

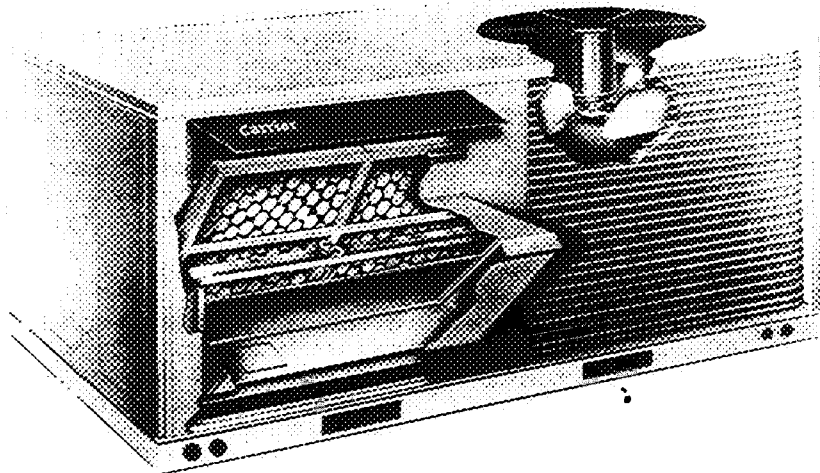


Advance Product Data

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

3 to 10 Nominal Tons

Weathermaster[®] S·E·R·I·E·S



The Weathermaster Series... Masters by Design

Carrier, the number one manufacturer of packaged rooftop units, has designed its new "Weathermaster" Series to meet its customers' growing needs of today and tomorrow.

Based on customer requests, the new Weathermaster Series has been designed to provide excellent year-round operating efficiencies, as well as unprecedented ease of maintenance and installation, and the highest reliability in the industry.

Standard Features

- belt-driven evaporator-fan motors on all sizes
- low sound levels down to 8.0 bels
- SEERs (Seasonal Energy-Efficiency Ratios) up to 12.0
- UL, ARI, CSA certified and approved
- EERs (Energy Efficiency Ratios) up to 100
- 2-in. disposable return-air filters requiring no tools for removal
- 10 year warranty on heat exchangers
- 5 year compressor warranty
- high and low pressure (loss-of-charge) and freeze protection switches
- heating AFUEs (Annual Fuel Utilization Efficiency) and steady state efficiencies up to 82%
- 24-v controls with resettable circuit breaker
- non-chalking exterior cabinet with non-corrosive exterior screws
- permanently lubricated evaporator-fan motors
- totally enclosed, permanently lubricated condenser-fan motors
- full perimeter base rails with built-in rigging capability
- easy field conversion from vertical to horizontal supply/return
- DrainGuard™ corrosion-resistant condensate pan with internal trap conforms with ASHRAE Standard 62 self-draining requirement

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. 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 shipment.

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 switch
- internal compressor overload
- exclusive Cycle-Loc™ protection device 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 surfaces 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 008-012.) The contractor can order and install the roof curbs early in the construction stage, before decisions on size requirements have been made.

All units feature roll-formed baserail design with forklift 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.

Ductwork connections are made easy by the logical 2 to 1 aspect ratio. On vertical discharge units, ductwork attaches directly to the roof curb. Accessory thru-the-curb service connections allow power, gas, and control wir-

ing 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.

The DrainGuard™ non-corrosive condensate drain is factory installed and internally trapped, and conforms to ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) Standard 62. This eliminates the need for a field-supplied condensate drain, saving time and money

Standard 2-in. disposable filters are easily accessed through a hinged access door located directly above the air intake hood, no tools are required to change the filters.

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

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

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

Quiet, efficient operation and dependable performance

Compressors are fully hermetic with internal vibration isolators for extremely quiet operation. Compressors are mounted on independent base rails for additional sound integrity and structural support. Efficient condenser fan and motor design permits operation at a low sound power of 8.0 bels for sizes 004-006, 8.2 bels for size 007, and 8.6 bels for sizes 008-012.

Totally enclosed fan motors and permanently lubricated bearings provide additional dependability.

All coils use state-of-the-art internally enhanced copper tubing. Coils are thoroughly leak and pressure tested at the factory. Condenser coils have louvered aluminum fins providing maximum heat transfer for optimum efficiency and easy cleaning.

Turbo-tubular™ 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, turbolators inside the heat exchanger tube act as baffles, forcing the hot gases to stay in close contact with the cell walls and improving heat transfer.

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 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. All ignition components are contained in a compact module that is easily accessible for service. 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 LP gas.

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

Patented Cycle-Loc™ protection system provides protection against compressor cycling.

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) replaceable filter driers, which trap moisture and dirt
- 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

Independent compressor circuiting (all 7½ to 10 ton units) provides greater comfort control and back-up capability.

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, pressure switches and rollout switches. This allows for greater inventory control and fewer stocked parts.

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

Resettable 24-v circuit breaker 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.

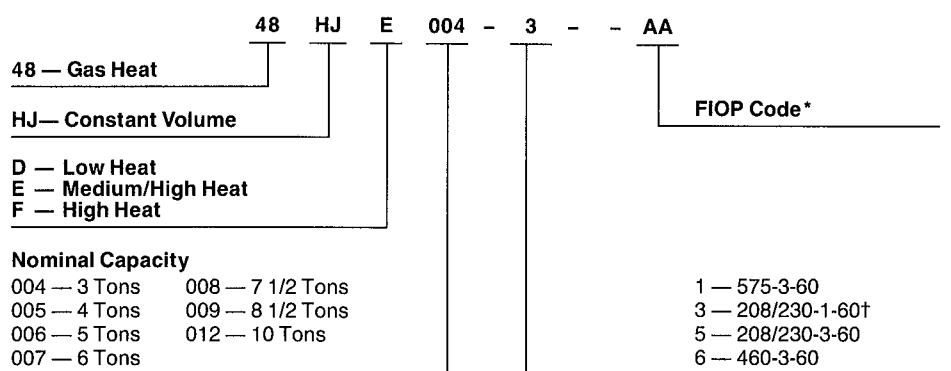
Belt-driven motors are available through a single access door to facilitate servicing and adjusting after installation.

Compressors are located in an easy-access location for troubleshooting and system analysis.

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Model number nomenclature



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

†5-ton unit motor is 230-1-60 only

ARI* capacities

UNIT 48	NOMINAL TONS	STANDARD CFM	NET COOLING CAPACITY (Btuh)	TOTAL kW	SEER†		EER	SOUND RATING (Bels)
					With Timer**	Without Timer		
HJE/HJF004	3	1200	36,000	3.7	11.0	10.6	9.7	8.0
HJD/HJE005	4	1600	48,500	4.4	12.3	12.0	11.0	8.0
HJD/HJE006	5	2000	61,000	5.8	12.0	11.9	10.5	8.0

UNIT 48	NOMINAL TONS	STANDARD CFM	NET COOLING CAPACITY (Btuh)	TOTAL kW	EER	SOUND RATING (Bels)	IPLV
HJD/HJE007	6	2100	72,000	8.0	9.0	8.2	††
HJD/HJE/HJF008	7½	2750	92,000	9.2	10.0	8.6	10.9
HJD/HJE/HJF009	8½	3000	100,000	10.0	10.0	8.6	10.9
HJD/HJE012	10	4000	120,000	12.0	10.0	8.6	11.0

LEGEND

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

* Air-Conditioning & Refrigeration Institute.

† Applies only to units with capacity of 65,000 Btuh or less

** SEER ratings with timer are made using time delay relay part number HN67SK031

†† The IPLV does not apply to single-compressor units

Rated in accordance with ARI Standards 210/240-89 and 270-84.



Ratings are net values, reflecting the effects of circulating fan heat. Ratings are based on:

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

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

HEATING CAPACITIES AND EFFICIENCIES

UNIT 48	HEATING INPUT (Btuh)	OUTPUT CAPACITY (Btuh)	TEMPERATURE RISE (°F)	AFUE (%)	STEADY STATE EFFICIENCY (%)	CALIFORNIA SEASONAL EFFICIENCY (%)
HJE004	74,000	59,940	25-55	81	81	77.7
HJF004	115,000	93,150	55-85	81	81	77.7
HJD005	74,000	59,940	25-55	81	81	77.7
HJE005	115,000	93,150	35-65	81	81	77.7
HJD006	74,000	59,940	25-55	81	81	77.7
HJE006	115,000	93,150	35-65	81	81	77.8
HJD007	74,000	59,940	25-55	81	81	77.8
HJE007	115,000	93,150	35-65	81	81	77.8

UNIT 48	HEATING INPUT (Btuh) First Stage/Second Stage	OUTPUT CAPACITY (Btuh) First Stage/Second Stage	TEMPERATURE RISE (°F)	AFUE (%)	STEADY STATE EFFICIENCY (%)	CALIFORNIA SEASONAL EFFICIENCY (%)
HJD008	125,000	102,500	20-50	82	82	77.5
HJE008	120,000/180,000	98,400/147,600	35-65	82	82	77.5
HJF008	180,000/220,000	147,600/180,400	45-75	82	82	79.3
HJD009	125,000	102,500	20-50	82	82	78.4
HJE009	120,000/180,000	98,400/147,600	35-65	82	82	78.4
HJF009	180,000/220,000	147,600/180,400	45-75	82	82	79.3
HJD012	120,000/180,000	98,400/147,600	35-65	82	82	78.4
HJE012	180,000/225,000	147,600/184,500	35-65	82	82	79.3

LEGEND

AFUE — Annual Fuel Utilization Efficiency

NOTE: NO_x Levels are 40 nanograms/joule with accessory kit.



