	2267	968	2.78	2593	1014	3.15	2935	1058	3.53	3292
2700	879	2.19	2046	929	2.53	2360	976	2.88	2689	1022	3.25	3035	1066	3.64	3395
2800	889	2.29	2140	938	2.64	2458	985	2.99	2791	1030	3.37	3140	1073	3.76	3503
2900	899	2.40	2239	948	2.75	2561	994	3.11	2898	1039	3.49	3250	**1082**	**3.88**	**3616**
3000	910	2.51	2343	958	2.86	2670	1004	3.23	3011	1048	3.61	3366	**1090**	**4.01**	**3736**
3100	921	2.63	2453	968	2.98	2783	1013	3.35	3128	1057	3.74	3488	**1099**	**4.14**	**3861**
3200	932	2.75	2569	978	3.11	2903	1023	3.49	3252	1066	3.88	3616	—	—	—
3300	943	2.88	2690	989	3.25	3029	1033	3.63	3382	1076	4.02	3749	—	—	—
3400	954	3.02	2816	1000	3.39	3159	1044	3.77	3518	**1086**	**4.17**	**3889**	—	—	—
3500	966	3.16	2950	1011	3.54	3297	1054	3.92	3660	—	—	—	—	—	—
3600	978	3.31	3088	1022	3.69	3442	1065	4.08	3808	—	—	—	—	—	—
3700	990	3.47	3233	1034	3.85	3591	—	—	—	—	—	—	—	—	—
3750	996	3.55	3308	1040	3.93	3669	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 4.20.

Performance data — 48HJ (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJ009 (8 1/2 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2500	**513**	**0.45**	**423**	**603**	**0.62**	**576**	**682**	**0.78**	**732**	**753**	**0.96**	**892**	**817**	**1.13**	**1055**
2600	**526**	**0.50**	**463**	**614**	**0.67**	**621**	**692**	**0.84**	**783**	**761**	**1.02**	**948**	**825**	**1.20**	**1117**
2700	**539**	**0.54**	**505**	**625**	**0.72**	**670**	**702**	**0.90**	**837**	**770**	**1.08**	**1008**	**834**	**1.27**	**1182**
2800	**552**	**0.59**	**551**	**637**	**0.77**	**721**	**712**	**0.96**	**894**	**780**	**1.15**	**1070**	842	1.34	1250
2900	**565**	**0.64**	**599**	**648**	**0.83**	**775**	**722**	**1.02**	**954**	**789**	**1.22**	**1136**	851	1.42	1321
3000	**579**	**0.70**	**651**	**660**	**0.89**	**832**	**732**	**1.09**	**1017**	**799**	**1.29**	**1204**	860	1.50	1395
3100	**592**	**0.76**	**706**	**672**	**0.96**	**893**	**743**	**1.16**	**1083**	**808**	**1.37**	**1276**	869	1.58	1471
3200	**606**	**0.82**	**764**	**684**	**1.03**	**957**	**754**	**1.24**	**1153**	**818**	**1.45**	**1351**	878	1.66	1552
3300	**620**	**0.88**	**825**	**696**	**1.10**	**1024**	**765**	**1.31**	**1225**	**829**	**1.53**	**1429**	888	1.75	1636
3400	**634**	**0.95**	**890**	**709**	**1.17**	**1095**	**777**	**1.40**	**1302**	**839**	**1.62**	**1511**	897	1.85	1723
3500	**648**	**1.03**	**958**	**721**	**1.25**	**1169**	**788**	**1.48**	**1381**	850	1.71	1597	907	1.95	1815
3600	**662**	**1.10**	**1030**	**734**	**1.34**	**1246**	**800**	**1.57**	**1465**	860	1.81	1686	917	2.05	1909
3700	**676**	**1.19**	**1106**	**747**	**1.42**	**1328**	**811**	**1.66**	**1552**	871	1.91	1779	927	2.15	2008
3800	**690**	**1.27**	**1185**	**760**	**1.52**	**1414**	**823**	**1.76**	**1644**	882	2.01	1876	938	2.26	2111
3900	**705**	**1.36**	**1269**	**773**	**1.61**	**1503**	**835**	**1.86**	**1739**	894	2.12	1977	948	2.38	2217
4000	**719**	**1.45**	**1357**	**786**	**1.71**	**1597**	848	1.97	1838	905	2.23	2082	959	2.50	2328
4100	**734**	**1.55**	**1449**	**799**	**1.82**	**1695**	860	2.08	1942	917	2.35	2192	970	2.62	2443
4200	**748**	**1.66**	**1545**	**813**	**1.93**	**1797**	872	2.20	2050	928	2.47	2305	981	2.75	2562
4300	**763**	**1.76**	**1646**	**826**	**2.04**	**1903**	885	2.32	2162	940	2.60	2423	992	2.88	2686

48HJ009 (8 1/2 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2500	877	1.31	1222	933	1.49	1392	986	1.68	1565	1037	1.87	1742	1085	2.06	1921
2600	885	1.38	1289	940	1.57	1464	993	1.76	1643	1043	1.96	1824	**1091**	**2.15**	**2008**
2700	892	1.46	1359	948	1.65	1540	1000	1.85	1723	1049	2.05	1909	**1097**	**2.25**	**2099**
2800	900	1.54	1432	955	1.74	1618	1007	1.94	1807	1056	2.14	1998	**1103**	**2.35**	**2192**
2900	908	1.62	1508	963	1.82	1699	1014	2.03	1893	1063	2.24	2089	**1110**	**2.45**	**2289**
3000	917	1.70	1587	970	1.91	1784	1021	2.13	1983	1070	2.34	2185	**1117**	**2.56**	**2389**
3100	925	1.79	1670	979	2.01	1872	1029	2.23	2076	1077	2.45	2283	**1123**	**2.67**	**2492**
3200	934	1.88	1756	987	2.10	1963	1037	2.33	2172	1085	2.56	2384	**1131**	**2.79**	**2599**
3300	943	1.98	1845	995	2.21	2057	1045	2.44	2272	**1092**	**2.67**	**2490**	—	—	—
3400	952	2.08	1939	1004	2.31	2156	1053	2.55	2376	**1100**	**2.79**	**2599**	—	—	—
3500	961	2.18	2035	1013	2.42	2258	1062	2.66	2483	—	—	—	—	—	—
3600	971	2.29	2135	1022	2.53	2364	1070	2.78	2595	—	—	—	—	—	—
3700	981	2.40	2240	1031	2.65	2473	—	—	—	—	—	—	—	—	—
3800	990	2.52	2348	1040	2.77	2587	—	—	—	—	—	—	—	—	—
3900	1000	2.64	2459	1050	2.90	2705	—	—	—	—	—	—	—	—	—
4000	1011	2.76	2576	—	—	—	—	—	—	—	—	—	—	—	—
4100	1021	2.89	2697	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJ009 (8 1/2 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2500	**513**	**0.45**	**423**	**603**	**0.62**	**576**	**682**	**0.78**	**732**	**753**	**0.96**	**892**	**817**	**1.13**	**1055**
2600	**526**	**0.50**	**463**	**614**	**0.67**	**621**	**692**	**0.84**	**783**	**761**	**1.02**	**948**	**825**	**1.20**	**1117**
2700	**539**	**0.54**	**505**	**625**	**0.72**	**670**	**702**	**0.90**	**837**	**770**	**1.08**	**1008**	**834**	**1.27**	**1182**
2800	**552**	**0.59**	**551**	**637**	**0.77**	**721**	**712**	**0.96**	**894**	**780**	**1.15**	**1070**	**842**	**1.34**	**1250**
2900	**565**	**0.64**	**599**	**648**	**0.83**	**775**	**722**	**1.02**	**954**	**789**	**1.22**	**1136**	**851**	**1.42**	**1321**
3000	**579**	**0.70**	**651**	**660**	**0.89**	**832**	**732**	**1.09**	**1017**	**799**	**1.29**	**1204**	860	1.50	1395
3100	**592**	**0.76**	**706**	**672**	**0.96**	**893**	**743**	**1.16**	**1083**	**808**	**1.37**	**1276**	869	1.58	1471
3200	**606**	**0.82**	**764**	**684**	**1.03**	**957**	**754**	**1.24**	**1153**	**818**	**1.45**	**1351**	878	1.66	1552
3300	**620**	**0.88**	**825**	**696**	**1.10**	**1024**	**765**	**1.31**	**1225**	**829**	**1.53**	**1429**	888	1.75	1636
3400	**634**	**0.95**	**890**	**709**	**1.17**	**1095**	**777**	**1.40**	**1302**	**839**	**1.62**	**1511**	897	1.85	1723
3500	**648**	**1.03**	**958**	**721**	**1.25**	**1169**	**788**	**1.48**	**1381**	**850**	**1.71**	**1597**	907	1.95	1815
3600	**662**	**1.10**	**1030**	**734**	**1.34**	**1246**	**800**	**1.57**	**1465**	860	1.81	1686	917	2.05	1909
3700	**676**	**1.19**	**1106**	**747**	**1.42**	**1328**	**811**	**1.66**	**1552**	871	1.91	1779	927	2.15	2008
3800	**690**	**1.27**	**1185**	**760**	**1.52**	**1414**	**823**	**1.76**	**1644**	882	2.01	1876	938	2.26	2111
3900	**705**	**1.36**	**1269**	**773**	**1.61**	**1503**	**835**	**1.86**	**1739**	894	2.12	1977	948	2.38	2217
4000	**719**	**1.45**	**1357**	**786**	**1.71**	**1597**	**848**	**1.97**	**1838**	905	2.23	2082	959	2.50	2328
4100	**734**	**1.55**	**1449**	**799**	**1.82**	**1695**	860	2.08	1942	917	2.35	2192	970	2.62	2443
4200	**748**	**1.66**	**1545**	**813**	**1.93**	**1797**	872	2.20	2050	928	2.47	2305	981	2.75	2562
4300	**763**	**1.76**	**1646**	**826**	**2.04**	**1903**	885	2.32	2162	940	2.60	2423	992	2.88	2686

48HJ009 (8 1/2 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2500	877	1.31	1222	933	1.49	1392	986	1.68	1565	1037	1.87	1742	**1085**	**2.06**	**1921**
2600	885	1.38	1289	940	1.57	1464	993	1.76	1643	1043	1.96	1824	**1091**	**2.15**	**2008**
2700	892	1.46	1359	948	1.65	1540	1000	1.85	1723	1049	2.05	1909	**1097**	**2.25**	**2099**
2800	900	1.54	1432	955	1.74	1618	1007	1.94	1807	1056	2.14	1998	**1103**	**2.35**	**2192**
2900	908	1.62	1508	963	1.82	1699	1014	2.03	1893	1063	2.24	2089	**1110**	**2.45**	**2289**
3000	917	1.70	1587	970	1.91	1784	1021	2.13	1983	1070	2.34	2185	**1117**	**2.56**	**2389**
3100	925	1.79	1670	979	2.01	1872	1029	2.23	2076	1077	2.45	2283	**1123**	**2.67**	**2492**
3200	934	1.88	1756	987	2.10	1963	1037	2.33	2172	**1085**	**2.56**	**2384**	**1131**	**2.79**	**2599**
3300	943	1.98	1845	995	2.21	2057	1045	2.44	2272	**1092**	**2.67**	**2490**	**1138**	**2.91**	**2710**
3400	952	2.08	1939	1004	2.31	2156	1053	2.55	2376	**1100**	**2.79**	**2599**	**1145**	**3.03**	**2824**
3500	961	2.18	2035	1013	2.42	2258	1062	2.66	2483	**1108**	**2.91**	**2711**	**1153**	**3.15**	**2942**
3600	971	2.29	2135	1022	2.53	2364	1070	2.78	2595	**1116**	**3.03**	**2827**	**1161**	**3.29**	**3063**
3700	981	2.40	2240	1031	2.65	2473	1079	2.91	2709	**1125**	**3.16**	**2948**	**1169**	**3.42**	**3189**
3800	990	2.52	2348	1040	2.77	2587	**1088**	**3.03**	**2828**	**1133**	**3.30**	**3073**	**1177**	**3.56**	**3319**
3900	1000	2.64	2459	1050	2.90	2705	**1097**	**3.17**	**2951**	**1142**	**3.43**	**3201**	**1186**	**3.70**	**3452**
4000	1011	2.76	2576	1059	3.03	2826	**1106**	**3.30**	**3079**	**1151**	**3.58**	**3334**	**1194**	**3.85**	**3591**
4100	1021	2.89	2697	1069	3.17	2953	**1116**	**3.44**	**3210**	**1160**	**3.72**	**3471**	**1203**	**4.00**	**3733**
4200	1031	3.03	2822	1079	3.31	3083	**1125**	**3.59**	**3347**	**1169**	**3.87**	**3612**	**1212**	**4.16**	**3880**
4300	1042	3.16	2951	**1089**	**3.45**	**3218**	**1135**	**3.74**	**3487**	**1179**	**4.03**	**3758**	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 4.20.

Performance data — 48HJ (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJ012 (10 TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	**579**	**0.70**	**651**	**660**	**0.89**	**832**	**732**	**1.09**	**1017**	**799**	**1.29**	**1204**	860	1.50	1395
3100	**592**	**0.76**	**706**	**672**	**0.96**	**893**	**743**	**1.16**	**1083**	**808**	**1.37**	**1276**	869	1.58	1471
3200	**606**	**0.82**	**764**	**684**	**1.03**	**957**	**754**	**1.24**	**1153**	**818**	**1.45**	**1351**	878	1.66	1552
3300	**620**	**0.88**	**825**	**696**	**1.10**	**1024**	**765**	**1.31**	**1225**	**829**	**1.53**	**1429**	888	1.75	1636
3400	**634**	**0.95**	**890**	**709**	**1.17**	**1095**	**777**	**1.40**	**1302**	**839**	**1.62**	**1511**	897	1.85	1723
3500	**648**	**1.03**	**958**	**721**	**1.25**	**1169**	**788**	**1.48**	**1381**	**850**	**1.71**	**1597**	907	1.95	1815
3600	**662**	**1.10**	**1030**	**734**	**1.34**	**1246**	**800**	**1.57**	**1465**	860	1.81	1686	917	2.05	1909
3700	**676**	**1.19**	**1106**	**747**	**1.42**	**1328**	**811**	**1.66**	**1552**	871	1.91	1779	927	2.15	2008
3800	**690**	**1.27**	**1185**	**760**	**1.52**	**1414**	**823**	**1.76**	**1644**	882	2.01	1876	938	2.26	2111
3900	**705**	**1.36**	**1269**	**773**	**1.61**	**1503**	**835**	**1.86**	**1739**	894	2.12	1977	948	2.38	2217
4000	**719**	**1.45**	**1357**	**786**	**1.71**	**1597**	**848**	**1.97**	**1838**	905	2.23	2082	959	2.50	2328
4100	**734**	**1.55**	**1449**	**799**	**1.82**	**1695**	860	2.08	1942	917	2.35	2192	970	2.62	2443
4200	**748**	**1.66**	**1545**	**813**	**1.93**	**1797**	872	2.20	2050	928	2.47	2305	981	2.75	2562
4300	**763**	**1.76**	**1646**	**826**	**2.04**	**1903**	885	2.32	2162	940	2.60	2423	992	2.88	2686
4400	**778**	**1.88**	**1751**	**840**	**2.16**	**2014**	898	2.44	2279	952	2.73	2546	1004	3.02	2814
4500	**792**	**1.99**	**1860**	**853**	**2.28**	**2130**	910	2.57	2401	964	2.87	2673	1015	3.16	2947
4600	**807**	**2.12**	**1975**	867	2.41	2250	923	2.71	2527	976	3.01	2805	1027	3.31	3085
4700	**822**	**2.25**	**2094**	881	2.55	2375	936	2.85	2658	989	3.15	2942	1038	3.46	3227
4800	**837**	**2.38**	**2218**	895	2.69	2505	949	3.00	2794	1001	3.31	3083	1050	3.62	3375
4900	**852**	**2.52**	**2347**	909	2.83	2640	963	3.15	2935	1014	3.46	3230	—	—	—
5000	867	2.66	2482	923	2.98	2781	976	3.30	3081	1026	3.63	3383	—	—	—

48HJ012 (10 TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	917	1.70	1587	970	1.91	1784	1021	2.13	1983	1070	2.34	2185	**1117**	**2.56**	**2389**
3100	925	1.79	1670	979	2.01	1872	1029	2.23	2076	1077	2.45	2283	**1123**	**2.67**	**2492**
3200	934	1.88	1756	987	2.10	1963	1037	2.33	2172	**1085**	**2.56**	**2384**	**1131**	**2.79**	**2599**
3300	943	1.98	1845	995	2.21	2057	1045	2.44	2272	**1092**	**2.67**	**2490**	**1138**	**2.91**	**2710**
3400	952	2.08	1939	1004	2.31	2156	1053	2.55	2376	**1100**	**2.79**	**2599**	**1145**	**3.03**	**2824**
3500	961	2.18	2035	1013	2.42	2258	1062	2.66	2483	**1108**	**2.91**	**2711**	**1153**	**3.15**	**2942**
3600	971	2.29	2135	1022	2.53	2364	1070	2.78	2595	**1116**	**3.03**	**2827**	**1161**	**3.29**	**3063**
3700	981	2.40	2240	1031	2.65	2473	1079	2.91	2709	**1125**	**3.16**	**2948**	**1169**	**3.42**	**3189**
3800	990	2.52	2348	1040	2.77	2587	**1088**	**3.03**	**2828**	**1133**	**3.30**	**3073**	**1177**	**3.56**	**3319**
3900	1000	2.64	2459	1050	2.90	2705	**1097**	**3.17**	**2951**	**1142**	**3.43**	**3201**	**1186**	**3.70**	**3452**
4000	1011	2.76	2576	1059	3.03	2826	**1106**	**3.30**	**3079**	**1151**	**3.58**	**3334**	—	—	—
4100	1021	2.89	2697	1069	3.17	2953	**1116**	**3.44**	**3210**	—	—	—	—	—	—
4200	1031	3.03	2822	1079	3.31	3083	**1125**	**3.59**	**3347**	—	—	—	—	—	—
4300	1042	3.16	2951	**1089**	**3.45**	**3218**	—	—	—	—	—	—	—	—	—
4400	1053	3.31	3085	**1100**	**3.60**	**3357**	—	—	—	—	—	—	—	—	—
4500	1064	3.46	3224	—	—	—	—	—	—	—	—	—	—	—	—
4600	1075	3.61	3367	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 3.70.

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJ012 (10 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	**579**	**0.70**	**651**	**660**	**0.89**	**832**	**732**	**1.09**	**1017**	**799**	**1.29**	**1204**	860	1.50	1395
3100	**592**	**0.76**	**706**	**672**	**0.96**	**893**	**743**	**1.16**	**1083**	**808**	**1.37**	**1276**	869	1.58	1471
3200	**606**	**0.82**	**764**	**684**	**1.03**	**957**	**754**	**1.24**	**1153**	**818**	**1.45**	**1351**	878	1.66	1552
3300	**620**	**0.88**	**825**	**696**	**1.10**	**1024**	**765**	**1.31**	**1225**	**829**	**1.53**	**1429**	888	1.75	1636
3400	**634**	**0.95**	**890**	**709**	**1.17**	**1095**	**777**	**1.40**	**1302**	839	1.62	1511	897	1.85	1723
3500	**648**	**1.03**	**958**	**721**	**1.25**	**1169**	**788**	**1.48**	**1381**	850	1.71	1597	907	1.95	1815
3600	**662**	**1.10**	**1030**	**734**	**1.34**	**1246**	**800**	**1.57**	**1465**	860	1.81	1686	917	2.05	1909
3700	**676**	**1.19**	**1106**	**747**	**1.42**	**1328**	**811**	**1.66**	**1552**	871	1.91	1779	927	2.15	2008
3800	**690**	**1.27**	**1185**	**760**	**1.52**	**1414**	**823**	**1.76**	**1644**	882	2.01	1876	938	2.26	2111
3900	**705**	**1.36**	**1269**	**773**	**1.61**	**1503**	835	1.86	1739	894	2.12	1977	948	2.38	2217
4000	**719**	**1.45**	**1357**	**786**	**1.71**	**1597**	848	1.97	1838	905	2.23	2082	959	2.50	2328
4100	**734**	**1.55**	**1449**	**799**	**1.82**	**1695**	860	2.08	1942	917	2.35	2192	970	2.62	2443
4200	**748**	**1.66**	**1545**	**813**	**1.93**	**1797**	872	2.20	2050	928	2.47	2305	981	2.75	2562
4300	**763**	**1.76**	**1646**	**826**	**2.04**	**1903**	885	2.32	2162	940	2.60	2423	992	2.88	2686
4400	**778**	**1.88**	**1751**	840	2.16	2014	898	2.44	2279	952	2.73	2546	1004	3.02	2814
4500	**792**	**1.99**	**1860**	853	2.28	2130	910	2.57	2401	964	2.87	2673	1015	3.16	2947
4600	**807**	**2.12**	**1975**	867	2.41	2250	923	2.71	2527	976	3.01	2805	1027	3.31	3085
4700	**822**	**2.25**	**2094**	881	2.55	2375	936	2.85	2658	989	3.15	2942	1038	3.46	3227
4800	837	2.38	2218	895	2.69	2505	949	3.00	2794	1001	3.31	3083	1050	3.62	3375
4900	852	2.52	2347	909	2.83	2640	963	3.15	2935	1014	3.46	3230	1062	3.78	3528
5000	867	2.66	2482	923	2.98	2781	976	3.30	3081	1026	3.63	3383	1074	3.95	3685

48HJ012 (10 TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	917	1.70	1587	970	1.91	1784	1021	2.13	1983	1070	2.34	2185	1117	2.56	2389
3100	925	1.79	1670	979	2.01	1872	1029	2.23	2076	1077	2.45	2283	1123	2.67	2492
3200	934	1.88	1756	987	2.10	1963	1037	2.33	2172	1085	2.56	2384	**1131**	**2.79**	**2599**
3300	943	1.98	1845	995	2.21	2057	1045	2.44	2272	1092	2.67	2490	**1138**	**2.91**	**2710**
3400	952	2.08	1939	1004	2.31	2156	1053	2.55	2376	1100	2.79	2599	**1145**	**3.03**	**2824**
3500	961	2.18	2035	1013	2.42	2258	1062	2.66	2483	1108	2.91	2711	**1153**	**3.15**	**2942**
3600	971	2.29	2135	1022	2.53	2364	1070	2.78	2595	1116	3.03	2827	**1161**	**3.29**	**3063**
3700	981	2.40	2240	1031	2.65	2473	1079	2.91	2709	1125	3.16	2948	**1169**	**3.42**	**3189**
3800	990	2.52	2348	1040	2.77	2587	1088	3.03	2828	**1133**	**3.30**	**3073**	**1177**	**3.56**	**3319**
3900	1000	2.64	2459	1050	2.90	2705	1097	3.17	2951	**1142**	**3.43**	**3201**	**1186**	**3.70**	**3452**
4000	1011	2.76	2576	1059	3.03	2826	1106	3.30	3079	**1151**	**3.58**	**3334**	**1194**	**3.85**	**3591**
4100	1021	2.89	2697	1069	3.17	2953	1116	3.44	3210	**1160**	**3.72**	**3471**	**1203**	**4.00**	**3733**
4200	1031	3.03	2822	1079	3.31	3083	1125	3.59	3347	**1169**	**3.87**	**3612**	**1212**	**4.16**	**3880**
4300	1042	3.16	2951	1089	3.45	3218	**1135**	**3.74**	**3487**	**1179**	**4.03**	**3758**	**1221**	**4.32**	**4031**
4400	1053	3.31	3085	1100	3.60	3357	**1145**	**3.90**	**3632**	**1188**	**4.19**	**3909**	**1230**	**4.49**	**4187**
4500	1064	3.46	3224	1110	3.76	3502	**1155**	**4.06**	**3782**	**1198**	**4.36**	**4064**	**1239**	**4.66**	**4348**
4600	1075	3.61	3367	1121	3.91	3650	**1165**	**4.22**	**3937**	**1208**	**4.53**	**4224**	**1249**	**4.84**	**4514**
4700	1086	3.77	3515	**1131**	**4.08**	**3805**	**1175**	**4.39**	**4096**	**1217**	**4.71**	**4389**	**1258**	**5.02**	**4684**
4800	1097	3.93	3668	**1142**	**4.25**	**3963**	**1186**	**4.57**	**4260**	**1228**	**4.89**	**4559**	**1268**	**5.21**	**4860**
4900	1109	4.10	3826	**1153**	**4.43**	**4128**	**1196**	**4.75**	**4430**	**1238**	**5.08**	**4734**	—	—	—
5000	1120	4.28	3990	**1164**	**4.61**	**4296**	**1207**	**4.94**	**4604**	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 830 to 1130 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 5.25.

Performance data — 48HJ (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJ014 (12½ TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	**676**	**1.19**	**1106**	**747**	**1.42**	**1328**	**811**	**1.66**	**1552**	871	1.91	1779	927	2.15	2008
3800	**690**	**1.27**	**1185**	**760**	**1.52**	**1414**	**823**	**1.76**	**1644**	882	2.01	1876	938	2.26	2111
3900	**705**	**1.36**	**1269**	**773**	**1.61**	**1503**	835	1.86	1739	894	2.12	1977	948	2.38	2217
4000	**719**	**1.45**	**1357**	**786**	**1.71**	**1597**	848	1.97	1838	905	2.23	2082	959	2.50	2328
4100	**734**	**1.55**	**1449**	**799**	**1.82**	**1695**	860	2.08	1942	917	2.35	2192	970	2.62	2443
4200	**748**	**1.66**	**1545**	**813**	**1.93**	**1797**	872	2.20	2050	928	2.47	2305	981	2.75	2562
4300	**763**	**1.76**	**1646**	**826**	**2.04**	**1903**	885	2.32	2162	940	2.60	2423	992	2.88	2686
4400	**778**	**1.88**	**1751**	840	2.16	2014	898	2.44	2279	952	2.73	2546	1004	3.02	2814
4500	**792**	**1.99**	**1860**	853	2.28	2130	910	2.57	2401	964	2.87	2673	1015	3.16	2947
4600	**807**	**2.12**	**1975**	867	2.41	2250	923	2.71	2527	976	3.01	2805	1027	3.31	3085
4700	**822**	**2.25**	**2094**	881	2.55	2375	936	2.85	2658	989	3.15	2942	1038	3.46	3227
4800	837	2.38	2218	895	2.69	2505	949	3.00	2794	1001	3.31	3083	1050	3.62	3375
4900	852	2.52	2347	909	2.83	2640	963	3.15	2935	1014	3.46	3230	1062	3.78	3528
5000	867	2.66	2482	923	2.98	2781	976	3.30	3081	1026	3.63	3383	1074	3.95	3685
5100	882	2.81	2622	937	3.14	2926	989	3.47	3232	1039	3.80	3540	1086	4.13	3849
5200	897	2.97	2766	951	3.30	3077	1003	3.63	3389	1052	3.97	3702	1099	4.31	4017
5300	912	3.13	2917	966	3.47	3233	1016	3.81	3551	1065	4.15	3870	1111	4.49	4191
5400	927	3.30	3073	980	3.64	3395	1030	3.99	3719	1078	4.34	4044	1123	4.69	4370
5500	943	3.47	3234	994	3.82	3563	1044	4.17	3892	1091	4.53	4223	**1136**	**4.88**	**4555**
5600	958	3.65	3402	1009	4.01	3736	1057	4.37	4071	1104	4.73	4408	**1149**	**5.09**	**4746**
5700	973	3.83	3575	1023	4.20	3915	1071	4.56	4256	1117	4.93	4599	—	—	—
5800	988	4.03	3754	1038	4.40	4100	1085	4.77	4447	1130	5.14	4796	—	—	—
5900	1004	4.22	3939	1052	4.60	4292	1099	4.98	4645	—	—	—	—	—	—
6000	1019	4.43	4131	1067	4.81	4489	1113	5.20	4848	—	—	—	—	—	—
6100	1034	4.64	4329	1082	5.03	4693	—	—	—	—	—	—	—	—	—
6200	1050	4.86	4533	—	—	—	—	—	—	—	—	—	—	—	—
6300	1065	5.09	4744	—	—	—	—	—	—	—	—	—	—	—	—

48HJ014 (12½ TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	981	2.40	2240	1031	2.65	2473	1079	2.91	2709	1125	3.16	2948	**1169**	**3.42**	**3189**
3800	990	2.52	2348	1040	2.77	2587	1088	3.03	2828	**1133**	**3.30**	**3073**	**1177**	**3.56**	**3319**
3900	1000	2.64	2459	1050	2.90	2705	1097	3.17	2951	**1142**	**3.43**	**3201**	**1186**	**3.70**	**3452**
4000	1011	2.76	2576	1059	3.03	2826	1106	3.30	3079	**1151**	**3.58**	**3334**	**1194**	**3.85**	**3591**
4100	1021	2.89	2697	1069	3.17	2953	1116	3.44	3210	**1160**	**3.72**	**3471**	**1203**	**4.00**	**3733**
4200	1031	3.03	2822	1079	3.31	3083	1125	3.59	3347	**1169**	**3.87**	**3612**	**1212**	**4.16**	**3880**
4300	1042	3.16	2951	1089	3.45	3218	**1135**	**3.74**	**3487**	**1179**	**4.03**	**3758**	**1221**	**4.32**	**4031**
4400	1053	3.31	3085	1100	3.60	3357	**1145**	**3.90**	**3632**	**1188**	**4.19**	**3909**	**1230**	**4.49**	**4187**
4500	1064	3.46	3224	1110	3.76	3502	**1155**	**4.06**	**3782**	**1198**	**4.36**	**4064**	**1239**	**4.66**	**4348**
4600	1075	3.61	3367	1121	3.91	3650	**1165**	**4.22**	**3937**	**1208**	**4.53**	**4224**	**1249**	**4.84**	**4514**
4700	1086	3.77	3515	**1131**	**4.08**	**3805**	**1175**	**4.39**	**4096**	**1217**	**4.71**	**4389**	**1258**	**5.02**	**4684**
4800	1097	3.93	3668	**1142**	**4.25**	**3963**	**1186**	**4.57**	**4260**	**1228**	**4.89**	**4559**	**1268**	**5.21**	**4860**
4900	1109	4.10	3826	**1153**	**4.43**	**4128**	**1196**	**4.75**	**4430**	**1238**	**5.08**	**4734**	—	—	—
5000	1120	4.28	3990	**1164**	**4.61**	**4296**	**1207**	**4.94**	**4604**	—	—	—	—	—	—
5100	**1132**	**4.46**	**4159**	**1175**	**4.79**	**4471**	**1218**	**5.13**	**4784**	—	—	—	—	—	—
5200	**1144**	**4.65**	**4333**	**1187**	**4.99**	**4651**	—	—	—	—	—	—	—	—	—
5300	**1155**	**4.84**	**4512**	**1198**	**5.19**	**4836**	—	—	—	—	—	—	—	—	—
5400	**1167**	**5.04**	**4697**	—	—	—	—	—	—	—	—	—	—	—	—
5500	**1179**	**5.24**	**4889**	—	—	—	—	—	—	—	—	—	—	—	—
5600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 830 to 1130 rpm. All other rpms require field-supplied drive.

See page 99 for general fan performance notes.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 5.25.

REFER TO 48HJ015,017 VERTICAL FAN PERFORMANCE TABLES ON PAGES 87-90 FOR FAN PERFORMANCE WITH HORIZONTAL ADAPTER CURB.

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJD020 (18 TONS) (Low Heat Units)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	635	1064	1.22	709	1278	1.47	776	1492	1.72	838	1708	1.96	896	1924	2.21
4,000	707	1402	1.61	773	1627	1.87	835	1853	2.13	892	2080	2.39	947	2307	2.65
4,500	780	1802	2.07	840	2037	2.34	897	2273	2.61	950	2510	2.89	1001	2465	2.84
5,000	853	2264	2.60	909	2510	2.89	961	2756	3.17	1011	2710	3.12	1059	3015	3.47
5,500	928	2794	3.21	979	3049	3.51	1028	3012	3.46	1075	3333	3.83	1120	3661	4.21
6,000	1003	3047	3.50	1051	3376	3.88	1096	3714	4.27	1140	4059	4.67	1182	4411	5.07
6,500	1079	3812	4.38	1123	4166	4.79	1166	4529	5.21	1207	4898	5.63	1247	5274	6.07
7,000	1155	4697	5.40	1196	5078	5.84	1236	5465	6.29	1275	5859	6.74	1313	6260	7.20
7,500	1231	5714	6.57	1270	6120	7.04	1308	6533	7.51	1345	6952	8.00	1381	7378	8.49
8,000	1308	6871	7.90	1344	7303	8.40	1380	7741	8.90	—	—	—	—	—	—
8,500	1385	8177	9.40	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJD020 (18 TONS) (Low Heat Units)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	951	2143	2.46	1003	2120	2.44	1052	2387	2.75	1100	2662	3.06	1146	2944	3.39
4,000	998	2535	2.92	1048	2548	2.93	1095	2835	3.26	1141	3129	3.60	1184	3432	3.95
4,500	1050	2756	3.17	1097	3055	3.51	1142	3363	3.87	1185	3678	4.23	1227	4001	4.60
5,000	1105	3329	3.83	1150	3651	4.20	1192	3979	4.58	1234	4315	4.96	1274	4658	5.36
5,500	1163	3997	4.60	1205	4342	4.99	1246	4692	5.40	1286	5051	5.81	1324	5415	6.23
6,000	1224	4771	5.49	1263	5138	5.91	1302	5511	6.34	1340	5892	6.78	1377	6278	7.22
6,500	1286	5658	6.51	1324	6048	6.96	1361	6445	7.41	1397	6847	7.87	—	—	—
7,000	1350	6668	7.67	1386	7081	8.14	—	—	—	—	—	—	—	—	—
7,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: Not Used
Mid-Low Range: 896-1227 (208/230 and 460-v), 863-1141 (575-v)
Mid-High Range: 1113-1414 (208/230 and 460-v), 1042-1285 (575-v)
High Range: 1096-1339
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: Not Used
Mid-Low Range: 4.25 (208/230 and 460-v), 3.45 (575-v)
Mid-High Range: 5.75
High Range: 8.63

Performance data — 48HJ (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJE020 (18 TONS) (Medium Heat Units)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	645	1105	1.27	720	1329	1.53	788	1549	1.78	851	1767	2.03	910	1982	2.28
4,000	718	1454	1.67	785	1692	1.95	848	1926	2.22	906	2158	2.48	962	2388	2.75
4,500	792	1866	2.15	853	2117	2.43	911	2364	2.72	965	2609	3.00	1017	2583	2.97
5,000	867	2343	2.69	923	2605	3.00	977	2865	3.30	1027	2845	3.27	1076	3163	3.64
5,500	943	2889	3.32	995	3162	3.64	1044	3158	3.63	1092	3497	4.02	1138	3843	4.42
6,000	1019	3177	3.65	1067	3532	4.06	1113	3892	4.48	1158	4259	4.90	1201	4631	5.33
6,500	1096	3973	4.57	1141	4354	5.01	1184	4742	5.45	1226	5136	5.91	1267	5535	6.37
7,000	1173	4894	5.63	1215	5304	6.10	1256	5719	6.58	1295	6140	7.06	1334	6567	7.55
7,500	1250	5952	6.85	1290	6389	7.35	1328	6832	7.86	1366	7281	8.37	—	—	—
8,000	1328	7153	8.23	1365	7620	8.76	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJE020 (18 TONS) (Medium Heat Units)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	965	2195	2.53	1018	2181	2.51	1068	2442	2.81	1116	2708	3.11	1162	2979	3.43
4,000	1014	2364	2.72	1064	2644	3.04	1112	2930	3.37	1158	3221	3.70	1202	3517	4.05
4,500	1067	2882	3.31	1114	3187	3.67	1160	3498	4.02	1204	3814	4.39	1246	4135	4.76
5,000	1123	3489	4.01	1168	3820	4.39	1211	4156	4.78	1253	4497	5.17	1294	4844	5.57
5,500	1182	4194	4.82	1224	4551	5.23	1266	4913	5.65	1306	5280	6.07	1345	5652	6.50
6,000	1243	5008	5.76	1283	5391	6.20	1323	5779	6.65	1361	6172	7.10	1398	6569	7.56
6,500	1306	5939	6.83	1345	6349	7.30	1382	6763	7.78	—	—	—	—	—	—
7,000	1371	6997	8.05	—	—	—	—	—	—	—	—	—	—	—	—
7,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: Not Used
Mid-Low Range: 896-1227 (208/230 and 460-v), 863-1141 (575-v)
Mid-High Range: 1113-1414 (208/230 and 460-v), 1042-1285 (575-v)
High Range: 1096-1339
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: Not Used
Mid-Low Range: 4.25 (208/230 and 460-v), 3.45 (575-v)
Mid-High Range: 5.75
High Range: 8.63

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJF020 (18 TONS) (High Heat Units)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	645	1105	1.27	720	1329	1.53	788	1549	1.78	851	1767	2.03	910	1982	2.28
4,000	718	1454	1.67	785	1692	1.95	848	1926	2.22	906	2158	2.48	962	2388	2.75
4,500	792	1866	2.15	853	2117	2.43	911	2364	2.72	965	2609	3.00	1017	2583	2.97
5,000	867	2343	2.69	923	2605	3.00	977	2865	3.30	1027	2845	3.27	1076	3163	3.64
5,500	943	2889	3.32	995	3162	3.64	1044	3158	3.63	1092	3497	4.02	1138	3843	4.42
6,000	1019	3177	3.65	1067	3532	4.06	1113	3892	4.48	1158	4259	4.90	1201	4631	5.33
6,500	1096	3973	4.57	1141	4354	5.01	1184	4742	5.45	1226	5136	5.91	1267	5535	6.37
7,000	1173	4894	5.63	1215	5304	6.10	1256	5719	6.58	1295	6140	7.06	1334	6567	7.55
7,500	1250	5952	6.85	1290	6389	7.35	1328	6832	7.86	1366	7281	8.37	—	—	—
8,000	1328	7153	8.23	1365	7620	8.76	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJF020 (18 TONS) (High Heat Units)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	965	2195	2.53	1018	2181	2.51	1068	2442	2.81	1116	2708	3.11	1162	2979	3.43
4,000	1014	2364	2.72	1064	2644	3.04	1112	2930	3.37	1158	3221	3.70	1202	3517	4.05
4,500	1067	2882	3.31	1114	3187	3.67	1160	3498	4.02	1204	3814	4.39	1246	4135	4.76
5,000	1123	3489	4.01	1168	3820	4.39	1211	4156	4.78	1253	4497	5.17	1294	4844	5.57
5,500	1182	4194	4.82	1224	4551	5.23	1266	4913	5.65	1306	5280	6.07	1345	5652	6.50
6,000	1243	5008	5.76	1283	5391	6.20	1323	5779	6.65	1361	6172	7.10	1398	6569	7.56
6,500	1306	5939	6.83	1345	6349	7.30	1382	6763	7.78	—	—	—	—	—	—
7,000	1371	6997	8.05	—	—	—	—	—	—	—	—	—	—	—	—
7,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: Not Used
Mid-Low Range: 896-1227 (208/230 and 460-v), 863-1141 (575-v)
Mid-High Range: 1113-1414 (208/230 and 460-v), 1042-1285 (575-v)
High Range: 1096-1339
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: Not Used
Mid-Low Range: 4.25 (208/230 and 460-v), 3.45 (575-v)
Mid-High Range: 5.75
High Range: 8.63

Performance data — 48HJ (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJD024 (20 TONS) (Low Heat Units)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	642	1082	1.24	714	1296	1.49	781	1510	1.74	843	1726	1.98	901	1943	2.23
4,000	714	1426	1.64	780	1651	1.90	841	1877	2.16	898	2103	2.42	952	2330	2.68
4,500	787	1831	2.11	847	2067	2.38	904	2303	2.65	957	2540	2.92	1008	2501	2.88
5,000	862	2301	2.65	917	2547	2.93	969	2793	3.21	1019	2755	3.17	1066	3062	3.52
5,500	937	2838	3.26	988	3094	3.56	1036	3067	3.53	1083	3390	3.90	1127	3719	4.28
6,000	1013	3113	3.58	1060	3445	3.96	1105	3783	4.35	1149	4130	4.75	1191	4484	5.16
6,500	1089	3893	4.48	1133	4250	4.89	1175	4615	5.31	1216	4986	5.73	1256	5364	6.17
7,000	1166	4798	5.52	1207	5181	5.96	1247	5570	6.41	1285	5965	6.86	1323	6369	7.32
7,500	1243	5837	6.71	1282	6244	7.18	1319	6658	7.66	1355	7080	8.14	1391	7507	8.63
8,000	1320	7017	8.07	1356	7450	8.57	1392	7890	9.08	—	—	—	—	—	—
8,500	1398	8350	9.60	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJD024 (20 TONS) (Low Heat Units)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	955	2160	2.48	1007	2142	2.46	1056	2409	2.77	1104	2684	3.09	1149	2968	3.41
4,000	1004	2299	2.64	1053	2578	2.96	1100	2865	3.29	1145	3160	3.63	1189	3463	3.98
4,500	1056	2793	3.21	1103	3093	3.56	1147	3402	3.91	1191	3718	4.28	1233	4041	4.65
5,000	1112	3376	3.88	1156	3699	4.25	1199	4029	4.63	1240	4366	5.02	1280	4710	5.42
5,500	1171	4057	4.67	1212	4402	5.06	1253	4754	5.47	1292	5114	5.88	1331	5480	6.30
6,000	1232	4845	5.57	1271	5213	6.00	1310	5588	6.43	1348	5970	6.87	1384	6358	7.31
6,500	1295	5749	6.61	1333	6141	7.06	1369	6538	7.52	—	—	—	—	—	—
7,000	1360	6778	7.80	1396	7193	8.27	—	—	—	—	—	—	—	—	—
7,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: Not Used
Mid-Low Range: 896-1227 (208/230 and 460-v), 873-1108 (575-v)
Mid-High Range: 1113-1414
High Range: 1096-1339
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: Not Used
Mid-Low Range: 4.25 (208/230 and 460-v), 5.75 (575-v)
Mid-High Range: 5.75
High Range: 8.63

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJE024 (20 TONS) (Medium Heat Units)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	652	1123	1.29	726	1347	1.55	793	1567	1.80	856	1784	2.05	914	2000	2.30
4,000	725	1479	1.70	792	1716	1.97	854	1950	2.24	912	2182	2.51	967	2412	2.77
4,500	800	1897	2.18	861	2148	2.47	918	2395	2.75	972	2639	3.04	1024	2620	3.01
5,000	875	2383	2.74	931	2645	3.04	984	2904	3.34	1035	2892	3.33	1083	3212	3.69
5,500	952	2937	3.38	1003	2883	3.32	1053	3217	3.70	1100	3558	4.09	1145	3905	4.49
6,000	1029	3249	3.74	1077	3605	4.15	1123	3966	4.56	1167	4334	4.98	1210	4707	5.41
6,500	1106	4061	4.67	1151	4445	5.11	1194	4834	5.56	1236	5229	6.01	1276	5629	6.47
7,000	1184	5003	5.75	1226	5414	6.23	1266	5831	6.71	1306	6253	7.19	1344	6681	7.68
7,500	1262	6083	7.00	1302	6522	7.50	1340	6967	8.01	1377	7417	8.53	—	—	—
8,000	1341	7312	8.41	1378	7779	8.95	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJE024 (20 TONS) (Medium Heat Units)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	970	2213	2.55	1022	2203	2.53	1072	2464	2.83	1120	2730	3.14	1166	3002	3.45
4,000	1019	2393	2.75	1069	2673	3.07	1117	2959	3.40	1163	3251	3.74	1207	3548	4.08
4,500	1073	2920	3.36	1120	3226	3.71	1165	3537	4.07	1209	3854	4.43	1252	4176	4.80
5,000	1130	3537	4.07	1174	3870	4.45	1218	4207	4.84	1259	4549	5.23	1300	4896	5.63
5,500	1189	4257	4.90	1232	4614	5.31	1273	4977	5.72	1313	5345	6.15	1352	5719	6.58
6,000	1251	5086	5.85	1292	5469	6.29	1331	5859	6.74	1369	6253	7.19	—	—	—
6,500	1315	6035	6.94	1354	6446	7.41	1391	6861	7.89	—	—	—	—	—	—
7,000	1381	7114	8.18	—	—	—	—	—	—	—	—	—	—	—	—
7,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: Not Used
Mid-Low Range: 896-1227 (208/230 and 460-v), 873-1108 (575-v)
Mid-High Range: 1113-1414
High Range: 1096-1339
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: Not Used
Mid-Low Range: 4.25 (208/230 and 460-v), 5.75 (575-v)
Mid-High Range: 5.75
High Range: 8.63

Performance data — 48HJ (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJF024 (20 TONS) (High Heat Units)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	652	1123	1.29	726	1347	1.55	793	1567	1.80	856	1784	2.05	914	2000	2.30
4,000	725	1479	1.70	792	1716	1.97	854	1950	2.24	912	2182	2.51	967	2412	2.77
4,500	800	1897	2.18	861	2148	2.47	918	2395	2.75	972	2639	3.04	1024	2620	3.01
5,000	875	2383	2.74	931	2645	3.04	984	2904	3.34	1035	2892	3.33	1083	3212	3.69
5,500	952	2937	3.38	1003	2883	3.32	1053	3217	3.70	1100	3558	4.09	1145	3905	4.49
6,000	1029	3249	3.74	1077	3605	4.15	1123	3966	4.56	1167	4334	4.98	1210	4707	5.41
6,500	1106	4061	4.67	1151	4445	5.11	1194	4834	5.56	1236	5229	6.01	1276	5629	6.47
7,000	1184	5003	5.75	1226	5414	6.23	1266	5831	6.71	1306	6253	7.19	1344	6681	7.68
7,500	1262	6083	7.00	1302	6522	7.50	1340	6967	8.01	1377	7417	8.53	—	—	—
8,000	1341	7312	8.41	1378	7779	8.95	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJF024 (20 TONS) (High Heat Units)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3,500	970	2213	2.55	1022	2203	2.53	1072	2464	2.83	1120	2730	3.14	1166	3002	3.45
4,000	1019	2393	2.75	1069	2673	3.07	1117	2959	3.40	1163	3251	3.74	1207	3548	4.08
4,500	1073	2920	3.36	1120	3226	3.71	1165	3537	4.07	1209	3854	4.43	1252	4176	4.80
5,000	1130	3537	4.07	1174	3870	4.45	1218	4207	4.84	1259	4549	5.23	1300	4896	5.63
5,500	1189	4257	4.90	1232	4614	5.31	1273	4977	5.72	1313	5345	6.15	1352	5719	6.58
6,000	1251	5086	5.85	1292	5469	6.29	1331	5859	6.74	1369	6253	7.19	—	—	—
6,500	1315	6035	6.94	1354	6446	7.41	1391	6861	7.89	—	—	—	—	—	—
7,000	1381	7114	8.18	—	—	—	—	—	—	—	—	—	—	—	—
7,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: Not Used
Mid-Low Range: 896-1227 (208/230 and 460-v), 873-1108 (575-v)
Mid-High Range: 1113-1414
High Range: 1096-1339
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: Not Used
Mid-Low Range: 4.25 (208/230 and 460-v), 5.75 (575-v)
Mid-High Range: 5.75
High Range: 8.63

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJD028 (25 TONS) (Low Heat Units)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
6,500	786	2,658	3.06	819	2,835	3.26	857	3,052	3.51	899	3,304	3.80	943	3,586	4.12
7,000	842	3,208	3.69	871	3,386	3.89	905	3,599	4.14	943	3,847	4.42	983	4,123	4.74
7,500	898	3,827	4.40	925	4,006	4.61	955	4,217	4.85	989	4,460	5.13	1026	4,733	5.44
8,000	955	4,518	5.20	979	4,699	5.40	1007	4,908	5.65	1037	5,148	5.92	1070	5,416	6.23
8,500	1012	5,284	6.08	1034	5,466	6.29	1059	5,675	6.53	1087	5,912	6.80	1117	6,176	7.10
9,000	1069	6,127	7.05	1090	6,312	7.26	1113	6,521	7.50	1138	6,757	7.77	1165	7,017	8.07
9,500	1127	7,050	8.11	1146	7,238	8.32	1167	7,448	8.57	1190	7,682	8.84	1215	7,940	9.13
10,000	1184	8,057	9.27	1202	8,247	9.49	1221	8,460	9.73	1243	8,693	10.00	1266	8,948	10.29
10,500	1242	9,149	10.52	1258	9,344	10.75	1276	9,557	10.99	1296	9,791	11.26	1318	10,046	11.55
11,000	1299	10,331	11.88	1315	10,529	12.11	1332	10,745	12.36	1350	10,979	12.63	1370	11,232	12.92
11,500	1357	11,604	13.35	1372	11,806	13.58	—	—	—	—	—	—	—	—	—
12,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJD028 (25 TONS) (Low Heat Units)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
6,500	988	3,900	4.49	1035	4,248	4.89	1082	4,632	5.33	1129	5,050	5.81	1177	5,499	6.32
7,000	1024	4,428	5.09	1066	4,760	5.48	1109	5,124	5.89	1153	5,521	6.35	1197	5,950	6.84
7,500	1063	5,031	5.79	1102	5,354	6.16	1141	5,703	6.56	1181	6,081	6.99	1221	6,487	7.46
8,000	1105	5,709	6.57	1140	6,025	6.93	1176	6,364	7.32	1213	6,729	7.74	1250	7,116	8.18
8,500	1149	6,465	7.44	1181	6,777	7.79	1215	7,109	8.18	1249	7,463	8.58	1283	7,838	9.02
9,000	1194	7,302	8.40	1225	7,608	8.75	1256	7,935	9.13	1287	8,282	9.53	1319	8,649	9.95
9,500	1242	8,222	9.46	1270	8,524	9.80	1298	8,847	10.17	1328	9,189	10.57	1358	9,548	10.98
10,000	1290	9,227	10.61	1316	9,525	10.96	1343	9,845	11.32	1370	10,181	11.71	1399	10,536	12.12
10,500	1340	10,321	11.87	1364	10,617	12.21	1389	10,932	12.57	—	—	—	—	—	—
11,000	1391	11,505	13.23	—	—	—	—	—	—	—	—	—	—	—	—
11,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: 687-873
Mid-Low Range: 805-1007
Mid-High Range: 941-1176
High Range: 1014-1297
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: 5.75
Mid-Low Range: 5.75
Mid-High Range: 8.63
High Range: 11.50

