



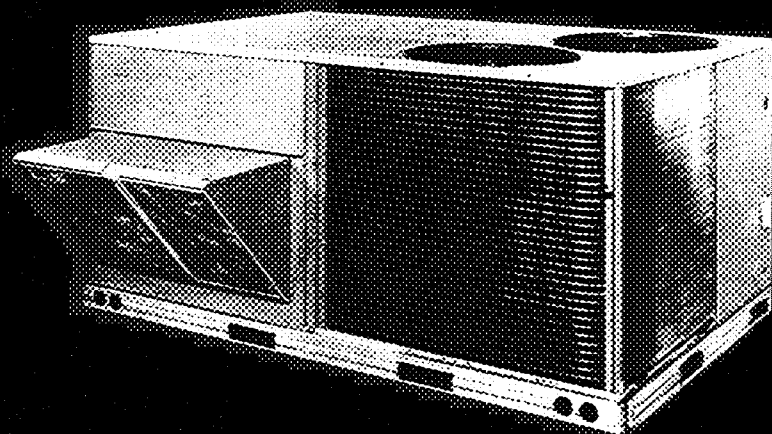
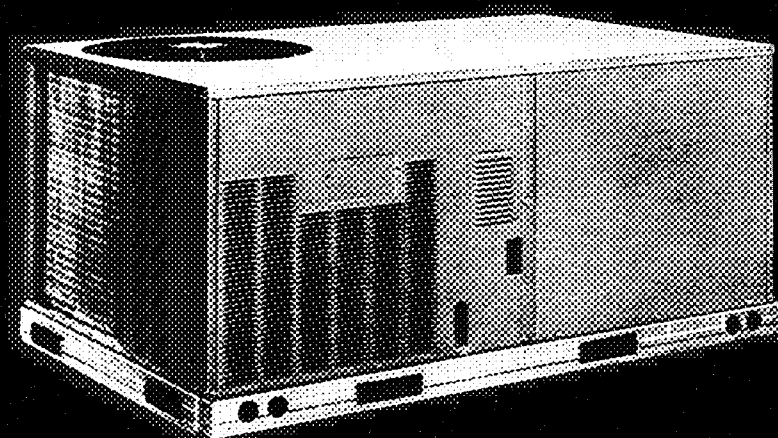
Product Data

48HJD/HJE/HJF Single-Package Rooftop Units Electric Cooling/Gas Heating

3 to 12½ Nominal Tons



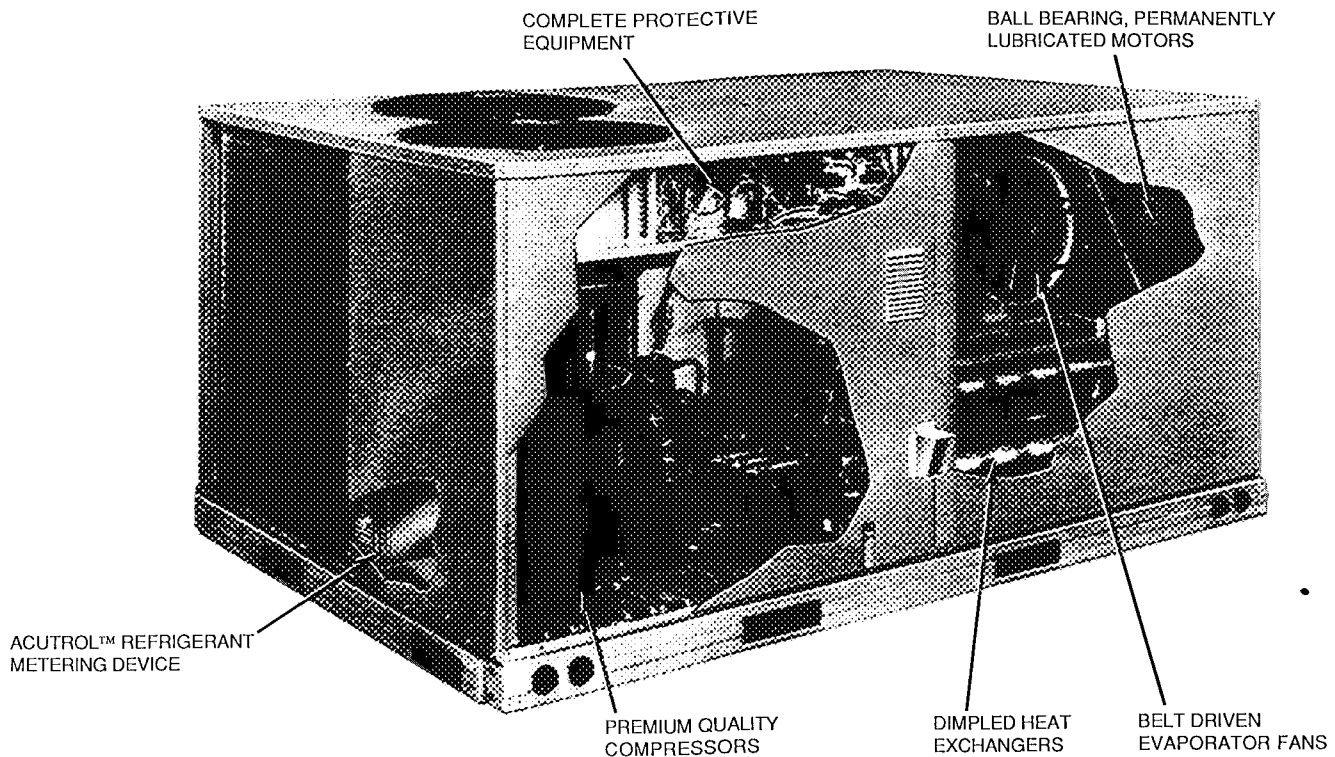
Carrier Weathermaster® S·E·R·I·E·S



Carrier has designed the new Weathermaster series based on customer needs and requests to be the most efficient and reliable ever.

Features/Benefits*

- most efficient rooftop line for cooling in the industry using scroll compressor technology
- most efficient rooftop line for heating in the industry using dimpled heat exchangers with 2-stage gas valves on all units
- highest reliability in the industry — non-corrosive condensate pans, prepainted cabinets and primed interior panels, and all units are fully protected by internal safeties
- quietest operation in the industry — isolated compressor rails. All compressors mounted on independent vibration isolators. Standard, belt-driven evaporator fan motors on all units
- unprecedented ease of maintenance achieved by self diagnostics on the Integrated Gas Unit Controller (IGC), optional direct digital controls, standard size filters, no tool filter access, simple compressor access, and permanently lubricated fan motors
- environmentally conscious rooftop. High efficiency means the 48HJ consumes less fossil fuels which results in a reduction of greenhouse gases emitted from the unit.



Carrier means Top Quality and Reliability

Each component utilized in the Weathermaster® Series is designed and tested for a minimum of 15 years operation under the harshest conditions.

Every unit is thoroughly run tested at the factory in each operating mode and evacuated for a full 30 minutes prior to final charging. Every coil is leak tested with helium particles. Automated run testing allows accurate, undisputed tests and measurements which are second to none in the industry.

Each unit contains a factory printout indicating tested pressures, amperages, dates, and inspectors, providing certification of the unit's status at the time of manufacture.

Units are equipped with valuable safety controls designed to monitor and protect for the life of the unit. The standard safeties include

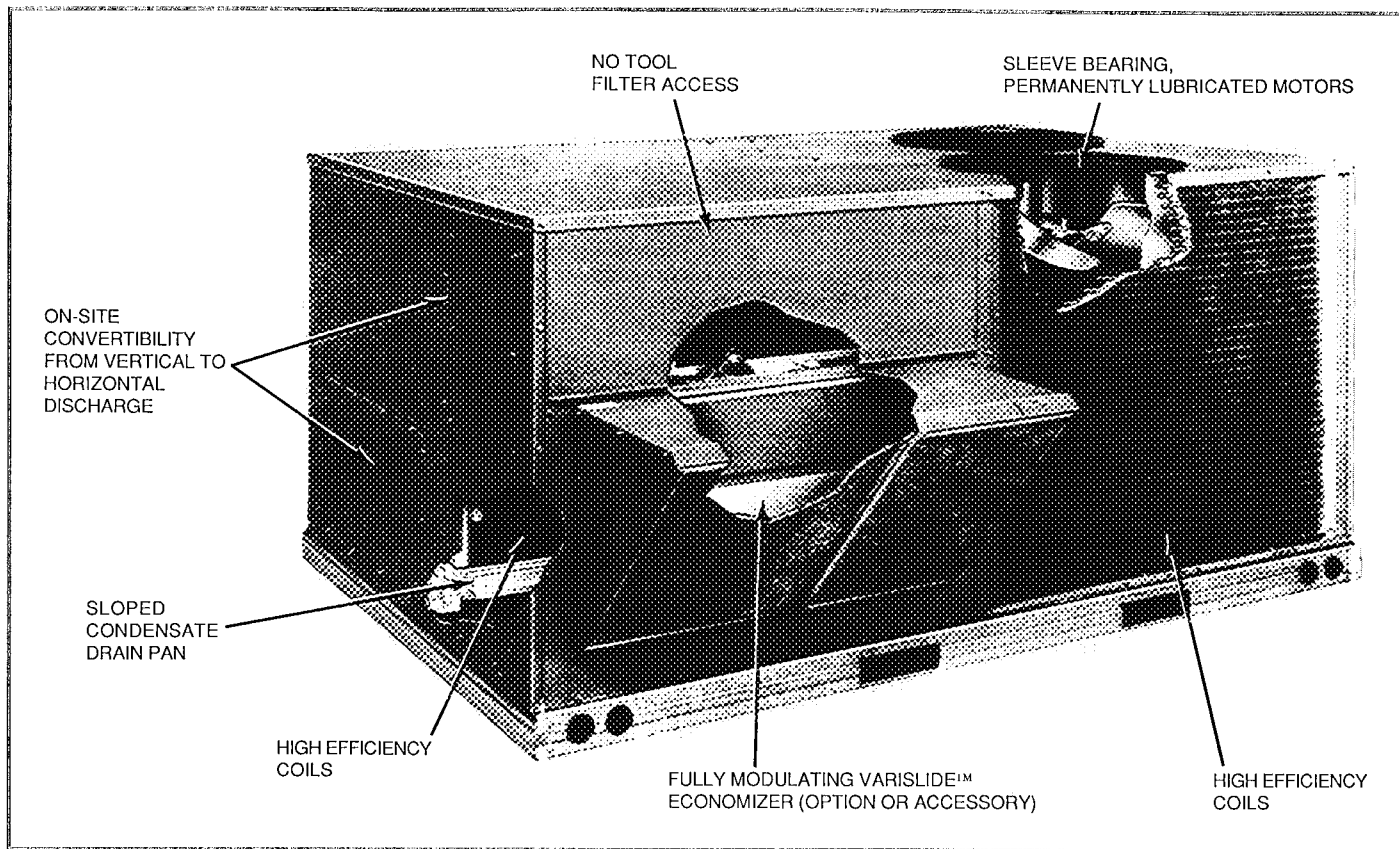
- low-pressure/loss-of-charge switch
- high-pressure switch
- freeze-protection thermostat
- internal compressor overload

- exclusive Carrier Cycle-LOC™ circuit board that provides anti-compressor cycling
- refrigerant filter drier

The cabinet is constructed of galvanized steel, bonderized and coated with a prepainted baked enamel finish. The paint finish is a non-chalking type, and is capable of withstanding Federal test Method Standard No. 141 (Method 6061) 500-hour salt spray test. In addition, all internal cabinet panels are primed, allowing the entire unit to have longer life and a more attractive appearance.

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Easy maintenance and installation

All units are factory shipped in the vertical discharge configuration

for fit-up to standard roof curbs. (One accessory curb fits sizes 004-007; another accessory curb fits sizes 008-014.) Contractors can order and install the roof curbs early in the construction stage, before decisions on size requirements have been made.

All units feature heavy-gage roll-formed baserail design with fork-lift slots on 3 sides of the unit and rigging holes for easier maneuvering and installation. Stretch-wrap packaging protects the unit during shipment and storage.

Units are easily converted from vertical to horizontal applications to make retrofit and add-on jobs easier. To convert from vertical to horizontal discharge, simply move 2 panels. The same basic unit can be used for a variety of applications and can be quickly modified at the jobsite.

Standard high-performance and high-static indoor (evaporator) fan motors enable 48HJ004-014 units to successfully operate in any ductwork configuration.

Ductwork connections are made easy by the logical 2 to 1 aspect ratio.

On vertical discharge units, ductwork attaches directly to the roof curb.

Thru-the-bottom service connection capability comes standard with the rooftop unit to allow power and control wiring to be routed through the unit's basepan, thereby minimizing roof penetrations. Both power and control connections are made on the same side of the unit to simplify installation. Accessory thru-the-curb service connections for power and control wiring are available.

The non-corrosive, sloped, condensate drain pan is factory installed and in conformance with ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) Standard 62 to meet many Indoor Air Quality (IAQ) specifications. The condensate drain pan offers both bottom and end drain capability to minimize roof penetrations. The bottom drain should be used in conjunction with thru-the-curb connections. An external trap must be field supplied.

Standard 2-in. throwaway filters are easily accessed through an easily removable filter access panel located directly above the air intake hood; no tools are required to change the filters.

All units are designed with a single continuous top piece to eliminate any possible leaking at the seams or gasketing, which tends to deteriorate over time and shift during rigging procedures.

Belt driven, evaporator-fan motors allow maximum on-site flexibility without changing motors or drive speeds.

Low-voltage wiring connections are easily made due to the large terminal board which is conveniently located for quick, simple access.

Quiet, efficient operation and dependable performance

All units are equipped with scroll compressors. The scroll compressors are fully hermetic with internal vibration isolators for extremely quiet operation. The scroll compressors are quieter and more reliable than reciprocating designs. Compressors are mounted on independent base rails for additional sound integrity and structural support. Efficient condenser fan and motor design permits operation at a low sound power of 8.0 bels for sizes 004-006, 8.2 bels for size 007, 8.6 bels for sizes 008-012, and 8.8 bels for size 014.

Totally enclosed condenser-fan motors and permanently lubricated bearings provide additional dependability

All coils use state-of-the-art internally enhanced copper tubing. Coils are thoroughly tested with helium particles as well as pressure tested at the factory. Condenser coils have louvered, aluminum lanced fins to provide maximum heat transfer for optimum efficiency and easy cleaning.

Dimpled 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. In addition, dimpled heat exchanger tubes act as baffles, forcing the hot gases to stay in close contact with the cell walls to maximize heat transfer and efficiency.

The induced draft combustion system eliminates the unsightly appearance of flue stacks, and diminishes the effects of winds on heating operation. The inducer fan draws hot combustion gas through the heat exchanger at the optimum rate for the most effective heat transfer. The induced draft also prevents contaminants from entering the supply air if a leak in the heat exchanger occurs.

Dual-stage gas heat on all size units maximize efficiency and customize comfort.

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

LP conversion kit — Standard units are designed for natural gas. An LP Conversion Kit is available as an accessory, if required. Installation of the accessory LP kit simply involves changing the gas orifices to accommodate liquid propane gas.

Refrigerant circuit protection assures dependability. All units have standard.

- 1) loss-of-charge/low-pressure protection switch which allows operation at lower ambient conditions while protecting against low-charge operation
- 2) freeze-protection thermostat, which protects against evaporator coil frost build-up
- 3) high-pressure switch, which protects against above normal operating pressure

- 4) filter driers, which trap moisture and debris in the refrigeration system.
- 5) Carrier's exclusive Acutrol™ metering device, which precisely controls refrigerant flow, preventing slugging and floodback, while maintaining optimum unit performance by metering the circuits individually.

Two independent compressor circuits (all 7½ to 12½ ton units) provide pinpoint comfort control, improved efficiency, and back-up capability

Carrier controls add reliability, efficiency, and simplification

Apollo communicating controls can be ordered as a factory-installed option. Designed exclusively by Carrier, the controls can be used to actively monitor all modes of operation as well as indoor fan status, filter status, indoor-air quality, supply-air temperature, and outdoor-air temperature.

The Apollo control board is factory-installed in the rooftop unit control box and comes equipped with built-in diagnostic capabilities. Light-emitting diodes (LEDs) simplify troubleshooting by indicating thermostat commands for both stages of heating and cooling, indoor (evaporator) fan operation, and economizer operation. The Apollo communicating control is designed to work specifically with Carrier TEMP and VVT® thermostats.

The standard control system is readily adaptable to all conventional and programmable thermostats. In addition, units are suitable for integration into monitor control systems if required.

Integrated gas unit controller (IGC)

— All ignition components are contained in the compact Integrated Gas Unit Controller (IGC) that is easily accessible for service. An IGC, designed exclusively by Carrier, provides built-in diagnostic capabilities. An LED simplifies troubleshooting by providing visual fault notification and system status information. The IGC board provides exclusive anti-cycle protection for its gas heat operation. The IGC also contains burner control logic for dependable heating operation. The LED is visible without removing the unit control box access panel. 48HJ units maximize heating efficiency through the IGC's control of evaporator fan ON/OFF delays. The IGC helps make 48HJ units reliable for many years.

Patented Cycle-LOC™ protection system provides protection against compressor cycling by monitoring compressor current draw. When lack of compressor current exists, the Cycle-LOC circuit board locks out the compressors. The Cycle-LOC board may be manually reset by simply switching thermostat to OFF, and then back to the Cooling or AUTO modes. No manipulation of the unit reset switches is needed.

Indoor air quality

The quality of building air is improved as the Weathermaster® series utilizes certain key features that assist in improving indoor air quality. A sloped condensate pan eliminates possible biological growth in the rooftop unit. A face-split indoor (evaporator) coil design proves effective in removing additional moisture from the supply air. Two-in. filters are standard in all rooftop units and an optional filter status sensor is available. Standard enthalpy control on the PARABLADE economizer regulates humidity in the building

Serviceability

Standardized components for the complete Weathermaster line of products are found in all safety devices, evaporator fan motors, and control boards, while the gas sections use common inducer motors, limit switches, and roll-out switches. This allows for greater inventory control, familiarity of parts, and fewer stocked parts.

Refrigerant access ports on all discharge, suction, and liquid lines permit easy and accurate measurements as well as simple accessibility.

Resettable 24-v circuit breaker on 48HJ008-014 units allows room for error without replacing transformers or fuses.

Single-side utility connections provide easy access to perform any necessary service.

Color-coded wires permit easy tracing and diagnostics.

Belt-driven motors are accessible through a single access door to facilitate servicing and adjusting after installation.

Compressors are easily accessible for troubleshooting and system analysis.

*Comparison based on averages of all 3 to 12½-ton rooftop YAC and PAC lines per ARI Directory, February, 1994.

Model number nomenclature



48 HJ E 004 Z - - 3 - - AA

48 — Gas Heat

HJ — Constant Volume

D — Low Heat

E — Medium/High Heat

F — High Heat

Nominal Capacity

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

FIOP Code*

V-Ph-Hz

1 — 575-3-60
3 — 208/230-1-60
5 — 208/230-3-60
6 — 460-3-60

Apollo Communicating Control

— None
Z — Factory Installed

*Refer to 48HJ price pages for FIOP (Factory-Installed Options) code table

ARI capacities*

UNIT 48HJ	NOMINAL TONS	STANDARD CFM	NET COOLING CAP (Btuh)	TOTAL kW	SEER†	EER	SOUND RATING (Bels)
004	3	1200	36,000	3.21	13.00	11.20	8.0
005	4	1450	47,000	4.25	13.00	11.05	8.0
006	5	1750	60,000	5.55	13.00	11.00	8.0

UNIT 48HJ	NOMINAL TONS	STANDARD CFM	NET COOLING CAP (Btuh)	TOTAL kW	EER	SOUND RATING (Bels)	IPLV
007	6	2100	74,000	6.70	11.00	8.2	**
008	7 1/2	3000	90,000	8.18	11.00	8.6	11.6
009	8 1/2	3000	102,000	9.44	10.80	8.6	10.9
012	10	3200	120,000	10.91	11.00	8.6	9.7
014	12 1/2	4300	140,000	14.04	9.90	8.8	9.8

LEGEND

Bels	— Sound Levels (1 bel = 10 decibels)
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

**The IPLV is not applicable to single-compressor units.

NOTES:

- 1 Rated in accordance with ARI Standard 210/240 (004-012 units) or 360 (014 units) and 270 (004-014 units)
- 2 Ratings are net values, reflecting the effects of circulating fan heat. Ratings are based on:

Cooling Standard: 80 F db, 67 F 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



Size 014 only

ARI capacities (cont)



HEATING CAPACITIES AND EFFICIENCIES

UNIT	HEATING INPUT (Btuh) First Stage/Second Stage	OUTPUT CAPACITY (Btuh)		TEMPERATURE RISE (°F)	AFUE (%)	STEADY STATE EFFICIENCY (%)	CALIFORNIA SEASONAL EFFICIENCY (%)
		Single-Phase Units*	3-Phase Units†				
48HJE004	50,000/ 72,000	40,000/ 57,100	41,000/ 59,040	15-45	82	82	78.7
48HJF004	82,000/115,000	63,500/ 89,000	65,600/ 92,000	55-85	80	80	77.3
48HJD005	50,000/ 72,000	40,000/ 57,100	41,000/ 59,040	15-45	82	82	78.7
48HJE005	82,000/115,000	65,600/ 92,000	66,420/ 93,150	35-65	81	81	77.7
48HJF005	120,000/150,000	94,400/118,000	96,000/120,000	50-80	80	80	76.9
48HJD006	50,000/ 72,000	40,000/ 57,100	41,000/ 59,040	15-45	82	82	78.7
48HJE006	82,000/115,000	65,600/ 92,000	66,420/ 93,150	35-65	81	81	77.8
48HJF006	120,000/150,000	94,400/118,000	96,000/120,000	50-80	80	80	76.9
48HJD007	50,000/ 72,000	—	41,000/ 59,040	15-45	82	82	78.7
48HJE007	82,000/115,000	—	66,420/ 93,150	35-65	81	81	77.8
48HJF007	120,000/150,000	—	96,000/120,000	50-80	80	80	76.9

UNIT	HEATING INPUT (Btuh) First Stage/Second Stage	OUTPUT CAPACITY (Btuh) First Stage/Second Stage	TEMPERATURE RISE (°F)	AFUE (%)	STEADY STATE EFFICIENCY (%)	CALIFORNIA SEASONAL EFFICIENCY (%)
48HJD008	90,000/125,000	72,900/102,500	20-50	82	82	77.5
48HJE008	120,000/180,000	98,400/147,600	35-65	82	82	77.5
48HJF008	180,000/224,000	147,600/183,700	45-75	82	82	79.4
48HJD009	90,000/125,000	72,900/102,500	20-50	82	82	78.4
48HJE009	120,000/180,000	98,400/147,600	35-65	82	82	78.4
48HJF009	180,000/224,000	147,600/183,700	45-75	82	82	79.4
48HJD012	120,000/180,000	98,400/147,600	35-65	82	82	78.4
48HJD014, HJE012	180,000/224,000	147,600/183,700	35-65	82	82	79.3
48HJE014, HJF012	200,000/250,000	160,000/200,000	40-70	80	80	76.4

LEGEND

AFUE — Annual Fuel Utilization Efficiency

*Single-phase units are rated for output capacity in accordance with U.S. Government Standard Tests

†Three-phase units are rated for output capacity in accordance with ANSI Z21.47 Standard for gas-fired, central furnaces.