Physical data

BASE UNIT 48	HJE/HJF004	HJD/HJE005	HJD/HJE006	HJD/HJE007
NOMINAL CAPACITY (tons)	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	Reciprocating	Scroll		Reciprocating
Quantity	1	1	1	1
Oil (oz)	45	60	75	65
REFRIGERANT TYPE	R-22			
Operating Charge (lb-oz)	5-2	7-11	8-4	9-12
CONDENSER FAN	Propeller			
Quantity...Diameter (in.)	1.. 26	1.. 26	1...26	1 ..26
Nominal Cfm	4600	4100	4100	4100
Motor Hp...Rpm	1/3 . 850	1/3 .850	1/3. 850	1/3 .850
CONDENSER COIL	Enhanced Copper Tubes, Aluminum Lanced Fin			
Rows...Fins/in.	1 . 17	2 17	2.. 17	2...17
Total Face Area (sq ft)	12 25	12 25	12.25	12 25
EVAPORATOR FAN	Centrifugal			
Size (in.)	10 x 10	10 x 10	10 x 10	10 x 10
Type Drive	Belt	Belt	Belt	Belt
Std	Direct	Direct	Belt	—
Alt	1200	1600	2000	2400
Nominal Cfm	—	—	—	—
Maximum Continuous Bhp	Std	1 30	1 70	2 40
Alt	34	.81	—	—
Motor Frame	Std	56	56	56
Alt	48	48	—	—
Nominal Rpm High/Low	Std	—	—	—
Alt	860/845	1080/970	—	—
Fan Rpm Range	Std	800-1100	920-1300	1070-1460
Alt	—	—	—	—
Motor Bearing Type	Ball	Ball	Ball	Ball
Maximum Fan Rpm	2100	2100	2100	2100
Motor Pulley Pitch Diameter A/B (in.)	Std	2 4/3 4	2 4/3 4	2 8/3.8
Alt	—	—	—	—
Fan Pulley Pitch Diameter (in.)	Std	5 2	4 5	4 5
Alt	—	—	—	—
Belt — Type...Length (in.)	Std	A 40	A 40	A 39
Alt	—	—	—	—
Pulley Center Line Distance (in.)	Std	14 7-15 5	14 7-15 5	14 7-15.5
Alt	—	—	—	—
Speed Change per Full Turn of	Std	66	76	79
Movable Pulley Flange (rpm)	Alt	—	—	—
Movable Pulley Maximum Full Turns	Std	5	5	5
from Closed Position	Alt	—	—	—
Factory Setting — Full Turns Open	Std	3	3	3
Alt	—	—	—	—
Factory Speed Setting (rpm)	Std	930	1075	1230
Alt	—	—	—	—
Fan Shaft Diameter at Pulley (in.)	Std	5/8	5/8	5/8
Alt	—	—	—	—
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)	4 17	5 5	5 5	5.5
FURNACE SECTION				
Burn Orifice Diameter (in. ...drill size)*				
Natural Gas — Std	.113 .33	113 .33	113 33	113 33
Liquid Propane — Alt	.089 .43	.089 .43	.089. 43	.089 .43
Thermostat Heat Anticipator Setting (amps)				
208/230/460/575 v	1.0	1.0	1 0	1 0
Gas Input	74,000/115,000	74,000/115,000	74,000/115,000	74,000/115,000
Efficiency (Steady State) (%)	81	81	81	81
Temperature Rise Range	25-55/55-85	25-55/35-65	25-55/35-65	25-55/35-65
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.)	5	5	5	5
HIGH-PRESSURE SWITCH (psig)				
Cutout	428			
Reset (Auto.)	320			
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (Liquid Line) (psig)				
Cutout	7 ± 3			
Reset (Auto.)	22 ± 5			
OUTDOOR-AIR INLET SCREENS				
Quantity...Size (in.)	Cleanable			
	1 . 20 x 24 x 1			
RETURN-AIR FILTERS				
Quantity...Size (in.)	Disposable			
	2 16 x 25 x 2			

LEGEND

Bhp — Brake Horsepower

* 48HJD005-007 and 48HJE004 (74,000 Btuh) units have 2 burners

48HJE005-007 (115,000 Btuh) units have 3 burners

†Data is not currently available

Physical data (cont)

BASE UNIT 48	HJD/HJE/HJF008	HJD/HJE/HJF009	HJD/HJE012
NOMINAL CAPACITY (tons)	7 1/2	8 1/2	10
OPERATING WEIGHT (lb)			
Unit	870	880	1035
With Economizer	914	924	1079
Roof Curb	143	143	143
COMPRESSOR		Scroll	
Quantity	2	2	2
Oil (oz) (each compr)	60	60	75
REFRIGERANT TYPE		R-22	
Operating Charge (lb-oz)			
Circuit 1	6-8	7-4	8-11
Circuit 2	5-14	6-4	8-3
CONDENSER FAN		Propeller	
Quantity...Diameter (in.)	1 . 26	1 . 26	1...26
Nominal Cfm	6500	6500	7000
Motor Hp...Rpm	3/4 1100	3/4...1100	3/4... 1100
CONDENSER COIL	Enhanced Copper Tubes, Aluminum Lanced Fins		
Rows...Fins/in.	2 17	2. 17	2 17
Total Face Area (sq ft)	18 0	20.5	25 0
EVAPORATOR FAN		Centrifugal	
Size (in.)	15 x 15	15 x 15	15 x 15
Type Drive	Std Alt	Belt Belt	Belt Belt
Nominal Cfm	3000	3400	4000
Maximum Continuous Bhp	Std Alt	2 4 2 9	2.4 4.2
Motor Frame	Std Alt	56 56	56 56
Fan Rpm Range	Sd Alt	590-840 840-1085	690-935 860-1080
Motor Bearing Type	Ball	Ball	Ball
Maximum Fan Rpm	2100	2100	2100
Motor Pulley Pitch Diameter A/B (in.)	Std Alt	2 4/3.4 3 4/4.4	2 8/3 8 4 0/5 0
Fan Pulley Pitch Diameter (in.)	Std Alt	7 0 7 0	7 0 8 0
Belt — Type...Length (in.)	Std Alt	A .48 A .51	A 51 A .57
Pulley Center Line Distance (in.)	Std Alt	16.75-19.25 16 75-19.25	18 25-20 75 18 25-20.75
Speed Change per Full Turn of Movable Pulley Flange (rpm)	Std Alt	50 50	50 44
Movable Pulley Maximum Full Turns From Closed Position	Std Alt	5 5	5 5
Factory Setting — Full Turns Open	Std Alt	5 5	5 5
Factory Speed Setting (rpm)	Std Alt	590 840	690 860
Fan Shaft Diameter at Pulley (in.)	1	1	1
EVAPORATOR COIL	Enhanced Copper Tubes, Aluminum Double Wavy Fins		
Rows...Fins/in.	3 . 15	3 ..15	3.. 15
Total Face Area (sq ft)	8.0	8 0	10 0
FURNACE SECTION			
Burn Orifice Diameter (in. ...drill size)			
Natural Gas — Std	120.. 31/ 120 .31	120...31/ 120 31	120 .31/ 120.. 31
Liquid Propane — Alt	096 41/ 096 41	096...41/ 096. .41	096.. 41/ 096.. 41
Thermostat Heat Anticipator Setting (amps)			
208/230/460/575-v Stage 1	1 0	1.0	1.0
Stage 2	0 6	0.6	0 6
Gas Input	125,000/120,000-180,000/ 180,000-220,000	125,000/120,000-180,000/ 180,000-220,000	120,000-180,000/ 180,000-225,000
Efficiency (Steady State) (%)	82	82	82
Temperature Rise Range	20-50/35-65/45-75	20-50/35-65/45-75	20-50/35-65
Manifold Pressure (in. wg)			
Natural Gas — Std	3 5	3 5	3.5
Liquid Propane — Alt	3 5	3 5	3.5
Field Gas Connection Size (in.)	5/ 75	5/ 75	75/ 75
HIGH-PRESSURE SWITCH (psig)			
Cutout		428	
Reset (Auto.)		320	
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (Liquid Line) (psig)			
Cutout		7 ± 3	
Reset (Auto.)		22 ± 7	
OUTDOOR-AIR INLET SCREENS		Cleanable	
Quantity...Size (in.)		1 .20 x 25 1 16 x 25	
RETURN-AIR FILTERS		Disposable	
Quantity...Size (in.)	4 16 x 20 x 2	4. .16 x 20 x 2	4 20 x 20 x 2

LEGEND

Bhp — Brake Horsepower

Options and accessories

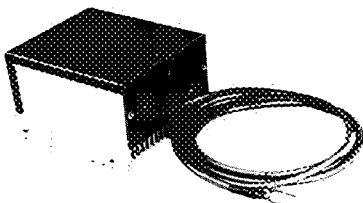
ITEM	OPTION*	ACCESSORY†
Economizer	X	X
Manual Outdoor-Air Damper		X
Two-Position Damper	X	X
Alternate Motor and Drive (004,005,008-012)	X	
Roof Curb		X
Thru-the-Curb Service Connections		X
Flue Shield		X
Thermostat and Subbase		X
Electronic Programmable Thermostat		X
Time Guard® II Control Circuit (3 phase units only)		X
Motormaster® Head Pressure Control (004-007)		X
Motormaster® II Head Pressure Control (004-012)		X
Accusensor™ II Enthalpy Control		X
Accusensor™ III Differential Enthalpy Control		X
LP Conversion Kit		X
Hail Guard		X
Remote Control Panel		X
NO _x Reduction Kit		X
Flue Discharge Deflector		X

*Factory installed

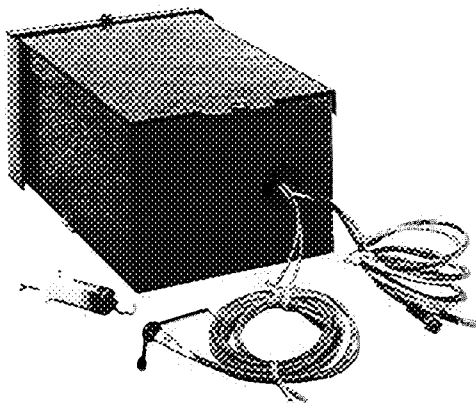
†Field installed

HEAD PRESSURE CONTROL

The 48HJ004-012 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) or Motormaster II control (condenser fan cycling for unit sizes 004-012), 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.



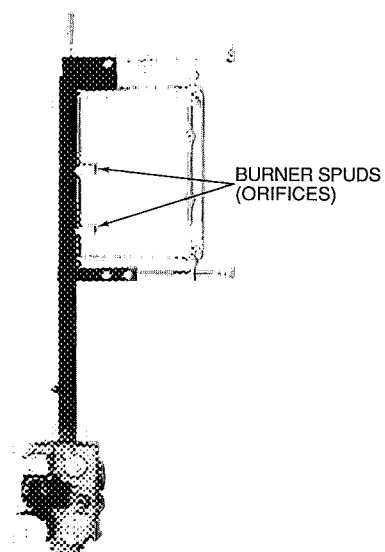
MOTORMASTER
(Sizes 004-007)



MOTORMASTER II
(Sizes 004-012)

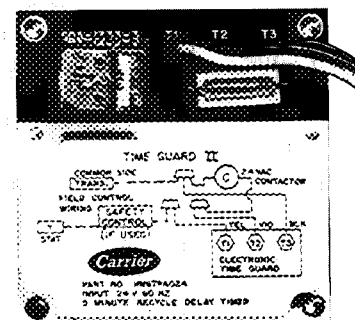
Time Guard II Control automatically prevents compressor from restarting for at least 5 minutes after a shutdown. Accessory prevents short cycling of compressor if thermostat is rapidly changed. Time Guard II mounts in the control compartment of unit.

LP CONVERSION KIT



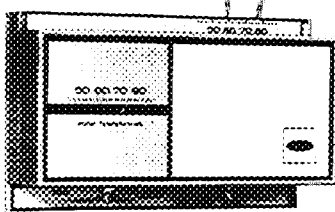
LP conversion kit allows the unit to utilize a liquid propane fuel supply in areas where natural gas is unavailable. (Kit shown is for sizes 004-007.)

