



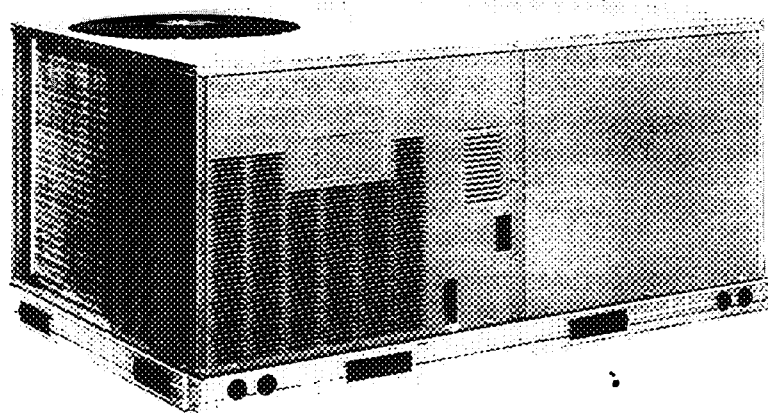
Advance Product Data

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, pre-painted 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

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

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.

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 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-curb service connection capability comes standard with the rooftop unit to allow power and control wiring to be routed through the curb, 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.

Table of contents

	Page
Features/Benefits	1-3
Model Number Nomenclature	4
Capacities	4
Options and Accessories	5-7
Physical Data	8,9
Base Unit Dimensions	10,11
Accessory Dimensions	12,13
Selection Procedure	14
Performance Data	15-26
Electrical Data	27
Application Data	28
Typical Wiring Schematic	29,30
Controls	30-33
Guide Specifications	34-39

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, 8.6 bels for sizes 007-012, 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.

Stainless steel heat exchangers are offered as a factory-installed option. Stainless steel design offers ultimate heat exchanger reliability.

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

Direct digital controls can be ordered as a factory-installed option. Designed exclusively for Carrier, the controls can be used to actively monitor all modes of operation as well as indoor fan status, filter status, and indoor-air quality. The direct digital controls are designed to work with Carrier Temp and VVT systems.

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. A light-emitting diode (LED) simplifies troubleshooting by providing visual fault notification and system status information. The IGC 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.

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.

Serviceability

Standardized components for the complete Weathermaster® line of products are found in all safety devices and control boards, while the gas sections use common inducer motors, limit switches, and rollout 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.

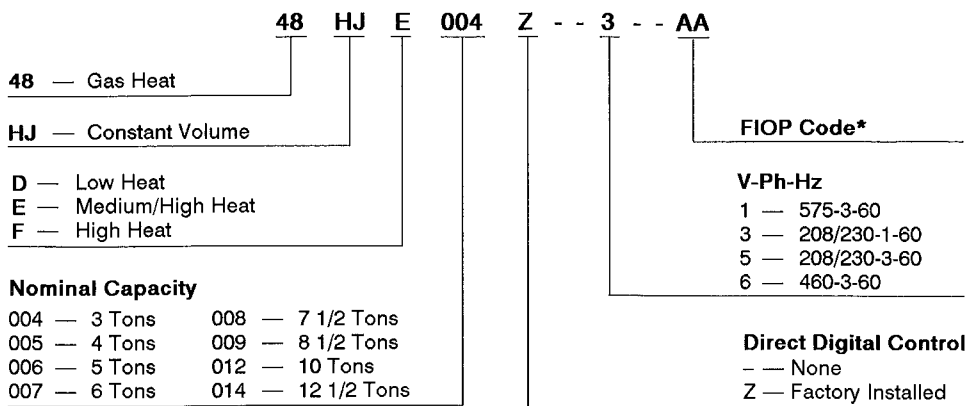
Color-coded wires permit easy tracing and diagnostics.

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



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

Capacities

UNIT 48HJ	NOMINAL TONS	STANDARD CFM	NET COOLING CAP (Btuh)	TOTAL kW	SEER†	EER	SOUND RATING (Bels)
004	3	1200	36,000	3.2	13.00	11.30	8.0
005	4	1450	47,900	4.2	13.00	11.20	8.0
006	5	1750	60,000	5.4	13.00	11.10	8.0

UNIT 48HJ	NOMINAL TONS	STANDARD CFM	NET COOLING CAP (Btuh)	TOTAL kW	EER	SOUND RATING (Bels)	IPLV
007	6	2100	74,000	6.7	11.00	8.6	†
008	7½	2750	90,000	8.2	11.00	8.6	10.9
009	8½	3000	102,000	9.3	11.00	8.6	10.9
012	10	4000	120,000	10.9	11.00	8.6	11.0
014	12½	4300	140,000	14.4	9.80	8.8	8.85

LEGEND

Bels — Sound Levels (1 bel = 10 decibels)
EER — Energy Efficiency Ratio
IPLV — Integrated Part-Load Value
SEER — Seasonal Energy Efficiency Ratio

*Applies only to units with capacity of 65,000 Btuh or less
†The IPLV is not applicable to single-compressor units.

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†
Integrated Economizer — Varislide™	X	X
Integrated Economizer — Parallel Blade	X	
Stainless Steel Heat Exchanger	X	
Manual Outdoor-Air Damper		X
Convenience Outlet	X	
Unit Mounted Disconnect	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-Curb 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 (sizes 004-007)		X
Motormaster II Head Pressure Control (sizes 004-014)		X
Motormaster III Head Pressure Control (Sizes 008-014)		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
Direct Digital Control	X	

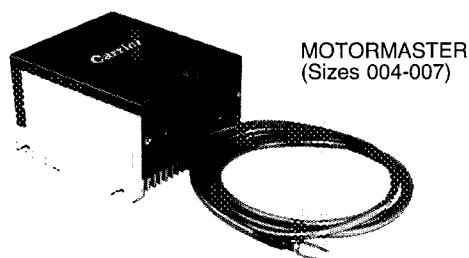
LEGEND

LP — Liquid Propane

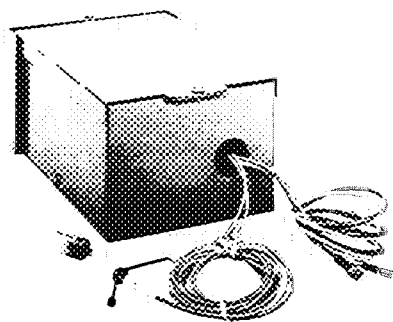
*Indicates a factory-installed option.
†Indicates a field-installed accessory

HEAD PRESSURE CONTROL

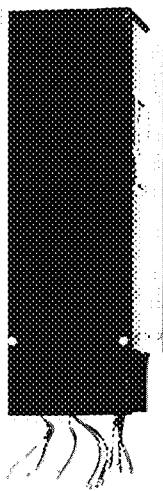
The 48HJ004-014 standard units are designed to operate in cooling at outdoor temperatures down to 25 F. With accessory Motormaster control (condenser-fan speed modulation for unit sizes 004-007), Motormaster II control (condenser-fan cycling for unit sizes 004-014), or Motormaster III control (condenser-fan speed modulation for unit sizes 008-014), 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
(Sizes 004-007)

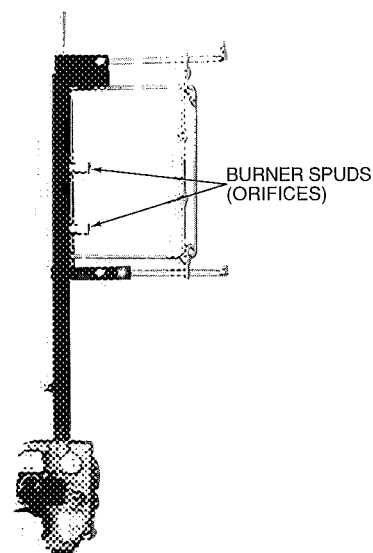


MOTORMASTER II (Sizes 004-014)



MOTORMASTER III
(Sizes 008-014)

LP CONVERSION KIT



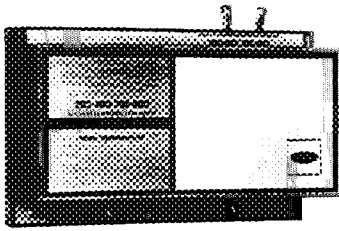
LP conversion kit allows the unit to utilize a liquid propane fuel supply in areas where natural gas is not available. (Kit shown is for sizes 004-007.)

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.

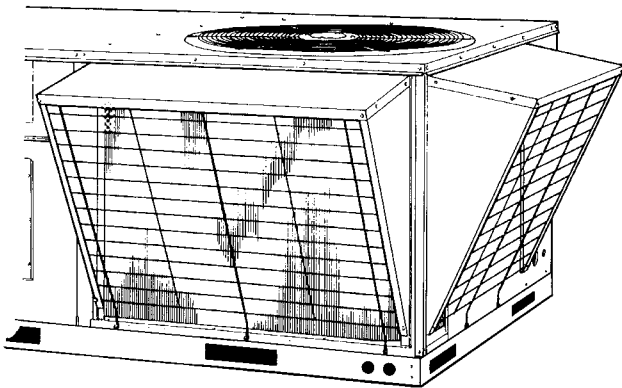
Options and accessories (cont)

THERMOSTAT



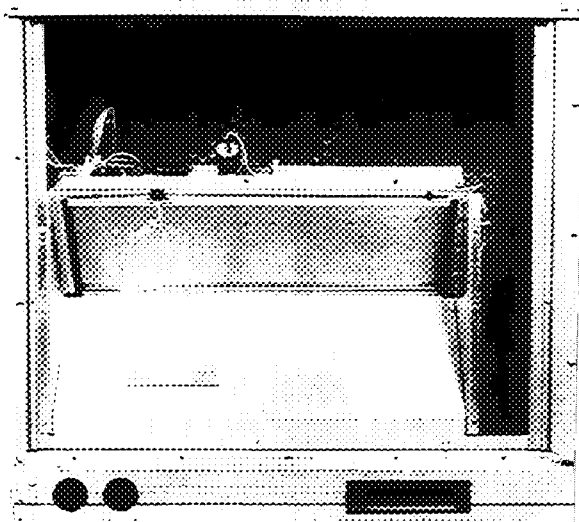
Zone thermostat (24 v) provides one- or 2-stage cooling for control of unit. Matching subbases are available with or without tamperproof switches and automatic changeover.

HAIL GUARD



Hail guard accessory (field installed) protects coils against damage from hail and other flying debris

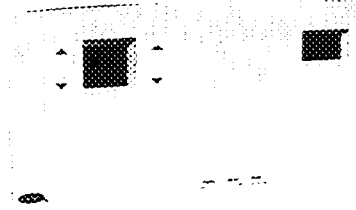
VARISLIDE™ ECONOMIZER



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.

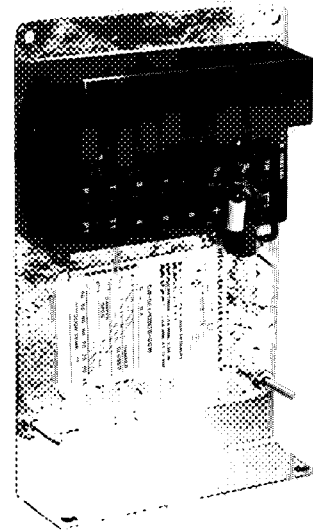
The new PARALLEL BLADE economizer is built with spring return and standard enthalpy control. The economizer includes 50% of nominal cfm barometric relief capability.

ELECTRONIC PROGRAMMABLE THERMOSTAT

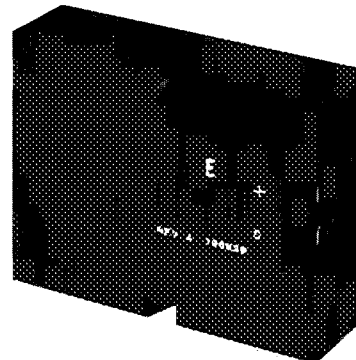


Electronic programmable thermostat provides efficient temperature control by allowing you to program heating and cooling setbacks and setups with provisions for weekends and holidays. The thermostat utilizes a time delay between operating modes. A Temp System relay pack is also required for thermostat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

ACCUSENSOR™ II

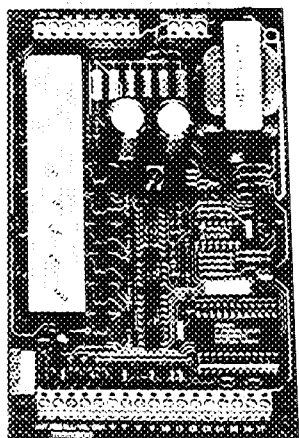


ACCUSENSOR III



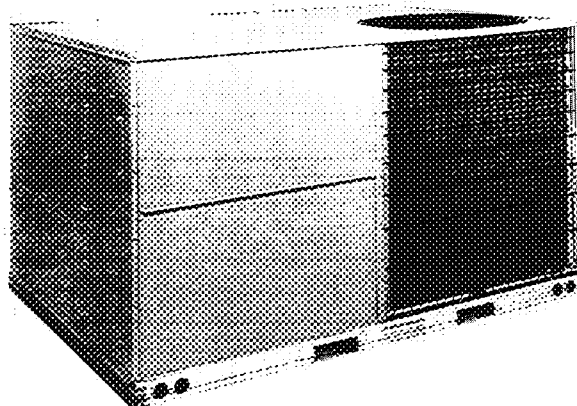
Accusensor economizer controls help provide efficient, economical economizer operation. Accusensor I standard dry-bulb sensor measures outdoor temperature. The accessory Accusensor II solid-state enthalpy control senses both dry and wet bulb of the outdoor air to provide an accurate enthalpy reading.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

DIRECT DIGITAL CONTROLS



Direct Digital Controls are designed exclusively for Carrier, and are used to actively monitor all modes of operation as well as indoor fan status, filter status, and indoor-air quality. They are designed to work with Carrier Temp and VVT systems.