Performance data — 48HJ (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJE028 (25 TONS) (Medium Heat Units)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
6,500	799	2,730	3.14	833	2,914	3.35	872	3,135	3.61	914	3,392	3.90	958	3,687	4.24
7,000	856	3,294	3.79	887	3,481	4.00	921	3,699	4.25	958	3,950	4.54	999	4,235	4.87
7,500	913	3,929	4.52	941	4,118	4.74	972	4,335	4.99	1006	4,582	5.27	1042	4,860	5.59
8,000	971	4,637	5.33	996	4,829	5.55	1024	5,046	5.80	1055	5,290	6.08	1088	5,562	6.40
8,500	1029	5,421	6.24	1052	5,617	6.46	1078	5,835	6.71	1106	6,077	6.99	1136	6,345	7.30
9,000	1087	6,285	7.23	1108	6,484	7.46	1132	6,703	7.71	1158	6,946	7.99	1185	7,211	8.29
9,500	1145	7,231	8.32	1165	7,433	8.55	1187	7,655	8.80	1211	7,898	9.08	1236	8,161	9.39
10,000	1203	8,262	9.50	1222	8,468	9.74	1243	8,693	10.00	1265	8,936	10.28	1288	9,199	10.58
10,500	1261	9,381	10.79	1279	9,592	11.03	1299	9,820	11.29	1319	10,065	11.58	1341	10,327	11.88
11,000	1320	10,592	12.18	1337	10,807	12.43	1355	11,038	12.70	1374	11,284	12.98	1394	11,547	13.28
11,500	1378	11,896	13.68	—	—	—	—	—	—	—	—	—	—	—	—
12,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJE028 (25 TONS) (Medium Heat Units)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
6,500	1005	4,020	4.62	1052	4,390	5.05	1100	4,791	5.51	1148	5,221	6.00	1195	5673	6.52
7,000	1041	4,555	5.24	1084	4,908	5.64	1128	5,294	6.09	1172	5,710	6.57	1217	6153	7.08
7,500	1080	5,168	5.94	1119	5,508	6.33	1160	5,878	6.76	1201	6,279	7.22	1242	6708	7.71
8,000	1122	5,862	6.74	1158	6,190	7.12	1195	6,548	7.53	1233	6,934	7.97	1272	7347	8.45
8,500	1167	6,638	7.63	1200	6,959	8.00	1234	7,305	8.40	1269	7,677	8.83	1304	8076	9.29
9,000	1214	7,499	8.63	1244	7,813	8.99	1275	8,149	9.37	1308	8,511	9.79	1340	8896	10.23
9,500	1262	8,447	9.72	1290	8,754	10.07	1319	9,084	10.45	1349	9,437	10.85	1379	9812	11.28
10,000	1312	9,482	10.91	1338	9,785	11.25	1365	10,110	11.63	1392	10,454	12.02	—	—	—
10,500	1363	10,608	12.20	1387	10,909	12.55	—	—	—	—	—	—	—	—	—
11,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: 687-873
Mid-Low Range: 805-1007
Mid-High Range: 941-1176
High Range: 1014-1297
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: 5.75
Mid-Low Range: 5.75
Mid-High Range: 8.63
High Range: 11.50

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJF028 (25 TONS) (High Heat Units)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
6,500	799	2,730	3.14	833	2,914	3.35	872	3,135	3.61	914	3,392	3.90	958	3,687	4.24
7,000	856	3,294	3.79	887	3,481	4.00	921	3,699	4.25	958	3,950	4.54	999	4,235	4.87
7,500	913	3,929	4.52	941	4,118	4.74	972	4,335	4.99	1006	4,582	5.27	1042	4,860	5.59
8,000	971	4,637	5.33	996	4,829	5.55	1024	5,046	5.80	1055	5,290	6.08	1088	5,562	6.40
8,500	1029	5,421	6.24	1052	5,617	6.46	1078	5,835	6.71	1106	6,077	6.99	1136	6,345	7.30
9,000	1087	6,285	7.23	1108	6,484	7.46	1132	6,703	7.71	1158	6,946	7.99	1185	7,211	8.29
9,500	1145	7,231	8.32	1165	7,433	8.55	1187	7,655	8.80	1211	7,898	9.08	1236	8,161	9.39
10,000	1203	8,262	9.50	1222	8,468	9.74	1243	8,693	10.00	1265	8,936	10.28	1288	9,199	10.58
10,500	1261	9,381	10.79	1279	9,592	11.03	1299	9,820	11.29	1319	10,065	11.58	1341	10,327	11.88
11,000	1320	10,592	12.18	1337	10,807	12.43	1355	11,038	12.70	1374	11,284	12.98	1394	11,547	13.28
11,500	1378	11,896	13.68	—	—	—	—	—	—	—	—	—	—	—	—
12,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48HJF028 (25 TONS) (High Heat Units)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
6,500	1005	4,020	4.62	1052	4,390	5.05	1100	4,791	5.51	1148	5,221	6.00	1195	5673	6.52
7,000	1041	4,555	5.24	1084	4,908	5.64	1128	5,294	6.09	1172	5,710	6.57	1217	6153	7.08
7,500	1080	5,168	5.94	1119	5,508	6.33	1160	5,878	6.76	1201	6,279	7.22	1242	6708	7.71
8,000	1122	5,862	6.74	1158	6,190	7.12	1195	6,548	7.53	1233	6,934	7.97	1272	7347	8.45
8,500	1167	6,638	7.63	1200	6,959	8.00	1234	7,305	8.40	1269	7,677	8.83	1304	8076	9.29
9,000	1214	7,499	8.63	1244	7,813	8.99	1275	8,149	9.37	1308	8,511	9.79	1340	8896	10.23
9,500	1262	8,447	9.72	1290	8,754	10.07	1319	9,084	10.45	1349	9,437	10.85	1379	9812	11.28
10,000	1312	9,482	10.91	1338	9,785	11.25	1365	10,110	11.63	1392	10,454	12.02	—	—	—
10,500	1363	10,608	12.20	1387	10,909	12.55	—	—	—	—	—	—	—	—	—
11,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive ranges:
Low Range: 687-873
Mid-Low Range: 805-1007
Mid-High Range: 941-1176
High Range: 1014-1297
All other rpms require field-supplied drive.

Refer to page 99 for general Fan Performance Data notes.

NOTE: Maximum continuous bhp is:
Low Range: 5.75
Mid-Low Range: 5.75
Mid-High Range: 8.63
High Range: 11.50

Performance data — 48HE/HJ (cont)

FAN RPM AT MOTOR PULLEY SETTING WITH STANDARD MOTOR* — 48HE003-007 and 48HJ004-014

UNIT 48HJ/HE	MOTOR PULLEY TURNS OPEN												
	0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6
003	936	906	876	846	816	786	756	726	696	656	639	—	—
004	1044	1008	971	935	898	862	826	789	753	716	680	—	—
005	1185	1144	1102	1061	1019	978	936	895	853	812	770	—	—
006	1460	1425	1389	1354	1318	1283	1248	1212	1177	1141	1106	1070	1035
007	1585	1538	1492	1445	1399	1352	1305	1259	1212	1166	1119	—	—
008,009	1085	1060	1035	1010	985	960	935	910	890	865	840	—	—
012	1080	1060	1035	1015	990	970	950	925	905	880	860	—	—
014	1130	1112	1087	1062	1037	1212	987	962	937	912	887	962	830

*Approximate fan rpm shown (standard motor/drive).

FAN RPM AT MOTOR PULLEY SETTING WITH HIGH-STATIC MOTOR* — 48HE003-006 and 48HJ004-014

UNIT 48HE/HJ	MOTOR PULLEY TURNS OPEN												
	0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6
004	1455	1423	1392	1360	1328	1297	1265	1233	1202	1170	1138	1107	1075
005	1455	1423	1392	1360	1328	1297	1265	1233	1202	1170	1138	1107	1075
006	1685	1589	1557	1525	1493	1460	1428	1396	1364	1332	1300	—	—
007	1685	1589	1557	1525	1493	1460	1428	1396	1364	1332	1300	—	—
008	1080	1025	1007	988	970	952	933	915	897	878	860	—	—
009	1080	1025	1007	988	970	952	933	915	897	878	860	—	—
012	1130	1112	1087	1062	1037	1212	987	962	937	912	887	962	830

*Approximate fan rpm shown (high-static motor/drive).

FAN RPM AT MOTOR PULLEY SETTINGS* — 48HJ015,017

UNIT 48HJ	MOTOR PULLEY TURNS OPEN												
	0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6
015†	1147	1124	1101	1078	1055	1032	1010	987	964	941	918	895	††
015**	1315	1292	1269	1246	1223	1200	1178	1155	1132	1109	1086	1063	1040
017†	††	††	††	††	1021	1002	984	965	947	928	910	891	873
017**	††	††	††	††	1200	1178	1156	1134	1112	1091	1069	1047	1025

*Approximate fan rpm shown.
†Indicates standard drive package.
**Indicates alternate drive package.
††Due to belt and pulley style, pulley cannot be set to this number of turns open.

48HJ FAN RPM AT MOTOR PULLEY SETTINGS* — 48HJ020-028

48HJ	DRIVE	MOTOR PULLEY TURNS OPEN												
		0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6
020 (208/230 and 460 volt)	Low Range Vertical	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Mid-Low Range Vertical	647	667	687	707	727	747	767	786	806	826	846	866	886
	Mid-High Range Vertical	897	917	937	958	978	998	1018	1038	1058	1079	1099	1119	1139
	High Range Vertical	1078	1094	1111	1127	1143	1160	1176	1192	1209	1225	1241	1258	1274
	Low Range Horizontal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Mid-Low Range Horizontal	896	924	951	979	1006	1034	1062	1089	1117	1144	1172	1199	1227
	Mid-High Range Horizontal	1113	1138	1163	1188	1213	1238	1264	1289	1314	1339	1364	1389	1414
	High Range Horizontal	1096	1116	1137	1157	1177	1197	1218	1238	1258	1278	1299	1319	1339
020 (575 volt)	Low Range Vertical	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Mid-Low Range Vertical	810	832	854	876	897	919	941	963	985	1007	1028	1050	1072
	Mid-High Range Vertical	873	893	912	932	951	971	991	1010	1030	1049	1069	1088	1108
	High Range Vertical	1078	1094	1111	1127	1143	1160	1176	1192	1209	1225	1241	1258	1274
	Low Range Horizontal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Mid-Low Range Horizontal	863	886	909	933	956	979	1002	1025	1048	1072	1095	1118	1141
	Mid-High Range Horizontal	1042	1062	1083	1103	1123	1143	1164	1184	1204	1224	1245	1265	1285
	High Range Horizontal	1096	1116	1137	1157	1177	1197	1218	1238	1258	1278	1299	1319	1339
024 (208/230 and 460 volt)	Low Range Vertical	685	706	727	749	770	791	812	833	854	876	897	918	939
	Mid-Low Range Vertical	949	970	992	1013	1035	1056	1078	1099	1120	1142	1163	1185	1206
	Mid-High Range Vertical	941	961	980	1000	1019	1039	1059	1078	1098	1117	1137	1156	1176
	High Range Vertical	1014	1038	1061	1085	1108	1132	1156	1179	1203	1226	1250	1273	1297
	Low Range Horizontal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Mid-Low Range Horizontal	896	924	951	979	1006	1034	1062	1089	1117	1144	1172	1199	1227
	Mid-High Range Horizontal	1113	1138	1163	1188	1213	1238	1264	1289	1314	1339	1364	1389	1414
	High Range Horizontal	1096	1116	1137	1157	1177	1197	1218	1238	1258	1278	1299	1319	1339
024 (575 volt)	Low Range Vertical	751	768	785	802	819	836	853	869	886	903	920	937	954
	Mid-Low Range Vertical	949	970	992	1013	1035	1056	1078	1099	1120	1142	1163	1185	1206
	Mid-High Range Vertical	941	961	980	1000	1019	1039	1059	1078	1098	1117	1137	1156	1176
	High Range Vertical	1014	1038	1061	1085	1108	1132	1156	1179	1203	1226	1250	1273	1297
	Low Range Horizontal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Mid-Low Range Horizontal	873	893	912	932	951	971	991	1010	1030	1049	1069	1088	1108
	Mid-High Range Horizontal	1113	1138	1163	1188	1213	1238	1264	1289	1314	1339	1364	1389	1414
	High Range Horizontal	1096	1116	1137	1157	1177	1197	1218	1238	1258	1278	1299	1319	1339
028 (all voltages)	Low Range Vertical	687	703	718	734	749	765	780	796	811	827	842	858	873
	Mid-Low Range Vertical	805	822	839	856	872	889	906	923	940	957	973	990	1007
	Mid-High Range Vertical	941	961	980	1000	1019	1039	1059	1078	1098	1117	1137	1156	1176
	High Range Vertical	1014	1038	1061	1085	1108	1132	1156	1179	1203	1226	1250	1273	1297
	Low Range Horizontal	687	703	718	734	749	765	780	796	811	827	842	858	873
	Mid-Low Range Horizontal	805	822	839	856	872	889	906	923	940	957	973	990	1007
	Mid-High Range Horizontal	941	961	980	1000	1019	1039	1059	1078	1098	1117	1137	1156	1176
	High Range Horizontal	1014	1038	1061	1085	1108	1132	1156	1179	1203	1226	1250	1273	1297

*Approximate fan rpm shown.

Performance data — 48HE/HJ (cont)

EVAPORATOR-FAN MOTOR PERFORMANCE — STANDARD MOTOR — 48HE003-006, 48HJ004-014

UNIT 48HE 48HJ	UNIT PHASE	MAXIMUM CONTINUOUS BHP*	MAXIMUM OPERATING WATTS*	UNIT VOLTAGE	MAXIMUM AMP DRAW
003	Single	0.58	580	208/230	2.0
004	Single	1.20	1000	208/230	4.9
	Three	1.20	1000	208/230	4.9
				460	2.2
				575	2.2
005	Single	1.20	1000	208/230	4.9
	Three	1.20	1000	208/230	4.9
				460	2.2
				575	2.2
006	Single	1.30	1650	208/230	9.2
	Three	2.40	2120	208/230	6.7
				460	3.0
				575	3.0
007	Three	2.40	2120	208/230	6.7
				460	3.0
				575	3.0
008,009	Three	2.90	2615	208/230	8.6
				460	3.9
				575	3.9
012	Three	3.70	3775	208/230	12.2
				460	5.5
				575	5.5
014	Three	5.25	4400	208/230	17.3
				460	8.5
				575	8.5

LEGEND

Bhp — Brake Horsepower

*Extensive motor and electrical testing on these units ensures that the full horsepower and watts range of the motors can be utilized with confidence. Using the fan motors up to the ratings shown in this table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

EVAPORATOR-FAN MOTOR PERFORMANCE — HIGH-STATIC MOTORS — 48HE004-006, 48HJ004-014

UNIT 48HE 48HJ	UNIT PHASE	MAXIMUM CONTINUOUS BHP*	MAXIMUM OPERATING WATTS*	UNIT VOLTAGE	MAXIMUM AMP DRAW
004	Three	2.40	2120	208/230	6.7
				460	3.0
				575	3.0
005	Three	2.40	2120	208/230	6.7
				460	3.0
				575	3.0
006	Three	2.90	2615	208/230	8.6
				460	3.9
				575	3.9
007	Three	2.90	2615	208/230	8.6
				460	3.9
				575	3.9
008,009	Three	4.20	3775	208/230	12.2
				460	5.5
				575	5.5
012	Three	5.25	4400	208/230	17.3
				460	8.5
				575	8.5

LEGEND

Bhp — Brake Horsepower

*Extensive motor and electrical testing on these units ensures that the full horsepower and watts range of the motors can be utilized with confidence. Using the fan motors up to the ratings shown in this table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

EVAPORATOR FAN MOTOR SPECIFICATIONS — 48HJ015,017

UNIT 48HJ	NOMINAL HP	VOLTAGE	MAX WATTS	EFF. %	MAX BHP	MAX BkW	MAX AMPS
015 (Standard Motor)	2.9	208	2700	85.8	3.13	2.34	9.46
	2.9	230	2700	85.8	3.13	2.34	8.6
	2.9	460	2700	85.8	3.13	2.34	4.3
	3	575	3065	81.7	3.38	2.53	3.9
015 (Optional Motor)	3.7	208	3610	85.8	4.38	3.27	10.5
	3.7	230	3610	85.8	4.38	3.27	10.5
	3.7	460	3610	85.8	4.38	3.27	4.8
017	5	208	5180	87.5	6.13	4.57	15.8
	5	230	5180	87.5	6.13	4.57	15.8
	5	460	5180	87.5	6.13	4.57	7.9
	5	575	5180	87.5	6.13	4.57	6.0

LEGEND

BHP — Brake Horsepower
BkW — Brake Kilowatts

EVAPORATOR-FAN MOTOR EFFICIENCY — 48HE003-006, 48HJ004-014

UNIT SIZE 48HE/HJ	EFFICIENCY%
003, 004,005	75
006	74/84*
007	84
008,009	80
012	85
014	87

*Single phase/3 phase.

NOTES:

1. Convert bhp to watts using the following formula:

$$\text{watts} = \frac{\text{bhp (746)}}{\text{motor efficiency}}$$

2. The EPACT (Energy Policy Act of 1992) regulates energy requirements for specific types of indoor fan motors. Motors regulated by EPACT include any general purpose, T-frame (three-digit, 143 and larger), single-speed, foot mounted, polyphase, squirrel cage induction motors of NEMA (National Electrical Manufacturers Association) design A and B, manufactured for use in the United States. Ranging from 1 to 200 Hp, these continuous-duty motors operate on 230 and 460 volt, 60 Hz power. If a motor does not fit into these specifications, the motor does not have to be replaced by an EPACT-compliant energy-efficient motor. Variable-speed motors are exempt from EPACT compliance requirements. Therefore, the indoor fan motors for Carrier 48HE003-006 and 48HJ004-014 units are exempt from these requirements.

EVAPORATOR-FAN MOTOR EFFICIENCY — 48HJ015,017

MOTOR HORSEPOWER	MOTOR EFFICIENCY (%)
3.0	81.7
2.9, 3.7	85.8
5.0	87.5

NOTE: All indoor-fan motors 5 hp and larger meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT) effective October 24, 1997.

Performance data — 48HJ (cont)

48HJ EVAPORATOR FAN MOTOR SPECIFICATIONS — 48HJ020-028

UNIT	DRIVE	ORIENTATION	MOTOR P/N	NOMINAL HP	VOLTAGE	MAX WATTS	EFFICIENCY %	MAX BHP	MAX BkW	MAX AMPS
48HJ020	Low	Vertical	N/A	N/A	208	N/A	N/A	N/A	N/A	N/A
			N/A	N/A	230	N/A	N/A	N/A	N/A	N/A
			N/A	N/A	460	N/A	N/A	N/A	N/A	N/A
			N/A	N/A	575	N/A	N/A	N/A	N/A	N/A
	Mid-Low	Vertical	HD60FK651	3.7	208	3698	85.8	4.25	3.17	10.6
			HD60FK651	3.7	230	3698	85.8	4.25	3.17	9.6
			HD60FK651	3.7	460	3698	85.8	4.25	3.17	4.8
			HD58DL575	3	575	3149	81.7	3.45	2.57	3.9
	Mid-High	Vertical	HD60FL650	5	208	4900	87.5	5.75	4.29	16.7
			HD60FL650	5	230	4900	87.5	5.75	4.29	15.2
			HD60FL650	5	460	4900	87.5	5.75	4.29	7.6
			HD60FL575	5	575	4900	87.5	5.75	4.29	6.1
	High	Vertical	HD62FL650	7.5	208	7267	88.5	8.63	6.43	24.2
			HD62FL650	7.5	230	7267	88.5	8.63	6.43	22
			HD62FL650	7.5	460	7267	88.5	8.63	6.43	11
			HD62FL575	7.5	575	7267	88.5	8.63	6.43	9
	Low	Horizontal	N/A	N/A	208	N/A	N/A	N/A	N/A	N/A
			N/A	N/A	230	N/A	N/A	N/A	N/A	N/A
			N/A	N/A	460	N/A	N/A	N/A	N/A	N/A
			N/A	N/A	575	N/A	N/A	N/A	N/A	N/A
	Mid-Low	Horizontal	HD60FK651	3.7	208	3698	85.8	4.25	3.17	10.6
			HD60FK651	3.7	230	3698	85.8	4.25	3.17	9.6
			HD60FK651	3.7	460	3698	85.8	4.25	3.17	4.8
			HD58DL575	3	575	3149	81.7	3.45	2.57	3.9
	Mid-High	Horizontal	HD60FL650	5	208	4900	87.5	5.75	4.29	16.7
			HD60FL650	5	230	4900	87.5	5.75	4.29	15.2
			HD60FL650	5	460	4900	87.5	5.75	4.29	7.6
			HD60FL575	5	575	4900	87.5	5.75	4.29	6.1
	High	Horizontal	HD62FL650	7.5	208	7267	88.5	8.63	6.43	24.2
			HD62FL650	7.5	230	7267	88.5	8.63	6.43	22
			HD62FL650	7.5	460	7267	88.5	8.63	6.43	11
			HD62FL575	7.5	575	7267	88.5	8.63	6.43	9
48HJ024	Low	Vertical	HD60FK651	3.7	208	3698	85.8	4.25	3.17	10.6
			HD60FK651	3.7	230	3698	85.8	4.25	3.17	9.6
			HD60FK651	3.7	460	3698	85.8	4.25	3.17	4.8
			HD60FL575	5	575	4900	87.5	5.75	4.29	6.1
	Mid-Low	Vertical	HD60FL650	5	208	4900	87.5	5.75	4.29	16.7
			HD60FL650	5	230	4900	87.5	5.75	4.29	15.2
			HD60FL650	5	460	4900	87.5	5.75	4.29	7.6
			HD60FL575	5	575	4900	87.5	5.75	4.29	6.1
	Mid-High	Vertical	HD62FL650	7.5	208	7267	88.5	8.63	6.43	24.2
			HD62FL650	7.5	230	7267	88.5	8.63	6.43	22
			HD62FL650	7.5	460	7267	88.5	8.63	6.43	11
			HD62FL575	7.5	575	7267	88.5	8.63	6.43	9
	High	Vertical	HD64FL650	10	208	9582	89.5	11.5	8.58	30.8
			HD64FL650	10	230	9582	89.5	11.5	8.58	28
			HD64FL650	10	460	9582	89.5	11.5	8.58	14
			HD64FL575	10	575	9582	89.5	11.5	8.58	11
	Low	Horizontal	N/A	N/A	208	N/A	N/A	N/A	N/A	N/A
			N/A	N/A	230	N/A	N/A	N/A	N/A	N/A
			N/A	N/A	460	N/A	N/A	N/A	N/A	N/A
			N/A	N/A	575	N/A	N/A	N/A	N/A	N/A
	Mid-Low	Horizontal	HD60FK651	3.7	208	3698	85.8	4.25	3.17	10.6
			HD60FK651	3.7	230	3698	85.8	4.25	3.17	9.6
			HD60FK651	3.7	460	3698	85.8	4.25	3.17	4.8
			HD60FL575	5	575	4900	87.5	5.75	4.29	6.1
	Mid-High	Horizontal	HD60FL650	5	208	4900	87.5	5.75	4.29	16.7
			HD60FL650	5	230	4900	87.5	5.75	4.29	15.2
			HD60FL650	5	460	4900	87.5	5.75	4.29	7.6
			HD60FL575	5	575	4900	87.5	5.75	4.29	6.1
	High	Horizontal	HD62FL650	7.5	208	7267	88.5	8.63	6.43	24.2
			HD62FL650	7.5	230	7267	88.5	8.63	6.43	22
			HD62FL650	7.5	460	7267	88.5	8.63	6.43	11
			HD62FL575	7.5	575	7267	88.5	8.63	6.43	9

LEGEND

BHP — Brake Horsepower
BkW — Brake Kilowatts

48HJ FAN RPM AT MOTOR PULLEY SETTINGS* — 48HJ020-028 (cont)

UNIT	DRIVE	ORIENTATION	MOTOR P/N	NOMINAL HP	VOLTAGE	MAX WATTS	EFFICIENCY %	MAX BHP	MAX BkW	MAX AMPS
48HJ028	Low	Vertical	HD60FL650	5	208	4900	87.5	5.75	4.29	16.7
			HD60FL650	5	230	4900	87.5	5.75	4.29	15.2
			HD60FL650	5	460	4900	87.5	5.75	4.29	7.6
			HD60FL575	5	575	4900	87.5	5.75	4.29	6.1
	Mid-Low	Vertical	HD60FL650	5	208	4900	87.5	5.75	4.29	16.7
			HD60FL650	5	230	4900	87.5	5.75	4.29	15.2
			HD60FL650	5	460	4900	87.5	5.75	4.29	7.6
			HD60FL575	5	575	4900	87.5	5.75	4.29	6.1
	Mid-High	Vertical	HD62FL650	7.5	208	7267	88.5	8.63	6.43	24.2
			HD62FL650	7.5	230	7267	88.5	8.63	6.43	22
			HD62FL650	7.5	460	7267	88.5	8.63	6.43	11
			HD62FL575	7.5	575	7267	88.5	8.63	6.43	9
	High	Vertical	HD64FL650	10	208	9582	89.5	11.5	8.58	30.8
			HD64FL650	10	230	9582	89.5	11.5	8.58	28
			HD64FL650	10	460	9582	89.5	11.5	8.58	14
			HD64FL575	10	575	9582	89.5	11.5	8.58	11
	Low	Horizontal	HD60FL650	5	208	4900	87.5	5.75	4.29	16.7
			HD60FL650	5	230	4900	87.5	5.75	4.29	15.2
			HD60FL650	5	460	4900	87.5	5.75	4.29	7.6
			HD60FL575	5	575	4900	87.5	5.75	4.29	6.1
	Mid-Low	Horizontal	HD60FL650	5	208	4900	87.5	5.75	4.29	16.7
			HD60FL650	5	230	4900	87.5	5.75	4.29	15.2
			HD60FL650	5	460	4900	87.5	5.75	4.29	7.6
			HD60FL575	5	575	4900	87.5	5.75	4.29	6.1
	Mid-High	Horizontal	HD62FL650	7.5	208	7267	88.5	8.63	6.43	24.2
			HD62FL650	7.5	230	7267	88.5	8.63	6.43	22
			HD62FL650	7.5	460	7267	88.5	8.63	6.43	11
			HD62FL575	7.5	575	7267	88.5	8.63	6.43	9
	High	Horizontal	HD64FL650	10	208	9582	89.5	11.5	8.58	30.8
			HD64FL650	10	230	9582	89.5	11.5	8.58	28
			HD64FL650	10	460	9582	89.5	11.5	8.58	14
			HD64FL575	10	575	9582	89.5	11.5	8.58	11

LEGEND

BHP — Brake Horsepower
BkW — Brake Kilowatts

ACCESSORY/FIOP STATIC PRESSURE* (in. wg) — 48HE003-006, 48HJ004-007

COMPONENT	CFM										
	600	800	1000	1250	1500	1750	2000	2250	2500	2750	3000
Vertical EconoMi$er IV and EconoMi$er2	0.10	0.20	0.35	0.045	0.065	0.08	0.12	0.145	0.175	0.22	0.255
Horizontal EconoMi$er IV and EconoMi$er2	—	—	—	—	—	0.1	0.125	0.15	0.18	0.225	0.275

LEGEND

FIOP — Factory-Installed Option

*The static pressure must be added to external static pressure. The sum and the evaporator entering-air cfm should be used in conjunction with the Fan Performance tables to determine indoor blower rpm and watts.

ACCESSORY/FIOP STATIC PRESSURE* (in. wg) — 48HJ008-014

COMPONENT	CFM													
	2250	2500	2750	3000	3250	3500	3750	4000	4250	4500	4750	5000	5250	6250
Vertical EconoMi$er IV and EconoMi$er2	0.06	0.075	0.09	0.115	0.13	0.15	0.17	0.195	0.22	0.25	0.285	0.325	0.36	—
Horizontal EconoMi$er IV and EconoMi$er2	—	0.1	0.125	0.15	0.18	0.21	0.25	0.275	0.3	0.34	0.388	—	—	—

LEGEND

FIOP — Factory-Installed Option

*The static pressure must be added to external static pressure. The sum and the evaporator entering-air cfm should be used in conjunction with the Fan Performance tables to determine indoor blower rpm and watts.

ACCESSORY/FIOP STATIC PRESSURE (in. wg)* — 48HJ015,017

COMPONENT	CFM								
	4500	5000	5400	6000	7200	7500	9000	10,000	11,250
EconoMi$er IV	0.040	0.050	0.060	0.070	0.090	0.100	0.110	0.120	0.140

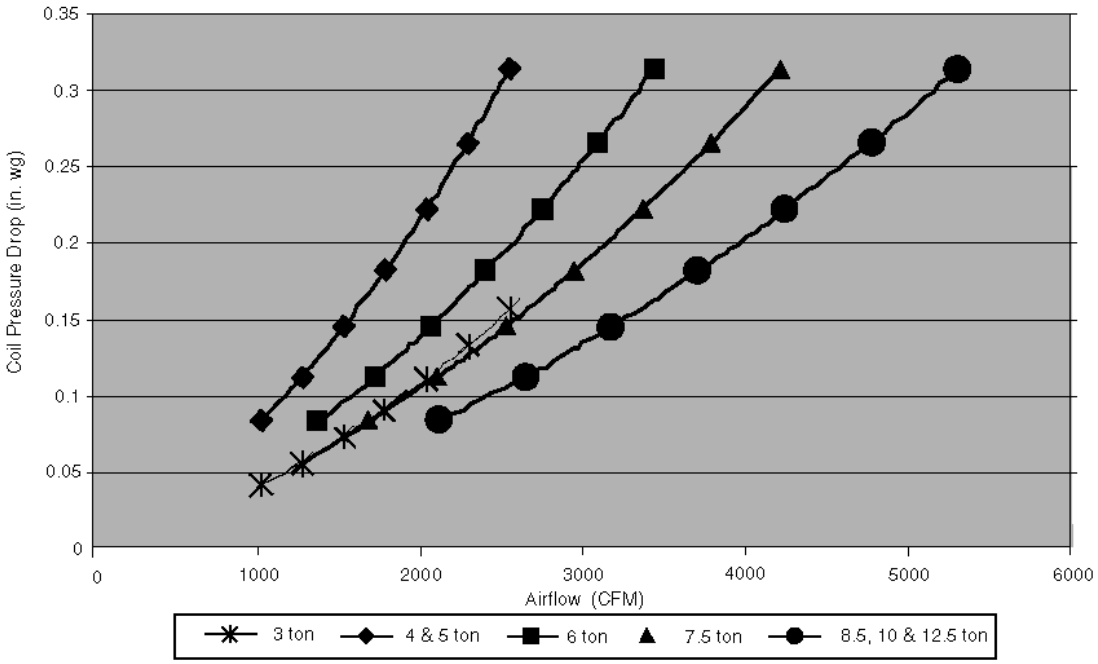
LEGEND

FIOP — Factory-Installed Option

*The static pressure must be added to external static pressure. The sum and the evaporator entering-air cfm should then be used in conjunction with the Fan Performance tables to determine blower rpm and watts.

Performance data — 48HE/HJ (cont)

HUMIDI-MIZER™ ADAPTIVE DEHUMIDIFICATION COIL PRESSURE DROP



ACCESSORY/FIOP STATIC PRESSURE (in. wg)* — 48HJ020-028

COMPONENT	CFM								
	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000
Economizer	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
4-in. Filters†	0.00	0.02	0.03	0.05	0.06	0.08	0.09	0.11	0.12

COMPONENT	CFM							
	8,500	9,000	9,500	10,000	10,500	11,000	11,500	12,000
Economizer	0.11	0.12	0.13	0.15	0.16	0.17	0.19	0.20
4-in. Filters†	0.14	0.15	0.17	0.18	0.20	0.21	0.23	0.24

LEGEND

FIOP — Factory-Installed Option

*The static pressure must be added to the external static pressure. The sum and the evaporator entering-air cfm should then be used in conjunction with the Fan Performance tables to determine blower rpm and watts.
†Four-inch filters are field-supplied.

ALTITUDE COMPENSATION* — 48HE003 STANDARD UNIT

ELEVATION (ft)	50,000 BTUH NOMINAL INPUT	
	Natural Gas Orifice Size†	Liquid Propane Orifice Size†
0-2,000	43	49
2,000	44	50
3,000	44	50
4,000	44	50
5,000	45	51
6,000	45	51
7,000	46	51
8,000	47	52
9,000	47	52
10,000	48	52
11,000	49	53
12,000	50	54
13,000	51	55
14,000	52	56

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, heat input rate should be reduced at higher altitudes.
†Orifices available through your Carrier distributor.

ALTITUDE COMPENSATION* — 48HJ004-007 STANDARD UNITS

ELEVATION (ft)	72,000 AND 115,000 BTUH NOMINAL INPUT		150,000 BTUH NOMINAL INPUT	
	Natural Gas Orifice Size†	Liquid Propane Orifice Size†	Natural Gas Orifice Size†	Liquid Propane Orifice Size†
0-2,000	33	43	30	37
2,000	36	44	31	39
3,000	36	45	31	40
4,000	37	45	32	41
5,000	38	46	32	42
6,000	40	47	34	43
7,000	41	48	35	43
8,000	42	49	36	44
9,000	43	50	37	45
10,000	44	50	39	46
11,000	45	51	41	47
12,000	46	52	42	48
13,000	47	52	43	49
14,000	48	53	44	50

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, heat input rate should be reduced at higher altitudes.
†Orifices available through your Carrier distributor.

ALTITUDE COMPENSATION* — 48HJ008-014

ELEVATION (ft)	125,000, 180,000, AND 224,000 BTUH NOMINAL INPUT		250,000 BTUH NOMINAL INPUT	
	Natural Gas Orifice Size†	Liquid Propane Orifice Size†	Natural Gas Orifice Size†	Liquid Propane Orifice Size†
0-2,000	31	41	30	38
2,000	32	42	30	39
3,000	32	42	31	40
4,000	32	42	32	41
5,000	33	43	33	42
6,000	34	43	34	43
7,000	35	44	35	43
8,000	36	44	36	44
9,000	37	45	37	44
10,000	38	46	38	45
11,000	39	47	39	45
12,000	40	47	40	46
13,000	41	48	41	47
14,000	42	48	42	47

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, the input rate should be reduced at higher altitudes.
†Orifices are available through your local Carrier distributor.

ALTITUDE COMPENSATION* — 48HE003-006 and 48HJ004-006 LOW NOx UNITS

ELEVATION (ft)	60,000 AND 90,000 BTUH NOMINAL INPUT	120,000 BTUH NOMINAL INPUT
	Natural Gas Orifice Size†	Natural Gas Orifice Size
0-2,000	38	32
2,000	40	33
3,000	41	35
4,000	42	36
5,000	43	37
6,000	43	38
7,000	44	39
8,000	45	41
9,000	46	42
10,000	47	43
11,000	48	44
12,000	49	44
13,000	50	46
14,000	51	47

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, the input rate should be reduced at higher altitudes.
†Orifices are available through your local Carrier distributor.

ALTITUDE COMPENSATION — 48HJ015,017 (LP Gas Units)

ELEVATION (ft)	LIQUID PROPANE ORIFICE SIZE
	Low Heat and High Heat
0-2,000	36
2,000	37
3,000	38
4,000	38
5,000	39
6,000	40
7,000	41
8,000	41
9,000	42
10,000	43

ALTITUDE COMPENSATION* — 48HJ015,017

ELEVATION (ft)	NATURAL GAS ORIFICE SIZE†	
	Low Heat	High Heat
0-3,000	30	29
3,000- 7,000	31	30
7,000- 9,000	32	31
9,000-10,000	33	31
above 10,000	35	32

*Includes a 4% input reduction per each 1,000 feet.
†Orifices available through your Carrier dealer.

ALTITUDE COMPENSATION — 48HJ020-028 (Natural Gas)

ELEVATION (ft)	ORIFICE SIZE — NATURAL GAS			
	Low Heat	Medium Heat	High Heat (6 Cell)	High Heat (8 Cell)
0-2,000	29	30	29	29
2,000	29	30	29	29
3,000	30	31	30	30
4,000	30	31	30	30
5,000	30	31	30	30
6,000	30	31	30	30
7,000	31	32	31	31
8,000	31	32	31	31
9,000	31	32	31	31
above 10,000	32	33	32	32

ALTITUDE COMPENSATION — 48HJ020-028 (LP Gas)

ELEVATION (ft)	ORIFICE SIZE — LP GAS			
	Low Heat	Medium Heat	High Heat (6 Cell)	High Heat (8 Cell)
0-2,000	35	38	35	35
2,000	36	39	36	36
3,000	36	39	36	36
4,000	37	40	37	37
5,000	37	40	37	37
6,000	38	41	38	38
7,000	39	42	39	39
8,000	40	43	40	40
9,000	41	44	41	41
above 10,000	42	45	42	42

ALTITUDE DERATING FACTOR*

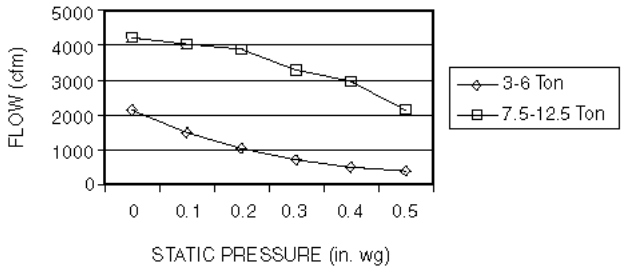
ELEVATION	MAXIMUM HEATING VALUE AT SEA LEVEL (Btu/ft³)
0-2000	1100
2001-3000	1050
3001-4000	1000
4001-5000	950
5001-6000	900

*Derating of the gas heating equipment to compensate for the effects of altitude is always required. Orifice change is not required if the fuel heating value (at sea level) is below the limits listed in the table at left. Derating conditions must be 4% per thousand ft above 2000 ft. For example, at 4000 ft, if the heating value of the gas exceeds 1000 Btu/ft³, the unit will require a 16% derating. For elevations above 6000 ft, the same formula applies. For example, at 7000 ft, the unit will require a 28% derating of the maximum heating value per the National Fuel Gas Code.

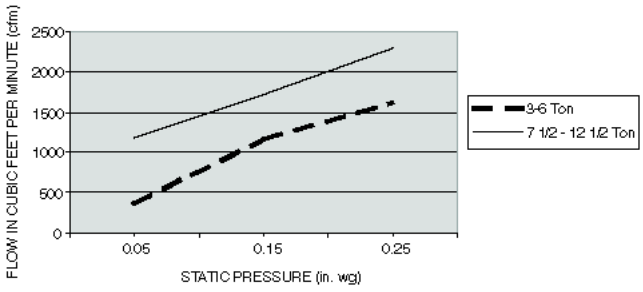
IMPORTANT: Local utility companies may be reducing heat content of gas at altitudes above 2000 ft. If this is being done, changing spuds may not be required.

Performance data — 48HJ (cont)

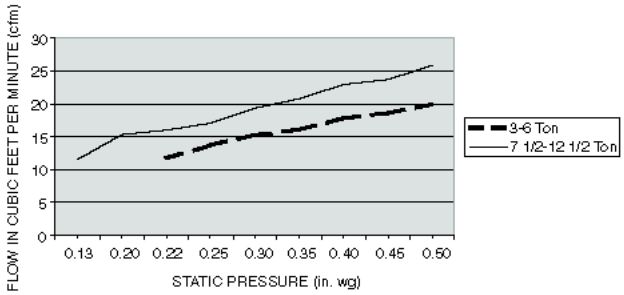
VERTICAL ECONOMI$ER IV AND ECONOMI$ER2 PERFORMANCE DATA (48HJ003-014)



VERTICAL POWER EXHAUST PERFORMANCE

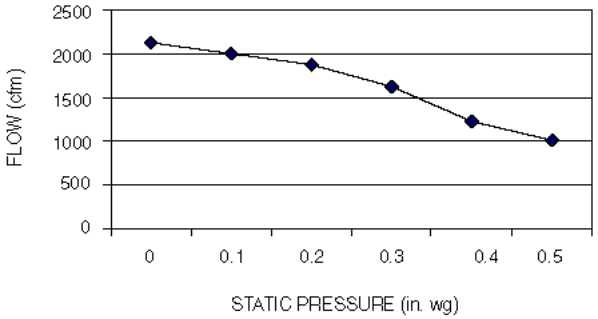


BAROMETRIC RELIEF FLOW CAPACITY

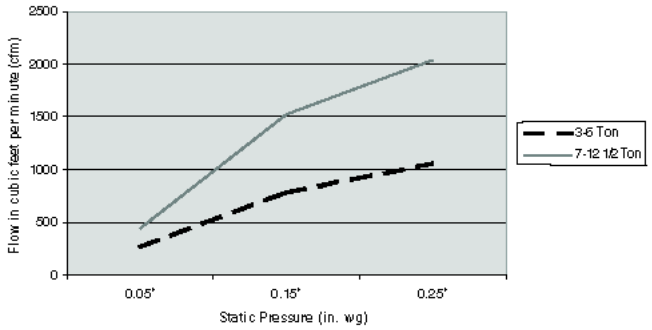


OUTDOOR AIR DAMPER LEAKAGE

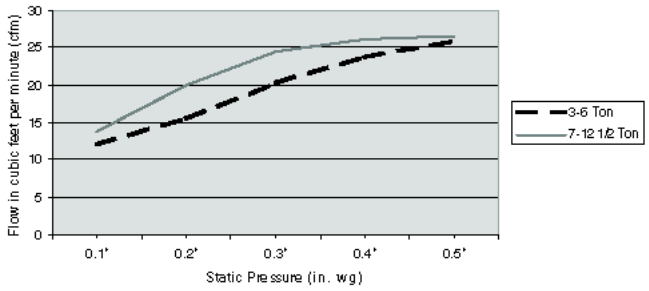
HORIZONTAL ECONOMI$ER IV AND ECONOMI$ER2 PERFORMANCE DATA (48HJ003-014)



HORIZONTAL POWER EXHAUST PERFORMANCE



BAROMETRIC RELIEF CAPACITY



OUTDOOR AIR DAMPER LEAKAGE

*

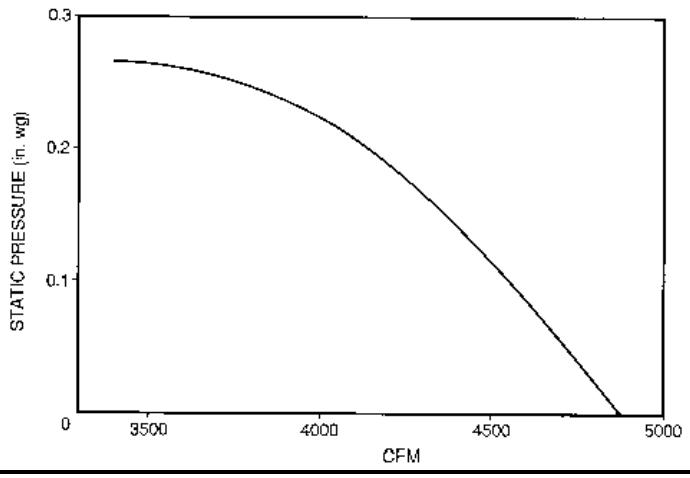
Vertical - Mounted in Economizer hood				
Power Exhaust Part No.	**Power Exhaust Description**	**Application Usage**	**Power Output (Hp per fan)**	**Fans per PE**
CRPWREXH021A01	Power Exhaust System (460-3-60)	004-007	0.24	2
CRPWREXH022A01	Power Exhaust System (208/230-1-60)	008-014	0.47	2
CRPWREXH023A01	Power Exhaust System (460-3-60)	008-014	0.37	2
CRPWREXH030A01	Power Exhaust System (208/230-1-60)	004-007*	0.23	2

Horizontal - Mounted in Return Ductwork				
Power Exhaust Part No.	**Power Exhaust Description**	**Application Usage**	**Power Output (Hp per fan)**	**Fans per PE**
CRPWREXH028A01	Power Exhaust System (208/230-1-60)	ALL*	0.48	1
CRPWREXH029A01	Power Exhaust System (460-3-60)	ALL	0.48	1

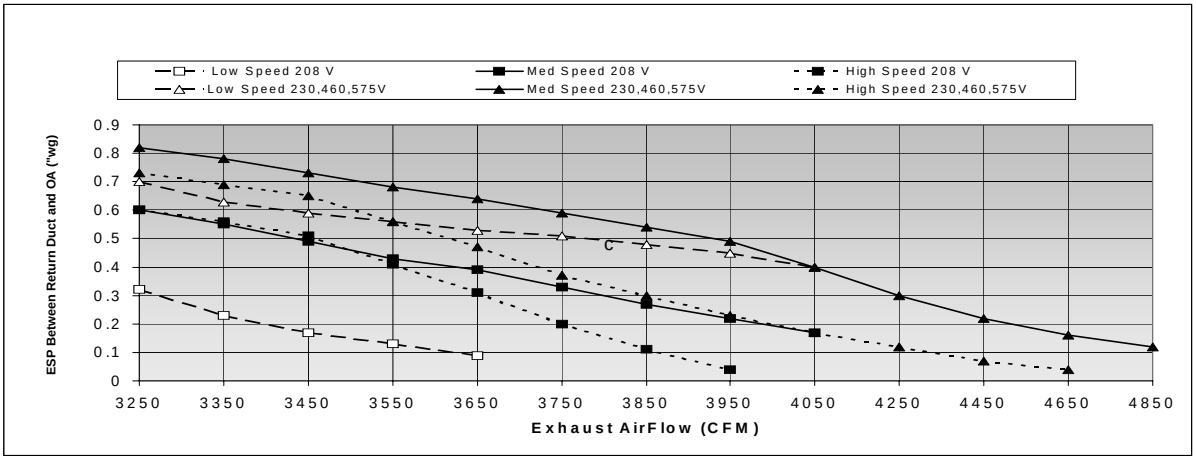
* Single or three phase rooftop unit.

OUTDOOR SOUND POWER (TOTAL UNIT)

FAN PERFORMANCE USING ACCESSORY POWER EXHAUST (48HJ015,017)



POWER EXHAUST PERFORMANCE (48HJ020-028)



UNIT 48HE/HJ	ARI RATING (decibels)	A-WEIGHTED (db)	OCTAVE BANDS							
			63	125	250	500	1000	2000	4000	8000
003-005	76	76.0	55.9	66.0	64.0	66.2	68.4	64.5	61.7	57.3
006,007	80	80.0	59.1	68.9	68.7	71.9	74.0	68.9	65.7	59.0
008,009	82	82.0	62.2	69.3	71.5	74.7	76.2	72.9	68.7	61.5
012	84	84.0	64.6	71.1	73.3	76.9	77.6	73.7	70.6	63.7
014	86	86.0	63.7	69.9	72.5	78.2	81.1	77.3	73.3	66.8
015,017	88	87.6	90.8	88.7	86.4	84.3	83.5	78.4	75.6	66.8
020-024	82	81.7	90.2	84.8	80.7	79.0	77.6	71.4	66.7	60.7
028	85	84.9	90.0	86.3	83.6	82.9	80.3	74.9	71.4	66.5

LEGEND

ARI — Air Conditioning and Refrigeration Institute

NOTE: Indoor sound power is available in Carrier's Electronic Catalog Program (ECAT) for specific operating parameters.