TIME GUARD II CONTROL



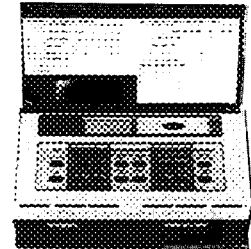
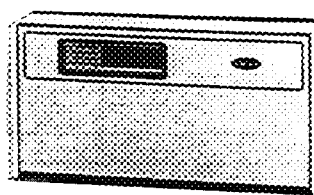
Options and accessories (cont)

THERMOSTAT



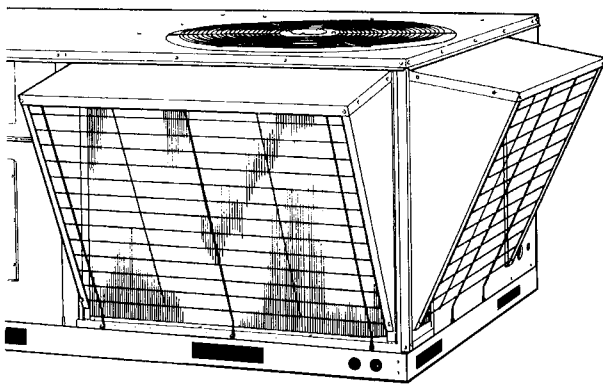
Zone thermostat (24 v) provides one- or 2-stage cooling for control of unit. Matching subbases are available with or without tamperproof switches and automatic changeover.

ELECTRONIC PROGRAMMABLE THERMOSTAT



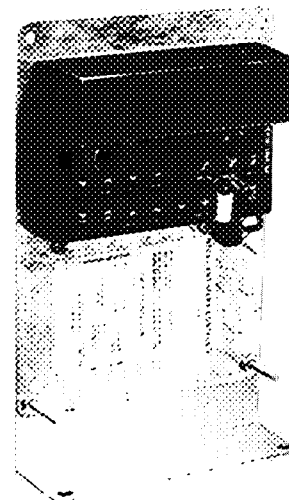
Electronic programmable thermostat provides efficient temperature control by allowing you to program heating and cooling setbacks and setups with provisions for weekends and holidays. Accessory remote sensing package is also available to provide tamperproof control in high traffic spaces.

HAIL GUARD

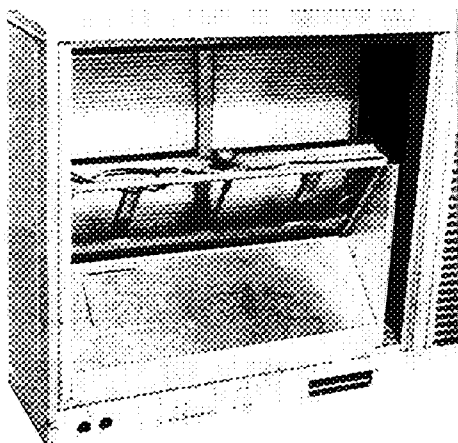


Hail guard accessory (field installed) protects coils against damage from hail and other flying debris.

ACCUSENSOR™ II

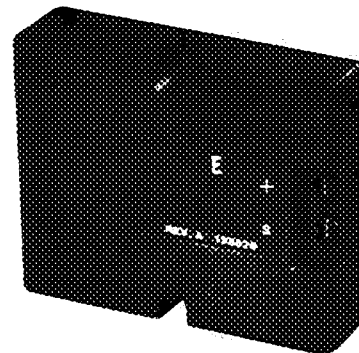


VARISLIDE™ ECONOMIZER



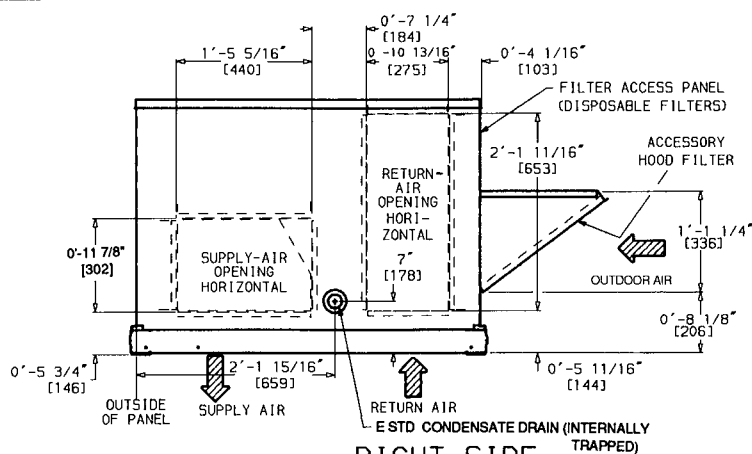
Exclusive Varislide™ economizer damper design saves energy while providing economical and reliable cooling. A sliding plate on the face of the economizer controls the amount of outdoor air entering the system. Closed, it provides a leakproof seal which prevents ambient air from seeping in or conditioned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

ACCUSENSOR III



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

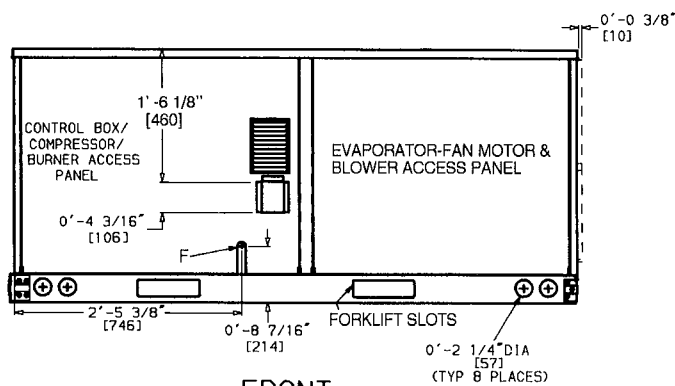
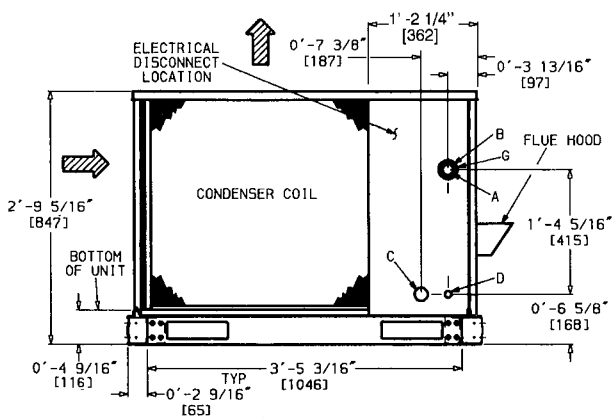
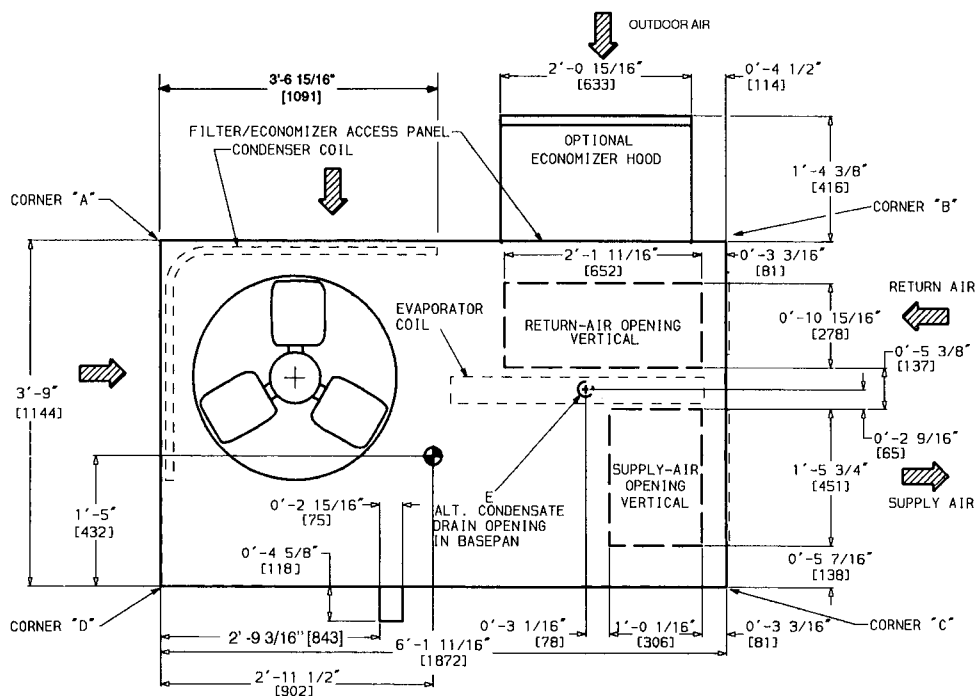
Base unit dimensions — 48HJ004-007



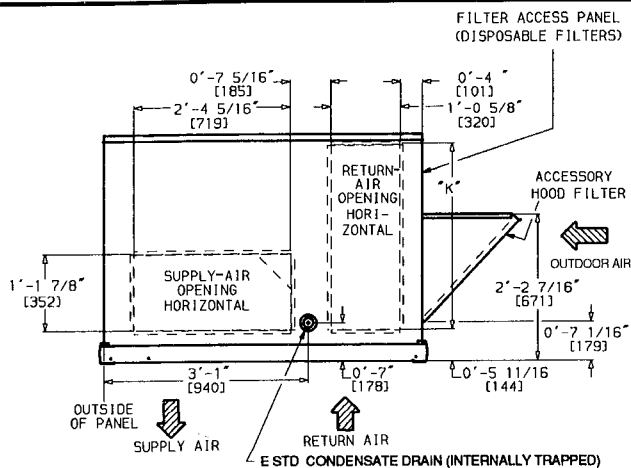
NOTES:

- 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, 36 inches
 - b Bottom to combustible surfaces (when not using curb), one in on HJF units, zero in on all others
 - c Condenser coil, for proper airflow, 36 in on 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 Horizontal supply and return end, zero inches
 - f Between units, control box side, 42 in per NEC (National Electrical Code).
 - g Between unit and ungrounded surfaces, control box side, 36 in per NEC
 - h Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in per NEC
- 6 With the exception of the clearance for the condenser coil and combustion side, as stated in notes 5a, b, and c, a removable fence or barricade requires no clearance.
- 7 Units may be installed on combustible floors made from wood or class A, B, or C roof covering material.