NOTE: NO_x levels are 40 nanograms/joule with accessory kit



Options and accessories

ITEM	OPTION*	ACCESSORY†
Apollo Communicating Control	X	
Integrated Economizer — Varislide™	X	X
Integrated Economizer — PARABLADE	X	
Manual Outdoor-Air Damper		X
Convenience Outlet	X	
Unit Mounted Disconnect	X	
Alternate Evaporator Fan Motor (014 only)	X	
Two-Position Damper (25% Open)		X
Two-Position Damper (100% Open)		X
Roof Curb (14 in.)		X
Roof Curb (24 in.)		X
Thru-the-Bottom Service Connections		X
Flue-Hood Protector Assembly		X
Electronic Programmable Thermostat		X
Thermostat and Subbase		X
Time Guard® II Control Circuit		X
Motormaster® Head Pressure Control		X
Accusensor™ II Enthalpy Control		X
Accusensor III Differential Enthalpy Control		X
LP Conversion Kit		X
Condenser Coil Hail Guard		X
Remote Control Panel		X
NO _x Reduction Kit		X
Flue Discharge Deflector		X
Condenser Coil Grille		X
Condenser Coil Salt Spray Protection Package		X
Integrated Economizer and Power Exhaust		X
Fan/Filter Status Switch		X

LEGEND

LP — Liquid Propane

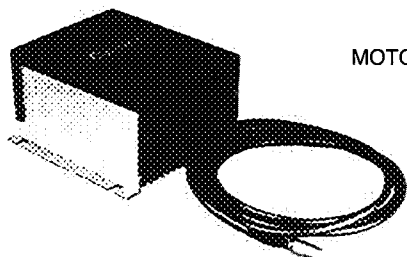
*Indicates a factory-installed option
†Indicates a field-installed accessory.

Options and accessories (cont)



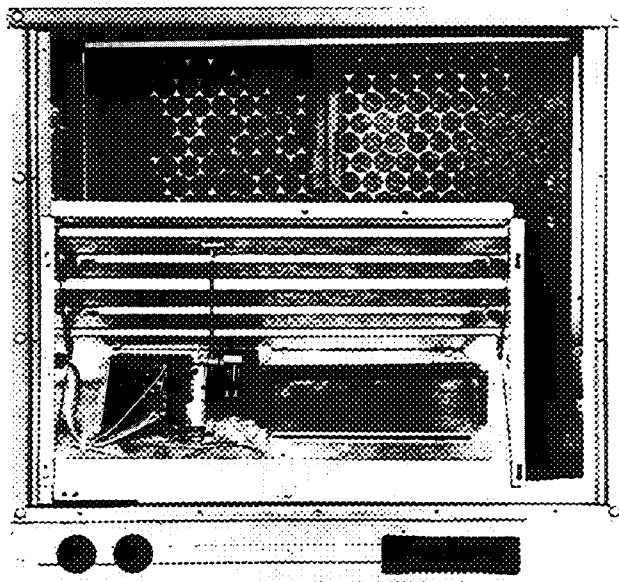
HEAD PRESSURE CONTROL

The 48HJ004-014 standard units are designed to operate in cooling at outdoor temperatures down to 25 F. With accessory Motormaster control (condenser fan speed modulation), units can operate at outdoor temperatures down to -20 F. The head pressure controls, which mount in the condenser section, control the condenser-fan motor to maintain correct condensing temperature.



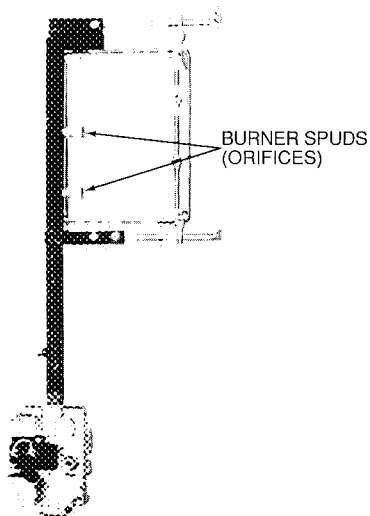
MOTORMASTER

PARABLADE ECONOMIZER



Factory-installed PARABLADE economizer features a new reliable design. The economizer utilizes parallel opposed-blade dampers, a motor with built-in spring return for close upon power loss, standard enthalpy controls, and 30% (004-007) or 45% (008-014) barometric capability for added flexibility in high outdoor-air applications.

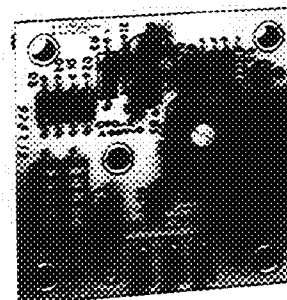
LP CONVERSION KIT



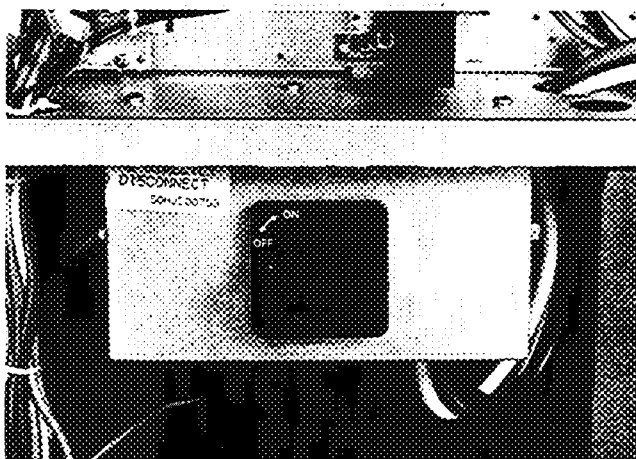
LP conversion kit allows the unit to utilize a liquid propane fuel supply in areas where natural gas is not available (Kit shown is for sizes 004-007)

TIME GUARD® II CONTROL

Time Guard II Control automatically prevents compressor from restarting for at least 5 minutes after a shutdown. Accessory prevents short cycling of compressor if thermostat is rapidly changed. Time Guard II device mounts in the control compartment of unit. The Time Guard II device is not used when a Carrier thermostat is applied.

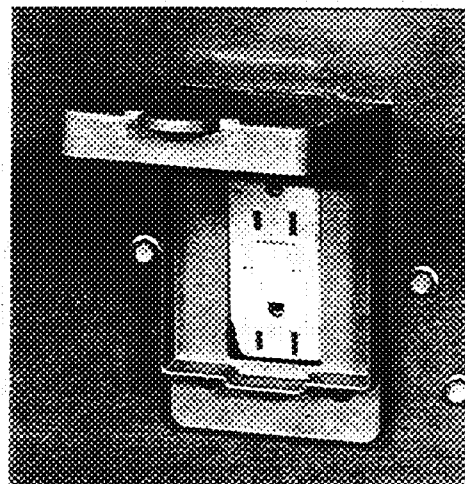


UNIT MOUNTED DISCONNECT



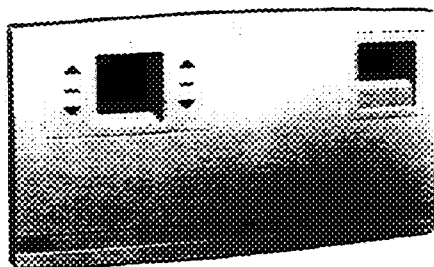
Factory-installed, internally-mounted, NEC (National Electrical Code) and UL (Underwriters' Laboratories) approved non-fused switch provides unit power shutoff with disconnect lockout protection capability. The switch is accessible from outside the unit.

CONVENIENCE OUTLET



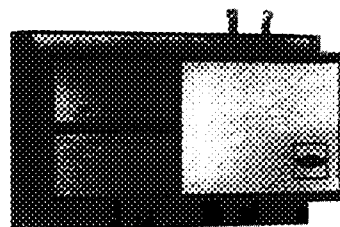
Factory-installed, internally mounted and externally accessible 115-v female receptacle. Includes 15-amp GFI (Ground Fault Interrupter) receptacle with independent fuse protection. Voltage required to operate convenience outlet is provided by a factory-installed transformer.

ELECTRONIC PROGRAMMABLE THERMOSTAT



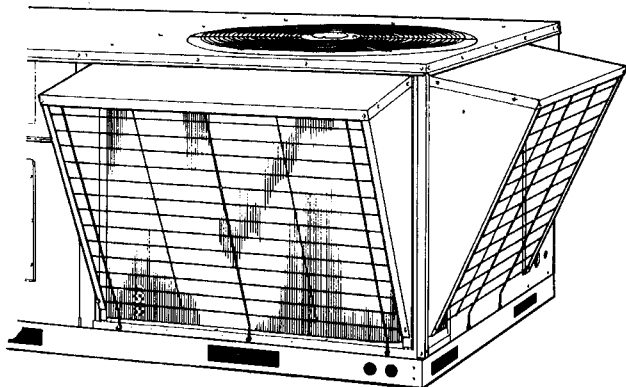
Electronic programmable thermostat provides efficient temperature control by allowing you to program heating and cooling setbacks and setups with provisions for weekends and holidays. The thermostat utilizes a time delay between operating modes. A Temp System relay pack is also required for thermostat operation. Thermostats are designed to operate with Carrier Apollo communicating control.

THERMOSTAT



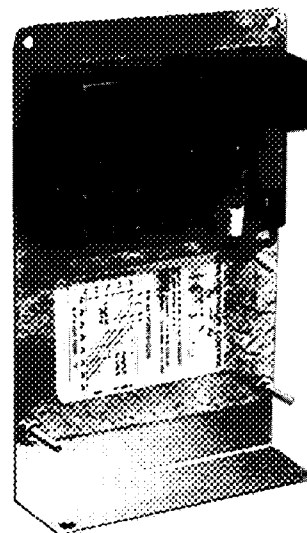
Zone thermostat (24 v) provides one- or 2-stage cooling for control of unit. Matching subbases are available with or without tamperproof switches and automatic changeover.

HAIL GUARD, CONDENSER COIL SALT SPRAY PROTECTION

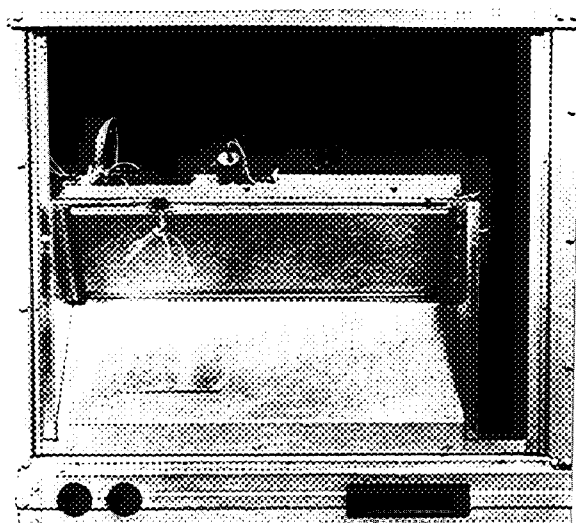


Hail guard accessory (field installed) protects coils against damage from hail and other flying debris. Coil guard accessory (field installed) protects coils from damage from salt-spray induced corrosion in coastal areas. Utilizes a replaceable filter.

ACCUSENSOR™ II

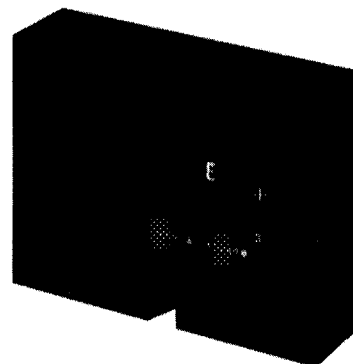


VARISLIDE™ ECONOMIZER



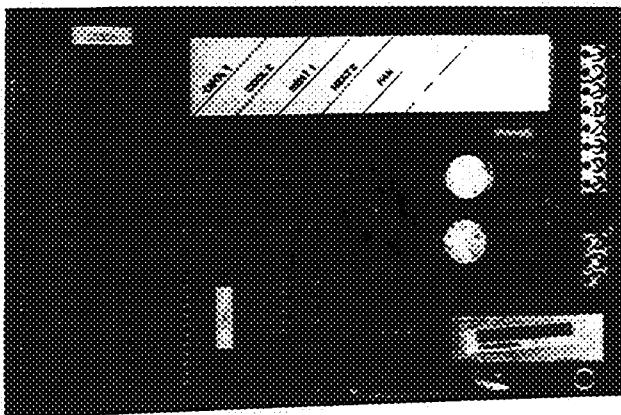
Exclusive Varislide economizer damper design saves energy while providing economical and reliable cooling. A sliding plate on the face of the economizer controls the amount of outdoor air entering the system. When the sliding plate is closed, it provides a leakproof seal which prevents ambient air from seeping in or conditioned air from seeping out. It can be easily adjusted for 100% outdoor air or any proportions of mixed air.

ACCUSENSOR III



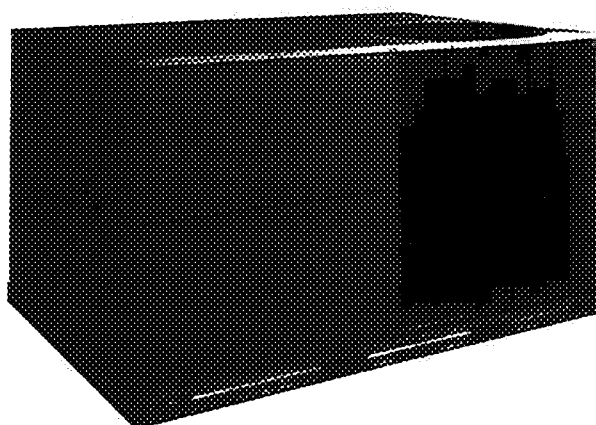
Accusensor economizer controls help provide efficient, economical economizer operation. Accusensor I standard dry-bulb sensor measures outdoor temperature. The accessory Accusensor II solid-state enthalpy control senses both dry and wet bulb of the outdoor air to provide an accurate enthalpy reading. The accessory Accusensor III differential enthalpy control compares outdoor temperature and humidity to return-air temperature and humidity and determines the most economical mixture of air.

APOLLO COMMUNICATING CONTROLS



Apollo communicating controls are designed exclusively by Carrier, and are used to actively monitor all modes of operation as well as indoor fan status, filter status, indoor-air quality, supply air temperature, and outdoor air temperature. They are designed to work with Carrier Temp and VVT® system thermostats

COIL GRILLE



Coil grille protects coils against large objects and vandalism.

Physical data



BASE UNIT 48	HJE/HJF004	HJD/HJE/HJF005	HJD/HJE/HJF006	HJD/HJE/HJF007
NOMINAL CAPACITY	3	4	5	6
OPERATING WEIGHT (lb)				
Unit	530	540	560	615
With Varislide™ Economizer	564	574	594	649
With PARABLADE Economizer	572	582	602	657
Roof Curb	115	115	115	115
COMPRESSOR			Scroll	
Quantity	1	1	1	1
Oil (oz)	42	53	50	60
REFRIGERANT TYPE			R-22	
Operating Charge (lb-oz)	5-8	8-6	10-10	9-10
CONDENSER FAN			Propeller	
Quantity...Diameter (in.)	1 .22	1 .22	1 .22	1 .22
Nominal Cfm	3500	3500	4100	4100
Motor Hp...Rpm	¼ .825	¼ .825	¼ .1100	¼ .1100
Watts Input (Total)	180	180	320	320
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins		
Rows...Fins/in.	1 .17	2 .17	2...17	2 .17
Total Face Area (sq ft)	14 6	16 5	16 5	16 5
EVAPORATOR FAN			Centrifugal	
Size (in.)	10 x 10	10 x 10	10 x 10	10 x 10
Type Drive	Belt	Belt	Belt	Belt
Nominal Cfm	1200	1600	2000	2400
Maximum Continuous Bhp	1.20	1.20	1.80	2.40
Motor Frame Size	48	48	56	56
Fan Rpm Range	760-1090	840-1185	1020-1460	1120-1585
Motor Bearing Type	Ball	Ball	Ball	Ball
Maximum Fan Rpm	2100	2100	2100	2100
Motor Pulley Pitch Diameter	1 9/2 9	1 9/2 9	2 4/3 4	2 4/3 4
A/B (in.)	1/2	1/2	1/2	5/8
Nominal Motor Shaft Diameter (in.)	4 5	4 0	4 0	3 7
Fan Pulley Pitch Diameter (in.)	A. 33	A. 36	A...40	A. 38
Belt — Type...Length (in.)	10 0-12 4	10 0-12 4	14 7-15 5	14 7-15 5
Pulley Center Line Distance (in.)	65	70	75	95
Speed Change Per Full Turn of Movable Pulley Flange (rpm)	5	5	6	5
Movable Pulley Maximum Full Turns from Closed Position	3	3	3	3
Factory Setting — Full Turns Open	890	980	1240	1305
Factory Speed Setting (rpm)	5/8	5/8	5/8	5/8
Fan Shaft Diameter at Pulley (in.)				
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double Wavy Fins, Acutrol™ Feed Device		
Rows...Fins/in.	2.. 15	2.. 15	4...15	4.. 15
Total Face Area (sq ft)	5 5	5 5	5 5	5 5
FURNACE SECTION				
Rollout Switch Cutout Temp (F)*	195	195	195	195
Burner Orifice Diameter (in. ...drill size)†				
Natural Gas — Std	.113 33	113 33/ 113 33/ 129 30	113 33/ 113 33/ 129 30	113 33/ 113 33/ 129.. 30
Liquid Propane — Alt**	.089 43	.089 43/ .089 43/ 102 38	.089 43/ .089 43/ 102 38	.089 .43/.089 43/ 102 .38
Thermostat Heat Anticipator Setting (amps)				
208/230/460 v				
First Stage	14	14	14	14
Second Stage	14	14	14	14
Gas Input (Btuh)				
First Stage	50,000/ 82,000	50,000/ 82,000/120,000	50,000/ 82,000/120,000	50,000/ 82,000/120,000
Second Stage	72,000/115,000	72,000/115,000/150,000	72,000/115,000/150,000	72,000/115,000/150,000
Efficiency (Steady State) (%)	82/80	82/81/80	82/81/80	82/81/80
Temperature Rise Range	15-45/55-85	15-45/35-65/50-80	15-45/35-65/50-80	15-45/35-65/50-80
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
Maximum Static Pressure (in. wg)	1 0	1 0	1 0	1 0
Field Gas Connection Size (in.)	½	½	½	½
HIGH-PRESSURE SWITCH (psig)			450 ± 50	
Standard Compressor Internal Relief			428	
Cutout			320	
Reset (Auto.)				
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (Liquid Line) (psig)			7 ± 3	
Cutout			22 ± 5	
Reset (Auto.)				
FREEZE-PROTECTION THERMOSTAT				
Opens (F)			30 ± 5	
Closes (F)			45 ± 5	
OUTDOOR-AIR INLET SCREENS			Cleanable	
Quantity...Size (in.)			1 20 x 24 x 1	
RETURN-AIR FILTERS			Throwaway	
Quantity...Size (in.)			2 16 x 25 x 2	

LEGEND

Bhp — Brake Horsepower

*Indicates automatic reset.

†48HJD005-007 and 48HJE004 (72,000 Btuh heat input) units have 2 burners. 48HJE005-007 and 48HJF004 (115,000 Btuh heat input) units and 48HJF005-007 (150,000 Btuh heat input) units have 3 burners

**An LP Conversion Kit is available as an accessory.

BASE UNIT 48		HJD/HJE/HJF008	HJD/HJE/HJF009	HJD/HJE/HJF012	HJD/HJE014
NOMINAL CAPACITY (tons)		7½	8½	10	12½
OPERATING WEIGHT (lb)					
Unit		870	880	1035	1050
With Varislide™ Economizer		914	924	1079	1094
With PARABLADE Economizer		932	942	1097	1112
Roof Curb		143	143	143	143
COMPRESSOR			Scroll		
Quantity		2	2	2	2
Oil (oz) (each compr)		53	53	50	60
REFRIGERANT TYPE			R-22		
Operating Charge (lb-oz)					
Circuit 1		6- 8	7-4	10-3	10-0
Circuit 2		5-14	6-4	9-3	9-3
CONDENSER FAN			Propeller		
Quantity...Diameter (in.)		2 . 22	2 . 22	2 . 22	2 . 22
Nominal Cfm		6500	6500	7000	7000
Motor Hp...Rpm		¼ . 1100	¼ . 1100	¼ . 1100	¼ . 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	20.5	25.0	25.0
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		—	—	—	4000
		Std			5.25
		Alt			4.20
Motor Frame		56	56	56	56
Fan Rpm Range		840-1085	840-1085	860-1080	900-1260
		Std			860-1080
		Alt			
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Fan Rpm		2100	2100	2100	2100
Motor Pulley Pitch Diameter		3 4/4 4	3 4/4 4	4 0/5 0	2 8/3 8
A/B (in.)		—	—	—	4.0/5.0
Nominal Motor Shaft Diameter (in.)		7/8	7/8	7/8	7/8
Fan Pulley Pitch Diameter (in.)		7.0	7.0	8.0	5.8
		Std			8.0
		Alt			
Belt — Type...Length (in.)		A . 51	A . 51	A . 51	BX .46
		Std			A . 51
		Alt			
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		50	50	45	60
Movable Pulley Flange (rpm)		—	—	—	45
Movable Pulley Maximum Full		5	5	5	6
Turns from Closed Position		—	—	—	5
Factory Setting — Full Turns Open		5	5	5	5
		Std			5
		Alt			
Factory Speed Setting (rpm)		840	840	860	960
		Std			860
		Alt			
Fan Shaft Diameter at Pulley (in.)		1	1	1	1
EVAPORATOR COIL			Enhanced Copper Tubes, Aluminum Double-Wavy Fins		
Rows...Fins/in.		3.. 15	3.. 15	4 . 15	4 . 15
Total Face Area (sq ft)		8.9	8.9	11.1	11.1
FURNACE SECTION					
Rollout Switch Cutout (Temp (F)*		195	195	195	195
Burner Orifice Diameter (in. ...drill size)†					
Natural Gas — Std		120 .31	120 .31	120 .31/ 120 31/ 129 30	120 31/ 129 .30
Liquid Propane — Alt**		096 .41	096 .41	096 .41/ 096 41/ 102 38	096 41/ 102 38
Thermostat Heat Anticipator Setting (amps)					
208/230/460-v Stage 1		14/ 14/ 14	14/ 14/ 14	14	14
Stage 2		14/ 20/ 20	14/ 20/ 20	20	20
Gas Input Stage 1		90,000/120,000/180,000	90,000/120,000/180,000	120,000/180,000/200,000	180,000/200,000
Stage 2		125,000/180,000/224,000	125,000/180,000/224,000	180,000/224,000/250,000	224,000/250,000
Efficiency (Steady State) (%)		82/82/82	82/82/82	82/82/80	82/80
Temperature Rise Range		20-50/35-65/45-75	20-50/35-65/45-75	35-65/35-65/40-70	35-65/40-70
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
Field Gas Connection Size (in.)		.50/.75/.75	.50/.75/.75	.75/.75/.75	.75/.75
HIGH-PRESSURE SWITCH (psig)					
Standard Compressor Internal Relief			450 ± 50		
Cutout			428		
Reset (Auto.)			320		
LOSS-OF-CHARGE/LOW-PRESSURE 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					
Quantity...Size (in.)			Cleanable		
			1 20 x 25 x 1		
			1...16 x 25 x 1		
RETURN-AIR FILTERS			Throwaway		
Quantity...Size (in.)		4.. 16 x 20 x 2	4 16 x 20 x 2	4 20 x 20 x 2	4 20 x 20 x 2

LEGEND

Bhp — Brake Horsepower

*Indicates automatic reset.

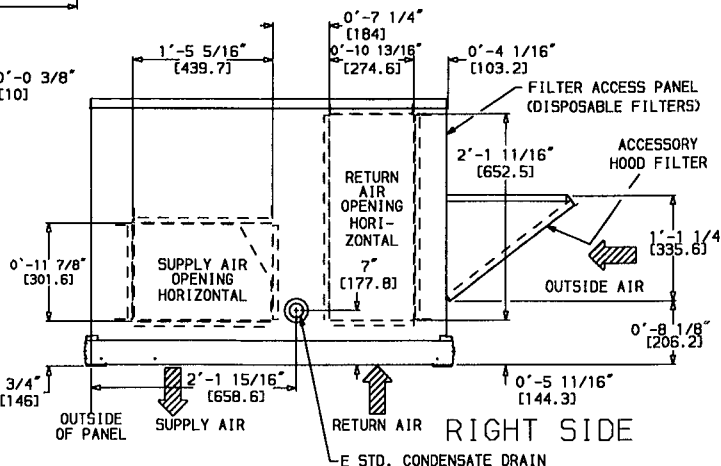
†48HJD008-009 units have 3 burners.

48HJD012 and 48HJE008,009 units have 4 burners.