Electrical data — 48HE

48HE003-004 UNITS

UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR		OFM			COMBUSTION FAN MOTOR	IFM	CONV OUTLET	POWER SUPPLY *		MINIMUM UNIT DISCONNECT SIZE	
			Min	Max	QTY	RLA	LRA	QTY	FLA	FLA	FLA		MCA	MOCP **	FLA	LRA
003 (2 tons)	208/ 230-1-60	STD	187	254	1	10.9	63	1	0.7	0.6	2.0	NO	16.3	20	15.6	69
												YES	22.3	25	21.2	73
004 (3 tons)	208/ 230-1-60	STD	187	254	1	16	88	1	0.7	0.6	4.9	NO	25.6	30	24.8	101
												YES	31.6	35	30.4	106
	208/ 230-3-60	STD	187	254	1	10.3	77	1	0.7	0.6	4.9	NO	18.5	25	18.3	90
												YES	24.5	30	23.8	95
		HS									5.8	NO	19.4	25	19.3	120
												YES	25.4	30	24.9	124
	460-3-60	STD	414	508	1	5.1	39	1	0.4	0.3	2.2	NO	9.0	15	8.9	46
												YES	11.7	15	11.4	48
		HS									2.6	NO	9.4	15	9.3	60
												YES	12.1	15	11.8	63
	575-3-60	STD	518	632	1	4.2	31	1	0.4	0.3†	1.9	NO	7.6	10	7.5	36
												YES	9.7	15	9.5	38
		HS									2.0	NO	7.7	10	7.6	43
												YES	9.8	15	9.6	44
		HumidiMi$er						1	0.4†		2.6†	NO	7.7	10	8.0	48
												YES	9.8	15	9.6	50

LEGEND

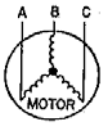
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps
UL — Underwriters' Laboratories

*The values listed in this table do not include power exhaust. See table at right for power exhaust requirements.
**Fuse or HACR circuit breaker.
†460v motor

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The UL, Canada units may be fuse or circuit breaker.
2. Electrical data based on 95 F ambient outdoor-air temperature ± 10% voltage.
3. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v
Maximum deviation is 7 v.
Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

POWER EXHAUST ELECTRICAL DATA

POWER EXHAUST PART NO.	Application usage	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A01	004-007*	1.6	N/A	0.64	15
CRPWREXH021A01	004-007	N/A	0.68	N/A	15
CRPWREXH022A01	008-014	3.4	N/A	1.32	15
CRPWREXH023A01	008-014	N/A	1.4	N/A	15
CRPWREXH028A01	ALL*	1.7	N/A	0.68	15
CRPWREXH029A01	ALL	N/A	0.7	N/A	15

*** —** Single or three phase rooftop unit
N/A — Not available

NOTE: If a single power source is to be used, size wire to include power exhaust MCA and MOCP.

Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 48HJD006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A01 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps

If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps and the MCA New is below 35; therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

48HE005-006 UNITS

UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR		OFM			COMBUSTION FAN MOTOR	IFM	CONV OUTLET	POWER SUPPLY *		MINIMUM UNIT DISCONNECT SIZE	
			Min	Max	QTY	RLA	LRA	QTY	FLA	FLA	FLA		MCA	MOCP **	FLA	LRA
005 (4 tons)	208/230-1-60	STD	197	254	1	21	115	1	1.5	0.6	4.9	NO	32.7	40	31.5	130
												YES	38.7	45	37.0	135
	208/230-3-60	STD	187	254	1	14.1	95	1	1.5	0.6	4.9	NO	24.0	30	23.6	110
												YES	30.0	35	29.1	115
		HS									5.8	NO	24.9	30	24.6	140
												YES	30.9	35	30.1	145
	460-3-60	STD	414	508	1	7.1	45	1	0.8	0.3	2.2	NO	11.9	15	11.6	53
												YES	14.6	20	14.1	55
		HS									2.6	NO	12.3	15	12.1	67
												YES	15.0	20	14.6	70
	575-3-60	STD	518	632	1	6.1	38	1	0.6	0.3†	1.9	NO	10.1	15	9.9	44
												YES	12.3	15	11.9	46
		HS									2.0	NO	10.2	15	10.0	51
												YES	12.4	15	12.0	52
		HumidiMi$er						1	0.8†		2.6†	NO	10.3	15	10.1	56
												YES	12.5	15	12.1	58
006 (5 tons)	208/230-1-60	STD	187	254	1	25	150	1	1.5	0.6	6.6	NO	39.4	50	38.1	187
												YES	45.4	60	43.6	191
	208/230-3-60	STD	187	254	1	17.3	123	1	1.5	0.6	5.8	NO	28.9	35	28.3	168
												YES	34.9	40	33.8	173
		HS									7.5	NO	30.6	35	30.2	187
												YES	36.6	40	35.8	192
	460-3-60	STD	414	508	1	8.4	70	1	0.8	0.3†	2.6	NO	13.9	20	13.6	92
												YES	16.6	20	16.1	95
		HS									3.4	NO	14.7	20	14.5	102
												YES	17.4	20	17.0	104
	575-3-60	STD	518	632	1	7.1	53	1	0.6	0.3†	2.0	NO	11.5	15	11.2	66
												YES	13.6	15	13.2	67
		HS									2.8	NO	12.3	15	12.1	75
												YES	14.4	20	14.1	76
		HumidiMi$er						1	1.9†		3.4†	NO	12.2	15	12.0	79
												YES	14.4	20	14.0	80

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps
UL — Underwriters' Laboratories

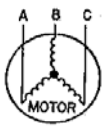
*The values listed in this table do not include power exhaust. See table at right for power exhaust requirements.
**Fuse or HACR circuit breaker.
†460v motor

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The UL, Canada units may be fuse or circuit breaker.
2. Electrical data based on 95 F ambient outdoor-air temperature ± 10% voltage.
3. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v
Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

POWER EXHAUST ELECTRICAL DATA

POWER EXHAUST PART NO.	Application usage	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A01	004-007*	1.6	N/A	0.64	15
CRPWREXH021A01	004-007	N/A	0.68	N/A	15
CRPWREXH022A01	008-014	3.4	N/A	1.32	15
CRPWREXH023A01	008-014	N/A	1.4	N/A	15
CRPWREXH028A01	ALL*	1.7	N/A	0.68	15
CRPWREXH029A01	ALL	N/A	0.7	N/A	15

*** —** Single or three phase rooftop unit
N/A — Not available

NOTE: If a single power source is to be used, size wire to include power exhaust MCA and MOCP.

Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 48HJD006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A01 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps

If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps and the MCA New is below 35; therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

Electrical data — 48HJ

48HJ004-014 UNITS

UNIT 48HJ	NOMINAL VOLTAGE (V-Ph-Hz)	IFM Type	VOLTAGE RANGE		COMPRESSOR (each)			OFM (each)		IFM	COMBUSTION FAN MOTOR	Conv Outlet	POWER SUPPLY*		MINIMUM UNIT DISCONNECT SIZE	
			Min	Max	Qty	RLA	LRA	Qty	FLA	FLA	FLA		MCA	MOCP**	FLA	LRA
004 (3 Tons)	208/230-1-60	STD	187	254	1	16	88	1	0.7	0.6	4.9	NO	25.6	30	25	101
												YES	31.6	35	30	106
	208/230-3-60	STD	187	254	1	10.3	77	1	0.7	0.6	4.9	NO	18.5	25	18	90
												YES	24.5	30	24	95
		HS									5.2	NO	19.4	25	19	120
												YES	25.4	30	25	124
	460-3-60	STD	414	508	1	5.1	39	1	0.4	0.3	2.2	NO	9.0	15	9	46
												YES	11.7	15	11	48
		HS									2.6	NO	9.4	15	9	60
												YES	12.1	15	12	63
	575-3-60	STD	518	632	1	4.2	31	1	0.4	0.3†	1.9	NO	7.6	10	7	36
												YES	9.7	15	9	38
		HS									2.0	NO	7.7	10	8	43
												YES	9.8	15	10	44
		HumidiMi$er						1	0.4†	0.9†	2.6†	NO	8.3	10	8	52
												YES	10.4	15	10	54

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps
UL — Underwriters' Laboratories

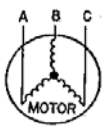
*The values listed in this table do not include power exhaust. See table at right for power exhaust requirements.
**Fuse or HACR circuit breaker.
†460v motor

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The UL, Canada units may be fuse or circuit breaker.
2. Electrical data based on 95 F ambient outdoor-air temperature ± 10% voltage.
3. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v
Maximum deviation is 7 v.
Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

POWER EXHAUST ELECTRICAL DATA

POWER EXHAUST PART NO.	Application usage	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A01	004-007*	1.6	N/A	0.64	15
CRPWREXH021A01	004-007	N/A	0.68	N/A	15
CRPWREXH022A01	008-014	3.4	N/A	1.32	15
CRPWREXH023A01	008-014	N/A	1.4	N/A	15
CRPWREXH028A01	ALL*	1.7	N/A	0.68	15
CRPWREXH029A01	ALL	N/A	0.7	N/A	15

*** —** Single or three phase rooftop unit
N/A — Not available

NOTE: If a single power source is to be used, size wire to include power exhaust MCA and MOCP.

Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 48HJD006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A01 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps

If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps and the MCA New is below 35; therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

48HJ004-014 UNITS (Cont)

UNIT 48HJ	NOMINAL VOLTAGE (V-Ph-Hz)	IFM Type	VOLTAGE RANGE		COMPRESSOR (each)			OFM (each)		IFM	COMBUSTION FAN MOTOR	Conv Outlet	POWER SUPPLY*		MINIMUM UNIT DISCONNECT SIZE†	
			Min	Max	Qty	RLA	LRA	Qty	FLA	FLA	FLA		MCA	MOCP**	FLA	LRA
005 (4 Tons)	208/230-1-60	STD	187	254	1	23.7	126	1	0.7	0.6	4.9	NO	35.2	45	34	139
												YES	41.2	50	39	144
	208/230-3-60	STD	187	254	1	13.5	93	1	0.7	0.6	4.9	NO	22.5	30	22	106
												YES	28.5	35	27	111
		HS									5.8	NO	23.4	30	23	136
												YES	29.4	35	29	140
	460-3-60	STD	414	508	1	6.4	46.5	1	0.4	0.3	2.2	NO	10.6	15	10	54
												YES	13.3	15	13	56
		HS									2.6	NO	11.0	15	11	68
												YES	13.7	15	13	70
	575-3-60	STD	518	632	1	6.4	40	1	0.4	0.3†	1.9	NO	10.3	15	10	45
												YES	12.5	15	12	47
		HS									2.0	NO	10.4	15	10	52
												YES	12.6	15	12	53
		HumidiMi$er						1	0.4	0.9†	2.6†	NO	11.0	15	11	61
												YES	13.2	15	13	63

LEGEND

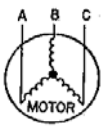
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps
UL — Underwriters' Laboratories

*The values listed in this table do not include power exhaust. See table at right for power exhaust requirements.
**Fuse or HACR circuit breaker.
†460v motor

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The UL, Canada units may be fuse or circuit breaker.
2. Electrical data based on 95 F ambient outdoor-air temperature ± 10% voltage.
3. **Unbalanced 3-Phase Supply Voltage**
Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v
Maximum deviation is 7 v.
Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

POWER EXHAUST ELECTRICAL DATA

POWER EXHAUST PART NO.	Application usage	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A01	004-007*	1.6	N/A	0.64	15
CRPWREXH021A01	004-007	N/A	0.68	N/A	15
CRPWREXH022A01	008-014	3.4	N/A	1.32	15
CRPWREXH023A01	008-014	N/A	1.4	N/A	15
CRPWREXH028A01	ALL*	1.7	N/A	0.68	15
CRPWREXH029A01	ALL	N/A	0.7	N/A	15

* — Single or three phase rooftop unit
N/A — Not available

NOTE: If a single power source is to be used, size wire to include power exhaust MCA and MOCP.

Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 48HJD006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A01 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps

If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps and the MCA New is below 35; therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

Electrical data — 48HJ (cont)

48HJ004-014 UNITS (Cont)

UNIT 48HJ	NOMINAL VOLTAGE (V-Ph-Hz)	IFM Type	VOLTAGE RANGE		COMPRESSOR (each)			OFM (each)		IFM	COMBUSTION FAN MOTOR	Conv Outlet	POWER SUPPLY*		MINIMUM UNIT DISCONNECT SIZE	
			Min	Max	Qty	RLA	LRA	Qty	FLA	FLA	FLA		MCA	MOCP**	FLA	LRA
006 (5 Tons)	208/230-1-60	STD	187	254	1	28.8	169	1	1.5	0.6	6.6	NO	44.1	60	42	206
												YES	50.1	60	48	210
	208/230-3-60	STD	187	254	1	17.3	123	1	1.5	0.6	5.8	NO	28.9	35	28	168
												YES	34.9	40	34	173
		HS									7.5	NO	30.6	35	30	187
												YES	36.6	40	36	192
	460-3-60	STD	414	508	1	9	62	1	0.8	0.3	2.6	NO	14.7	20	14	84
												YES	17.4	20	17	87
		HS									3.4	NO	15.5	20	15	94
												YES	18.2	20	18	96
	575-3-60	STD	518	632	1	7.1	50	1	0.6	0.3†	2.0	NO	11.5	15	11	63
												YES	13.6	15	13	64
		HS									2.8	NO	12.3	15	12	72
												YES	14.4	20	14	73
		HumidiMi$er						1	0.8†	0.3†	3.4†	NO	12.2	15	12	76
												YES	14.4	20	14	77

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps
UL — Underwriters' Laboratories

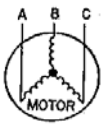
*The values listed in this table do not include power exhaust. See table at right for power exhaust requirements.
**Fuse or HACR circuit breaker.
†460v motor

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The UL, Canada units may be fuse or circuit breaker.
2. Electrical data based on 95 F ambient outdoor-air temperature ± 10% voltage.
3. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v
Maximum deviation is 7 v.
Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

POWER EXHAUST ELECTRICAL DATA

POWER EXHAUST PART NO.	Application usage	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A01	004-007*	1.6	N/A	0.64	15
CRPWREXH021A01	004-007	N/A	0.68	N/A	15
CRPWREXH022A01	008-014	3.4	N/A	1.32	15
CRPWREXH023A01	008-014	N/A	1.4	N/A	15
CRPWREXH028A01	ALL*	1.7	N/A	0.68	15
CRPWREXH029A01	ALL	N/A	0.7	N/A	15

* — Single or three phase rooftop unit
N/A — Not available

NOTE: If a single power source is to be used, size wire to include power exhaust MCA and MOCP.

Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 48HJD006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A01 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps

If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps and the MCA New is below 35; therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

48HJ004-014 UNITS (Cont)

UNIT 48HJ	NOMINAL VOLTAGE (V-Ph-Hz)	IFM Type	VOLTAGE RANGE		COMPRESSOR (each)			OFM (each)		IFM	COMBUSTION FAN MOTOR	Conv Outlet	POWER SUPPLY*		MINIMUM UNIT DISCONNECT SIZE	
			Min	Max	Qty	RLA	LRA	Qty	FLA	FLA	FLA		MCA	MOCP**	FLA	LRA
007 (6 Tons)	208/230-3-60	STD	187	254	1	20.5	156	1	1.4	0.6	5.8	NO	32.8	40	32	200
												YES	38.8	45	37	205
		HS								0.6	7.5	NO	34.5	40	34	219
												YES	40.5	45	39	224
	460-3-60	STD	414	508	1	9.6	75	1	0.6	0.3	2.6	NO	15.2	20	15	97
												YES	17.9	20	17	99
		HS								0.3	3.4	NO	16.0	20	16	107
												YES	18.7	25	18	109
	575-3-60	STD	518	632	1	7.7	56	1	0.8	0.3†	2.0	NO	12.4	15	12	69
												YES	14.6	20	14	70
		HS									2.8	NO	13.2	20	13	79
												YES	15.4	20	15	80
		HumidiMi$er						1	0.6†	0.3†	3.4†	NO	12.8	15	13	81

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps
UL — Underwriters' Laboratories

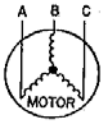
*The values listed in this table do not include power exhaust. See table at right for power exhaust requirements.
**Fuse or HACR circuit breaker.
†460v motor

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The UL, Canada units may be fuse or circuit breaker.
2. Electrical data based on 95 F ambient outdoor-air temperature ± 10% voltage.
3. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

POWER EXHAUST ELECTRICAL DATA

POWER EXHAUST PART NO.	Application usage	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A01	004-007*	1.6	N/A	0.64	15
CRPWREXH021A01	004-007	N/A	0.68	N/A	15
CRPWREXH022A01	008-014	3.4	N/A	1.32	15
CRPWREXH023A01	008-014	N/A	1.4	N/A	15
CRPWREXH028A01	ALL*	1.7	N/A	0.68	15
CRPWREXH029A01	ALL	N/A	0.7	N/A	15

* — Single or three phase rooftop unit
N/A — Not available

NOTE: If a single power source is to be used, size wire to include power exhaust MCA and MOCP.

Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 48HJD006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A01 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps
If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps and the MCA New is below 35; therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

Electrical data — 48HJ (cont)

48HJ004-014 UNITS (Cont)

UNIT 48HJ	NOMINAL VOLTAGE (V-Ph-Hz)	IFM Type	VOLTAGE RANGE		COMPRESSOR (each)			OFM (each)		IFM	COMBUSTION FAN MOTOR	Conv Outlet	POWER SUPPLY*		MINIMUM UNIT DISCONNECT SIZE†	
			Min	Max	Qty	RLA	LRA	Qty	FLA	FLA	FLA		MCA	MOCP**	FLA	LRA
008 (71/2 Tons)	208/230-3-60	STD	187	254	2	12.4	88	2	1.4	0.6	7.5	NO	38.2	45	40	242
												YES	44.2	50	46	247
		HS									10.6	NO	41.3	45	44	267
												YES	47.3	50	49	271
	460-3-60	STD	414	508	2	6.4	44	2	0.7	0.3	3.4	NO	19.2	25	20	121
												YES	21.9	25	23	123
		HS									4.8	NO	20.6	25	22	134
												YES	23.3	25	24	136
	575-3-60	STD	518	632	2	4.8	34	2	0.6	0.3†	2.8	NO	14.6	20	15	95
												YES	16.8	20	17	95
		HS									3.3	NO	15.3	20	17	104
												YES	17.5	20	19	104
		HumidiMi$er						2	0.7†	0.3†	4.8†	NO	15.8	20	17	104

LEGEND

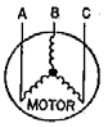
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps
UL — Underwriters' Laboratories

*The values listed in this table do not include power exhaust. See table at right for power exhaust requirements.
**Fuse or HACR circuit breaker.
†460v motor

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The UL, Canada units may be fuse or circuit breaker.
2. Electrical data based on 95 F ambient outdoor-air temperature ± 10% voltage.
3. **Unbalanced 3-Phase Supply Voltage**
Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v
Maximum deviation is 7 v.
Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

POWER EXHAUST ELECTRICAL DATA

POWER EXHAUST PART NO.	Application usage	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A01	004-007*	1.6	N/A	0.64	15
CRPWREXH021A01	004-007	N/A	0.68	N/A	15
CRPWREXH022A01	008-014	3.4	N/A	1.32	15
CRPWREXH023A01	008-014	N/A	1.4	N/A	15
CRPWREXH028A01	ALL*	1.7	N/A	0.68	15
CRPWREXH029A01	ALL	N/A	0.7	N/A	15

* — Single or three phase rooftop unit
N/A — Not available

NOTE: If a single power source is to be used, size wire to include power exhaust MCA and MOCP.

Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 48HJD006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A01 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps
If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps and the MCA New is below 35; therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

48HJ004-014 UNITS (Cont)

UNIT 48HJ	NOMINAL VOLTAGE (V-Ph-Hz)	IFM Type	VOLTAGE RANGE		COMPRESSOR (each)			OFM (each)		IFM	COMBUSTION FAN MOTOR	Conv Outlet	POWER SUPPLY*		MINIMUM UNIT DISCONNECT SIZE†	
			Min	Max	Qty	RLA	LRA	Qty	FLA	FLA	FLA		MCA	MOCP**	FLA	LRA
009 (81/2 Tons)	208/230-3-60	STD	187	254	2	13.1	105	2	1.4	0.6	7.5	NO	40.2	45	42	276
												YES	46.2	50	48	281
		HS									10.6	NO	43.3	50	46	301
												YES	49.3	60	51	305
	460-3-60	STD	414	508	2	7.4	55	2	0.7	0.3	3.4	NO	21.5	25	23	143
												YES	24.2	30	25	145
		HS									4.8	NO	22.9	25	24	156
												YES	25.6	30	27	158
	575-3-60	STD	518	632	2	6.4	44	2	0.6	0.3†	2.8	NO	18.2	20	19	115
												YES	20.4	25	21	116
		HS									3.3	NO	18.9	25	20	124
												YES	21.1	25	22	126
		HumidiMi$er	518	632		6.4	44	2	0.7†	0.3†	4.8†	NO	19.4	25	20	124

LEGEND

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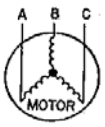
*The values listed in this table do not include power exhaust. See table at right for power exhaust requirements.
**Fuse or HACR circuit breaker.
†460v motor

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The UL, Canada units may be fuse or circuit breaker.
2. Electrical data based on 95 F ambient outdoor-air temperature ± 10% voltage.
3. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v
Maximum deviation is 7 v.
Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

POWER EXHAUST ELECTRICAL DATA

POWER EXHAUST PART NO.	Application usage	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A01	004-007*	1.6	N/A	0.64	15
CRPWREXH021A01	004-007	N/A	0.68	N/A	15
CRPWREXH022A01	008-014	3.4	N/A	1.32	15
CRPWREXH023A01	008-014	N/A	1.4	N/A	15
CRPWREXH028A01	ALL*	1.7	N/A	0.68	15
CRPWREXH029A01	ALL	N/A	0.7	N/A	15

* — Single or three phase rooftop unit
N/A — Not available

NOTE: If a single power source is to be used, size wire to include power exhaust MCA and MOCP.

Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 48HJD006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A01 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps
If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps and the MCA New is below 35; therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

Electrical data — 48HJ (cont)

48HJ004-014 UNITS (Cont)

UNIT 48HJ	NOMINAL VOLTAGE (V-Ph-Hz)	IFM Type	VOLTAGE RANGE		COMPRESSOR (each)			OFM (each)		IFM	COMBUSTION FAN MOTOR	Conv Outlet	POWER SUPPLY*		MINIMUM UNIT DISCONNECT SIZE†	
			Min	Max	Qty	RLA	LRA	Qty	FLA	FLA	FLA		MCA	MOCP**	FLA	LRA
012 (10 Tons)	208/230-3-60	STD	187	254	2	17.6	125	2	1.4	0.6	10.6	NO	53.0	60	56	341
												YES	59.0	70	61	345
		HS								0.6	15.0	NO	57.4	70	61	364
												YES	63.4	70	66	369
	460-3-60	STD	414	508	2	8.3	62.5	2	0.7	0.3	4.8	NO	24.9	30	26	171
												YES	27.6	30	29	173
		HS									7.4	NO	27.5	30	29	182
												YES	30.2	35	32	184
	575-3-60	STD	518	632	2	6.3	50	2	0.6	0.3†	3.3	NO	19.1	25	20	136
												YES	21.3	25	22	138
		HS								0.3†	5.6	NO	21.0	25	23	146
												YES	23.1	25	25	148
		HumidiMi$er						2	0.7†	0.3†	7.4†	NO	21.2	25	23	146
												YES	23.4	25	25	148
014 (12 1/2 Tons)	208/230-3-60	STD	187	254	2	19	156	2	1.4	0.6	15.0	NO	60.6	70	64	426
												YES	66.6	70	70	431
	460-3-60	STD	414	508	2	9	75	2	0.7	7.4	0.3	NO	29.1	35	31	207
												YES	31.8	35	33	209
	575-3-60	STD	518	632	2	7.4	54	2	0.6	5.6	0.3	NO	23.5	30	25	154
												YES	25.6	30	27	156
		HumidiMi$er						2	0.7	7.4	0.3	NO	23.7	30	25	154
												YES	25.9	30	27	156

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps
UL — Underwriters' Laboratories

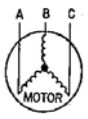
*The values listed in this table do not include power exhaust. See table at right for power exhaust requirements.
**Fuse or HACR circuit breaker.
†460v motor

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The UL, Canada units may be fuse or circuit breaker.
2. Electrical data based on 95 F ambient outdoor-air temperature ± 10% voltage.
3. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

POWER EXHAUST ELECTRICAL DATA

POWER EXHAUST PART NO.	Application usage	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A01	004-007*	1.6	N/A	0.64	15
CRPWREXH021A01	004-007	N/A	0.68	N/A	15
CRPWREXH022A01	008-014	3.4	N/A	1.32	15
CRPWREXH023A01	008-014	N/A	1.4	N/A	15
CRPWREXH028A01	ALL*	1.7	N/A	0.68	15
CRPWREXH029A01	ALL	N/A	0.7	N/A	15

*** —** Single or three phase rooftop unit
N/A — Not available

NOTE: If a single power source is to be used, size wire to include power exhaust MCA and MOCP.

Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 48HJD006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A01 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps

If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps and the MCA New is below 35; therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

COBRA™ ENERGY RECOVERY UNITS (48HE003-006 UNITS WITH 62AQ060)

BASE UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	CONV OUTLET	62AQ FLA	POWER SUPPLY *		DISCONNECT SIZE	
					MCA	MOCP**	FLA	LRA
003	208/230-1-60	STD	NO	9.2	25.5	30	26	103
			YES	9.2	31.5	35	32	107
004	208/230-1-60	STD	NO	9.2	34.8	40	35	135
			YES	9.2	40.8	45	41	140
	208/230-3-60	STD	NO	9.2	27.7	35	29	124
			YES	9.2	33.7	40	34	129
		HS	NO	9.2	28.6	35	30	154
			YES	9.2	34.6	40	35	158
	460-3-60	STD	NO	9.2	13.6	15	14	63
			YES	9.2	16.3	20	17	65
		HS	NO	9.2	14.0	20	15	77
			YES	9.2	16.7	20	17	80
005	208/230-1-60	STD	NO	9.2	41.9	50	42	164
			YES	9.2	47.9	60	48	169
	208/230-3-60	STD	NO	9.2	33.2	40	34	144
			YES	9.2	39.2	45	40	149
		HS	NO	9.2	34.1	40	35	174
			YES	9.2	40.1	45	41	179
	460-3-60	STD	NO	9.2	16.5	20	17	70
			YES	9.2	19.2	25	19	72
		HS	NO	9.2	16.9	20	17	84
			YES	9.2	19.6	25	20	87
006	208/230-1-60	STD	NO	9.2	48.6	60	49	221
			YES	9.2	54.6	60	54	225
	208/230-3-60	STD	NO	9.2	38.1	45	39	202
			YES	9.2	44.1	50	44	207
		HS	NO	9.2	39.8	45	41	221
			YES	9.2	45.8	50	46	226
	460-3-60	STD	NO	9.2	19.3	25	20	101
			YES	9.2	22.0	25	22	104
		HS	NO	9.2	20.1	25	20	111
			YES	9.2	22.8	25	23	113

LEGEND

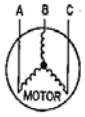
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
NEC — National Electrical Code
UL — Underwriters' Laboratories

*Used to determine minimum disconnect per NEC.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. UL, Canada units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Electrical data — 48HE

COBRA™ ENERGY RECOVERY UNITS (48HE004-006 UNITS WITH 62AQ100)

BASE UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	CONV OUTLET	62AQ FLA	POWER SUPPLY *		DISCONNECT SIZE	
					MCA	MOCP **	FLA	LRA
004	208/230-1-60	STD	NO	15.1	40.7	45	42	161
			YES	15.1	46.7	50	48	166
	208/230-3-60	STD	NO	15.1	33.6	40	36	150
			YES	15.1	39.6	45	41	155
		HS	NO	15.1	34.5	40	37	180
			YES	15.1	40.5	45	42	184
	460-3-60	STD	NO	15.1	16.5	20	18	76
			YES	15.1	19.2	20	20	78
		HS	NO	15.1	16.9	20	18	90
			YES	15.1	19.6	25	20	93
005	208/230-1-60	STD	NO	15.1	47.8	60	49	190
			YES	15.1	53.8	60	54	195
	208/230-3-60	STD	NO	15.1	39.1	45	41	170
			YES	15.1	45.1	50	46	175
		HS	NO	15.1	40.0	45	42	200
			YES	15.1	46.0	50	48	205
	460-3-60	STD	NO	15.1	19.4	25	20	83
			YES	15.1	22.1	25	23	85
		HS	NO	15.1	19.8	25	21	97
			YES	15.1	22.5	25	23	100
006	208/230-1-60	STD	NO	15.1	54.5	70	55	247
			YES	15.1	60.5	70	61	251
	208/230-3-60	STD	NO	15.1	44.0	50	46	228
			YES	15.1	50.0	60	51	233
		HS	NO	15.1	45.7	60	48	247
			YES	15.1	51.7	60	53	252
	460-3-60	STD	NO	15.1	21.5	25	22	122
			YES	15.1	24.2	30	25	125
		HS	NO	15.1	22.3	25	23	132
			YES	15.1	25.0	30	26	134

LEGEND

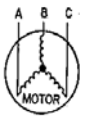
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
NEC — National Electrical Code
UL — Underwriters' Laboratories

*Used to determine minimum disconnect per NEC.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. UL, Canada units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v
Maximum deviation is 7 v.
Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

COBRA™ ENERGY RECOVERY UNITS (48HJ004-007 UNITS WITH 62AQ060)

UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	CONV OUTLET	62AQ FLA	POWER SUPPLY*		DISCONNECT SIZE	
					MCA	MOCP†	FLA	LRA
48HJ004	208/230-1-60	STD	NO	9.2	34.8/34.8	40/40	35/35	135/135
			YES	9.2	40.8/40.8	45/45	41/41	140/140
	208/230-3-60	STD	NO	9.2	27.7/27.7	35/35	29/29	124/124
			YES	9.2	33.7/33.7	40/40	34/34	129/129
		HIGH	NO	9.2	28.6/28.6	35/35	30/30	154/154
			YES	9.2	34.6/34.6	40/40	35/35	158/158
	460-3-60	STD	NO	9.2	13.6	15	14	63
			YES	9.2	16.3	20	17	65
		HIGH	NO	9.2	14.0	20	15	77
			YES	9.2	16.7	20	17	80
48HJ005	208/230-1-60	STD	NO	9.2	44.4/44.4	60/60	44/44	173/173
			YES	9.2	50.4/50.4	60/60	50/50	178/178
	208/230-3-60	STD	NO	9.2	31.7/31.7	40/40	33/33	140/140
			YES	9.2	37.7/37.7	40/40	38/38	145/145
		HIGH	NO	9.2	32.6/32.6	40/40	34/34	170/170
			YES	9.2	38.6/38.6	45/45	39/39	174/174
	460-3-60	STD	NO	9.2	15.2	20	16	71
			YES	9.2	17.9	20	18	73
		HIGH	NO	9.2	15.6	20	16	85
			YES	9.2	18.3	20	19	87
48HJ006	208/230-1-60	STD	NO	9.2	53.3/53.3	70/70	53/53	240/240
			YES	9.2	59.3/59.3	70/70	59/59	244/244
	208/230-3-60	STD	NO	9.2	38.1/38.1	45/45	39/39	202/202
			YES	9.2	44.1/44.1	50/50	44/44	207/207
		HIGH	NO	9.2	39.8/39.8	45/45	41/41	221/221
			YES	9.2	45.8/45.8	50/50	46/46	226/226
	460-3-60	STD	NO	9.2	19.3	25	20	101
			YES	9.2	22.0	25	22	104
		HIGH	NO	9.2	20.1	25	20	111
			YES	9.2	22.8	25	23	113
48HJ007	208/230-3-60	STD	NO	9.2	42.0/42.0	50/50	42/42	234/234
			YES	9.2	48.0/48.0	60/60	48/48	239/239
		HIGH	NO	9.2	43.7/43.7	50/50	44/44	253/253
			YES	9.2	49.7/49.7	60/60	50/50	258/258
	460-3-60	STD	NO	9.2	19.8	25	20	114
			YES	9.2	22.5	25	23	116
		HIGH	NO	9.2	20.6	25	21	124
			YES	9.2	23.3	30	23	126

LEGEND

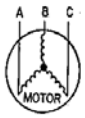
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
NEC — National Electrical Code
UL — Underwriters' Laboratories

*Used to determine minimum disconnect per NEC.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. UL, Canada units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Electrical data — 48HJ (cont)

COBRA™ ENERGY RECOVERY UNITS (48HJ004-007 UNITS WITH 62AQ100)

UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	CONV OUTLET	62AQ FLA	POWER SUPPLY*		DISCONNECT SIZE	
					MCA	MOCP†	FLA	LRA
48HJ004	208/230-1-60	STD	NO	15.1	40.7/40.7	45/45	42/42	161/161
			YES	15.1	46.7/46.7	50/50	48/48	166/166
	208/230-3-60	STD	NO	15.1	33.6/33.6	40/40	36/36	150/150
			YES	15.1	39.6/39.6	45/45	41/41	155/155
		HIGH	NO	15.1	34.5/34.5	40/40	37/37	180/180
			YES	15.1	40.5/40.5	45/45	42/42	184/184
	460-3-60	STD	NO	15.1	16.5	20	18	76
			YES	15.1	19.2	20	20	78
		HIGH	NO	15.1	16.9	20	18	90
			YES	15.1	19.6	25	20	93
48HJ005	208/230-1-60	STD	NO	15.1	50.3/50.3	60/60	51/51	199/199
			YES	15.1	56.3/56.3	70/70	57/57	204/204
	208/230-3-60	STD	NO	15.1	37.6/37.6	45/45	39/39	166/166
			YES	15.1	43.6/43.6	50/50	45/45	171/171
		HIGH	NO	15.1	38.5/38.5	45/45	40/40	196/196
			YES	15.1	44.5/44.5	50/50	46/46	200/200
	460-3-60	STD	NO	15.1	18.2	20	19	84
			YES	15.1	20.9	25	22	86
		HIGH	NO	15.1	18.6	25	19	98
			YES	15.1	21.3	25	22	100
48HJ006	208/230-1-60	STD	NO	15.1	59.2/59.2	70/70	60/60	266/266
			YES	15.1	65.2/65.2	80/80	65/65	270/270
	208/230-3-60	STD	NO	15.1	44.0/44.0	50/50	46/46	228/228
			YES	15.1	50.0/50.0	60/60	51/51	233/233
		HIGH	NO	15.1	45.7/45.7	60/60	48/48	247/247
			YES	15.1	51.7/51.7	60/60	53/53	252/252
	460-3-60	STD	NO	15.1	22.2	25	23	114
			YES	15.1	24.9	30	25	117
		HIGH	NO	15.1	23.0	30	24	124
			YES	15.1	25.7	30	26	126
48HJ007	208/230-3-60	STD	NO	15.1	47.9/47.9	60/60	49/49	260/260
			YES	15.1	53.9/53.9	60/60	55/55	265/265
		HIGH	NO	15.1	49.6/49.6	60/60	51/51	279/279
			YES	15.1	55.6/55.6	60/60	57/57	284/284
	460-3-60	STD	NO	15.1	22.8	30	23	127
			YES	15.1	25.5	30	26	129
		HIGH	NO	15.1	23.6	30	24	137
			YES	15.1	26.3	30	27	139

LEGEND

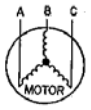
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
NEC — National Electrical Code
UL — Underwriters' Laboratories

*Used to determine minimum disconnect per NEC.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. UL, Canada units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

COBRA™ ENERGY RECOVERY UNITS (48HJ008-014 UNITS WITH 62AQ200)

UNIT SIZE	NOMINAL V-PH-HZ	IFM TYPE	CONV OUTLET	62AQ FLA	POWER SUPPLY*		DISCONNECT SIZE	
					MCA	MOCP†	FLA	LRA
48HJ008	208/230-3-60	STD	NO	21.9	60.1	70	66	366
			YES	21.9	66.1	70	71	371
		HIGH	NO	21.9	63.2	70	69	391
			YES	21.9	69.2	80	75	395
	460-3-60	STD	NO	10.2	29.4	35	32	184
			YES	10.2	32.1	35	34	186
		HIGH	NO	10.2	30.8	35	34	197
			YES	10.2	33.5	35	36	199
48HJ009	208/230-3-60	STD	NO	21.9	62.1	70	68	400
			YES	21.9	68.1	70	73	405
		HIGH	NO	21.9	65.2	70	71	425
			YES	21.9	71.2	80	77	429
	460-3-60	STD	NO	10.2	31.7	35	34	206
			YES	10.2	34.4	40	37	208
		HIGH	NO	10.2	33.1	35	36	219
			YES	10.2	35.8	40	38	221
48HJ012	208/230-3-60	STD	NO	21.9	74.9	80	81	465
			YES	21.9	80.9	90	87	469
		HIGH	NO	21.9	79.3	90	86	488
			YES	21.9	85.3	90	92	493
	460-3-60	STD	NO	10.2	35.1	40	38	234
			YES	10.2	37.8	45	40	236
		HIGH	NO	10.2	37.7	40	41	245
			YES	10.2	40.4	45	43	247
48HJ014	208/230-3-60	STD	NO	21.9	82.5	90	89	550
			YES	21.9	88.5	100	95	555
	460-3-60	STD	NO	10.2	39.3	45	43	270
			YES	10.2	42.0	50	45	272

LEGEND

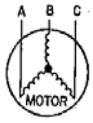
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
NEC — National Electrical Code
UL — Underwriters' Laboratories

*Used to determine minimum disconnect per NEC.
†Single point box with fuse is part of base unit.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. UL, Canada units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Electrical data — 48HJ (cont)

COBRA™ ENERGY RECOVERY UNITS (48HJ008-014 UNITS WITH 62AQ300)

UNIT	NOMINAL V-PH-Hz	IFM TYPE	CONV OUTLET	62AQ FLA	POWER SUPPLY		DISCONNECT SIZE*	
					MCA	FUSE OR HACR BKR	FLA	LRA
48HJ008	208/230-3-60	STD	NO	29.8	68.0	80	75	420
		STD	YES	29.8	74.0	80	80	425
		HIGH STATIC	NO	29.8	71.1	80	78	445
		HIGH STATIC	YES	29.8	77.1	80	84	449
	460-3-60	STD	NO	15.8	35.0	40	38	211
		STD	YES	15.8	37.7	40	41	213
		HIGH STATIC	NO	15.8	36.4	40	40	224
		HIGH STATIC	YES	15.8	39.1	45	43	226
48HJ009	208/230-3-60	STD	NO	29.8	70.0	80	77	454
		STD	YES	29.8	76.0	80	82	459
		HIGH STATIC	NO	29.8	73.1	80	80	479
		HIGH STATIC	YES	29.8	79.1	80	86	483
	460-3-60	STD	NO	15.8	37.3	40	41	233
		STD	YES	15.8	40.0	45	43	235
		HIGH STATIC	NO	15.8	38.7	45	42	246
		HIGH STATIC	YES	15.8	41.4	45	45	248
48HJ012	208/230-3-60†	STD	NO	29.8	82.8	90	90	519
		STD	YES	29.8	88.8	100	96	523
		HIGH STATIC	NO	29.8	87.2	100	95	542
		HIGH STATIC	YES	29.8	93.2	100	101	547
	460-3-60	STD	NO	15.8	40.7	45	44	261
		STD	YES	15.8	43.4	45	47	263
		HIGH STATIC	NO	15.8	43.3	50	47	272
		HIGH STATIC	YES	15.8	46.0	50	50	274
48HJ014	208/230-3-60†	STD	NO	29.8	90.4	100	98	604
		STD	YES	29.8	96.4	100	104	609
	460-3-60	STD	NO	15.8	44.9	50	49	297
		STD	YES	15.8	47.6	50	51	299

LEGEND

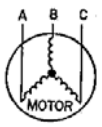
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
NEC — National Electrical Code
UL — Underwriters' Laboratories

*Used to determine minimum disconnect per NEC.
†Single point box with fuse is part of base unit.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. UL, Canada units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

ELECTRICAL DATA — 48HJ015,017

UNIT 48HJ	NOMINAL VOLTAGE (3 Ph, 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		COMBUSTION FAN MOTOR	POWER SUPPLY	
				No. 1		No. 2											
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	FLA	MCA	MOCP*
015 (Standard IFM)	208/230	187	253	20.7	156	20.7	156	3	0.5	1.70	2.9	8.8/ 8.4	—	—	0.57	60/60	80/80
													4.6	18.8	0.57	65/65	80/80
	460	414	506	10.0	75	10.0	75	3	0.5	0.80	2.9	4.2	—	—	0.30	29	35
													2.3	6.0	0.30	31	40
	575	518	633	8.2	54	8.2	54	3	0.5	0.75	3.0	3.9	—	—	0.57	25	30
													2.1	4.8	0.57	27	30
015 (Optional IFM)	208/230	187	253	20.7	156	20.7	156	3	0.5	1.70	3.7	10.5/11.0	—	—	0.57	62/63	80/80
													4.6	18.8	0.57	67/67	80/80
	460	414	506	10.0	75	10.0	75	3	0.5	0.80	3.7	4.8	—	—	0.30	30	35
													2.3	6.0	0.30	32	40
017	208/230	187	253	32.1	195	20.7	156	3	0.5	1.70	5.0	15.8/15.8	—	—	0.57	82/82	110/110
													4.6	18.8	0.57	86/86	110/110
	460	414	506	16.4	95	10.0	75	3	0.5	0.80	5.0	7.9	—	—	0.30	41	50
													2.3	6.0	0.30	43	50
	575	518	633	12.0	80	8.2	54	3	0.5	0.75	5.0	6.0	—	—	0.57	31	40
													2.1	4.8	0.57	34	45

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

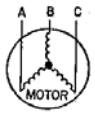
*Fuse or HACR circuit breaker.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

   % Voltage Imbalance

   $$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.