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



Base unit dimensions — 48HJ008-012



RIGHT SIDE

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 to combustible surfaces (when not using curb), one in on HJF units, zero in on all others

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 Horizontal supply and return end, zero inches

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

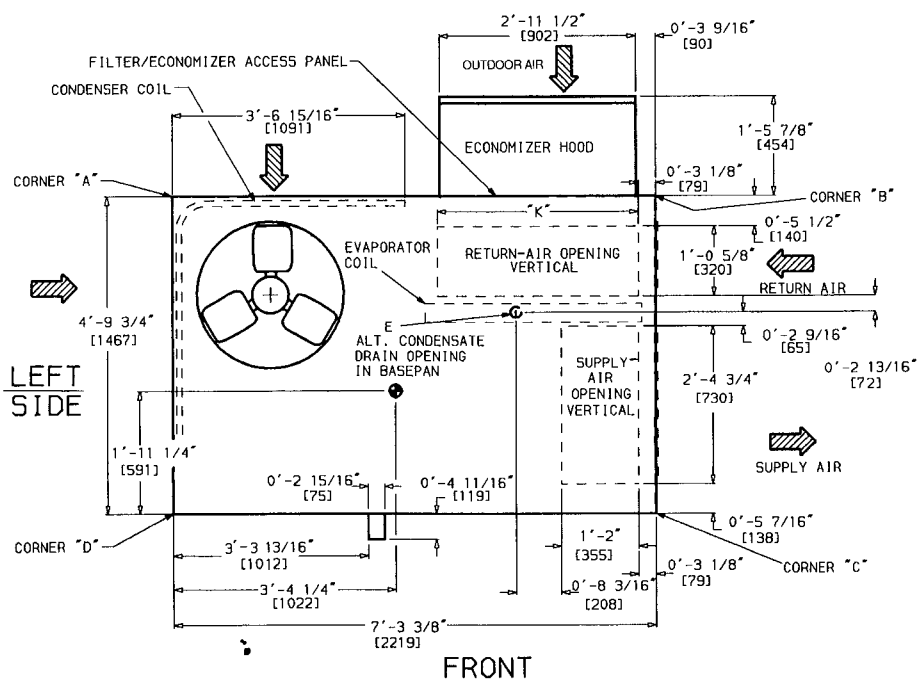
g Between unit and ungrounded surfaces, control box side, 36 in. per NEC

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

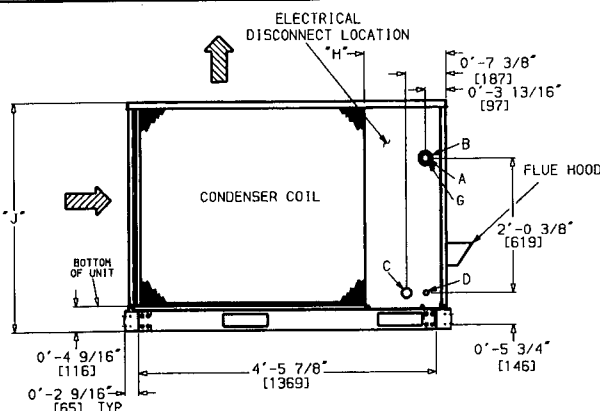
6 With the exception of the clearance for the condenser coil and combustion side, as stated in notes 5a, b, and c, a removable fence or barricade requires no clearance

7 Units may be installed on combustible floors made from wood or class A, B, or C roof covering material

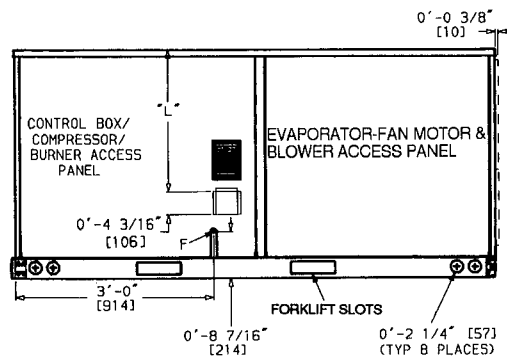
CONNECTION SIZES	
A	1 3/8" Dia [35] Field Power Supply Hole
B	2 1/2" Dia [64] Power Supply Knockout
C	1 3/4" Dia [44] Charging-Port Hole
D	7/8" Dia [22] Field Control Wiring Hole
E	3/4" - 14 NPT Condensate Drain
F	1/2" - 14 NPT Gas Connection 48HJD008,009 3/4" - 14 NPT Gas Connection 48HJE,HJF008,009, 48HJD,HJE012
G	2" Dia [51] Power Supply Knockout



FRONT



LEFT SIDE



FRONT

Accessory dimensions

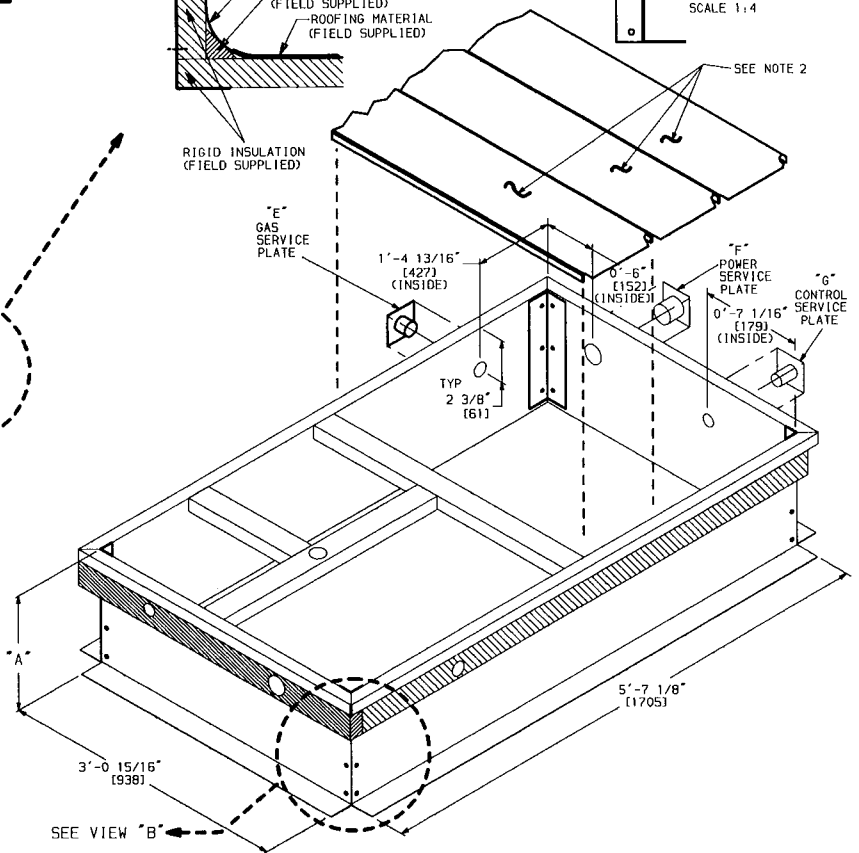
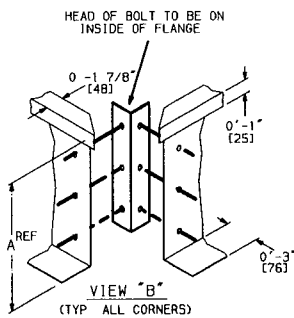
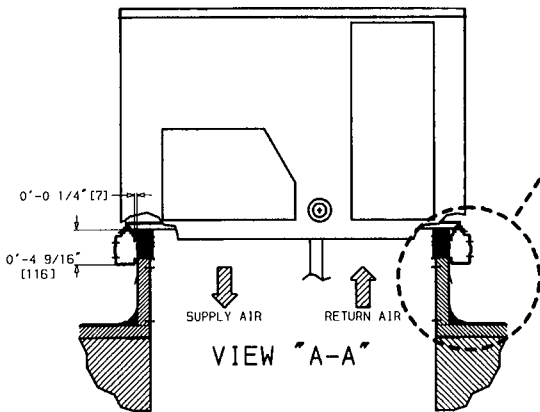
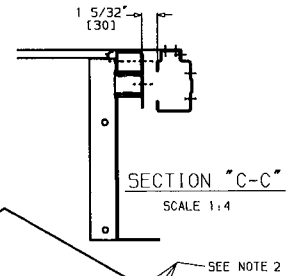
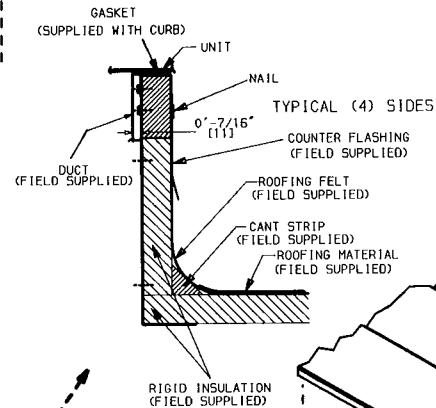
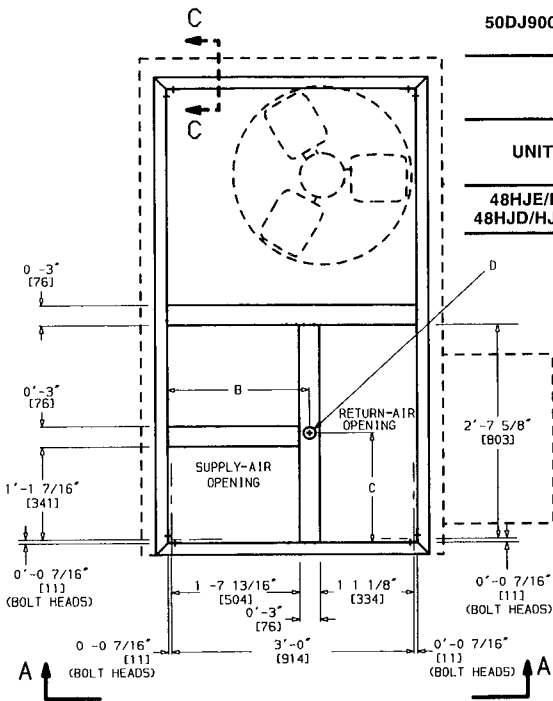
ROOF CURB — 48HJ004-007

ROOF CURB ACCESSORY	"A"	UNIT SIZE
50DJ900771	1'-2" [356]	48HJE/HJF004, 48HJD/HJE005-007
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

UNIT SIZE	"B"	"C"	"D" ALT DRAIN HOLE	"E" GAS	"F" POWER	"G" CONTROL	CONNECTOR PKG. ACC.
48HJE/HJF004, 48HJD/HJE005-007	1-9 1/4" [551]	1-4" [406]	1-3/4" [45]	3/4" [19] NPT	3/4" [19] NPT	3/4" [19] NPT	50DJ900791