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 Economizer	564	574	594	649
Roof Curb	115	115	115	115
COMPRESSOR			Scroll	
Quantity	1	1	1	1
Oil (oz)	45	52	75	75
REFRIGERANT TYPE			R-22	
Operating Charge (lb-oz)	5-8	8-8	9-8	9-10
CONDENSER FAN			Propeller	
Quantity...Diameter (in.)	1.. 22	1.. 22	1.. 22	1.. 22
Nominal Cfm	3500	4100	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	1.00	1.00	2.00	2.40
Motor Frame Size	48	48	56	56
Fan Rpm Range	760-1090	840-1185	900-1300	1120-1585
Motor Bearing Type	Ball	Ball	Ball	Ball
Maximum Fan Rpm	2100	2100	2100	2100
Motor Pulley Pitch Diameter				
A/B (in.)	1 9/2 9	1 9/2 9	2 8/3 8	2.4/3.4
Nominal Motor Shaft Diameter (in.)	½	½	½	¾
Fan Pulley Pitch Diameter (in.)	4.5	4.0	5.5	3.7
Belt — Type...Length (in.)	A.. 33	A.. 33	A.. 33	A.. 40
Pulley Center Line Distance (in.)	10 0-12.4	10 0-12.4	14 7-15.5	14 7-15.5
Speed Change Per Full Turn of Movable Pulley Flange (rpm)	65	70	80	95
Movable Pulley Maximum Full Turns from Closed Position	5	5	5	5
Factory Setting — Full Turns Open	3	3	3	3
Factory Speed Setting (rpm)	890	980	1060	1305
Fan Shaft Diameter at Pulley (in.)	⅝	⅝	⅝	⅝
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double Wavy Fins, Acutrol™ Feed Device		
Rows...Fins/in.	2.. 15	2..15	3..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)				
Standard Compressor Internal Relief			450	
Cutout			428	
Reset (Auto.)			320	
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (Liquid Line) (psig)				
Cutout			7 ± 3	
Reset (Auto.)			22 ± 5	
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 Economizer	914	924	1079	1094
Roof Curb	143	143	143	143
COMPRESSOR		Scroll		
Quantity	2	2	2	2
Oil (oz) (each compr)	60	65	64	65
REFRIGERANT TYPE		R-22		
Operating Charge (lb-oz)				
Circuit 1	6- 8	7-4	8-11	10-0
Circuit 2	5-14	6-4	8-3	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)	18 0	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	2.90	2.90	4.20	5.25
Motor Frame	56	56	56	56
Fan Rpm Range	840-1085	840-1085	860-1080	900-1260
Motor Bearing Type	Ball	Ball	Ball	Ball
Maximum Fan Rpm	2100	2100	2100	2100
Motor Pulley Pitch Diameter				
A/B (in.)	3 4/4 4	3 4/4 4	4 0/5 0	2 8/3 8
Nominal Motor Shaft Diameter (in.)	7/8	7/8	7/8	7/8
Fan Pulley Pitch Diameter (in.)	7 0	7 0	8 0	5 8
Belt — Type...Length (in.)	A...51	A... 51	A... 51	BX .46
Pulley Center Line Distance (in.)	16 75-19 25	16 75-19 25	15 85-17.50	15.85-17.50
Speed Change per Full Turn of Movable Pulley Flange (rpm)	50	50	45	60
Movable Pulley Maximum Full Turns from Closed Position	5	5	5	6
Factory Setting — Full Turns Open	5	5	5	5
Factory Speed Setting (rpm)	840	840	860	960
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	3.. 15	4...15
Total Face Area (sq ft)	8 0	8 0	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)		450 ± 50		500 ± 50
Standard Compressor Internal Relief		428		428
Cutout		320		320
Reset (Auto.)				
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (Liquid Line) (psig)		7 ± 3		
Cutout		22 ± 7		
Reset (Auto.)				
FREEZE-PROTECTION THERMOSTAT		30 ± 5		
Opens (F)		45 ± 5		
Closes (F)				
OUTDOOR-AIR INLET SCREENS		Cleanable		
Quantity...Size (in.)		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

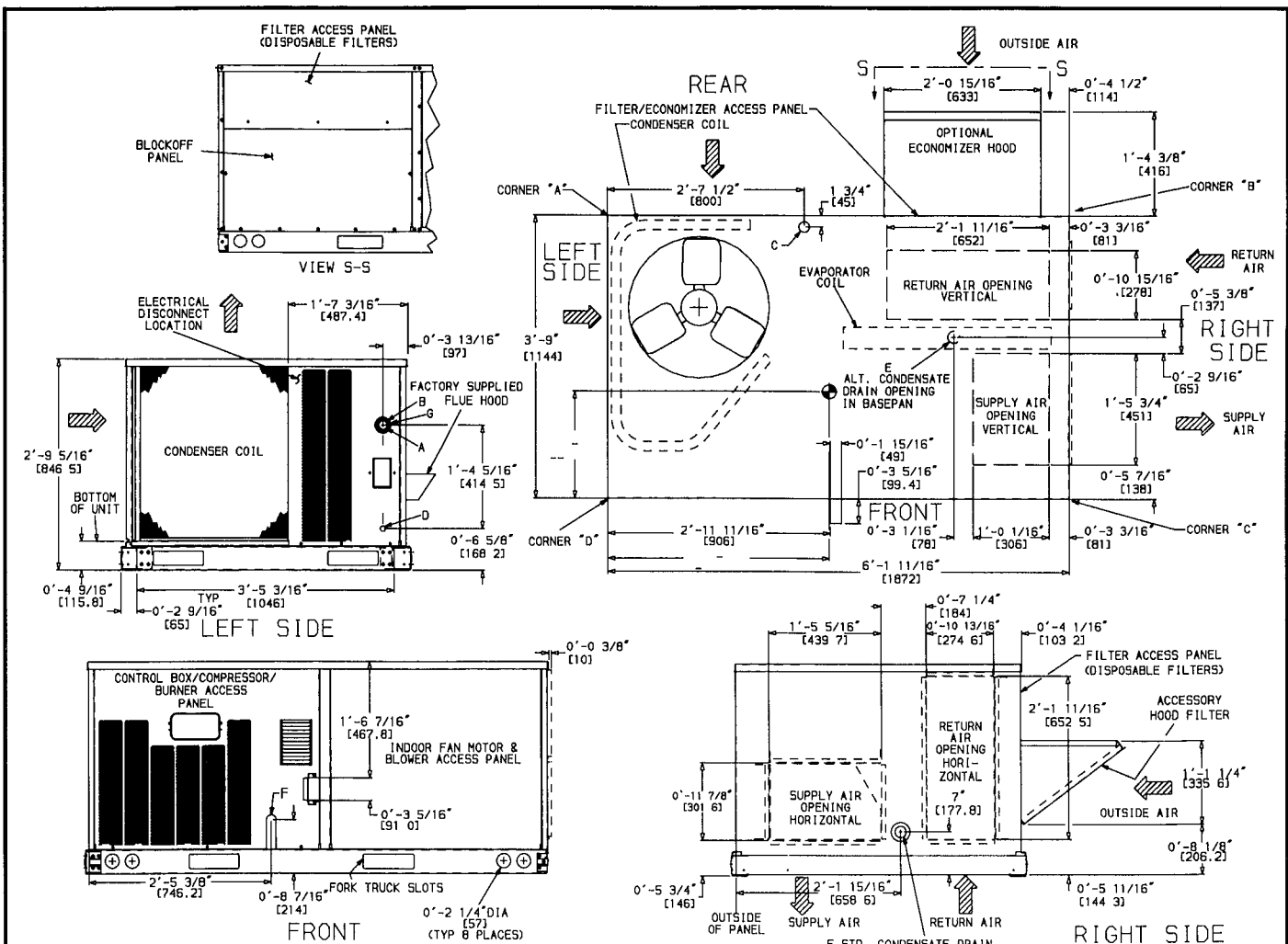
†48HJD008-009 units have 3 burners

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

Base unit dimensions — 48HJ004-007



UNIT	STANDARD UNIT WEIGHT		ECONOMIZER WEIGHT	
	Lb	Kg	Lb	Kg
48HJE/HJF004	530	240	34	15.4
48HJD/HJE/HJF005	540	245	34	15.4
48HJD/HJE/HJF006	560	254	34	15.4
48HJD/HJE/HJF007	615	279	34	15.4

Connection Sizes	
A	1 3/8" Dia [35] Field Power Supply Hole
B	2" Dia [51] Power Supply Knockout
C	1 3/4" Dia [44] Charging-Port Hole
D	7/8" Dia [22] Field Control Wiring Hole
E	3/4"-14 NPT Condensate Drain
F	1/2"-14 NPT Gas Connection
G	2 1/2" Dia [64] Power Supply Knockout

NOTES:

1 Dimensions in [] are in millimeters

2. Center of Gravity.

3. Direction of airflow

4 On vertical discharge units, ductwork to be attached to accessory roof curb only. For horizontal discharge units field-supplied flanges should be attached to horizontal discharge openings, and all ductwork should be attached to the flanges.

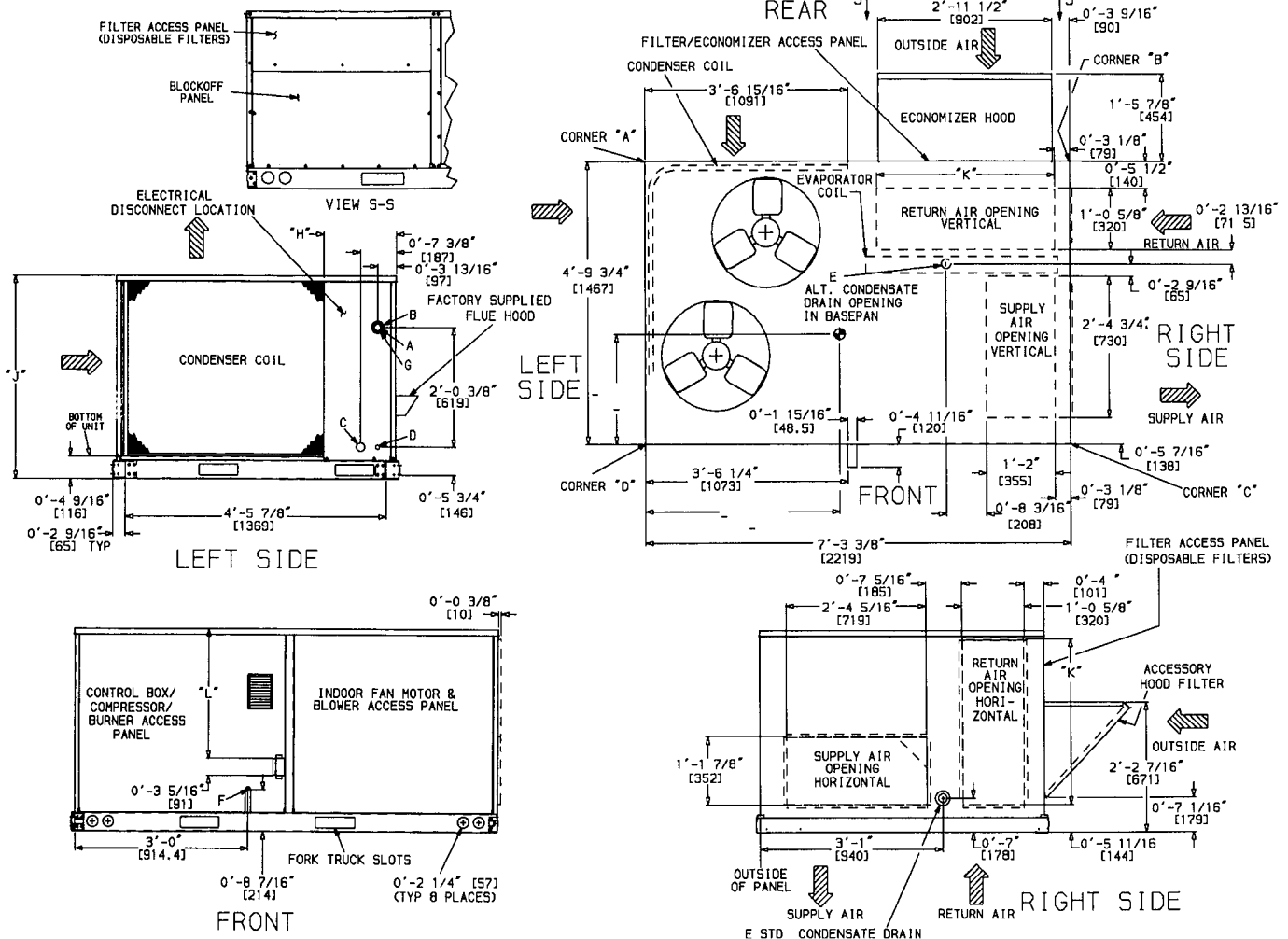
5 Minimum clearances (local codes or jurisdiction may prevail):

- a Between unit, flue side and combustible surfaces, 48 inches
- b Bottom of unit to combustible surfaces (when not using curb), 1 inch. Bottom of base rail to combustible surfaces (when not using curb) 0 inches.
- c Condenser coil, for proper airflow, 36 in. one side, 12 in. the other. The side getting the greater clearance is optional.
- d Overhead, 60 in. to assure proper condenser fan operation
- e Between units, control box side, 42 in. per NEC (National Electrical Code).
- f Between unit and ungrounded surfaces, control box side, 36 in. per NEC.
- g. Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. per NEC
- h. Horizontal supply and return end, 0 inches

6 With the exception of the clearance for the condenser coil and combustion side, as stated in Note 5a, b and c, a removable fence or barricade requires no clearance

7 Units may be installed on combustible floors made from wood or Class A, B, or C roof covering material if set on base rail

Base unit dimensions — 48HJ008-014



UNIT	STANDARD UNIT WEIGHT		ECONOMIZER WEIGHT		"H"		"J"		"K"		"L"	
	Lb	Kg	Lb	Kg	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm
48HJD/HJE/HJF008	870	395	44	20	2-0 ⁷ / ₈	632	3-5 ⁵ / ₁₆	1050	2-9 ¹¹ / ₁₆	856	2- 2 ⁷ / ₁₆	672
48HJD/HJE/HJF009	880	399	44	20	1-2 ⁷ / ₈	378	3-5 ⁵ / ₁₆	1050	2-9 ¹¹ / ₁₆	856	2- 2 ⁷ / ₁₆	672
48HJD/HJE/HJF012	1035	469	44	20	1-2 ⁷ / ₈	378	4-1 ⁵ / ₁₆	1253	3-0 ³ / ₈	924	2-10 ⁷ / ₁₆	875
48HJD/HJE014	1050	476	44	20	1-2 ⁷ / ₈	378	4-1 ⁵ / ₁₆	1253	3-0 ³ / ₈	924	2-10 ⁷ / ₁₆	875

*Indicates horizontal center of gravity

†Indicates vertical center of gravity.