(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Electrical data — 48HJ (cont)

ELECTRICAL DATA — 48HJ020-028 WITHOUT CONVENIENCE OUTLET

UNIT 48HJ	NOMINAL VOLTAGE (3 Ph, 60 Hz)	VOLTAGE RANGE		COMPRESSOR						OFM			IFM		POWER EXHAUST			COMBUSTION FAN MOTOR	POWER SUPPLY		DISCONNECT SIZE
				No. 1		No. 2		No. 3													
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	Qty	Hp	FLA (ea)	FLA	MCA	MOCP*	FLA
020	208/230	187	253	16.7	130	16.7	130	22.4	184	4	0.25	1.5	3.7	10.6/ 9.6	—	—	—	0.5	78/ 77	100/ 90	83/ 82
															2	1	5.9		90/ 89	100/100	97/ 96
													5	16.7/15.2	—	—	—		84/ 83	100/100	90/ 89
															2	1	5.9		96/ 94	100/100	104/102
													7.5	24.2/22	—	—	—		92/ 89	100/100	99/ 96
															2	1	5.9		104/101	125/110	112/110
	460	414	506	9	70	9	70	10.7	90	4	0.25	0.7	3.7	4.8	—	—	—	0.3	39	45	42
															2	1	3.1		45	50	49
													5	7.6	—	—	—		42	50	45
															2	1	3.1		48	50	52
													7.5	11	—	—	—		45	50	49
															2	1	3.1		51	60	56
	575	518	633	7	55	7	55	9.3	73	4	0.25	0.7	3	3.9	—	—	—	0.24	32	40	35
															2	1	2.4		37	45	40
													5	6.1	—	—	—		35	40	37
															2	1	2.4		39	45	43
													7.5	9	—	—	—		37	45	40
															2	1	2.4		42	50	46
024	208/230	187	253	22.4	184	22.4	184	22.4	184	4	0.25	1.5	3.7	10.6/ 9.6	—	—	—	0.5	89/ 88	100/100	96/ 95
															2	1	5.9		101/100	110/110	110/109
													5	16.7/15.2	—	—	—		96/ 94	100/100	103/102
															2	1	5.9		107/106	125/125	117/115
													7.5	24.2/22	—	—	—		103/101	125/110	112/109
															2	1	5.9		115/113	125/125	126/123
													10	30.8/28	—	—	—		112/108	125/125	120/116
															2	1	5.9		124/120	150/125	133/130
	460	414	506	10.7	90	10.7	90	10.7	90	4	0.25	0.7	3.7	4.8	—	—	—	0.3	42	50	46
															2	1	3.1		49	50	53
													5	7.6	—	—	—		45	50	49
															2	1	3.1		51	60	56
													7.5	11	—	—	—		49	50	53
															2	1	3.1		55	60	60
													10	14	—	—	—		52	60	56
															2	1	3.1		59	60	63
	575	518	633	9.3	73	9.3	73	9.3	73	4	0.25	0.7	5	6.1	—	—	—	0.24	39	45	42
															2	1	2.4		44	50	48
													7.5	9	—	—	—		42	50	46
															2	1	2.4		47	50	51
													10	11	—	—	—		44	50	48
															2	1	2.4		49	60	53
028	208/230	187	253	47.1	245	47.1	245	—	—	6	0.25	1.5	5	16.7/15.2	—	—	—	0.5	132/130	175/175	138/136
															2	1	5.9		143/142	175/175	151/150
													7.5	24.2/22	—	—	—		139/137	175/175	147/144
															2	1	5.9		151/149	175/175	160/158
													10	30.8/28	—	—	—		146/143	175/175	154/151
															2	1	5.9		158/155	200/200	168/164
	460	414	506	19.6	125	19.6	125	—	—	6	0.25	0.7	5	7.6	—	—	—	0.3	56	60	59
															2	1	3.1		62	80	66
													7.5	11	—	—	—		59	60	63
															2	1	3.1		66	80	70
													10	14	—	—	—		62	80	66
															2	1	3.1		69	80	73
	575	518	633	15.8	100	15.8	100	—	—	6	0.25	0.7	5	6.1	—	—	—	0.24	46	60	48
															2	1	2.4		51	60	54
													7.5	9	—	—	—		49	60	52
															2	1	2.4		54	60	57
													10	11	—	—	—		51	60	54
															2	1	2.4		56	60	59

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP— Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

*Fuse or HACR circuit breaker.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.
   % Voltage Imbalance

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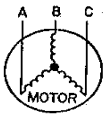


AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v
Maximum deviation is 7 v.
Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

ELECTRICAL DATA — 48HJ020-028 WITH OPTIONAL CONVENIENCE OUTLET

UNIT 48HJ	NOMINAL VOLTAGE (3 Ph, 60 Hz)	VOLTAGE RANGE		COMPRESSOR						OFM			IFM		POWER EXHAUST			COMBUSTION FAN MOTOR	POWER SUPPLY		DISCONNECT SIZE
				No. 1		No. 2		No. 3													
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	Qty	Hp	FLA (ea)	FLA	MCA	MOCP*	FLA
020	208/230	187	253	16.7	130	16.7	130	22.4	184	4	0.25	1.5	3.7	10.6/ 9.6	—	—	—	0.5	83/ 82	100/100	89/ 88
															2	1	5.9		95/ 94	100/100	103/101
													5	16.7/15.2	—	—	—		89/ 88	100/100	96/ 94
															2	1	5.9		101/ 99	110/100	110/108
													7.5	24.2/22	—	—	—		97/ 94	100/100	105/102
															2	1	5.9		109/106	125/125	118/116
	460	414	506	9	70	9	70	10.7	90	4	0.25	0.7	3.7	4.8	—	—	—	0.3	42	50	45
															2	1	3.1		48	50	52
													5	7.6	—	—	—		45	50	48
															2	1	3.1		51	60	56
													7.5	11	—	—	—		48	50	52
															2	1	3.1		54	60	59
	575	518	633	7	55	7	55	9.3	73	4	0.25	0.7	3	3.9	—	—	—	0.24	35	40	38
															2	1	2.4		40	45	43
													5	6.1	—	—	—		38	45	40
															2	1	2.4		42	50	46
													7.5	9	—	—	—		40	45	44
															2	1	2.4		45	50	49
024	208/230	187	253	22.4	184	22.4	184	22.4	184	4	0.25	1.5	3.7	10.6/ 9.6	—	—	—	0.5	94/ 93	100/100	102/101
															2	1	5.9		106/105	125/125	116/115
													5	16.7/15.2	—	—	—		101/ 99	110/100	109/107
															2	1	5.9		112/111	125/125	123/121
													7.5	24.2/22	—	—	—		108/106	125/125	118/115
															2	1	5.9		120/118	125/125	131/129
													10	30.8/28	—	—	—		117/113	125/125	125/122
															2	1	5.9		129/125	150/150	139/136
	460	414	506	10.7	90	10.7	90	10.7	90	4	0.25	0.7	3.7	4.8	—	—	—	0.3	45	50	49
															2	1	3.1		52	60	56
													5	7.6	—	—	—		48	50	52
															2	1	3.1		54	60	59
													7.5	11	—	—	—		52	60	56
															2	1	3.1		58	60	63
													10	14	—	—	—		55	60	60
															2	1	3.1		62	70	67
	575	518	633	9.3	73	9.3	73	9.3	73	4	0.25	0.7	5	6.1	—	—	—	0.24	42	50	46
															2	1	2.4		47	50	51
													7.5	9	—	—	—		45	50	49
															2	1	2.4		50	50	55
													10	11	—	—	—		47	50	51
															2	1	2.4		52	60	57
028	208/230	187	253	47.1	245	47.1	245	—	—	6	0.25	1.5	5	16.7/15.2	—	—	—	0.5	137/135	175/175	144/142
															2	1	5.9		148/147	175/175	157/155
													7.5	24.2/22	—	—	—		144/142	175/175	152/150
															2	1	5.9		156/154	200/200	166/163
													10	30.8/28	—	—	—		151/148	175/175	160/157
															2	1	5.9		163/160	200/200	173/170
	460	414	506	19.6	125	19.6	125	—	—	6	0.25	0.7	5	7.6	—	—	—	0.3	59	60	62
															2	1	3.1		65	80	69
													7.5	11	—	—	—		62	80	66
															2	1	3.1		69	80	73
													10	14	—	—	—		65	80	69
															2	1	3.1		72	90	77
	575	518	633	15.8	100	15.8	100	-	-	6	0.25	0.7	5	6.1	—	—	—	0.24	49	60	52
															2	1	2.4		54	60	57
													7.5	9	—	—	—		52	60	55
															2	1	2.4		57	60	60
													10	11	—	—	—		54	60	57
															2	1	2.4		59	60	63

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MCA — Minimum Circuit Amps
MOCP— Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

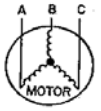
*Fuse or HACR circuit breaker.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

% Voltage Imbalance

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v
Maximum deviation is 7 v.
Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100 \times \frac{7}{457}$$

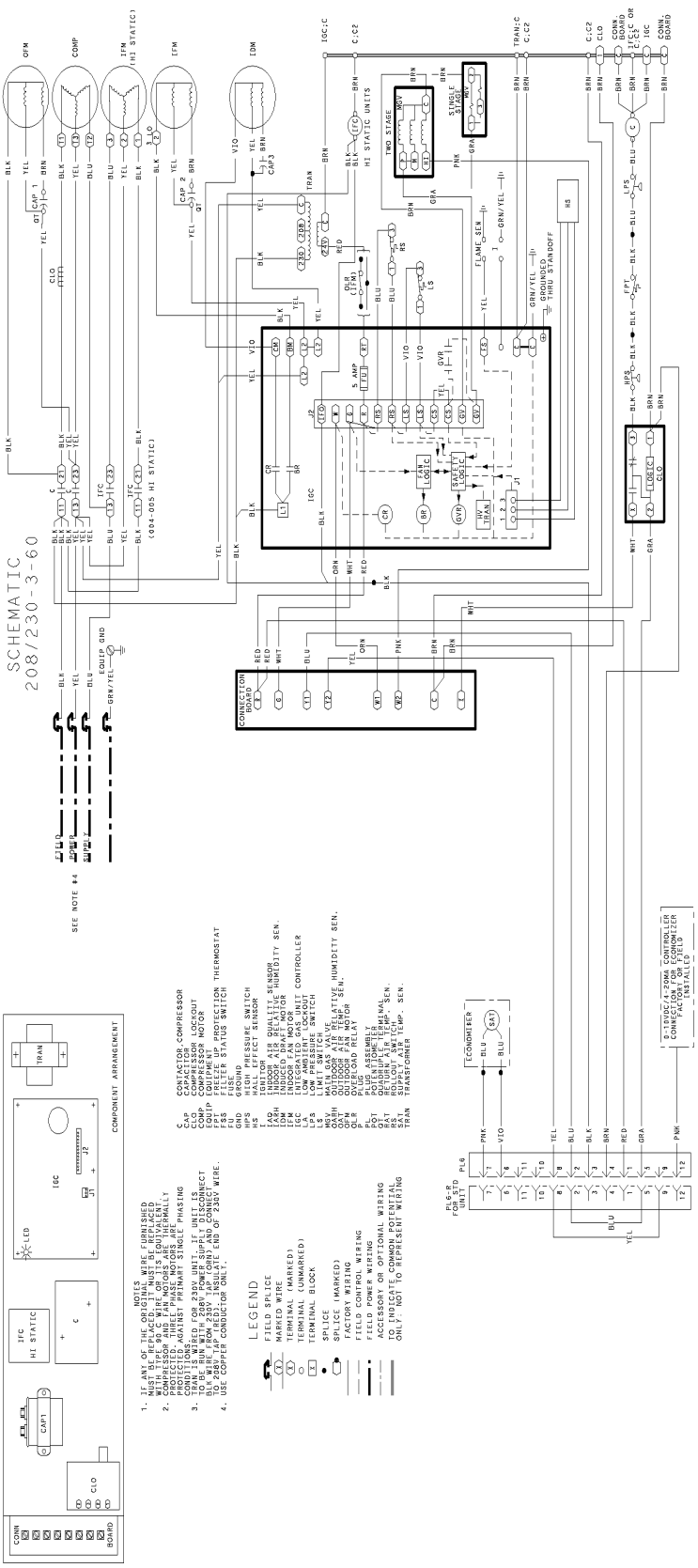
$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

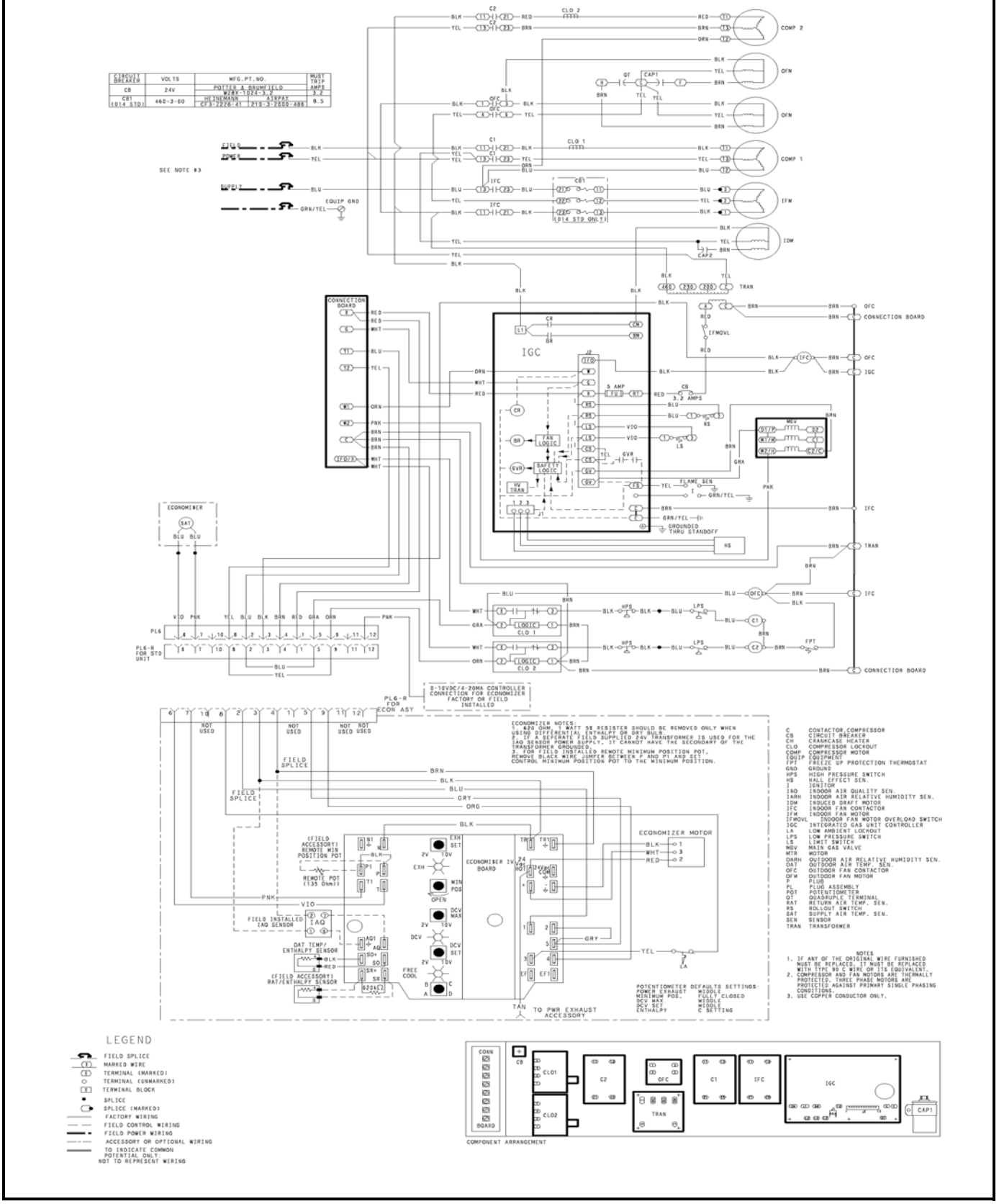
IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Typical wiring schematics — 48HJ

SIZES 003-007 (48HJ004-005, 208/230-3-60 SHOWN)

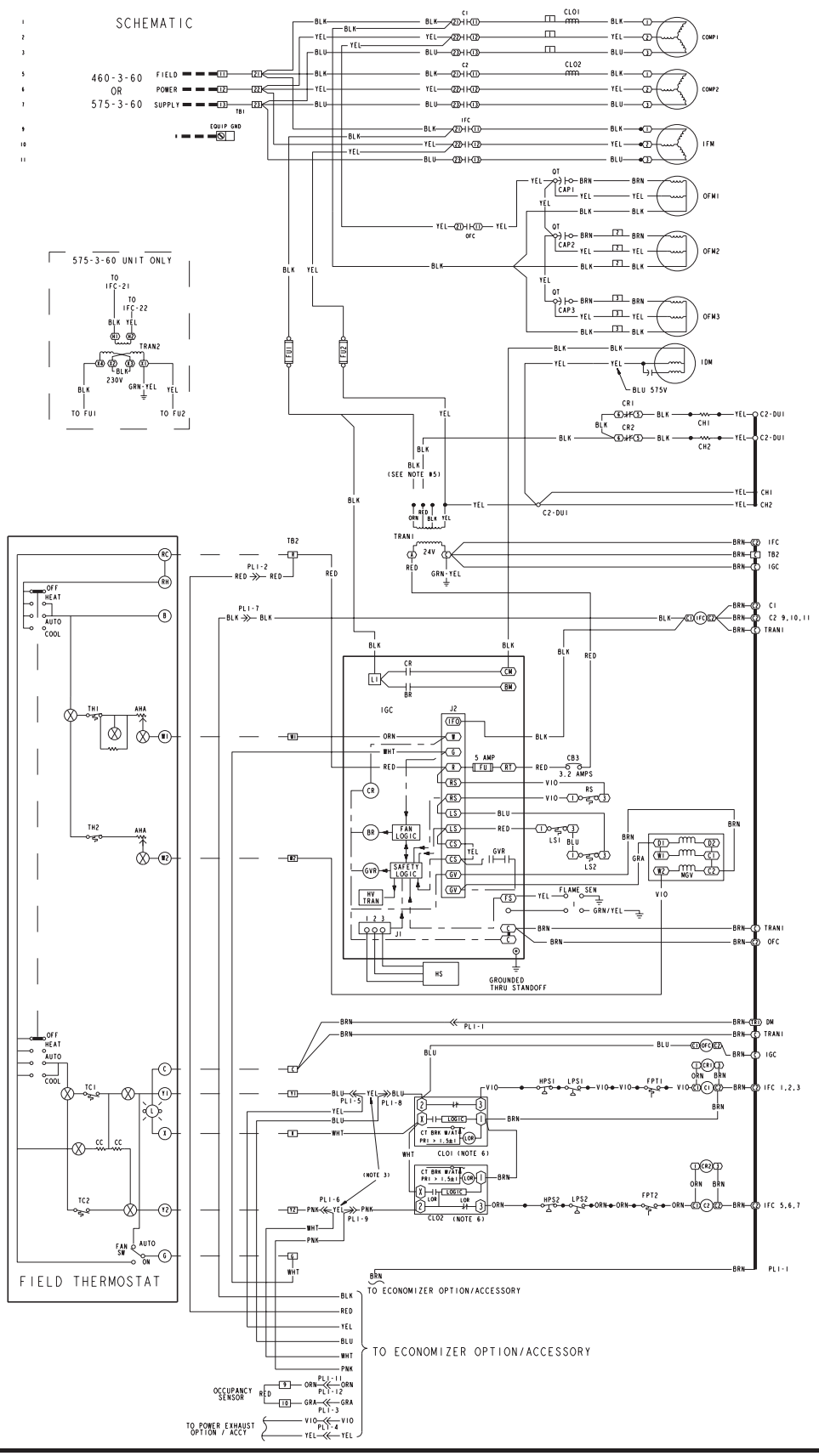


SIZES 008-014 (48HJ008-014, 460-3-60 SHOWN)



Typical wiring schematics — 48HJ (cont)

SIZES 015,017 (48HJ015, 460-3-60 SHOWN)



LEGEND

AHA	—	Adjustable Heat Anticipator
C	—	Contactor, Compressor
CAP	—	Capacitor
CB	—	Circuit Breaker
CC	—	Cooling Compensator
CH	—	Crankcase Heater
CLO	—	Compressor Lockout
COMP	—	Compressor Motor
CR	—	Control Relay
DM	—	Damper Motor
DU	—	Dummy Terminal
EQUIP	—	Equipment
FPT	—	Freeze Protection Thermostat
FU	—	Fuse
GND	—	Ground
HPS	—	High-Pressure Switch
HS	—	Hall Effect Sensor
HV	—	High Voltage
I	—	Ignitor
IDM	—	Induced Draft Motor
IFC	—	Indoor Fan Contactor
IFCB	—	Indoor Fan Circuit Breaker
IFM	—	Indoor (Evaporator) Fan Motor
IGC	—	Integrated Gas Unit Controller
L	—	Light
LOR	—	Lockout Relay
LPS	—	Low-Pressure Switch
LS	—	Limit Switch
MGV	—	Main Gas Valve
OFC	—	Outdoor Fan Contactor
OFM	—	Outdoor Fan Motor
PL	—	Plug Assembly
PRI	—	Primary
QT	—	Quadruple Terminal
RS	—	Rollout Switch
SEN	—	Sensor
SW	—	Switch
TB	—	Terminal Block
TC	—	Thermostat-Cooling
TH	—	Thermostat-Heating
TRAN	—	Transformer

Terminal (Marked)

Terminal (Unmarked)

Terminal Block

Splice

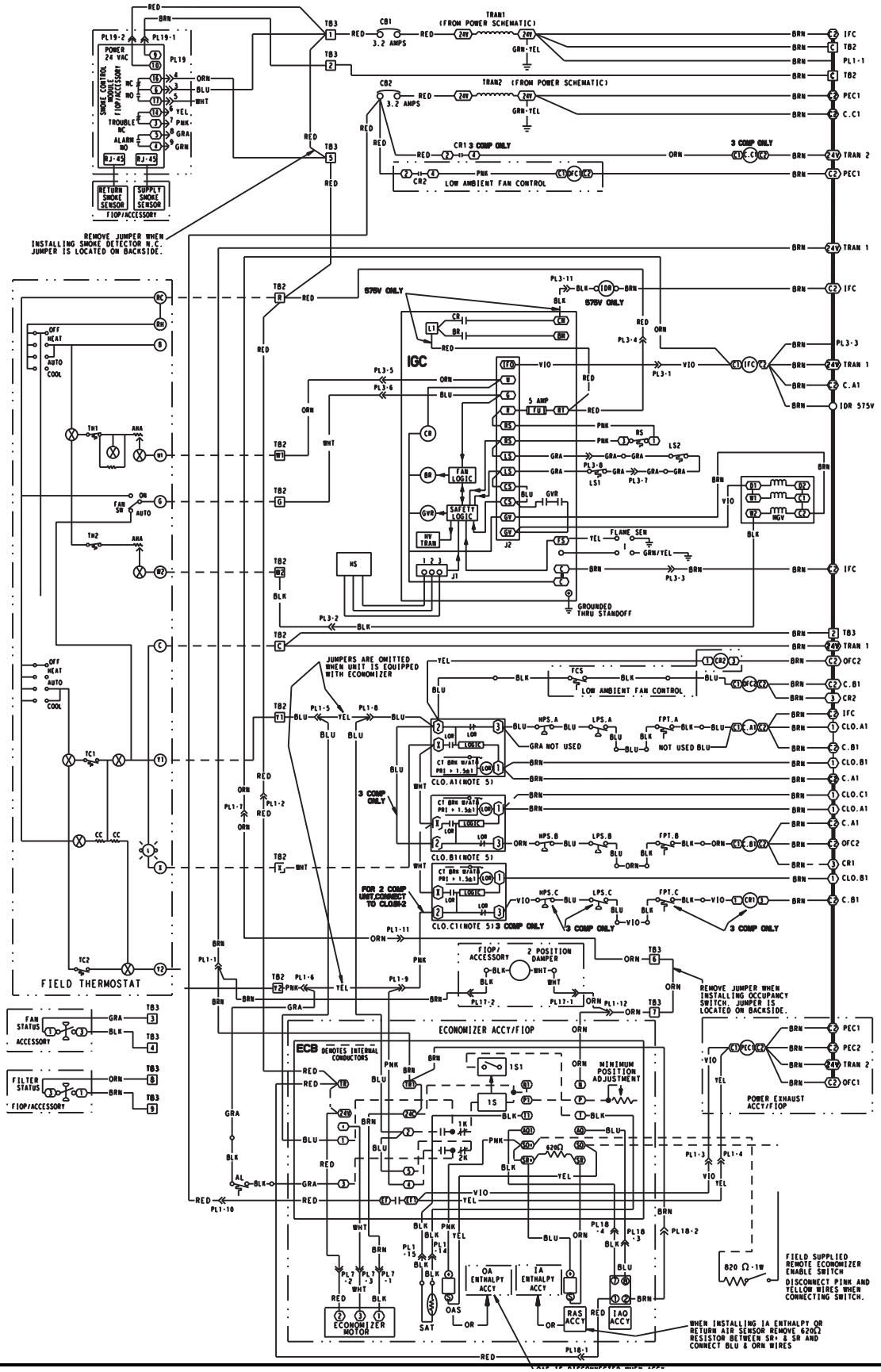
Factory Wiring

Field Wiring

Option/Accessory Wiring

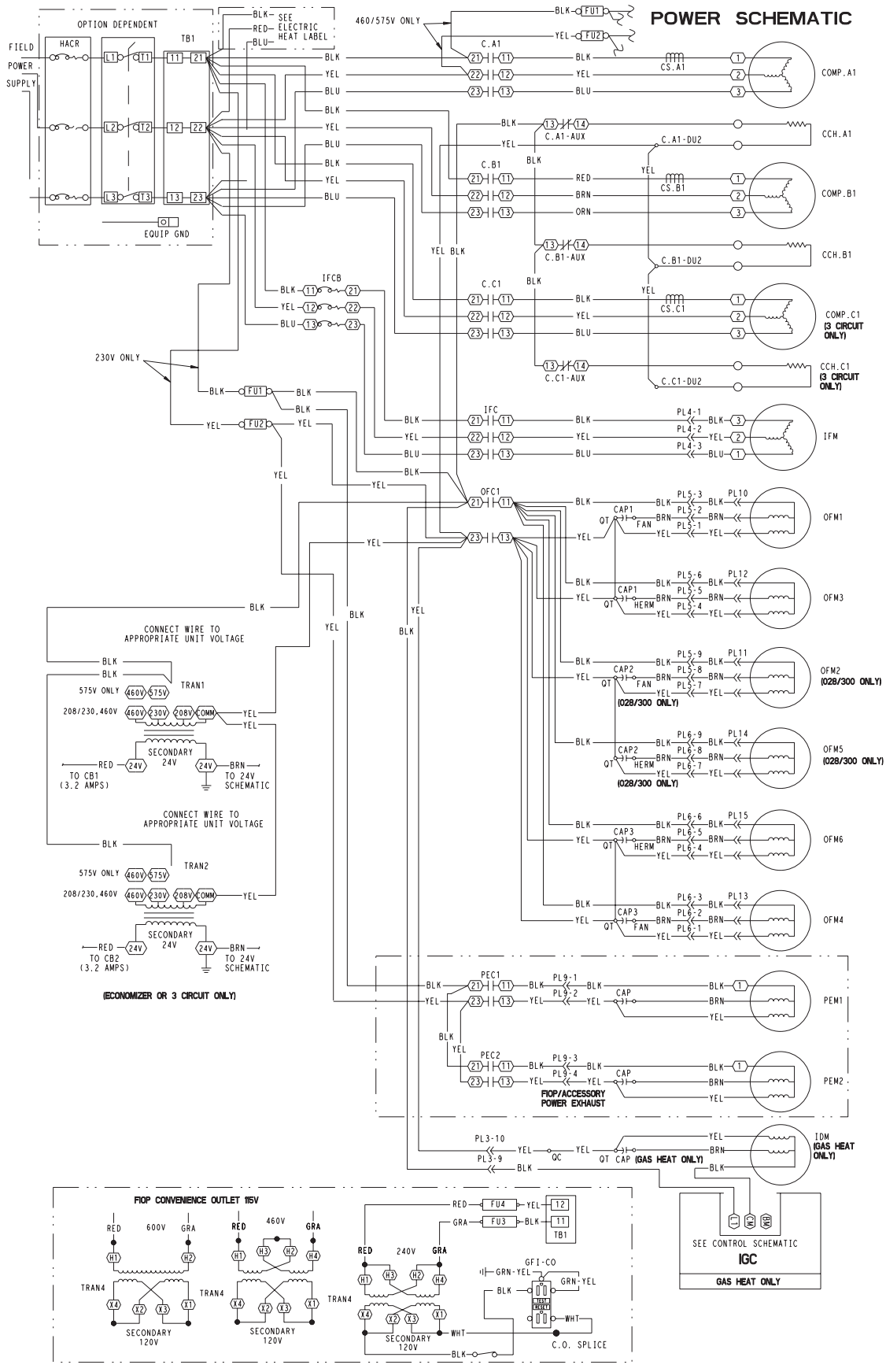
To indicate common potential only. Not to represent wiring.

LOW VOLTAGE CONTROL SCHEMATIC — 48HJ020-028

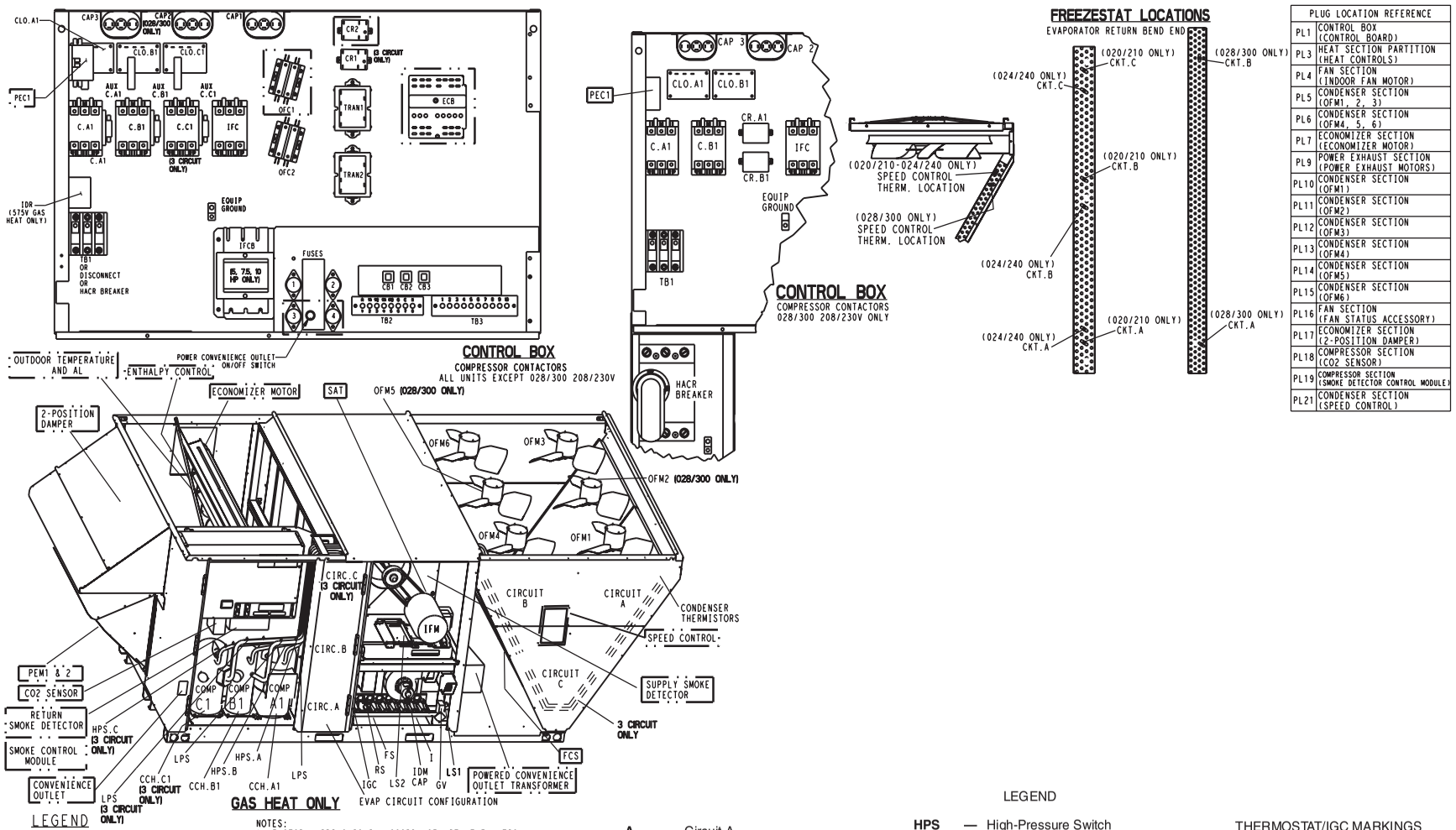


Typical wiring schematics — 48HJ (cont)

POWER SCHEMATIC — 48HJ020-028



COMPONENT ARRANGEMENT — 48HJ020- 028



PLUG LOCATION REFERENCE	
PL1	CONTROL BOX (CONTROL BOARD)
PL3	HEAT SECTION PARTITION (HEAT CONTROLS)
PL4	FAN SECTION (INDOOR FAN MOTOR)
PL5	CONDENSER SECTION (OFM1, 2, 3)
PL6	CONDENSER SECTION (OFM4, 5, 6)
PL7	ECONOMIZER SECTION (ECONOMIZER MOTOR)
PL9	POWER EXHAUST SECTION (POWER EXHAUST MOTORS)
PL10	CONDENSER SECTION (OFM1)
PL11	CONDENSER SECTION (OFM2)
PL12	CONDENSER SECTION (OFM3)
PL13	CONDENSER SECTION (OFM4)
PL14	CONDENSER SECTION (OFM5)
PL15	CONDENSER SECTION (OFM6)
PL16	FAN SECTION (FAN STATUS ACCESSORY)
PL17	ECONOMIZER SECTION (2-POSITION DAMPER)
PL18	COMPRESSOR SECTION (CO2 SENSOR)
PL19	COMPRESSOR SECTION (SMOKE DETECTOR CONTROL MODULE)
PL21	CONDENSER SECTION (SPEED CONTROL)

LEGEND

- TERMINAL BLOCK
- TERMINAL (UNMARKED)
- TERMINAL (MARKED
- SPLICE
- FACTORY WIRING
- FIELD WIRING
- TO INDICATE COMMON POTENTIAL ONLY, NOT TO REPRESENT WIRING
- TO INDICATE FIOP OR ACCESSORY

NOTES:
1. FACTORY WIRING IS IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODES. ANY FIELD MODIFICATIONS OR ADDITIONS MUST BE IN COMPLIANCE WITH ALL APPLICABLE CODES.
2. USE 75°C MIN WIRE FOR FIELD POWER SUPPLY, USE COPPER WIRES FOR ALL UNITS.
3. ALL CIRCUIT BREAKERS "MUST TRIP AMPS" ARE EQUAL TO OR LESS THAN 156% RLA.
4. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED--THREE PHASE MOTORS PROTECTED AGAINST PRIMARY SINGLE PHASE CONDITIONS.
5. THE CLO LOCKS OUT THE COMPRESSOR TO PREVENT SHORT CYCLING ON COMPRESSOR OVERLOAD AND SAFETY DEVICES; BEFORE REPLACING CLO, CHECK THESE DEVICES.

---A	—	Circuit A
AUX	—	Auxiliary Contact
AL	—	Ambient Limit
---B	—	Circuit B
---C	—	Circuit C
C	—	Compressor, Contactor
CAP	—	Capacitor
CB	—	Circuit Breaker
CCH	—	Crankcase Heater
CLO	—	Compressor Lockout
COMP	—	Compressor
CR	—	Control Relay
ECB	—	Economizer Control Board
FCS	—	Fan Cycling Switch
FIOP	—	Factory-Installed Option
FPT	—	Freeze Protect Thermostat
FS	—	Flame Sensor
GV	—	Gas Valve
HACR	—	Heating, Air Conditioning, and Refrigeration

LEGEND

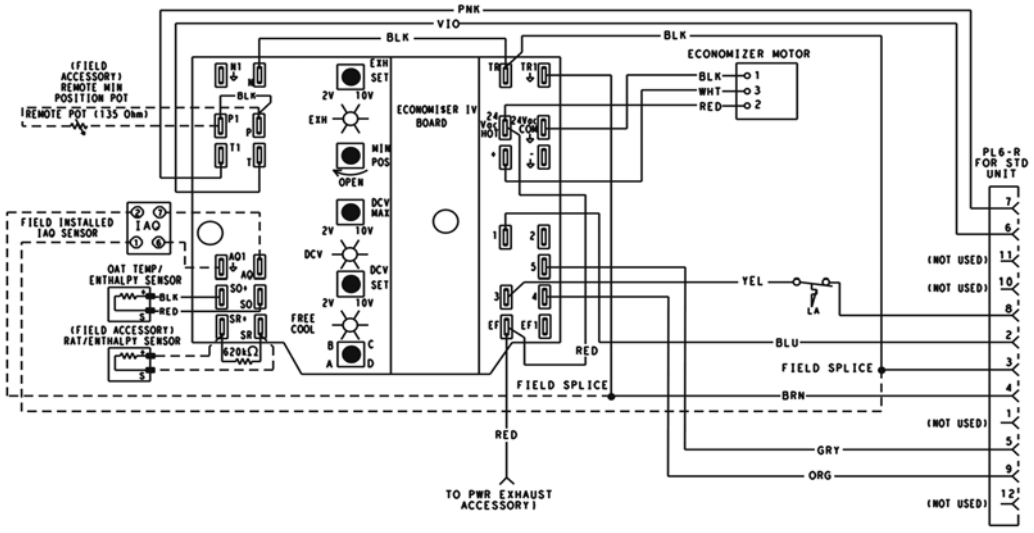
HPS	—	High-Pressure Switch
I	—	Ignitor
IAQ	—	Indoor Air Quality
IDM	—	Induced Draft Motor
IDR	—	Induced Draft Relay
IFC	—	Indoor Fan Contactor
IFCB	—	Indoor Fan Circuit Breaker
IFM	—	Indoor Fan Motor
IGC	—	Integrated Gas Controller
LPS	—	Low-Pressure Switch
LS	—	Limit Switch
OAT	—	Outdoor Air Temperature
OFC	—	Outdoor Fan Contactor
OFM	—	Outdoor Fan Motor
PEC	—	Power Exhaust Contactor
PEM	—	Power Exhaust Motor
PL	—	Plug
RS	—	Rollout Switch
SAT	—	Supply-Air Temperature
TB	—	Terminal Block
TRAN	—	Transformer

THERMOSTAT/IGC MARKINGS

BM	—	Blower Motor
C	—	Common
CM	—	Combustion Motor
CS	—	Centrifugal Switch
G	—	Fan
IFO	—	Indoor Fan On
L1	—	Line 1
R	—	Thermostat Power
RT	—	Power Supply
SS	—	Speed Sensor
W	—	Thermostat Heat
W1	—	1st Stage of Heating
W2	—	2nd Stage of Heating
X	—	Alarm Output
Y1	—	1st Stage of Cooling
Y2	—	2nd Stage of Cooling

Typical wiring schematics — 48HJ (cont)

ECONOMI$ER IV WIRING — 48HJ004-014 UNITS



LEGEND

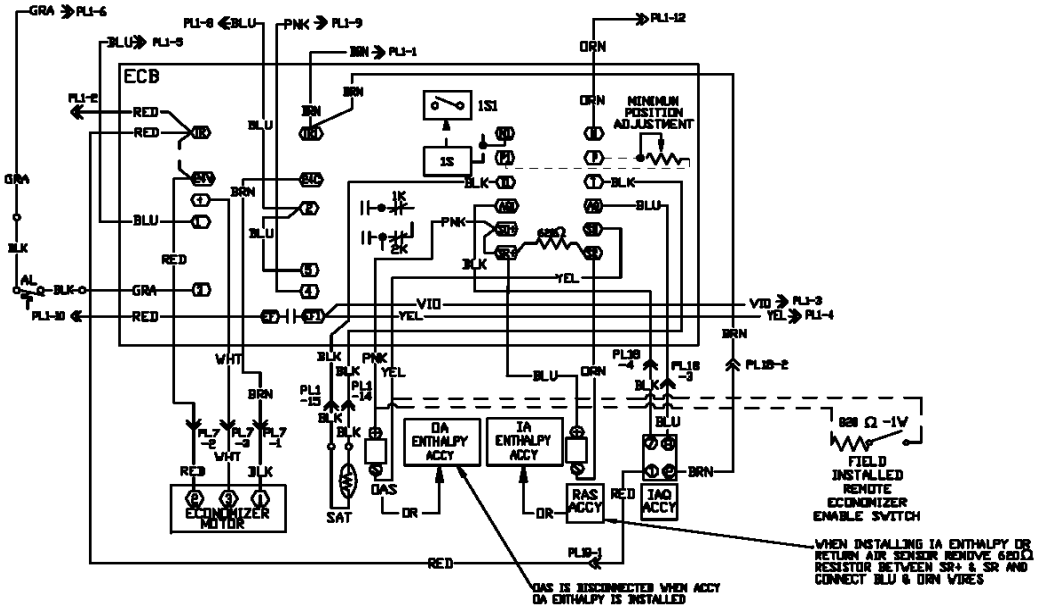
IAQ	—	Indoor Air Quality
LA	—	Low Ambient Lockout Device
POT	—	Potentiometer
OAT	—	Outdoor-Air Tempeture
RAT	—	Return-Air Temperature

NOTES:
Potentiometer Default settings:

Power Exhaust	Middle
Minimum Pos.	Fully Closed
DCV Max.	Middle
DCV Set	Middle
Enthalpy	C Setting

NOTES:
1. 620 ohm, 1 watt 5% resister schould be removed only when using differential enthalpy or dry bulb
2. If a seperate field-supplied 24v transfomer is used for the IAQ sensor power supply, it cannot have the secondary of the transformer grounded.
3. For field-installed remote minimum position POT, remove black wire jumper between P and P1 and set control minimum position POT to the minimum position.

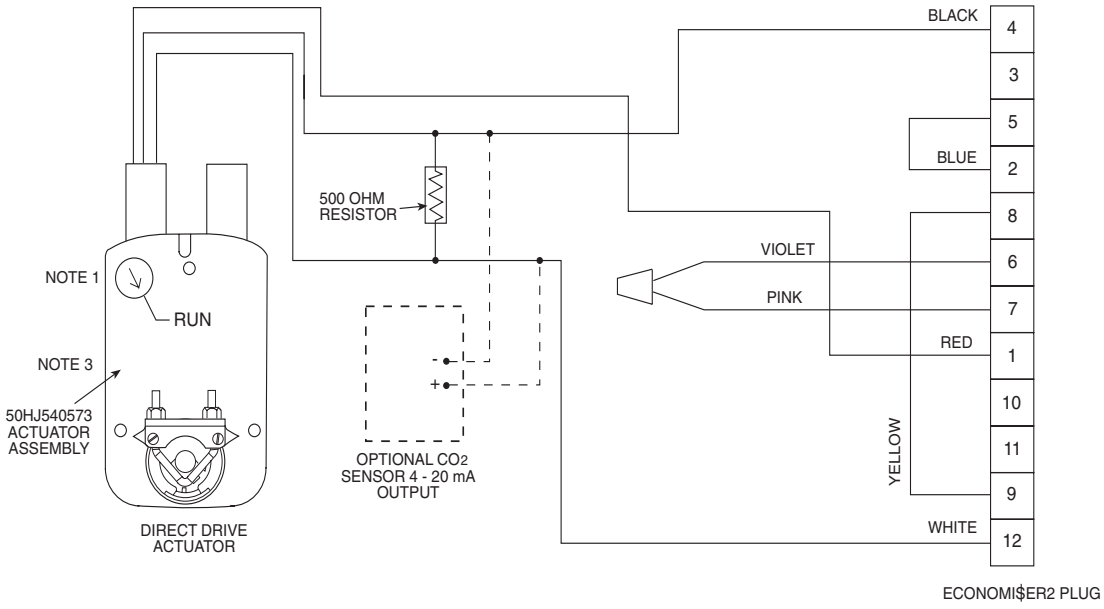
ECONOMI$ER IV WIRING — 48HJ015,017 UNITS



LEGEND

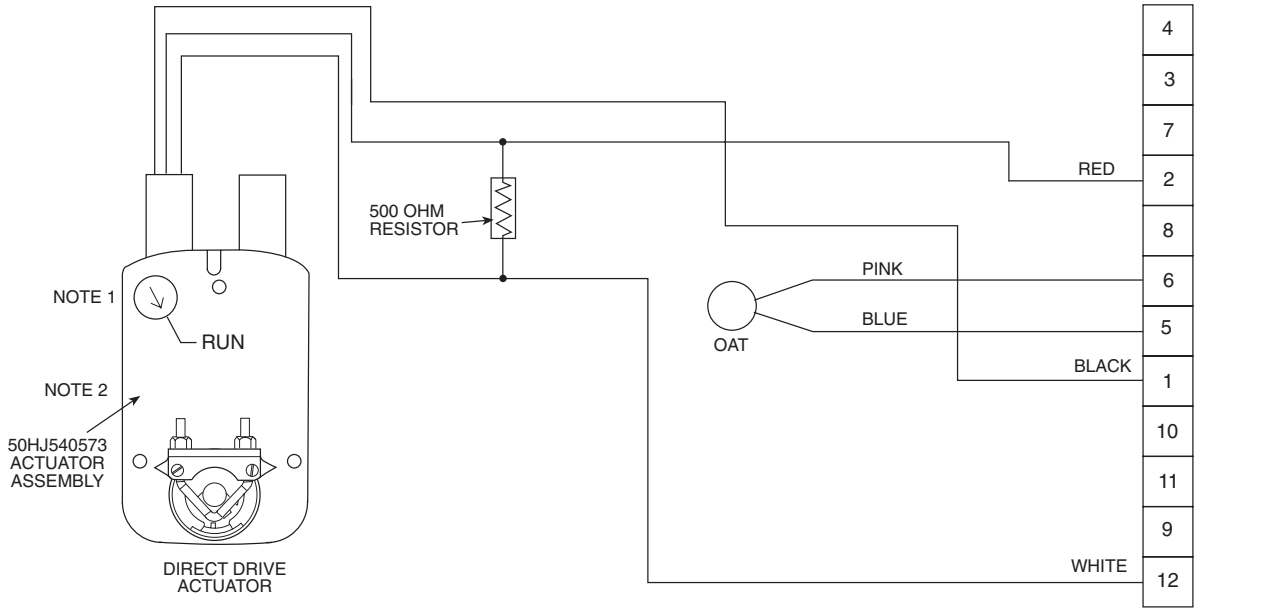
AL	—	Ambient Limit
ECB	—	Economizer Control Board
IA	—	Indoor Air
IAQ	—	Indoor Air Quality
OA	—	Outdoor Air
OAS	—	Outdoor Air Sensor
RAS	—	Return Air Sensor
SAT	—	Supply Air Temperature

ECONOMI$ER2 WIRING — 48HE003-006 and 48HJ004-014 UNITS



NOTES:
1. Switch on actuator must be in run position for economizer to operate.
2. PremierLink™ control requires that the standard 50HJ540569 outside-air sensor be replaced by either the CROASENR001A00 dry bulb sensor or HH57A077 enthalpy sensor.
3. 50HJ540573 actuator consists of the 50HJ540567 actuator and a harness with 500-ohm resistor.

ECONOMI$ER2 WIRING — 48HJ015,017 UNITS



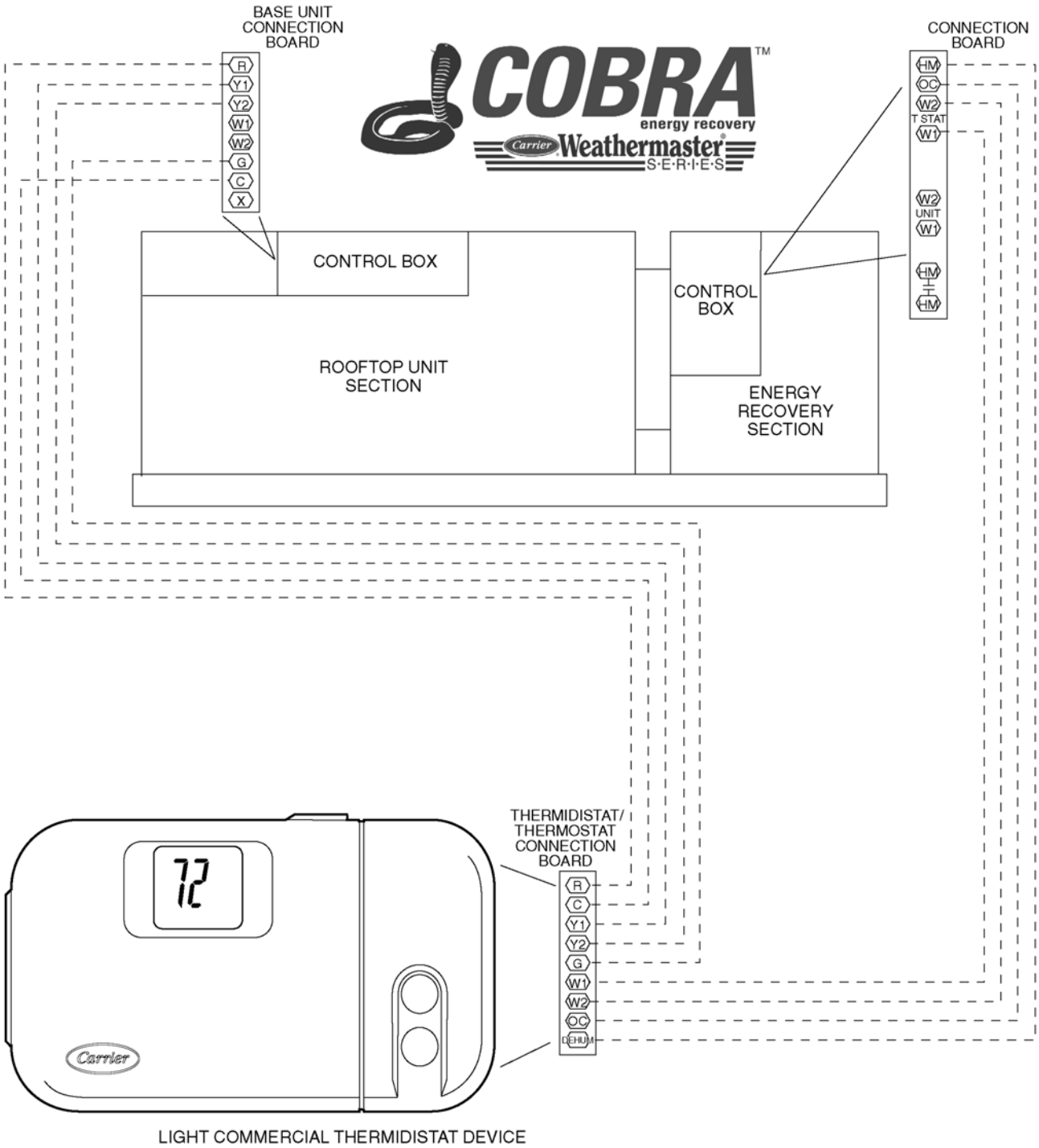
LEGEND

OAT — Outdoor Air Temperature Sensor

NOTES:
1. Switch on actuator must be in run position for economizer to operate.
2. 50HJ540573 actuator consists of the 50HJ540567 actuator and a harness with 500-ohm resistor.