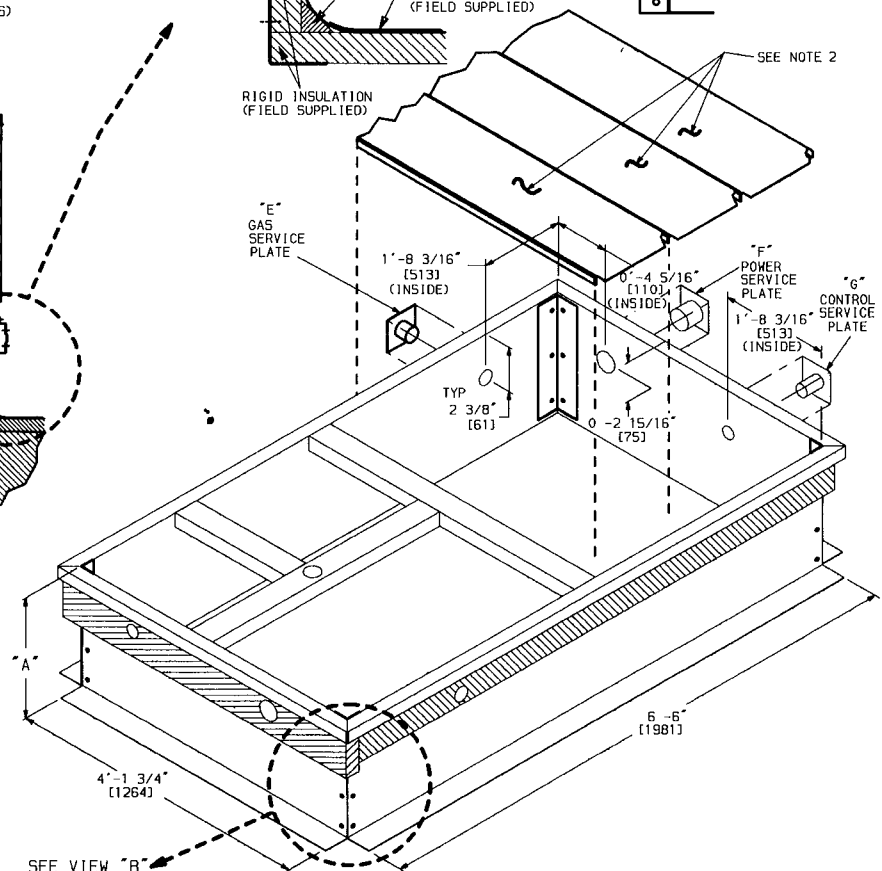
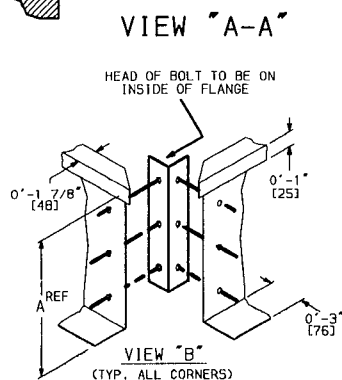
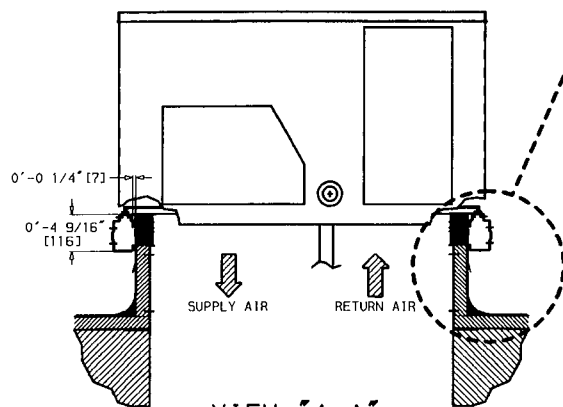
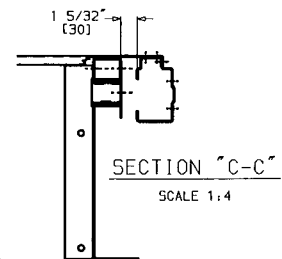
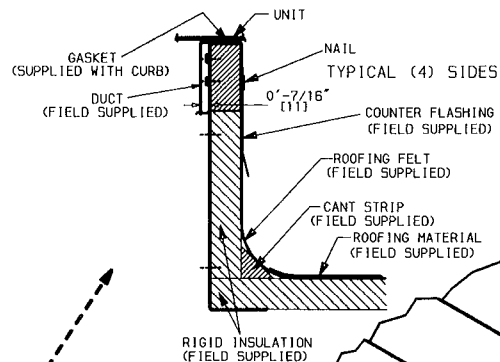
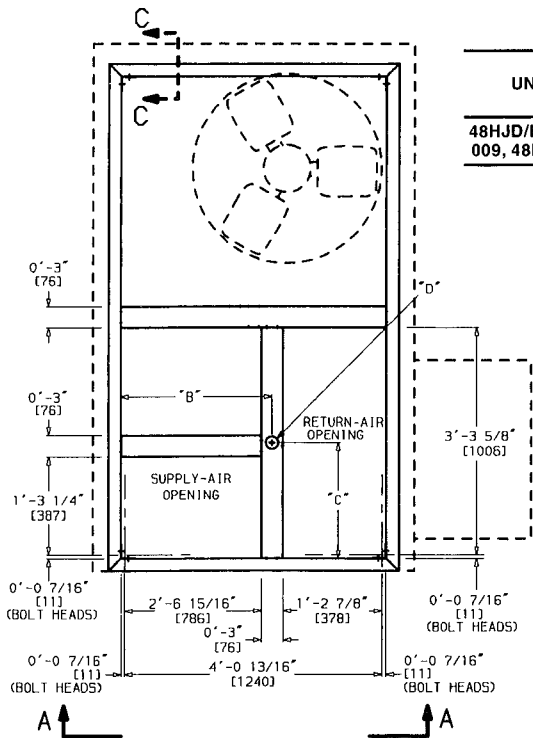
Accessory dimensions (cont)

ROOF CURB — 48HJ008-012

ROOF CURB ACCESSORY	"A"	UNIT SIZE
50DJ901371	1'-2" [356]	48HJD/HJE/HJF008, 009, 48HJD/HJE012
50DJ901381	2'-0" [610]	

- 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

UNIT SIZE	"B"	"C"	"D" ALT DRAIN HOLE	"E" GAS	"F" POWER	"G" CONTROL	CONNECTOR PKG. ACC
48HJD/HJE/HJF008, 009, 48HJD/HJE012	2'-87 ¹ / ₁₆ " [827]	1-10 ¹⁵ / ₁₆ " [583]	1-3 ¹ / ₄ " [45]	3/4" [19] NPT	1" [25] NPT	3/4" [19] NPT	50DJ901551



Selection procedure (with 48HJ005 example)

I Determine cooling and heating requirements at design conditions.

Given:

Required Cooling Capacity (TC) 46,000 Btuh
Sensible Heat Capacity (SHC) 32,000 Btuh
Required Heating Capacity 85,000 Btuh
Condenser Entering Air Temperature 95 F
Evaporator Enter Air
Temperature 80 F edb, 67 F ewb
Evaporator Air Quantity 1600 cfm
External Static Pressure (ESP) 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 14) 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 49,500 Btuh and a sensible heat capacity of 35,700 Btuh. For evaporator-air temperature other than 80 F edb, calculate sensible heat capacity correction, as required, using the formula found in the notes following the Cooling Capacities tables.

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 93,150 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 22), find:

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

Enter the Fan Performance table for 48HJ005 vertical discharge units. At 1600 cfm, the standard motor will deliver .80 in. wg static pressure and .93 bhp. This will adequately handle the job requirements.

To determine the input power to the motor, convert bhp to Watts using the Evaporator-Fan Motor Efficiency table (page 22).

For example:

$$\begin{aligned}\text{IFM Watts} &= \frac{\text{Bhp} \times 746}{\text{Motor Efficiency}} \\ &= \frac{.93 \times 746}{.81}\end{aligned}$$

$$\text{IFM Watts} = 866$$

V Determine net cooling capacity.

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

$$\begin{aligned}\text{Net capacity} &= \text{gross capacity} - \text{IFM heat} \\ &= 49,500 \text{ Btuh} - 866 \text{ Watts} \left(3.413 \frac{\text{Btuh}}{\text{Watts}} \right) \\ &= 49,500 \text{ Btuh} - 2956 \text{ Btuh}\end{aligned}$$

$$\text{Net capacity} = 46,544 \text{ Btuh}$$

$$\text{Net sensible capacity} = 35,700 \text{ Btuh} - 2956 \text{ Btuh}$$

$$\text{Net sensible capacity} = 32,744 \text{ Btuh}$$

Performance data

COOLING CAPACITIES

48HJ004 (3 TONS)										
Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF								
		900/0.09			1200/0.12			1500/0.15		
		Temp (F) Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	42.1	38.2	34.3	44.0	40.2	36.2	45.4	41.4	37.3
	SHC	19.7	24.2	28.3	21.4	27.5	32.5	23.1	30.3	35.9
	kW	2.87	2.79	2.70	2.92	2.85	2.77	2.97	2.89	2.80
95	TC	40.7	36.4	32.4	42.5	38.3	34.4	43.5	39.4	35.4
	SHC	19.1	23.5	27.4	21.1	26.8	31.7	22.6	29.7	35.1
	kW	3.09	2.98	2.88	3.15	3.05	2.95	3.18	3.10	2.99
105	TC	38.6	34.4	30.0	40.4	36.2	31.8	41.4	37.1	33.6
	SHC	18.4	22.7	26.2	20.4	26.1	30.4	22.1	28.8	33.6
	kW	3.29	3.17	3.06	3.36	3.25	3.13	3.40	3.28	3.20
115	TC	36.4	32.0	27.7	38.1	34.0	29.4	38.9	35.0	31.7
	SHC	17.7	21.7	25.1	19.6	25.2	29.1	21.3	28.1	31.7
	kW	3.48	3.36	3.23	3.55	3.43	3.32	3.59	3.48	3.40

48HJ005 (4 TONS)										
Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF								
		1200/0.15			1600/0.19			2000/0.22		
		Temp (F) Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	53.3	49.0	44.8	55.8	51.3	47.4	56.9	52.9	48.9
	SHC	26.1	32.1	37.9	28.4	36.2	43.2	30.3	39.8	47.6
	kW	3.07	3.02	2.97	3.10	3.04	3.00	3.11	3.06	3.02
95	TC	51.3	47.3	42.6	53.6	49.5	45.2	55.1	51.0	47.1
	SHC	25.3	31.5	36.8	27.6	35.7	42.2	29.8	39.3	46.8
	kW	3.42	3.38	3.32	3.45	3.41	3.36	3.48	3.43	3.38
105	TC	49.3	45.4	40.2	51.1	47.4	42.6	52.1	48.6	45.2
	SHC	24.5	30.7	35.6	26.6	34.9	40.9	28.4	38.2	45.2
	kW	3.82	3.77	3.70	3.84	3.80	3.75	3.85	3.82	3.78
115	TC	47.0	43.1	36.9	48.6	45.1	39.8	49.8	46.4	43.3
	SHC	23.6	29.9	33.8	25.7	33.9	39.5	27.8	37.5	43.3
	kW	4.23	4.19	4.12	4.26	4.23	4.16	4.28	4.25	4.21