NOTES:

1 Dimensions in [] are in millimeters

2 Center of gravity.

3 Direction of airflow

4 On vertical discharge units, ductwork to be attached to accessory roof curb only. For horizontal discharge units, field supplied flanges should be attached to horizontal discharge openings, and all ductwork should be attached to the flanges

5. Minimum clearance (local codes or jurisdiction may prevail):

a. Between unit, flue side and combustible surfaces, 48 inches.

b. Bottom of unit to combustible surfaces (when not using curb), 1 inch. Bottom of base rail to combustible surfaces (when not using curb) 0 inches.

c. Condenser coil, for proper airflow, 36 in. one side, 12 in. the other. The side getting the greater clearance is optional.

d Overhead, 60 in. to assure proper condenser fan operation

e Between units, control box side, 42 in. per NEC (National Electrical Code).

f. Between unit and ungrounded surfaces, control box side, 36 in. per NEC.

g Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. per NEC.

h Horizontal supply and return end, 0 inches

6. With the exception of the clearance for the condenser coil and combustion side, as stated in Note 5a, b and c, a removable fence or barricade requires no clearance.

7 Units may be installed on combustible floors made from wood or Class A, B, or C roof covering material if set on base rail.

Connection Sizes

A	1 ³ / ₈ " Dia [35] Field Power Supply Hole
B	2 ¹ / ₂ " Dia [64] Power Supply Knockout
C	1 ³ / ₄ " Dia [44] Charging-Port Hole
D	7 ⁸ / ₁₆ " Dia [22] Field Control Wiring Hole
E	3 ⁴ / ₁₆ "-14 NPT Condensate Drain
F	1 ¹ / ₂ "-14 NPT Gas Connection 48HJD008,009
F	3 ⁴ / ₁₆ "-14 NPT Gas Connection 48HJE008-014, 48HJD012,014; 48HJF008-012
G	2" Dia [51] Power Supply Knockout

Accessory dimensions — 48HJ004-007

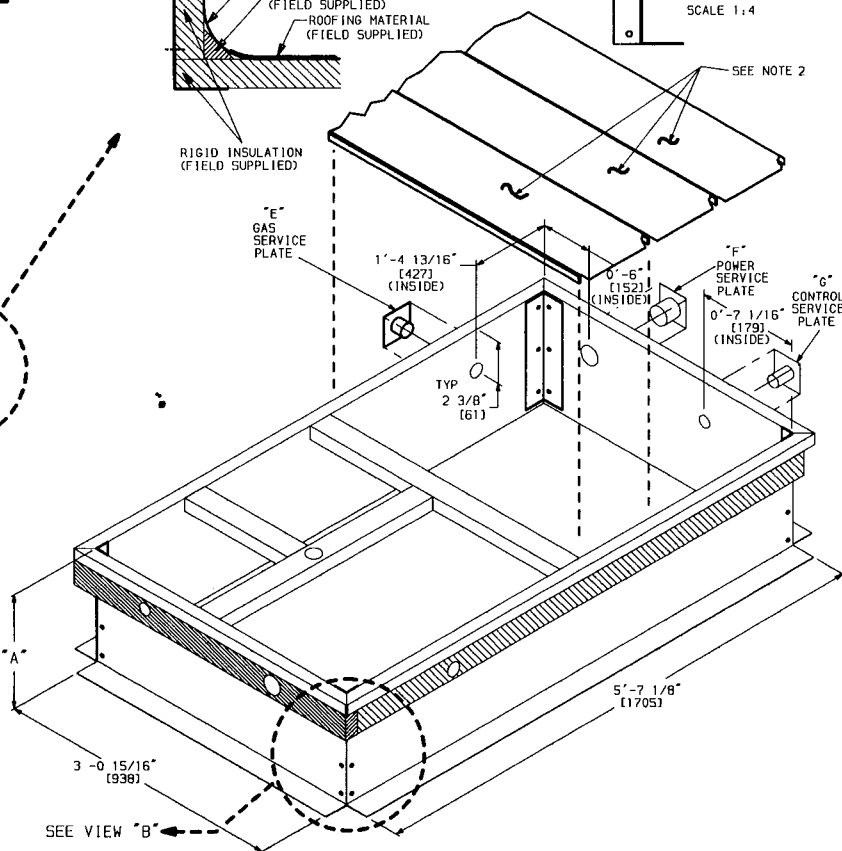
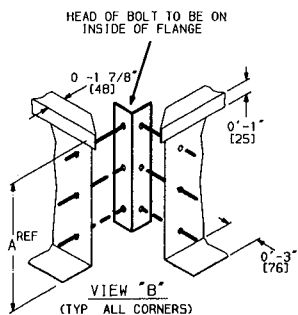
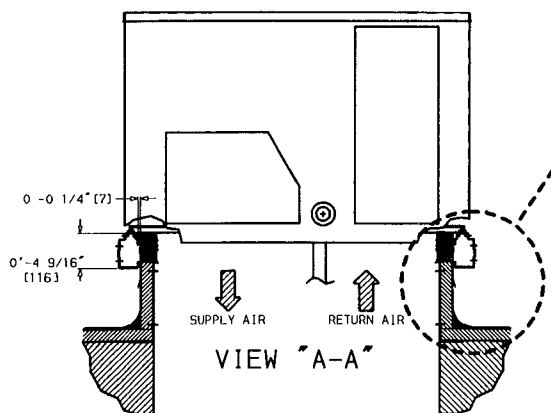
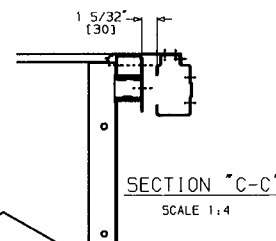
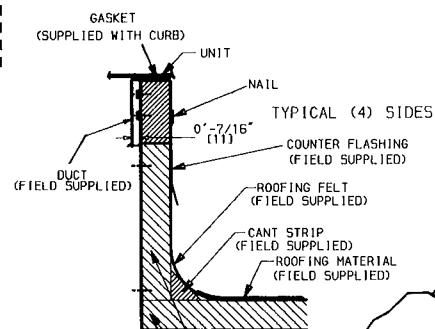
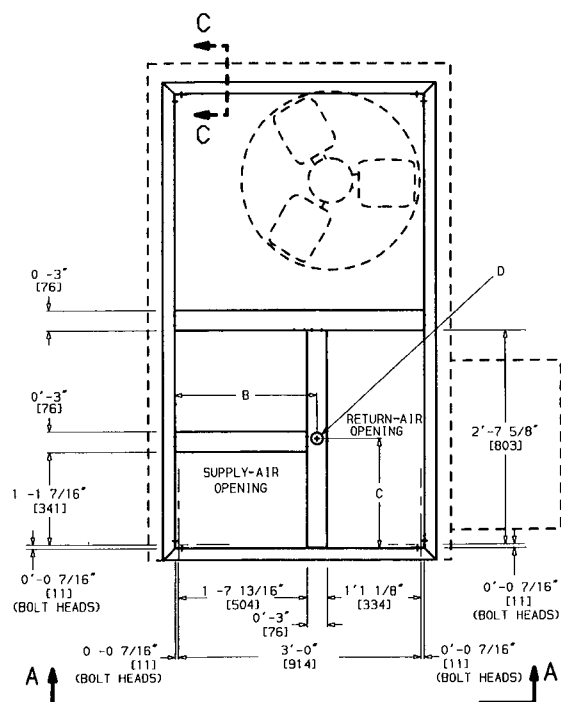
ROOF CURB – 48HJ004-007

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

ROOF CURB ACCESSORY	"A"	UNIT SIZE
50DJ900771	1'-2" [356]	48HJ004-007
50DJ900781	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

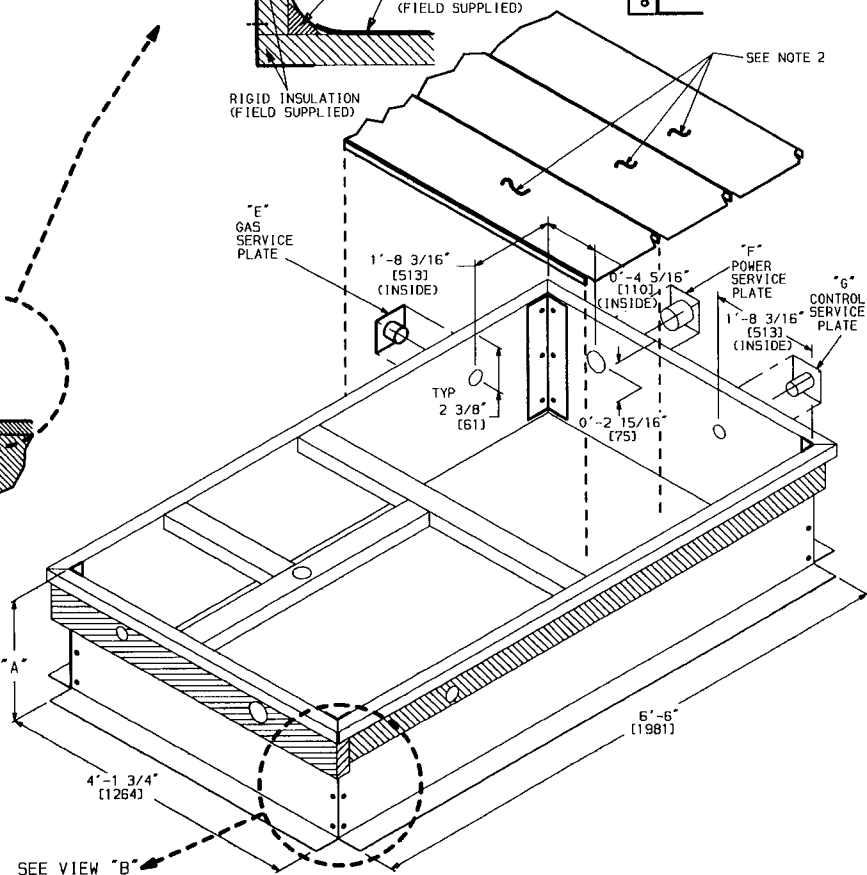
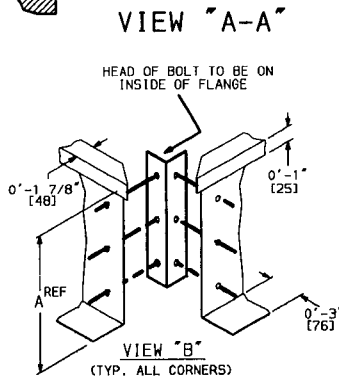
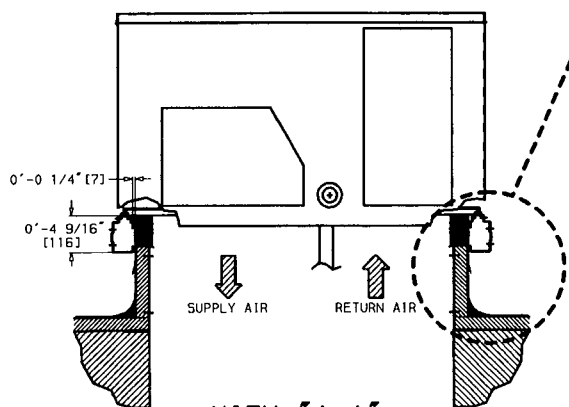
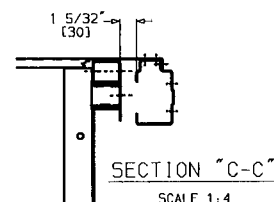
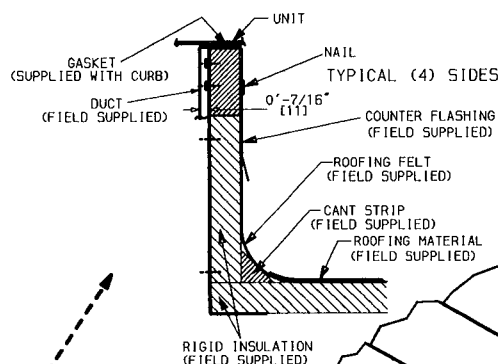
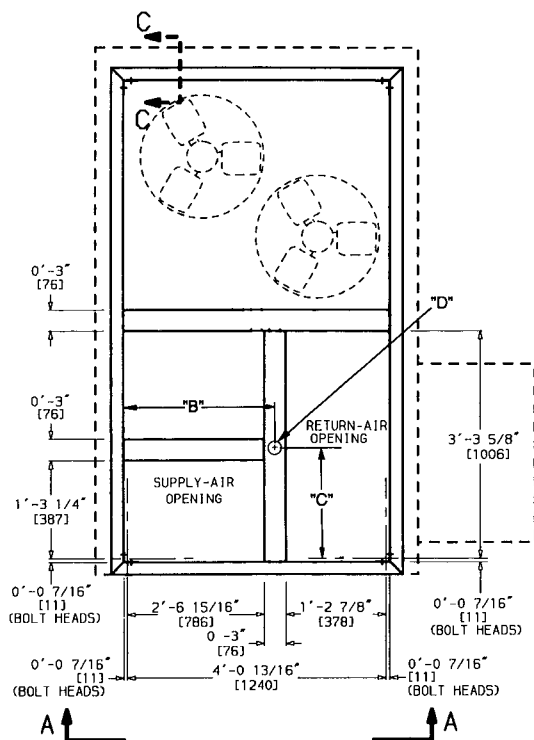
ROOF CURB — 48HJ008-014

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	1" NPT	3/4" NPT	50DJ901551

ROOF CURB ACCESSORY	"A"	UNIT SIZE
50DJ901371	1'-2" [356]	48HJ008-014
50DJ901381	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.