48HJF008,009; 48HJE/HJF012; and the 48HJD/HJE014 have 5 burners

**An LP Conversion Kit is available as an accessory.

Carrier



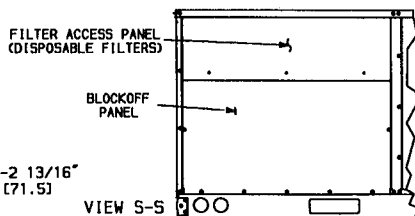
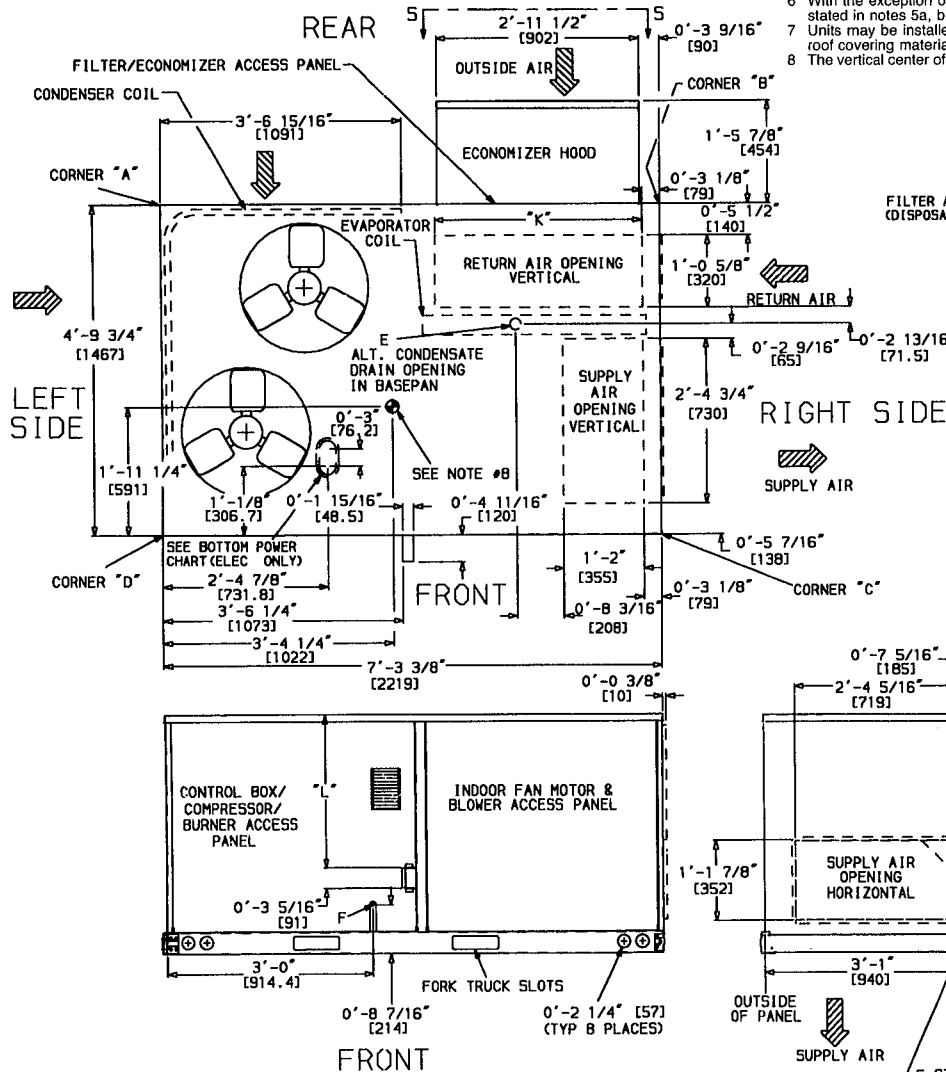
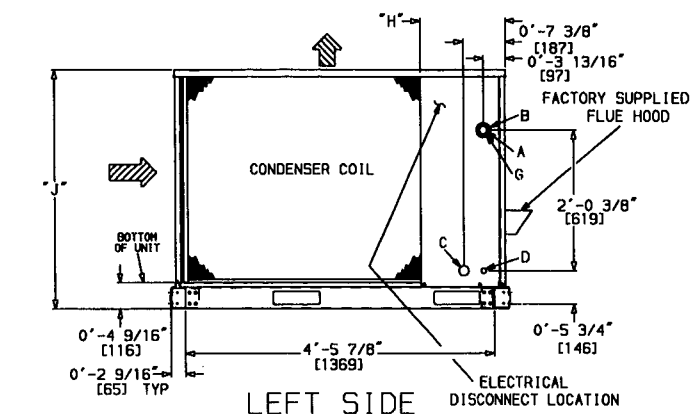
UNIT	STANDARD UNIT WEIGHT		VARISLIDE™ ECONOMIZER WEIGHT		PARABLADE ECONOMIZER WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		"H"		"J"		"K"		"L"	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	ft-in	mm	ft-in	mm	ft-in	mm	ft-in	mm
48HJF/HJE/HJD008	870	395	44	20	62	28.1	189	86	161	73	239	109	280	127	2'-0 7/8"	632	3'-5 1/8"	1050	2'-9 1/8"	856	2'-2 7/8"	672
48HJF/HJE/HJD009	880	399	44	20	62	28.1	191	87	163	74	242	110	284	129	1'-2 7/8"	378	3'-5 1/8"	1050	2'-9 1/8"	856	2'-2 7/8"	672
48HJF/HJE/HJD012	1035	469	44	20	62	28.1	225	102	192	87	285	129	333	151	1'-2 7/8"	378	4'-1 1/8"	1253	3'-0 3/8"	924	2'-10 7/8"	875
48HJE/HJD014	1050	476	44	20	62	28.1	228	103	195	88	289	131	338	153	1'-2 7/8"	378	4'-1 1/8"	1253	3'-0 3/8"	924	2'-10 7/8"	875

*Indicates horizontal center of gravity
†Indicates vertical center of gravity

Connection Sizes	
A	1 1/2" Dia [35] Field Power Supply Hole
B	2 1/2" Dia [64] Power Supply Knockout
C	1 1/4" Dia [44] Charging-Port Hole
D	3/4" Dia [22] Field Control Wiring Hole
E	3/4"-14 NPT Condensate Drain
F	1/2"-14 NPT Gas Connection 48HJD008 & 009
G	3/4"-14 NPT Gas Connection 48HJE, HJF008, 009, 012, 48HJD012 & 014
	2" Dia [51] Power Supply Knockout

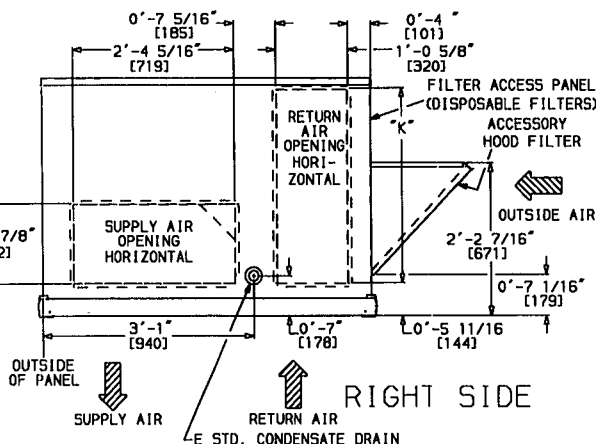
NOTES:

- Dimensions in [] are in millimeters
- Center of gravity
- Direction of airflow
- 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.
- Minimum clearance (local codes or jurisdiction may prevail):
 - Between unit, flue side and combustible surfaces, 48 inches (18 in. when using accessory flue discharge deflector)
 - 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
 - Condenser coil, for proper airflow, 36 in. on one side, 12 in. on the other. The side getting the greater clearance is optional.
 - Overhead, 60 in. to assure proper condenser fan operation.
 - Between units, control box side, 42 in. per NEC (National Electrical Code)
 - Between unit and ungrounded surfaces, control box side, 36 in. per NEC
 - Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. per NEC
 - Horizontal supply and return end, 0 inches
- With the exception of the clearance for the condenser coil and combustion side as stated in notes 5a, b and c, a removable fence or barricade requires no clearance.
- Units may be installed on combustible floors made from wood or Class A, B, or C roof covering material if set on base rail.
- The vertical center of gravity is 1'-7" [483] for 008 up from the bottom of the base rail



BOTTOM POWER CHART: THESE HOLES REQ'D FOR USE WITH ACCESSORY PACKAGES - CRBTMPW001A00 (1/2", 3/4") OR CRBTMPW002A00 (1/2", 1 1/4")		
THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
1/2"	24V POWER=	7/8" [22.2]
3/4"	24V POWER=	1 1/8" [28.4]
1 1/4"	24V POWER=	1 3/4" [44.4]

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



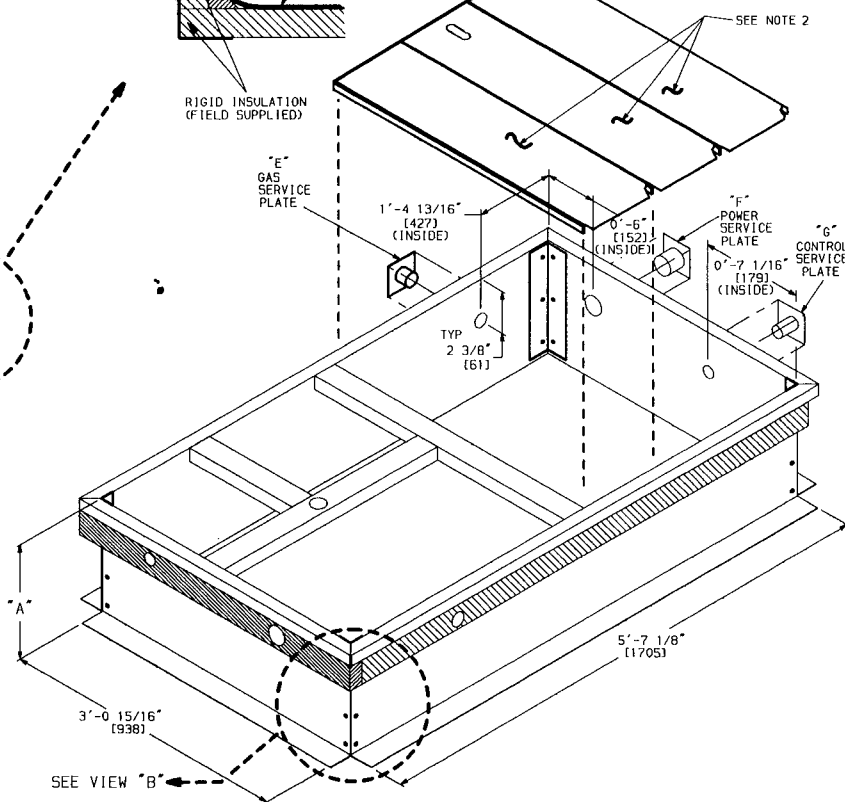
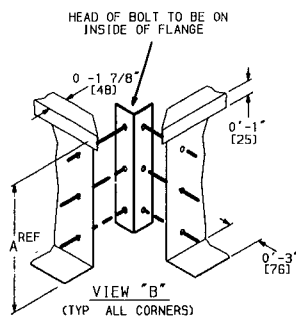
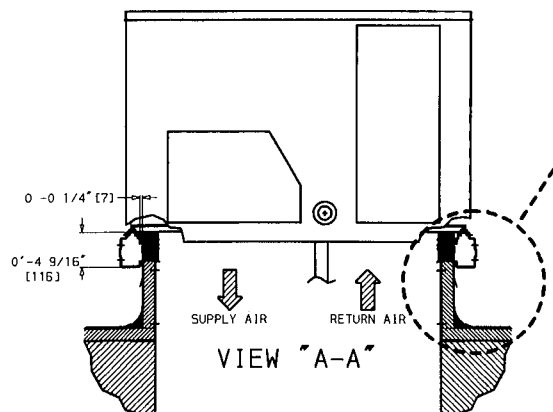
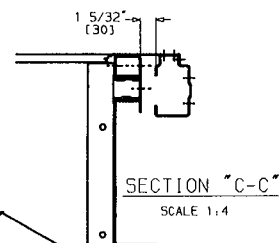
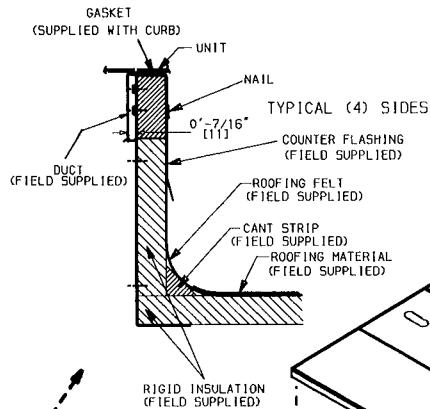
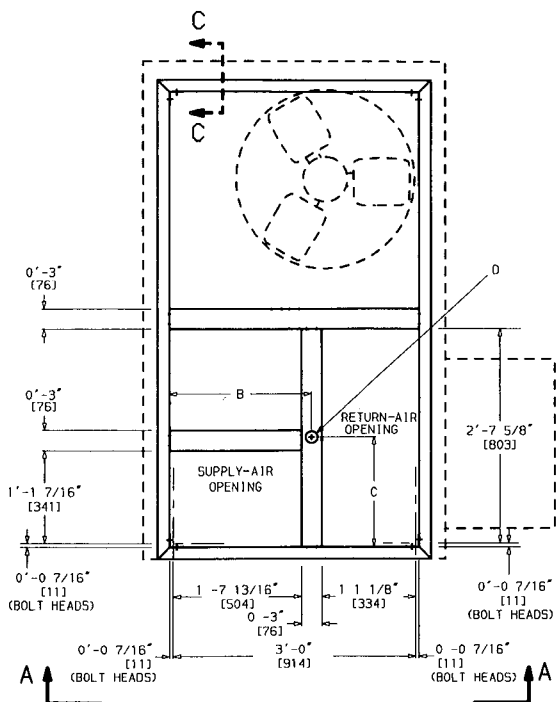
ROOF CURB – 48HJ004-007

UNIT SIZE	"B"	"C"	"D" ALT DRAIN HOLE	"E" GAS	"F" POWER	"G" CONTROL	CONNECTOR PKG ACY
48HJ004-007	1'-9 11/16" [551]	1'-4" [406]	1 3/4" [45]	3/4" NPT	3/4" NPT	3/4" NPT	50DJ900791 (THRU-THE-SIDE)
				3/4" NPT	3/4" NPT	1/2" NPT	CRBTMPWR001A00 (THRU-THE-BOTTOM)

ROOF CURB ACCESSORY	"A"	UNIT SIZE
CRRFCURB001A00	1'-2" [356]	48HJ004-007
CRRFCURB002A00	2'-0" [610]	

NOTES:

- 1 Roof curb accessory is shipped unassembled
- 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

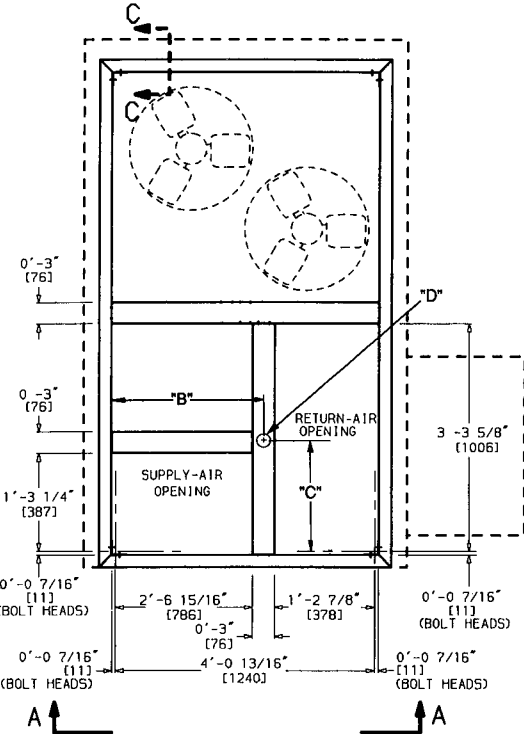


Accessory dimensions — 48HJ008-014



ROOF CURB — 48HJ008-014

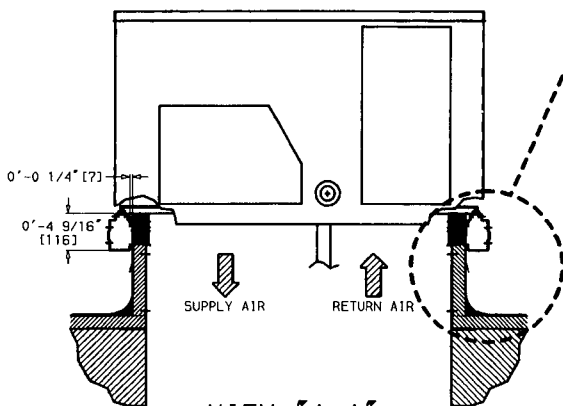
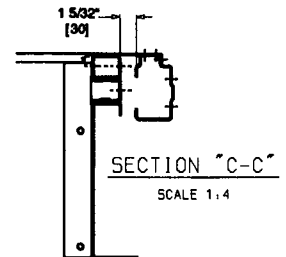
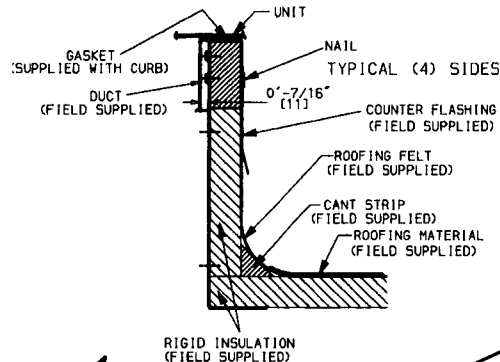
UNIT SIZE	"B"	"C"	"D" ALT DRAIN HOLE	"E" GAS	"F" POWER	"G" CONTROL	CONNECTOR PKG ACY
48HJ008-014	2'-8 ⁷ / ₁₆ " [827]	1'-10 ¹⁵ / ₁₆ " [583]	1 ³ / ₄ " [45]	³ / ₄ " NPT ³ / ₄ " NPT ³ / ₄ " NPT	1" NPT ³ / ₄ " NPT 1 ¹ / ₄ " NPT	³ / ₄ " NPT ¹ / ₂ " NPT ¹ / ₂ " NPT	50DJ901551 (THRU-THE-SIDE) CRBTMAWR001A00 (THRU-THE-BOTTOM) CRBTMPWR002A00 (THRU-THE-BOTTOM)



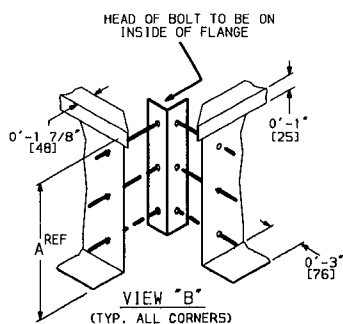
ROOF CURB ACCESSORY	"A"	UNIT SIZE
CRRFCURB003A00	1'-2" [356]	48HJ008-014
CRRFCURB004A00	2'-0" [610]	

NOTES:

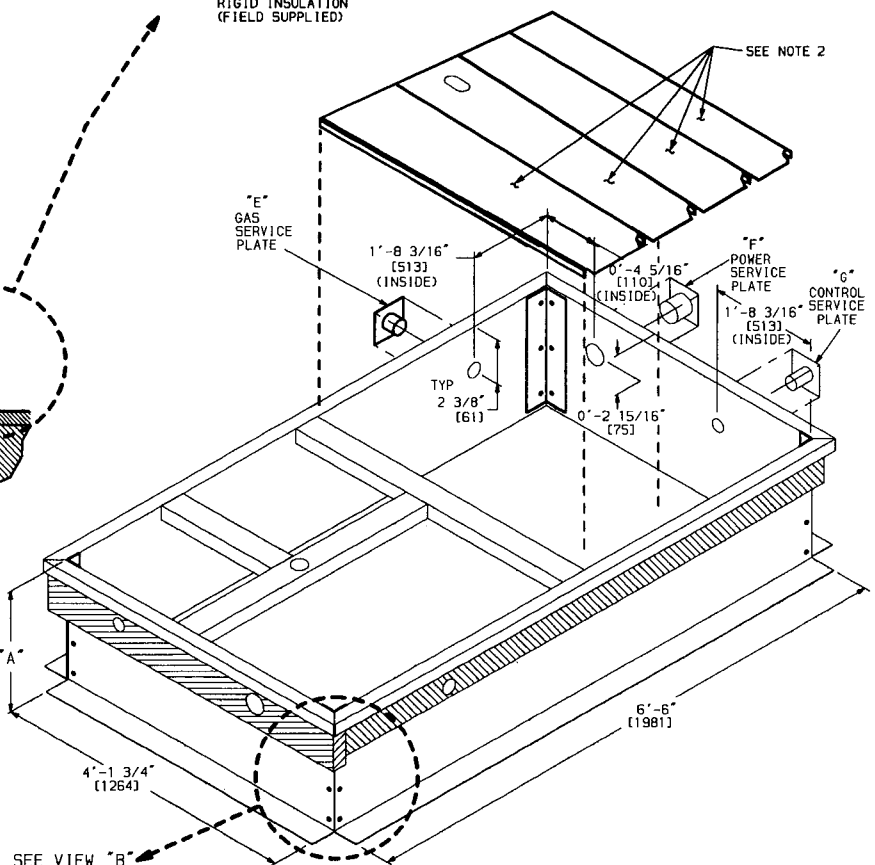
- 1 Roof curb accessory is shipped unassembled
- 2 Insulated panels
- 3 Dimensions in [] are in millimeters
- 4 Roof curb: galvanized steel.
- 5 Attach ductwork to curb (flanges of duct rest on curb).
- 6 Service clearance 4 ft on each side
- 7 Direction of airflow



VIEW "A-A"



VIEW "B"
(TYP. ALL CORNERS)



I Determine cooling and heating requirements at design conditions.

Given:

Required Cooling Capacity (TC) 44,600 Btuh
 Sensible Heat Capacity (SHC) 32,000 Btuh
 Required Heating Capacity 85,000 Btuh
 Condenser Entering-Air Temperature 95 F
 Evaporator Entering-Air Temperature 82 F edb,
 67 F ewb
 Evaporator Air Quantity 1600 cfm
 External Static Pressure (ESP) 0.75 in. wg
 Electrical Characteristics (V-Ph-Hz) 230-1-60

II Select unit based on required cooling capacity.

Enter the Cooling Capacities table (page 17) at condenser entering temperature of 95 F, evaporator air entering at 1600 cfm and 80 F db and 67 F wb. The 48HJ005 unit will provide a total cooling capacity of 48,900 Btuh and a sensible heat capacity of 34,700 Btuh. For evaporator-air temperature other than 80 F edb, calculate sensible heat capacity correction, as required, using the formula found in Note 3 following the Cooling Capacities tables.

For this example:

$$\text{Correction factor} = 1.10 \times (1 - .21) \times (82 - 80) = 1.738$$

Multiply the correction factor of 1.738 by 1600 cfm (a total of 2781). From the Gross Cooling Capacities tables find that the sensible heat capacity at 80 F is 34.7 MBtuh (equivalent to 34,700 Btuh). Add 34,700 and 2781 to get the corrected sensible heat capacity of 37,481.

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

III Select heating capacity of unit to provide design condition requirements.

In the Heating Capacities and Efficiencies table (page 6) note that unit 48HJE005 will provide output capacity of 92,000 Btuh, which is adequate for the given application.

IV Determine fan speed and power requirements at design conditions.

Before entering the Fan Performance tables, calculate the total static pressure required based on unit components. From the given and the Pressure Drop tables (page 30), find:

External static pressure	.75 in. wg
Varislide™ Economizer	.05 in. wg
Total static pressure	= .80 in. wg

Enter the Fan Performance table for the 48HJ005 vertical discharge unit. At 1600 cfm, the standard motor will deliver 1.1 in. wg static pressure and 1.17 Bhp. This will adequately handle the job requirements.

Using evaporator-fan motor efficiency table and formula on page 30, determine watts.

$$\text{Watts} = \frac{1.17 (746)}{.75}$$

$$\text{Watts} = 1164$$

V Determine net cooling capacity.