48HJ006 (5 TONS)										
Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF								
		1500/0.09			2000/0.11			2500/0.14		
		Temp (F) Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	70.9	65.2	59.8	73.8	68.4	63.2	76.0	70.6	65.4
	SHC	35.1	43.2	51.3	38.2	48.9	59.0	41.5	54.5	64.9
	kW	4.58	4.48	4.39	4.63	4.54	4.45	4.68	4.58	4.49
95	TC	68.1	63.0	57.2	71.1	66.0	60.7	73.2	68.0	63.2
	SHC	34.0	42.4	50.0	37.4	48.3	58.0	40.7	53.9	63.2
	kW	5.11	5.03	4.92	5.18	5.09	4.99	5.23	5.13	5.04
105	TC	65.2	60.2	54.1	68.0	63.1	57.6	70.0	65.1	60.7
	SHC	32.7	41.2	48.4	36.1	47.1	56.3	39.6	52.6	60.7
	kW	5.68	5.60	5.49	5.75	5.66	5.57	5.81	5.72	5.62
115	TC	62.6	57.5	50.6	64.6	60.2	54.8	66.4	61.9	58.3
	SHC	31.9	40.1	46.7	34.9	46.1	54.6	37.9	51.4	58.3
	kW	6.33	6.23	6.10	6.37	6.30	6.19	6.42	6.34	6.25

48HJ007 (6 TONS)										
Temp (F) Air Ent Condenser (Edb)		Temp (F) Air Entering Evaporator — Cfm/BF								
		1800/0.02			2400/0.04			3000/0.05		
		Temp (F) Air Entering Evaporator — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	85.2	77.6	69.9	89.8	81.9	73.8	92.0	84.3	77.9
	SHC	41.9	51.8	61.0	46.9	59.9	71.6	50.9	67.3	77.8
	kW	6.25	6.14	6.00	6.35	6.23	6.09	6.39	6.27	6.17
95	TC	81.9	73.8	66.2	85.8	77.7	70.1	88.0	80.0	74.7
	SHC	40.7	50.3	59.4	45.5	58.4	69.5	50.1	65.8	74.6
	kW	6.72	6.58	6.40	6.82	6.67	6.51	6.88	6.73	6.63
105	TC	77.9	69.5	60.6	81.3	73.6	65.4	83.4	75.6	71.3
	SHC	39.2	48.6	56.7	44.0	56.9	65.4	48.7	64.3	71.3
	kW	7.18	7.00	6.80	7.28	7.12	6.96	7.35	7.19	7.07
115	TC	73.9	64.7	54.9	76.8	69.3	62.0	78.9	71.2	67.6
	SHC	37.8	46.7	53.9	42.5	55.3	62.0	47.2	62.7	67.6
	kW	7.65	7.43	7.22	7.74	7.56	7.40	7.82	7.64	7.54

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

NOTES:

1 Direct interpolation is permissible. Do not extrapolate.

2 The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{110 \times \text{cfm}}$$

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

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

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.

$$\text{Correction Factor} = 110 \times (1 - \text{BF}) \times (\text{edb} - 80)$$

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	98.3	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	57.0	70.9	84.4	63.0	80.6	97.3	67.9	89.4	106.1
	kW	7.11	6.96	6.83	7.20	7.04	6.92	7.24	7.08	6.98
95	TC	110.6	102.3	92.7	114.8	107.0	98.3	117.7	109.4	102.9
	SHC	55.3	69.5	82.2	60.9	79.4	95.0	65.9	87.9	102.9
	kW	7.93	7.81	7.65	8.01	7.89	7.76	8.07	7.93	7.84
105	TC	105.5	97.9	87.4	109.8	102.3	94.2	111.5	104.8	98.2
	SHC	53.4	67.7	79.6	58.9	77.3	92.4	63.6	86.1	98.2
	kW	8.82	8.73	8.55	8.92	8.81	8.66	8.94	8.84	8.71
115	TC	100.6	93.2	81.7	103.6	97.0	89.4	106.4	99.3	94.4
	SHC	51.5	65.9	76.8	56.3	75.4	89.1	61.7	83.6	94.3
	kW	9.79	9.68	9.51	9.85	9.75	9.63	9.92	9.80	9.70

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	81.4	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	127.8	116.1	141.5	131.6	122.9
	SHC	67.0	83.1	97.3	73.8	95.4	112.9	80.2	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

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

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 = $110 \times (1 - BF) \times (edb - 80)$

Performance data (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS

48HJE/HJF004 (3 TONS) STANDARD 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		0.9	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
900	—	—	760	0.32	808	0.34	858	0.35	910	0.37	—	—	—	—	—	—	—	—
1100	—	—	804	0.36	855	0.37	904	0.40	954	0.43	1005	0.47	1057	0.50	1111	0.56	—	—
1200	755	0.34	828	0.38	901	0.42	949	0.44	999	0.47	1307	0.52	1074	0.56	—	—	—	—
1300	801	0.38	851	0.40	921	0.45	969	0.48	1018	0.52	1064	0.59	—	—	—	—	—	—
1500	892	0.46	935	0.50	980	0.55	1208	0.73	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

- Values include losses for filters, unit casing, and wet coils.
- Extensive motor and drive testing of the Weathermaster® units ensures that the full horsepower range of the motor can be utilized with

confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

- Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.

48HJE/HJF004 (3 TONS) — ALTERNATE MOTOR (DIRECT)

AIRFLOW (Cfm)	LOW SPEED				HIGH SPEED			
	208		230, 460, 575		208		230, 460, 575	
	ESP	Bhp	ESP	Bhp	ESP	Bhp	ESP	Bhp
900	0.46	0.17	0.48	0.19	0.49	0.21	0.51	0.25
1000	0.44	0.20	0.45	0.22	0.47	0.23	0.48	0.27
1100	0.40	0.21	0.42	0.24	0.44	0.25	0.45	0.29
1200	0.32	0.23	0.37	0.25	0.38	0.27	0.40	0.31
1300	0.28	0.24	0.32	0.26	0.32	0.29	0.34	0.32
1400	0.22	0.26	0.25	0.28	0.26	0.30	0.28	0.33
1500	0.16	0.27	0.18	0.33	0.20	0.31	0.21	0.34

LEGEND

Bhp — Brake Horsepower

ESP — External Static Pressure

NOTE: Values include losses for filters, unit casing, and wet coils

48HJD/HJE005 (4 TONS) — STANDARD MOTOR AND DRIVE (BELT)

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																					
	0.1		0.2		0.4		0.6		0.8		0.9		1.0		1.2		1.4		1.6		1.8	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1200	596	0.20	665	0.25	779	0.36	872	0.48	957	0.60	992	0.64	1028	0.69	1083	0.74	—	—	—	—	—	—
1300	633	0.24	699	0.30	809	0.42	902	0.55	984	0.67	1021	0.73	1058	0.80	1121	0.89	1171	0.94	—	—	—	—
1400	672	0.30	735	0.36	840	0.48	933	0.62	1011	0.75	1048	0.82	1086	0.89	1153	1.02	1210	1.12	1257	1.17	—	—
1500	711	0.35	770	0.42	873	0.55	963	0.69	1041	0.84	1077	0.91	1113	0.99	1180	1.13	1241	1.27	1295	1.37	1339	1.43
1600	751	0.42	806	0.49	907	0.63	993	0.77	1072	0.93	1106	1.01	1141	1.09	1207	1.25	1269	1.40	1326	1.54	1376	1.65
1700	791	0.49	843	0.57	941	0.72	1024	0.87	1103	1.04	1137	1.12	1171	1.20	1235	1.37	1296	1.53	1354	1.70	1407	1.84
1800	831	0.58	881	0.66	976	0.81	1057	0.97	1132	1.14	1167	1.23	1202	1.32	1263	1.49	1323	1.67	1381	1.85	1436	2.02
1900	872	0.67	919	0.75	1011	0.92	1091	1.08	1162	1.25	1197	1.35	1232	1.45	1294	1.63	1351	1.81	1408	2.00	1463	2.19
2000	913	0.77	958	0.86	1046	1.03	1125	1.21	1195	1.38	1228	1.48	1262	1.58	1325	1.78	1382	1.97	1436	2.16	1489	2.36

LEGEND

Bhp — Brake Horsepower

NOTES:

- Boldface** indicates field-supplied drive required (See Note 6)
- Shading** indicates field-supplied motor and drive required
- Maximum usable bhp is 1.3. Extensive motor and drive testing of the Weathermaster units ensures that the full horsepower range of the motor

can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

- 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.
- Standard motor drive range: 800 to 1130 rpm. All other rpms require field-supplied drive.

48HJD/HJE005 (4 TONS) — ALTERNATE MOTOR (DIRECT)

AIRFLOW (Cfm)	LOW SPEED				HIGH SPEED			
	208		230, 460, 575		208		230, 460, 575	
	ESP	Bhp	ESP	Bhp	ESP	Bhp	ESP	Bhp
1200	0.53	0.44	0.58	0.48	0.72	0.56	0.84	0.65
1300	0.44	0.48	0.50	0.50	0.64	0.60	0.75	0.68
1400	0.35	0.50	0.42	0.54	0.56	0.63	0.67	0.69
1500	0.25	0.53	0.33	0.58	0.47	0.65	0.58	0.72
1600	0.16	0.57	0.24	0.60	0.38	0.68	0.50	0.74
1700	0.09	0.58	0.15	0.63	0.30	0.69	0.40	0.76
1800	0.00	0.61	0.06	0.65	0.22	0.71	0.32	0.78
1900	—	—	—	—	0.12	0.73	0.24	0.79
2000	—	—	—	—	0.03	0.74	0.15	0.81