Selection procedure (with 48HJE005 example)

I Determine cooling and heating requirements at design conditions.

Given:

Required Cooling Capacity (TC) 45,600 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 15) 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

$$\text{Correction factor} = 1.10 \times (1 - .19) \times (82 - 80) = 1.782$$

Multiply the correction factor of 1.782 by 1600 cfm (a total of 2851). 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 2851 to get the corrected sensible heat capacity of 37,551.

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 4) 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 25), find:

External static pressure	.75 in. wg
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 90 in. wg static pressure and 998 watts. This will adequately handle the job requirements.

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.

$$\begin{aligned}\text{Net capacity} &= \text{gross capacity} - \text{IFM heat} \\ &= 48,900 \text{ Btuh} - 998 \text{ Watts} \\ &\quad \left(3.413 \frac{\text{Btuh}}{\text{Watts}} \right) \\ &= 48,900 \text{ Btuh} - 3406 \text{ Btuh}\end{aligned}$$

$$\text{Net capacity} = 45,494 \text{ Btuh}$$

$$\text{Net sensible capacity} = 37,551 \text{ Btuh} - 3406 \text{ Btuh}$$

$$\text{Net sensible capacity} = 34,145 \text{ Btuh}$$

Performance data

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 Btu/h) Gross
TC	—	Total Capacity (1000 Btu/h) Gross

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	43.2	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	53.8	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				

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

Performance data (cont)

COOLING CAPACITIES (cont)

48HJ008 (7½ TONS)										
Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF								
		2250/0.075			3000/0.105			3750/0.125		
		Temp (F) Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	106.4	97.5	89.1	111.0	102.0	93.8	113.6	105.0	96.7
	SHC	51.1	63.1	74.8	55.7	71.5	86.3	60.0	79.6	95.3
	kW	6.52	6.39	6.26	6.60	6.46	6.35	6.65	6.52	6.42
95	TC	102.7	94.4	85.5	106.8	98.8	90.2	109.4	101.4	93.4
	SHC	49.7	61.8	73.3	54.2	70.5	84.7	58.7	78.4	93.0
	kW	7.30	7.18	7.05	7.38	7.27	7.15	7.43	7.32	7.20
105	TC	98.6	90.7	81.1	102.6	94.7	85.8	105.0	96.8	89.8
	SHC	48.2	60.5	71.2	52.8	69.0	82.3	57.3	76.5	89.7
	kW	8.15	8.04	7.89	8.23	8.13	7.97	8.29	8.17	8.06
115	TC	94.4	86.5	76.2	98.2	89.9	81.7	99.4	92.1	86.4
	SHC	46.6	58.7	68.9	51.2	66.9	80.0	55.3	74.5	86.2
	kW	9.06	8.95	8.79	9.16	9.01	8.88	9.17	9.06	8.99

48HJ009 (8½ TONS)										
Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF								
		2550/0.095			3400/0.13			4250/0.155		
		Temp (F) Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	115.3	105.9	97.4	120.0	110.8	102.7	122.8	113.5	106.4
	SHC kW	57.0 7.11	70.9 6.96	84.4 6.83	63.0 7.20	80.6 7.04	97.3 6.92	67.9 7.24	89.4 7.08	106.1 6.98
95	TC	110.6	102.3	92.7	114.8	107.0	98.3	117.7	109.4	102.9
	SHC kW	55.3 7.93	69.5 7.81	82.2 7.65	60.9 8.01	73.4 7.89	95.0 7.76	65.9 8.07	87.9 7.93	102.9 7.84
105	TC	105.5	97.9	87.4	109.8	102.3	94.2	111.5	104.8	98.2
	SHC kW	53.4 8.82	67.7 8.73	79.6 8.55	58.9 8.92	77.3 8.81	92.4 8.66	63.6 8.94	86.1 8.84	98.2 8.71
115	TC	100.6	93.2	81.7	103.6	97.0	89.4	106.4	99.3	94.4
	SHC kW	51.5 9.79	65.9 9.68	76.8 9.51	56.3 9.85	75.4 9.75	89.1 9.63	61.7 9.92	83.6 9.80	94.3 9.70

Standard Ratings

LEGEND

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

48HJ012 (10 TONS)										
Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF								
		3000/0.055			4000/0.08			5000/0.10		
		Temp (F) Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	136.6	126.2	114.9	142.9	132.7	121.9	146.4	136.8	127.4
	SHC	68.2	84.9	100.0	75.1	97.1	115.9	84.4	108.2	126.9
	kW	8.26	8.10	7.93	8.37	8.22	8.06	8.45	8.30	8.16
95	TC	132.9	121.8	109.1	138.3	127.3	116.1	141.5	131.6	122.9
	SHC	67.0	83.1	97.3	73.8	95.4	112.9	80.0	106.5	122.9
	kW	9.25	9.07	8.85	9.34	9.18	9.00	9.40	9.24	9.12
105	TC	127.0	115.7	102.9	132.3	122.1	110.4	134.9	125.6	118.3
	SHC	64.6	80.8	94.2	71.7	92.9	109.2	77.8	104.0	118.2
	kW	10.25	10.09	9.86	10.36	10.17	10.01	10.41	10.25	10.15
115	TC	121.0	110.7	96.2	126.1	116.3	105.3	129.1	119.6	113.4
	SHC	62.4	78.5	91.0	69.5	90.8	105.3	76.1	101.8	113.2
	kW	11.34	11.19	10.95	11.47	11.31	11.11	11.55	11.37	11.28

48HJ014 (12½ TONS)										
Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF								
		3750/0.075			5000/0.10			6250/0.125		
		Temp (F) Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	165.1	152.0	138.2	172.2	159.2	145.9	177.0	163.4	151.9
	SHC	81.3	102.3	122.2	89.4	116.6	140.7	97.6	129.6	151.9
	kW	12.46	12.25	12.01	12.62	12.39	12.18	12.73	12.48	12.29
95	TC	159.0	144.6	126.7	165.6	153.8	137.2	169.9	156.3	146.0
	SHC	79.6	99.6	116.9	88.1	114.3	136.7	96.4	128.7	145.7
	kW	13.38	13.09	12.79	13.53	13.27	13.01	13.65	13.39	13.17
105	TC	151.1	135.1	112.3	157.9	142.5	125.8	161.7	147.3	138.1
	SHC	77.3	96.5	109.6	86.5	112.5	125.8	94.4	126.7	138.1
	kW	14.31	13.96	13.62	14.49	14.18	13.89	14.60	14.30	14.11
115	TC	142.0	118.5	100.0	148.5	125.6	114.8	152.4	132.3	125.6
	SHC	74.4	89.9	100.0	83.7	106.1	114.8	92.9	121.2	125.6
	kW	15.25	14.83	14.52	15.46	15.05	14.83	15.58	15.18	15.05

NOTES

1. Direct interpolation is permissible. Do not extrapolate.

2. The following formulas may be used.

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

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

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

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

FAN PERFORMANCE – VERTICAL DISCHARGE UNITS

48HJ004 (3 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

Airflow (Cfm)	External Static Pressure (in. wg)															
	0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
900	581	119	673	179	736	219	805	249	865	288	911	338	957	388	988	428
1000	644	189	709	219	782	279	835	298	900	348	937	378	992	438	1039	487
1100	687	219	746	259	806	298	867	348	929	398	964	398	1013	487	1068	547
1200	733	259	785	318	843	348	903	408	960	467	994	497	1045	557	1090	637
1300	754	288	826	378	891	428	942	477	991	527	1047	597	1075	637	1122	696
1400	810	348	868	448	937	507	984	567	1032	617	1067	666	1110	726	1160	766
1500	841	418	911	527	985	607	1029	656	1073	716	1109	766	1150	816	1190	855

48HJ004 (3 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

Airflow (Cfm)	External Static Pressure (in. wg)							
	0.9		1.0		1.1		1.2	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
900	1039	448	1061	487	1083	527	1105	567
1000	1061	507	1086	547	1111	587	1136	627
1100	1090	577	1109	607	1127	637	1145	666
1200	1109	647	1156	676	1203	706	1250	736
1300	1152	716	1190	756	1228	796	1266	836
1400	1181	806	1237	845	1293	885	1349	925
1500	1225	895	1271	945	1317	995	1363	1044

NOTES:

- 1** **Field-supplied** indicates a field-supplied drive is required (See Note 6)
- 2** **Shading** indicates field-supplied motor and drive are required
- 3** Maximum usable watts input is 1000. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24.

- 4** Values include losses for filters, unit casing, and wet coils
- 5** Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- 6** Motor drive range: 760 to 1090 rpm. All other rpms require field-supplied drive.
- 7** To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = 75$$

48HJ005 (4 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

Airflow (Cfm)	External Static Pressure (in. wg)															
	0.1		0.2		0.3		0.4		0.6		0.7		0.8		0.9	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
1200	596	210	665	263	722	320	779	378	872	504	915	567	957	630	993	678
1300	633	252	699	315	754	378	809	441	902	578	943	641	984	704	1021	772
1400	672	315	735	378	788	441	840	504	933	651	972	720	1011	788	1049	837
1500	711	368	770	441	822	510	873	578	963	725	1002	804	1041	858	1077	922
1600	751	441	840	515	871	588	907	662	993	787	1033	869	1072	950	1107	998
1700	791	515	873	599	907	678	941	757	1024	889	1064	976	1103	1063	1137	1128
1800	831	609	881	693	929	772	976	851	1057	991	1095	1078	1132	1165	1187	1239
1900	872	704	919	788	965	877	1011	967	1091	1104	1127	1191	1162	1277	1197	1260
2000	913	809	958	904	1002	993	1046	1082	1125	1237	1160	1323	1195	1410	1228	1491

48HJ005 (4 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

Airflow (Cfm)	External Static Pressure (in. wg)									
	1.0		1.1		1.2		1.4		1.6	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
1200	1028	725	1056	751	1083	778	1134	935	1185	965
1300	1058	841	1090	888	1121	935	1171	988	1218	1001
1400	1086	885	1120	950	1153	976	1210	1071	1257	1105
1500	1113	985	1147	1054	1180	1081	1241	1215	1295	1294
1600	1141	1084	1174	1134	1207	1196	1263	1339	1326	1454
1700	1171	1194	1203	1278	1235	1330	1296	1483	1354	1605
1800	1202	1313	1233	1398	1263	1425	1323	1597	1381	1747
1900	1232	1442	1263	1532	1294	1559	1351	1731	1408	1889
2000	1262	1572	1294	1671	1325	1702	1382	1884	1436	2040

NOTES:

- 1** **Field-supplied** indicates a field-supplied drive is required (See Note 6)
- 2** **Shading** indicates field-supplied motor and drive are required.
- 3** Maximum usable watts input is 1000. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24.

- 4** Values include losses for filters, unit casing, and wet coils
- 5** Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- 6** Motor drive range: 840 to 1185 rpm. All other rpms require field-supplied drive.
- 7** To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = 75$$

Performance data (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJ006 (5 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

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	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
1500	750	368	808	429	914	572	1001	705	1084	869	1168	1032	1199	1216	1226	1492	1250	1757
1600	794	429	846	501	950	654	1034	797	1111	961	1194	1134	1263	1308	1275	1523	1299	1800
1700	839	511	884	582	983	736	1068	899	1145	1053	1218	1237	1295	1420	1351	1615	1352	1850
1800	885	593	924	674	1018	838	1105	1001	1179	1155	1246	1349	1319	1553	1389	1747	1435	1952
1900	932	695	965	777	1057	940	1143	1124	1212	1288	1280	1461	1343	1676	1415	1891	1478	2095
2000	979	797	1008	889	1096	1063	1177	1247	1247	1431	1300	1604	1374	1809	1438	2034	1505	2258
2100	1026	910	1051	1012	1136	1196	1210	1380	1284	1574	1347	1758	1409	1952	1465	2187	1528	2420
2200	1074	1042	1095	1145	1173	1328	1245	1523	1322	1737	1380	1931	1442	2126	1488	2350	1558	2578
2300	1122	1185	1140	1288	1210	1502	1284	1686	1356	1901	1418	2115	1475	2310	1525	2518	1580	2732
2400	1170	1328	1185	1441	1249	1645	1323	1860	1389	2074	1455	2310	1510	2524	1555	2720	1620	2900
2500	1218	1492	1231	1604	1289	1819	1353	2044	1424	2259	1500	2504	1555	2739	1595	2948	1650	3113

NOTES:

- 1 **Boldface** indicates a field-supplied drive is required (See Note 6)
- 2 **Shading** indicates field-supplied motor and drive are required.
- 3 Maximum usable watts input is 1921. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24.