Cooling capacities are gross and do not include indoor-fan motor (IFM) heat. Determine net capacity using the following formula:

$$\begin{aligned} \text{Net capacity} &= \text{gross capacity} - \text{IFM heat} \\ &= 48,900 \text{ Btuh} - 1164 \text{ Watts} \\ &\quad \left(3.413 \frac{\text{Btuh}}{\text{Watts}} \right) \\ &= 48,900 \text{ Btuh} - 3972 \text{ Btuh} \end{aligned}$$

$$\text{Net capacity} = 44,928 \text{ Btuh}$$

$$\text{Net sensible capacity} = 37,481 \text{ Btuh} - 3972 \text{ Btuh}$$

$$\text{Net sensible capacity} = 33,509 \text{ Btuh}$$

COOLING CAPACITIES

48HJ004 (3 TONS)

Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF								
		900/0.14			1200/0.17			1500/0.20		
		Temp (F) Air Entering Evaporator — Ewb								
		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

48HJ005 (4 TONS)

Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF											
		1200/0.17			1450/0.19			1600/0.21			2000/0.24		
		Temp (F) 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

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:

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h}_{lwb}\text{)}$$

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

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 = $1.10 \times (1 - BF) \times (edb - 80)$

Performance data (cont)



COOLING CAPACITIES (cont)

48HJ006 (5 TONS)

Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF											
		1500/0.08			1750/0.09			2000/0.11			2500/0.13		
		Temp (F) 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

48HJ007 (6 TONS)

Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF											
		1800/0.05			2100/0.06			2400/0.06			3000/0.08		
		Temp (F) 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

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:

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h}_{lwb}\text{)}$$

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

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 = $1.10 \times (1 - BF) \times (edb - 80)$

COOLING CAPACITIES (cont)

48HJ008 (7½ TONS)

Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF								
		2450/0.095			3000/0.11			3750/0.135		
		Temp (F) Air Entering Evaporator — Ewb								
		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	92.8	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

48HJ009 (8½ TONS)

Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF											
		2450/0.075			3000/0.09			3400/0.105			4250/0.125		
		Temp (F) Air Entering Evaporator — Ewb											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	119.5	105.7	94.8	123.1	109.1	98.7	124.8	110.7	100.2	126.3	112.8	103.4
	SHC	56.5	65.7	77.8	60.2	71.7	86.3	62.2	75.8	92.8	67.8	83.3	101.2
	kW	5.92	5.84	5.77	5.95	5.88	5.81	5.96	5.89	5.83	5.99	5.91	5.85
85	TC	115.5	101.9	90.6	119.7	105.4	94.8	121.4	106.9	96.1	124.0	109.1	98.7
	SHC	55.1	64.3	76.1	58.9	70.5	85.1	61.3	74.5	90.5	66.2	82.9	98.5
	kW	6.77	6.69	6.61	6.83	6.74	6.67	6.85	6.76	6.67	6.88	6.79	6.71
95	TC	111.3	97.7	86.6	115.0	101.2	90.6	117.2	102.6	91.7	120.1	104.8	94.5
	SHC	53.7	62.8	74.2	57.4	68.3	82.9	60.0	73.0	88.6	65.0	81.5	94.5
	kW	7.71	7.62	7.52	7.76	7.66	7.59	7.80	7.69	7.58	7.84	7.74	7.66
105	TC	107.2	93.5	82.5	110.5	96.7	85.9	112.1	97.9	87.6	114.9	99.9	90.5
	SHC	52.2	61.3	72.7	56.0	67.4	81.2	58.4	71.4	86.6	63.5	79.5	90.5
	kW	8.75	8.64	8.54	8.80	8.70	8.61	8.82	8.71	8.62	8.86	8.75	8.67
115	TC	101.9	89.2	78.0	104.7	91.8	81.5	106.7	93.1	83.3	109.2	94.9	86.3
	SHC	50.2	59.5	70.7	53.7	65.7	79.5	56.6	69.5	83.1	61.5	77.8	86.3
	kW	9.80	9.73	9.64	9.86	9.79	9.72	9.90	9.79	9.71	9.95	9.84	9.75
125	TC	97.3	84.3	73.1	100.0	86.8	76.0	101.3	87.9	78.7	102.9	89.5	81.9
	SHC	48.7	57.7	68.5	52.4	63.9	76.0	54.8	67.9	78.7	59.1	75.7	81.9
	kW	11.03	10.90	10.70	11.08	10.96	10.81	11.11	10.99	10.88	11.14	11.03	10.93

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:

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h}_{lwb}\text{)}$$

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

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 = $1.10 \times (1 - BF) \times (edb - 80)$.

COOLING CAPACITIES (cont)

48HJ012 (10 TONS)

Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF											
		3000/0.025			3200/0.03			4000/0.035			5000/0.04		
		Temp (F) Air Entering Evaporator — Ewb											
		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 (12½ TONS)

Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF											
		3750/0.08			4300/0.09			5000/0.11			6250/0.13		
		Temp (F) Air Entering Evaporator — Ewb											
		72	67	62	72	67	62	72	67	62	72	67	62
75	TC	164.3	154.8	132.8	168.5	157.7	143.6	171.7	160.6	148.3	174.7	164.6	153.5
	SHC	91.0	107.5	111.6	95.7	114.1	121.0	101.6	121.5	129.7	49.4	110.6	142.3
	kW	9.56	9.43	9.18	9.67	9.44	9.26	9.75	9.51	9.25	9.83	9.61	9.38
85	TC	159.5	149.4	125.8	163.8	152.7	136.6	166.8	155.6	143.6	170.2	159.5	149.4
	SHC	78.3	102.0	116.4	82.8	108.2	128.8	86.7	116.1	140.0	93.3	130.0	149.3
	kW	10.60	10.50	10.19	10.47	10.49	10.27	10.81	10.57	10.33	10.92	10.69	10.43
95	TC	154.0	143.2	118.0	157.7	146.7	128.8	161.1	149.6	137.5	164.4	153.6	144.3
	SHC	76.6	99.5	112.5	80.5	106.1	124.8	85.1	114.4	136.3	75.5	112.1	135.8
	kW	11.59	11.62	11.41	11.64	11.71	11.49	11.78	11.80	11.56	12.08	11.90	11.69
105	TC	148.0	134.1	110.7	151.5	139.5	120.6	153.9	142.4	128.3	157.0	145.8	138.7
	SHC	74.4	95.9	108.6	78.9	104.0	119.9	83.2	111.6	128.3	89.3	125.2	138.7
	kW	12.94	12.69	12.36	13.04	12.77	12.45	13.10	12.84	12.57	13.18	12.93	12.76
115	TC	139.1	120.4	103.2	143.0	125.0	110.6	146.1	128.8	118.2	148.9	135.7	129.5
	SHC	71.3	90.5	103.2	76.0	98.1	110.5	80.5	107.0	118.2	87.2	122.1	129.5
	kW	14.12	13.83	13.50	14.20	13.93	13.63	14.29	14.03	13.78	14.37	14.14	13.97
125	TC	127.1	106.2	97.5	131.6	108.7	100.7	136.1	112.0	105.7	139.5	118.4	116.4
	SHC	67.2	85.1	97.4	72.4	91.9	100.3	77.6	100.4	105.6	84.6	114.2	116.3
	kW	15.31	14.99	14.65	15.42	15.08	14.85	15.51	15.18	15.03	15.60	15.28	15.22

Standard Ratings

LEGEND

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

NOTES:

1 Direct interpolation is permissible. Do not extrapolate.

2 The following formulas may be used:

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h}_{lwb}\text{)}$$

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

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 = $1.10 \times (1 - BF) \times (edb - 80)$.

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS

48HJ004 (3 TONS) — STANDARD MOTOR (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)											
	0.1		0.2		0.3		0.4		0.5		0.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
900	581	0.12	673	0.18	736	0.22	805	0.25	865	0.29	911	0.34
1000	644	0.19	709	0.22	782	0.28	835	0.30	900	0.35	937	0.38
1100	687	0.22	746	0.26	806	0.30	867	0.35	929	0.40	964	0.40
1200	733	0.26	785	0.32	843	0.35	903	0.41	960	0.47	994	0.50
1300	754	0.29	826	0.38	891	0.43	942	0.48	991	0.53	1047	0.60
1400	810	0.35	868	0.45	937	0.51	984	0.57	1032	0.62	1067	0.67
1500	841	0.42	911	0.53	985	0.61	1029	0.66	1073	0.72	1109	0.77

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

Airflow (Cfm)	External Static Pressure (in. wg)											
	0.7		0.8		0.9		1.0		1.1		1.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
900	957	0.39	988	0.43	1039	0.47	1061	0.51	1083	0.54	1105	0.58
1000	992	0.44	1039	0.49	1061	0.55	1088	0.60	1111	0.66	1136	0.72
1100	1013	0.49	1068	0.55	1091	0.61	1109	0.66	1127	0.73	1145	0.80
1200	1045	0.56	1090	0.64	1109	0.68	1156	0.73	1203	0.81	1250	0.86
1300	1075	0.64	1122	0.70	1152	0.76	1190	0.82	1228	0.87	1266	0.94
1400	1110	0.73	1160	0.78	1181	0.83	1237	0.88	1293	0.94	1349	0.99
1500	1150	0.78	1190	0.84	1225	0.89	1271	0.95	1371	1.00	1383	1.05

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- Boldface** indicates field-supplied drive required. (See Note 2.)
- Motor drive range is 760 to 1090 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 1.20. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate.

48HJ005 (4 TONS) — STANDARD MOTOR (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)											
	0.1		0.2		0.3		0.4		0.6		0.7	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1200	596	0.20	665	0.25	722	0.31	779	0.36	872	0.48	915	0.54
1300	633	0.24	699	0.30	754	0.36	809	0.42	902	0.55	943	0.61
1400	672	0.30	735	0.36	788	0.42	840	0.48	933	0.62	972	0.69
1500	711	0.35	770	0.42	822	0.49	873	0.55	963	0.69	1002	0.77
1600	751	0.42	835	0.49	871	0.56	907	0.63	993	0.77	1033	0.85
1700	791	0.49	873	0.57	907	0.65	941	0.72	1024	0.87	1064	0.96
1800	831	0.58	881	0.66	929	0.74	976	0.81	1057	0.97	1095	1.06
1900	872	0.67	919	0.75	965	0.84	1011	0.92	1091	1.08	1127	1.17
2000	913	0.77	958	0.86	1002	0.95	1046	1.03	1125	1.21	1160	1.30

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

Airflow (Cfm)	External Static Pressure (in. wg)											
	0.9		1.0		1.1		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1200	993	0.65	1028	0.69	1056	0.72	1083	0.74	1134	0.80	1185	0.88
1300	1021	0.74	1058	0.80	1090	0.85	1121	0.89	1171	0.94	1219	1.00
1400	1049	0.82	1086	0.89	1120	0.96	1153	1.00	1210	1.12	1257	1.17
1500	1077	0.92	1113	0.99	1147	1.06	1180	1.13	1241	1.27	1295	1.37
1600	1107	1.00	1141	1.09	1174	1.17	1207	1.25	1269	1.40	1326	1.54
1700	1137	1.12	1171	1.20	1203	1.29	1235	1.37	1296	1.53	1354	1.70
1800	1167	1.23	1202	1.32	1233	1.41	1263	1.49	1323	1.67	1381	1.85
1900	1197	1.35	1232	1.45	1263	1.54	1294	1.63	1351	1.81	1408	2.00
2000	1229	1.48	1262	1.58	1294	1.68	1325	1.78	1362	1.97	1436	2.16

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- Boldface** indicates field-supplied drive required. (See Note 3.)
- Shading** indicates field-supplied motor and drive required.
- Motor drive range is 840 to 1185 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 1.2. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate.

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJ006 (5 TONS) — STANDARD MOTOR (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.1		0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1500	771	0.37	828	0.44	935	0.58	1027	0.73	1107	0.88	1185	1.04	1257	1.20	1330	1.38	1411	1.59
1600	816	0.45	869	0.51	968	0.66	1056	0.81	1127	0.97	1215	1.14	1286	1.31	1353	1.49	1421	1.68
1700	902	0.61	940	0.60	1007	0.75	1094	0.91	1175	1.09	1245	1.26	1315	1.44	1381	1.52	1443	1.69
1800	942	0.70	978	0.66	1063	0.82	1147	0.97	1248	1.20	1322	1.33	1395	1.46	1475	1.56	1542	1.71
1900	982	0.80	1023	0.78	1097	0.91	1175	1.11	1266	1.29	1356	1.47	1430	1.58	1504	1.69	1556	1.82
2000	1022	0.91	1068	0.90	1132	1.01	1218	1.23	1303	1.41	1397	1.52	1459	1.67	1532	1.82	1588	1.97
2100	1063	0.99	1115	1.00	1180	1.17	1261	1.35	1340	1.53	1428	1.66	1489	1.80	1567	1.99	1626	2.16
2200	1104	1.13	1159	1.15	1214	1.28	1310	1.52	1375	1.63	1459	1.80	1528	1.95	1603	2.17	1666	2.37
2300	1130	1.26	1202	1.29	1248	1.38	1358	1.69	1410	1.72	1488	1.93	1561	2.13	1637	2.35	1710	2.54
2400	1174	1.37	1237	1.41	1292	1.55	1392	1.81	1460	1.90	1532	2.14	1584	2.28	1671	2.55	1756	2.70
2500	1201	1.48	1272	1.53	1335	1.71	1427	1.94	1518	2.16	1575	2.35	1633	2.53	1698	2.72	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- Boldface** indicates field-supplied drive required. (See Note 3.)
- Shading** indicates field-supplied motor and drive required
- Motor drive range is 1020 to 1460 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information

- Maximum continuous bhp is 1.80. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify
- Interpolation is permissible. Do not extrapolate.

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

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.1		0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1800	942	0.70	978	0.66	1063	0.82	1147	0.97	1248	1.20	1322	1.33	1395	1.46	1475	1.56	1542	1.71
1900	982	0.80	1023	0.78	1097	0.91	1175	1.11	1266	1.29	1356	1.47	1430	1.58	1504	1.69	1556	1.82
2000	1022	0.91	1068	0.90	1132	1.01	1218	1.23	1303	1.41	1397	1.52	1459	1.67	1532	1.82	1588	1.97
2100	1063	0.99	1115	1.00	1180	1.17	1261	1.35	1340	1.53	1428	1.66	1489	1.80	1567	1.99	1626	2.16
2200	1104	1.13	1159	1.15	1214	1.28	1310	1.52	1375	1.63	1459	1.80	1528	1.95	1603	2.17	1666	2.37
2300	1130	1.26	1202	1.29	1248	1.38	1358	1.69	1410	1.72	1488	1.93	1561	2.13	1637	2.35	1710	2.54
2400	1174	1.37	1237	1.41	1292	1.55	1392	1.81	1460	1.90	1532	2.14	1584	2.28	1671	2.55	1756	2.70
2500	1201	1.48	1272	1.53	1335	1.71	1427	1.94	1518	2.16	1575	2.35	1633	2.53	1698	2.72	—	—
2600	1246	1.62	1320	1.68	1368	1.81	1458	2.06	1562	2.42	1620	2.59	1675	2.77	—	—	—	—
2700	1285	1.75	1361	1.82	1400	1.91	1490	2.19	1602	2.64	1666	2.85	—	—	—	—	—	—
2800	1304	1.87	1402	1.95	1439	2.08	1543	2.43	1642	2.86	—	—	—	—	—	—	—	—
2900	1345	2.07	1446	2.16	1477	2.16	1585	2.65	—	—	—	—	—	—	—	—	—	—
3000	1378	2.26	1489	2.36	1529	2.52	1598	2.73	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- Boldface** indicates field-supplied drive required. (See Note 3.)
- Shading** indicates field-supplied motor and drive required.
- Motor drive range is 1120 to 1585 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 2.40. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify
- Interpolation is permissible. Do not extrapolate.

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJ008 (7½ TONS) — STANDARD MOTOR (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	506	0.52	586	0.72	656	0.95	718	1.18	776	1.43	838	1.78	898	2.21	935	2.58
2250	514	0.55	593	0.76	662	0.99	724	1.22	781	1.78	841	1.81	902	2.25	939	2.60
2300	521	0.57	600	0.79	668	1.02	730	1.26	786	1.50	843	1.83	905	2.28	943	2.62
2400	536	0.63	613	0.85	680	1.09	741	1.34	796	1.59	849	1.88	910	2.31	952	2.74
2500	551	0.69	626	0.93	693	1.17	753	1.43	808	1.69	859	1.96	912	2.31	963	2.81
2550	559	0.72	634	0.97	700	1.21	759	1.48	814	1.74	864	2.01	915	2.34	968	2.81
2600	567	0.75	641	1.00	706	1.25	764	1.52	819	1.79	869	2.06	918	2.37	973	2.81
2700	582	0.83	655	1.08	719	1.34	776	1.61	831	1.89	880	2.17	927	2.47	976	2.84
2800	598	0.90	670	1.17	732	1.43	789	1.71	842	2.00	892	2.29	938	2.58	983	2.92
2900	614	0.98	684	1.25	745	1.53	802	1.81	854	2.11	903	2.42	949	2.71	993	3.03
3000	630	1.07	699	1.35	759	1.63	815	1.92	866	2.23	915	2.54	961	2.85	1003	3.17
3100	646	1.16	714	1.45	773	1.74	828	2.04	878	2.35	926	2.67	972	3.00	1015	3.32
3200	662	1.26	729	1.55	787	1.86	841	2.16	891	2.48	938	2.81	983	3.14	1026	3.47
3300	679	1.36	744	1.66	801	1.98	854	2.29	904	2.61	950	2.95	995	3.30	—	—
3400	695	1.47	759	1.78	816	2.10	867	2.42	917	2.75	963	3.10	1007	3.45	—	—
3500	712	1.59	774	1.90	830	2.23	881	2.56	930	2.90	976	3.25	—	—	—	—
3600	729	1.71	790	2.03	845	2.37	895	2.71	943	3.05	988	3.41	—	—	—	—
3700	745	1.84	805	2.17	860	2.52	909	2.87	956	3.22	—	—	—	—	—	—
3750	754	1.91	813	2.24	868	2.59	917	2.95	963	3.30	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

1. **Boldface** indicates field-supplied drive required. (See Note 3.)
2. **Shading** indicates field-supplied motor and drive required.
3. Standard drive range is 840 to 1085 rpm. All other rpms require a field-supplied drive.
4. Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

5. Maximum continuous bhp is 2.90. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
7. Interpolation is permissible. Do not extrapolate.

48HJ009 (8½ TONS) — STANDARD MOTOR (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2550	559	0.72	634	0.97	700	1.21	759	1.48	814	1.74	864	2.01	915	2.34	968	2.81
2600	567	0.75	641	1.00	706	1.25	764	1.52	819	1.79	869	2.06	918	2.37	973	2.81
2700	582	0.83	655	1.08	719	1.34	776	1.61	831	1.89	880	2.17	927	2.47	976	2.84
2800	598	0.90	670	1.17	732	1.43	789	1.71	842	2.00	892	2.29	938	2.58	983	2.92
2900	614	0.98	684	1.25	745	1.53	802	1.81	854	2.11	903	2.42	949	2.71	993	3.03
3000	630	1.07	690	1.35	759	1.63	815	1.92	866	2.23	915	2.54	961	2.85	1003	3.17
3100	646	1.16	714	1.45	773	1.74	828	2.04	878	2.35	926	2.67	972	3.00	1016	3.32
3200	662	1.26	729	1.55	787	1.86	841	2.16	891	2.48	938	2.81	983	3.14	1026	3.47
3300	679	1.36	744	1.66	801	1.98	854	2.29	904	2.61	950	2.95	995	3.30	—	—
3400	695	1.47	759	1.78	816	2.10	867	2.42	917	2.75	963	3.10	1007	3.45	—	—
3500	712	1.59	774	1.90	830	2.23	881	2.56	930	2.90	976	3.25	—	—	—	—
3600	729	1.71	790	2.03	845	2.37	895	2.71	943	3.05	988	3.41	—	—	—	—
3700	745	1.84	805	2.17	860	2.52	909	2.87	956	3.22	—	—	—	—	—	—
3750	754	1.91	813	2.24	868	2.59	917	2.95	963	3.30	—	—	—	—	—	—
3800	762	1.98	821	2.31	875	2.66	924	3.03	970	3.38	—	—	—	—	—	—
3900	779	2.12	836	2.46	890	2.82	938	3.19	—	—	—	—	—	—	—	—
4000	796	2.27	852	2.61	905	2.98	953	3.37	—	—	—	—	—	—	—	—
4100	813	2.42	868	2.78	920	3.15	—	—	—	—	—	—	—	—	—	—
4200	830	2.59	884	2.95	935	3.33	—	—	—	—	—	—	—	—	—	—
4250	839	2.68	890	3.04	—	—	—	—	—	—	—	—	—	—	—	—
4300	847	2.76	900	3.13	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

1. **Boldface** indicates field-supplied drive required. (See Note 3.)
2. **Shading** indicates field-supplied motor and drive required.
3. Standard drive range is 840 to 1085 rpm. All other rpms require a field-supplied drive.
4. Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

5. Maximum continuous bhp is 2.9. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
7. Interpolation is permissible. Do not extrapolate.

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		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	556	0.65	624	0.81	682	0.95	737	0.99	745	1.04	750	1.12	809	1.24	815	1.40	899	1.56	950	1.92
3100	569	0.70	636	0.87	693	1.01	748	1.08	755	1.12	757	1.20	862	1.38	903	1.53	943	1.88	971	2.21
3200	583	0.76	649	0.94	705	1.08	758	1.17	787	1.30	769	1.36	905	1.52	971	1.86	982	2.19	992	2.41
3300	597	0.83	662	1.00	717	1.16	770	1.29	815	1.37	780	1.43	965	1.82	991	2.10	1000	2.40	1025	2.59
3400	611	0.90	675	1.08	730	1.23	781	1.41	830	1.50	808	1.63	992	2.11	1015	2.43	1030	2.62	1050	2.72
3500	625	0.97	688	1.15	742	1.32	792	1.49	840	1.64	860	1.85	1011	2.45	1028	2.62	1072	2.74	1099	2.90
3600	639	1.04	701	1.23	755	1.41	803	1.57	850	1.87	890	2.21	1026	2.55	1063	2.75	1095	2.89	1119	3.08
3700	729	1.36	790	1.58	847	1.79	902	2.06	955	2.29	1008	2.55	1060	2.80	1108	3.05	1152	3.27	1190	3.46
3800	745	1.46	805	1.69	861	1.89	915	2.17	967	2.41	1019	2.67	1070	2.94	1118	3.19	1163	3.44	1203	3.65
3900	761	1.56	820	1.80	875	2.01	928	2.29	979	2.55	1029	2.80	1079	3.07	1128	3.34	1173	3.60	1214	3.83
4000	777	1.67	836	1.92	889	2.14	941	2.40	991	2.68	1040	2.94	1089	3.22	1137	3.49	1183	3.76	1225	4.00
4100	793	1.79	851	2.05	904	2.27	955	2.52	1004	2.82	1052	3.08	1100	3.36	1147	3.65	1193	3.93	1236	4.19
4200	810	1.91	867	2.18	918	2.41	968	2.65	1017	2.96	1064	3.23	1110	3.51	1157	3.81	1202	4.09	1245	4.38
4300	826	2.04	883	2.32	933	2.55	982	2.79	1030	3.11	1076	3.40	1121	3.67	1167	3.97	1212	4.27	1255	4.56
4400	842	2.17	898	2.46	948	2.70	996	2.93	1043	3.25	1088	3.56	1133	3.84	1178	4.14	1222	4.44	1265	4.74
4500	859	2.31	914	2.60	962	2.85	1010	3.09	1056	3.40	1101	3.73	1144	4.00	1188	4.31	1232	4.62	1274	4.93
4600	876	2.45	930	2.76	977	3.01	1024	3.26	1070	3.55	1114	3.90	1157	4.19	1199	4.49	1242	4.81	1284	5.13
4700	892	2.60	945	2.91	992	3.18	1039	3.43	1083	3.71	1126	4.07	1169	4.38	1210	4.68	1252	5.00	1294	5.33
4800	909	2.77	961	3.07	1008	3.36	1053	3.61	1097	3.88	1140	4.25	1181	4.58	1222	4.87	1263	5.20	—	—
4900	926	2.93	977	3.24	1024	3.54	1068	3.80	1111	4.06	1153	4.41	1194	4.77	1234	5.09	1274	5.40	—	—
5000	942	3.11	993	3.41	1039	3.73	1080	3.99	1125	4.25	1166	4.59	1207	4.97	1247	5.30	1286	5.62	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- Boldface** indicates field-supplied drive required. (See Note 3.)
- Shading indicates field-supplied motor and drive required
- Standard drive range is 860 to 1080 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 4.20. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate.