LEGEND

Bhp — Brake Horsepower

ESP — External Static Pressure

NOTE: Values include losses for filters, unit casing, and wet coils

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJD/HJE006 (5 TONS) — STANDARD 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	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1500	750	0.37	808	0.43	914	0.57	1001	0.70	1084	0.85	1168	1.02	1199	1.11	1126	1.02	—	—
1600	794	0.44	846	0.50	950	0.65	1034	0.78	1111	0.93	1194	1.11	1263	1.28	1275	1.35	—	—
1700	839	0.52	884	0.58	983	0.73	1068	0.88	1145	1.04	1218	1.20	1295	1.40	1351	1.57	1352	1.62
1800	885	0.61	924	0.67	1018	0.82	1105	0.99	1179	1.15	1246	1.32	1319	1.51	1389	1.72	1435	1.88
1900	932	0.72	965	0.77	1057	0.94	1143	1.12	1212	1.27	1280	1.45	1343	1.63	1415	1.85	1478	2.06
2000	979	0.83	1008	0.88	1096	1.06	1177	1.24	1247	1.41	1300	1.59	1374	1.78	1438	1.98	1505	2.21
2100	1026	0.96	1051	1.01	1136	1.19	1210	1.37	1284	1.57	1347	1.74	1409	1.94	1465	2.13	1528	2.36
2200	1074	1.10	1095	1.15	1173	1.33	1245	1.51	1322	1.73	1380	1.90	1442	2.11	1498	2.31	—	—
2300	1122	1.25	1140	1.30	1210	1.47	1284	1.67	1356	1.90	1418	2.09	1475	2.29	—	—	—	—
2400	1170	1.42	1185	1.46	1249	1.64	1323	1.85	1389	2.06	1456	2.30	—	—	—	—	—	—
2500	1218	1.61	1231	1.64	1289	1.81	1363	2.04	1424	2.24	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied drive required (See Note 6)
2. **Shading** indicates field-supplied motor and drive required
3. *Maximum usable bhp is 1.7* Extensive motor and electrical testing on the Weathermaster® units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
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: 920 to 1300 rpm. All other rpms require field-supplied drive

48HJD/HJE007 (6 TONS) — STANDARD 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	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1800	935	0.67	983	0.75	1069	0.91	1152	1.08	1226	1.26	1294	1.45	1358	1.64	1420	1.85	1486	2.11
1900	982	0.78	1027	0.86	1111	1.03	1190	1.20	1263	1.40	1330	1.59	1392	1.79	1452	2.00	1511	2.23
2000	1029	0.90	1072	0.98	1154	1.16	1228	1.34	1301	1.54	1367	1.75	1428	1.96	1486	2.17	1542	2.39
2100	1076	1.03	1117	1.12	1197	1.31	1267	1.49	1338	1.69	1403	1.91	1464	2.13	1521	2.35	1575	2.57
2200	1124	1.18	1163	1.27	1240	1.47	1307	1.66	1376	1.86	1440	2.08	1500	2.31	1557	2.54	1610	2.77
2300	1171	1.33	1209	1.43	1283	1.64	1350	1.84	1414	2.04	1478	2.27	1537	2.51	1593	2.75	1646	2.99
2400	1219	1.51	1255	1.61	1326	1.82	1392	2.03	1453	2.24	1515	2.47	1574	2.72	1629	2.97	—	—
2500	1267	1.70	1301	1.80	1370	2.02	1435	2.25	1493	2.46	1554	2.69	1612	2.94	—	—	—	—
2600	1315	1.90	1348	2.00	1414	2.23	1479	2.47	1535	2.69	1592	2.92	—	—	—	—	—	—
2700	1363	2.12	1395	2.23	1458	2.45	1521	2.71	1577	2.94	—	—	—	—	—	—	—	—
2800	1411	2.36	1442	2.47	1503	2.71	1564	2.96	—	—	—	—	—	—	—	—	—	—
2900	1459	2.61	1489	2.72	1548	2.97	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied drive required. (See Note 6)
2. **Shading** indicates field-supplied motor and drive required
3. *Maximum usable bhp is 2.4* Extensive motor and electrical testing on the Weathermaster units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected
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: 1070 to 1460 rpm. All other rpms require field-supplied drive

Performance data (cont)

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48HJD/HJE/HJF008, 009 (7½ AND 8½ TONS)

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.2		0.4		0.6		0.8		0.9		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	499	0.50	580	0.70	652	0.94	717	1.17	748	1.30	779	1.43	839	1.78	905	2.21	951	2.57
2250	507	0.53	586	0.73	658	0.97	722	1.22	752	1.34	783	1.46	843	1.81	908	2.25	955	2.59
2300	513	0.55	592	0.76	663	1.00	727	1.26	756	1.37	786	1.49	846	1.84	910	2.28	959	2.61
2400	528	0.60	606	0.83	674	1.06	738	1.34	766	1.46	795	1.58	853	1.88	912	2.31	967	2.68
2500	542	0.66	619	0.90	686	1.13	748	1.41	777	1.54	806	1.68	859	1.94	919	2.37	971	2.73
2550	550	0.69	627	0.94	692	1.17	754	1.45	783	1.59	812	1.74	864	1.99	920	2.39	974	2.76
2600	557	0.72	634	0.97	698	1.21	759	1.49	787	1.64	816	1.79	868	2.04	921	2.37	976	2.78
2700	573	0.79	648	1.05	711	1.29	770	1.58	798	1.73	827	1.88	878	2.16	928	2.45	983	2.88
2800	588	0.86	662	1.13	723	1.38	782	1.66	809	1.82	837	1.98	889	2.29	937	2.57	986	2.91
2900	604	0.94	676	1.21	737	1.48	794	1.76	821	1.92	848	2.08	900	2.41	947	2.70	993	3.01
3000	620	1.02	690	1.30	750	1.58	806	1.86	832	2.02	859	2.18	910	2.52	958	2.85	1002	3.35
3100	636	1.11	704	1.39	764	1.69	818	1.97	844	2.13	870	2.29	920	2.64	968	2.99	1012	3.36
3200	652	1.21	718	1.49	778	1.80	831	2.09	856	2.24	882	2.40	931	2.76	979	3.13	1023	3.47
3300	668	1.31	732	1.59	793	1.92	844	2.21	869	2.37	894	2.53	942	2.89	990	3.26	1034	3.63
3400	684	1.41	747	1.70	807	2.04	857	2.35	882	2.50	907	2.66	954	3.02	1000	3.40	1044	3.79
3500	701	1.53	762	1.82	821	2.16	871	2.48	895	2.64	919	2.80	966	3.15	1011	3.55	1054	3.94
3600	717	1.65	777	1.94	835	2.29	885	2.63	908	2.79	932	2.95	978	3.30	1022	3.69	1065	4.10
3700	733	1.77	792	2.07	849	2.42	899	2.78	922	2.94	945	3.11	990	3.45	1034	3.84	1076	4.25
3750	742	1.84	800	2.14	856	2.49	907	2.86	929	3.03	952	3.20	997	3.54	1040	3.99	1082	4.28
3800	750	1.90	807	2.21	863	2.56	914	2.93	936	3.10	958	3.28	1003	3.62	1045	4.01	1087	4.33
3900	767	2.04	822	2.35	877	2.71	928	3.09	950	3.27	972	3.45	1015	3.80	1057	4.18	1098	4.60
4000	783	2.18	838	2.50	891	2.86	942	3.26	964	3.44	986	3.63	1028	3.99	1070	4.36	1110	4.78
4100	800	2.34	854	2.66	905	3.02	956	3.43	978	3.62	1000	3.81	1042	4.18	1082	4.56	1122	4.97
4200	817	2.49	869	2.82	920	3.19	970	3.60	992	3.80	1015	4.00	1055	4.38	1095	4.76	1134	5.16
4250	826	2.58	877	2.91	928	3.28	977	3.69	999	3.89	1022	4.10	1062	4.49	1102	4.87	1140	5.27
4300	834	2.66	885	3.00	935	3.37	984	3.78	1006	3.99	1029	4.20	1069	4.59	1108	4.98	1147	5.38

LEGEND

Bhp — Brake Horsepower

NOTES:

- 1 **Shading** indicates alternate motor required (See Note 7)
- 2 **Boldface** indicates field-supplied drive required (See Note 7)
- 3 **Shading** indicates field-supplied motor and drive required
- 4 Maximum usable bhp is 2.4 with the standard motor and 2.9 with the alternate motor. Extensive motor and electrical testing on the Weathermaster® units ensures that the full horsepower range of the

- motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected
- 5 Use of field-supplied motor may affect wire sizing. Contact Carrier representative to verify
- 6 Values include losses for filters, unit casing, and wet coils
- 7 Standard motor drive range: 590 to 840 rpm. Alternate motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive

48HJD/HJE012 (10 TONS)

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	552	0.68	632	0.87	701	1.05	761	1.22	816	1.36	871	1.54	918	1.67	967	1.89	1010	2.09	1063	2.46
3100	565	0.74	644	0.93	711	1.12	772	1.31	825	1.45	879	1.63	928	1.78	973	1.94	1018	2.17	1070	2.51
3200	578	0.81	656	1.00	723	1.20	782	1.39	835	1.55	887	1.71	937	1.90	981	2.04	1026	2.26	1075	2.57
3300	591	0.88	668	1.08	734	1.28	793	1.47	845	1.65	895	1.80	946	2.00	991	2.16	1032	2.32	1080	2.64
3400	605	0.96	680	1.16	745	1.36	803	1.56	856	1.75	904	1.91	953	2.10	1000	2.29	1041	2.44	1083	2.65
3500	619	1.04	691	1.23	755	1.44	813	1.65	867	1.86	914	2.03	961	2.20	1009	2.41	1051	2.57	1090	2.74
3600	633	1.13	703	1.31	766	1.52	824	1.74	877	1.97	924	2.15	970	2.32	1017	2.53	1060	2.72	1099	2.88
3700	648	1.23	714	1.39	777	1.61	835	1.85	887	2.07	935	2.28	980	2.45	1024	2.64	1069	2.87	1109	3.03
3800	662	1.33	726	1.47	789	1.72	846	1.95	897	2.18	946	2.40	989	2.58	1033	2.76	1077	2.99	1118	3.20
3900	677	1.44	738	1.56	801	1.82	857	2.06	908	2.29	956	2.53	1000	2.73	1042	2.91	1085	3.12	1127	3.36
4000	692	1.55	750	1.66	813	1.94	868	2.17	918	2.40	967	2.66	1010	2.87	1052	3.06	1093	3.24	—	—
4100	707	1.67	762	1.76	825	2.05	878	2.28	929	2.53	977	2.78	1021	3.02	1062	3.22	1102	3.41	—	—
4200	722	1.80	775	1.87	837	2.16	889	2.40	941	2.66	987	2.91	1032	3.17	1072	3.38	—	—	—	—
4300	737	1.94	787	1.99	848	2.27	900	2.52	952	2.80	999	3.04	1042	3.32	—	—	—	—	—	—
4400	752	2.08	800	2.12	860	2.39	912	2.66	962	2.93	1008	3.19	—	—	—	—	—	—	—	—
4500	768	2.24	814	2.25	871	2.51	924	2.80	973	3.07	1019	3.34	—	—	—	—	—	—	—	—
4600	783	2.40	827	2.39	883	2.64	937	2.95	983	3.21	—	—	—	—	—	—	—	—	—	—
4700	799	2.56	841	2.54	894	2.77	949	3.10	994	3.36	—	—	—	—	—	—	—	—	—	—
4800	814	2.74	855	2.69	906	2.91	961	3.26	—	—	—	—	—	—	—	—	—	—	—	—
4900	830	2.92	868	2.86	918	3.05	972	3.40	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	883	3.03	931	3.21	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