- 4 Values include losses for filters, unit casing, and wet coils
- 5 Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- 6 Motor drive range: 900 to 1300 rpm. All other rpms require field-supplied drive.
- 7 To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

Motor efficiency = 74

48HJ007 (6 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

Airflow (Cfm)	External Static Pressure (in. wg)											
	0.1		0.2		0.4		0.6		0.8		1.0	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
1800	942	700	978	646	1063	771	1147	891	1248	1081	1322	1190
1900	982	779	1023	739	1097	843	1175	1006	1266	1156	1356	1310
2000	1022	867	1068	835	1132	924	1218	1106	1303	1258	1397	1353
2100	1063	998	1115	916	1180	1056	1261	1207	1340	1361	1428	1473
2200	1104	1081	1159	1039	1214	1148	1310	1353	1375	1447	1459	1595
2300	1130	1140	1202	1156	1248	1233	1358	1499	1410	1526	1488	1709
2400	1174	1224	1237	1258	1292	1378	1392	1604	1460	1683	1532	1892
2500	1201	1335	1272	1361	1335	1517	1427	1718	1518	1910	1575	2076
2600	1246	1482	1320	1491	1368	1604	1458	1823	1582	2138	1620	2283
2700	1285	1595	1361	1613	1400	1691	1490	1936	1602	2326	1666	2504
2800	1304	1639	1402	1726	1439	1840	1543	2145	1642	2512	—	—
2900	1345	1814	1446	1910	1477	1989	1585	2335	—	—	—	—
3000	1378	2032	1489	2084	1523	2223	1598	2444	—	—	—	—

48HJ007 (6 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

Airflow (Cfm)	External Static Pressure (in. wg)							
	1.2		1.4		1.6		1.8	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
1800	1395	1301	1475	1387	1542	1517	1609	1648
1900	1430	1404	1504	1499	1556	1613	1655	1840
2000	1459	1482	1532	1613	1588	1744	1675	1919
2100	1489	1595	1567	1761	1626	1910	1684	2067
2200	1528	1726	1603	1919	1666	2093	1711	2241
2300	1561	1884	1637	2076	1710	2272	1760	2442
2400	1584	2015	1671	2249	1756	2467	1825	2654
2500	1633	2232	1698	2405	—	—	—	—
2600	1675	2436	—	—	—	—	—	—
2700	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—

NOTES:

- 1 **Boldface** indicates a field-supplied drive is required (See Note 6)
- 2 **Shading** indicates field-supplied motor and drive are required
- 3 Maximum usable watts input is 2120. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24.

- 4 Values include losses for filters, unit casing, and wet coils
- 5 Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- 6 Standard motor drive range: 1120 to 1585 rpm. All other rpms require field-supplied drive.
- 7 To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

Motor efficiency = 84

FAN PERFORMANCE – VERTICAL DISCHARGE UNITS (cont)

48HJ008,009 (7½ AND 8½ TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

Airflow (Cfm)	External Static Pressure (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
2200	506	539	586	692	656	875	718	1064	776	1275	838	1578	898	1954	935	2275
2250	514	562	593	723	662	907	724	1097	781	1318	841	1604	902	1989	939	2292
2300	521	577	600	747	668	932	730	1131	786	1335	843	1621	905	2015	943	2309
2400	536	623	613	795	680	989	741	1199	796	1413	849	1665	910	2041	952	2411
2500	551	669	626	859	693	1056	753	1275	808	1499	859	1735	912	2050	963	2470
2550	559	692	634	891	700	1089	759	1318	814	1543	864	1779	915	2067	968	2479
2600	567	716	641	916	706	1123	764	1353	819	1587	869	1823	918	2093	973	2487
2700	582	779	655	981	719	1199	776	1430	831	1674	880	1919	927	2180	976	2495
2800	598	835	670	1056	732	1275	789	1517	842	1770	892	2023	938	2275	983	2562
2900	614	899	684	1123	745	1361	802	1604	854	1866	903	2136	949	2386	992	2633
3000	630	973	690	1207	759	1417	815	1700	866	1971	915	2240	961	2504	1003	2767
3100	646	1047	714	1292	773	1543	828	1805	878	2076	926	2352	972	2623	1016	2866
3200	662	1131	729	1378	787	1648	841	1910	891	2188	938	2470	983	2743	1026	3002
3300	679	1216	744	1473	801	1753	854	2023	904	2300	950	2587	995	2870	—	—
3400	695	1310	759	1578	816	1858	867	2136	917	2420	963	2710	1007	2967	—	—
3500	712	1413	774	1683	830	1971	881	2257	930	2546	976	2831	—	—	—	—
3600	729	1517	790	1796	845	2093	895	2386	943	2670	988	2956	—	—	—	—
3700	745	1630	805	1919	860	2223	909	2521	956	2807	—	—	—	—	—	—
3750	754	1691	813	1980	868	2283	917	2587	963	2870	—	—	—	—	—	—
3800	762	1753	821	2041	875	2343	924	2653	970	2933	—	—	—	—	—	—
3900	779	1875	836	2171	890	2479	938	2763	—	—	—	—	—	—	—	—
4000	796	2006	852	2300	905	2612	953	2925	—	—	—	—	—	—	—	—
4100	813	2136	868	2445	920	2751	—	—	—	—	—	—	—	—	—	—
4200	830	2283	884	2587	935	2894	—	—	—	—	—	—	—	—	—	—
4250	839	2360	890	2661	—	—	—	—	—	—	—	—	—	—	—	—
4300	847	2428	906	2735	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:

- Boldface** indicates a field-supplied drive is required (See Note 6)
- Shading** indicates a field-supplied motor and drive are required (See Note 6)
- Maximum usable watts input is 2615. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24.

- Values include losses for filters, unit casing, and wet coils.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive.
- To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = 80$$

48HJ012 (10 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

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	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3000	592	723	661	859	722	989	779	1131	829	1267	880	1404	924	1534	970	1736	1019	1828
3100	607	779	676	924	734	1056	791	1199	840	1344	890	1491	935	1695	977	1828	1026	1971
3200	622	835	690	989	746	1123	803	1275	852	1422	900	1569	946	1786	987	1920	1029	2065
3300	638	899	705	1056	759	1190	815	1353	864	1508	910	1665	957	1878	998	2022	1037	2169
3400	653	965	719	1131	772	1275	826	1439	876	1604	921	1753	967	1971	1009	2125	1047	2282
3500	669	1039	733	1207	786	1361	838	1526	888	1691	933	1858	976	2074	1020	2238	1058	2397
3600	684	1114	747	1284	800	1456	850	1613	900	1796	945	2014	986	2177	1030	2353	1069	2523
3700	700	1190	760	1370	814	1552	863	1700	912	1892	957	2117	998	2291	1039	2469	1081	2651
3800	715	1275	774	1456	828	1648	875	1805	924	1997	969	2230	1010	2406	1049	2587	1091	2782
3900	731	1370	787	1543	843	1753	888	1910	936	2151	981	2344	1022	2533	1060	2726	1100	2923
4000	747	1456	801	1639	857	1858	902	2032	948	2265	993	2469	1034	2670	1072	2866	1110	3068
4100	763	1560	816	1744	872	1971	916	2203	960	2380	1005	2596	1046	2810	1084	3010	1121	3213
4200	778	1665	831	1884	886	2084	929	2326	972	2505	1016	2735	1058	2952	1094	3155	1132	3369
4300	794	1770	846	1971	900	2256	943	2460	985	2642	1028	2866	1072	3117	1106	3311	1142	3531
4400	810	1884	861	2093	913	2380	958	2605	999	2791	1040	3010	1088	3276	1117	3473	1153	3698
4500	826	2006	876	2273	927	2505	973	2744	1012	2952	1053	3167	1099	3440	1128	3642	1163	3871
4600	842	2177	892	2406	940	2633	987	2904	1024	3117	1065	3321	1113	3611	1140	3837	1174	4049
4700	858	2300	907	2551	954	2782	1002	3068	1037	3275	1077	3481	1127	3789	1152	3997	1184	4235
4800	874	2433	922	2698	968	2933	1018	3232	1050	3439	1089	3646	1142	3973	1163	4184	1195	4422
4900	890	2578	938	2857	984	3063	1034	3406	1063	3609	1101	3816	1157	4163	1175	4377	1205	4617
5000	906	2735	953	3020	998	3216	1050	3588	1077	3785	1114	3981	1173	4360	1187	4576	1216	4818

NOTES:

- Boldface** indicates a field-supplied drive is required (See Note 6)
- Shading** indicates a field-supplied motor and drive are required. (See Note 6.)
- Maximum usable watts input is 3775. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24.

- Values include losses for filters, unit casing, and wet coils.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Standard motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.
- To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = 85$$

Performance data (cont)

FAN PERFORMANCE – VERTICAL DISCHARGE UNITS (cont)

48HJ014 (12½ TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

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	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3700	729	1259	790	1440	847	1615	902	1845	955	2044	1008	2272	1060	2494	1108	2719	1152	2919	1190	3092
3800	745	1340	805	1531	861	1700	915	1940	967	2149	1019	2378	1070	2620	1118	2846	1163	3074	1203	3267
3900	761	1423	820	1624	875	1802	928	2044	979	2272	1029	2494	1079	2737	1128	2983	1173	3221	1214	3433
4000	777	1514	836	1725	889	1914	941	2140	991	2387	1040	2620	1089	2873	1137	3120	1183	3368	1225	3590
4100	793	1615	851	1836	904	2027	955	2246	1004	2512	1052	2746	1100	3001	1147	3267	1193	3525	1236	3767
4200	810	1717	867	1948	918	2149	968	2361	1017	2638	1064	2882	1110	3138	1157	3414	1202	3674	1245	3943
4300	826	1828	883	2070	933	2272	982	2485	1030	2773	1076	3037	1121	3285	1167	3562	1212	3841	1255	4111
4400	842	1940	898	2193	948	2405	996	2611	1043	2901	1088	3184	1133	3442	1178	3720	1222	3999	1265	4279
4500	859	2061	914	2316	962	2539	1010	2755	1056	3037	1101	3341	1144	3590	1188	3878	1232	4167	1274	4456
4600	876	2184	930	2459	977	2683	1024	2910	1070	3175	1114	3498	1157	3767	1199	4046	1242	4344	1284	4642
4700	892	2316	945	2593	992	2837	1039	3065	1083	3329	1126	3655	1169	3943	1210	4223	1252	4521	1294	4828
4800	909	2468	961	2737	1008	3001	1053	3230	1097	3479	1140	3822	1181	4130	1222	4400	1263	4707	—	—
4900	926	2611	977	2891	1024	3166	1068	3405	1111	3646	1153	3971	1194	4307	1234	4605	1274	4893	—	—
5000	942	2773	993	3047	1039	3341	1080	3581	1125	3822	1166	4139	1207	4493	1247	4800	1285	5097	—	—
5100	959	2937	1009	3221	1055	3516	1097	3767	1139	4018	1180	4316	1220	4689	1259	5004	1296	5297	—	—
5200	976	3101	1025	3387	1071	3702	1112	3962	1153	4214	1194	4503	1233	4874	1272	5207	—	—	—	—
5300	993	3285	1041	3572	1086	3897	1127	4158	1168	4428	1208	4698	1246	5050	—	—	—	—	—	—
5400	1010	3470	1057	3757	1102	4093	1142	4372	1182	4642	1221	4902	—	—	—	—	—	—	—	—
5500	1027	3655	1073	3953	1118	4298	1157	4586	1197	4856	1235	5115	—	—	—	—	—	—	—	—
5600	1043	3860	1090	4158	1133	4512	1173	4870	1213	5087	—	—	—	—	—	—	—	—	—	—
5700	1060	4065	1106	4363	1149	4726	1189	5032	—	—	—	—	—	—	—	—	—	—	—	—
5800	1077	4279	1122	4586	1165	4939	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	1094	4528	1139	4810	1181	5170	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	1111	4726	1155	5032	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	1128	4967	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1145	5207	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:

- 1** **Boldface** indicates a field-supplied drive is required. (See Note 6)
- 2** **Shading** indicates a field-supplied motor and drive are required (See Note 6.)
- 3** Maximum usable watts input is 4400. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Data table on page 24.

- 4** Values include losses for filters, unit casing, and wet coils
- 5** Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- 6** Motor drive range: 900 to 1260 rpm. All other rpms require field-supplied drive.
- 7** To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = 87$$

FAN PERFORMANCE – HORIZONTAL DISCHARGE UNITS

48HJ004 (3 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

Airflow (Cfm)	External Static Pressure (in. wg)															
	0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
900	526	70	584	99	656	139	734	219	818	269	875	269	924	308	953	348
1000	570	109	627	149	738	189	800	259	848	288	895	308	936	348	977	388
1100	614	149	670	189	758	229	812	288	863	308	914	348	960	388	1005	428
1200	658	189	710	229	780	279	840	318	889	358	938	398	988	448	1038	497
1300	703	239	752	269	808	318	868	368	916	408	963	448	1012	507	1061	557
1400	725	288	776	308	845	378	891	418	937	467	983	507	1027	557	1071	597
1500	755	328	816	378	870	428	924	477	969	527	1014	577	1056	627	1097	676

48HJ004 (3 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

Airflow (Cfm)	External Static Pressure (in. wg)							
	0.9		1.0		1.1		1.2	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
900	989	388	1028	438	1074	487	1120	537
1000	1020	438	1064	477	1124	537	1185	597
1100	1052	487	1100	527	1163	587	1225	647
1200	1076	527	1136	577	1201	647	1266	716
1300	1090	607	1172	647	1239	716	1306	786
1400	1108	666	1208	706	1278	786	1347	865
1500	1117	696	1245	776	1315	865	1385	955

NOTES:

- 1** **Boldface** indicates a field-supplied drive is required. (See Note 4)
- 2** Maximum usable watts input is 1000. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24.