48HJ014 (12½ TONS) — STANDARD AND ALTERNATE MOTORS (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3700	729	1.36	790	1.58	847	1.79	902	2.06	955	2.29	1008	2.55	1060	2.80	1108	3.05	1152	3.27	1190	3.46
3800	745	1.46	805	1.69	861	1.89	915	2.17	967	2.41	1019	2.67	1070	2.94	1118	3.19	1163	3.44	1203	3.65
3900	761	1.56	820	1.80	875	2.01	928	2.29	979	2.55	1029	2.80	1079	3.07	1128	3.34	1173	3.60	1214	3.83
4000	777	1.67	836	1.92	889	2.14	941	2.40	991	2.68	1040	2.94	1089	3.22	1137	3.49	1183	3.76	1225	4.00
4100	793	1.79	851	2.05	904	2.27	955	2.52	1004	2.82	1052	3.08	1100	3.36	1147	3.65	1193	3.93	1236	4.19
4200	810	1.91	867	2.18	918	2.41	968	2.65	1017	2.96	1064	3.23	1110	3.51	1157	3.81	1202	4.09	1245	4.38
4300	826	2.04	883	2.32	933	2.55	982	2.79	1030	3.11	1076	3.40	1121	3.67	1167	3.97	1212	4.27	1255	4.56
4400	842	2.17	898	2.46	948	2.70	996	2.93	1043	3.25	1088	3.56	1133	3.84	1178	4.14	1222	4.44	1265	4.74
4500	859	2.31	914	2.60	962	2.85	1010	3.09	1056	3.40	1101	3.73	1144	4.00	1188	4.31	1232	4.62	1274	4.93
4600	876	2.45	930	2.76	977	3.01	1024	3.26	1070	3.55	1114	3.90	1157	4.19	1199	4.49	1242	4.81	1284	5.13
4700	892	2.60	945	2.91	992	3.18	1039	3.43	1083	3.71	1126	4.07	1169	4.38	1210	4.68	1252	5.00	1294	5.33
4800	909	2.77	961	3.07	1008	3.36	1053	3.61	1097	3.88	1140	4.25	1181	4.58	1222	4.87	1263	5.20	—	—
4900	926	2.93	977	3.24	1024	3.54	1068	3.80	1111	4.06	1153	4.41	1194	4.77	1234	5.09	1274	5.40	—	—
5000	942	3.11	993	3.41	1039	3.73	1080	3.99	1125	4.25	1166	4.59	1207	4.97	1247	5.30	1286	5.62	—	—
5100	959	3.29	1009	3.60	1055	3.92	1097	4.19	1139	4.46	1180	4.78	1220	5.18	1259	5.52	—	—	—	—
5200	976	3.47	1025	3.78	1071	4.12	1112	4.40	1153	4.67	1194	4.98	1233	5.38	1272	5.74	—	—	—	—
5300	993	3.67	1041	3.98	1086	4.33	1127	4.61	1168	4.90	1208	5.19	1246	5.58	—	—	—	—	—	—
5400	1010	3.87	1057	4.18	1102	4.54	1142	4.84	1182	5.13	1221	5.41	—	—	—	—	—	—	—	—
5500	1027	4.07	1073	4.39	1118	4.76	1157	5.07	1197	5.36	1235	5.64	—	—	—	—	—	—	—	—
5600	1043	4.29	1090	4.61	1133	4.99	1173	5.31	1211	5.61	—	—	—	—	—	—	—	—	—	—
5700	1060	4.51	1106	4.83	1149	5.22	1189	5.55	—	—	—	—	—	—	—	—	—	—	—	—
5800	1077	4.74	1122	5.07	1165	5.45	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	1094	4.98	1139	5.31	1181	5.70	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	1111	5.22	1155	5.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	1128	5.48	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1145	5.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- Boldface** indicates field-supplied drive required. (See Note 4.)
- Shading indicates alternate motor and/or drive cannot be used.
- Shading indicates field-supplied motor and drive required.
- Standard drive range is 900 to 1260 rpm. Alternate drive range is 860 to 1080 rpm. All other rpms require a field-supplied drive.

- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.
- Maximum continuous bhp is 5.25 for the standard motor and 4.20 for the alternate motor. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate.

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS

48HJ004 (3 TONS) — STANDARD MOTOR (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)											
	0.1		0.2		0.3		0.4		0.5		0.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
900	526	0.06	584	0.08	656	0.12	734	0.22	818	0.25	875	0.27
1000	570	0.09	627	0.13	738	0.19	800	0.26	848	0.29	895	0.31
1100	614	0.13	670	0.16	758	0.23	812	0.29	863	0.32	914	0.35
1200	658	0.16	710	0.23	780	0.28	840	0.32	889	0.36	938	0.40
1300	703	0.20	752	0.27	808	0.32	868	0.37	916	0.41	963	0.45
1400	725	0.29	776	0.31	845	0.38	891	0.42	937	0.47	983	0.51
1500	755	0.33	816	0.38	870	0.43	924	0.48	969	0.53	1014	0.58

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

Airflow (Cfm)	External Static Pressure (in. wg)											
	0.7		0.8		0.9		1.0		1.1		1.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
900	924	0.32	953	0.35	989	0.38	1028	0.42	1074	0.45	1120	0.50
1000	936	0.35	977	0.39	1020	0.44	1064	0.48	1124	0.52	1185	0.55
1100	960	0.39	1005	0.43	1052	0.49	1100	0.52	1163	0.56	1225	0.60
1200	988	0.45	1038	0.50	1076	0.53	1136	0.59	1201	0.61	1266	0.64
1300	1012	0.51	1061	0.56	1094	0.61	1172	0.65	1239	0.69	1306	0.72
1400	1027	0.56	1071	0.60	1108	0.67	1208	0.70	1278	0.75	1347	0.79
1500	1056	0.63	1097	0.68	1117	0.70	1245	0.74	1315	0.80	1385	0.85

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- 1. Boldface** indicates field-supplied drive required. (See Note 3.)
- Alternate motor drive range is 760 to 1090 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 1.20. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate.

48HJ005 (4 TONS) — STANDARD MOTOR (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)											
	0.1		0.2		0.3		0.4		0.6		0.7	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1200	569	0.18	641	0.23	701	0.29	761	0.34	859	0.46	901	0.52
1300	604	0.22	673	0.28	731	0.34	788	0.39	887	0.52	928	0.59
1400	640	0.27	705	0.33	761	0.39	817	0.45	914	0.59	955	0.66
1500	676	0.32	738	0.38	793	0.45	847	0.51	940	0.65	982	0.73
1600	713	0.38	772	0.44	825	0.51	877	0.58	967	0.73	1009	0.81
1700	750	0.45	806	0.51	857	0.59	908	0.66	997	0.81	1037	0.90
1800	788	0.52	841	0.59	890	0.67	939	0.75	1026	0.91	1065	1.01
1900	826	0.60	876	0.68	924	0.76	971	0.84	1056	1.01	1094	1.10
2000	864	0.70	912	0.77	958	0.86	1004	0.94	1087	1.12	1125	1.21

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

Airflow (Cfm)	External Static Pressure (in. wg)											
	0.9		1.0		1.1		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1200	987	0.64	1030	0.70	1068	0.79	1106	0.87	1134	0.98	1189	1.12
1300	1006	0.71	1044	0.77	1086	0.84	1128	0.91	1183	1.10	1226	1.23
1400	1033	0.79	1069	0.86	1104	0.93	1139	1.01	1218	1.14	1286	1.34
1500	1060	0.88	1095	0.95	1129	1.02	1162	1.09	1228	1.24	1303	1.40
1600	1087	1.01	1123	1.05	1156	1.13	1185	1.20	1250	1.35	1319	1.51
1700	1114	1.07	1151	1.15	1183	1.23	1215	1.31	1276	1.48	1334	1.64
1800	1141	1.17	1178	1.26	1211	1.35	1243	1.43	1303	1.61	1359	1.78
1900	1168	1.28	1204	1.37	1238	1.47	1271	1.56	1330	1.74	1386	1.93
2000	1197	1.39	1231	1.48	1265	1.59	1298	1.69	1358	1.89	1413	2.08

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- 1. Boldface** indicates field-supplied drive required. (See Note 3.)
- Shading** indicates field-supplied motor and drive required.
- Motor drive range is 840 to 1185 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 1.20. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate.

Performance data (cont)



FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJ006 (5 TONS) — STANDARD MOTOR (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.1		0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1500	741	0.38	798	0.43	895	0.54	990	0.67	1073	0.80	1154	0.95	1218	1.12	1295	1.36	1360	1.40
1600	783	0.45	838	0.51	933	0.63	1016	0.75	1102	0.90	1182	1.04	1251	1.20	1310	1.40	1385	1.49
1700	825	0.53	878	0.60	969	0.72	1049	0.84	1134	1.00	1206	1.14	1281	1.31	1342	1.48	1398	1.53
1800	885	0.63	942	0.73	1047	0.90	1139	1.05	1193	1.14	1276	1.30	1341	1.40	1413	1.55	1474	1.58
1900	928	0.73	982	0.83	1084	1.02	1160	1.11	1223	1.24	1301	1.38	1374	1.53	1437	1.62	1490	1.67
2000	971	0.84	1022	0.94	1121	1.12	1188	1.22	1254	1.36	1329	1.44	1396	1.66	1460	1.68	1509	1.77
2100	1015	0.97	1063	1.10	1140	1.18	1196	1.27	1272	1.45	1354	1.58	1413	1.75	1475	1.73	1529	1.92
2200	1060	1.10	1104	1.20	1159	1.23	1229	1.41	1306	1.53	1363	1.70	1434	1.81	1487	1.85	1554	2.07
2300	1104	1.25	1130	1.27	1196	1.37	1264	1.56	1340	1.66	1397	1.86	1459	1.88	1520	2.07	1576	2.24
2400	1138	1.30	1174	1.37	1245	1.57	1305	1.63	1373	1.84	1440	1.95	1502	2.06	1552	2.24	1604	2.42
2500	1183	1.43	1201	1.50	1284	1.65	1338	1.75	1402	1.99	1469	2.04	1524	2.24	1585	2.42	1638	2.60

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- Boldface** indicates field-supplied drive required (See Note 3.)
- Shading** indicates field-supplied motor and drive required
- Motor drive range is 1020 to 1460 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 1.8. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate

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

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.1		0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1800	885	0.63	942	0.73	1047	0.90	1139	1.05	1193	1.14	1276	1.30	1341	1.40	1413	1.55	1474	1.58
1900	928	0.73	982	0.83	1084	1.02	1160	1.11	1223	1.24	1301	1.38	1374	1.53	1437	1.62	1490	1.67
2000	971	0.84	1022	0.94	1121	1.12	1188	1.22	1254	1.36	1329	1.44	1396	1.66	1460	1.68	1509	1.77
2100	1015	0.97	1063	1.10	1140	1.18	1196	1.27	1272	1.45	1354	1.58	1413	1.75	1475	1.73	1529	1.92
2200	1060	1.10	1104	1.20	1159	1.23	1229	1.41	1306	1.53	1363	1.70	1434	1.81	1487	1.85	1554	2.07
2300	1104	1.25	1130	1.27	1196	1.37	1264	1.56	1340	1.66	1397	1.86	1459	1.88	1520	2.07	1576	2.24
2400	1138	1.30	1174	1.37	1245	1.57	1305	1.63	1373	1.84	1440	1.95	1502	2.06	1552	2.24	1604	2.42
2500	1183	1.43	1201	1.50	1284	1.65	1338	1.75	1402	1.99	1469	2.04	1524	2.24	1585	2.42	1638	2.60
2600	1210	1.58	1243	1.67	1312	1.76	1366	1.96	1435	2.10	1494	2.19	1552	2.40	1616	2.63	1671	2.80
2700	1254	1.76	1285	1.80	1354	1.95	1403	2.14	1474	2.21	1536	2.45	1584	2.61	1646	2.83	1706	2.97
2800	1274	1.82	1304	1.85	1374	2.12	1459	2.25	1514	2.42	1570	2.66	1624	2.85	1677	2.99	—	—
2900	1318	1.95	1345	2.05	1412	2.32	1496	2.45	1529	2.61	1603	2.87	1671	3.03	—	—	—	—
3000	1362	2.20	1378	2.30	1451	2.40	1534	2.66	1560	2.81	1611	3.01	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- Boldface** indicates field-supplied drive required (See Note 3.)
- Shading** indicates field-supplied motor and drive required
- Alternate motor drive range is 1120 to 1585 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 2.4. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate.

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJ008 (7½ TONS) — STANDARD MOTOR (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.2		0.4		0.6		0.8		0.9		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	499	0.50	580	0.70	652	0.94	717	1.17	748	1.30	779	1.43	839	1.78	905	2.21	951	2.57
2250	507	0.53	586	0.73	658	0.97	722	1.22	752	1.34	783	1.46	843	1.81	908	2.25	955	2.59
2300	513	0.55	592	0.76	663	1.00	727	1.26	756	1.38	786	1.49	846	1.84	910	2.25	959	2.61
2400	528	0.60	606	0.83	674	1.06	738	1.34	766	1.46	795	1.58	853	1.88	912	2.31	967	2.68
2500	542	0.66	619	0.90	686	1.13	748	1.41	777	1.55	806	1.68	859	1.94	919	2.37	971	2.73
2550	550	0.69	627	0.94	692	1.17	754	1.45	783	1.60	812	1.74	864	1.99	920	2.39	974	2.76
2600	557	0.72	634	0.97	698	1.21	759	1.49	787	1.64	816	1.79	868	2.04	921	2.41	976	2.78
2700	573	0.79	648	1.05	711	1.29	770	1.58	798	1.73	827	1.88	878	2.16	928	2.45	983	2.88
2800	588	0.86	662	1.13	723	1.38	782	1.66	809	1.82	837	1.98	889	2.29	937	2.57	986	2.91
2900	604	0.94	676	1.21	737	1.48	794	1.76	821	1.92	848	2.08	900	2.41	947	2.70	993	3.01
3000	620	1.02	690	1.30	750	1.58	806	1.86	832	2.02	859	2.18	910	2.52	958	2.85	1002	3.15
3100	636	1.11	704	1.39	764	1.69	818	1.97	844	2.13	870	2.29	920	2.64	968	2.99	1012	3.30
3200	652	1.21	718	1.49	778	1.80	831	2.09	856	2.25	882	2.40	931	2.76	979	3.13	1023	3.47
3300	668	1.31	732	1.59	793	1.92	844	2.21	869	2.37	894	2.53	942	2.89	989	3.26	1034	3.63
3400	684	1.41	747	1.70	807	2.04	857	2.35	882	2.51	907	2.66	954	3.02	1000	3.40	1044	3.79
3500	701	1.53	762	1.82	821	2.16	871	2.48	895	2.64	919	2.80	966	3.15	1011	3.55	1054	3.94
3600	717	1.65	777	1.94	835	2.29	885	2.63	908	2.79	932	2.95	978	3.30	1022	3.69	1065	4.10
3700	733	1.77	792	2.07	849	2.42	899	2.78	922	2.95	945	3.11	990	3.45	1034	3.84	1076	4.26
3750	742	1.84	800	2.14	856	2.49	907	2.86	929	3.03	952	3.20	997	3.54	1040	3.93	1082	5.27

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- Boldface** indicates field-supplied drive required. (See Note 3.)
- Shading** indicates field-supplied motor and drive required.
- Standard drive range is 840 to 1085 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 2.9. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate.

48HJ009 (8½ TONS) — STANDARD MOTOR (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.2		0.4		0.6		0.8		0.9		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2550	550	0.69	627	0.94	692	1.17	754	1.45	783	1.60	812	1.74	864	1.99	920	2.39	974	2.76
2600	557	0.72	634	0.97	698	1.21	759	1.49	787	1.64	816	1.79	868	2.04	921	2.41	976	2.78
2700	573	0.79	648	1.05	711	1.29	770	1.58	798	1.73	827	1.88	878	2.16	928	2.45	983	2.88
2800	588	0.86	662	1.13	723	1.38	782	1.66	809	1.82	837	1.98	889	2.29	937	2.57	986	2.91
2900	604	0.94	676	1.21	737	1.48	794	1.76	821	1.92	848	2.08	900	2.41	947	2.70	993	3.01
3000	620	1.02	690	1.30	750	1.58	806	1.86	832	2.02	859	2.18	910	2.52	958	2.85	1002	3.15
3100	636	1.11	704	1.39	764	1.69	818	1.97	844	2.13	870	2.29	920	2.64	968	2.99	1012	3.30
3200	652	1.21	718	1.49	778	1.80	831	2.09	856	2.25	882	2.40	931	2.76	979	3.13	1023	3.47
3300	668	1.31	732	1.59	793	1.92	844	2.21	869	2.37	894	2.53	942	2.89	989	3.26	1034	3.63
3400	684	1.41	747	1.70	807	2.04	857	2.35	882	2.51	907	2.66	954	3.02	1000	3.40	1044	3.79
3500	701	1.53	762	1.82	821	2.16	871	2.48	895	2.64	919	2.80	966	3.15	1011	3.55	1054	3.94
3600	717	1.65	777	1.94	835	2.29	885	2.63	908	2.79	932	2.95	978	3.30	1022	3.69	1065	4.10
3700	733	1.77	792	2.07	849	2.42	899	2.78	922	2.95	945	3.11	990	3.45	1034	3.84	1076	4.26
3750	742	1.84	800	2.14	856	2.49	907	2.86	929	3.03	952	3.20	997	3.54	1040	3.93	1082	4.27
3800	750	1.90	807	2.21	863	2.56	914	2.93	936	3.11	958	3.28	1003	3.62	1045	4.01	1087	4.43
3900	767	2.04	822	2.35	877	2.71	928	3.09	950	3.27	972	3.45	1015	3.80	1057	4.18	1098	4.60
4000	783	2.18	838	2.50	891	2.86	942	3.26	964	3.45	986	3.63	1028	3.99	1070	4.36	1110	4.78
4100	800	2.34	854	2.66	905	3.02	956	3.43	978	3.62	1000	3.81	1042	4.18	1082	4.56	1122	4.97
4200	817	2.49	869	2.82	920	3.19	970	3.60	992	3.80	1015	4.00	1055	4.38	1095	4.76	1134	5.16
4250	826	2.58	877	2.91	928	3.28	977	3.69	999	3.90	1022	4.10	1062	4.49	1102	4.87	1140	5.27
4300	834	2.66	885	3.00	935	3.37	984	3.78	1006	3.99	1029	4.20	1069	4.59	1108	4.98	1147	5.38

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- Boldface** indicates field-supplied drive required. (See Note 3.)
- Shading** indicates field-supplied motor and drive required.
- Standard drive range is 840 to 1085 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 2.9. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate.

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJ012 (10½ TONS) — STANDARD MOTOR (BELT DRIVE)

Airflow (Cfm)	External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	478	0.57	658	0.92	721	1.08	796	1.23	851	1.50	898	1.78	942	2.01	983	2.17	1023	2.46	1063	2.61
3100	500	0.62	669	0.97	731	1.16	808	1.30	861	1.57	907	1.86	951	2.09	992	2.24	1031	2.51	1070	2.75
3200	519	0.69	680	1.03	741	1.23	818	1.38	873	1.65	916	1.95	960	2.18	1000	2.32	1039	2.58	1077	2.88
3300	337	0.77	692	1.10	751	1.30	828	1.47	884	1.72	925	2.03	969	2.27	1009	2.41	1048	2.66	1086	2.95
3400	561	0.86	704	1.17	761	1.37	837	1.57	896	1.82	934	2.12	978	2.36	1018	2.51	1057	2.75	1094	3.02
3500	592	0.98	715	1.24	773	1.45	847	1.66	907	1.92	945	2.22	987	2.46	1027	2.60	1066	2.85	1102	3.12
3600	632	1.12	727	1.32	784	1.54	857	1.76	917	2.03	957	2.32	996	2.55	1036	2.71	1075	2.96	1111	3.22
3700	677	1.20	748	1.43	810	1.65	869	1.89	928	2.17	984	2.43	1036	2.68	1080	2.90	1114	3.07	1135	3.17
3800	691	1.28	761	1.52	822	1.75	880	1.98	937	2.28	993	2.55	1046	2.81	1092	3.05	1129	3.25	1156	3.39
3900	705	1.37	773	1.62	834	1.86	891	2.08	947	2.39	1002	2.66	1055	2.94	1102	3.20	1143	3.42	1174	3.59
4000	720	1.47	786	1.71	847	1.97	902	2.19	957	2.50	1011	2.79	1064	3.07	1112	3.34	1155	3.59	1190	3.80
4100	734	1.56	800	1.82	860	2.09	914	2.31	967	2.60	1021	2.91	1072	3.20	1121	3.49	1165	3.76	1203	3.99
4200	749	1.66	813	1.92	873	2.21	926	2.44	978	2.71	1030	3.04	1081	3.34	1130	3.64	1175	3.92	1215	4.18
4300	764	1.77	826	2.04	886	2.33	938	2.57	989	2.83	1040	3.18	1090	3.48	1139	3.79	1185	4.08	1226	4.36
4400	779	1.88	840	2.16	899	2.46	951	2.71	1000	2.96	1050	3.31	1100	3.63	1148	3.94	1194	4.25	1236	4.54
4500	793	1.99	854	2.28	912	2.59	963	2.86	1012	3.09	1061	3.43	1109	3.78	1157	4.09	1203	4.42	1246	4.72
4600	808	2.11	868	2.42	925	2.73	975	3.00	1024	3.25	1071	3.56	1119	3.93	1166	4.26	1212	4.58	1255	4.91
4700	822	2.24	882	2.56	937	2.86	988	3.16	1036	3.42	1082	3.70	1129	4.09	1175	4.43	1221	4.76	1264	5.09
4800	837	2.37	896	2.71	950	3.00	1001	3.32	1048	3.59	1093	3.86	1139	4.24	1185	4.60	1230	4.93	1273	5.28
4900	852	2.51	910	2.86	963	3.15	1014	3.48	1060	3.76	1105	4.02	1150	4.38	1194	4.77	1239	5.12	1282	5.47
5000	867	2.65	924	3.01	977	3.30	1027	3.65	1073	3.94	1117	4.20	1161	4.54	1204	4.95	1248	5.31	1291	5.66

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- 1. Boldface** indicates field-supplied drive required. (See Note 3)
- Shading** indicates field-supplied motor and drive required
- Standard drive range is 860 to 1080 rpm. All other rpms require a field-supplied drive.
- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 4.2. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate.