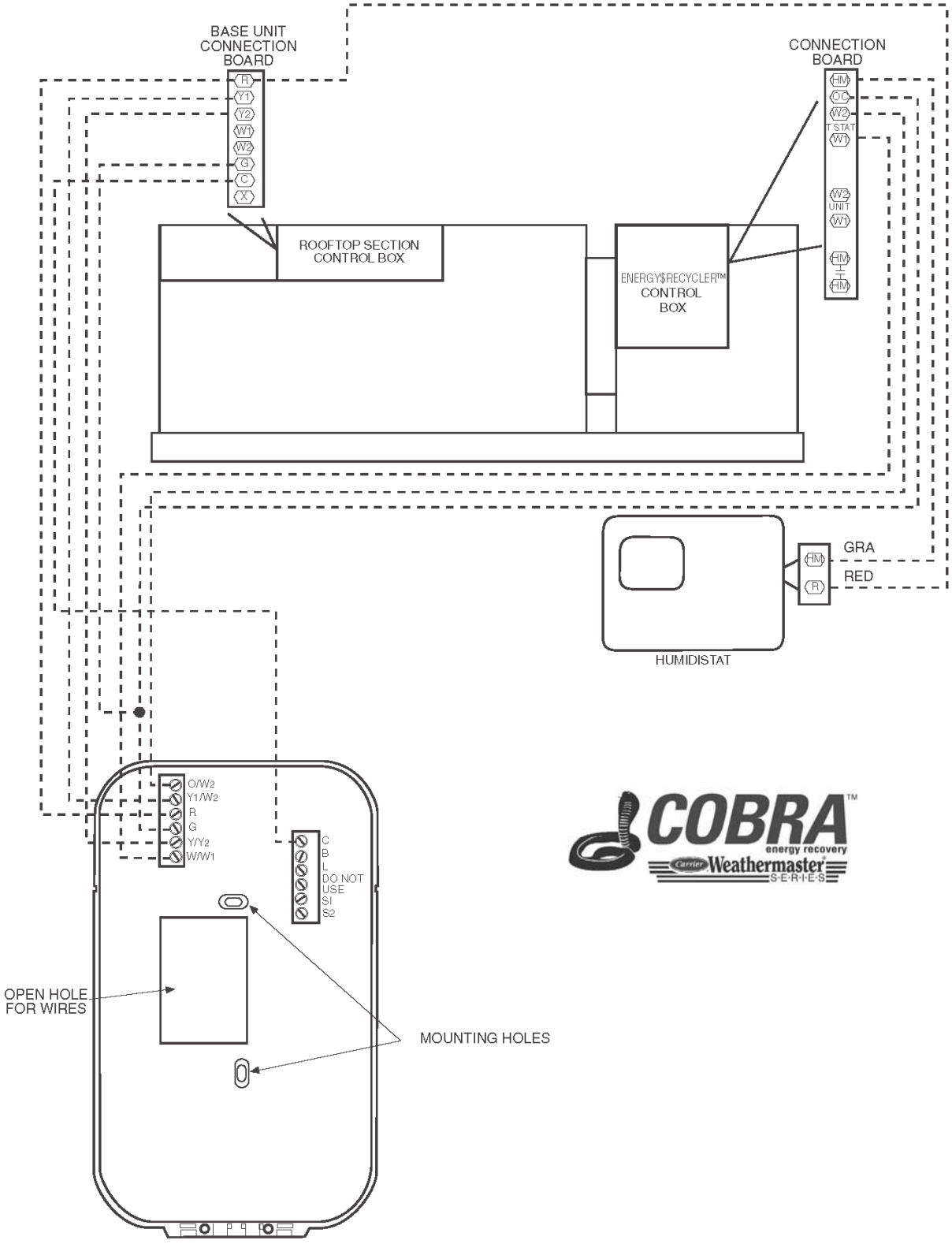
Typical wiring schematics — 48HJ (cont)

TYPICAL COBRA™ ENERGY RECOVERY UNIT CONTROL WIRING WITH THERMIDISTAT™ DEVICE AND STANDARD CONTROLS



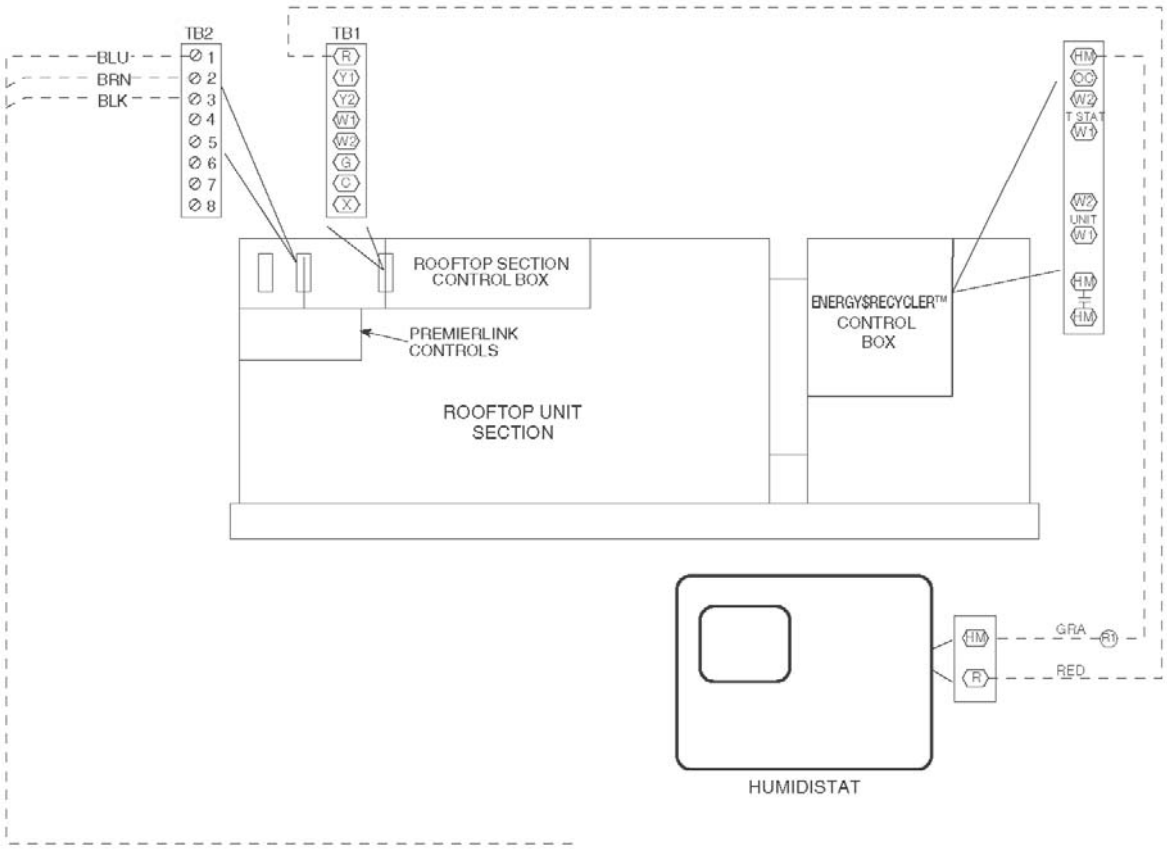
LIGHT COMMERCIAL THERMIDISTAT DEVICE

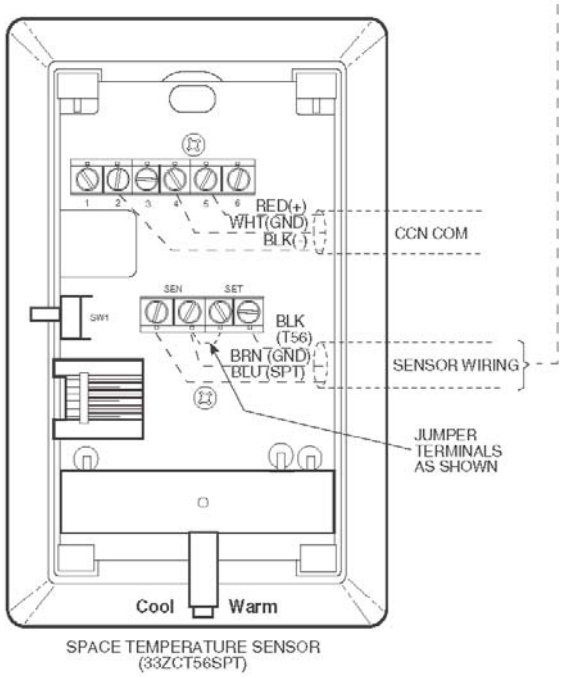
TYPICAL COBRA™ ENERGY RECOVERY UNIT CONTROL WIRING WITH DIGITAL THERMOSTAT, HUMIDISTAT, AND ELECTRO-MECHANICAL CONTROLS



Typical wiring schematics — 48HJ (cont)

TYPICAL COBRA™ ENERGY RECOVERY UNIT CONTROL WIRING WITH HUMIDISTAT, SPACE TEMPERATURE SENSOR, AND PREMIERLINK™ CONTROLS

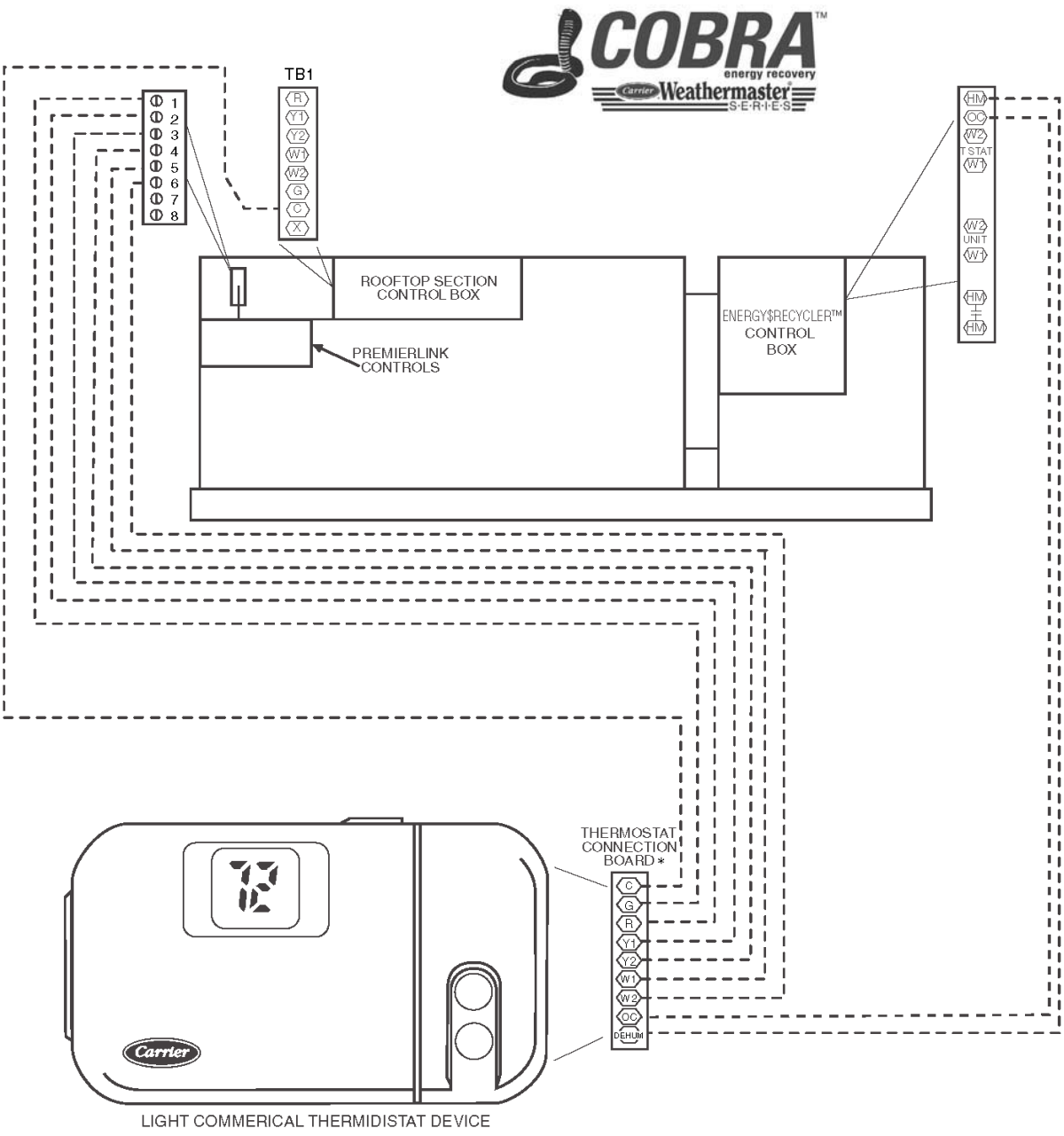




SPACE TEMPERATURE SENSOR
(33ZCT56SPT)

COBRA™ energy recovery Carrier Weathermaster SERIES

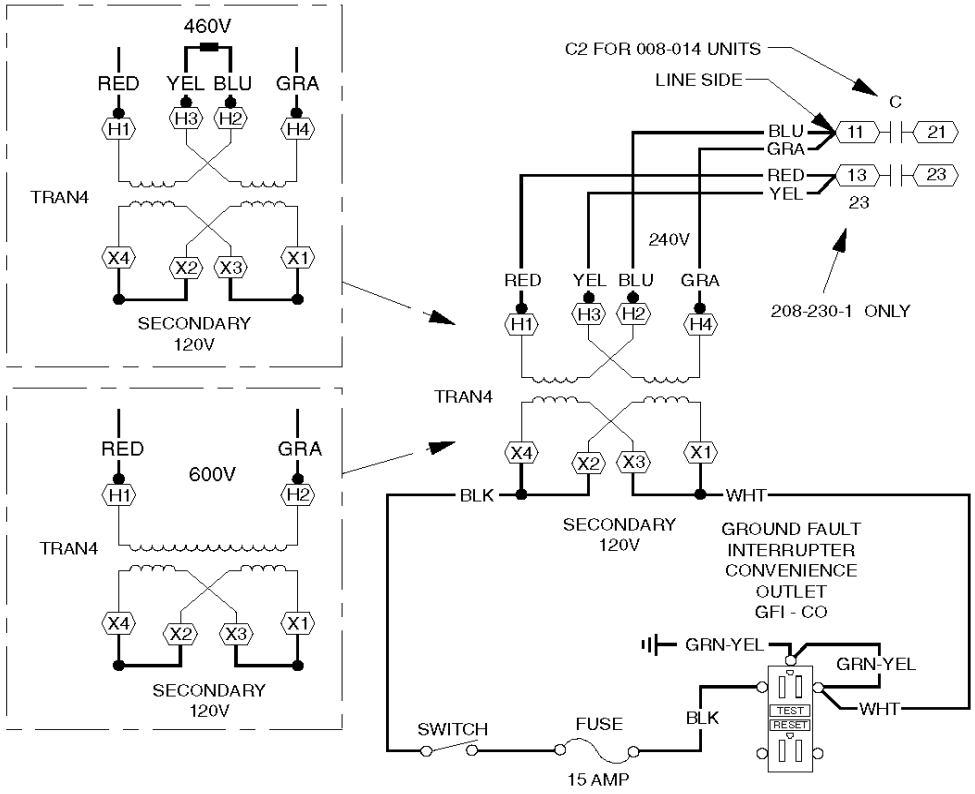
TYPICAL COBRA™ ENERGY RECOVERY UNIT CONTROL WIRING WITH THERMIDSTAT™, AND PREMIERLINK™ CONTROLS



NOTE: Thermidistat connection terminal arrangement for schematic purposes only.

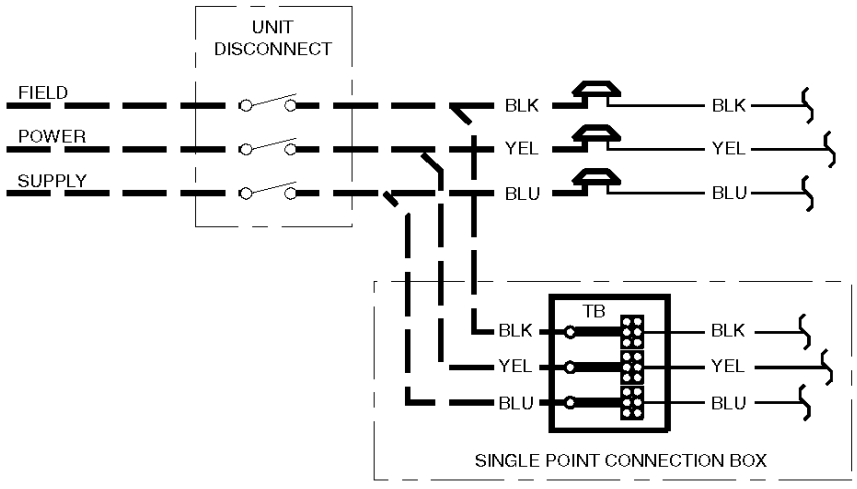
Typical wiring schematics — 48HJ (cont)

CONVENIENCE OUTLET (OPTIONAL) — SIZES 48HJ004-014



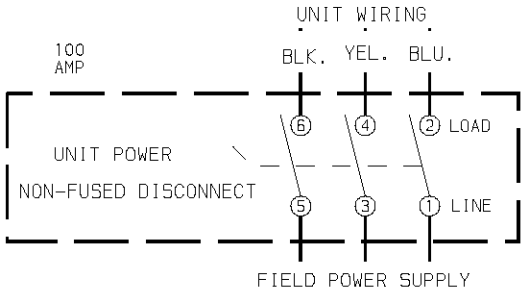
NOTE:
Convenience outlet is intended for intermittent use of service equipment and not as a power source for extended operation of electrical loads.

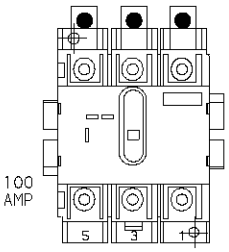
NON-FUSED DISCONNECT (OPTIONAL) — SIZES 48HJ004-014

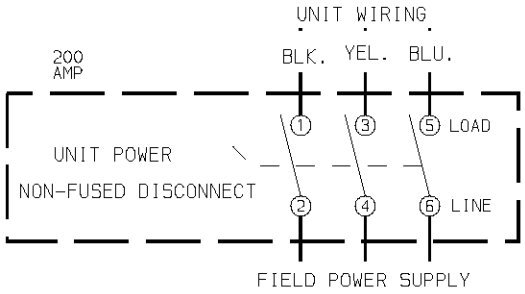


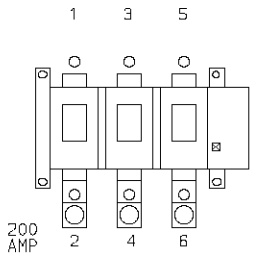
NOTE: Use copper conductors only.

NON-FUSED DISCONNECT (OPTIONAL) — 48HJ015,017





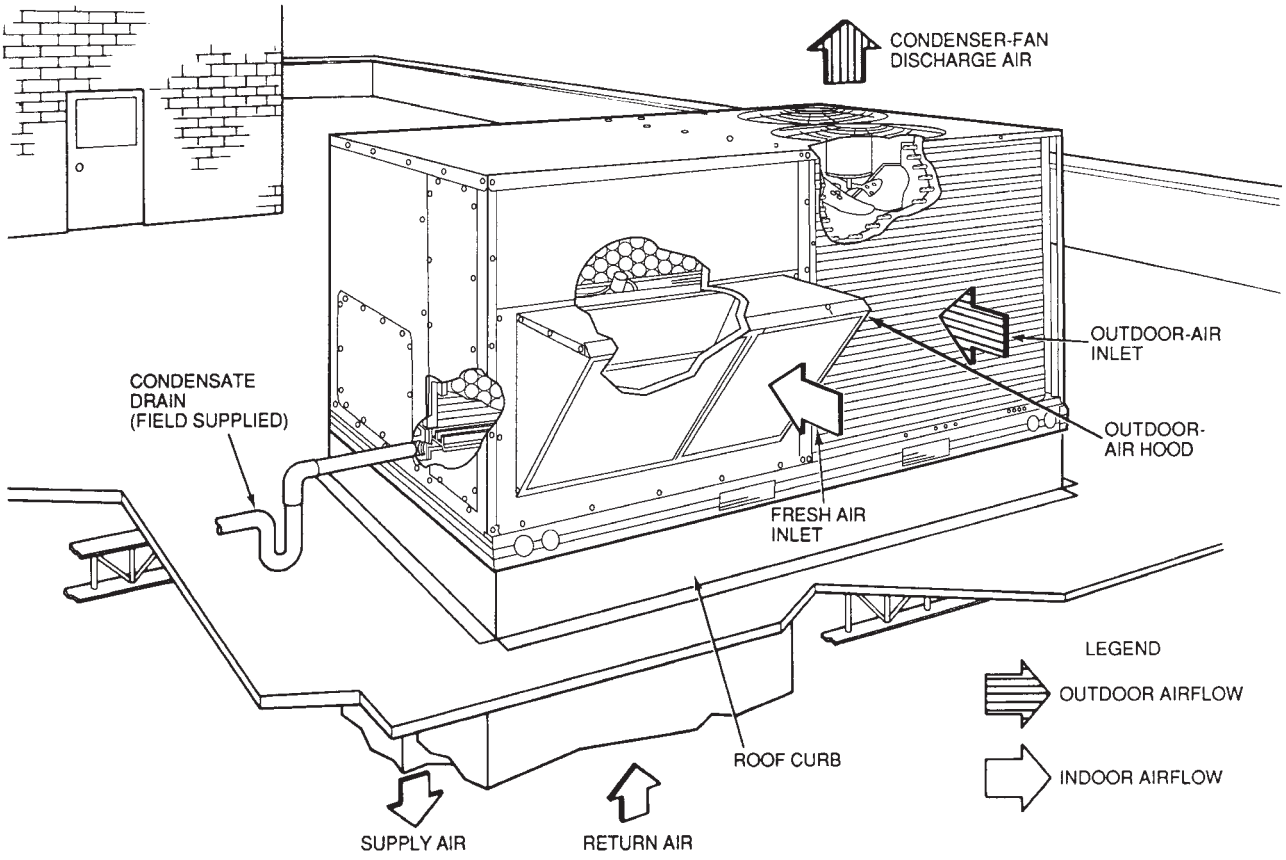




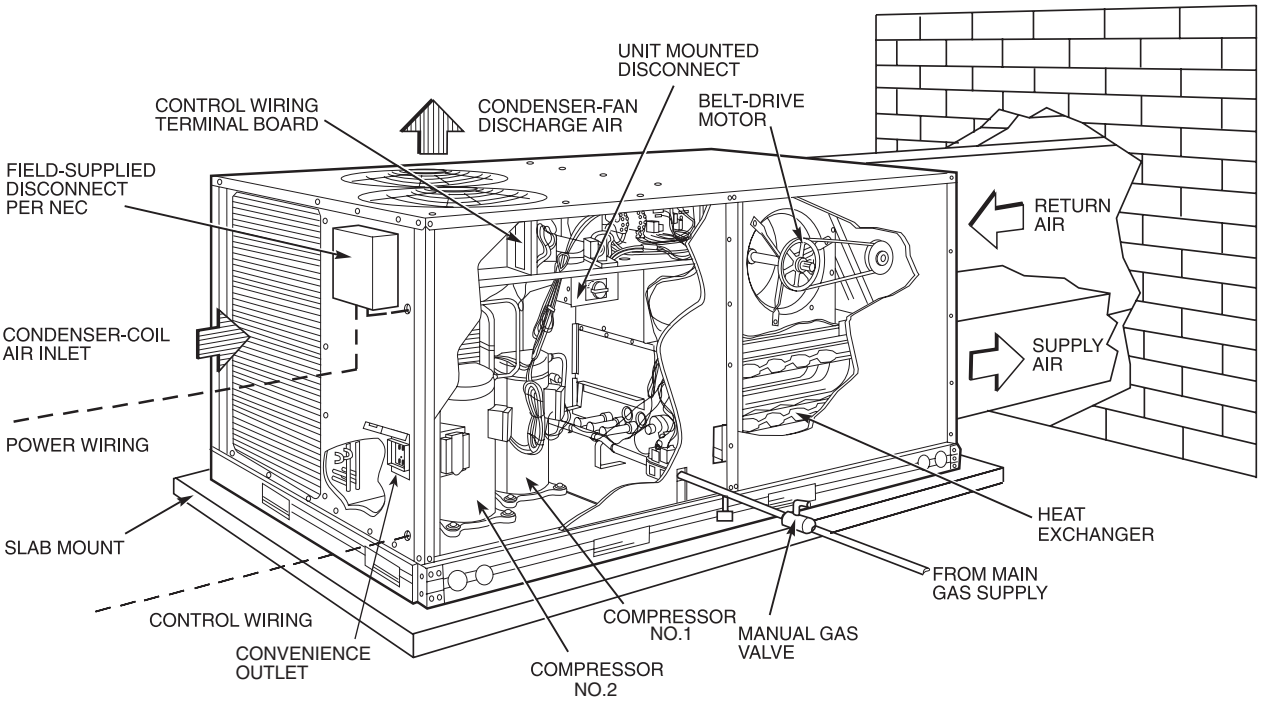
NOTES:
1. If the Non-Fused Disconnect Service Option is ordered for size 015,017 units, the Non-Fused Disconnect will be factory-installed.
2. The Disconnect takes the place of TB-1 as shown on the unit wiring diagram label and the component arrangement label.

Typical piping and wiring — 48HE003-006 and 48HJ004-014

VERTICAL DISCHARGE DUCTING

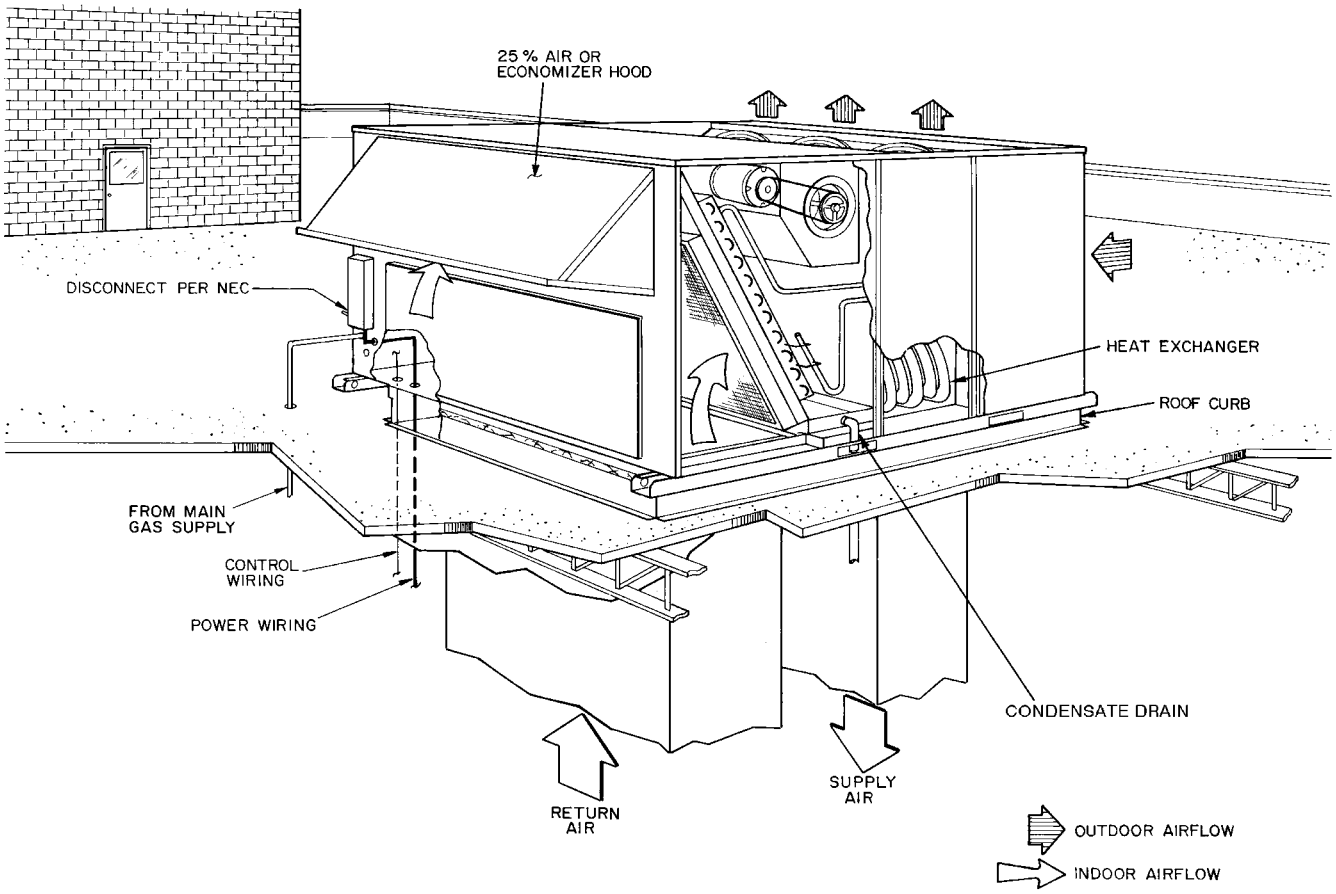


HORIZONTAL DISCHARGE DUCTING



NEC — National Electrical Code

Typical piping and wiring — 48HJ015 and 017



LEGEND

NEC — National Electrical Code

Controls

PremierLink™ Direct Digital Controls — The PremierLink Direct Digital Controls (DDC) require the use of a Carrier electronic thermostat or a CCN connection for time broadcast to initiate its internal timeclock. This is necessary for broadcast of time of day functions (occupied/unoccupied). Refer to PremierLink™ literature for more information

PremierLink Features:

- Equipment Control Functions
  - Cooling Stages
  - Heating Stages
  - Indoor-Fan Motor
  - 4-Way Valve
- Economizer Control Functions
  - Dry Bulb Control
  - Enthalpy Control
  - Differential Enthalpy
  - Power Exhaust
- Advanced Control Functions
  - Smoke Detection
  - Optimal Start (90.1)
  - Unoccupied Free Cool
  - Smart Staging and Optimal Staging
- Network Protocol
  - CCN
  - Internet Ready 38.4 K baud rate
- Diagnostics/Advanced Service Features
  - Diagnostics
  - Onboard display
- Scheduling
  - Via Communicating Stat
- User Interface
  - Navigator (LEN protocol)
  - LID2B (CCN)
  - PC with Carrier software (CCN)

Indoor Air Quality (IAQ) Monitoring — An indoor air quality (IAQ) controller will maintain indoor air quality within the space at the set point level. The set point is calculated from the differential air quality that is configured by the user. As air quality within the space changes, the position of the economizer damper will also change thus allowing more or less outdoor air into the space. If IAQ is configured for low priority, the positioning of the economizer damper can be overridden by comfort requirements. If IAQ is configured for high priority, the controller will check the air quality every 30 seconds and will perform supply air tempering when in IAQ mode if the following criteria are met:

- IAQ priority is high
- Outdoor temperature is less than 55 F
- Heat and cool set points have not been exceeded

Demand Control Ventilation — Certain criteria must be considered when using the PremierLink™ controller for demand control ventilation. When selecting the heating and cooling capacity of the equipment, the maximum ventilation rate must be evaluated for design conditions along with the maximum damper position to achieve desired conditioning of the space. Typical maximum ventilation rate should be ASHRAE occupied design crfm +5 to 10%.

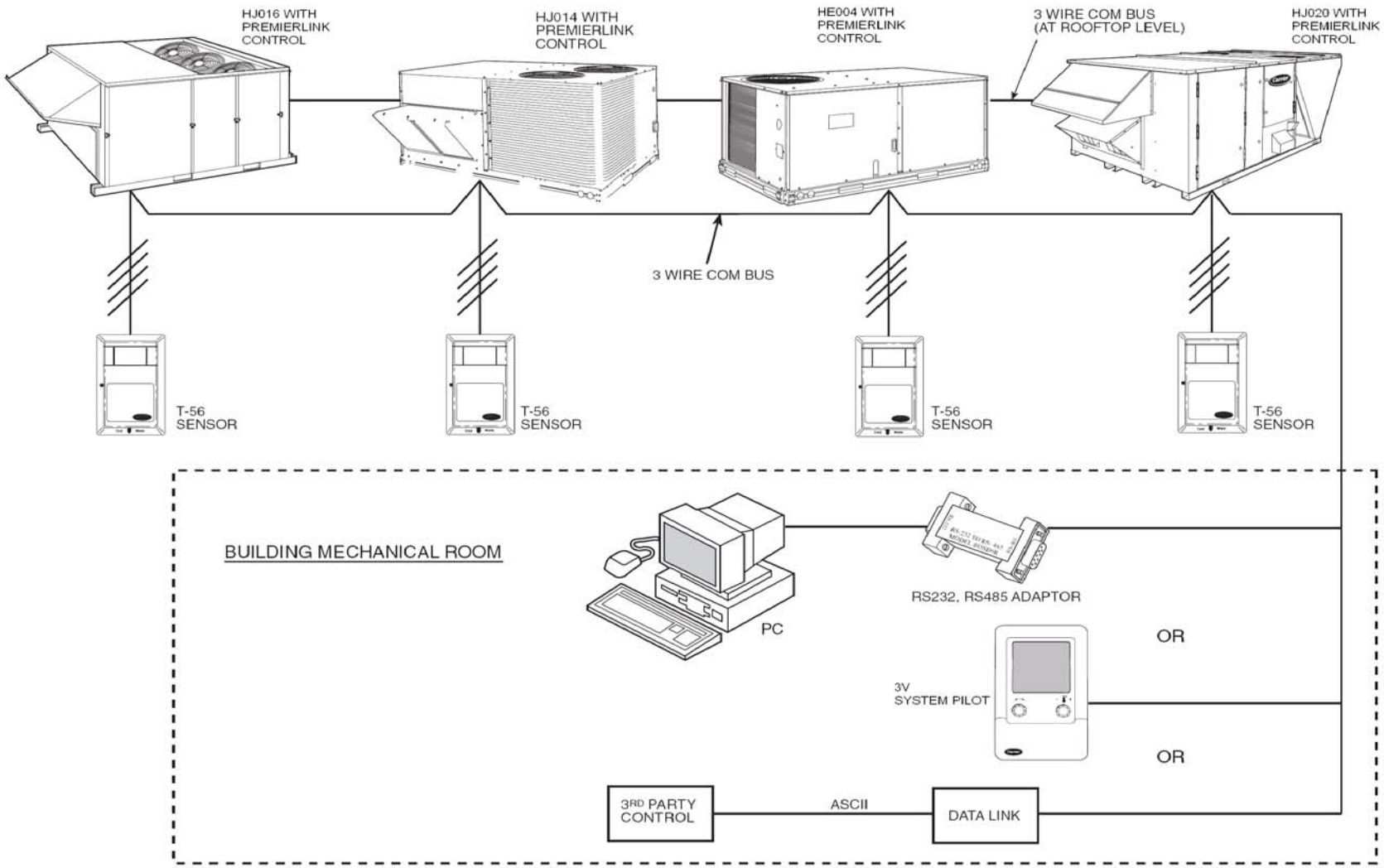
The PremierLink controller can also provide tempering of the supply air when the space or return air temperature falls between the occupied heat and cool set points or there is not a call for heating or cooling in the Thermostat mode. The maximum ventilation airflow rate should be checked by evaluating the unit's heating capability to raise the supply air to an acceptable level during tempering of supply air.

After determining the maximum ventilation airflow rate the IAQ maximum damper configuration needs to be configured. Demand control ventilation software may be used to assist in determining the CO_2 maximum ventilation recovery rate. The recovery rate can be accomplished by using either proportional-anticipatory strategy or proportional integral (PI) control.

CCN POINTS FOR PREMIERLINK CONTROL

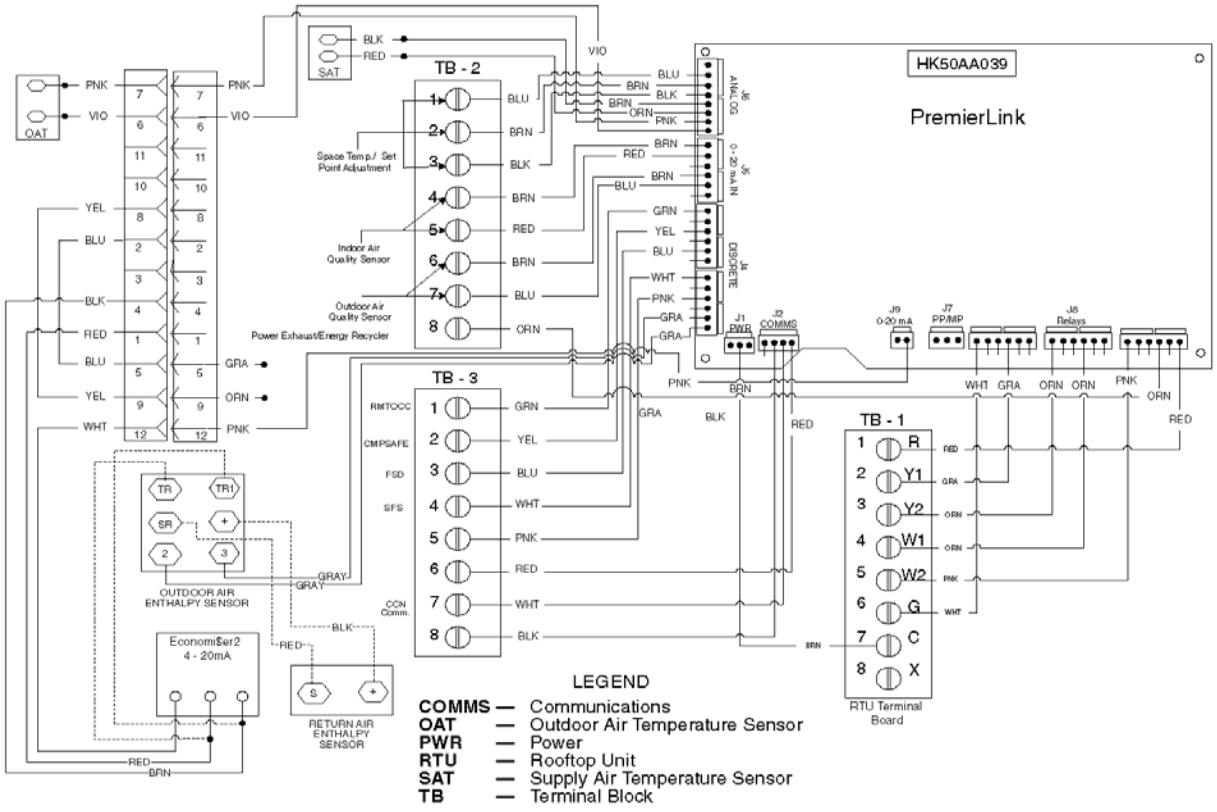
DESCRIPTION	STATUS	UNITS	POINT	LIMITS	ACCESS
Space Temperature	xxx.x	dF	SPT	–40.0 to 245.0 dF	R/W
Supply Air Temperature	xxx.x	dF	SAT	–40.0 to 245.0 dF	R/W
Outside Air Temperature	xxx.x	dF	OAT	–40.0 to 245.0 dF	R/W
Control Setpoint	xxx.x	dF	CLSP		R
Cooling % Total Capacity	xxx	%	CCAP	0 to 100 %	R
Heating % Total Capacity	xxx	%	HCAP	0 to 100 %	R
Economizer Active	No/Yes		ECOS	0 to 1	R
Supply Fan Relay	Off/On		SF	0 to 1	R/W
Supply Fan Status	Off/On		SFS	0 to 1	R
Economizer Position	xxx.x	%	ECONPOS	0.0 to 100.0 %	R/W
Current Min Damper Pos	xxx.x	%	IQMP	0.0 to 100.0 %	R
Filter Status	Clean/Dirty		FLTS	0 to 1	R/W
Remote Occupied Mode	Off/On		RMTOCC	0 to 1	R/W
Heat Stage 1	Off/On		HS1	0 to 1	R
Heat Stage 2	Off/On		HS2	0 to 1	R
Heat 3/Exhaust/Rev Valve	Off/On		H3_EX_RV	0 to 1	R
Enthalpy	Low/High		ENTH	0 to 1	R/W
Indoor Air Quality	xxxx.x		IAQI	0.0 to 5000.0	R/W
Indoor Air Quality Setpt	xxxx.x		IAQS	0.0 to 5000.0	R
Outdoor Air Quality	xxxx.x		OAQ	0.0 to 5000.0	R/W
Fire Shutdown	Normal/Alarm		FSD	0 to 1	R/W
SPT Offset	xx.x	^F	STO	–15.0 to 15.0 ^F	R/W
Compressor 1	Off/On		CMP1	0 to 1	R
Compressor 2	Off/On		CMP2	0 to 1	R
Compressor Safety	Off/On		CMPSAFE	0 to 1	R

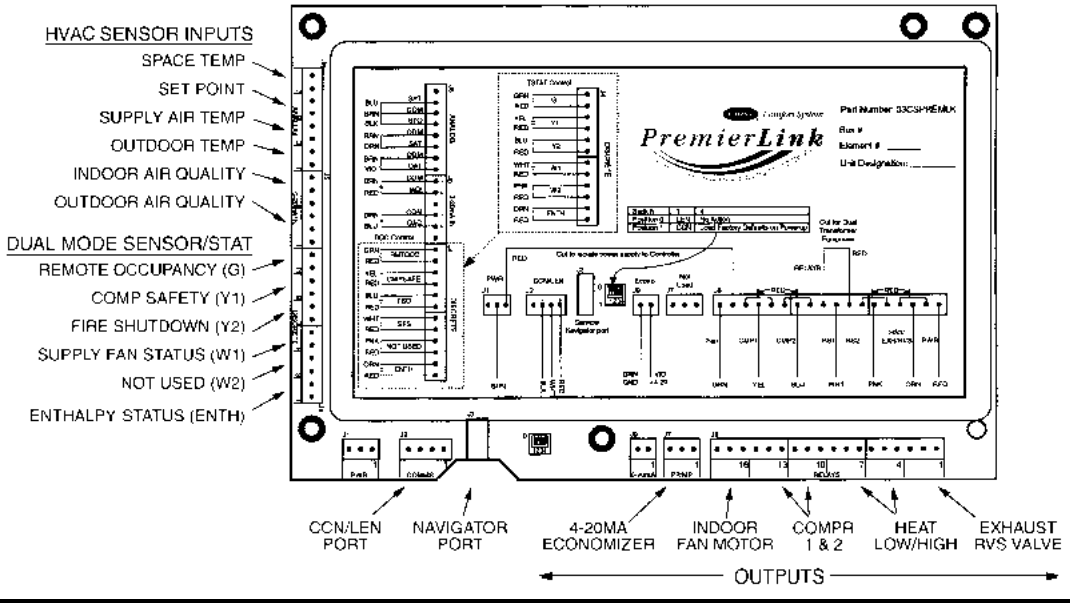
CARRIER CONTROL NETWORK



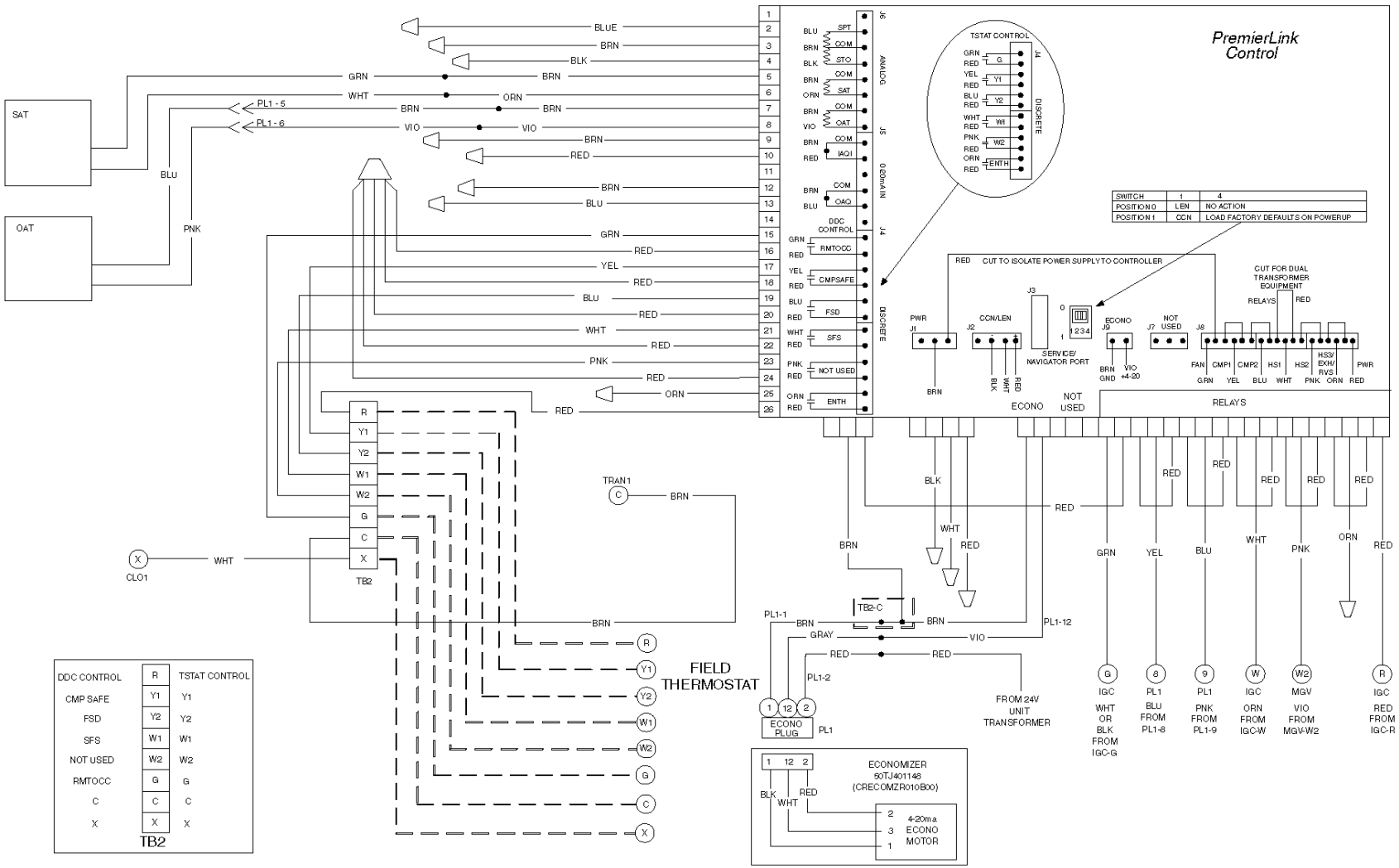
Controls (cont)

TYPICAL PREMIERLINK™ CONTROLS WIRING (48HJ 004-014)





TYPICAL PREMIERLINK™ CONTROLS WIRING (48HJ015,017)



Controls (cont)

Operating sequence, 48HE003-006, 48HJ 004-014 units

Cooling, units without economizer — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor-fan contactor (IFC) and compressor contactor are energized and indoor-fan motor, compressor, and outdoor fan starts. The outdoor-fan motor runs continuously while unit is cooling.

For units with 2 stages of cooling, if the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts.

Heating, units without economizer — When the thermostat calls for heating, terminal W1 is energized. To prevent thermostat short-cycling, the unit is locked into the Heating mode for at least 1 minute when W1 is energized. The induced-draft motor is energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited. On units equipped for two stages of heat, when additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 is deenergized, the IFM stops after a 45-second time-off delay.

**Cooling, units with EconoMi$er IV —** When free cooling is not available, the compressors will be controlled by the zone thermostat. When free cooling is available, the outdoor-air damper is modulated by the EconoMi$er IV control to provide a 50 to 55 F mixed-air temperature into the zone. As the mixed-air temperature fluctuates above 55 or below 50 F, the dampers will be modulated (open or close) to bring the mixed-air temperature back within control.

If mechanical cooling is utilized with free cooling, the outdoor-air damper will maintain its current position at the time the compressor is started. If the increase in cooling capacity causes the mixed-air temperature to drop below 45 F, then the outdoor-air damper position will be decreased to the minimum position. If the mixed-air temperature continues to fall, the outdoor-air damper will close. Control returns to normal once the mixed-air temperature rises above 48 F.

If optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the EconoMi$er IV control, a demand controlled ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

For EconoMi$er IV operation, there must be a thermostat call for the fan (G). If the unit is occupied and the fan is on, the damper will operate at minimum position. Otherwise, the damper will be closed.

When the EconoMi$er IV control is in the occupied mode and a call for cooling exists (Y1 on the thermostat), the control will first check for indoor fan operation. If the fan is not on, then cooling will not be activated. If the fan is on, then the control will open the EconoMi$er IV damper to the minimum position.

On the initial power to the EconoMi$er IV control, it will take the damper up to $2^1/_2$ minutes before it begins to position itself. Any change in damper position will take up to 30 seconds to initiate. Damper movement from full closed to full open (or vice versa) will take between $1^1/_2$ and $2^1/_2$ minutes.

If free cooling can be used as determined from the appropriate changeover command (switch, dry bulb, enthalpy curve, differential dry bulb, or differential enthalpy), then the control will modulate the dampers open to maintain the mixed-air temperature set point at 50 to 55 F.

If there is a further demand for cooling (cooling second stage — Y2 is energized), then the control will bring on compressor stage 1 to maintain the mixed-air temperature set point. The EconoMi$er IV damper will be open at maximum position. EconoMi$er IV operation is limited to a single compressor.

Heating, units with economizer

NOTE: The units have 2 stages of heat.

When the thermostat calls for heating, power is sent to W1 on the IGC (integrated gas unit controller) board. An LED (light-emitting diode) on the IGC board will be on during normal operation. A check is made to ensure that the rollout switch and limit switch are closed and the induced-draft motor is running. The induced-draft motor is then energized, and when speed is proven with the hall effect sensor on the motor, the ignition activation period begins. The burners will ignite within 5 seconds.

If the burners do not light, there is a 22-second delay before another 5-second attempt. If the burners still do not light, this sequence is repeated for 15 minutes. After the 15 minutes have elapsed, if the burners still have not lit, heating is locked out. To reset the control, break 24-v power to the thermostat.

When ignition occurs the IGC board will continue to monitor the condition of the rollout and limit switches, the hall effect sensor, as well as the flame sensor. If the unit is controlled through a room thermostat set for fan auto., 45 seconds after ignition occurs, the indoor-fan motor will be energized (and the outdoor-air dampers will open to their minimum position). If for some reason the overtemperature limit opens prior to the start of the indoor fan blower, on the next attempt, the 45-second delay will be shortened to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will continue. Once modified, the fan on delay will not change back to 45 seconds unless power is reset to the control.

When additional heat is required, W2 closes and initiates power to the second stage of the main gas valve. When the thermostat is satisfied, W1 and W2 open and the gas valve closes, interrupting the flow of gas to the main burners. If the call for W1 lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is controlled through a room thermostat set for fan auto., the indoor-fan motor will continue to operate for an additional 45 seconds then stop (and the outdoor-air dampers will close). If the overtemperature limit opens after the indoor motor is stopped within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control.

When the thermostat is satisfied and W1 and W2 are deenergized, the IFM continues to run and the economizer damper then moves to the minimum position.

Cooling, units with EconoMi$er2, PremierLink™ control and a thermostat — When free cooling is not available, the compressors will be controlled by the PremierLink control in response to the Y1 and Y2 inputs from the thermostat.

The PremierLink control will use the following information to determine if free cooling is available:

- Indoor fan has been on for at least 30 seconds.
- The SPT, SAT, and OAT inputs must have valid readings.
- OAT must be less than 75 F.
- OAT must be less than SPT.
- Enthalpy must be LOW (may be jumpered if an enthalpy sensor not available).
- Economizer position is NOT forced.

Pre-cooling occurs when the is no call from the thermostat except G. Pre-cooling is defined as the economizer modulates to provide 70 F supply air.

When free cooling is available the PremierLink control will control the compressors and economizer to provide a supply-air temperature determined to meet the Y1 and Y2 calls from the thermostat.

If optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the PremierLink control, a PID-controlled demand ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

Heating, units with EconoMi$er2, PremierLink control and a thermostat — When the thermostat calls for heating, terminal W1 is energized. The PremierLink control will move the economizer damper to the minimum position if there is a call for G and closed if there is a call for W1 without G. In order to prevent thermostat from short cycling, the unit is locked into the heating mode for at least 10 minutes when W1 is energized. The induced-draft motor is then energized and the burner ignition sequence begins.

On units equipped for two stages of heat, when additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 is deenergized, the IFM stops after a 45-second time-off delay unless G is still maintained.