- 3** Values include losses for filters, unit casing, and wet coils
- 4** Motor drive range: 760 to 1090 rpm. All other rpms require field-supplied drive
- 5** To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = .75$$

FAN PERFORMANCE – HORIZONTAL DISCHARGE UNITS (cont)

48HJ005 (4 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.1		0.2		0.3		0.4		0.6		0.7		0.8		0.9		1.0	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
1200	569	189	641	242	701	299	761	357	859	483	901	546	943	609	987	652	1030	695
1300	604	231	673	294	731	352	788	410	887	546	928	615	968	683	1006	709	1044	736
1400	640	284	705	347	761	410	817	473	914	620	955	688	996	757	1033	797	1069	838
1500	676	336	738	399	793	468	847	536	940	683	982	767	1024	851	1060	891	1095	930
1600	713	399	772	462	825	536	877	609	967	767	1009	851	1051	935	1087	998	1123	1073
1700	750	473	806	536	857	615	908	693	997	851	1037	940	1077	1030	1114	1105	1151	1185
1800	788	546	841	620	890	704	939	788	1026	956	1065	1040	1104	1124	1141	1221	1178	1318
1900	826	630	876	714	924	799	971	883	1056	1061	1094	1151	1132	1240	1188	1271	1204	1502
2000	864	735	912	809	958	898	1004	988	1087	1177	1125	1271	1162	1366	1197	1485	1231	1604

48HJ005 (4 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

Airflow (Cfm)	External Static Pressure (in. wg)									
	1.1		1.2		1.4		1.6		1.8	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
1200	1068	792	1106	889	1134	998	1188	1138	1245	1353
1300	1086	833	1128	930	1182	1052	1226	1215	1297	1406
1400	1104	925	1139	1012	1216	1090	1266	1262	1320	1463
1500	1129	1022	1162	1114	1228	1186	1303	1339	1343	1530
1600	1156	1150	1188	1226	1250	1291	1319	1444	1382	1607
1700	1183	1262	1215	1339	1276	1415	1334	1569	1398	1722
1800	1211	1390	1243	1461	1303	1540	1359	1702	1418	1865
1900	1238	1548	1271	1594	1330	1664	1386	1846	1439	2018
2000	1265	1666	1298	1727	1358	1808	1413	1989	1466	2171

NOTES:

- Boldface** indicates a field-supplied drive is required (See Note 6)
- Shading** indicates field-supplied motor and drive are required
- Maximum usable watts input is 1000. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24.

- Values include losses for filters, unit casing, and wet coils
- Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- Motor drive range: 840 to 1185 rpm. All other rpms require field-supplied drive.
- To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

Motor efficiency = 75

48HJ006 (5 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

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	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
1500	730	357	789	420	896	557	990	704	1072	872	1153	1051	1221	1229	1256	1366	1283	1387
1600	770	420	826	483	931	641	1020	788	1101	956	1178	1145	1252	1334	1311	1524	1340	1660
1700	811	494	865	567	966	725	1051	883	1133	1061	1205	1240	1278	1439	1345	1650	1397	1849
1800	852	578	905	651	1002	820	1084	977	1163	1156	1235	1355	1303	1555	1371	1776	1433	1966
1900	894	567	945	757	1037	925	1119	1093	1194	1271	1266	1471	1330	1671	1396	1902	1460	2133
2000	936	778	984	862	1072	1030	1154	1219	1226	1397	1297	1608	1362	1818	1422	2038	1485	2270
2100	978	893	1024	977	1108	1156	1192	1355	1259	1545	1327	1744	1395	1965	1452	2185	1510	2427
2200	1021	1019	1064	1103	1145	1282	1225	1503	1294	1702	1359	1902	1423	2122	1482	2354	1536	2585
2300	1064	1156	1104	1240	1183	1429	1260	1650	1330	1870	1392	2070	1454	2291	1515	2532	1571	2758
2400	1107	1303	1145	1387	1222	1524	1296	1818	1365	2038	1426	2259	1485	2480	1544	2721	1604	2947
2500	1150	1460	1186	1555	1262	1765	1333	1986	1400	2227	1461	2459	1512	2679	1574	2905	1633	3134

NOTES:

- Boldface** indicates a field-supplied drive is required (See Note 4.)
- Shading** indicates field-supplied motor and drive are required
- Maximum usable watts input is 1921. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24.

- Values include losses for filters, unit casing, and wet coils
- Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- Motor drive range: 900 to 1300 rpm. All other rpms require field-supplied drive.
- To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

Motor efficiency = 74

Performance data (cont)

FAN PERFORMANCE – HORIZONTAL DISCHARGE UNITS (cont)

48HJ007 (6 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

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	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
1800	885	623	942	700	1047	835	1139	956	1193	1031	1276	1165	1341	1250	1413	1378	1474	1404
1900	928	700	982	779	1084	932	1160	1006	1223	1114	1301	1233	1374	1361	1437	1439	1490	1482
2000	971	787	1022	867	1121	1014	1188	1097	1254	1216	1329	1284	1396	1473	1460	1491	1509	1569
2100	1015	891	1063	998	1140	1064	1196	1140	1272	1292	1354	1404	1413	1552	1475	1534	1529	1700
2200	1060	998	1104	1081	1159	1106	1229	1258	1306	1361	1363	1508	1434	1604	1487	1639	1554	1831
2300	1104	1123	1130	1140	1196	1224	1264	1387	1340	1473	1397	1648	1459	1665	1520	1831	1576	1980
2400	1138	1165	1174	1224	1245	1396	1305	1447	1373	1630	1440	1726	1502	1823	1552	1980	1504	2136
2500	1183	1275	1201	1335	1284	1465	1338	1552	1402	1761	1469	1805	1524	1980	1585	2136	1538	2292
2600	1210	1404	1246	1482	1312	1560	1366	1735	1435	1858	1494	1936	1552	2119	1616	2317	1671	2462
2700	1254	1560	1285	1595	1354	1726	1403	1892	1474	1954	1536	2171	1584	2300	1646	2487	1706	2653
2800	1274	1613	1304	1639	1374	1875	1459	1989	1514	2136	1570	2343	1524	2504	1677	2561	—	—
2900	1318	1726	1345	1814	1412	2050	1496	2240	1529	2300	1603	2521	1571	2725	—	—	—	—
3000	1362	1945	1378	2032	1451	2119	1534	2343	1560	2470	1611	2648	1590	2886	—	—	—	—

NOTES:

- 1 **Boldface** indicates a field-supplied drive is required (See Note 6)
- 2 **Shading** indicates field-supplied motor and drive are required
- 3 Maximum usable watts input is 2120 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24

4. Values include losses for filters, unit casing, and wet coils
5. Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify
6. Motor drive range: 1120 to 1585 rpm. All other rpms require field-supplied drive
7. To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = 84$$

48HJ008,009 (7½ AND 8½ TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

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	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
2200	499	524	580	677	652	867	717	1056	748	1165	779	1275	839	1578	905	1954	951	2266
2250	507	547	586	700	658	891	722	1097	752	1199	783	1301	843	1604	908	1989	955	2283
2300	513	562	592	723	663	916	727	1131	756	1224	786	1327	846	1630	910	2015	959	2300
2400	528	600	606	779	674	965	738	1199	766	1301	795	1404	853	1665	912	2041	967	2360
2500	542	646	619	835	686	1022	748	1258	777	1370	806	1491	859	1718	919	2093	971	2403
2550	550	669	627	867	692	1056	754	1292	783	1413	812	1543	864	1761	920	2110	974	2428
2600	557	692	634	891	698	1089	759	1327	787	1456	816	1587	868	1805	921	2136	976	2445
2700	573	747	648	956	711	1156	770	1404	798	1534	827	1665	878	1910	928	2162	983	2529
2800	588	803	662	1022	723	1233	782	1473	809	1613	837	1753	889	2023	937	2266	986	2554
2900	604	867	676	1089	737	1318	794	1560	821	1700	848	1840	900	2128	947	2377	992	2637
3000	620	932	690	1165	750	1404	806	1648	832	1788	849	1927	910	2223	958	2504	1002	2731
3100	636	1006	704	1241	764	1499	818	1744	844	1884	870	2023	920	2326	966	2620	1012	2870
3200	652	1089	718	1327	778	1595	831	1849	856	1980	882	2119	931	2428	979	2735	1023	3002
3300	668	1173	732	1413	793	1700	844	1954	869	2093	894	2232	942	2537	989	2839	1034	3121
3400	684	1258	747	1508	807	1805	857	2076	882	2206	907	2343	954	2645	1000	2948	1044	3237
3500	701	1361	762	1613	821	1910	871	2188	895	2326	919	2462	966	2751	1011	3062	1054	3340
3600	717	1465	777	1718	835	2023	885	2317	908	2453	932	2587	978	2870	1022	3165	1065	3445
3700	733	1569	792	1831	849	2136	899	2445	922	2579	945	2718	990	2987	1034	3272	1076	3544
3750	742	1630	800	1892	856	2197	907	2512	929	2653	952	2719	997	3055	1040	3333	1082	3609
3800	750	1683	807	1954	863	2257	914	2571	936	2847	958	2854	1003	3114	1045	3387	1087	3643
3900	767	1805	822	2076	877	2386	928	2702	930	2979	972	2987	1015	3244	1057	3495	1098	3733
4000	783	1927	838	2206	891	2512	942	2839	964	3127	986	3121	1028	3373	1070	3603	1110	3820
4100	800	2067	854	2343	905	2645	956	2971	978	3244	1000	3251	1042	3495	1082	3713	1122	3902
4200	817	2197	869	2479	920	2783	970	3099	992	3358	1015	3380	1055	3614	1095	3811	1134	3971
4250	826	2275	877	2554	928	2854	977	3165	999	3396	1022	3445	1062	3676	1102	3860	1140	4006
4300	834	2343	885	2629	935	2925	984	3230	1006	3313	1028	3508	1068	3728	1108	3905	1147	4036

NOTES:

- 1 **Boldface** indicates a field-supplied drive is required. (See Note 6)
- 2 **Shading** indicates a field-supplied motor and drive are required (See Note 6)
- 3 Maximum usable watts input is 2615 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24

4. Values include losses for filters, unit casing, and wet coils.
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify
6. Motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive
7. To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = 80$$

FAN PERFORMANCE – HORIZONTAL DISCHARGE UNITS (cont)

48HJ012 (10 TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

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	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3000	552	661	632	810	701	956	761	1097	816	1216	871	1370	918	1482	967	1736	1010	1903	1063	2221
3100	565	708	644	859	711	1014	722	1173	825	1292	879	1447	928	1478	973	1778	1018	1971	1070	2265
3200	578	763	656	916	723	1081	782	1241	835	1378	887	1517	937	1745	981	1861	1026	2048	1075	2318
3300	591	818	668	973	734	1148	793	1310	845	1465	895	1595	946	1828	991	1963	1032	2099	1080	2380
3400	605	883	680	1047	745	1216	803	1387	856	1552	904	1691	953	1912	1000	2074	1041	2203	1083	2389
3500	619	948	691	1106	755	1284	813	1465	867	1648	914	1796	961	1997	1009	2177	1051	2318	1090	2469
3600	633	1022	703	1173	766	1353	824	1543	877	1744	924	1901	970	2099	1017	2282	1061	2451	1099	2596
3700	648	1106	714	1241	777	1430	835	1639	887	1831	935	2015	980	2212	1024	2380	1069	2587	1109	2735
3800	662	1190	726	1310	789	1526	846	1726	897	1927	946	2169	989	2326	1033	2487	1077	2698	1118	2895
3900	677	1284	738	1387	801	1613	857	1823	908	2023	956	2282	1000	2460	1042	2624	1085	2819	1127	3049
4000	692	1378	750	1473	813	1718	868	1919	918	2119	967	2397	1010	2587	1052	2763	1093	2933	1142	3187
4100	707	1482	762	1560	825	1814	878	2015	929	2282	977	2505	1021	2726	1062	2914	1102	3097	1155	3373
4200	722	1595	775	1656	837	1910	889	2119	941	2397	987	2624	1032	2866	1072	2971	1110	3244	1169	3576
4300	737	1718	787	1761	848	2006	900	2273	952	2523	999	2744	1042	3010	1081	3141	1118	3396	1185	3754
4400	752	1840	800	1875	860	2110	912	2397	962	2642	1008	2885	1054	3158	1091	3276	1126	3553	1201	4029
4500	768	1980	814	1989	871	2265	924	2523	973	2772	1019	3029	1067	3324	1101	3414	1134	3715	1219	4281
4600	783	2119	827	2110	883	2380	937	2661	983	2904	1030	3155	1079	3497	1111	3555	1142	3883	1237	4548
4700	799	2309	841	2291	894	2496	949	2800	994	3049	1042	3296	1092	3678	1122	3700	1150	4056	1257	4832
4800	814	2469	855	2424	906	2624	961	2952	1003	3186	1052	3440	1105	3866	1132	3848	1158	4235	1277	5133
4900	—	—	868	2578	918	2754	972	3088	1013	3333	1063	3589	1119	4061	1143	3999	1166	4419	1299	5449
5000	—	—	883	2735	931	2904	985	3226	1024	3489	1075	3741	1133	4263	1154	4154	1174	4608	1322	5782

NOTES:

1. **Boldface** indicates a field-supplied drive is required (See Note 6.)
3. **Shading** indicates a field-supplied motor and drive are required (See Note 6.)
4. Maximum usable watts input is 3775. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24.