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

Airflow (Cfm)	External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3700	677	1.20	748	1.43	810	1.65	869	1.89	928	2.17	984	2.43	1036	2.68	1080	2.90	1114	3.07	1135	3.17
3800	691	1.28	761	1.52	822	1.75	880	1.98	937	2.28	993	2.55	1046	2.81	1092	3.05	1129	3.25	1156	3.39
3900	705	1.37	773	1.62	834	1.86	891	2.08	947	2.39	1002	2.66	1055	2.94	1102	3.20	1143	3.42	1174	3.59
4000	720	1.47	786	1.71	847	1.97	902	2.19	957	2.50	1011	2.79	1064	3.07	1112	3.34	1155	3.59	1190	3.80
4100	734	1.56	800	1.82	860	2.09	914	2.31	967	2.60	1021	2.91	1072	3.20	1121	3.49	1165	3.76	1203	3.99
4200	749	1.66	813	1.92	873	2.21	926	2.44	978	2.71	1030	3.04	1081	3.34	1130	3.64	1175	3.92	1215	4.18
4300	764	1.77	826	2.04	886	2.33	938	2.57	989	2.83	1040	3.18	1090	3.48	1139	3.79	1185	4.08	1226	4.36
4400	779	1.88	840	2.16	899	2.46	951	2.71	1000	2.96	1050	3.31	1100	3.63	1148	3.94	1194	4.25	1236	4.54
4500	793	1.99	854	2.28	912	2.59	963	2.86	1012	3.09	1061	3.43	1109	3.78	1157	4.09	1203	4.42	1246	4.72
4600	808	2.11	868	2.42	925	2.73	975	3.00	1024	3.25	1071	3.56	1119	3.93	1166	4.26	1212	4.58	1255	4.91
4700	822	2.24	882	2.56	937	2.86	988	3.16	1036	3.42	1082	3.70	1129	4.09	1175	4.43	1221	4.76	1264	5.09
4800	837	2.37	896	2.71	950	3.00	1001	3.32	1048	3.59	1093	3.86	1139	4.24	1185	4.60	1230	4.93	1273	5.28
4900	852	2.51	910	2.86	963	3.15	1014	3.48	1060	3.76	1105	4.02	1150	4.38	1194	4.77	1239	5.12	1282	5.47
5000	867	2.65	924	3.01	977	3.30	1027	3.65	1073	3.94	1117	4.20	1161	4.54	1204	4.95	1248	5.31	1291	5.66
5100	882	2.79	938	3.17	990	3.46	1040	3.82	1085	4.12	1129	4.40	1172	4.71	1214	5.13	1257	5.51	—	—
5200	896	2.95	952	3.33	1003	3.63	1053	4.00	1098	4.30	1141	4.60	1183	4.91	1225	5.29	1267	5.70	—	—
5300	911	3.11	967	3.50	1017	3.80	1066	4.18	1111	4.50	1153	4.80	1194	5.08	1236	5.47	—	—	—	—
5400	926	3.27	981	3.68	1030	3.98	1079	4.35	1124	4.70	1166	5.01	1206	5.29	1247	5.65	—	—	—	—
5500	940	3.44	995	3.86	1044	4.17	1092	4.54	1137	4.91	1178	5.22	1218	5.52	—	—	—	—	—	—
5600	955	3.62	1010	4.04	1058	4.38	1105	4.73	1150	5.12	1190	5.44	1230	5.75	—	—	—	—	—	—
5700	970	3.80	1024	4.23	1072	4.59	1118	4.93	1163	5.34	1203	5.67	—	—	—	—	—	—	—	—
5800	985	3.99	1039	4.42	1086	4.80	1131	5.14	1176	5.56	—	—	—	—	—	—	—	—	—	—
5900	1000	4.18	1053	4.62	1100	5.02	1144	5.36	—	—	—	—	—	—	—	—	—	—	—	—
6000	1015	4.39	1068	4.83	1114	5.25	1158	5.58	—	—	—	—	—	—	—	—	—	—	—	—
6100	1030	4.59	1083	5.04	1128	5.46	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1046	4.81	1097	5.26	1142	5.71	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

- 1. Boldface** indicates field-supplied drive required. (See Note 4.)
- Shading** indicates alternate motor and/or drive cannot be used.
- Shading** indicates field-supplied motor and drive required.
- Standard drive range is 900 to 1260 rpm. Alternate drive range is 860 to 1080 rpm. All other rpms require a field-supplied drive.

- Values include losses for filters, unit casing, and wet coils. See page 30 for accessory/FIOP static pressure information.
- Maximum continuous bhp is 5.25 for the standard motor and 4.20 for the alternate motor. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Data table on page 29 for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Interpolation is permissible. Do not extrapolate.

FAN RPM AT MOTOR PULLEY SETTING*

UNIT 48HJ	MOTOR PULLEY TURNS OPEN												
	0	½	1	1½	2	2½	3	3½	4	4½	5	5½	6
004	1090	1055	1025	990	960	925	890	860	825	795	760	—	—
005	1185	1150	1115	1080	1045	1015	980	945	910	875	840	—	—
006	1460	1425	1385	1350	1315	1275	1240	1205	1165	1130	1095	1055	1020
007	1585	1540	1490	1445	1400	1350	1305	1260	1210	1165	1120	—	—
008, 009	1085	1060	1035	1010	985	960	935	910	890	865	840	—	—
012, 014 Alt	1080	1060	1035	1015	990	970	950	925	905	880	860	—	—
014 Std	1260	1220	1185	1155	1130	1100	1075	1045	1015	990	960	930	900

*Approximate fan rpm shown.

EVAPORATOR FAN MOTOR DATA

UNIT 48HJ	UNIT PHASE	MAXIMUM CONTINUOUS BHP*	MAXIMUM OPERATING WATTS*	UNIT VOLTAGE	MAXIMUM AMP DRAW
004	Single	1.20	1000	208/230	5.4
	Three	1.20	1000	208/230	5.4
				460	2.4
005	Single	1.20	1000	575	2.4
				208/230	5.4
	Three	1.20	1000	208/230	5.4
006	Single	1.80	1921	460	2.4
				575	2.4
	Three	1.80	1921	208/230	6.4
007	Single	1.80	1921	460	2.9
				575	2.9
	Three	2.40	2120	208/230	6.4
008, 009	Single	2.40	2615	460	2.9
				575	2.9
	Three	2.90	2615	208/230	7.9
012, 014 (Alt)	Single	4.20	3775	460	3.6
				575	3.6
	Three	4.20	3775	208/230	12.6
014 (Std)	Single	5.25	4400	460	5.7
				575	5.7
	Three	5.25	4400	208/230	15.0
				460	7.4
				575	7.4

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 your 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.

Performance data (cont)



EVAPORATOR-FAN MOTOR EFFICIENCY

UNIT	EFFICIENCY%
48HJ004,005	75
48HJ006	74
48HJ007	84
48HJ008,009	80
48HJ012, 48HJ014 (Alt)	85
48HJ014 (Std)	87

NOTE: Convert bhp to watts using the following formula:

$$\text{watts} = \frac{\text{bhp (746)}}{\text{motor efficiency}}$$

ECONOMIZER STATIC PRESSURE DROP (in. wg) — 48HJ004-007

UNIT	CFM								
	900	1200	1400	1600	1800	2000	2200	2400	2600
Varislide™	.05	.05	.05	.05	.05	.05	.05	.05	.05
PARABLADE	.08	.10	.17	.26	.33	.34	.36	.40	.44

ECONOMIZER STATIC PRESSURE DROP (in. wg) — 48HJ008-014

UNIT	CFM								
	2200	2500	3000	3500	4000	4500	5000	5500	6000
Varislide	.02	.02	.03	.04	.05	.06	.07	.08	.09
PARABLADE	.21	.25	.35	.49	.61	—	—	—	—

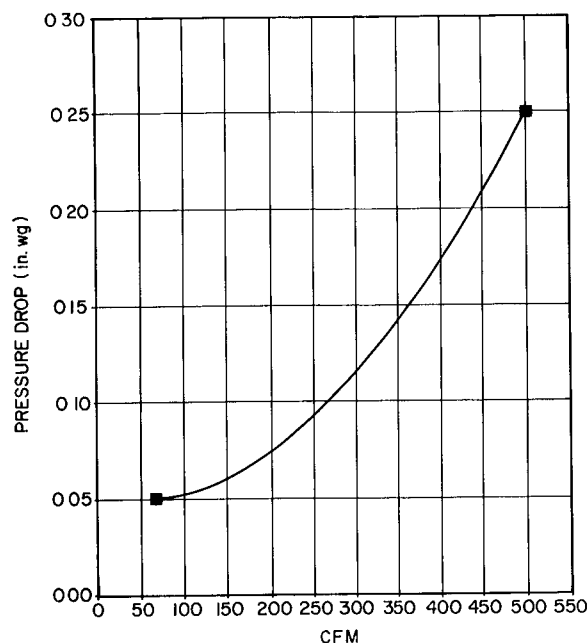
OUTDOOR SOUND POWER (TOTAL UNIT)

48HJ	ARI RATING (60 Hz)	OCTAVE BANDS							
		63	125	250	500	1000	2000	4000	8000
004-006	8.0 Bels	63.2	69.5	70.0	73.7	73.5	70.6	66.7	60.3
007	8.2 Bels	57.9	69.7	73.4	78.6	75.6	73.2	70.2	62.0
008-012	8.6 Bels	63.7	69.9	72.5	78.2	81.1	77.3	73.3	66.8
014	8.8 Bels	83.7	87.2	83.4	82.8	83.0	77.7	71.8	67.0

ARI — Air Conditioning and Refrigeration Institute

Bels — Sound Levels (1 bel = 10 decibels)

VARISLIDE™ ECONOMIZER/TWO-POSITION DAMPER BAROMETRIC RELIEF DAMPER CHARACTERISTICS 48HJ004-014



PARABLADE ECONOMIZER BAROMETRIC RELIEF DAMPER STATIC PRESSURE DROP (in. wg) — 50HJ004-007

CFM							
100	200	300	400	500	600	700	800
.01	.05	.12	.22	.34	.49	.67	.87

PARABLADE ECONOMIZER BAROMETRIC RELIEF DAMPER PRESSURE DROP (in. wg) — 50HJ008-014

CFM					
200	400	600	800	1000	1200
.06	.13	.20	.31	.52	.73

ALTITUDE DERATING FACTOR* — 48HJ004-014

ELEVATION	MAXIMUM HEATING VALUE (Btu/ft ³)
0-2000	1100
2001-3000	1050
3001-4000	1000
4001-5000	950
5001-6000	900

*Derating of the unit is not required unless the heating value of the gas exceeds the values listed in the table above, or if the elevation exceeds 6000 ft. Derating conditions must be 4% per thousand ft above sea level. 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.

ALTITUDE COMPENSATION* — 48HJ004-007

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	38
2,000	34	43	30	39
3,000	35	44	31	40
4,000	36	44	32	41
5,000	36	44	33	42
6,000	37	45	34	43
7,000	37	45	35	43
8,000	38	46	36	44
9,000	39	47	37	44
10,000	41	48	38	45
11,000	43	48	39	45
12,000	44	49	40	46
13,000	44	49	41	47
14,000	45	50	42	47

*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 are available through your local 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, heat input rate should be reduced at higher altitudes.

†Orifices available through your local Carrier distributor

UNITS WITHOUT ELECTRICAL CONVENIENCE OUTLET

UNIT	NOMINAL VOLTAGE (V-Ph-Hz)	VOLTAGE RANGE		COMPRESSOR (each)		OFM (each)		IFM	COMBUSTION FAN MOTOR	POWER SUPPLY		MINIMUM UNIT DISCONNECT SIZE*	
		Min	Max	RLA	LRA	FLA	FLA			MCA	MOCp	FLA	LRA
48HJE/HJF004 (3 Tons)	208/230-1-60	187	254	16.0	88.0	0.7	4.9		.57	25.6/25.6	35/35†	25/25	101/101
	208/230-3-60	187	254	10.3	77.0	0.7	4.9		.57	18.5/18.5	25/25†	18/18	90/90
	460-3-60	414	508	5.1	39.0	0.4	2.2		.30	9.0	15†	9	46
	575-3-60	518	632	4.2	31.0	0.4	2.2		.30	7.3	15†	7	37
48HJD/HJE/HJF005 (4 Tons)	208/230-1-60	187	254	23.7	129.0	0.7	4.9		.57	35.2/35.2	45/45†	34/34	142/142
	208/230-3-60	187	254	13.5	99.0	0.7	4.9		.57	22.5/22.5	30/30†	22/22	112/112
	460-3-60	414	508	7.4	49.5	0.4	2.2		.30	9.7	15†	12	57
	575-3-60	518	632	5.8	40.0	0.4	2.2		.30	9.3	15†	9	46
48HJD/HJE/HJF006 (5 Tons)	208/230-1-60	187	254	28.8	169.0	1.5	8.8		.57	46.3/46.3	60/60†	45/45	216/216
	208/230-3-60	187	254	17.3	123.0	1.5	5.8		.57	29.0/29.0	35/35†	28/28	168/168
	460-3-60	414	508	9.0	62.0	0.8	2.6		.30	14.7	20†	14	84
	575-3-60	518	632	7.1	50.0	0.8	2.6		.30	11.6	15†	11	59
48HJD/HJE/HJF007 (6 Tons)	208/230-3-60	187	254	20.5	156.0	1.4	5.8		.57	32.8/32.8	40/40†	32/32	200/200
	460-3-60	414	508	9.6	70.0	0.6	2.6		.30	15.2	20†	15	92
	575-3-60	518	632	7.7	56.0	0.6	2.6		.30	12.2	15†	12	74
	208/230-3-60	187	254	12.4	88.4	1.4	7.5		.57	38.2/38.2	45/45†	40/40	242/242
48HJD/HJE/HJF008 (7½ Tons)**	460-3-60	414	508	6.4	44.0	0.7	3.4		.30	19.2	25†	20	121
	575-3-60	518	632	4.8	34.0	0.7	3.4		.30	14.6	20†	16	95
	208/230-3-60	187	254	15.0	99.0	1.4	7.5		.57	44.1/44.1	50/50†	46/46	264/264
	460-3-60	414	508	8.2	49.5	0.7	3.4		.30	19.9	30†	24	132
48HJD/HJE/HJF009 (8½ Tons)**	575-3-60	518	632	5.8	40.0	0.7	3.4		.30	16.9	20†	18	107
	208/230-3-60	187	254	19.3	123.0	1.4	10.6		.57	56.8/56.8	70/70†	60/60	337/337
	460-3-60	414	508	10.0	62.0	0.7	4.8		.30	28.7	35†	30	170
	575-3-60	518	632	7.9	50.0	0.7	4.8		.30	22.7	25†	24	136
48HJD/HJE014 (12½ Tons) (Std)**	208/230-3-60	187	254	25.9	156.0	1.4	15.0		.57	76.1/76.1	90/90†	80/80	426/426
	460-3-60	414	508	12.9	70.0	0.7	7.4		.30	37.8	45†	40	197
	575-3-60	518	632	7.4	54.0	0.7	7.4		.30	23.7	30†	25	154
	208/230-3-60	187	254	25.9	156.0	1.4	10.6		.57	71.7/71.7	80/80†	75/75	403/403
48HJD/HJE014 (12½ Tons) (Alt)**	460-3-60	414	508	12.9	70.0	0.7	4.8		.30	35.2	45†	39	186
	575-3-60	518	632	7.4	54.0	0.7	4.8		.30	21.6	25†	23	144

LEGEND

CUL	— Canadian Underwriters' Laboratories
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

*Used to determine minimum disconnect per NEC

†Fuse or HACR circuit breaker.

**Units have 2 outdoor fan motors.

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 CUL units may be fuse or circuit breaker.
2. Electrical data based on 95 F ambient outdoor-air temperature ± 10% voltage



UNITS WITH ELECTRICAL CONVENIENCE OUTLET

UNIT	NOMINAL VOLTAGE (V-Ph-Hz)	VOLTAGE RANGE		COMPRESSOR		OFM	IFM	COMBUSTION FAN MOTOR	POWER SUPPLY WITH OUTLET		MINIMUM UNIT DISCONNECT SIZE*	
		Min	Max	RLA	LRA				MCA	MOCP	FLA	LRA
48HJE/HJF004 (3 Tons)	208/230-1-60	187	254	16.0	88.0	0.7	4.9	.57	31.6/31.6	40/40†	30/30	106/106
	208/230-3-60	187	254	10.3	77.0	0.7	4.9	.57	24.5/24.5	30/30†	24/24	95/95
	460-3-60	414	508	5.1	39.0	0.4	2.2	.30	14.6	20†	14	59
	575-3-60	518	632	4.2	31.0	0.4	2.2	.30	11.5	15†	11	47
48HJD/HJE/HJF005 (4 Tons)	208/230-1-60	187	254	23.7	129.0	0.7	4.9	.57	41.2/41.2	50/50†	39/39	147/147
	208/230-3-60	187	254	13.5	99.0	0.7	4.9	.57	28.5/28.5	35/35†	28/28	117/117
	460-3-60	414	508	7.4	49.5	0.4	2.2	.30	14.6	20†	14	59
	575-3-60	518	632	5.8	40.0	0.4	2.2	.30	11.5	15†	11	47
48HJD/HJE/HJF006 (5 Tons)	208/230-1-60	187	254	28.8	169.0	1.5	8.8	.57	52.3/52.3	60/60†	51/51	221/221
	208/230-3-60	187	254	17.3	123.0	1.5	5.8	.57	34.9/34.9	40/40†	34/34	173/173
	460-3-60	414	508	9.0	62.0	0.8	2.6	.30	17.4	20†	17	87
	575-3-60	518	632	7.1	50.0	0.8	2.6	.30	13.8	20†	13	61
48HJD/HJE/HJF007 (6 Tons)	208/230-3-60	187	254	20.5	156.0	1.4	5.8	.57	38.8/38.8	45/45†	35/35	205/205
	460-3-60	414	508	9.6	70.0	0.6	2.6	.30	17.9	20†	17	95
	575-3-60	518	632	7.7	56.0	0.6	2.6	.30	14.4	20†	14	75
	208/230-3-60	187	254	12.4	88.0	1.4	7.5	.57	44.2/44.2	50/50†	46/46	247/247
48HJD/HJE/HJF008 (7½ Tons)**	460-3-60	414	508	6.4	44.0	0.7	3.4	.30	21.9	25†	23	124
	575-3-60	518	632	4.8	34.0	0.7	3.4	.30	16.8	20†	17.5	97
	208/230-3-60	187	254	15.0	99.0	1.4	7.5	.57	50.1/50.1	60/60†	52/52	269/269
	460-3-60	414	508	8.2	49.5	0.7	3.4	.30	26.0	30†	27	135
48HJD/HJE/HJF009 (8½ Tons)**	575-3-60	518	632	5.8	40.0	0.7	3.4	.30	19.1	25†	20	109
	208/230-3-60	187	254	19.3	123.0	1.4	10.6	.57	62.8/62.8	70/70	65/65	341/341
	460-3-60	414	508	10.0	62.0	0.7	4.8	.30	31.4	35†	33	172
	575-3-60	518	632	7.9	50.0	0.7	4.8	.30	24.9	30†	26	138
48HJD/HJE/HJF014 (12½ Tons) (Std)**	208/230-3-60	187	254	25.9	156.0	1.4	15.0	.57	82.1/82.1	90/90	86/86	431/431
	460-3-60	414	508	12.9	70.0	0.7	7.4	.30	40.5	45†	42	200
	575-3-60	518	632	7.4	54.0	0.7	7.4	.30	25.9	30†	27.1	156
	208/230-3-60	187	254	25.9	156.0	1.4	10.6	.57	77.7/77.7	90/90	81/81	407/407
48HJD/HJE/HJF014 (12½ Tons) (Alt)**	460-3-60	414	508	12.9	70.0	0.7	4.8	.30	37.9	45†	39	188
	575-3-60	518	632	7.4	54.0	0.7	4.8	.30	23.8	30†	24.7	147

LEGEND

CUL	— Canadian Underwriters' Laboratories
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

*Used to determine minimum disconnect per NEC.

†Fuse or HACR circuit breaker.

**Units have 2 outdoor fan motors

NOTES:

- 1 In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the over-current protective device for the unit shall be fuse or HACR breaker. The CUL units may be fuse or circuit breaker.
- 2 Electrical data based on 95 F ambient outdoor-air temperature $\pm 10\%$ voltage.



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. The bottom drain can be used for thru-the-curb connections

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.

To convert from vertical discharge to horizontal discharge:

1. Remove economizer/two-position damper to gain access to return duct opening.
2. Move the horizontal-discharge duct opening covers to the vertical discharge openings.
3. Rotate economizer 90 degrees (until the economizer/two-position damper motor faces the condenser section).
4. Rotate the barometric relief damper 90 degrees.
5. Install block-off plate over the opening on the access panel.

Thru-the-curb service connections — Roof curb connections allow field power wires, control wires, and gas supply to enter through the roof curb opening.

Thermostat — Use of 2-stage cooling thermostat is recommended for all size 004-007 units equipped with 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.

Minimum airflow — Minimum airflow for cooling is 300 cfm/ton.

Minimum ambient operating temperature — Minimum ambient operating temperature for size 004-014 standard units is 25 F. With accessory Motormaster® control, units can operate at outdoor temperatures down to -20 F.

Maximum operating outdoor-air temperature — Maximum outdoor-air operating temperature for cooling is 125 F.

High altitudes — These may require a change to the gas orifice. Refer to Altitude Compensation tables on page 31.

Minimum temperature — Minimum temperature of air entering the dimpled heat exchanger is 50 F continuous and 45 F intermittent.

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 table and the notes following each Fan Performance table can be utilized with extreme confidence.

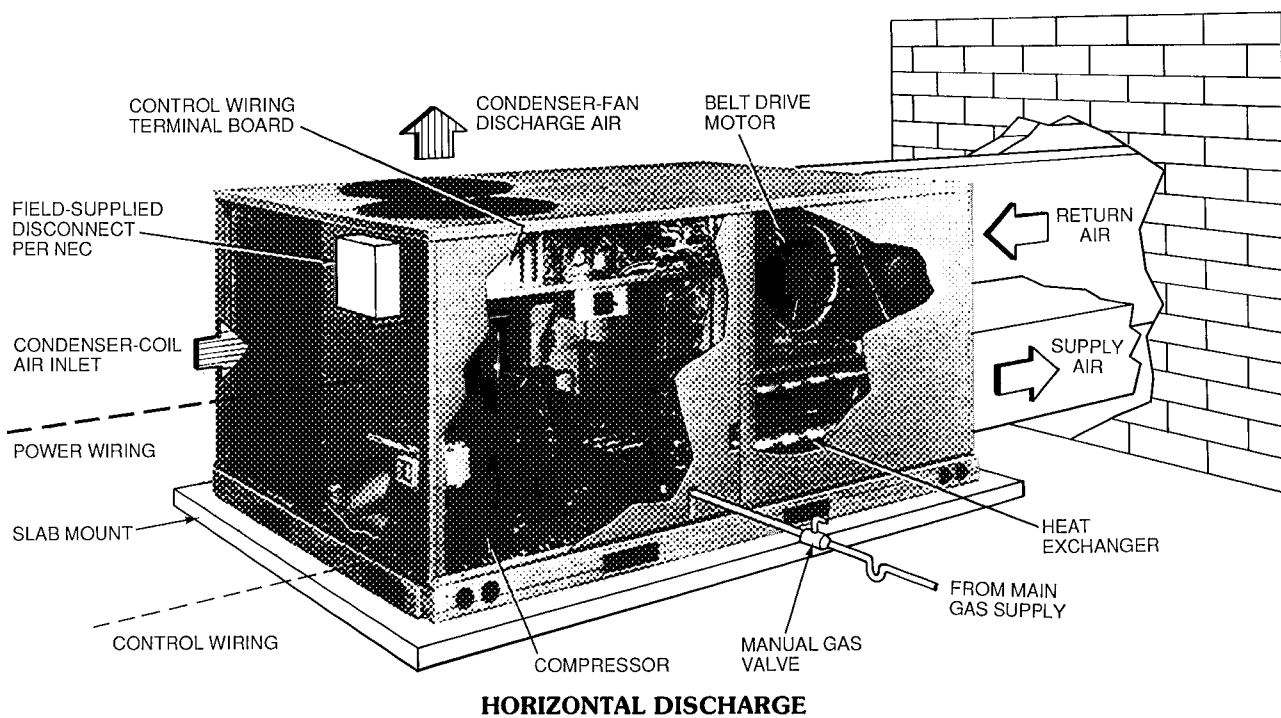
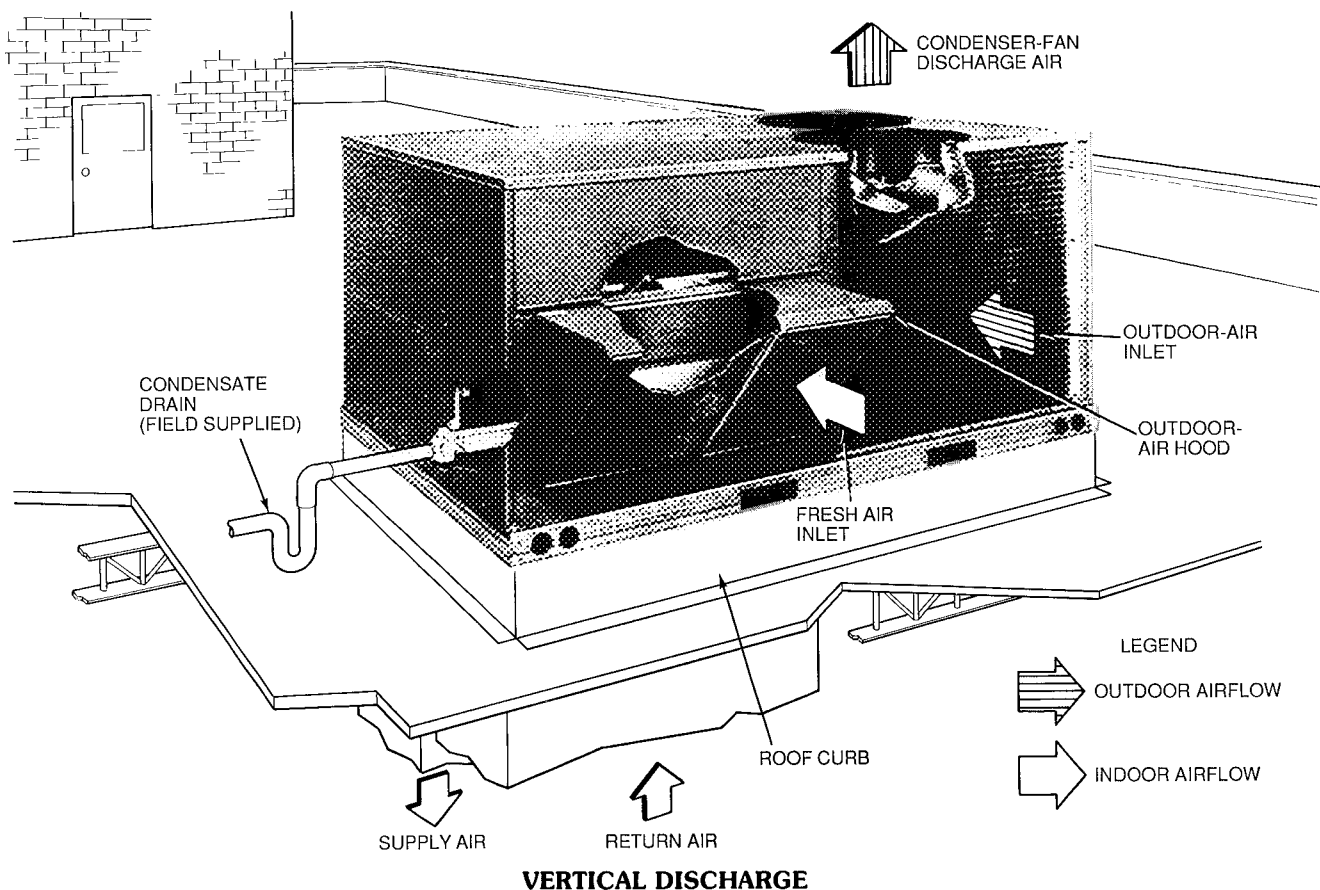
Using Carrier motors to the values listed in the Physical Data, Fan Performance, and Evaporator-Fan Motor Data tables *will not* result in nuisance tripping or premature motor failure. In addition, the unit warranty will not be affected.