Cooling, units with EconoMi$er2, PremierLink Control and a room sensor — When free cooling is not available, the compressors will be controlled by the PremierLink controller using a PID Error reduction calculation as indicated below.

The PremierLink controller will use the following information to determine if free cooling is available:

- Indoor fan has been on for at least 30 seconds.
- The SPT, SAT, and OAT inputs must have valid readings.
- OAT must be less than 75 F.
- OAT must be less than SPT.
- Enthalpy must be LOW (may be jumpered if an enthalpy sensor is not available).
- Economizer position is NOT forced.

When free cooling is available, the outdoor-air damper is positioned through the use of a Proportional Integral (PID) control process to provide a calculated supply-air temperature into the zone. The supply air will maintain the space temperature between the heating and cooling set points.

The PremierLink control will integrate the compressors stages with the economizer based on logic built into the controller.

If an optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the PremierLink™ control, a PID-controlled demand ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

Heating, unit with EconoMi$er2, PremierLink control and a room sensor — Every 40 seconds the controller will calculate the required heat stages (maximum of 3) to maintain Supply Air Temperature (SAT) if the following qualifying conditions are met:

- Indoor fan has been on for at least 30 seconds.
- COOL mode is not active.
- OCCUPIED, TEMP.COMPENSATED START or HEAT mode is active.
- SAT reading is available.
- Fire shutdown mode is not active.

If all of the above conditions are met, the number of heat stages is calculated; otherwise the required number of heat stages will be set to 0.

If the PremierLink controller determines that heat stages are required, the economizer damper will be moved to minimum position if occupied and closed if unoccupied.

Controls (cont)

Operating sequence, COBRA™ energy recovery units (48HE003-006 and 48HJ004-014)

Cooling, units with COBRA™ energy recovery — The cooling changeover thermostat located on COBRA energy recovery unit hood determines when the COBRA energy recovery unit goes into economizer mode. When the outdoor temperature is below the cooling set point the unit will be in economizer mode.

In the unoccupied mode, fans are normally set for AUTO operation, causing the fans to cycle on only as needed for heating or cooling. If the Light Commercial Thermidistat™ device is set for "AUTO" fan, the rooftop unit fan will be off except when cooling or humidity control is required. The COBRA energy recovery unit fans will be off except when unit is running in the economizer mode. If the Light Commercial Thermidistat device is set to "ON" for fan, the COBRA energy recovery unit and rooftop unit fans will run continuously. If outdoor air is below the outdoor air thermostat set point, the compressors are locked off and the unit operates in economizer mode when cooling is required. If outdoor air is unsuitable due to humidity or quality, the COBRA energy recovery unit is off and only the rooftop unit compressor runs when cooling is required. Note that the COBRA energy recovery unit does not run and dampers are closed when the outdoor air is unsuitable for cooling and the mode is unoccupied. If outdoor air is suitable, first stage cooling is COBRA energy recovery unit in economizer mode and all compressors are off. Second stage cooling adds the COBRA energy recovery unit compressor and rooftop unit compressor no. 1.

In occupied mode, when the COBRA energy recovery unit compressor runs in cooling mode, it is extracting heat from the incoming outdoor air and rejecting heat to the exhaust air. The COBRA energy recovery unit and rooftop unit fans run continuously. On a first stage call, all compressors will be off if the outdoor air is suitable for free cooling. Otherwise, the COBRA energy recovery unit compressor and rooftop unit compressor no. 1 will run whenever there is a first stage demand for cooling. On a second stage call, the COBRA energy recovery unit compressor and rooftop unit compressor no. 1 and 2 will run whenever there is a demand for cooling. If there is a demand for humidity control but not cooling, only the COBRA energy recovery unit compressor will run. If there is a field-installed CO_2 sensor and the levels are below that sensor set point, then the unit will operate in the unoccupied mode sequence (i.e.,COBRA energy recovery unit dampers closed and rooftop unit operation only to maintain space conditions).

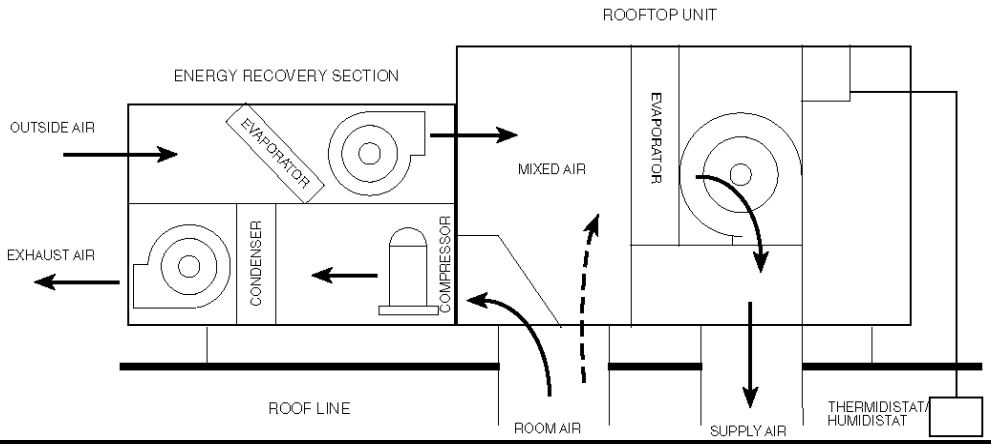
Heating, units with COBRA energy recovery — The heating changeover thermostat located on the COBRA energy recovery unit hood determines the stage 1 to stage 2 switchover point in heating mode.

In unoccupied mode, the COBRA energy recovery unit is off and all compressors are locked off. First stage heat is rooftop unit heat at 50%. Second stage heat is rooftop unit heat at 100%.

In unoccupied mode, when the COBRA energy recovery unit compressor runs in heat mode, it is extracting heat from the exhaust air and rejecting heat to the incoming outdoor air. So it is returning energy to the building that otherwise would be "thrown away". The COBRA energy recovery unit and rooftop unit fans run continuously. The rooftop unit compressors are always off. On a first stage call, the COBRA energy recovery unit compressor is on in heat mode. Rooftop unit heat is off if the outdoor air is above the set point. Rooftop unit heat is on at 50% if the outdoor air is below the set point. On a second stage call, the COBRA energy recovery unit compressor is on in heat mode. Rooftop unit heat is on a 50% if the outdoor air is above the set point. Rooftop unit heat is on at 100% if the outdoor air is below the set point.

Defrost — If the temperature of the 62AQ section condenser (exhaust air) coil drops below 28 F at the defrost thermostat (DFT) and the defrost timer is at the end of a timed period (adjustable to 30, 50 or 90 minutes), then the reversing valve solenoid (RVS) is energized and the condenser fan contactor(s) are deenergized. This switches the position of the reversing valve and shuts off the 62AQ section condenser (exhaust air) fan. The unit continues to defrost until the coil temperature measured at the DFT reaches 65 F or the defrost cycle completes a 10-minute cycle. At the end of the defrost cycle the RVS deenergizes and the exhaust fan motor energizes to put the unit in heating mode. If the space thermostat is satisfied during a defrost cycle, then the 62AQ section will continue in the Defrost mode until the defrost cycle is complete.

TYPICAL COBRA ENERGY RECOVERYTM UNIT AIRFLOW DIAGRAM



Operating sequence, 48HJ015,017 units

Cooling, units without economizer — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC) and compressor contactor no. 1 (C1) are energized, and evaporator-fan motor (IFM), compressor no. 1 and condenser fan(s) start. The condenser-fan motor(s) runs continuously while unit is cooling. When the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts.

Heating, units without economizer — When the thermostat calls for heating, power is sent to W on the IGC (integrated gas unit controller) board. An LED (light-emitting diode) on the IGC board will be on during normal operation. A check is made to ensure that the rollout switch and limit switch are closed. The induced-draft motor is then energized, and when speed is proven with the hall effect sensor on the motor, the ignition activation period begins. The burners will ignite within 5 seconds.

If the burners do not light, there is a 22-second delay before another 5-second attempt. If the burners still do not light, this sequence is repeated for 15 minutes. After the 15 minutes have elapsed, if the burners still have not lit, heating is locked out. To reset the control, break 24-v power to the thermostat.

When ignition occurs the IGC board will continue to monitor the condition of the rollout and limit switches, the hall effect sensor, as well as the flame sensor. If the unit is controlled through a room thermostat set for fan auto., 45 seconds after ignition occurs, the indoor-fan motor will be energized. If for some reason the overtemperature limit opens prior to the start of the indoor fan blower, on the next attempt, the 45-second delay will be shortened to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will continue. Once modified, the fan on delay will not change back to 45 seconds unless power is reset to the control.

When additional heat is required, W2 closes and initiates power to the second stage of the main gas valve. When the thermostat is satisfied, W1 and W2 open and the gas valve closes, interrupting the flow of gas to the main burners. If the call for W1 lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is controlled through a room thermostat set for fan auto., the indoor-fan motor will continue to operate for an additional 45 seconds then stop. If the overtemperature limit opens after the indoor motor is stopped within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control.

An LED indicator is provided on the IGC to monitor operation. The IGC is located by removing the side panel and viewing the IGC through the view port located in the control box access panel. During normal operation, the LED is continuously on.

**Cooling, units with EconoMi$er IV —** When free cooling is not available, the compressors will be controlled by the zone thermostat. When free cooling is available, the outdoor-air damper is modulated by the EconoMi$er IV control to provide a 50 to 55 F mixed-air temperature into the zone. As the mixed-air temperature fluctuates above 55 or below 50 F, the dampers will be modulated (open or close) to bring the mixed-air temperature back within control.

If mechanical cooling is utilized with free cooling, the outdoor-air damper will maintain its current position at the time the compressor is started. If the increase in cooling capacity causes the mixed-air temperature to drop below 45 F, then the outdoor-air damper position will be decreased to the minimum position. If the mixed-air temperature continues to fall, the outdoor-air damper will close. Control returns to normal once the mixed-air temperature rises above 48 F.

If optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the EconoMi$er IV control, a demand controlled ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

For EconoMi$er IV operation, there must be a thermostat call for the fan (G). If the unit is occupied and the fan is on, the damper will operate at minimum position. Otherwise, the damper will be closed.

When the EconoMi$er IV control is in the occupied mode and a call for cooling exists (Y1 on the thermostat), the control will first check for indoor fan operation. If the fan is not on, then cooling will not be activated. If the fan is on, then the control will open the EconoMi$er IV damper to the minimum position.

On the initial power to the EconoMi$er IV control, it will take the damper up to $2^1/_2$ minutes before it begins to position itself. Any change in damper position will take up to 30 seconds to initiate. Damper movement from full closed to full open (or vice versa) will take between $1^1/_2$ and $2^1/_2$ minutes.

If free cooling can be used as determined from the appropriate changeover command (switch, dry bulb, enthalpy curve, differential dry bulb, or differential enthalpy), then the control will modulate the dampers open to maintain the mixed-air temperature set point at 50 to 55 F.

If there is a further demand for cooling (cooling second stage — Y2 is energized), then the control will bring on compressor stage 1 to maintain the mixed-air temperature set point. The EconoMi$er IV damper will be open at maximum position. EconoMi$er IV operation is limited to a single compressor.

Heating, units with economizer

NOTE: The units have 2 stages of heat.

When the thermostat calls for heating, power is sent to W1 on the IGC (integrated gas unit controller) board. An LED (light-emitting diode) on the IGC board will be on during normal operation. A check is made to ensure that the rollout switch and limit switch are closed and the induced-draft motor is running. The induced-draft motor is then energized, and when speed is proven with the hall effect sensor on the motor, the ignition activation period begins. The burners will ignite within 5 seconds.

Controls (cont)

If the burners do not light, there is a 22-second delay before another 5-second attempt. If the burners still do not light, this sequence is repeated for 15 minutes. After the 15 minutes have elapsed, if the burners still have not lit, heating is locked out. To reset the control, break 24-v power to the thermostat.

When ignition occurs the IGC board will continue to monitor the condition of the rollout and limit switches, the hall effect sensor, as well as the flame sensor. If the unit is controlled through a room thermostat set for fan auto., 45 seconds after ignition occurs, the indoor-fan motor will be energized (and the outdoor-air dampers will open to their minimum position). If for some reason the overtemperature limit opens prior to the start of the indoor fan blower, on the next attempt, the 45-second delay will be shortened to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will continue. Once modified, the fan on delay will not change back to 45 seconds unless power is reset to the control.

When additional heat is required, W2 closes and initiates power to the second stage of the main gas valve. When the thermostat is satisfied, W1 and W2 open and the gas valve closes, interrupting the flow of gas to the main burners. If the call for W1 lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is controlled through a room thermostat set for fan auto., the indoor-fan motor will continue to operate for an additional 45 seconds then stop (and the outdoor-air dampers will close). If the overtemperature limit opens after the indoor motor is stopped within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control.

When the thermostat is satisfied and W1 and W2 are deenergized, the IFM continues to run and the economizer damper then moves to the minimum position.

Cooling, units with EconoMi$er2, PremierLink™ control and a thermostat — When free cooling is not available, the compressors will be controlled by the PremierLink control in response to the Y1 and Y2 inputs from the thermostat.

The PremierLink control will use the following information to determine if free cooling is available:

- Indoor fan has been on for at least 30 seconds.
- The SPT, SAT, and OAT inputs must have valid readings.
- OAT must be less than 75 F.
- OAT must be less than SPT.
- Enthalpy must be LOW (may be jumpered if an enthalpy sensor not available).
- Economizer position is NOT forced.

Pre-cooling occurs when the is no call from the thermostat except G. Pre-cooling is defined as the economizer modulates to provide 70 F supply air.

When free cooling is available the PremierLink control will control the compressors and economizer to provide a supply-air temperature determined to meet the Y1 and Y2 calls from the thermostat.

If optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the PremierLink control, a PID-controlled demand ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

Heating, units with EconoMi$er2, PremierLink control and a thermostat — When the thermostat calls for heating, terminal W1 is energized. The PremierLink control will move the economizer damper to the minimum position if there is a call for G and closed if there is a call for W1 without G. In order to prevent thermostat from short cycling, the unit is locked into the heating mode for at least 10 minutes when W1 is energized. The induced-draft motor is then energized and the burner ignition sequence begins.

On units equipped for two stages of heat, when additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 is deenergized, the IFM stops after a 45-second time-off delay unless G is still maintained.

Cooling, units with EconoMi$er2, PremierLink™ control and a room sensor — When free cooling is not available, the compressors will be controlled by the PremierLink controller using a PID Error reduction calculation as indicated below.

The PremierLink controller will use the following information to determine if free cooling is available:

- Indoor fan has been on for at least 30 seconds.
- The SPT, SAT, and OAT inputs must have valid readings.
- OAT must be less than 75 F.
- OAT must be less than SPT.
- Enthalpy must be LOW (may be jumpered if an enthalpy sensor is not available).
- Economizer position is NOT forced.

When free cooling is available, the outdoor-air damper is positioned through the use of a Proportional Integral (PID) control process to provide a calculated supply-air temperature into the zone. The supply air will maintain the space temperature between the heating and cooling set points.

The PremierLink will integrate the compressors stages with the economizer based on logic built into the controller.

If an optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the PremierLink control, a PID-controlled demand ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

Heating, unit with EconoMi$er2, PremierLink control and a room sensor — Every 40 seconds the controller will calculate the required heat stages (maximum of 3) to maintain Supply Air Temperature (SAT) if the following qualifying conditions are met:

- Indoor fan has been on for at least 30 seconds.
- COOL mode is not active.

- OCCUPIED, TEMP.COMPENSATED START or HEAT mode is active.
- SAT reading is available.
- Fire shutdown mode is not active.

If all of the above conditions are met, the number of heat stages is calculated; otherwise the required number of heat stages will be set to 0.

If the PremierLink controller determines that heat stages are required, the economizer damper will be moved to minimum position if occupied and closed if unoccupied.

Operating sequence 48HJ020-028

Cooling, units without economizer — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor-fan contactor (IFC) and compressor contactors A1 and B1 (except 028 units) are energized and indoor-fan motor, compressor, and outdoor fan starts. The outdoor fan motor runs continuously while unit is cooling. If further cooling is required, the Y2 output from the thermostat energizes compressor contactor C1 (B1 on 028 units).

Heating, units without economizer

NOTE: The 48HJ020-028 units have 2 stages of heat.

When the thermostat calls for heating, power is sent to W on the IGC (integrated gas unit controller) board. An LED (light-emitting diode) on the IGC board will be on during normal operation. A check is made to ensure that the rollout switch and limit switch are closed and the induced-draft motor is running. The induced-draft motor is then energized, and when speed is proven with the hall effect sensor on the motor, the ignition activation period begins. The burners will ignite within 5 seconds.

If the burners do not light, there is a 22-second delay before another 5-second attempt. If the burners still do not light, this sequence is repeated for 15 minutes. After the 15 minutes have elapsed, if the burners still have not lit, heating is locked out. To reset the control, break 24-v power to the thermostat. When ignition occurs the IGC board will continue to monitor the condition of the rollout and limit switches, the hall effect sensor, as well as the flame sensor. If the unit is controlled through a room thermostat set for fan auto., 45 seconds after ignition occurs, the indoor-fan motor will be energized (and the outdoor-air dampers will open to their minimum position). If for some reason the overtemperature limit opens prior to the start of the indoor fan blower, on the next attempt, the 45-second delay will be shortened to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will continue.

Once modified, the fan on delay will not change back to 45 seconds unless power is reset to the control.

When additional heat is required, W2 closes and initiates power to the second stage of the main gas valve. When the thermostat is satisfied, W1 and W2 open and the gas valve closes, interrupting the flow of gas to the main burners. If the call for W1 lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is controlled through a room thermostat set for fan auto., the indoor-fan motor will continue to operate for an additional 45 seconds then stop (and the outdoor-air dampers will close).

If the overtemperature limit opens after the indoor motor is stopped within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control.

A LED indicator is provided on the IGC to monitor operation. The IGC is located by removing the side panel and viewing the IGC through the view port located in the control box access panel. During normal operation, the LED is continuously on.

**Cooling, units with EconoMi$er IV —** When free cooling is not available, the compressors will be controlled by the zone thermostat. When free cooling is available, the outdoor-air damper is modulated by the EconoMi$er IV control to provide a 50 to 55 F mixed-air temperature into the zone. As the mixed-air temperature fluctuates above 55 or below 50 F, the dampers will be modulated (open or close) to bring the mixed-air temperature back within control.

If mechanical cooling is utilized with free cooling, the outdoor-air damper will maintain its current position at the time the compressor is started. If the increase in cooling capacity causes the mixed-air temperature to drop below 45 F, then the outdoor-air damper position will be decreased to the minimum position. If the mixed-air temperature continues to fall, the outdoor-air damper will close. Control returns to normal once the mixed-air temperature rises above 48 F.

If optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the EconoMi$er IV control, a demand controlled ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

For EconoMi$er IV operation, there must be a thermostat call for the fan (G). If the unit is occupied and the fan is on, the damper will operate at minimum position. Otherwise, the damper will be closed.

When the EconoMi$er IV control is in the occupied mode and a call for cooling exists (Y1 on the thermostat), the control will first check for indoor fan operation. If the fan is not on, then cooling will not be activated. If the fan is on, then the control will open the EconoMi$er IV damper to the minimum position.

On the initial power to the EconoMi$er IV control, it will take the damper up to $2^1/_2$ minutes before it begins to position itself. Any change in damper position will take up to 30 seconds to initiate. Damper movement from full closed to full open (or vice versa) will take between $1^1/_2$ and $2^1/_2$ minutes.

If free cooling can be used as determined from the appropriate changeover command (switch, dry bulb, enthalpy curve, differential dry bulb, or differential enthalpy), then the control will modulate the dampers open to maintain the mixed-air temperature set point at 50 to 55 F.

If there is a further demand for cooling (cooling second stage — Y2 is energized), then the control will bring on compressor stage 1 to maintain the mixed-air temperature set point. The EconoMi$er IV damper will be open at maximum posi-

tion. EconoMi$er IV operation is limited to a single compressor.

Heating, units with economizer

NOTE: The units have 2 stages of heat.

When the thermostat calls for heating, power is sent to W1 on the IGC (integrated gas unit controller) board. An LED (light-emitting diode) on the IGC board will be on during normal operation. A check is made to ensure that the rollout switch and limit switch are closed and the induced-draft motor is running. The induced-draft motor is then energized, and when speed is proven with the hall effect sensor on the motor, the ignition activation period begins. The burners will ignite within 5 seconds.

If the burners do not light, there is a 22-second delay before another 5-second attempt. If the burners still do not light, this sequence is repeated for 15 minutes. After the 15 minutes have elapsed, if the burners still have not lit, heating is locked out. To reset the control, break 24-v power to the thermostat.

When ignition occurs the IGC board will continue to monitor the condition of the rollout and limit switches, the hall effect sensor, as well as the flame sensor. If the unit is controlled through a room thermostat set for fan auto., 45 seconds after ignition occurs, the indoor-fan motor will be energized (and the outdoor-air dampers will open to their minimum position). If for some reason the overtemperature limit opens prior to the start of the indoor fan blower, on the next attempt, the 45-second delay will be shortened to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will continue. Once modified, the fan on delay will not change back to 45 seconds unless power is reset to the control.

When additional heat is required, W2 closes and initiates power to the second stage of the main gas valve. When the thermostat is satisfied, W1 and W2 open and the gas valve closes, interrupting the flow of gas to the main burners. If the call for W1 lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is controlled through a room thermostat set for fan auto., the indoor-fan motor will continue to operate for an additional 45 seconds then stop (and the outdoor-air dampers will close). If the overtemperature limit opens after the indoor motor is stopped within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control.

When the thermostat is satisfied and W1 and W2 are deenergized, the IFM continues to run and the economizer damper then moves to the minimum position.

Application data

Condensate drain pan
A sloped condensate drain pan is supplied on all units. The condensate pan must be externally trapped. Condensate drains are located on both the bottom and end of the unit.

Ductwork
All ductwork must be attached to flanges. If no flanges are present, they must be field supplied. Secure vertical discharge ductwork to roof curb. For horizontal discharge applications, attach ductwork to flanges. Field-supplied flanges can be attached to horizontal discharge openings and all ductwork attached to flanges.

Thermostat
Use of 2-stage cooling thermostat is recommended for all units equipped with economizer. A 2-stage cooling thermostat is required for size 015-028 units with integrated economizer.

Heating-to-cooling changeover
All units are automatic changeover from heating to cooling when automatic changeover thermostat and subbase are used.

Airflow
Units are draw-thru on cooling and blow-thru on heating.

Maximum airflow
To minimize possibility of condensate blow-off from evaporator, airflow through units should not exceed 500 cfm/ton (sizes 004-025) and 11,250 cfm (size 028).

Minimum airflow
Minimum airflow for cooling is 300 cfm/ton (size 004-025) and 280 cfm/ton (028 units). Refer to Heating Capacities and Efficiencies table for minimum heating airflow.

Minimum ambient operating temperature
Minimum ambient operating temperature for size 004-014 standard units is 25 F. With accessory Motormaster® I, II, or IV units can operate at outdoor temperatures down to –20 F.

Unit sizes 015-028 are designed to operate at outdoor temperatures down to 40 F. With accessory Motormaster I or Motormaster V control, units can operate at outdoor temperatures down to –20 F.

NOTE: Under most application circumstances, if the rooftop unit is equipped with an economizer, low ambient controls are not required. Unless the outdoor air is unsatisfactory for free cooling due to high temperature, excessive humidity, or poor air quality, outdoor air should be used.

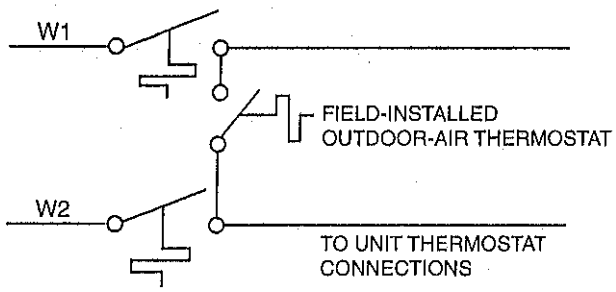
Maximum operating outdoor-air temperature
Maximum outdoor operating temperature for cooling is shown below (60 Hz):

48HE003-006	125 F
48HJ004-015	125 F
48HJ017	120 F
48HJ020	125 F
48HJ024	125 F
48HJ028	125 F

High altitudes
These may require a change to the gas orifice. Refer to Altitude Compensation tables.

Minimum heating entering air temperature
The minimum temperature of air entering the dimpled heat exchanger is 50 F continuous and 45 F intermittent for aluminum heat exchangers and 40 F continuous and 35 F intermittent for stainless steel heat exchangers. To operate at lower mixed-air temperatures, a field-supplied outdoor-air thermostat must be used to initiate both stages of heat when the temperature is below the minimum required temperature to ensure full fire operation. Wire the outdoor-air thermostat (part no. HH22AG106) in series with the second stage gas valve as shown below. Set the outdoor-air thermostat at 35 F for stainless steel heat exchangers or 45 F for aluminum heat exchangers. This temperature setting will bring on the second stage of heat whenever the ambient temperature is below the thermostat set point. Indoor comfort may be compromised when heating is initiated using low entering air temperatures with insufficient heating temperature rise.

WIRING OF OUTDOOR-AIR THERMOSTAT



Motor data
Due to Carrier's internal unit design (draw-thru over the motor), air path, and specially designed motors, the full horsepower (maximum continuous bhp) listed in the Physical Data tables and the notes following each Fan Performance table can be utilized with extreme confidence.

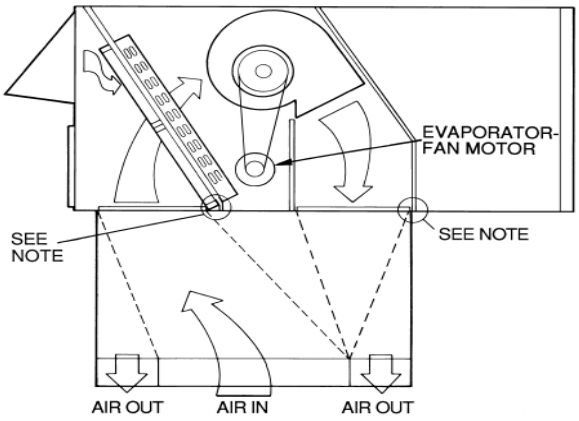
Using Carrier motors to the values listed in the Physical Data, Fan Performance, and Evaporator-Fan Motor Data tables *will not* result in nuisance tripping or premature motor failure. In addition, the unit warranty will not be affected.

Carrier PremierLink™ controls
The Carrier PremierLink controls can be used with any thermostat.

Thru-the-bottom connections
The accessory thru-the-bottom connections are needed to ensure proper connections when routing wiring and piping through the basep an and roof curb. This accessory is used for electric and control power only or electric, control power, and gas piping depending on which accessory is selected.

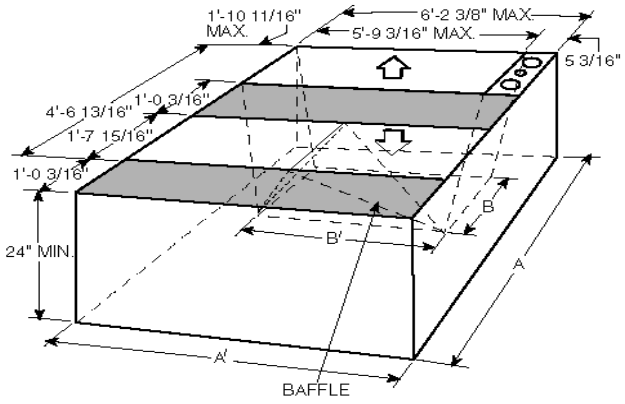
Concentric duct details

CONCENTRIC DUCT DISTRIBUTION



NOTE: Do not drill in this area, damage to basepan may result in water leak.

CONCENTRIC DUCT DETAILS



Shaded area indicates block-off panels.

NOTE: Dimensions A, A′ and B, B′ are obtained from field-supplied ceiling diffuser.

⚠ CAUTION

Concentric ducts may only be installed on units without electric heat. Personal injury or unit damage may result.

Field-supplied fan drives

If the factory drive sets must be changed to obtain other wheel speeds, consult the nearest Browning Manufacturing Co. sales office with the required new wheel speed and the data from Physical Data tables (center distances, motor and fan shaft diameters, motor horsepower) for a modified drive set selection. For minor speed changes, the fan sheave size should be changed. (Do not reduce the size of the motor sheave; this will result in reduced belt horse-power ratings and reduced belt life.)

Condenser coil protection

Pre-coated aluminum-fin coils have a durable epoxy- phenolic coating applied to the fin prior to the fin stamping process to provide protection in mildly corrosive coastal environments. Pre-coated coils have an inert barrier between the aluminum fin and copper tube. This barrier electrically disconnects the dissimilar metals to minimize the potential for galvanic corrosion. This economical option provides substantial corrosion protection beyond the standard uncoated coil construction.

Copper-fin coils provide increased corrosion resistance in moderate coastal environments where industrial air pollution is not present. All copper coils eliminate bi-metallic construction to eliminate the potential for galvanic corrosion. Application in industrial environments is not recommended due to potential attack from sulfur, sulfur oxide, nitrogen oxides, carbon and several other industrial airborne contaminants. In moderate seacoast environments, copper-fin coils have extended life compared to standard or pre-coated aluminum-fin coils.

E-Coated aluminum-fin coils undergo a precisely controlled scientific process that bonds an impermeable epoxy coating to the specially prepared fin coil surface. E-Coating produces a smooth, consistent coating that is less brittle, more resilient and more durable than previous post coating processes. E-Coated aluminum-fin coils offer economical protection and improved coil life in many contaminated environments.

E-Coated copper-fin coils provide maximum protection in virtually all environments, this option combines the continuous, impenetrable barrier of the E-Coating process with the natural resistance of an all-copper construction. E-Coated copper-fin coil assemblies ensure long life, even in environments that combine harsh coastal conditions with industrial contamination.

CONDENSER COIL PROTECTION APPLICATIONS

DESCRIPTION (*Enviro-Shield*™ Option)	ENVIRONMENT				
	Standard, Non-Corrosive	Mild Coastal	Severe Coastal	Industrial	Combined Coastal and Industrial
Standard, Al/Cu	X				
Pre-Coated Al/Cu		X			
Cu/Cu		X			
E-Coated Al/Cu				X	X
E-Coated Cu/Cu			X		

LEGEND

Al/Cu — Aluminum Fin with Copper Tube Coil
Cu/Cu — Copper Fin with Copper Tube Coil
Enviro-Shield — Family of Coil Protection Options
E-Coated — Extremely Flexible and Durable Epoxy Coating Uniformly Applied to the Coil Surfaces
Pre-Coated — Epoxy Coating Applied to Fin Stock Material

EconoMi$er IV

The EconoMi$er IV factory-installed economizer package includes a gear-driven damper system that modulates the return air and outdoor air supply to the rooftop unit in order to take advantage of "free cooling" with outdoor air when conditions are suitable. The system utilizes industry proven technology available for integrating the use of outdoor air for cooling with mechanical cooling for 3 through 25-ton rooftop units. The intuitive EconoMi$er IV microprocessor-based controller optimizes and enhances rooftop operation through reduced energy consumption, optimal zone comfort, and efficient equipment cycling. This is accomplished by operating the compressors when the outdoor air temperature is too warm, integrating the compressors with outdoor air when free cooling is available, and locking out the compressor when outdoor air temperature is too cold. The detailed sequence of operation is described in the Controls section with a brief description of selected application items here.

Thermostat interface — The EconoMi$er IV control was designed to work with conventional thermostats that have Y1 (cooling stage 1), Y2 (cooling stage 2), W1 (heat stage 1), W2 (heat stage 2), and G (fan). In addition, the EconoMi$er IV will support an occupied/unoccupied switch (typically integrated into the thermostat or Thermidistat™ device). When the switch is closed, it provides a 24-vac signal to the unit for occupied mode, and provides no signal to indicate unoccupied mode. The EconoMi$er IV control can be configured to allow different minimum economizer damper positions and to allow the use of mechanical cooling in the occupied mode.

Control features — The EconoMi$er IV controller provides superior functionality for rooftop unit operation. EconoMi$er IV control features are included as follows:

Remote minimum position — The EconoMi$er IV controller can be used with a field-supplied and field-installed remote minimum position control switch that will enable and disable the EconoMi$er IV to open or close the damper beyond the minimum position for modified ventilation, providing 2 to 10 vdc output.

NOTE: Minimum position signal takes priority over the DCV (demand control ventilation) maximum position signal.

Demand control ventilation (DCV) — The EconoMi$er IV has DCV capability when using an IAQ sensor. This sensor is typically installed in the return duct or occupied space. When implementing a DCV control scheme with the EconoMi$er IV, the control algorithm will modulate the position of the damper between two user-configured damper positions, Maximum DCV Position and Minimum Occupied position. Design airflow rates for these two damper positions should be such that when the damper is at the Maximum DCV position, enough fresh ventilation air will be brought in to remove contaminants and CO_2 generated by sources other than people (i.e., since in unoccupied mode). The Maximum DCV position is intended to satisfy the IAQ "Base Ventilation Rate." The Minimum Occupied position design airflow rate should be sufficient to satisfy ventilation requirements for removing CO_2 from all sources including people at the maximum occupancy.

IAQ sensors — EconoMi$er IV can be utilized with any IAQ (CO_2) sensor that provides a 2 to 10 vdc output. The controller will modulate the outdoor air damper to provide ventilation based on the sensor output and the IAQ setting of the controller. When used, an IAQ sensor will modulate the damper from the minimum position (base ventilation rate based on CO_2 levels) to maximum position (full occupancy ventilation rate).

Damper operation — The EconoMi$er IV allows the damper to be configured for two adjustable damper positions including maximum position and occupied minimum positions. The two (2) position damper capability is a unique feature of EconoMi$er IV and includes operation flexibility as follows:

1. Minimum Occupied Position: This adjustable position allows a minimum ventilation (base ventilation rate) airflow rate through the unit during occupied periods.
2. Demand Control Ventilation (DCV) Maximum Position: A DCV maximum occupied position is provided when using an IAQ sensor for DCV. See DCV and Control sections for sequence. The DCV Maximum Position limits outdoor airflow into the rooftop when the DCV routine overrides the mixed air sensor. Setting the DCV Maximum Position of the outdoor air damper prevents large amounts of hot or cold air into the space.

IMPORTANT: When the DCV Maximum Position is set below the minimum position, the minimum position overrides the maximum position, negating most DCV functions.

Power exhaust — The EconoMi$er IV has the capability to control one stage of power exhaust for maintaining air balance and pressurization. Control is activated based on outdoor air damper position (adjustable); factory-set at the "middle" position (dampers halfway open).

Compressor staging — The EconoMi$er IV is an integrated economizer and has the ability to utilize simultaneous outdoor air and compressors. The EconoMi$er IV can be configured to support economizer and compressor operation. Only one or two compressor operation is available with 3 to $12^1/_2$ ton units.

Changeover strategies — The EconoMi$er IV controller can be configured to accommodate all available economizer control strategies that place the rooftop unit in economizer mode including:

Remote Minimum Position — Used when a remote signal from a remote minimum position control will enable and disable the EconoMi$er IV (remote enable control).

Outdoor dry bulb — EconoMi$er IV will be enabled based on the outdoor-air temperature. This is provided standard with the EconoMi$er IV.

Differential dry bulb — EconoMi$er IV will be enabled whenever the outdoor-air temperature is lower than the return-air temperature.

Outside air enthalpy — EconoMi$er IV will be enabled based on the outside air enthalpy curves as shown in the EconoMi$er IV Changeover diagram below. The A, B, C, and D curves shown have been in use for many years and have been included as part of the latest ASHRAE 90.1 energy efficiency code. The curves are designed to take into consideration both outdoor temperature and humidity. These curves are used to set up the EconoMi$er IV controller to use the EconoMi$er IV for free cooling when the conditions to the left of the curve exist. When the conditions are to the right of the curve, then outdoor air cooling will not be used and the outdoor air damper position will be set at the minimum position.

Application data (cont)

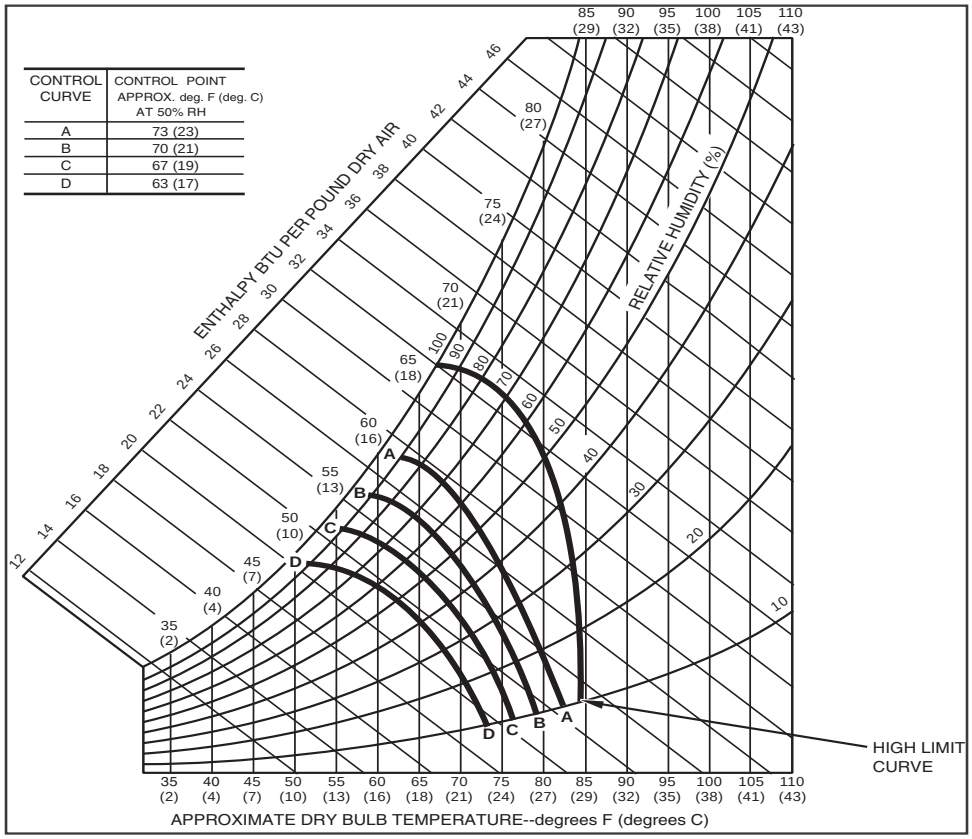
Deciding which curve is used is a function of the outdoor climate and the type of economizer utilized. Since EconoMi$er IV is a fully integrated economizer, the range where outdoor air can be utilized for free cooling is expanded and the A and B curves may be used. The control point table in the EconoMi$er IV Changeover diagram below provides assistance for whether the A and B curves will be suitable. In general terms, a hot and humid climate may be a reason not to use the A curve, while a cooler climate might be more applicable for using the A or B curve.

The EconoMi$er IV has expanded outdoor air capability. For a changeover economizer which cannot utilize simultaneous economizer and compression, both A and B curves would potentially be undesirable since the temperature and humidity levels are too high without compression assistance to provide effective cooling. Therefore, most changeover economizers utilize the D curve.

Differential enthalpy — The EconoMi$er IV will be enabled based on the comparison of the enthalpy of the return air and outside air. When the outside air enthalpy is lower than he return side, the unit will be in economizer mode.

Using the EconoMi$er IV controller for implementing different control changeover strategies requires the use of different combinations of dry bulb and humidity sensors as outlined in the EconoMi$er IV Sensor Usage table.

ECONOMI$ER CHANGEOVER CURVES



ECONOMI$ER II SENSOR USAGE CHART

APPLICATION	ECONOMI$ER IV WITH OUTDOOR AIR DRY BULB SENSOR		
	Accessories Required		
Outdoor Air Dry Bulb	None. The outdoor air dry bulb sensor is factory installed.		
Differential Dry Bulb	CRTEMPSN002A00*		
Single Enthalpy	HH57AC078		
Differential Enthalpy	HH57AC078 and CRENTDIF004A00*		
CO_2 for DCV Control using a Wall-Mounted CO_2 Sensor	33ZCSENCO2		
CO_2 for DCV Control using a Duct-Mounted CO_2 Sensor	33ZCSENCO2† and 33ZCASPCO2**	OR	CRCBDIOX005A00††

*CRENTDIF004A00 and CRTEMPSN002A00 accessories are used on many different base units. As such, these kits may contain parts that will not be needed for installation.

†33ZCSENCO2 is an accessory CO_2 sensor.

**33ZCASPCO2 is an accessory aspirator box required for duct-mounted applications.

††CRCBDIOX005A00 is an accessory that contains both 33ZCSENCO2 and 33ZCASPCO2 accessories.

Guide specifications — 48HE003-006

Packaged Rooftop Electric Cooling Unit with Gas Heat – Constant Volume Application

HVAC Guide Specifications

Size Range: **24,000 to 60,000 Btuh, Nominal (Input Heating)**
2 to 5 Tons, Nominal (Cooling)

ENERGY STAR PARTNER

ASHRAE 90.1 COMPLIANT

SIZE 003-006 UNITS ARE ENERGY STAR QUALIFIED

Carrier Model Numbers:

48HE D/L/G/S 003 - 006
48HE E/M/H/R 003 - 006
48HE F/N/K/T 003 - 006

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor rooftop mounted, electrically controlled heating and cooling unit utilizing a hermetic compressor(s) for cooling duty and gas combustion for heating duty. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.

1.02 QUALITY ASSURANCE

A. Unit exceeds ASHRAE 90.1-2004 Energy Standards. Units 003-006 are Energy Star qualified.

B. Unit shall be rated in accordance with ARI Standards 210 or 360 as applicable. Designed in accordance with UL Standard 1995.

C. Unit shall be designed to conform to ASHRAE 15, latest revision.

D. Unit shall be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.

E. Roof curb shall be designed to conform to NRCA Standards.

F. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

G. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).

H. Unit shall be designed in accordance with ISO 9001:2000, and shall be manufactured in a facility registered to ISO 9001:2000.

I. Each unit shall be subjected to a completely automated run testing on the assembly line. A factory-supplied printout indicating tested pressures, amperages, data, and inspectors; providing certification of the unit status at the time of manufacture; shall be available upon request.

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

Part 2 — Product

2.01 EQUIPMENT (STANDARD)

A. General:

Factory assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, refrigerant charge (R-22), and special features required prior to field start-up.

B. Unit Cabinet:

1. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a prepainted baked enamel finish on all externally exposed surfaces.
2. Evaporator fan compartment interior cabinet surfaces shall be insulated with a minimum $^1/_2$-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
3. Cabinet panels shall be easily removable for servicing.
4. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
5. Unit shall have a factory-installed, sloped condensate drain pan made of a non-corrosive material, providing a minimum $^3/_4$-in.-14 NPT. connection with both vertical and horizontal drains, and shall comply with ASHRAE Standard 62.
6. Unit shall have a factory-installed filter access panel to provide filter access with tool-less removal.
7. Unit shall have standard thru-the-bottom gas and power connection capability (accessory kit is required).

C. Fans:

1. Evaporator Fan:
   a. Fan shall be belt driven as shown on the equipment drawings. Belt drive shall include an adjustable-pitch motor pulley.
   b. Fan wheel shall be double-inlet type with forward-curved blades.
   c. Bearings shall be sealed, permanently lubricated ball-bearing type for longer life and lower maintenance.

2. Evaporator fan shall be made from steel with a corrosion-resistant finish and shall be dynamically balanced.
3. Condenser fan shall be of the direct-driven (with totally enclosed motors) propeller type and shall discharge air vertically.
4. Condenser fan shall have aluminum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.
5. Induced-draft blower shall be of the direct-driven, single inlet, forward-curved centrifugal type, made from steel with a corrosion-resistant finish and shall be dynamically balanced.

D. Compressor(s):
1. Fully hermetic type, internally protected scroll-type.
2. Factory mounted on rubber grommets and internally spring mounted for vibration isolation.
3. Units shall be electrically and mechanically single circuits (one compressor per circuit).

E. Coils:
1. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
2. Testing:
   a. Evaporator and condenser coils shall be qualified to UL 1995 burst test at 2,200 psi.
   b. Evaporator and condenser coils shall be leak tested to 150 psig and pressure tested to 400 psig.
3. Optional Coils:
   a. Optional pre-coated aluminum-fin coils shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
   b. Copper-fin coils shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan. All copper construction shall provide protection in moderate coastal environments.
   c. E-Coated aluminum-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be aluminum fins mechanically bonded to copper tubes.
   d. E-Coated copper-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be copper fins mechanically bonded to copper tubes with copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting sheet metal coil pan to maintain coating integrity and minimize corrosion potential between coil and pan.

F. Heating Section:
1. Induced-draft combustion type with energy saving direct-spark ignition system and redundant main gas valve.
2. Heat Exchanger:
   a. The standard heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
   b. The optional stainless steel heat exchanger shall be of the tubular-section type, constructed of a minimum of 20-gage type 409 stainless steel.
3. Burners shall be of the in-shot type constructed of aluminum-coated steel.

4. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).
5. The integrated gas controller (IGC) board shall include gas heat operation fault notification using an LED (light-emitting diode).
6. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high-temperature limit switch. Fault indication shall be made using an LED.
7. The IGC board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high-temperature limit switch.
8. The LED shall be visible without removal of control box access panel.

G. Refrigerant Components:

Refrigerant circuit components shall include:

1. Fixed orifice metering system (Acutrol™ device).
2. Refrigerant filter drier.
3. Service gage connections on suction, discharge, and liquid lines.

H. Filter Section:

1. Standard filter section shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.
2. Filter face velocity shall not exceed 320 fpm at nominal airflows.
3. Filter section should use only one size filter.
4. Filters shall be accessible through an access panel with "no-tool" removal.

I. Controls and Safeties:

1. Unit Controls:

   Unit shall be complete with self-contained low-voltage control circuit protected by a fuse on the 24-v transformer side.

2. Safeties:

   a. a.Unit shall incorporate a solid-state compressor protector which provides anti-cycle reset capability at the space thermostat, should any of the following standard safety devices trip and shut off compressor.

      1) Compressor overtemperature, overcurrent.
      2) Loss-of-charge/low-pressure switch.
      3) Freeze-protection thermostat, evaporator coil.
      4) High-pressure switch.
      5) Automatic reset motor thermal overload protector.

      The lockout protection shall be easily disconnected at the control board, if necessary.

   b. Heating section shall be provided with the following minimum protections:

      1) High-temperature limit switches.
      2) Induced draft motor speed sensor.
      3) Flame rollout switch.
      4) Flame proving controls.

J. Operating Characteristics:

1. Unit shall be capable of starting and running at 125 F ambient outdoor temperature, meeting maximum load criteria of ARI Standard 210/240 or 360 at ± 10% voltage.
2. Compressor with standard controls shall be capable of operation down to 25 F ambient outdoor temperature.

K. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single factory-predrilled location.

L. Motors:

1. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have line break thermal and current overload protection.
2. Evaporator-fan motor shall have permanently lubricated bearings and inherent automatic-reset thermal overload protection. Evaporator motors are designed specifically for Carrier and do *not* have conventional horsepower (HP) ratings listed on the motor nameplate. Motors are designed and qualified in the "air-over" location downstream of the cooling coil and carry a maximum continuous bhp rating that is the maximum application bhp rating for the motor; no "safety factors" above that rating may be applied.
3. Totally enclosed condenser-fan motor shall have permanently lubricated bearings, and inherent automatic-reset thermal overload protection.
4. Induced-draft motor shall have permanently lubricated sealed bearings and inherent automatic-reset thermal overload protection.

M. Special Features:

Certain features are not applicable when the features designated * are specified. For assistance in amending the specifications, contact your local Carrier Sales Office.

Guide specifications — 48HE003-006 (cont)

*1. Carrier PremierLink™ Controls:

a. Shall be available as a factory-installed or as a field-installed accessory.

b. Shall work with Carrier 3V, Comfort Network® (CCN) and ComfortVIEW™ software.

c. Shall be compatible with *Comfort*Link™ controllers.

d. Shall be ASHRAE 62-2001 compliant.

e. Shall accept a CO_2 sensor in the conditioned space — Demand Control Ventilation (DCV) ready.

f. Shall have baud communication rate of 38.4K or faster.

g. Shall be Internet ready.

h. Shall include an integrated economizer controller.

i. If an economizer is specified, the "EconoMi$er2 with 4 to 20 mA actuator and no microprocessor control" is required.

2. Roof Curbs (Horizontal and Vertical):

a. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.

b. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.