5. Values indicate losses for filters, unit casing, and wet coils.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
7. Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.
8. To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = 85$$

48HJ014 (12½ TONS) STANDARD FACTORY-INSTALLED MOTOR AND DRIVE (BELT)

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	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3700	677	1129	748	1316	810	1498	869	1700	928	1940	984	2166	1036	2387	1080	2548	1114	2737	1135	2828
3800	691	1194	761	1390	822	1582	880	1776	937	2035	993	2272	1046	2503	1092	2719	1129	2901	1156	3028
3900	705	1267	773	1473	834	1674	891	1862	947	2131	1002	2370	1055	2620	1102	2855	1143	3056	1174	3212
4000	720	1349	786	1548	847	1768	902	1957	957	2228	1011	2485	1064	2737	1112	2983	1155	3212	1190	3405
4100	734	1423	800	1641	860	1871	914	2061	967	2316	1021	2593	1072	2855	1121	3120	1165	3368	1203	3581
4200	749	1506	813	1725	873	1974	926	2175	978	2414	1030	2710	1081	2983	1130	3258	1175	3516	1215	3757
4300	764	1598	826	1828	886	2079	938	2290	989	2521	1040	2837	1090	3111	1139	3396	1185	3664	1226	3925
4400	779	1691	840	1931	899	2193	951	2414	1000	2638	1050	2955	1100	3248	1148	3535	1194	3822	1236	4093
4500	793	1785	854	2035	912	2307	963	2548	1012	2755	1061	3065	1109	3387	1157	3674	1203	3981	1246	4260
4600	808	1888	868	2158	925	2459	975	2674	1024	2901	1071	3184	1119	3525	1166	3832	1212	4130	1255	4437
4700	822	2000	882	2281	937	2548	988	2819	1036	3056	1082	3313	1129	3674	1175	3990	1221	4298	1264	4605
4800	837	2114	896	2414	950	2674	1001	2964	1048	3212	1093	3461	1139	3813	1185	4148	1230	4456	1273	4782
4900	852	2237	910	2548	963	2810	1014	3111	1060	3368	1105	3609	1150	3943	1194	4307	1239	4633	1282	4958
5000	867	2361	924	2683	977	2946	1027	3267	1073	3535	1117	3776	1161	4093	1204	4475	1248	4810	1291	5133
5100	882	2485	938	2828	990	3092	1040	3424	1085	3702	1129	3962	1172	4251	1214	4642	1257	4985	—	—
5200	896	2629	952	2973	1003	3248	1053	3590	1098	3869	1141	4148	1183	4418	1225	4781	1267	5170	—	—
5300	911	2773	967	3129	1017	3405	1066	3757	1111	4055	1153	4335	1194	4596	1236	4958	—	—	—	—
5400	926	2919	981	3294	1030	3572	1079	3916	1124	4270	1166	4531	1206	4791	1247	5124	—	—	—	—
5500	940	3074	995	3461	1044	3748	1092	4093	1137	4437	1178	4726	1218	4958	—	—	—	—	—	—
5600	955	3239	1010	3627	1058	3943	1105	4270	1150	4633	1190	4930	1230	5124	—	—	—	—	—	—
5700	970	3405	1024	3804	1072	4139	1118	4456	1163	4837	1202	5143	—	—	—	—	—	—	—	—
5800	985	3581	1039	3981	1086	4335	1131	4652	1176	5041	—	—	—	—	—	—	—	—	—	—
5900	1000	3757	1053	4167	1100	4520	1144	4856	—	—	—	—	—	—	—	—	—	—	—	—
6000	1015	3953	1068	4363	1114	4754	1158	5060	—	—	—	—	—	—	—	—	—	—	—	—
6100	1030	4139	1083	4558	1128	4967	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1046	4344	1097	4763	1142	5180	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:

1. **Boldface** indicates a field-supplied drive is required (See Note 6.)
3. **Shading** indicates a field-supplied motor and drive are required (See Note 6.)
4. Maximum usable watts input is 4400. 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 wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to the Evaporator Fan Motor Data table on page 24.

5. Values include losses or filters, unit casing, and wet coils.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
7. Motor drive range: 900 to 1260 rpm. All other rpms require field-supplied drive.
8. To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = 87$$

Performance data (cont)

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	1300	1260	1220	1180	1140	1100	1060	1020	980	940	900	—	—
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	1080	1060	1035	1015	990	970	950	925	905	880	860	—	—
014	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	1.00	1000	208/230	3.9
	Three	1.00	1000	208/230	3.9
				460	2.3
				575	2.3
005	Single	1.00	1000	208/230	3.9
	Three	1.00	1000	208/230	3.9
				460	2.3
				575	2.3
006	Single	2.00	1921	208/230	9.2
	Three	2.00	1921	208/230	6.1
				460	2.7
				575	2.7
007	Three	2.40	2120	208/230	6.1
				460	2.7
				575	2.7
008, 009	Three	2.90	2615	208/230	7.9
				460	3.6
				575	3.6
012	Three	4.20	3775	208/230	12.6
				460	5.7
				575	5.7
014	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.

EVAPORATOR-FAN MOTOR EFFICIENCY

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

NOTE: Convert watts to bhp using the following formula:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

CONDENSER-FAN MOTOR EFFICIENCY

UNIT	EFFICIENCY%
48HJ004-007	83
48HJ008-014	77

COMPRESSOR MOTOR EFFICIENCY

UNIT	EFFICIENCY%
48HJ004	80
48HJ005	80
48HJ006	86
48HJ007	88
48HJ008	85
48HJ009	84
48HJ012	90
48HJ014	86

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

CFM								
900	1200	1400	1600	1800	2000	2200	2400	2600
.05	.05	.05	.05	.05	.05	.05	.05	.05

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

CFM								
2200	2500	3000	3500	4000	4500	5000	5500	6000
.02	.02	.03	.04	.05	.06	.07	.08	.09

Performance data (cont)

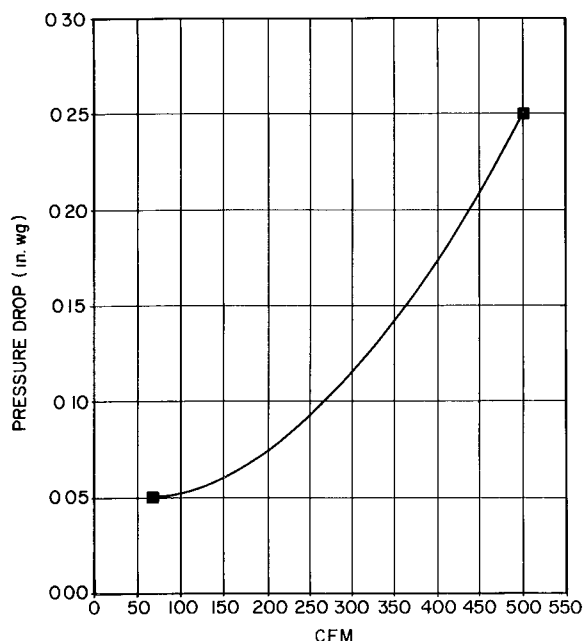
OUTDOOR SOUND POWER (TOTAL UNIT)

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	8.6 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



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.

Electrical data

UNIT	NOMINAL VOLTS-PH-HZ	VOLTAGE RANGE		COMPR		OFM	IFM	COMBUSTION FAN MOTOR	POWER SUPPLY		MINIMUM UNIT DISCONNECT SIZE*	
		Min	Max	RLA	LRA	FLA	FLA	FLA	MCA	MOCP	FLA	LRA
48HJ004 (3 Tons)	208/230-1-60	187	254	16.2	96.0	0.7	4.9	.57	26.0/26.0	35/35†	25/25	108/108
	208/230-3-60	187	254	10.3	75.0	0.7	4.9	.57	18.5/18.5	25/25†	18/18	87/ 87
	460-3-60	414	508	5.1	40.0	0.4	2.2	.30	9.1	15†	8	48
	575-3-60	518	632	3.7	31.0	0.4	2.2	.30	7.2	15†	7	40
48HJ005 (4 Tons)	208/230-1-60	187	254	23.7	129.0	0.7	4.9	.57	35.3/35.3	45/45†	36/36	143/143
	208/230-3-60	187	254	13.5	99.0	0.7	4.9	.57	27.6/22.6	30/30†	24/24	113/113
	460-3-60	414	508	7.4	49.5	0.4	2.2	.30	13.0	15†	13	58
	575-3-60	518	632	5.8	40.0	0.4	2.2	.30	10.3	15†	10	47
48HJ006 (5 Tons)	208/230-1-60	187	254	28.8	169.0	1.4	8.8	.57	46.7/46.7	50/50†	45/45	207/207
	208/230-3-60	187	254	17.3	123.0	1.4	5.8	.57	29.0/29.0	35/35†	29/29	160/160
	460-3-60	414	508	9.0	62.0	0.8	2.6	.30	14.9	20†	14	80
	575-3-60	518	632	7.1	50.0	0.8	2.6	.30	12.5	15†	12	68
48HJ007 (6 Tons)	208/230-3-60	187	254	21.9	142.0	1.4	5.8	.57	35.1/35.1	45/45†	34/34	188/188
	460-3-60	414	508	10.4	72.0	0.8	2.6	.30	16.6	20†	16	94
	575-3-60	518	632	9.6	58.5	0.8	2.6	.30	17.2	20†	17	81
48HJ008** (7½ Tons)	208/230-3-60	187	254	13.5	99.0	1.4	7.5	.57	41.7/41.7	50/50†	44/44	276/276
	460-3-60	414	508	7.4	49.5	0.8	3.4	.30	22.0	25†	23	138
	575-3-60	518	632	5.8	40.0	0.8	3.4	.30	17.3	20†	18	111
48HJ009** (8½ Tons)	208/230-3-60	187	254	13.5	99.0	1.4	7.5	.57	41.7/41.7	50/50†	44/44	276/276
	460-3-60	414	508	7.4	49.5	0.8	3.4	.30	22.0	25†	23	138
	575-3-60	518	632	5.8	40.0	0.8	3.4	.30	17.3	20†	18	111
48HJ012** (10 Tons)	208/230-3-60	187	254	17.3	123.0	1.4	12.0	.57	54.7/54.7	60/60†	58/58	348/348
	460-3-60	414	508	9.0	62.0	0.8	5.4	.30	27.6	30†	29	175
	575-3-60	518	632	7.1	50.0	0.8	5.4	.30	21.8	30†	23	141
48HJ014** (12½ Tons)	208/230-3-60	187	254	22.3	142.0	1.4	15.0	.57	69.0/69.0	80/80	69/69	386/386
	460-3-60	414	508	10.4	72.0	0.8	7.4	.30	32.8	35†	32	195
	575-3-60	518	632	9.6	58.5	0.8	7.4	.30	29.1	35†	29	158

LEGEND

FLA	—	Full Load Amps
HACR	—	Heating, Air Conditioning and Refrigeration
IFM	—	Indoor (Evaporator) Fan Motor
LRA	—	Locked Rotor Amps
MCA	—	Minimum Circuit Amps
MOCP	—	Maximum Overcurrent Protection
NEC	—	National Electrical Code
OFM	—	Outdoor (Condenser) Fan Motor
RLA	—	Rated Load Amps
ULC	—	Underwriters' Laboratories Canadian

*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 ULC units may be fuse or circuit breaker.
2. Electrical data based on 95 F ambient outdoor-air temperature $\pm 10\%$ voltage



Application data

Condensate drain pan — A sloped condensate drain pan is supplied on all units. The condensate pan must be externally trapped. Condensate drains are located on both the bottom and end of the unit. 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 (for unit sizes 004-007), Motormaster II control (for unit sizes 004-014), or Motormaster III control (for unit sizes 008-014), 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 26.

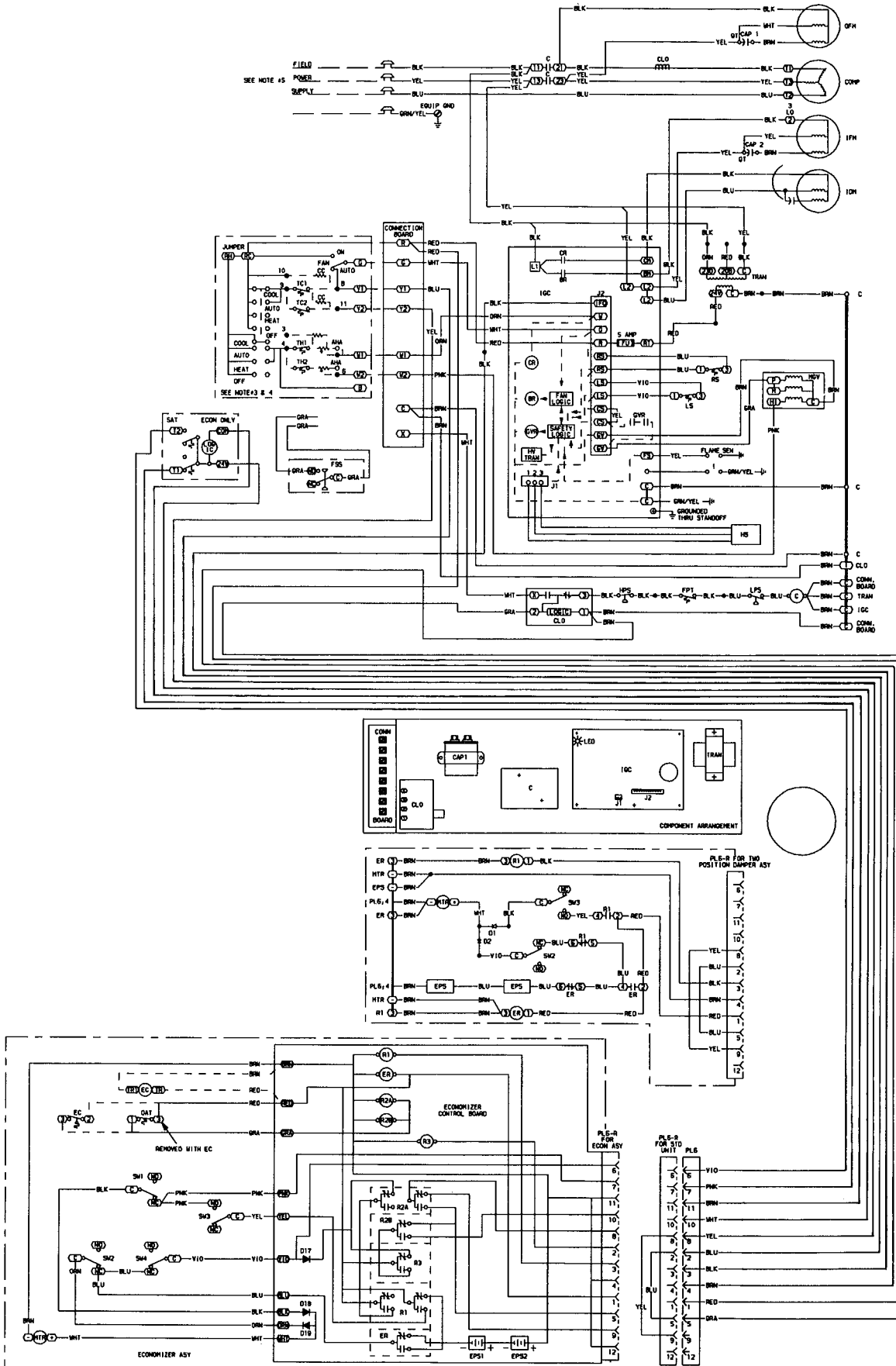
Minimum temperature — Minimum temperature of air entering the dimpled heat exchanger is 50 F continuous and 45 F intermittent.