Apollo communicating controls — Apollo communicating controls must be used with a Carrier master thermostat.

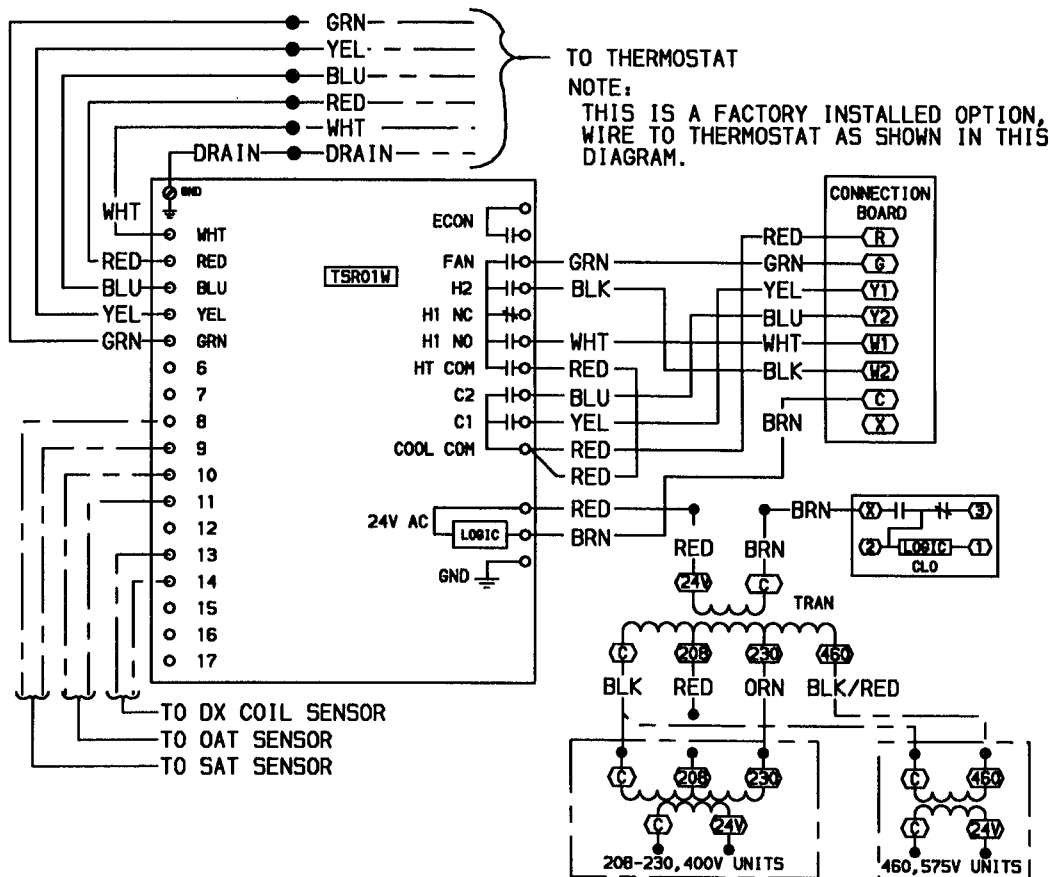
Thru-the-bottom connections — The accessory thru-the-bottom connections are needed to ensure proper connections when routing wiring and piping through the base-pan and roof curb.

Typical piping and wiring

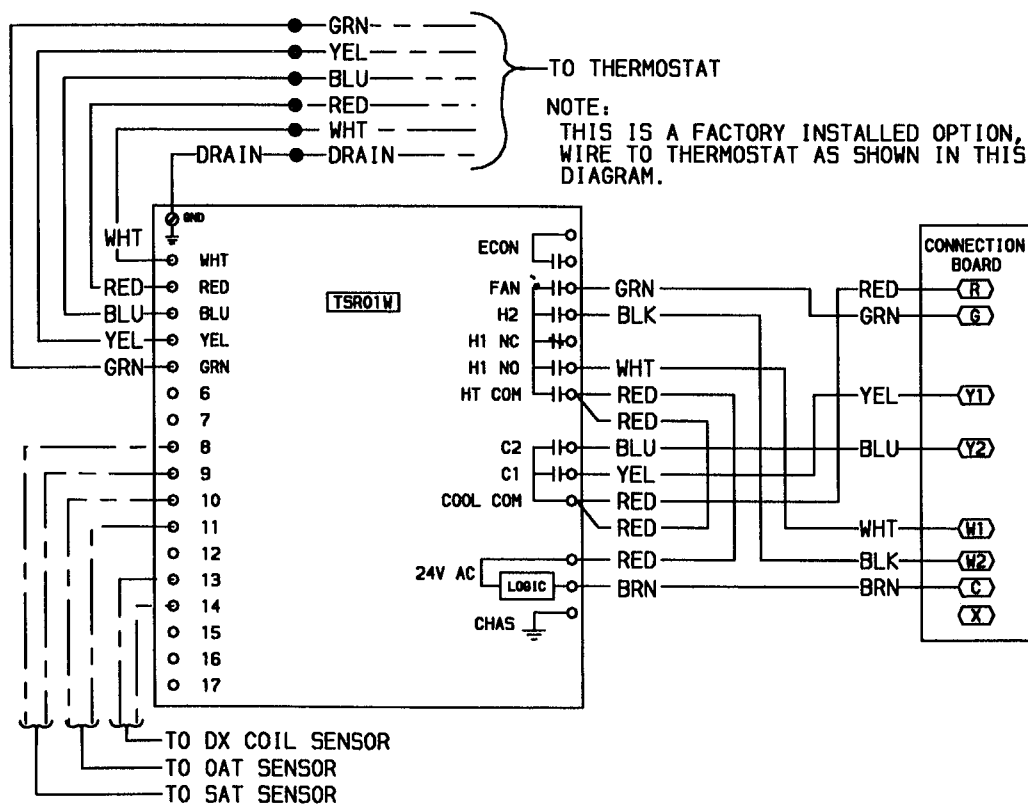
Carrier®

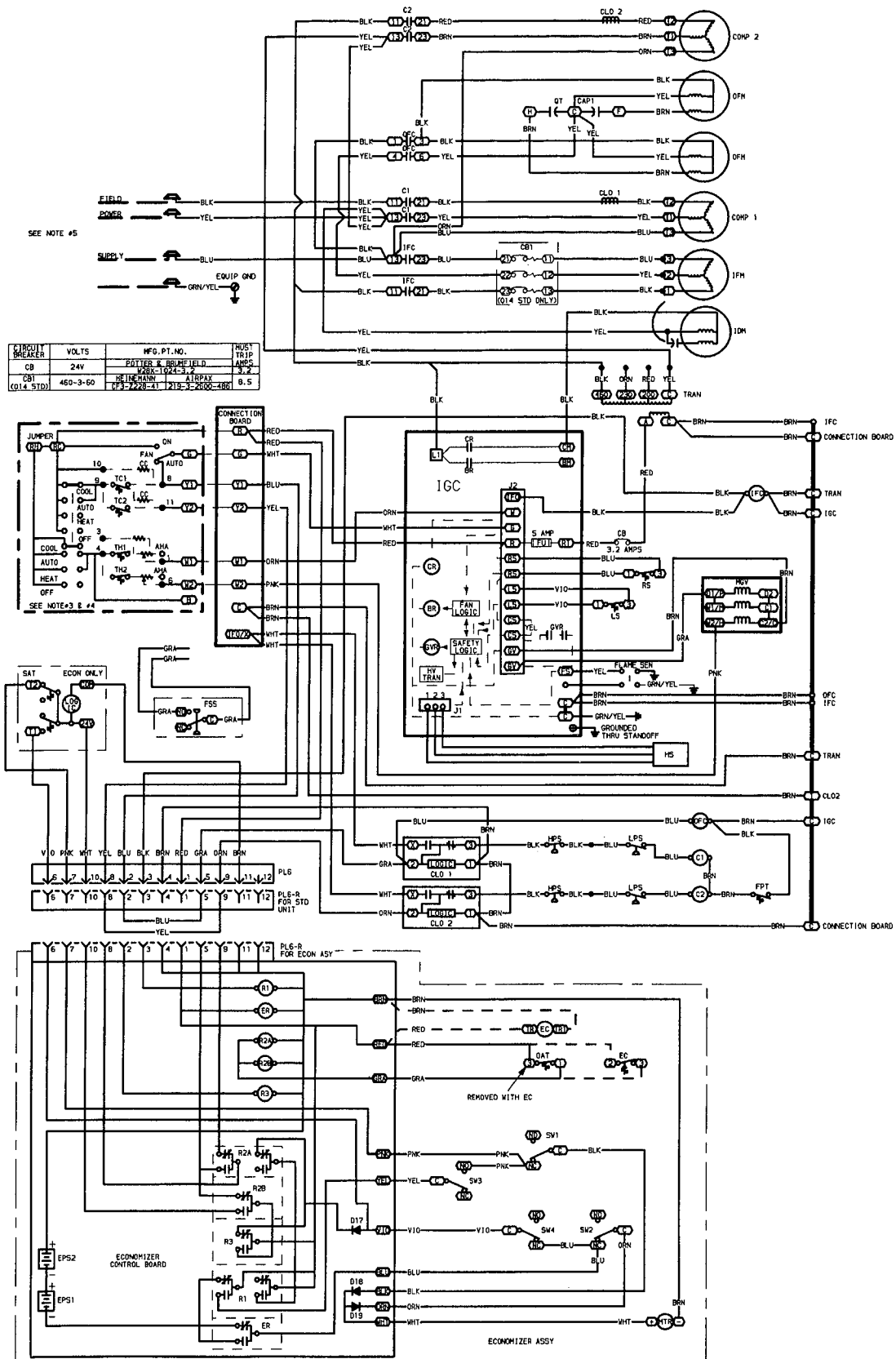


APOLLO AND THERMOSTAT WIRING (48HJ004-007)



APOLLO AND THERMOSTAT WIRING (48HJ008-014)





Typical wiring schematic (cont)



LEGEND FOR TYPICAL WIRING SCHEMATIC

IMPORTANT: Refer to unit wiring label for actual unit wiring

AHA	— Adjustable Heat Anticipator	OAT	— Outdoor-Air Thermostat
C	— Contactor, Compressor	OFC	— Outdoor (Condenser) Fan Contactor
CB	— Circuit Breaker	OFM	— Outdoor (Condenser) Fan Motor
CC	— Cooling Compensator	P	— Plug
CH	— Crankcase Heater	PL	— Plug Assembly
CLO	— Compressor Lockout	QT	— Quadruple Terminal
COMP	— Compressor Motor	R	— Relay
CONN	— Connection	RS	— Rollout Switch
D	— Diode	SAT	— Supply-Air Thermostat
EC	— Enthalpy Control	SEN	— Sensor
ECON	— Economizer	SW1	— Switch Fully Open
EPS	— Emergency Power Supply (9-Volt Battery)	SW2	— Switch Fully Closed
EQUIP	— Equipment	SW3	— Switch Minimum Vent Position
ER	— Economizer Relay	SW4	— Switch Maximum Vent Position
FPT	— Freeze-Protection Thermostat	TC	— Thermostat-Cooling
FS	— Flame Sensor	TH	— Thermostat-Heating
FSS	— Filter-Status Switch	TRAN	— Transformer
FU	— Fuse		Field Splice
GND	— Ground		Terminal (Marked)
GV	— Gas Valve		Terminal (Unmarked)
GVR	— Gas Valve Relay		Terminal Block
HPS	— High-Pressure Switch		Splice
HS	— Hall-Effect Sensor		Splice (Marked)
HV	— High Voltage		Factory Wiring
I	— Ignitor		Field Control Wiring
IDM	— Induced-Draft Motor		Field Power Wiring
IFC	— Indoor (Evaporator) Fan Contactor		Accessory or Optional Wiring
IFM	— Indoor (Evaporator) Fan Motor		To indicate common potential only, not to represent wiring
IGC	— Integrated Gas Unit Controller		
LED	— Light-Emitting Diode		
LPS	— Low-Pressure/Loss-of-Charge Switch		
LS	— Limit Switch		
MGV	— Main Gas Valve		
MTR	— Motor		
NC	— Normally Closed		
NO	— Normally Open		

NOTES FOR TYPICAL WIRING SCHEMATIC

1. If any of the original wire furnished must be replaced, it must be replaced with Type 90 C wire or its equivalent.
2. Three-phase motors are protected under primary single-phasing conditions.
3. Thermostat: HH07AT170, 172, 174, and P272-2783
Subbase: HH93AZ176, 178, and P272-1882, 1883.
4. Sizes 004-007:
Set heat anticipator for both stages at 0.14 amp.
Sizes 008-014:
Set heat anticipator for first stage at 14 amp, second stage at 0.20 amp, except for 008 and 009 low heat. Set both first and second stage at 0.14 amp.
5. Use copper conductors only.

Operating sequence for 48HJ004-007 units

Cooling, units without economizer — When thermostat calls for cooling, terminals G and Y1 and the compressor contactor (C) are energized. The indoor (evaporator) fan motor (IFM), compressor, and outdoor (condenser) fan motor (OFM) start. The OFM runs continuously while the unit is in cooling. When the thermostat is satisfied, C is deenergized and the compressor and OFM shut off. After a 30-second delay, the IFM shuts off. If the thermostat fan selector switch is in the ON position, the evaporator motor will run continuously.

Cooling, units with Varislide™ economizer — When the outdoor-air temperature is above the OAT setting and the room thermostat calls for cooling, the compressor contactor is energized to start the compressor and outdoor (condenser) fan motor (OFM). The indoor (evaporator) fan motor (IFM) is energized and the economizer damper moves to the minimum position. After the thermostat is satisfied, the damper moves to the fully closed position when IFM is deenergized.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for Y1 and G, the economizer damper moves to the minimum position when the indoor fan starts. The first stage of cooling is provided by the economizer. If the supply-air temperature is above 57 F, a switch on the supply-air thermostat is closed between the T2 terminal and the 24 vac terminal. This causes the damper to continue to modulate open until the supply-air temperature falls below 55 F or the damper reaches the fully open position.

When the supply-air temperature is between 55 F and 52 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals and between the T1 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the supply-air temperature falls below 52 F, a switch on the supply-air thermostat is closed between the T1 terminal and the 24 vac terminal. This causes the damper to modulate closed until the supply-air temperature rises above 55 F or the damper reaches the minimum position.

When the supply-air temperature is between 55 F and 57 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing second stage cooling. The compressor and outdoor fan will be energized and the position of the economizer damper will be determined by the supply-air temperature.

When the second stage of cooling is satisfied, the compressor and outdoor-fan motor will be deenergized. The damper position will be determined by the supply-air temperature.

When the first stage of cooling is satisfied, the IFM shuts off after a 30-second delay. The damper then moves to fully closed position.

Cooling, units with PARABLADE economizer —

When the outdoor air is above the enthalpy control setting, and the room thermostat calls for cooling, the compressor contactor is energized to start the compressor and the outdoor (condenser) fan motor. The indoor (evaporator) fan motor is energized and the economizer damper moves to the minimum position. After the room thermostat is satisfied the damper will spring return to the fully closed position.

When the outdoor air is below the enthalpy control setting and the thermostat calls for cooling, the economizer outdoor air damper is opened proportionally to maintain between 50 and 56 F at the mixed air sensor. If outside air alone cannot satisfy the cooling requirements, economizer cooling is integrated with mechanical cooling. When the room thermostat is satisfied, the damper will spring return to the fully closed position.

Heating, units without economizer — When the thermostat calls for heating, terminal 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.

Heating, units with economizer/two-position damper

— When the thermostat calls for heating, terminal 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 and the damper moves to the minimum position. If the accessory two-position damper is used, the outdoor-air damper opens to the minimum position whenever the evaporator fan runs. 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. The economizer damper then moves to the fully closed position. When using continuous fan, the damper will remain in the minimum position.

Operating sequence for 48HJ008-014 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, compressor no. 1, and condenser fans start. The condenser-fan motors run 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.

When the thermostat is satisfied, C1 and C2 are deenergized and the compressors and outdoor (condenser) fan motors (OFM) shut off. After a 30-second delay, the indoor (evaporator) fan motor (IFM) shuts off. If the thermostat fan selector switch is in the ON position, the evaporator motors will run continuously.

Cooling, units with Varislide™ economizer — When the outdoor-air temperature is above the OAT setting and the room thermostat calls for cooling, the compressor contactor no. 1 is energized to start compressor no. 1 and outdoor (condenser) fan motors (OFM). The indoor (evaporator) fan motor (IFM) is energized and the economizer damper moves to the minimum position. Upon a further call for cooling, compressor contactor no. 2 will be energized, starting compressor no. 2. After the thermostat is satisfied and the IFM is deenergized, the damper moves to the fully closed position.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for Y1 and G, the economizer damper moves to the minimum position when the indoor fan starts. The first stage of cooling is provided by the economizer. If the supply-air temperature is above 57 F, a switch on the supply-air thermostat is closed between the T2 terminal and the 24 vac terminal. This causes the damper to continue to modulate open until the supply-air temperature falls below 55 F or the damper reaches the fully open position.

When the supply-air temperature is between 55 F and 52 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals and between the T1 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the supply-air temperature falls below 52 F, a switch on the supply-air thermostat is closed between the T1 terminal and the 24 vac terminal. This causes the damper to modulate closed until the supply-air temperature rises above 55 F or the damper reaches the minimum position.

When the supply-air temperature is between 55 F and 57 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing second stage cooling. Compressor no. 1 and outdoor fan will be energized, and the position of the economizer damper will be determined by the supply-air temperature. Compressor no. 2 is locked out.

When the second stage of cooling is satisfied, the compressor and outdoor (condenser) fan motors will be deenergized. The damper position will be determined by the supply-air temperature.

When the first stage of cooling is satisfied, the IFM shuts off after a 30-second delay. The damper then moves to fully closed position.

Cooling, units with PARABLADE economizer — When the outdoor air is above the enthalpy control setting, and the room thermostat calls for cooling, the compressor contactor no. 1 is energized to start compressor no. 1 and the outdoor (condenser) fan motors. The indoor (evaporator) fan motor is energized and the economizer damper moves to the minimum position. Upon further call for cooling, compressor contactor no. 2 is energized, starting compressor no. 2. After the room thermostat is satisfied the damper will spring return to the fully closed position.

When the outdoor air is below the enthalpy control setting and the thermostat calls for cooling, the economizer outdoor air damper is opened proportionally to maintain between 50 and 56 F at the mixed air sensor. If outside air alone cannot satisfy the cooling requirements, economizer cooling is integrated with mechanical cooling and the second compressor is locked out. When the room thermostat is satisfied, the damper will spring return to the fully closed position.

Heating, units without economizer — When the thermostat calls for heating, terminal W1 is energized. In order 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 (IDM) is then energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited. 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 and W2 are deenergized, the IFM stops after a 45-second time-off delay.

Heating, units with economizer/two-position damper

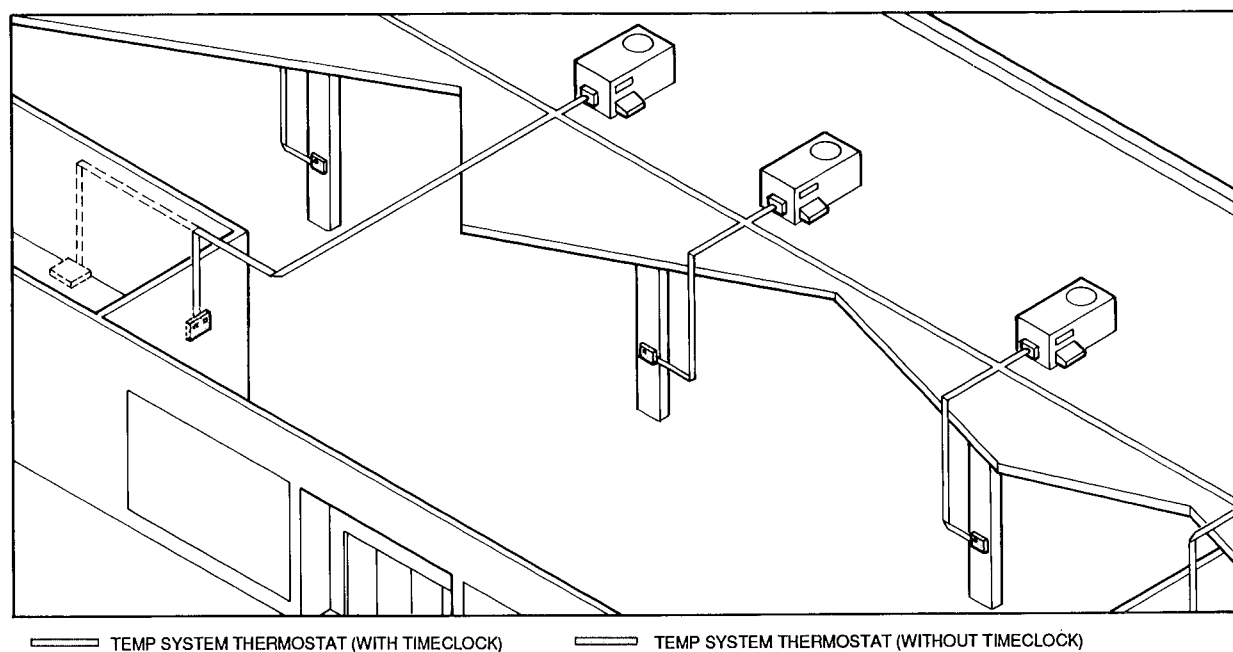
— When the thermostat calls for heating, terminal W1 is energized. In order to prevent thermostat short-cycling, the unit is locked into the Heating mode for at least 1 minute when W1 is energized. The induced-draft motor is then energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited and the damper moves to the minimum position. If the accessory two-position damper is used, the outdoor-air damper opens to the minimum position whenever the evaporator fan runs. 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 and W2 are deenergized, the IFM stops after a 45-second time-off delay. The economizer damper then moves to the fully closed position. When using continuous fan, the damper will remain in the minimum position.