*3. Integrated Economizers:

a. Integrated integral modulating type capable of simultaneous economizer and compressor operation.

b. Available as a factory-installed option in vertical supply/return configuration only. (Available as a field-installed accessory for dedicated horizontal and/or vertical supply return configurations.)

c. Includes all hardware and controls to provide cooling with outdoor air.

d. Equipped with low-leakage dampers, not to exceed 2% leakage at 1 in. wg pressure differential.

e. Capable of introducing up to 100% outdoor air.

f. EconoMi$er IV and EconoMi$er2 shall be equipped with a barometric relief damper capable of relieving up to 100% return air.

g. Designed to close damper(s) during loss-of-power situations with spring return built into motor.

h. Dry bulb outdoor-air temperature sensor shall be provided as standard. Outdoor air sensor set point is adjustable and shall range from 40 to 100 F. For the EconoMi$er IV, the return air sensor, indoor enthalpy sensor, and outdoor enthalpy sensor shall be provided as field-installed accessories to provide enthalpy control, differential enthalpy control, and differential dry bulb temperature control. For the EconoMi$er2, the enthalpy, differential temperature (adjustable), and differential enthalpy control shall be provided as field-installed accessories.

i. The EconoMi$er IV and EconoMi$er2 shall have a gear-driven parallel blade design.

j. EconoMi$er IV microprocessor control shall provide control of internal building pressure through its accessory power exhaust function. Factory set at 100%, with a range of 0% to 100%.

k. EconoMi$er2 shall be capable of control from a 4 to 20 mA signal through optional 4 to 20 mA design without microprocessor control (required for PremierLink™ or third party control interface).

l. EconoMi$er IV Microprocessor Occupied Minimum Damper Position Setting maintains the minimum airflow into the building during occupied period providing design ventilation rate for full occupancy (damper position during heating). A remote potentiometer may be used to override the set point.

m. EconoMi$er IV Microprocessor Unoccupied Minimum Damper Position Setting — The EconoMi$er IV dampers shall be closed when the unit is in the occupied mode.

n. EconoMi$er IV Microprocessor IAQ/DCV Maximum Damper Position Setting — Setting the maximum position of the damper prevents the introduction of large amounts of hot or cold air into the space. This position is intended to satisfy the base minimum ventilation rate.

o. EconoMi$er IV Microprocessor IAQ/DCV control modulates the outdoor-air damper to provide ventilation based on the optional 2 to 10 vdc CO_2 sensor input.

p. Compressor lockout sensor (opens at 35 F, closes at 50 F).

q. Actuator shall be direct coupled to economizer gear, eliminating linkage arms and rods.

r. Control LEDs:

1) When the outdoor air damper is capable of providing free cooling, the "Free Cool" LED shall illuminate.
2) The IAQ LED indicates when the module is on the DCV mode.
3) The EXH LED indicates when the exhaust fan contact is closed.

s. Remote Minimum Position Control — A field-installed accessory remote potentiometer allows the outdoor air damper to be opened or closed beyond the minimum position in the occupied mode for modified ventilation.

4. Manual Outdoor-Air Damper:

   Manual damper package shall consist of damper, birdscreen, and rainhood which can be preset to admit up to 50% outdoor air for year round ventilation.

*5. 100% Two-Position Damper:

   a. Two-position damper package shall include single blade damper and motor. Admits up to 100% outdoor air.

   b. Damper shall close upon indoor (evaporator) fan shutoff.

   c. Designed to close damper during loss of power situations.

   d. Equipped with 15% barometric relief damper.

6. 25% Two-Position Damper:

   a. Two-position damper package shall include single blade damper and motor. Admits up to 25% outdoor air.

   b. Damper shall close upon indoor (evaporator) fan shutoff.

*7. Head Pressure Control Package:

   Consists of solid-state control and condenser-coil temperature sensor to maintain condensing temperature between 90 F and 110 F at outdoor ambient temperatures down to –20 F by condenser-fan speed modulation or condenser-fan cycling and wind baffles.

8. LP (Liquid Propane) Conversion Kit:

   Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane (valid up to 2000 ft elevation).

*9. Electronic Programmable Thermostat:

   Units shall be capable of using deluxe full-featured electronic thermostat. Thermostat shall use built-in compressor cycle delay control for both heating and cooling duty. Thermostat shall be capable of working with Carrier direct digital controls.

10. Light Commercial Thermidistat™ Device:

   Field-installed wall-mounted thermostat is used to control temperature and activation of the dehumidification package. The Thermidistat device can be set for humidity settings from 50% to 90% relative humidity. Automatic humidity control adjusts indoor humidity based on the outdoor temperature sensor.

*11. Flue Shield:

   Flue shield shall provide protection from the hot sides of the gas flue hood.

*12. Thermostat and Subbase:

   Thermostat and subbase shall provide staged cooling and heating automatic (or manual) changeover, fan control, and indicator light.

*13. Condenser Coil Hail Guard Assembly:

   Hail guard shall protect against damage from hail and flying debris.

14. Unit-Mounted, Non-Fused Disconnect Switch:

   Switch shall be factory-installed, internally mounted. NEC and UL approved non-fused switch shall provide unit power shutoff. Switch shall be accessible from outside the unit and shall provide power off lockout capability.

15. Convenience Outlet:

   Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle. Shall include 15 amp GFI receptacle with independent fuse protection. Voltage required to operate convenience outlet shall be provided by a factory-installed step-down transformer. Shall be accessible from outside the unit.

16. High-Static Indoor Fan Motor(s) and Drive(s) (004-012):

   High-static motor(s) and drive(s) shall be factory-installed to provide additional performance range.

17. Flue Discharge Deflector:

   Flue discharge deflector directs unit exhaust vertically instead of horizontally.

18. Condenser Coil Grille:

   The grille protects the condenser coil from damage by large objects without increasing unit clearances.

19. Compressor Cycle Delay:

   Unit shall be prevented from restarting for minimum of 5 minutes after shutdown.

20. Thru-the-Bottom Utility Connectors:

   Kit shall provide connectors to permit gas and electrical connections to be brought to the unit through the basepan.

21. Fan/Filter Status Switch:

   Switch shall provide status of indoor (evaporator) fan (ON/OFF) or filter (CLEAN/DIRTY). Status shall be displayed over communication bus when used with direct digital controls or with an indicator light at the thermostat.

Guide specifications — 48HE003-006 (cont)

22. Energy$Recycler™ Energy Recovery System:

    The package shall be an outdoor rooftop, surface mounted, electronically controlled, air-to-air heat pump unit utilizing a hermetic compressor for cooling and heating duty.

    The Energy$Recycler system shall recover energy from building exhaust air and pre-condition ventilation air to allow higher ventilation requirements and minimizing energy cost.

    This option shall be available with the following:

    a. A mounting kit for the Energy$Recycler device for cantilever mounting off of the rooftop unit with out the use of a slab or a roof curb.
    b. A supplementary supply air fan kit to provide increased air movement into the 62AQ unit.b. An accessory sleeper rail is available for use with a standard unit roof curb.
    c. A field-installed 460-v to 208/230-v transformer to provide power when the 208-230/1/60 62AQ060 or 100 size Energy$Recycler device is used with a 460-v rooftop unit.
    d. A field-installed 575-v to 208/230-v transformer to provide power when an Energy$Recycler device is used with a 575-v unit.

23. Power Exhaust Accessory for EconoMi$er IV or EconoMi$er2:

    Power exhaust shall be used in conjunction with EconoMi$er IV or EconoMi$er2 to provide system exhaust of up to 100% of return air (vertical only). The power exhaust is a field-installed accessory (separate vertical and horizontal design).

    NOTE: Horizontal power exhaust is intended to mount in return ductwork.

    As the outdoor-air damper opens and closes, *both* propeller fans are energized and deenergized through the EconoMi$er IV controller. The set point is factory set at 100% of outdoor-air, and is adjustable 0 to 100% to meet specific job requirements. Available in 208/230-1-60 v or 460-3-60 v. An LED light on the controller indicates when the power exhaust is operating.

    For the EconoMi$er2, the power exhaust shall be controlled by the PremierLink™ or third party controls.

24. Outdoor Air Enthalpy Sensor (EconoMi$er IV or EconoMi$er2):

    The outdoor air enthalpy sensor shall be used with the EconoMi$er IV or EconoMi$er2 device to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the EconoMi$er IV or EconoMi$er2 device will provide differential enthalpy control. The sensor allows the EconoMi$er IV or EconoMi$er2 controller to determine if outside air is suitable for free cooling.

25. Return Air Enthalpy Sensor (EconoMi$er IV or EconoMi$er2):

    The return air enthalpy sensor shall be used with the EconoMi$er IV or EconoMi$er2 device. When used in conjunction with an outdoor air enthalpy sensor, the EconoMi$er IV or EconoMi$er2 device will provide differential enthalpy control.

26. Return Air Temperature Sensor (EconoMi$er IV or EconoMi$er2):

    The return air temperature sensor shall be used with the EconoMi$er IV or EconoMi$er2 device. When used in conjunction with the standard outdoor air temperature sensor, the EconoMi$er IV or EconoMi$er2 device will provide differential temperature control.

27. Indoor Air Quality (CO_2) Sensor (EconoMi$er2):

    a. Shall have the ability to provide demand ventilation indoor air quality (IAQ) control through the EconoMi$er2 with an IAQ sensor.
    b. The IAQ sensor shall be available in duct mount, wall mount, and wall mount with LED display. The set point shall have adjustment capability.
    c. Requires EconoMi$er2, PremierLink, or Apollo control options.

28. Indoor Air Quality (CO_2) Room Sensor (EconoMi$er IV):

    Sensor shall have the ability to provide demand ventilation control through the EconoMi$er IV. The IAQ sensor shall be wall mounted with an LED display in parts per million. The set point shall have adjustment capability.

29. Return Air CO_2 Sensor (EconoMi$er IV):

    Sensor shall have the ability to provide demand ventilation control through the EconoMi$er IV. The IAQ sensor shall be duct mounted. The set point shall have adjustment capability.

30. Gas Heat options (sizes 004-006):

    a. Single-stage gas heat shall be provided in lieu of two-stage heat.
    b. NOx reduction shall be provided to reduce nitrous oxide emissions to meet the California Air Quality Management NOx requirement of 40 nanograms/joule or less.
    c. Primary tubes on low NOx units shall be 409 stainless steel. Other components shall be aluminized steel.

31. Ultraviolet Germicidal Lamps:

    Ultraviolet germicidal lamps are designed to eliminate odor causing mold and fungus that may develop in the wet area of the evaporator section of the unit. The high output, low temperature germicidal lamps are field installed in the evaporator section of the unit, aimed at the evaporator coil and condensate pan. The short wavelength ultraviolet light inhibits and kills mold, fungus and microbial growth. The lamps have an output rating at 45F in 400 fpm airflow of 120 microwatts/cm^2 at 1 meter.

32. Humidi-MiZer™ Adaptive Dehumidification System:

    a. The Humidi-MiZer dehumidification system shall be factory-installed in the rooftop unit, and shall provide greater dehumidification of the occupied space by two modes of dehumidification operations beside its normal design cooling mode:

        1) Subcooling mode further subcools the hot liquid refrigerant leaving the condenser coil when both temperature and humidity in the space are not satisfied.
        2) Hot gas reheat mode shall mix a portion of the hot gas from the discharge of the compressor with the hot liquid refrigerant leaving the condenser coil to create a two-phase heat transfer in the system, resulting in a neutral leaving-air temperature when only humidity in the space is not satisfied.

    b. The system shall consist of a subcooling/ reheat dehumidification coil located downstream of the standard evaporator coil. This dehumidification coil is a two-row coil on the 005 and 006 units, and a one-row coil on 003 and 004 units.

    c. The system shall include crankcase heater(s) for the scroll compressor(s).

    d. The system shall include a low outdoor air temperature switch to lock out both subcooling and hot gas reheat mode when the outdoor-air temperature is below 40 F.

    e. The system shall include a Motormaster® low ambient control to ensure the normal design cooling mode capable of down to 0° F low ambient operation.

    f. The system shall include a low-pressure switch on the suction line to ensure low pressure start-up of hot gas reheat mode at lower outdoor temperature condition.

    g. The system operation may be controlled by a field-installed, wall-mounted humidistat. The dehumidification circuit will then operate only when needed. Field connections for the humidistat are made in the low-voltage compartment of the unit control box. The sensor can be set for any level between 55% and 80% relative humidity.

    h. The system shall include a Thermal Expansion Valve (TXV) to ensure a positive superheat condition and a balance of pressure drop.

33. Humidistat:

    Field-installed, wall-mounted humidistat is used to control activation of the dehumidification package. The humidistat can be set for humidity levels between 20% and 80% relative humidity.

34. Hinged Panel Option:

    Hinged panel option provides hinged access panels for the filter, compressor, evaporator fan, and control box areas. Filter hinged panels permit tool-less entry for changing filters. Each hinged panel is permanently attached to the rooftop unit.

Guide specifications — 48HJ004-014

Packaged Rooftop Electric Cooling Unit with Gas Heat — Constant Volume Application

HVAC Guide Specifications

Size Range: **3 to 12 1/2 Tons, Nominal (Cooling)**
60,000 to 250,000 Btuh, Nominal (Input Heating)

Carrier Model Numbers:

48HJD/L/G/S
48HJE/M/H/R
48HJF/N/K/T

ENERGY STAR PARTNER

ASHRAE 90.1 COMPLIANT

SIZE 004-012 UNITS ARE ENERGY STAR QUALIFIED

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor rooftop mounted, electrically controlled heating and cooling unit utilizing a hermetic compressor(s) for cooling duty and gas combustion for heating duty. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.

1.02 QUALITY ASSURANCE

A. Unit well exceeds ASHRAE 90.1-2001 Energy Standards. Units 004-012 are Energy Star qualified.

B. Unit shall be rated in accordance with ARI Standards 210 or 360. Designed in accordance with UL Standard 1995.

C. Unit shall be designed to conform to ASHRAE 15, latest revision.

D. Unit shall be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.

E. Roof curb shall be designed to conform to NRCA Standards.

F. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

G. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).

H. Unit shall be designed in accordance with ISO 9001:2000, and shall be manufactured in a facility registered to ISO 9001:2000.

I. Each unit shall be subjected to a completely automated run testing on the assembly line. A factory-supplied printout indicating tested pressures, amperages, data, and inspectors; providing certification of the unit status at the time of manufacture shall be available upon request.

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT (STANDARD)

A. General:

Factory assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, refrigerant charge (R-22), and special features required prior to field start-up.

B. Unit Cabinet:

1. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a prepainted baked enamel finish on all externally exposed surfaces.
2. Evaporator fan compartment interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
3. Cabinet panels shall be easily removable for servicing.
4. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
5. Unit shall have a factory-installed, sloped condensate drain pan made of a non-corrosive material, providing a minimum 3/4-in.-14 NPT. connection with both vertical and horizontal drains, and shall comply with ASHRAE Standard 62.
6. Unit shall have a factory-installed filter access panel to provide filter access with tool-less removal.
7. Unit shall have standard thru-the-bottom gas and power connection capability (accessory kit is required).

C. Fans:

1. Evaporator Fan:
   a. Fan shall be direct or belt driven as shown on the equipment drawings. Belt drive shall include an adjustable-pitch motor pulley.
   b. Fan wheel shall be double-inlet type with forward-curved blades.
   c. Bearings shall be sealed, permanently lubricated ball-bearing type for longer life and lower maintenance.
2. Evaporator fan shall be made from steel with a corrosion-resistant finish and shall be dynamically balanced.
3. Condenser fan shall be of the direct-driven (with totally enclosed motors) propeller type and shall discharge air vertically.
4. Condenser fan shall have aluminum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.

5. Induced-draft blower shall be of the direct-driven, single inlet, forward-curved centrifugal type, made from steel with a corrosion-resistant finish and shall be dynamically balanced.

D. Compressor(s):
   1. Fully hermetic type, internally protected scroll-type.
   2. Factory mounted on rubber grommets and internally spring mounted for vibration isolation.
   3. On dual electrically and mechanically independent circuits (008-014).

E. Coils:
   1. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
   2. Dual compressor models (size 008-014) shall have face-split type evaporator coil (circuit no. 1 on bottom).
   3. Testing:
      a. Evaporator and condenser coils shall be qualified to UL 1995 burst test at 2,200 psi.
      b. Evaporator and condenser coils shall be leak tested to 150 psig and pressure tested to 400 psig.
   4. Optional Coils:
      a. Optional pre-coated aluminum-fin coils shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
      b. Copper-fin coils shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan. All copper construction shall provide protection in moderate coastal environments.
      c. E-Coated aluminum-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be aluminum fins mechanically bonded to copper tubes.
      d. E-Coated copper-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be copper fins mechanically bonded to copper tubes with copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting sheet metal coil pan to maintain coating integrity and minimize corrosion potential between coil and pan.

F. Heating Section:
   1. Induced-draft combustion type with energy saving direct-spark ignition system and redundant main gas valve.
   2. Heat Exchanger:
      a. The standard heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
      b. The optional stainless steel heat exchanger shall be of the tubular-section type, constructed of a minimum of 20-gage type 409 stainless steel.
   3. Burners shall be of the in-shot type constructed of aluminum-coated steel.
   4. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).
   5. The integrated gas controller (IGC) board shall include gas heat operation fault notification using an LED (light-emitting diode).

6. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high-temperature limit switch. Fault indication shall be made using an LED.
7. The IGC board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high-temperature limit switch.
8. The LED shall be visible without removal of control box access panel.

G. Refrigerant Components:

Refrigerant circuit components shall include:

1. Fixed orifice metering system (Acutrol™ device).
2. Refrigerant filter drier.
3. Service gage connections on suction, discharge, and liquid lines.

H. Filter Section:

1. Standard filter section shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.
2. Filter face velocity shall not exceed 320 fpm at nominal airflows.
3. Filter section should use only one size filter.
4. Filters shall be accessible through an access panel with "no-tool" removal.

I. Controls and Safeties:

1. Unit Controls:

   Unit shall be complete with self-contained low-voltage control circuit protected by a fuse on the 24-v transformer side (008-014 units have a resettable circuit breaker).

2. Safeties:

   a. Unit shall incorporate a solid-state compressor protector which provides anti-cycle reset capability at the space thermostat, should any of the following standard safety devices trip and shut off compressor.
      1) Compressor overtemperature, overcurrent.
      2) Loss-of-charge/low-pressure switch.
      3) Freeze-protection thermostat, evaporator coil.
      4) High-pressure switch.
      5) Automatic reset motor thermal overload protector.

      The lockout protection shall be easily disconnected at the control board, if necessary.

   b. Heating section shall be provided with the following minimum protections:
      1) High-temperature limit switches.
      2) Induced draft motor speed sensor.
      3) Flame rollout switch.
      4) Flame proving controls.

J. Operating Characteristics:

1. Unit shall be capable of starting and running at 125 F ambient outdoor temperature, meeting maximum load criteria of ARI Standard 210/240 or 360 at ± 10% voltage.
2. Compressor with standard controls shall be capable of operation down to 25 F ambient outdoor temperature.

K. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single factory-predrilled location.

L. Motors:

1. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have line break thermal and current overload protection.
2. Evaporator-fan motor shall have permanently lubricated bearings and inherent automatic-reset thermal overload protection. Evaporator motors are designed specifically for Carrier and do *not* have conventional horsepower (HP) ratings listed on the motor nameplate. Motors are designed and qualified in the "air-over" location downstream of the cooling coil and carry a maximum continuous bhp rating that is the maximum application bhp rating for the motor; no "safety factors" above that rating may be applied.
3. Totally enclosed condenser-fan motor shall have permanently lubricated bearings, and inherent automatic-reset thermal overload protection.
4. Induced-draft motor shall have permanently lubricated sealed bearings and inherent automatic-reset thermal overload protection.

M. Special Features:

Certain features are not applicable when the features designated * are specified. For assistance in amending the specifications, contact your local Carrier Sales Office.

* 1. Carrier PremierLink™ Controls:

   a. Shall be available as a factory-installed or as a field-installed accessory.

   b. Shall work with Carrier Comfort Network® (CCN) and ComfortVIEW™ software.

   c. Shall be compatible with *Comfort*Link™ controllers.

   d. Shall be ASHRAE 62-2001 compliant.

   e. Shall accept a CO_2 sensor in the conditioned space — Demand Control Ventilation (DCV) ready.

   f. Shall have baud communication rate of 38.4K or faster.

   g. Shall be Internet ready.

   h. Shall include an integrated economizer controller.

i. If an economizer is specified, the "EconoMi$er2 with 4 to 20 mA actuator and no microprocessor control" is required.

2. Roof Curbs (Horizontal and Vertical):
   a. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
   b. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.

* 3. Integrated Economizers:
   a. Integrated integral modulating type capable of simultaneous economizer and compressor operation. During economizer operation, up to two compressors on sizes 008-014 will operate.
   b. Available as a factory-installed option in vertical supply/return configuration only. (Available as a field-installed accessory for dedicated horizontal and/or vertical supply return configurations.)
   c. Includes all hardware and controls to provide cooling with outdoor air.
   d. Equipped with low-leakage dampers, not to exceed 2% leakage at 1 in. wg pressure differential.
   e. Capable of introducing up to 100% outdoor air.
   f. EconoMi$er IV and EconoMi$er2 shall be equipped with a barometric relief damper capable of relieving up to 100% return air.
   g. Designed to close damper(s) during loss-of-power situations with spring return built into motor.
   h. Dry bulb outdoor-air temperature sensor shall be provided as standard. Outdoor air sensor set point is adjustable and shall range from 40 to 100 F. For the EconoMi$er IV, the return air sensor, indoor enthalpy sensor, and outdoor enthalpy sensor shall be provided as field-installed accessories to provide enthalpy control, differential enthalpy control, and differential dry bulb temperature control. For the EconoMi$er2, the enthalpy, differential temperature (adjustable), and differential enthalpy control shall be provided as field-installed accessories.
   i. The EconoMi$er IV and EconoMi$er2 shall have a gear-driven parallel blade design.
   j. EconoMi$er IV microprocessor control shall provide control of internal building pressure through its accessory power exhaust function. Factory set at 100%, with a range of 0% to 100%.
   k. EconoMi$er2 shall be capable of control from a 4 to 20 mA signal through optional 4 to 20 mA design without microprocessor control (required for PremierLink™ or third party control interface).
   l. EconoMi$er IV Microprocessor Occupied Minimum Damper Position Setting maintains the minimum airflow into the building during occupied period providing design ventilation rate for full occupancy (damper position during heating). A remote potentiometer may be used to override the set point.
   m. EconoMi$er IV Microprocessor Unoccupied Minimum Damper Position Setting — The EconoMi$er IV dampers shall be closed when the unit is in the occupied mode.
   n. EconoMi$er IV Microprocessor IAQ/DCV Maximum Damper Position Setting — Setting the maximum position of the damper prevents the introduction of large amounts of hot or cold air into the space. This position is intended to satisfy the base minimum ventilation rate.
   o. EconoMi$er IV Microprocessor IAQ/DCV control modulates the outdoor-air damper to provide ventilation based on the optional 2 to 10 vdc CO_2 sensor input.
   p. Compressor lockout sensor (opens at 35 F, closes at 50 F).
   q. Actuator shall be direct coupled to economizer gear, eliminating linkage arms and rods.
   r. Control LEDs:
      1) When the outdoor air damper is capable of providing free cooling, the "Free Cool" LED shall illuminate.
      2) The IAQ LED indicates when the module is on the DCV mode.
      3) The EXH LED indicates when the exhaust fan contact is closed.
   s. Remote Minimum Position Control — A field-installed accessory remote potentiometer allows the outdoor air damper to be opened or closed beyond the minimum position in the occupied mode for modified ventilation.

4. Manual Outdoor-Air Damper:

   Manual damper package shall consist of damper, birdscreen, and rainhood which can be preset to admit up to 50% outdoor air for year round ventilation.

* 5. 100% Two-Position Damper:
   a. Two-position damper package shall include single blade damper and motor. Admits up to 100% outdoor air.
   b. Damper shall close upon indoor (evaporator) fan shutoff.

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c. Designed to close damper during loss of power situations.

d. Equipped with 15% barometric relief damper.

* 6. 25% Two-Position Damper:

a. Two-position damper package shall include single blade damper and motor. Admits up to 25% outdoor air.

b. Damper shall close upon indoor (evaporator) fan shutoff.

* 7. Head Pressure Control Package:

Consists of solid-state control and condenser-coil temperature sensor to maintain condensing temperature between 90 F and 110 F at outdoor ambient temperatures down to –20 F by condenser-fan speed modulation or condenser-fan cycling and wind baffles.

8. LP (Liquid Propane) Conversion Kit:

Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane (valid up to 2000 ft elevation).

* 9. Electronic Programmable Thermostat:

Units shall be capable of using deluxe full-featured electronic thermostat. Thermostat shall use built-in compressor cycle delay control for both heating and cooling duty. Thermostat shall be capable of working with Carrier direct digital controls.

10. Light Commercial Thermidistat™ Device:

Field-installed wall-mounted thermostat is used to control temperature and activation of the dehumidification package. The Thermidistat device can be set for humidity settings from 50% to 90% relative humidity. Automatic humidity control adjusts indoor humidity based on the outdoor temperature sensor.

* 11. Flue Shield:

Flue shield shall provide protection from the hot sides of the gas flue hood.

* 12. Thermostat and Subbase:

Thermostat and subbase shall provide staged cooling and heating automatic (or manual) changeover, fan control, and indicator light.

* 13. Condenser Coil Hail Guard Assembly:

Hail guard shall protect against damage from hail and flying debris.

14. Unit-Mounted, Non-Fused Disconnect Switch:

Switch shall be factory-installed, internally mounted. NEC and UL approved non-fused switch shall provide unit power shutoff. Switch shall be accessible from outside the unit and shall provide power off lockout capability.

15. Convenience Outlet:

Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle. Shall include 15 amp GFI receptacle with independent fuse protection. Voltage required to operate convenience outlet shall be provided by a factory-installed step-down transformer. Shall be accessible from outside the unit.

16. High-Static Indoor Fan Motor(s) and Drive(s) (004-012):

High-static motor(s) and drive(s) shall be factory-installed to provide additional performance range.

17. Flue Discharge Deflector:

Flue discharge deflector directs unit exhaust vertically instead of horizontally.

18. Condenser Coil Grille:

The grille protects the condenser coil from damage by large objects without increasing unit clearances.

19. Compressor Cycle Delay:

Unit shall be prevented from restarting for minimum of 5 minutes after shutdown.

20. Thru-the-Bottom Utility Connectors:

Kit shall provide connectors to permit gas and electrical connections to be brought to the unit through the basepan.

21. Fan/Filter Status Switch:

Switch shall provide status of indoor (evaporator) fan (ON/OFF) or filter (CLEAN/DIRTY). Status shall be displayed over communication bus when used with direct digital controls or with an indicator light at the thermostat.

22. Energy$Recycler™ Energy Recovery System:

The package shall be an outdoor rooftop, surface mounted, electronically controlled, air-to-air heat pump unit utilizing a hermetic compressor for cooling and heating duty.

The Energy$Recycler system shall recover energy from building exhaust air and pre-condition ventilation air to allow higher ventilation requirements and minimizing energy cost.

This option shall be available with the following:

a. A mounting kit for the Energy$Recycler device for cantilever mounting off of the rooftop unit with out the use of a slab or a roof curb.

b. An accessory sleeper rail is available for use with a standard unit roof curb.

c. A supplementary supply air fan kit to provide increased air movement into the 62AQ unit.

d. A field-installed 460-v to 208/230-v transformer to provide power when the 208-230/1/60 62AQ060 or 100 size Energy$Recycler device is used with a 460-v rooftop unit.

e. A field-installed 575-v to 208/230-v transformer to provide power when an Energy$Recycler device is used with a 575-v unit.

23. Power Exhaust Accessory for EconoMi$er IV or EconoMi$er2:

    Power exhaust shall be used in conjunction with EconoMi$er IV or EconoMi$er2 to provide system exhaust of up to 100% of return air (vertical only). The power exhaust is a field-installed accessory (separate vertical and horizontal design).

    NOTE: Horizontal power exhaust is intended to mount in return ductwork.

    As the outdoor-air damper opens and closes, *both* propeller fans are energized and de-energized through the EconoMi$er IV controller. The set point is factory set at 100% of outdoor-air, and is adjustable 0 to 100% to meet specific job requirements. Available in 208/230-1-60 v or 460-3-60 v. An LED light on the controller indicates when the power exhaust is operating.

    For the EconoMi$er2, the power exhaust shall be controlled by the PremierLink™ or third party controls.

24. Outdoor Air Enthalpy Sensor (EconoMi$er IV or EconoMi$er2):

    The outdoor air enthalpy sensor shall be used with the EconoMi$er IV or EconoMi$er2 device to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the EconoMi$er IV or EconoMi$er2 device will provide differential enthalpy control. The sensor allows the EconoMi$er IV or EconoMi$er2 controller to determine if outside air is suitable for free cooling.

25. Return Air Enthalpy Sensor (EconoMi$er IV or EconoMi$er2):

    The return air enthalpy sensor shall be used with the EconoMi$er IV or EconoMi$er2 device. When used in conjunction with an outdoor air enthalpy sensor, the EconoMi$er IV or EconoMi$er2 device will provide differential enthalpy control.

26. Return Air Temperature Sensor (EconoMi$er IV or EconoMi$er2):

    The return air temperature sensor shall be used with the EconoMi$er IV or EconoMi$er2 device. When used in conjunction with the standard outdoor air temperature sensor, the EconoMi$er IV or EconoMi$er2 device will provide differential temperature control.

27. Indoor Air Quality (CO_2) Sensor (EconoMi$er2):

    a. Shall have the ability to provide demand ventilation indoor air quality (IAQ) control through the EconoMi$er2 with an IAQ sensor.

    b. The IAQ sensor shall be available in duct mount, wall mount, and wall mount with LED display. The set point shall have adjustment capability.

    c. Requires EconoMi$er2, PremierLink, or Apollo control options.

28. Indoor Air Quality (CO_2) Room Sensor (EconoMi$er IV):

    Sensor shall have the ability to provide demand ventilation control through the EconoMi$er IV. The IAQ sensor shall be wall mounted with an LED display in parts per million. The set point shall have adjustment capability.

29. Return Air CO_2 Sensor (EconoMi$er IV):

    Sensor shall have the ability to provide demand ventilation control through the EconoMi$er IV. The IAQ sensor shall be duct mounted. The set point shall have adjustment capability.

30. Gas Heat options (sizes 004-006):

    a. Single-stage gas heat shall be provided in lieu of two-stage heat.

    b. NOx reduction shall be provided to reduce nitrous oxide emissions to meet the California Air Quality Management NOx requirement of 40 nanograms/joule or less.

    c. Primary tubes on low NOx units shall be 409 stainless steel. Other components shall be aluminized steel.

31. Ultraviolet Germicidal Lamps:

    Ultraviolet germicidal lamps are designed to eliminate odor causing mold and fungus that may develop in the wet area of the evaporator section of the unit. The high output, low temperature germicidal lamps are field installed in the evaporator section of the unit, aimed at the evaporator coil and condensate pan. The short wavelength ultraviolet light inhibits and kills mold, fungus and microbial growth. The lamps have an output rating at 45F in 400 fpm airflow of 120 microwatts/cm^2 at 1 meter.

32. Humidi-MiZer™ Adaptive Dehumidification System:

    a. The Humidi-MiZer dehumidification system shall be factory-installed in the rooftop units, and shall provide greater dehumidification of the occupied space by two modes of dehumidification operations beside its normal design cooling mode:

        1) Subcooling mode further subcools the hot liquid refrigerant leaving the condenser coil when both temperature and humidity in the space are not satisfied.

2) Hot gas reheat mode shall mix a portion of the hot gas from the discharge of the compressor with the hot liquid refrigerant leaving the condenser coil to create a two-phase heat transfer in the system, resulting in a neutral leaving-air temperature when only humidity in the space is not satisfied.

b. The system shall consist of a subcooling/reheat dehumidification coil located downstream of the standard evaporator coil. This dehumidification coil is a two-row coil with the exception of the 004 unit, which has a one-row coil.

c. The system shall include crankcase heater(s) for the scroll compressor(s).

d. The system shall include a low outdoor air temperature switch to lock out both subcooling and hot gas reheat mode when the outdoor-air temperature is below 40 F.

e. The system shall include a Motormaster® low ambient control to ensure the normal design cooling mode capable of down to 0° F low ambient operation.

f. The system shall include a low-pressure switch on the suction line to ensure low pressure start-up of hot gas reheat mode at lower outdoor temperature condition.

g. The system operation may be controlled by a field-installed, wall-mounted humidistat. The dehumidification circuit will then operate only when needed. Field connections for the humidistat are made in the low-voltage compartment of the unit control box. The sensor can be set for any level between 55% and 80% relative humidity.

h. The system shall include a Thermal Expansion Valve (TXV) to ensure a positive superheat condition and a balance of pressure drop.

i. For units with two compressors (sizes 008-014), depending on the conditions required to maintain the space set points, one or both compressors can operate in subcooling mode, one compressor could operate in subcooling mode while the other operates in hot gas reheat mode, or one or both compressors can operate in hot gas reheat mode.

33. Humidistat:

    Field-installed, wall-mounted humidistat is used to control activation of the dehumidification package. The humidistat can be set for humidity levels between 20% and 80% relative humidity.

34. Hinged Panel Option:

    Hinged panel option provides hinged access panels for the filter, compressor, evaporator fan, and control box areas. Filter hinged panels permit tool-less entry for changing filters. Each hinged panel is permanently attached to the rooftop unit.

35. 62M Energy Recovery Ventilator

    One-piece energy recovery ventilation (ERV) unit utilizing an ARI 1060 certified energy recovery cassette with permanently bonded silica gel desiccant. UL std 1995, ETL tested and certified. Factory assembled single piece unit with single point power connections. Unit shall be designed as a stand-alone ERV or may be mated with any 2-25 ton Carrier rooftop unit. For mated applications, the ERV unit shall operate in conjunction with rooftop unit fan. For additional specifications refer to the 62M Product Data

Guide specifications — 48HE003-006 COBRA™ energy recovery units

Packaged Rooftop Electric Cooling Unit with Gas Heat and Energy Recovery Capability –

HVAC Guide Specifications

Constant Volume Applications

Size Range: 2 to 5 Tons, Nominal (Cooling)
24,000 to 60,000 Btuh, Nominal (Input Heating)
600 to 1000 cfm of outdoor air

Carrier Model Numbers:

48HE D/L/G/S
48HE E/M/H/R
48HE F/N/K/T

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor rooftop mounted, electrically controlled heating and cooling unit utilizing a hermetic compressor(s) for cooling duty and gas combustion for heating duty. Energy recovery section is electrically controlled using a rotary compressor for cooling and heating duty. Unit shall discharge supply air vertically.

1.02 QUALITY ASSURANCE

A. Unit well exceeds ASHRAE 90.1-2001 Energy Standards. Units are Energy Star qualified.

B. Unit shall be rated in accordance with ARI Standards 21. Designed in accordance with UL Standard 1812/ 1995.

C. Unit shall be designed to conform to ASHRAE 15, latest revision.

D. Unit shall be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.

E. Roof curb shall be designed to conform to NRCA Standards.

F. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

G. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).

H. Unit casing shall be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 5000-hour salt spray.

I. Unit shall be designed in accordance with ISO 9001:2000, and shall be manufactured in a facility registered to ISO 9001:2000.

J. Each unit shall be subjected to a completely automated run testing on the assembly line. A factory-supplied printout indicating tested pressures, amperages, data, and inspectors; providing certification of the unit status at the time of manufacture shall be available upon request.

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

Part 2 — Product

2.01 EQUIPMENT (STANDARD)

A. General:

Factory assembled, single-piece heating and cooling rooftop unit with energy recovery capability for vertical discharge applications. Contained within the unit enclosure shall be all factory wiring, piping, controls, refrigerant charge (R-22), and special features required prior to field start-up.

B. Unit Cabinet:

1. General:
   a. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a prepainted baked enamel finish on all externally exposed surfaces.
   b. Cabinet panels shall be easily removable for servicing.
   c. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
   d. Unit shall have 2 factory-installed, sloped condensate drain pans made of a non-corrosive material, providing a common connection with a minimum $^{3}/_{4}$-in. drain, and shall comply with ASHRAE Standard 62. Condensate drain must be installed per manufacturer's recommendations.
   e. Unit shall have one factory-installed filter access panel to provide filter access with toolless removal.
2. Rooftop Section:
   a. Evaporator fan compartment interior cabinet surfaces shall be insulated with a minimum $^{1}/_{2}$-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
   b. Unit shall have standard thru-the-bottom gas and power connection capability (accessory kit is required).
3. Energy Recovery Section:
   a. All internal panels shall be primer coated.
   b. Cabinet interior shall be insulated with a minimum $^{1}/_{2}$-in. thick, rigid foam board insulation with foil facing on the air side.

C. Fans:

1. Evaporator Fan (rooftop section):
   a. Fan shall be direct or belt driven as shown on the equipment drawings. Belt drive shall include an adjustable-pitch motor pulley.
   b. Fan wheel shall be double-inlet type with forward-curved blades.
   c. Bearings shall be sealed, permanently lubricated ball-bearing type for longer life and lower maintenance.
   d. Evaporator fan shall be made from steel with a corrosion-resistant finish and shall be dynamically balanced.

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2. Condenser Fan (Rooftop Section):
   a. Fan shall be of the direct-driven (with totally enclosed motors) propeller type and shall discharge air vertically.
   b. Fan shall have aluminum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.
3. Supply Fan and Exhaust Air Fan (Energy Recovery Section):
   a. Fans shall be of the double-inlet forward-curved centrifugal type.
   b. Fan wheels shall be made from steel with a corrosion-resistant finish and shall be statically and dynamically balanced.
   c. Bearings shall be sealed and permanently lubricated for longer life and lower maintenance.
4. Induced-draft blower shall be of the direct-driven, single inlet, forward-curved centrifugal type, made from steel with a corrosion-resistant finish and shall be dynamically balanced.

D. Compressors:
1. Rooftop Section:
   a. Fully hermetic type, internally protected scroll-type.
   b. Factory mounted on rubber grommets and internally spring mounted for vibration isolation.
2. Energy Recovery Section:
   a. Fully hermetic type with electrical overload protection.
   b. Factory rubber shock mounted vibration isolation.

E. Coils:
1. Rooftop Section:
   a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
2. Energy Recovery Section:
   a. Supply and exhaust air coils shall have aluminum plate fins mechanically bonded to internally enhanced seamless copper tubes with all joints brazed.
   b. Tube sheet openings shall be belled to prevent tube wear.
3. Optional Coils:
   a. Copper-fin coils shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan. All copper construction shall provide protection in moderate coastal environments.
   b. E-Coated aluminum-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be aluminum fins mechanically bonded to copper tubes.

F. Rooftop Heating Section:
1. Induced-draft combustion type with energy saving direct-spark ignition system and redundant main gas valve.
2. The heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
3. Burners shall be of the in-shot type constructed of aluminum-coated steel.
4. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).
5. The integrated gas controller (IGC) board shall include gas heat operation fault notification using an LED (light-emitting diode).
6. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high-temperature limit switch. Fault indication shall be made using an LED.
7. The IGC board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high-temperature limit switch.
8. The LED shall be visible without removal of control box access panel.
9. Optional Stainless Steel Heat Exchanger:
   a. Complete stainless steel heat exchanger allows for greater application flexibility.
   b. 409 stainless steel used in heat exchanger tubes and vestibule plate.

G. Refrigerant Components:
1. Rooftop section refrigerant circuit components shall include:
   a. Fixed orifice metering system (Acutrol™ device).
   b. Refrigerant filter drier.
   c. Service gage connections on suction, discharge, and liquid lines.
2. Energy recovery section refrigerant circuit components shall include:
   a. Fixed orifice metering device combined with maximum overcurrent protection (MOCP) type thermostatic expansion valve (TXV) to prevent compressor overloading.
   b. Service gage connections on suction and discharge lines to charge and evacuate the system.
   c. Ability to route gage hoses through the energy recovery section side panel to eliminate air bypass during diagnostic periods.

d. Reversing valve.
e. Accumulator located in compressor suction line.

H. Filter Section:
1. Rooftop Section:
a. Standard filter section shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.
b. Filter face velocity shall not exceed 320 fpm at nominal airflows.
c. Filter section should use only one size filter.
d. Filters shall be accessible through an access panel with "no-tool" removal.
2. Energy Recovery Section:
a. Standard filter section shall consist of factory-installed low-velocity, throwaway fiberglass filters of commercially available sizes.
b. Filter face velocity shall not exceed 300 fpm at nominal airflows.

I. Controls and Safeties:
1. Unit Controls:
Unit shall be complete with self-contained low-voltage control circuit protected by a fuse on the 24-v transformer side.
2. Safeties:
a. Rooftop cooling section:
1) Unit shall incorporate a solid-state compressor protector which provides anti-cycle reset capability at the space thermostat, should any of the following standard safety devices trip and shut off compressor.
2) Compressor over temperature, overcurrent.
3) Loss-of-charge/low-pressure switch.
4) Freeze-protection thermostat, evaporator coil.
5) High-pressure switch.
6) Automatic reset motor thermal overload protector.
7) The lockout protection shall be easily disconnected at the control board, if necessary.
b. Rooftop heating section shall be provided with the following minimum protections:
1) High-temperature limit switches.
2) Induced draft motor speed sensor.
3) Flame rollout switch.
4) Flame proving controls.
c. Energy recovery section shall be provided with the following minimum protections:
1) High-pressure switch.
2) Unit shall incorporate an outdoor coil defrost system to prevent excessive frost accumulation during heating duty, Defrost system shall be initiated on the basis of time and coil temperature. A 30/50/90 minute timer shall activate defrost cycle only if coil temperature is low enough to indicate a heavy frost condition. Defrost cycle shall terminate when the defrost thermostat is satisfied and shall have a positive termination time of 10 minutes. A 5-minute time delay shall be built into the defrost control to prevent compressor short cycling.

J. Operating Characteristics:
1. Rooftop Section:
a. Unit shall be capable of starting and running at 125 F ambient outdoor temperature, meeting maximum load criteria of ARI Standard 210/240 at ± 10% voltage.
b. Compressor with standard controls shall be capable of operation down to 25 F ambient outdoor temperature.
2. Energy Recovery Section:
a. Unit shall be capable of starting and running at 125 F ambient outdoor temperature, meeting maximum load criteria of ARI Standard 210/240 ± 10% voltage.
b. Compressor with standard controls shall be capable of operation down to 55 F ambient outdoor temperature in cooling mode and –20 F ambient outdoor temperature in heating mode.

K. Electrical Requirements:
All unit power wiring shall enter unit cabinet at a single factory-predrilled location.

L. Motors:
1. Rooftop Section:
a. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have line break thermal and current overload protection.
b. Evaporator-fan motor shall have permanently lubricated bearings and inherent automatic-reset thermal overload protection. Evaporator motors are designed specifically for Carrier and do *not* have conventional horsepower (hp) ratings listed on the motor nameplate. Motors are designed and qualified in the "air-over" location downstream of the cooling coil and carry a maximum continuous bhp rating that is the maximum application bhp rating for the motor; no "safety factors" above that rating may be applied.
c. Totally enclosed condenser-fan motor shall have permanently lubricated bearings, and inherent automatic-reset thermal overload protection.
d. Induced-draft motor shall have permanently lubricated sealed bearings and inherent automatic-reset thermal overload protection.
2. Energy Recovery Section:
a. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall include thermal overload protection.
b. Supply and exhaust-air fan motor shall have permanently lubricated bearings and inherent automatic reset thermal overload protection.

M. Energy Recovery Section Supply and Exhaust Air Damper:
1. Modulating type supply air damper opens to preset position any time system fans are energized to provide specified ventilation airflow.
2. Motorized spring return supply air damper automatically closes on loss of power.

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3. Capable of providing up to 100% outside air when matched to proper size rooftop unit.
4. Functions as economizer when outdoor air enthalpy sufficient to provide free cooling.
5. Barometric type exhaust air damper with adjustable stops to limit exhaust airflow to specified cfm. Gravity type damper closes automatically on loss of power or fan shut down.
6. Supply and exhaust rain hoods with cleanable aluminum mesh filters on supply air inlet and bird screens on exhaust air outlet standard.

N. Special Features:

Certain features are not applicable when the features designated * are specified. For assistance in amending the specifications, contact your local Carrier Sales Office.

1. Carrier PremierLink™ Controls:
   a. Shall be available as a factory-installed or as a field-installed accessory.
   b. Shall work with Carrier Comfort Network® (CCN) and ComfortVIEW™ software.
   c. Shall be compatible with *Comfort*Link™ controllers.
   d. Shall be ASHRAE 62-2001 compliant.
   e. Shall accept a CO_2 sensor in the conditioned space — Demand Control Ventilation (DCV) ready.
   f. Shall have baud communication rate of 38.4K or faster.
   g. Shall be Internet ready.
   h. Shall include an integrated economizer controller.
2. Electronic Programmable Light Commercial Thermidistat™ Accessory:

   The Light Commercial Thermidistat accessory is a fully programmable thermostat with a built-in humidistat.
   a. Provides direct control of energy recovery control and rooftop unit fans in response to occupied/unoccupied output signals.
   b. Liquid crystal display (LCD) equipment function indicators display operating mode.
   c. Five-minute compressor delay with override functions.
   d. Keypad lock feature to prevent unauthorized changing of program control.
   e. Holiday Mode — With a single touch of a button mode adjusts all comfort levels for optimum efficiency while the home is unoccupied and restores the settings to normal upon return.
   f. Comfort and energy savings — Seven-day programming with 4 temperature changes and humidity set point changes provided per day, means proper ventilation during occupied periods and savings through reduced energy usage when the building is unoccupied.
   g. Easy to use — Simple instructions are located inside the thermostat's door.
   h. Duplicate Programming — Copy the programmed schedule of one day to the next using the copy function.
   i. Override Capability — Hold function allows the regular schedule to be bypassed with a temporary setting.
   j. Battery-Free — Non-volatile RAM chip requires no battery backup. Retained in memory so reprogramming is not required after power loss.
3. Roof Curbs (Vertical):
   a. Full perimeter roof curb with exhaust capability providing separate airstreams for energy recovery from the exhaust air without supply air contamination.
   b. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
   c. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
4. Head Pressure Control Package:

   Consists of solid-state control and condenser-coil temperature sensor to maintain condensing temperature between 90 F and 110 F at outdoor ambient temperatures down to –20 F by condenser-fan speed modulation or condenser-fan cycling and wind baffles.
5. LP (Liquid Propane) Conversion Kit:

   Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane.
6. Flue Shield:

   Provides protection from the hot sides of the gas flue hood.
7. Condenser Coil Hail Guard Assembly:

   Hail guard shall protect against damage from hail and flying debris.
8. Unit-Mounted, Non-Fused Disconnect Switch:

   Shall be factory-installed, internally mounted. NEC and UL approved non-fused switch shall provide unit power shutoff. Shall be accessible from outside the unit and shall provide power off lockout capability. (80 amp MAXIMUM)
9. Convenience Outlet:

   Shall be factory-installed and internally mounted with easily accessible 115-v female receptacle. Shall include 15-amp GFI receptacle with independent fuse protection. Voltage required to operate convenience outlet shall be provided by a factory-installed step-down transformer. Shall be accessible from outside the unit.
10. High-Static Indoor Fan Motor(s) and Drive(s) (004-006):

    High-static motor(s) and drive(s) shall be factory-installed to provide additional performance range.
11. Flue Discharge Deflector:

    Flue discharge deflector directs unit exhaust vertically instead of horizontally.
12. Condenser Coil Grille:

    The grille protects the condenser coil from damage by large objects without increasing unit clearances.
13. Compressor Cycle Delay:

    Unit shall be prevented from restarting for minimum of 5 minutes after shutdown.

14. Thru-the-Bottom Utility Connectors:

    Kit shall provide connectors to permit gas and electrical connections to be brought to the unit through the basepan.

15. Fan/Filter Status Switch:

    Provides status of indoor (evaporator) fan (ON/OFF) or filter (CLEAN/DIRTY). Status shall be displayed over communication bus when used with direct digital controls or with an indicator light at the thermostat.

16. Outdoor Air Enthalpy Sensor:

    The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit will provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.

17. Return Air Enthalpy Sensor:

    The return air enthalpy sensor shall be used in conjunction with an outdoor air enthalpy sensor to provide differential enthalpy control.

18. Indoor Air Quality (CO_2) Sensor:
    a. Shall have the ability to provide demand ventilation indoor air quality (IAQ) control.
    b. The IAQ sensor shall be available in duct mount, wall mount, and wall mount with LED display. The set point shall have adjustment capability.

19. Gas Heat options:
    a. Single-stage gas heat shall be provided in lieu of two-stage heat.
    b. NOx reduction shall be provided to reduce nitrous oxide emissions to meet the California Air Quality Management NOx requirement of 40 nanograms/joule or less.
    c. Primary tubes and vestibule plates on low NOx units shall be 409 stainless steel. Other components shall be aluminized steel.