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 watts input listed in 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.

Direct digital controls — Direct digital controls must be used with a Carrier master thermostat.

Typical wiring schematic (208/230-3-60 shown)



Typical wiring schematic (cont)

LEGEND AND NOTES FOR TYPICAL WIRING SCHEMATIC

AHA	— Adjustable Heat Anticipator
C	— Contactor, Compressor
CAP	— Capacitor
CC	— Cooling Compensator
CLO	— Compressor Lockout
COMP	— Compressor Motor
D	— Diode
EC	— Enthalpy Control
ECON	— Economizer
EPS	— Emergency Power Supply (9-V Battery)
EQUIP	— Equipment
ER	— Economizer Relay
FPT	— Freeze-Protection Thermostat
FU	— Fuse
GND	— Ground
HPS	— High-Pressure Switch
HS	— Hall Effect Sensor
I	— Ignitor
IDM	— Induced Draft Motor
IFC	— Indoor-Fan Contactor
IFM	— Indoor-Fan Motor
IGC	— Integrated Gas Unit Controller
LPS	— Low-Pressure Switch
LS	— Limit Switch
MGV	— Main Gas Valve
MTR	— Motor
OAT	— Outdoor-Air Thermostat
OFM	— Outdoor-Fan Motor
P	— Plug
PL	— Plug Assembly
QT	— Quadruple Terminal

R	— Relay
RS	— Rollout Switch
SAT	— Supply-Air Thermostat
SEN	— Sensor
SW1	— Switch Fully Open
SW2	— Switch Fully Closed
SW3	— Switch Minimum Vent Position
SW4	— Switch Maximum Vent Position
TC	— Thermostat-Cooling
TH	— Thermostat-Heating
TRAN	— Transformer

	Field Splice
	Marked Wire
	Terminal (Marked)
	Terminal (Unmarked)
	Terminal Block
	Splice
	Factory Wiring
	Field Control Wiring
	Field Power Wiring
	Accessory or Optional Wiring
	To indicate common potential only, not to represent wiring

NOTES:

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
Subbase: HH93AZ176, 177, 178 and 179
4. Set heat anticipator at .14 amp for first stage and 14 amp for second stage
5. Use copper conductors only.
6. Tran is wired for 230 v unit. If unit is to be run with 208 v power supply, disconnect BLK wire from 230 v tap (ORN) and connect to 208 v tap (RED). Insulate end of 230 v tap.

Controls

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 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.

Controls (cont)

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.

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 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 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.

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 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.

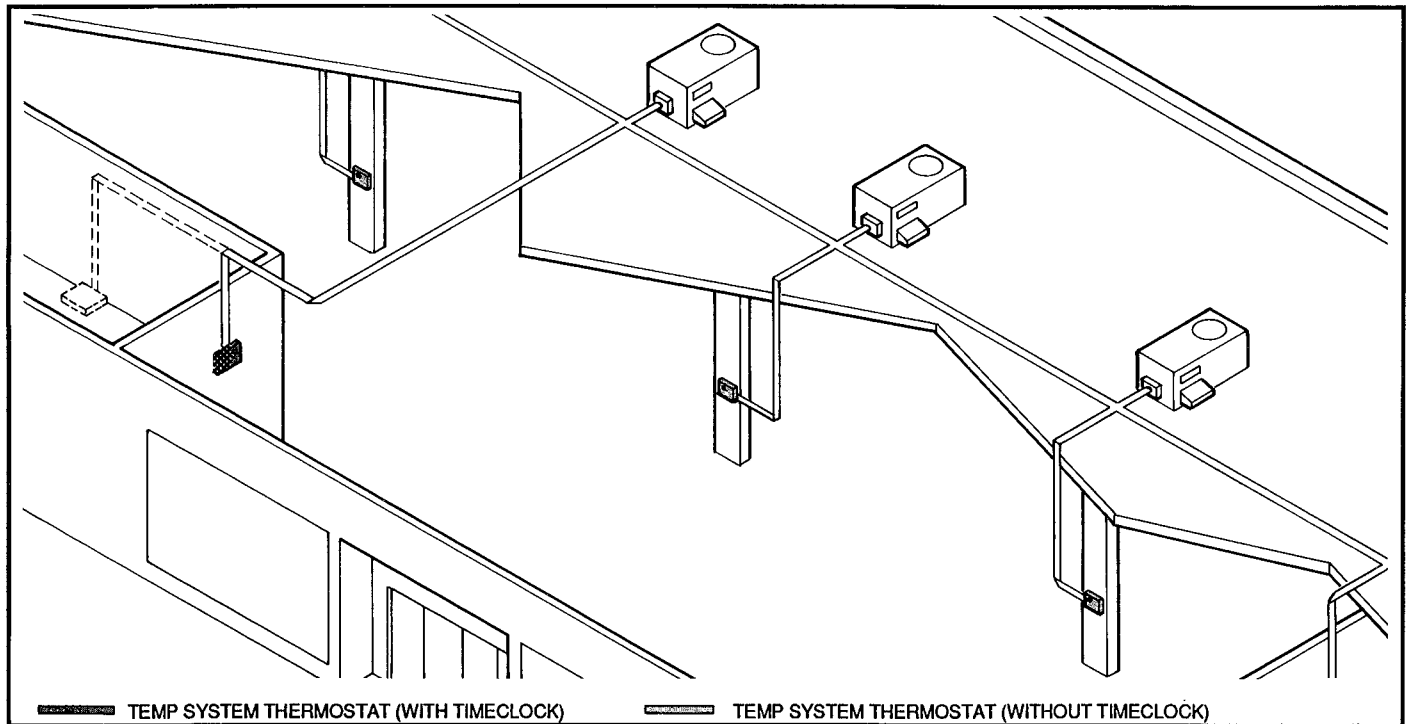
Controls (cont)

Temp systems

A Temp System is a network of communicating Carrier Temp System Thermostats and rooftop, factory-mounted 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.

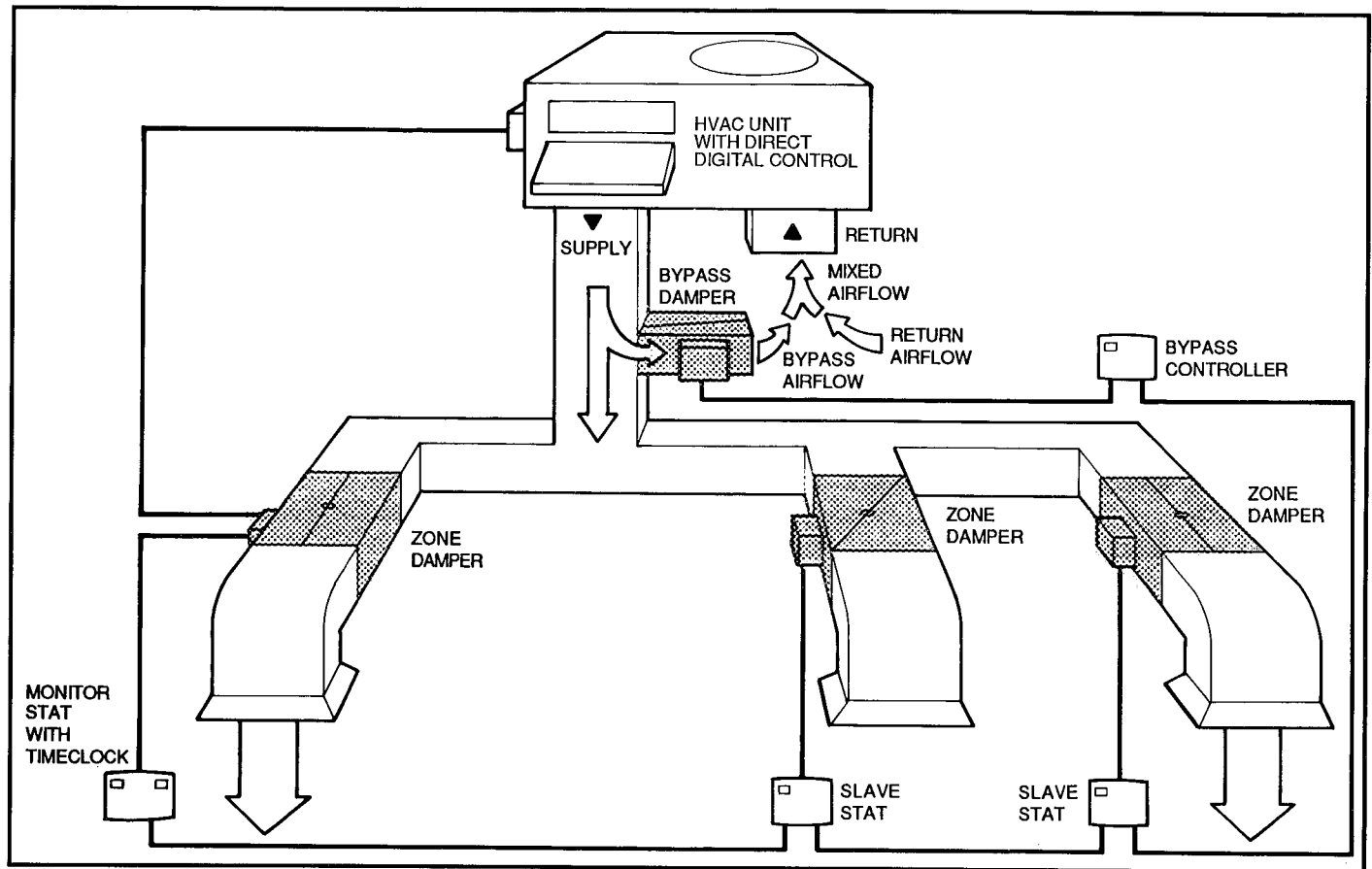
Ideal for department stores, small office buildings, fast food chains, schools and hotels, a Temp System is a cost-effective way to maintain comfortable building environments.



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.



Guide specifications — 48HJ004-007

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 and certified in accordance with ANSI Z21.47 Standards and CSA or CGA certified 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

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 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.

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 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.
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 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, and indoor air quality.
- c. Shall work with Carrier Temp and VVT® systems.

* 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 sliding-plate low leakage type damper or parallel blade design.
- d. Capable of introducing up to 100% outdoor air.
- e. Equipped with a barometric relief damper for up to 50% of nominal cfm.
- f. Designed to close damper during loss of power situations with emergency power supply or spring return.
- g. Dry bulb outdoor thermostat or enthalpy detection provided.

* 4. Manual Damper:

Manual damper package shall consist of damper, birdscreen, and rainhood which can be preset to admit up to 50% outdoor air for year round ventilation

Guide specifications — 48HJ004-007 (cont)

- * 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 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 (Time Guard® II device):

Compressor shall be prevented from restarting for a minimum of 5 minutes after shutdown.
- * 8. Solid-State Enthalpy Control:
 - 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 either condenser-fan speed modulation or condenser-fan cycling.
- * 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-Curb Service Connections:

Allow gas and electrical connections to be brought to the unit through the roof curb.
- * 14. Electronic Programmable Thermostat:

Capable of using deluxe full-featured programmable electronic thermostat. Shall use a built-in Time Guard control 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.
- 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.
- * 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.
- * 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.

Guide specifications — 48HJ008-014

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 and CSA certified 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.

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 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.

Guide specifications — 48HJ008-014 (cont)

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
- 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 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.
 - * 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 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 50% of nominal cfm.
 - f. Designed to close damper during loss of power situations with emergency power supply or spring return.
 - g. Dry bulb outdoor thermostat or enthalpy detection provided.

- * 4. Manual Damper:
Manual damper package shall consist of damper, birdscreen, and rainhood which can be preset to admit up to 50% outdoor air for year round ventilation
- * 5. 100% Two-Position Damper.
 - a. Two-position damper package shall include single blade damper and motor. Admits up to 100% outdoor air.
 - b. Damper shall close upon indoor (evaporator) fan shutoff.
 - c. Designed to close damper during loss of power situations.
 - d. Equipped with barometric relief damper.
- * 6. 25% Two-Position Damper:
 - a. Two-position damper package shall include single blade damper and motor. Admits up to 25% outdoor air.
 - b. Damper shall close upon indoor (evaporator) fan shutoff.
 - c. Designed to close damper during loss of power situations.
 - d. Equipped with barometric relief damper.
- 7. Compressor Cycle Delay (Time Guard® II):
Compressor shall be prevented from restarting for a minimum of 5 minutes after shutdown.
- * 8. Solid-State Enthalpy Control:
 - 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 cycling 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-Curb Service Connections:
Allow gas and electrical connections to be brought to the unit through the roof curb.
- * 14. Electronic Programmable Thermostat:
Capable of using deluxe full-featured programmable electronic thermostat. Shall use built-in Time Guard control 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
- 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.
- * 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.
- * 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