TEMP systems

A TEMP System is a network of communicating Carrier TEMP System Thermostats and rooftop, factory-mounted Apollo direct digital controls, each serving its own zone and heating/cooling unit. Networking allows your building manager to easily access each of your systems from a single location...whether they are in the same building or located throughout town.

The TEMP System's inherently flexible, modular base design supports the *exact* number of independent, single zone systems you require.. no more, no less, no compromises

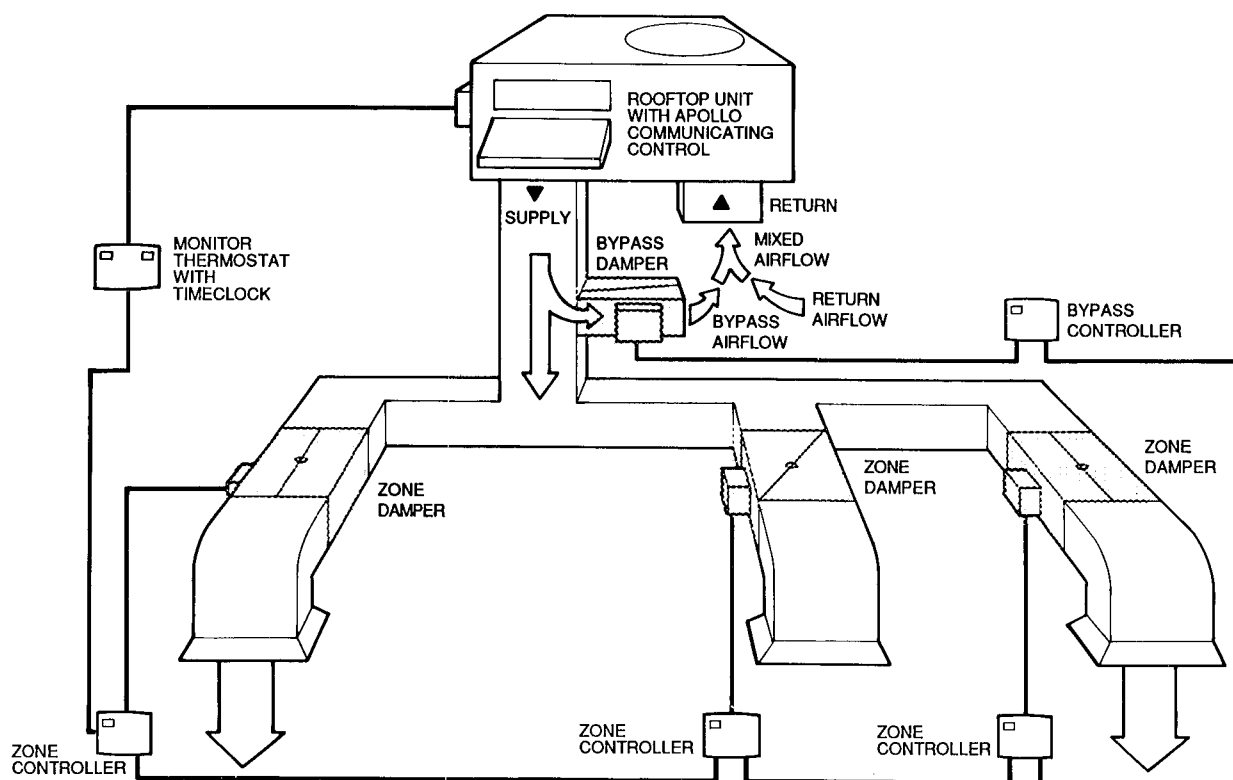
Ideal for department stores, small office buildings, fast food chains, schools and hotels, a TEMP System is a cost-effective way to maintain comfortable building environments.



Variable Volume/Variable Temperature VVT® Systems

VVT Systems are dedicated to total building comfort. Carrier thermostats, zone dampers, and HVAC equipment with factory-mounted direct digital controls continually monitor and adjust their operation to ensure uninterrupted and personalized comfort for all occupants.

Through the use of communicating electronic controls, VVT Systems are able to provide the comfort of a multiple zone system while using the installation, operating and maintenance economics of single zone equipment . virtually putting an end to the cost vs. comfort compromise.



Packaged Rooftop Cooling Unit with Gas Heat — Constant Volume Application

HVAC Guide Specifications

Size Ranges: **3 to 6 Tons, Nominal (Cooling)**
50,000 to 150,000 Btuh, Nominal
(Input Heating)

Carrier Model Number: **48HJD**
48HJE
48HJF

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor rooftop mounted, electrically controlled heating and cooling unit utilizing a scroll compressor 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 shall be rated in accordance with ARI Standards 210/240 and 270. Unit shall be designed in accordance with UL Standard 1995.
- B. Unit shall be designed to conform to ANSI/ASHRAE 15, latest revision.
- C. Unit shall be UL tested. Unit shall be certified in accordance with ANSI Z21.47 Standards. Unit shall be certified under Canadian standards as a total package.
- D. Roof curb shall be designed to conform to NRCA Standards.
- E. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
- F. Unit casing shall be capable of withstanding Federal test Method Standard No. 141 (Method 6061) 500-hour salt spray test.

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, bonderized and coated with a prepainted baked enamel finish on all externally exposed surfaces, with primer coated internal panels.
2. Indoor blower (evaporator-fan) compartment interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, flexible fiberglass insulation, coated on the air side. Aluminum foil faced fiberglass insulation shall be used in the furnace compartment.
3. Cabinet panels shall be easily removable for servicing.

4. Filters (2 in.) will be accessible through a removable access door, and will require no screw removal (tool-less).
5. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
6. Units shall have a factory-installed condensate drain pan made of a non-corrosive material, providing a minimum 3/4-in. connection. The condensate pan must be externally trapped. Unit shall be shipped in the end condensate drain position, but can be easily changed to the bottom condensate drain position. Condensate pan has a sloped design to conform to ASHRAE Standard 62.
7. Thru-the-bottom power connection capability is standard

C. Fans:

1. Indoor blower (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 which are statically and dynamically balanced.
 - c. Bearings shall be sealed, permanently lubricated ball-bearing type for longer life and lower maintenance
2. Indoor (evaporator) fan shall be made from steel with a corrosion resistant finish and shall be statically and dynamically balanced.
3. Outdoor (condenser) fan shall be of the direct-driven propeller type and shall discharge air vertically upward.
4. Outdoor (condenser) fan shall be totally enclosed with permanently lubricated bearings
5. Outdoor (condenser) fan shall have aluminum blades riveted to corrosion resistant steel spiders and shall be dynamically balanced.
6. 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:

1. Fully hermetic scroll type, internally protected with internal high-pressure relief.
2. Factory rubber shock mounted and internally spring mounted on independent dedicated rails for vibration isolation.

E. Coils:

1. Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless internally-enhanced copper tubes with all joints brazed.
2. Tube sheet openings shall be belled to prevent tube wear

3. Evaporator coil shall be of the full face active design.

F. Heating Section:

1. Induced draft combustion type with energy saving direct spark ignition system, redundant main gas valve, and 2-stage heat.
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, and shall have a 10-year warranty.
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.
5. The Integrated Gas Unit Control (IGC) board shall provide timed control of evaporator fan functioning and burner ignition. An LED (light-emitting diode) shall provide diagnostic information. The LED shall be visible without removing the control box access panel.
6. IGC board contains anti-cycle protection for gas heat operation.

G. Refrigerant Components:

Refrigerant circuit components shall include.

1. Acutrol™ multiple independent circuit feed system.
2. Filter drier to eliminate any moisture or foreign matter.
3. Service gage connections on suction, discharge, and liquid lines to charge, evacuate, and contain refrigerant.
4. Ability to route gage hoses through unit top cover to eliminate air bypass during diagnostic periods

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 300 fpm at nominal airflows
3. Filter section should use only one size filter

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. 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

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 switch.
- 2) Induced draft motor speed sensor.
- 3) Flame rollout switch (automatic reset).
- 4) Flame proving controls.

J. Operating Characteristics:

1. Unit shall be capable of starting and running at 125 F ambient outdoor temperature, exceeding maximum load criteria of ARI Standard 210/240.
2. Compressor with standard controls shall be capable of operation down to 25 F ambient outdoor temperature.
3. Unit provided with fan time delay to prevent cold air delivery before heat exchanger warms up.

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. Indoor (evaporator) fan motor shall have permanently lubricated bearings and inherent automatic reset thermal overload protection.
3. Outdoor totally enclosed 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 by * are specified. For assistance in amending the specifications, your local Carrier Sales Office should be contacted.

1. Roof Curb:

- a. Formed galvanized steel with wood nailer strip and capable of supporting entire unit weight.
- b. Allows for installing and securing ductwork to curb prior to mounting unit on the curb.

*

2. Direct Digital Controls:

- a. Shall be available as a factory-installed option
- b. Shall actively monitor all modes of operation as well as indoor-fan status, filter status, indoor air quality, supply air temperature, and outdoor air temperature.
- c. Shall work with Carrier TEMP and VVT® systems.
- d. Shall have built-in diagnostic capability for thermostat commands for both stages of heating and cooling, evaporator fan operation, and economizer operation.

- e. Shall be equipped with a 5-minute time delay between modes of operation.
 - f. Reference the Apollo control Application Guide for Apollo control guide specifications.
- * 3. Integrated Economizer:
- a. Integrated type capable of simultaneous economizer and compressor operation.
 - b. Includes all hardware and controls to provide cooling with outdoor air.
 - c. Equipped with a single variable sliding-plate not to exceed 3% leakage damper.
 - d. Capable of introducing up to 100% outdoor air in minimum or full open position.
 - e. Equipped with a barometric relief damper for up to 15% (on variable sliding economizer), and 30% (on parallel blade economizer) of nominal cfm.
 - f. Designed to close damper during loss of power situations with emergency power supply (on variable sliding economizer) or spring return (on parallel blade economizer)
 - g. Dry bulb outdoor thermostat (on variable sliding economizer) or enthalpy detection (on parallel blade economizer) provided.
- * 4. Manual Damper:
- Manual damper package shall consist of damper, birdscreen, and rainhood which can be preset to admit up to 25% 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 barometric (15%) 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.
 - c. Designed to close damper during loss of power situations.
 - d. Equipped with barometric relief damper.
7. Compressor Cycle Delay:
Compressor shall be prevented from restarting for a minimum of 5 minutes after shutdown.
- * 8. Solid-State Enthalpy Control (Variable Sliding Economizer):
- a. For use with economizer package only.
 - b. Capable of sensing outdoor-air heat content (temperature and humidity) and control economizer cut-in point to have minimum heat content air passing over the evaporator coil for most efficient system operation.
- * 9. Differential Enthalpy Sensor:
- a. For use with economizer only.
 - b. Capable of comparing heat content (temperature and humidity) of outdoor air and return air controlling economizer cut-in point at the most economical level.
- * 10. 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 temperature down to -20 F by condenser-fan speed modulation
- * 11. Remote Control Panel:
Panel shall be a decorative, indoor, wall-mounted panel consisting of:
- a. Two-stage heat/2-stage cool thermostat.
 - b. Automatic changeover.
 - c. System switch with HEAT-COOL-AUTO.-OFF settings.
 - d. Fan switch with ON-AUTO. settings.
 - e. Indicator lights for HEAT-COOL-FAN operation.
 - f. Three unused indicator lights for field use.
 - g. Control of economizer to forced open or forced closed position.
- * 12. LP Gas Kit:
Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane gas.
13. Thru-the-Bottom Service Connections:
Allow gas and electrical connections to be brought to the unit through the basepan.
- * 14. Electronic Programmable Thermostat:
Capable of using deluxe full-featured programmable electronic thermostat. Shall use a built-in compressor cycle delay for both heating and cooling. Capable of working with Carrier direct digital control.
15. Flue Hood Protector Assembly:
Provides protection from the hot sides of the gas flue hood.
- * 16. Thermostat and Subbase:
Provides staged cooling and heating automatic (or manual) changeover, fan control, and indicator light.
- * 17. Hail Guard:
Hail guard shall protect against damage from hail and flying debris.

- 18. NO_x Reduction Kit:
Package shall contain all necessary hardware and instructions to convert a standard natural gas unit to reduce the nitrous oxide (NO_x) emissions to a level of 40 nanograms/joule.
- 19. Flue Discharge Deflector:
Package shall contain single-piece deflector and hardware to exhaust the flue discharge up and away from unit. The flue discharge deflector shall allow minimum flue side clearances to combustibles to be reduced to 18 inches.
- 20. Unit Mounted Disconnect Switch:
Factory-installed, internally-mounted, NEC and UL approved switch provides unit power shutoff. Shall be accessible from outside the unit if desired. Shall provide power off lockout safety capability.
- * 21. Convenience Outlet:
Factory-installed and internally-mounted with easily accessible female receptacle. Includes a 15-amp GFI receptacle with independent fuse protection. Voltage required to operate convenience outlet is provided by a factory-installed step-down transformer. Shall be accessible from outside the unit.
- * 22. Coil Guard Grille:
Protects condenser coil from penetration by large objects and vandalism.
- * 23. Economizer and Power Exhaust:
Provides control of internal building air pressure. The system shall exhaust up to 100% of return air. Economizer is parallel blade design and equipped with enthalpy controls.
- * 24. Condenser Coil Salt Spray Protector.
Package shall contain a grille to protect condenser coil from salt spray damage in coastal areas.
- 25. Fan/Filter Status Switch:
Provides status of indoor fan (ON/OFF) or filter (CLEAN/DIRTY). Status shall be displayed over communication bus when used with direct digital control or with an indicator light at the thermostat.

Packaged Rooftop Cooling Unit with Gas Heat — Constant Volume Application

HVAC Guide Specifications

Size Ranges: **7½ to 12½ Tons, Nominal (Cooling)**
90,000 to 250,000 Btuh, Nominal
(Input Heating)

Carrier Model Number: **48HJD**
48HJE
48HJF

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor rooftop mounted, electrically controlled heating and cooling unit utilizing a scroll compressor 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 shall be rated in accordance with ARI Standards 210/240 or 360 and 270. Designed in accordance with UL standard 1995.
- B. Unit shall be designed to conform to ANSI/ASHRAE 15, latest revision.
- C. Unit shall be UL tested and certified in accordance with ANSI Z21.47 Standards. Unit shall be certified under Canadian standards as a total package.
- D. Roof curb shall be designed to conform to NRCA Standards.
- E. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
- F. Unit casing shall be capable of withstanding Federal test Method Standard No. 141 (Method 6061) 500-hour salt spray test

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, bonderized and coated with a prepainted baked enamel finish on all externally exposed surfaces, with primer coated internal panels.
2. Indoor blower (evaporator fan) compartment interior cabinet surfaces shall be insulated with a minimum ½-in. thick, flexible fiberglass insulation, coated on the air side. Aluminum foil faced fiberglass insulation shall be used in the furnace compartment.
3. Cabinet panels shall be easily removable for servicing.

4. Filters (2 in.) will be accessible through a removable access door, and will require no screw removal (tool-less).
5. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
6. Unit shall have a factory-installed internally trapped condensate drain pan made of non-corrosive material, providing a minimum ¾-in. connection. The condensate pan shall be externally trapped in the field. Unit shall be shipped in the end condensate drain position, but can be easily changed to the bottom condensate drain position. Condensate pan has a sloped design to conform to ASHRAE Standard 62
7. Thru-the-bottom power connection capability is standard.

C. Fans:

1. Indoor blower (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 which are statically and dynamically balanced.
- c. Bearings shall be sealed, permanently lubricated ball-bearing type for longer life and lower maintenance.

2. Indoor blower (evaporator fan) shall be made from steel with a corrosion resistant finish and shall be dynamically balanced.

3. Outdoor (condenser) fans shall be of the direct driven propeller type and shall discharge air vertically upwards.

4. Outdoor (condenser) fan motors shall be totally enclosed with permanently lubricated bearings.

5. Outdoor (condenser) fans shall have aluminum blades riveted to corrosion resistant steel spiders and shall be dynamically balanced

6. 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. Fully hermetic scroll type, on independent circuits and internally protected with internal high-pressure relief.
2. Factory rubber shock mounted and internally spring mounted on independent dedicated rails for vibration isolation.

E. Coils:

1. Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless internally-enhanced copper tubes with all joints brazed.
2. Tube sheet openings shall be belled to prevent tube wear.

F. Heating Section:

1. Induced draft combustion type with energy saving direct spark ignition system, redundant main gas valve, and 2-stage heat.
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, and shall have a 10-year warranty.
3. Burners shall be of the in-shot type constructed of aluminum coated steel.
4. All gas piping shall enter the unit cabinet as a single location.
5. The Integrated Gas Unit Control (IGC) board shall provide timed control of the evaporator fan functioning and burner ignition. An LED (light-emitting diode) shall provide diagnostic information. LED shall be visible without removing control box access panel.
6. IGC board contains anti-cycle protection for gas heat operation.

G Refrigerant Components:

Refrigerant components shall include:

1. Acutrol™ multiple independent circuit feed system.
2. Filter drier to eliminate any moisture or foreign matter.
3. Service gage connections on suction, discharge, and liquid lines to charge, evacuate, and contain refrigerant.
4. Ability to route gage hoses through unit side panels to eliminate air bypass during diagnostic periods

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 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 manually resettable circuit breaker on the 24-v transformer side.

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 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.

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 switch.
- 2) Induced draft motor speed sensor.
- 3) Flame rollout switch (automatic reset).
- 4) Flame proving controls.

J. Operating Characteristics:

1. Unit shall be capable of starting and running at 125 F ambient outdoor temperature, exceeding maximum load criteria of ARI Standard 210/240 or 360.
2. Compressor with standard controls shall be capable of operation down to 25 F ambient outdoor temperature.
3. Unit provided with fan time delay to prevent cold air delivery before heat exchanger warms up.

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. Indoor (evaporator) fan motor shall have permanently lubricated bearings and inherent automatic reset thermal overload protection.
3. Outdoor (condenser) fan motor, totally enclosed, 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 by * are specified. For assistance in amending the specifications, your local Carrier Sales Office should be contacted.

1. Roof Curb:

- a. Formed galvanized steel with wood nailer strip and capable of supporting entire unit weight.
- b. Allows for installing and securing ductwork to curb prior to mounting unit on the curb.

*

2 Direct Digital Controls:

- a. Shall be available as a factory-installed option.
- b. Shall actively monitor all modes of operation as well as indoor-fan status, filter status, and indoor air quality.
- c. Shall work with Carrier TEMP and VVT® systems.
- d. Shall have built-in diagnostic capability for thermostat commands for both stages of heating and cooling, evaporator fan operation, and economizer operation.

- e. Shall be equipped with a 5-minute time delay between modes of operation.
 - f. Reference the Apollo control Application Guide for Apollo control guide specifications.
- * 3. Integrated Economizer
- a. Integrated type capable of simultaneous economizer and compressor operation
 - b. Includes all hardware and controls to provide cooling with outdoor air.
 - c. Equipped with low-leakage variable sliding dampers not to exceed 3% leakage, at 1.0 in wg pressure differential or parallel blade design.
 - d. Capable of introducing up to 100% outdoor air.
 - e. Equipped with a barometric relief damper for up to 45% of nominal cfm.
 - f. Designed to close damper during loss of power situations with emergency power supply (for variable sliding economizer) or spring return (for parallel blade economizer)
 - g. Dry bulb outdoor thermostat (for variable sliding economizer) or enthalpy detection (for parallel blade economizer) provided.
- * 4. Manual Damper:
Manual damper package shall consist of damper, birdscreen, and rainhood which can be preset to admit up to 25% 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 barometric (15%) 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.
 - c. Designed to close damper during loss of power situations
 - d. Equipped with barometric relief damper.
7. Compressor Cycle Delay:
Compressor shall be prevented from restarting for a minimum of 5 minutes after shutdown.
- * 8. Solid-State Enthalpy Control (Variable Sliding Economizer):
- a. For use with economizer package only.
 - b. Capable of sensing outdoor-air heat content (temperature and humidity) and control economizer cut-in point to have minimum heat content air passing over the evaporator coil for most efficient system operation.
- * 9. Differential Enthalpy Sensor:
- a. For use with economizer only
 - b. Capable of comparing heat content (temperature and humidity) of outdoor air and return air and controlling economizer cut-in point at the most economical level.
- * 10. Head Pressure Control Package:
- a. Consists of solid-state control and condenser temperature sensor for head pressure control
 - b. Capable of controlling outdoor fan motor speed to maintain condensing temperature between 90 F and 110 F at outdoor ambient temperatures down to -20 F.
- * 11. Remote Control Panel:
Panel shall be a decorative, indoor, wall-mounted panel consisting of:
- a. Two-stage heat/2-stage cool thermostat.
 - b. Automatic changeover
 - c. System switch with HEAT-COOL-AUTO.-OFF settings.
 - d. Fan switch with ON-AUTO. settings
 - e. Indicator lights for HEAT-COOL-FAN operation.
 - f. Three unused indicator lights for field use.
 - g. Control of economizer to forced open or forced closed position.
- * 12. LP Gas Kit:
Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane gas.
13. Thru-the-Bottom Service Connections
Allow gas and electrical connections to be brought to the unit through the basepan
- * 14. Electronic Programmable Thermostat
Capable of using deluxe full-featured programmable electronic thermostat. Shall use built-in compressor cycle delay for both heating and cooling. Capable of working with Carrier direct digital controls.
15. Flue Hood Protector Assembly:
Provides protection from the hot sides of the gas flue hood.
- * 16. Thermostat and Subbase:
Provides staged cooling and heating automatic (or manual) changeover, fan control, and indicator light.
- * 17. Hail Guard:
Hail guard shall protect against damage from hail and flying debris.
18. NO_x Reduction Kit.
Package shall contain all necessary hardware and instructions to convert a standard natural gas unit to reduce the nitrous oxide (NO_x) emissions to a level of 40 nanograms/joule



- 19. Flue Discharge Deflector:
Package shall contain single-piece deflector and hardware to exhaust the flue discharge up and away from unit. The flue discharge deflector shall allow minimum flue side clearances to combustibles to be reduced to 18 inches
- 20. Unit Mounted Disconnect Switch:
Factory-installed, internally-mounted, NEC and UL approved switch provides unit power shutoff. Shall be accessible from outside the unit if desired. Shall provide power off lockout safety capability.
- * 21. Convenience Outlet:
Factory-installed and internally-mounted with easily accessible female receptacle. Includes 15 amp GFI receptacle with independent fuse protection. Voltage required to operate convenience outlet is provided by a factory-installed step-down transformer. Shall be accessible from outside the unit.
- * 22. Coil Guard Grille:
Protects condenser coil from penetration by large objects and vandalism
- * 23. Economizer and Power Exhaust:
Provides control of internal building air pressure. The system shall exhaust up to 100% of return air. Economizer is parallel blade design and equipped with enthalpy control.
- * 24. Condenser Coil Salt Spray Protector:
Package shall contain a grille to protect condenser coil from salt spray damage in coastal areas.
- 25. Fan/Filter Status Switch:
Provides status of indoor 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.
- * 26. Alternate motor and drive (48HJ014 only):
Alternate motor and drive shall be factory installed to provide additional performance range.



Carrier Corporation • Syracuse, New York 13221

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