Guide specifications — 48HJ004-014 COBRA™ energy recovery units

Packaged Rooftop Electric Cooling Unit with Gas Heat and Energy Recovery Capability — Constant Volume Applications

HVAC Guide Specifications

Size Range: **3 to 12 1/2 Tons, Nominal (Cooling)**
60,000 to 250,000 Btuh, Nominal (Input Heating)
600 to 3000 cfm of outdoor air

Carrier Model Numbers:

48HJD/L/G/S
48HJE/M/H/R
48HJF/N/K/T

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor rooftop mounted, electrically controlled heating and cooling unit utilizing a hermetic compressor(s) for cooling duty and gas combustion for heating duty. Energy recovery section is electrically controlled using a rotary compressor for cooling and heating duty. Unit shall discharge supply air vertically.

1.02 QUALITY ASSURANCE

A. Unit well exceeds ASHRAE 90.1-2001 Energy Standards. Units are Energy Star qualified.

B. Unit shall be rated in accordance with ARI Standards 210 and 360. Designed in accordance with UL Standard 1812/1995.

C. Unit shall be designed to conform to ASHRAE 15, latest revision.

D. Unit shall be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.

E. Roof curb shall be designed to conform to NRCA Standards.

F. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

G. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).

H. Unit casing shall be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 5000-hour salt spray.

I. Unit shall be designed in accordance with ISO 9001:2000, and shall be manufactured in a facility registered to ISO 9001:2000.

J. Each unit shall be subjected to a completely automated run testing on the assembly line a factory-supplied printout indicating tested pressures, amperages, data, and inspectors; providing certification of the unit status at the time of manufacture shall be avaliable upon request.

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT (STANDARD)

A. General:

Factory assembled, single-piece heating and cooling rooftop unit with energy recovery capability for vertical discharge applications. Contained within the unit enclosure shall be all factory wiring, piping, controls, refrigerant charge (R-22), and special features required prior to field start-up.

B. Unit Cabinet:

1. General:
   a. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a prepainted baked enamel finish on all externally exposed surfaces.
   b. Cabinet panels shall be easily removable for servicing.
   c. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
   d. Unit shall have 2 factory-installed, sloped condensate drain pans made of a non-corrosive material, providing a common connection with a minimum 3/4-in. drain, and shall comply with ASHRAE Standard 62. Condensate drain must be installed per manufacturer's recommendations.
   e. Unit shall have one factory-installed filter access panel to provide filter access with toolless removal.
2. Rooftop Section:
   a. Evaporator fan compartment interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
   b. Unit shall have standard thru-the-bottom gas and power connection capability (accessory kit is required).
3. Energy Recovery Section:
   a. All internal panels shall be primer coated.
   b. Cabinet interior shall be insulated with a minimum 1/2-in. thick, rigid foam board insulation with foil facing on the air side.

C. Fans:

1. Evaporator Fan (rooftop section):
   a. Fan shall be direct or belt driven as shown on the equipment drawings. Belt drive shall include an adjustable-pitch motor pulley.

b. Fan wheel shall be double-inlet type with forward-curved blades.

c. Bearings shall be sealed, permanently lubricated ball-bearing type for longer life and lower maintenance.

d. Evaporator fan shall be made from steel with a corrosion-resistant finish and shall be dynamically balanced.

2. Condenser Fan (Rooftop Section):

a. Fan shall be of the direct-driven (with totally enclosed motors) propeller type and shall discharge air vertically.

b. Fan shall have aluminum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.

3. Supply Fan and Exhaust Air Fan (Energy Recovery Section):

a. Fans shall be of the double-inlet forward-curved centrifugal type.

b. Fan wheels shall be made from steel with a corrosion-resistant finish and shall be statically and dynamically balanced.

c. Bearings shall be sealed and permanently lubricated for longer life and lower maintenance.

4. Induced-draft blower shall be of the direct-driven, single inlet, forward-curved centrifugal type, made from steel with a corrosion-resistant finish and shall be dynamically balanced.

D. Compressor(s):

1. Rooftop Section:

a. Fully hermetic type, internally protected scroll-type.

b. Factory mounted on rubber grommets and internally spring mounted for vibration isolation.

c. On independent circuits (sizes 008-014).

2. Energy Recovery Section:

a. Fully hermetic type with electrical overload protection.

b. Factory rubber shock mounted vibration isolation.

E. Coils:

1. Rooftop Section:

a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.

b. Dual compressor models (size 008-014) shall have face-split type evaporator coil (circuit no. 1 on bottom).

2. Energy Recovery Section:

a. Supply and exhaust air coils shall have aluminum plate fins mechanically bonded to internally enhanced seamless copper tubes with all joints brazed.

b. Tube sheet openings shall be belled to prevent tube wear.

3. Optional Coils:

a. Copper-fin coils shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan. All copper construction shall provide protection in moderate coastal environments.

b. E-Coated aluminum-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be aluminum fins mechanically bonded to copper tubes.

F. Rooftop Heating Section:

1. Induced-draft combustion type with energy saving direct-spark ignition system and redundant main gas valve.

2. The heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.

3. Burners shall be of the in-shot type constructed of aluminum-coated steel.

4. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).

5. The integrated gas controller (IGC) board shall include gas heat operation fault notification using an LED (light-emitting diode).

6. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high-temperature limit switch. Fault indication shall be made using an LED.

7. The IGC board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high-temperature limit switch.

8. The LED shall be visible without removal of control box access panel.

9. Optional Stainless Steel Heat Exchanger:

Guide specifications — 48HJ004-014 COBRA™ energy recovery units (cont)

a. Complete stainless steel heat exchanger allows for greater application flexibility.

b. 409 stainless steel used in heat exchanger tubes and vestibule plate.

G. Refrigerant Components:

1. Rooftop section refrigerant circuit components shall include:

a. Fixed orifice metering system (Acutrol™ device).

b. Refrigerant filter drier.

c. Service gage connections on suction, discharge, and liquid lines.

2. Energy recovery section refrigerant circuit components shall include:

a. Fixed orifice metering device combined with maximum overcurrent protection (MOCP) type thermostatic expansion valve (TXV) to prevent compressor overloading.

b. Service gage connections on suction and discharge lines to charge and evacuate the system.

c. Ability to route gage hoses through the energy recovery section side panel to eliminate air bypass during diagnostic periods.

d. Reversing valve.

e. Accumulator located in compressor suction line.

H. Filter Section:

1. Rooftop Section:

a. Standard filter section shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.

b. Filter face velocity shall not exceed 320 fpm at nominal airflows.

c. Filter section should use only one size filter.

d. Filters shall be accessible through an access panel with “no-tool” removal.

2. Energy Recovery Section:

a. Standard filter section shall consist of factory-installed low-velocity, throwaway fiberglass filters of commercially available sizes.

b. Filter face velocity shall not exceed 300 fpm at nominal airflows.

I. Controls and Safeties:

1. Unit Controls:

Unit shall be complete with self-contained low-voltage control circuit protected by a fuse on the 24-v transformer side (008-014 units have a reset-table circuit breaker).

2. Safeties:

a. Rooftop cooling section:

1) Unit shall incorporate a solid-state compressor protector which provides anti-cycle reset capability at the space thermostat, should any of the following standard safety devices trip and shut off compressor.

2) Compressor overtemperature, overcurrent.

3) Loss-of-charge/low-pressure switch.

4) Freeze-protection thermostat, evaporator coil.

5) High-pressure switch.

6) Automatic reset motor thermal overload protector.

7) The lockout protection shall be easily disconnected at the control board, if necessary.

b. Rooftop heating section shall be provided with the following minimum protections:

1) High-temperature limit switches.

2) Induced draft motor speed sensor.

3) Flame rollout switch.

4) Flame proving controls.

c. Energy recovery section shall be provided with the following minimum protections:

1) High-pressure switch.

2) Unit shall incorporate an outdoor coil defrost system to prevent excessive frost accumulation during heating duty, Defrost system shall be initiated on the basis of time and coil temperature. A 30/50/90 minute timer shall activate defrost cycle only if coil temperature is low enough to indicate a heavy frost condition. Defrost cycle shall terminate when the defrost thermostat is satisfied and shall have a positive termination time of 10 minutes. A 5-minute time delay shall be built into the defrost control to prevent compressor short cycling.

J. Operating Characteristics:

1. Rooftop Section:

a. Unit shall be capable of starting and running at 125 F ambient outdoor temperature, meeting maximum load criteria of ARI Standard 210/240 or 360 at ± 10% voltage.

b. Compressor with standard controls shall be capable of operation down to 25 F ambient outdoor temperature.

2. Energy Recovery Section:

a. Unit shall be capable of starting and running at 125 F ambient outdoor temperature, meeting maximum load criteria of ARI Standard 210/240 ± 10% voltage.

b. Compressor with standard controls shall be capable of operation down to 55 F ambient outdoor temperature in cooling mode and –20 F ambient outdoor temperature in heating mode.

K. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single factory-predrilled location.

L. Motors:

1. Rooftop Section:
   a. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have line break thermal and current overload protection.
   b. Evaporator-fan motor shall have permanently lubricated bearings and inherent automatic-reset thermal overload protection. Evaporator motors are designed specifically for Carrier and do *not* have conventional horsepower (hp) ratings listed on the motor nameplate. Motors are designed and qualified in the "air-over" location downstream of the cooling coil and carry a maximum continuous bhp rating that is the maximum application bhp rating for the motor; no "safety factors" above that rating may be applied.
   c. Totally enclosed condenser-fan motor shall have permanently lubricated bearings, and inherent automatic-reset thermal overload protection.
   d. Induced-draft motor shall have permanently lubricated sealed bearings and inherent automatic-reset thermal overload protection.
2. Energy Recovery Section:
   a. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall include thermal overload protection.
   b. Supply and exhaust-air fan motor shall have permanently lubricated bearings and inherent automatic reset thermal overload protection.

M. Energy Recovery Section Supply and Exhaust Air Damper:

1. Modulating type supply air damper opens to preset position any time system fans are energized to provide specified ventilation airflow.
2. Motorized spring return supply air damper automatically closes on loss of power.
3. Capable of providing up to 100% outside air when matched to proper size rooftop unit.
4. Functions as economizer when outdoor air enthalpy sufficient to provide free cooling.
5. Barometric type exhaust air damper with adjustable stops to limit exhaust airflow to specified cfm. Gravity type damper closes automatically on loss of power or fan shut down.
6. Supply and exhaust rain hoods with cleanable aluminum mesh filters on supply air inlet and bird screens on exhaust air outlet standard.

N. Special Features:

Certain features are not applicable when the features designated * are specified. For assistance in amending the specifications, contact your local Carrier Sales Office.

* 1. Carrier PremierLink™ Controls:
   a. Shall be available as a factory-installed or as a field-installed accessory.
   b. Shall work with Carrier Comfort Network® (CCN) and ComfortVIEW™ software.
   c. Shall be compatible with *Comfort*Link™ controllers.
   d. Shall be ASHRAE 62-2001 compliant.
   e. Shall accept a CO_2 sensor in the conditioned space — Demand Control Ventilation (DCV) ready.
   f. Shall have baud communication rate of 38.4K or faster.
   g. Shall be Internet ready.
   h. Shall include an integrated economizer controller.
2. Electronic Programmable Light Commercial Thermidistat™ Accessory:

   The Light Commercial Thermidistat accessory is a fully programmable thermostat with a built-in humidistat.
   a. Provides direct control of energy recovery control and rooftop unit fans in response to occupied/unoccupied output signals.
   b. Liquid crystal display (LCD) equipment function indicators display operating mode.
   c. Five-minute compressor delay with override functions.
   d. Keypad lock feature to prevent unauthorized changing of program control.
   e. Holiday Mode — With a single touch of a button mode adjusts all comfort levels for optimum efficiency while the home is unoccupied and restores the settings to normal upon return.
   f. Comfort and energy savings — Seven-day programming with 4 temperature changes and humidity set point changes provided per day, means proper ventilation during occupied periods and savings through reduced energy usage when the building is unoccupied.
   g. Easy to use — Simple instructions are located inside the thermostat's door.
   h. Duplicate Programming — Copy the programmed schedule of one day to the next using the copy function.
   i. Override Capability — Hold function allows the regular schedule to be bypassed with a temporary setting.

Guide specifications — 48HJ004-014 COBRA™ energy recovery units (cont)

j. Battery-Free — Non-volatile RAM chip requires no battery backup. Retained in memory so reprogramming is not required after power loss.

3. Roof Curbs (Vertical):
   a. Full perimeter roof curb with exhaust capability providing separate airstreams for energy recovery from the exhaust air without supply air contamination.
   b. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
   c. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.

* 4. Head Pressure Control Package:

Consists of solid-state control and condenser-coil temperature sensor to maintain condensing temperature between 90 F and 110 F at outdoor ambient temperatures down to –20 F by condenser-fan speed modulation or condenser-fan cycling and wind baffles.

5. LP (Liquid Propane) Conversion Kit:

Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane.

* 6. Flue Shield:

Provides protection from the hot sides of the gas flue hood.

* 7. Condenser Coil Hail Guard Assembly:

Hail guard shall protect against damage from hail and flying debris.

8. Unit-Mounted, Non-Fused Disconnect Switch:

Shall be factory-installed, internally mounted. NEC and UL approved non-fused switch shall provide unit power shutoff. Shall be accessible from outside the unit and shall provide power off lockout capability. (80 amp MAXIMUM)

9. Convenience Outlet:

Shall be factory-installed and internally mounted with easily accessible 115-v female receptacle. Shall include 15-amp GFI receptacle with independent fuse protection. Voltage required to operate convenience outlet shall be provided by a factory-installed step-down transformer. Shall be accessible from outside the unit.

10. High-Static Indoor Fan Motor(s) and Drive(s) (004-012):

High-static motor(s) and drive(s) shall be factory-installed to provide additional performance range.

11. Flue Discharge Deflector:

Flue discharge deflector directs unit exhaust vertically instead of horizontally.

12. Condenser Coil Grille:

The grille protects the condenser coil from damage by large objects without increasing unit clearances.

13. Compressor Cycle Delay:

Unit shall be prevented from restarting for minimum of 5 minutes after shutdown.

14. Thru-the-Bottom Utility Connectors:

Kit shall provide connectors to permit gas and electrical connections to be brought to the unit through the basepan.

15. Fan/Filter Status Switch:

Provides status of indoor (evaporator) fan (ON/OFF) or filter (CLEAN/DIRTY). Status shall be displayed over communication bus when used with direct digital controls or with an indicator light at the thermostat.

16. Outdoor Air Enthalpy Sensor:

The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit will provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.

17. Return Air Enthalpy Sensor:

The return air enthalpy sensor shall be used in conjunction with an outdoor air enthalpy sensor to provide differential enthalpy control.

18. Indoor Air Quality (CO_2) Sensor:
   a. Shall have the ability to provide demand ventilation indoor air quality (IAQ) control.
   b. The IAQ sensor shall be available in duct mount, wall mount, and wall mount with LED display. The set point shall have adjustment capability.

19. Gas Heat options (sizes 004-006):
   a. Single-stage gas heat shall be provided in lieu of two-stage heat.
   b. NOx reduction shall be provided to reduce nitrous oxide emissions to meet the California Air Quality Management NOx requirement of 40 nanograms/joule or less.
   c. Primary tubes on low NOx units shall be 409 stainless steel. Other components shall be aluminized steel.

20. Humidi-MiZer™ Adaptive Dehumidification System:
    a. The Humidi-MiZer dehumidification system shall be factory-installed in the Weathermaster® 48HJ004-014 rooftop units, and shall provide greater dehumidification of the occupied space by two modes of dehumidification operations beside its normal design cooling mode:
        1) Subcooling mode further subcools the hot liquid refrigerant leaving the condenser coil when both temperature and humidity in the space are not satisfied.
        2) Hot gas reheat mode shall mix a portion of the hot gas from the discharge of the compressor with the hot liquid refrigerant leaving the condenser coil to create a two-phase heat transfer in the system, resulting in a neutral leaving-air temperature when only humidity in the space is not satisfied.
    b. The system shall consist of a subcooling/reheat dehumidification coil located downstream of the standard evaporator coil. This dehumidification coil is a two-row coil with the exception of the 004 unit, which has a one-row coil.
    c. The system shall include crankcase heater(s) for the scroll compressor(s).
    d. The system shall include a low outdoor air temperature switch to lock out both subcooling and hot gas reheat mode when the outdoor-air temperature is below 40° F.
    e. The system shall include a Motormaster® low ambient control to ensure the normal design cooling mode capable of down to 0° F low ambient operation.
    f. The system shall include a low-pressure switch on the suction line to ensure low pressure start-up of hot gas reheat mode at lower outdoor temperature condition.
    g. The system operation may be controlled by a field-installed, wall-mounted humidistat. The dehumidification circuit will then operate only when needed. Field connections for the humidistat are made in the low-voltage compartment of the unit control box. The sensor can be set for any level between 55% and 80% relative humidity.
    h. The system shall include a Thermal Expansion Valve (TXV) to ensure a positive superheat condition and a balance of pressure drop.
    i. For units with two compressors (sizes 008-014), depending on the conditions required to maintain the space set points, one or both compressors can operate in subcooling mode, one compressor could operate in subcooling mode while the other operates in hot gas reheat mode, or one or both compressors can operate in hot gas reheat mode.
21. Humidistat:

    Field-installed, wall-mounted humidistat is used to control activation of the dehumidification package. The humidistat can be set for humidity levels between 20% and 80% relative humidity.
22. Hinged Panel Option:

    Hinged panel option provides hinged access panels for the filter, compressor, evaporator fan, and control box areas. Filter hinged panels permit tool-less entry for changing filters. Each hinged panel is permanently attached to the rooftop unit.

Guide specifications — 48HJ015,017

Packaged Rooftop Electric Cooling Unit with Gas Heat — Constant Volume Application

HVAC Guide Specifications

Size Range: **12 and 15 Tons Nominal (Cooling)**
172,000 to 360,000 Btuh, Nominal (Input Heating)

Carrier Model Numbers:

48HJD, 48HJF
48HJM, 48HJN

ENERGY STAR PARTNER

ASHRAE 90.1 COMPLIANT

Part 1 — General

1.01 SYSTEM DESCRIPTION

Unit is an outdoor rooftop mounted, electrically controlled heating and cooling unit utilizing scroll hermetic compressors for cooling duty and gas combustion for heating duty. Supply air shall be discharged downward or horizontally (with horizontal supply/return curb adapter assembly), as shown on contract drawings. Standard unit shall include a manual outdoor-air inlet.

1.02 QUALITY ASSURANCE

A. Units shall well exceed the energy efficiency requirements of ASHRAE standard 90.1-2001. Units are Energy Star qualified.

B. Unit shall be rated in accordance with ARI Standards 270 and 360 and all units shall be designed in accordance with UL Standard 1995.

C. Unit shall be designed to conform to ASHRAE 15.

D. Unit shall be ETL and ETL, Canada tested and certified in accordance with ANSI Z21.47 Standards as a total package.

E. Roof curb shall be designed to conform to NRCA Standards.

F. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

G. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).

H. Unit shall be manufactured in a facility registered to ISO 9001:2000.

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT (STANDARD)

A. General:

Each unit shall be a factory assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, refrigerant charge (R-22), and special features required prior to field start-up.

B. Unit Cabinet:

1. Constructed of galvanized steel (G90 — 1.8 oz. of zinc per square foot [550 grams per square meter] of sheet metal), bonderized and primer-coated on both sides and coated with a baked polyester thermosetting powdercoating finish on the outer surface.
2. Indoor blower compartment interior surfaces shall be insulated with a minimum $^1/_2$-in. thick, 1 lb density fiberglass insulation. Fiberglass insulation shall be bonded with a thermosetting resin (8 to 12% by weight nominal, phenol formaldehyde typical), and coated with an acrylic or other material that meets the NFPA 90 flame retardance requirements and has an ''R'' Value of 3.70. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
3. Cabinet panels shall be easily removable for servicing. Cabinet panels are minimum 20 gage. Panels shall have $^1/_2$-in. thick, 1.5-lb. density insulation.
4. Filters shall be accessible through an access panel.
5. Holes shall be provided in the base rails (minimum 12 gage) for rigging shackles to facilitate overhead rigging.
6. Unit shall contain a sloped drain pan, to prevent standing water from accumulating. Pan shall be fabricated of hot dipped zinc coated minimum spangle steel. Zinc coating shall be G90 designation according to ASTM Standard A653. Unit shall contain a factory-installed nonferrous main condensate drain connection.

C. Fans:

1. Indoor blower (evaporator fan):
   a. Fan shall be belt driven. Belt drive shall include an adjustable pulley. The standard fan drive shall have a factory-installed low-medium static pressure fan drive. The alternate fan drive option shall have a factory-installed high static pressure fan drive.
   b. Fan wheel shall be made from steel with a corrosion resistant finish. It shall be a dynamically balanced, double-inlet type with forward-curved blades.
2. Condenser fans shall be of the direct-driven propeller type, with corrosion-resistant blades riveted to corrosion-resistant steel supports. They shall be dynamically balanced and discharge air upwards.
3. Induced-draft blower shall be of the direct-driven, single inlet, forward-curved, centrifugal type. It shall be made from steel with a corrosion-resistant finish and shall be dynamically balanced.

D. Compressor(s):

1. Fully hermetic, scroll type, internally protected.
2. Factory spring-shock mounted and internally spring mounted for vibration isolation.
3. On electrically and mechanically independent refrigerant circuits.

4. All compressors shall have 70 W crankcase heaters.

E. Coils:

1. Standard evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
2. Coils shall be leak tested at 150 psig (1034 kPa) and pressure tested at 450 psig (3103 kPa).

F. Heating Section:

1. Induced-draft combustion type with energy saving direct-spark ignition system and redundant main gas valve.

2. a. The heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.

b. The optional stainless steel heat exchangers shall be tubular-section design and shall be constructed of a minimum 20 gage, 409 stainless steel.

3. Burners shall be of the in-shot type constructed of aluminum-coated steel.
4. All gas piping shall enter the unit at a single location.
5. Gas piping shall be capable of being routed through the roof curb directly into unit.

G. Refrigerant Components:

Refrigerant circuit components shall include:

1. Thermostatic expansion valve (TXV).
2. Filter driers.
3. Gage port and connections on suction, discharge, and liquid lines.

H. Filter Section:

Standard filter section shall consist of 2 sizes of factory-installed 2-in. thick throwaway fiberglass filters of commercially available sizes. Filters shall be approximately 10% efficient with an airside pressure drop of approximately 0.07 in. wg (clean).

I. Controls and Safeties:

1. Unit Controls:
   a. Economizer control (optional)
   b. Capacity control (2-step)
   c. Unit shall be complete with self-contained low-voltage control circuit.
2. Safeties:
   a. Unit shall incorporate a solid-state compressor lockout which provides reset capability at the space thermostat, should any of the following safety devices trip and shut off compressor:
      1) Compressor lockout protection provided for either internal or external overload.
      2) Low-pressure switch.
      3) Dual freezestats (evaporator coil).
      4) High-pressure switch.
   b. Supply-air thermostat shall be located in the unit.
   c. Heating section shall be provided with the following minimum protections:
      1) High-temperature limit switch.
      2) Induced-draft motor speed sensor.
      3) Flame rollout switch.
      4) Flame proving controls.
      5) Redundant gas valve.

J. Operating Characteristics:

1. Unit shall be capable of starting and running at 120 F (size 017) or 125 F (size 015) ambient outdoor temperature per maximum load criteria of ARI Standard 360.
2. Unit with standard controls will operate in cooling down to an outdoor ambient temperature of 40 F.
3. Unit shall be provided with fan time delay to prevent cold air delivery.

K. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single location.

L. Motors:

1. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have line break thermal and current overload protection.
2. All fan motors shall have permanently lubricated, sealed bearings and inherent automatic-reset thermal overload protection or manual reset calibrated circuit breakers. Evaporator motors are designed specifically for Carrier and do *not* have conventional horsepower (HP) ratings listed on the motor nameplate. Motors are designed and qualified in the "air-over" location downstream of the cooling coil and carry a maximum continuous bhp rating that is the maximum application bhp rating for the motor; no "safety factors" above that rating may be applied.
3. All indoor-fan motors 5 hp and larger shall meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT) effective October 24, 1997.

M. Special Features:

Certain features are not applicable when the features designated * are specified. For assistance in amending the specifications, contact your local Carrier Sales Office.

* 1. Carrier PremierLink™ Controls:
   a. Shall be available as a factory-installed or as a field-installed accessory.
   b. Shall work with Carrier Comfort Network™ (CCN) and ComfortVIEW™ software.
   c. Shall be compatible with *Comfort*Link™ controllers.
   d. Shall be ASHRAE 62-2001 compliant.

e. Shall accept a CO_2 sensor in the conditionel space — Demand Control Ventilation (DCV) ready.

f. Shall have baud communication rate of 38.4K or faster.

g. Shall be Internet ready.

h. Shall include an integrated economizer controller.

2. Optional Coils:

a. Optional pre-coated aluminum-fin coils shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.

b. Optional copper-fin coils shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan. All copper construction shall provide protection in moderate coastal environments.

c. Optional E-Coated aluminum-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be aluminum fins mechanically bonded to copper tubes.

d. Optional E-Coated copper-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be copper fins mechanically bonded to copper tubes with copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting sheet metal coil pan to maintain coating integrity and minimize corrosion potential between coil and pan.

3. Roof Curbs (Horizontal and Vertical):

a. Formed of 16-gage galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.

b. Permits installing and securing ductwork to curb prior to mounting unit on the curb.

4. Horizontal Adapter Roof Curb:

Includes factory-assembled adapter and internal duct.

NOTE: Power exhaust or barometric relief must be mounted in the return ductwork when used in conjunction with this accessory.

* 5. Integrated Economizers:

a. Integrated integral modulating type capable of simultaneous economizer and compressor operation.

b. Available as a factory-installed option in vertical supply/return configuration only. (Available as a field-installed accessory for horizontal and/or vertical supply return configurations.)

c. Includes all hardware and controls to provide cooling with outdoor air.

d. Equipped with low-leakage dampers, not to exceed 2% leakage at 1 in. wg pressure differential.

e. Capable of introducing up to 100% outdoor air.

f. EconoMi$er IV and EconoMi$er2 shall be equipped with a barometric relief damper.

g. Designed to close damper(s) during loss-of-power situations with spring return built into motor.

h. Dry bulb outdoor-air temperature sensor shall be provided as standard. Outdoor air sensor set point is adjustable and shall range from 40 to 100 F. For the EconoMi$er IV, the return air sensor, indoor enthalpy sensor, and outdoor enthalpy sensor shall be provided as field-installed accessories to provide enthalpy control, differential enthalpy control, and differential dry bulb temperature control. For the EconoMi$er2, the enthalpy, differential temperature (adjustable), and differential enthalpy con-

trol shall be provided as field-installed accessories.

i. The EconoMi$er IV and EconoMi$er2 shall have a gear-driven parallel blade design.

j. EconoMi$er IV microprocessor control shall provide control of internal building pressure through its accessory power exhaust function. Factory set at 100%, with a range of 0% to 100%.

k. EconoMi$er2 shall be capable of control from a 4 to 20 mA signal through optional 4 to 20 mA design without microprocessor control (required for PremierLink™ or third party control interface).

l. EconoMi$er IV Microprocessor Occupied Minimum Damper Position Setting maintains the minimum airflow into the building during occupied period providing design ventilation rate for full occupancy (damper position during heating). A remote potentiometer may be used to override the set point.

m. EconoMi$er IV Microprocessor Unoccupied Minimum Damper Position Setting — The EconoMi$er IV dampers shall be completely closed when the unit is in the occupied mode.

n. EconoMi$er IV Microprocessor IAQ/DCV Maximum Damper Position Setting — Setting the maximum position of the damper prevents the introduction of large amounts of hot or cold air into the space. This position is intended to satisfy the base minimum ventilation rate.

o. EconoMi$er IV Microprocessor IAQ/DCV control modulates the outdoor-air damper to provide ventilation based on the optional 2 to 10 vdc CO_2 sensor input.

p. Compressor lockout sensor (opens at 35 F, closes at 50 F).

q. Actuator shall be direct coupled to economizer gear, eliminating linkage arms and rods.

r. Control LEDs:

1) When the outdoor air damper is capable of providing free cooling, the “Free Cool” LED shall illuminate.
2) The IAQ LED indicates when the module is on the DCV mode.
3) The EXH LED indicates when the exhaust fan contact is closed.

s. Remote Minimum Position Control — A field-installed accessory remote potentiometer allows the outdoor air damper to be opened or closed beyond the minimum position in the occupied mode for modified ventilation.

6. Two-Position Damper:

Two-position damper package shall include single blade damper and 24-v motor. Admits up to 25% outdoor air, and shall close upon unit shutoff. Damper shall cover 3.8-in. high by 17.75-in. wide (117.8 sq. in.) opening in return air upper panel.

7. Accessory Compressor Cycle Delay:

Compressor shall be prevented from restarting for a minimum of 5 minutes after shutdown.

* 8. Thermostats and Subbases:

Thermostat and subbase shall provide staged heating and cooling in addition to automatic (or manual) changeover and fan control.

* 9. Barometric Relief Damper Package:

a. Package shall include damper, seals, hardware, and hoods to relieve excess internal pressure.

b. Damper shall close due to gravity upon unit shutdown.

c. Damper package must be field-installed in return-air ductwork when used with optional side return connections.

*10. Power Exhaust:

Package shall include an exhaust (propeller style) fan, 1/2 Hp 208-230, 460 v (factory-wired for 460 v) direct drive motor, and damper for vertical flow units with economizer to control over-pressurization of building. Power Exhaust package must be field-installed in return-air ductwork when used with optional side return connections.

*11. Head Pressure Control Package:

Package shall consist of an accessory outdoor-air package and a solid-state control with condenser coil temperature sensor for controlling condenser-fan motor speed to maintain condensing temperature between 90 F and 100 F at outdoor ambient temperature down to –20 F.

12. Low-Ambient Kits:

When used, low-ambient kits allow units to operate at lower outdoor ambient temperatures down to 20 F.

13. Electronic Programmable Thermostat:

Thermostat shall be capable of using deluxe full-featured electronic thermostat.

14. Winter Start Time-Delay Relay:

Relay shall be used in conjunction with the accessory low-ambient kit or head pressure control device, permits operation in cooling at lower outdoor ambient temperatures. See price pages for more information.

15. Liquid Propane Conversion Kit:

Kit shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane gas.

16. Service Option Package:

a. Hinged access panels for the filter, compressors, evaporator fan, and control box areas. Filter hinged access panels permit tool-less entry for changing filters. Evaporator fan hinged access panel shall be field-convertible to a tool-less entry by removing and discarding screws. Each external hinged access panel shall be permanently attached to the rooftop unit.

b. Convenience outlet shall be factory-installed and internally mounted with an externally accessible 115-v, 15-amp GFI, female receptacle with hinged cover. Voltage and circuit protection required to operate convenience outlet shall be provided by a field- supplied and properly fused separate branch circuit.

c. Non-fused disconnect switch shall be factory-installed, internally mounted, NEC and UL approved non-fused switch; shall provide unit power shutoff. The control access door shall be interlocked with the non-fused disconnect. The disconnect switch must be in the OFF position to open the control box access door. Shall be accessible from outside the unit and shall provide power off lockout capability.

17. Alternate Drive:

    Drive shall provide higher static drive capability to enhance evaporator-fan performance rpm range.

18. Hail Guard:

    Hail guard shall protect the condenser coil from hail, flying debris, and damage by large objects without increasing unit clearances.

19. Ultraviolet Germicidal Lamps:

    Ultraviolet germicidal lamps are designed to eliminate odor causing mold and fungus that may develop in the wet area of the evaporator section of the unit. The high output, low temperature germicidal lamps are field installed in the evaporator section of the unit, aimed at the evaporator coil and condensate pan. The short wavelength ultraviolet light inhibits and kills mold, fungus and microbial growth. The lamps have an output rating at 45 F in 400 fpm airflow of 120 microwatts/cm^2 at 1 meter.

20. Stainless Steel Condensate Pan:

    Stainless steel condensate pans shall be available for condensate collection.

21. Indoor Air Quality (CO_2) Room Sensor (EconoMi$er IV):

    Sensor shall have the ability to provide demand ventilation control through the EconoMi$er IV. The IAQ sensor shall be wall mounted with an LED display in parts per million. The set point shall have adjustment capability.

22. Return Air CO_2 Sensor (EconoMi$er IV):

    Sensor shall have the ability to provide demand ventilation control through the EconoMi$er IV. The IAQ sensor shall be duct mounted. The set point shall have adjustment capability.

23. Outdoor Air Enthalpy Sensor (EconoMi$er IV or EconoMi$er2):

    The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the controller will provide differential enthalpy control. The sensor allows the controller to determine if outside air is suitable for free cooling.

24. Return Air Enthalpy Sensor (EconoMi$er IV or EconoMi$er2):

    The return air enthalpy sensor shall be used with the EconoMi$er IV or EconoMi$er2 device. When used in conjunction with an outdoor air enthalpy sensor, the controller will provide differential enthalpy control.

25. Return Air Temperature Sensor (EconoMi$er IV or EconoMi$er2):

    The return air temperature sensor shall be used with the EconoMi$er IV or EconoMi$er2 device. When used in conjunction with the standard outdoor air temperature sensor, the EconoMi$er IV or EconoMi$er2 device will provide differential temperature control.

26. Humidistat:

    Field-installed, wall-mounted humidistat is used to control activation of the dehumidification package. The humidistat can be set for humidity levels between 20% and 80% relative humidity.

27. Light Commercial Thermidistat™ Device:

    Field-installed wall-mounted Thermidistat device is used to control temperature and activation of the dehumidification package. The Thermidistat device can be set for humidity settings from 50% to 90% relative humidity.

28. Manual Outdoor-Air Damper:

    Manual damper package shall consist of damper, birdscreen, and rainhood which can be preset to admit up to 50% outdoor air for year round ventilation.

29. Fan/Filter Status Switch:

    Switch shall provide status of indoor (evaporator) fan (ON/OFF) or filter (CLEAN/DIRTY). Status shall be displayed over communication bus when used with direct digital controls or with an indicator light at the thermostat.

30. Indoor Air Quality (CO_2) Sensor (EconoMi$er2):

    a. Shall have the ability to provide demand ventilation indoor air quality (IAQ) control through the EconoMi$er2 with an IAQ sensor.

    b. The IAQ sensor shall be available in duct mount, wall mount, and wall mount with LED display. The set point shall have adjustment capability.

    c. Requires EconoMi$er2 or PremierLink control options.

Guide specifications — 48HJ020-028

Packaged Rooftop Electric Cooling Unit with Gas Heat — Constant Volume Application

HVAC Guide Specifications

Size Range: **18 to 25 Tons, Nominal (Cooling)**
250,000 to 400,000 Btuh, Nominal (Input Heating)

Carrier Model Numbers:

48HJD, 48HJE, 48HJF, 48HJK, 48HJL, 48HJM

ENERGY STAR PARTNER

ASHRAE 90.1 COMPLIANT

Part 1 — General

1.01 SYSTEM DESCRIPTION

Unit is an outdoor rooftop mounted, electrically controlled heating and cooling unit utilizing scroll hermetic compressors with crankcase heaters for cooling duty and gas combustion heat for heating duty. Supply air shall be discharged downward or horizontally, as shown on contract drawings.

1.02 QUALITY ASSURANCE

A. Unit shall well exceed the energy efficiency requirements of ASHRAE standard 90.1-2001. Unit shall be Energy Star qualified.

B. Unit shall be rated in accordance with ARI Standards 270 and 360 and all units shall be designed in accordance with UL Standard 1995.

C. Unit shall be designed to conform to ASHRAE 15.

D. Unit shall be UL and UL, Canada, tested and certified in accordance with ANSI Z21.47 Standards as a total package.

E. Roof curb shall be designed to conform to NRCA Standards.

F. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

G. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).

H. Unit shall be manufactured in a facility registered to ISO 9001:2000.

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT (STANDARD)

A. General:

The 48HJ unit shall be a factory assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, refrigerant charge (R-22), and special features required prior to field start-up.

B. Unit Cabinet:

1. Constructed of galvanized steel (G90 — 1.8 oz. of zinc per square foot of sheet metal), bonderized and primer-coated on both sides and coated with a baked polyester thermosetting powdercoating finish on the outer surface.
2. Indoor blower compartment interior surfaces shall be insulated with a minimum $^1/_2$-in. thick, 1 lb density fiberglass insulation. Fiberglass insulation shall be bonded with a thermosetting resin (8 to 12% by weight nominal, phenol formaldehyde typical), and coated with an acrylic or other material that meets the NFPA 90 flame retardance requirements and has an ''R'' Value of 3.70. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
3. Cabinet panels shall have minimum $^1/_2$-in. thick, 1.5-lb. density insulation. Each external access panel shall be permanently attached to the rooftop unit. Panels shall also include tiebacks.
4. Filters shall be accessible through an access panel.
5. Holes shall be provided in the base rails (minimum 14 gage) for rigging shackles and level travel and movement during overhead rigging operations.
6. Fork lift slots shall be available from two sides of the unit (end and side).
7. Unit shall contain a sloped drain pan, to prevent standing water from accumulating. Pan shall be fabricated of epoxy powder coated steel.

C. Fans:

1. Indoor blower (evaporator fan):
   a. Centrifugal supply air blower shall have pillow-block ball bearings and adjustable belt drive. Blower assembly shall slide out of unit for servicing.
   b. Fan wheel shall be made from steel with a corrosion resistant finish. It shall be a dynamically balanced, double-inlet type with forward-curved blades.
   c. The indoor fan system (blower wheels, motors, belts, and both bearings) shall slide out for easy access.
2. Condenser fans shall be of the direct-driven propeller type, with corrosion-resistant blades riveted to corrosion-resistant steel supports. They shall be dynamically balanced and discharge air upwards. Condenser fan motors shall be totally enclosed and be of a shaft down design.
3. Induced-draft blower shall be of the direct-driven, single inlet, forward-curved, centrifugal type. It shall be made from steel with a corrosion-resistant finish and shall be dynamically balanced.

D. Compressor(s):

1. Fully hermetic, scroll type, internally protected.
2. Factory spring-shock mounted and internally spring mounted for vibration isolation.
3. On electrically and mechanically independent refrigerant circuits.
4. Reverse rotation protection capability.

5. Crankcase heaters shall only be activated during compressor OFF mode.

E. Coils:

1. Standard evaporator and condenser coils shall have copper or aluminum plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
2. Coils shall be leak tested at 150 psig (1034 kPa) and pressure tested at 450 psig (3103 kPa).
3. Optional pre-coated aluminum-fin coils shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
4. Copper-fin coils shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan. All copper construction shall provide protection in moderate coastal environments.
5. E-Coated aluminum-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be aluminum fins mechanically bonded to copper tubes.
6. E-Coated copper-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be copper fins mechanically bonded to copper tubes with copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting sheet metal coil pan to maintain coating integrity and minimize corrosion potential between coil and pan.

F. Heating Section:

1. Induced-draft combustion type with energy saving direct-spark ignition system and redundant main gas valve with 2-stage capability.
2. The heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
3. Burners shall be of the in-shot type constructed of aluminum-coated steel.
4. All gas piping shall enter the unit at a single location.
5. Stainless steel heat exchanger shall be available.

G. Refrigerant Components:

Each refrigerant circuit shall include:

1. Thermostatic expansion valve (TXV) with removable power element.
2. Filter driers.
3. Gage port and connections on suction and discharge.

H. Filter Section:

Standard filter section shall consist of factory-installed 2-in. thick throwaway fiberglass filters.

I. Controls and Safeties:

1. Electro-Mechanical Control:
   a. Economizer control (optional).
   b. Capacity control (2-step).
   c. Unit shall be complete with self-contained low-voltage control circuit.
2. Safeties:
   a. Unit shall incorporate a solid-state compressor lockout which provides optional reset capability at the space thermostat, should any of the following safety devices trip and shut off compressor:
      1) Compressor lockout protection provided for either internal or external overload.
      2) Low-pressure protection.
      3) Freeze protection (evaporator coil).
      4) High-pressure protection (high pressure switch or internal).
   b. Induced draft heating section shall be provided with the following minimum protections:
      1) High-temperature limit switch.
      2) Induced-draft motor speed sensor.
      3) Flame rollout switch.
      4) Flame proving controls.

5) Redundant gas valve.

J. Operating Characteristics:

1. Unit shall be capable of starting and running at 125 F ambient outdoor temperature per maximum load criteria of ARI Standard 360.
2. Unit with standard controls will operate in cooling down to an outdoor ambient temperature of 40 F.
3. Size 18 and 20 ton units shall have 3 fully independent refrigerant circuits to allow for 33% capacity per circuit.

K. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single location.

L. Motors:

1. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have line break thermal and current overload protection.
2. All fan motors shall have permanently lubricated, sealed bearings and inherent automatic-reset thermal overload protection or manual reset calibrated circuit breakers.
3. All indoor-fan motors 5 hp and larger shall meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT), effective October 24, 1997.

M. Special Features:

Certain features are not applicable when the features designated * are specified. For assistance in amending the specifications, contact your local Carrier Sales Office.

1. Full Perimeter Roof Curbs (Horizontal and Vertical):
   a. Formed of 14-gage galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
   b. Permits installing and securing ductwork to curb prior to mounting unit on the curb.
   c. Retrofit roof curb kit shall be available for fit up to existing Carrier DP, DR, TJ roof curbs.

* 2. Integrated Economizer:
   a. Integrated integral modulating type capable of simultaneous economizer and compressor operation.
   b. Available as a factory-installed option in vertical supply/return configuration only. (Available as a field-installed accessory for dedicated horizontal and/or vertical supply return configurations.)
   c. Includes all hardware and controls to provide cooling with outdoor air.
   d. Equipped with low-leakage dampers, not to exceed 2% leakage at 1 in. wg pressure differential.
   e. Capable of introducing up to 100% outdoor air.
   f. Designed to close damper(s) during loss-of-power situations with spring return built into motor.
   g. Dry bulb outdoor-air temperature sensor shall be provided as standard. Outdoor air sensor set point is adjustable and shall range from 40 to 100 F. For the EconoMi$er IV, the return air sensor, indoor enthalpy sensor, and outdoor enthalpy sensor shall be provided as field-installed accessories to provide enthalpy control, differential enthalpy control, and differential dry bulb temperature control.
   h. The EconoMi$er IV shall have a gear-driven parallel blade design.
   i. EconoMi$er IV microprocessor control shall provide control of internal building pressure through its accessory power exhaust function. Factory set at 100%, with a range of 0% to 100%.
   j. EconoMi$er IV Microprocessor Occupied Minimum Damper Position Setting maintains the minimum airflow into the building during occupied period providing design ventilation rate for full occupancy (damper position during heating). A remote potentiometer may be used to override the set point.
   k. EconoMi$er IV Microprocessor Unoccupied Minimum Damper Position Setting — The EconoMi$er IV dampers shall be completely closed when the unit is in the occupied mode.
   l. EconoMi$er IV Microprocessor IAQ/DCV control modulates the outdoor-air damper to provide ventilation based on the optional 2 to 10 vdc CO_2 sensor input.
   m. Compressor lockout sensor (opens at 35 F, closes at 50 F).
   n. Actuator shall be direct coupled to economizer gear, eliminating linkage arms and rods.
   o. Control LEDs:
      1) When the outdoor air damper is capable of providing free cooling, the “Free Cool” LED shall illuminate.
      2) The IAQ LED indicates when the module is on the DCV mode.
      3) The EXH LED indicates when the exhaust fan contact is closed.
   p. Remote Minimum Position Control — A field-installed accessory remote potentiometer allows the outdoor air damper to be opened or closed beyond the minimum position in the occupied mode for modified ventilation.

* 3. Barometric Relief Damper Package:
   a. Package shall include damper, seals, hardware, and hoods to relieve excess internal pressure.
   b. Damper shall close due to gravity upon unit shutdown.

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* 4. Power Exhaust:

Package shall include an exhaust (centrifugal style) fan, 1 Hp 208-230, 460 v (factory-wired for 460 v) direct-drive motor, and damper for vertical flow units with economizer to control over-pressurization of building.

* 5. Thermostats and Subbases:

Units shall provide staged heating and cooling in addition to automatic (or manual) changeover and fan control.

* 6. Electronic Programmable Thermostat:

Thermostat shall be capable of using deluxe full-featured electronic thermostat.

7. Liquefied Propane Conversion Kit:

Kit shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane gas.

8. Convenience Outlet:

Outlet shall be factory-installed and internally mounted with an externally accessible 115-v, 15 amp GFI, female receptacle with hinged cover. A step down transformer shall be included so no additional wiring is necessary.

9. Non-Fused Disconnect Switch:

Switch shall be factory-installed, internally mounted, NEC and UL approved. Non-fused switch shall provide unit power shutoff. Shall be accessible from outside the unit and shall provide power off lockout capability.

10. Hail Guard, Condenser Coil Grille:

Grille shall protect the condenser coil from hail, flying debris, and damage by large objects without increasing unit clearances.

11. Horizontal Kit:

Horizontal kit shall contain all the necessary hardware to convert a vertical airflow unit to a horizontal airflow unit.

The unit shall also be available as a horizontal airflow unit directly from the factory.

12. Return Air Smoke Detector:

The smoke detector shall send input to the controller to shut down the unit in case smoke is detected. The smoke detector shall be factory installed in the return air section or shall be available as a field-installed accessory.

13. Two-Position Damper:

The damper shall admit up to 25% outdoor air and shall close upon shutdown. The package shall include a single-blade damper and motor.

14. Manual Damper:

The damper shall have a manually adjustable outside air intake for up to 33% outside air.

15. 30% Filters:

The filters shall be 30% efficient. The filters shall be 2-in., pleated filters.

16. Standard Motor with Alternate Drive:

The alternate drive shall provide high-static drive capability to enhance evaporator fan performance.

17. Alternate Motor with Standard Drive:

The alternate motor shall provide high-static motor capability to enhance evaporator fan performance.

18. Alternate Motor with Optional Drive:

The alternate motor and optional drive shall provide high-static motor and drive capability to enhance evaporator fan performance.

19. Supply Air Smoke Detector:

The smoke detector shall send input to the controller to shut down the unit in case smoke is detected. The smoke detector shall be factory installed in the supply air section or shall be available as a field-installed accessory.

20. Supply and Return Air Smoke Detector:

The smoke detector shall send input to the controller to shut down the unit in case smoke is detected. The smoke detector shall be factory installed in the supply and return air sections or shall be available as a field-installed accessory.

21. HACR Breaker:

The HACR circuit breaker shall be factory installed.

22. Thru-the-Curb Utility Connectors:

Kit shall provide connectors to permit gas and electrical connections to be brought to the unit through the roof curb.

23. Condensate Overflow Switch:

The condensate overflow switch shall close when the condensate level in the pan rises above switch.

24. Outdoor Air Enthalpy Sensor (EconoMi$er IV):

The outdoor air enthalpy sensor is used to sense outdoor air enthalpy for the EconoMi$er IV device. The outdoor air humidity sensor, in conjunction with the standard outdoor air temperature sensor, shall be used with the EconoMi$er IV device to provide outdoor enthalpy. Outdoor air enthalpy shall be calculated by the EconoMi$er IV device from the outdoor air temperature and enthalpy readings. When the outdoor air enthalpy sensor is installed, the EconoMi$er IV can perform Outdoor Air Enthalpy control. With the additional installation of an accessory return air temperature sensor and return air enthalpy sensor, differential enthalpy control can also be performed.

25. Return Air Enthalpy Sensor (EconoMi$er IV):

    The return air enthalpy sensor is used to sense return air enthalpy for the EconoMi$er IV device. The return air enthalpy sensor, in conjunction with the accessory return air temperature sensor, shall be used with the EconoMi$er IV device to provide return air enthalpy. Return air enthalpy shall be calculated by the EconoMi$er IV device from the return air temperature and humidity readings. With the additional installation of an accessory return air temperature sensor and outdoor air enthalpy sensor, differential enthalpy control can also be performed.

26. Return Air Temperature Sensor (EconoMi$er IV):

    The return air temperature sensor is used to sense return air temperature for the Econo-Mi$er IV device. When the return air temperature sensor is installed, the EconoMi$er IV can perform Differential Temperature control. The return air temperature sensor, in conjunction with the accessory return air humidity sensor, shall be used with the EconoMi$er IV device to provide return air enthalpy. Return air enthalpy shall be calculated by the EconoMi$er IV device from the return air temperature and humidity readings. With the additional installation of an accessory return air enthalpy sensor and outdoor air humidity sensor, differential enthalpy control can also be performed.

27. Indoor Air Quality (CO_2) Room Sensor (EconoMi$er IV:

    Sensor shall have the ability to provide demand ventilation control through the EconoMi$er IV. The IAQ sensor shall be wall mounted with an LED display in parts per million. The set point shall have adjustment capability.

28. Return Air CO_2 Sensor (EconoMi$er IV):

    Sensor shall have the ability to provide demand ventilation control through the EconoMi$er IV. The IAQ sensor shall be duct mounted. The set point shall have adjustment capability.

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