- 1 **Boldface** indicates field-supplied drive required (See Note 6)
- 2 **Shading** indicates alternate motor required (See Note 6)
- 3 Maximum usable bhp is 2.4 with standard motor and 4.2 with alternate motor. Extensive motor and electrical testing on the Weathermaster units ensures that the full horsepower range of the motor can be

- utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected
- 4 Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify
- 5 Values include losses for filters, unit casing, and wet coils
- 6 Standard motor drive range: 690 to 935 rpm. Alternate motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS

48HJE/HJF004 (3 TONS) STANDARD 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		0.9	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
900	—	—	—	—	811	0.33	859	0.35	911	0.37	961	0.39	1012	0.42	1083	0.44	1122	0.47
1100	—	—	756	0.33	831	0.36	881	0.38	930	0.40	979	0.43	1032	0.47	1090	0.52	1117	0.55
1200	—	—	803	0.36	853	0.38	902	0.40	949	0.43	999	0.47	1055	0.51	1108	0.58	—	—
1300	754	0.35	825	0.38	875	0.41	922	0.43	970	0.47	1021	0.51	1072	0.57	—	—	—	—
1500	823	0.41	892	0.45	937	0.49	981	0.53	1029	0.60	1054	0.70	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

- Values include losses for filters, unit casing, and wet coils.
- Extensive motor and drive testing of the Weathermaster® units ensures that the full horsepower range of the motor can be utilized with

confidence Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure Unit warranty will not be affected

- Use of a field-supplied motor may affect wire sizing Contact Carrier representative to verify

48HJE/HJF004 (3 TONS) — ALTERNATE MOTOR (DIRECT)

AIRFLOW (Cfm)	LOW SPEED				HIGH SPEED			
	208		230, 460, 575		208		230, 460, 575	
	ESP	Bhp	ESP	Bhp	ESP	Bhp	ESP	Bhp
900	0.53	0.17	0.55	0.19	0.63	0.21	0.64	0.25
1000	0.48	0.20	0.51	0.22	0.57	0.23	0.60	0.27
1100	0.43	0.21	0.45	0.24	0.52	0.25	0.54	0.29
1200	0.36	0.23	0.40	0.25	0.47	0.27	0.47	0.31
1300	0.28	0.24	0.32	0.26	0.38	0.29	0.41	0.32
1400	0.20	0.26	0.24	0.28	0.31	0.30	0.32	0.33
1500	0.11	0.27	0.14	0.33	0.21	0.31	0.22	0.34

LEGEND

Bhp — Brake Horsepower

ESP — External Static Pressure

NOTE: Values include losses for filters, unit casing, and wet coils

48HJD/HJE005 (4 TONS) — STANDARD 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		1.8	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1200	569	0.18	641	0.23	761	0.34	859	0.46	943	0.58	1030	0.70	1155	0.87	—	—	—	—	—	—
1300	604	0.22	673	0.28	788	0.39	887	0.52	968	0.65	1044	0.77	1128	0.91	1245	1.10	—	—	—	—
1400	640	0.27	705	0.33	817	0.45	914	0.59	996	0.72	1069	0.86	1139	0.99	1218	1.14	1325	1.34	—	—
1500	676	0.32	738	0.38	847	0.51	940	0.65	1024	0.81	1095	0.95	1162	1.09	1228	1.24	1303	1.40	1398	1.60
1600	713	0.38	772	0.44	877	0.58	967	0.73	1051	0.89	1123	1.05	1188	1.20	1250	1.35	1312	1.51	1382	1.68
1700	750	0.45	806	0.51	908	0.66	997	0.81	1077	0.98	1151	1.15	1215	1.31	1276	1.48	1334	1.64	1393	1.80
1800	788	0.52	841	0.59	939	0.75	1026	0.91	1104	1.07	1178	1.26	1243	1.43	1303	1.61	1359	1.78	1414	1.95
1900	826	0.60	876	0.68	971	0.84	1056	1.01	1132	1.18	1204	1.37	1271	1.56	1330	1.74	1386	1.93	1439	2.11
2000	864	0.70	912	0.77	1004	0.94	1087	1.12	1162	1.30	1231	1.48	1298	1.69	1358	1.89	1413	2.08	1466	2.27

LEGEND

Bhp — Brake Horsepower

NOTES:

- Boldface** indicates field-supplied drive required (See Note 6.)
- Shading** indicates field-supplied motor and drive required
- Maximum usable bhp is 1.3** Extensive motor and electrical testing on Weathermaster units ensures that the full horsepower range of the motor

can be utilized with confidence Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure Unit warranty will not be affected

- 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
- Standard motor drive range: 800 to 1130 rpm All other rpms require field-supplied drive

48HJD/HJE005 (4 TONS) — ALTERNATE MOTOR (DIRECT)

AIRFLOW (Cfm)	LOW SPEED				HIGH SPEED			
	208		230, 460, 575		208		230, 460, 575	
	ESP	Bhp	ESP	Bhp	ESP	Bhp	ESP	Bhp
1200	0.78	0.44	0.85	0.48	0.92	0.56	1.01	0.65
1300	0.70	0.48	0.76	0.50	0.84	0.60	0.94	0.68
1400	0.62	0.50	0.68	0.54	0.78	0.63	0.87	0.69
1500	0.52	0.53	0.59	0.58	0.69	0.65	0.78	0.72
1600	0.44	0.57	0.50	0.60	0.61	0.68	0.70	0.74
1700	0.34	0.58	0.40	0.63	0.53	0.69	0.62	0.76
1800	0.22	0.61	0.30	0.65	0.45	0.71	0.54	0.78
1900	0.10	0.63	0.20	0.68	0.37	0.73	0.48	0.79
2000	—	—	0.09	0.69	0.29	0.74	0.39	0.81

LEGEND

Bhp — Brake Horsepower

ESP — External Static Pressure

NOTE: Values include losses for filters, unit casing, and wet coils

Performance data (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJD/HJE006 (5 TONS) — STANDARD MOTOR AND DRIVE (BELT) AND ALTERNATE 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	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1500	720	0.34	776	0.39	886	0.53	978	0.66	1059	0.80	1142	0.96	1207	1.11	1245	1.20	1251	1.21
1600	760	0.40	814	0.46	915	0.59	1010	0.74	1089	0.89	1165	1.04	1240	1.22	1296	1.37	1329	1.46
1700	801	0.47	853	0.54	950	0.68	1044	0.84	1120	0.99	1190	1.14	1266	1.33	1331	1.50	1381	1.65
1800	842	0.55	891	0.62	985	0.77	1075	0.94	1151	1.09	1221	1.26	1287	1.42	1358	1.63	1417	1.81
1900	883	0.64	931	0.72	1019	0.87	1103	1.03	1184	1.21	1252	1.38	1351	1.55	1380	1.74	1446	1.95
2000	924	0.74	970	0.82	1054	0.97	1134	1.14	1217	1.34	1283	1.51	1346	1.69	1405	1.87	1469	2.08
2100	965	0.85	1010	0.93	1090	1.09	1170	1.27	1247	1.47	1315	1.65	1377	1.84	1435	2.03	1492	2.22
2200	1007	0.97	1050	1.06	1128	1.22	1205	1.40	1275	1.59	1349	1.81	1409	1.99	1466	2.02	1521	2.40
2300	1049	1.10	1090	1.19	1166	1.36	1239	1.55	1306	1.74	1380	1.98	1440	2.16	1497	2.37	—	—
2400	1090	1.24	1131	1.34	1204	1.51	1273	1.70	1342	1.91	1409	2.13	1474	2.36	—	—	—	—
2500	1132	1.39	1172	1.49	1243	1.68	1309	1.87	1377	2.09	1438	2.29	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied drive required (See Note 6)
2. **Shading** indicates field-supplied motor and drive required.
3. *Maximum usable bhp is 17* Extensive motor and electrical testing on Weathermaster® units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
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: 920 to 1300 rpm. All other rpms require field-supplied drive

48HJD/HJE007 (6 TONS) STANDARD MOTOR AND DRIVE (BELT)																				
AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.1		0.2		0.4		0.6		0.8		1.0		1.1		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1800	852	0.55	905	0.62	1002	0.78	1084	0.93	1163	1.10	1235	1.29	1269	1.38	1303	1.48	1371	1.69	1433	1.90
1900	894	0.64	945	0.72	1037	0.88	1119	1.04	1194	1.21	1266	1.40	1298	1.49	1330	1.59	1396	1.81	1450	2.03
2000	936	0.74	984	0.82	1072	0.98	1154	1.16	1226	1.33	1297	1.53	1329	1.63	1362	1.73	1422	1.94	1485	2.16
2100	978	0.85	1024	0.93	1108	1.10	1190	1.29	1259	1.47	1327	1.66	1360	1.76	1393	1.87	1452	2.08	1510	2.31
2200	1021	0.97	1064	1.05	1145	1.22	1225	1.43	1294	1.62	1359	1.81	1391	1.91	1423	2.02	1483	2.24	1538	2.46
2300	1064	1.10	1104	1.18	1183	1.36	1260	1.57	1330	1.78	1392	1.97	1423	2.07	1454	2.18	1515	2.41	1569	2.64
2400	1107	1.24	1145	1.32	1222	1.52	1296	1.73	1365	1.94	1426	2.15	1455	2.25	1485	2.36	1544	2.59	1601	2.84
2500	1150	1.39	1186	1.48	1262	1.68	1331	1.89	1400	2.12	1461	2.34	1489	2.44	1518	2.55	1575	2.78	—	—
2600	1193	1.56	1228	1.65	1301	1.86	1367	2.07	1435	2.31	1497	2.54	1524	2.65	1552	2.76	1607	2.99	—	—
2700	1237	1.74	1269	1.83	1341	2.05	1404	2.26	1471	2.51	1532	2.75	1559	2.76	1587	2.88	—	—	—	—
2800	1280	1.94	1311	2.03	1381	2.25	1442	2.47	1500	2.72	1567	2.98	—	—	—	—	—	—	—	—
2900	1324	2.15	1354	2.24	1420	2.47	1481	2.69	1542	2.94	—	—	—	—	—	—	—	—	—	—
3000	1368	2.37	1396	2.46	1460	2.69	1521	2.93	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied drive required (See Note 6)
2. **Shading** indicates field-supplied motor and drive required
3. *Maximum usable bhp is 24 with the standard motor* Extensive motor and electrical testing on Weathermaster units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected
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: 1070 to 1460 rpm. All other rpms require field-supplied drive

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48HJD/HJE/HJF008, 009 (7½ AND 8½ TONS)

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	506	0.52	586	0.72	656	0.95	718	1.18	776	1.43	838	1.78	898	2.21	935	2.58
2250	514	0.55	593	0.76	662	0.99	724	1.22	781	1.78	841	1.81	902	2.25	939	2.60
2300	521	0.57	600	0.79	668	1.02	730	1.26	786	1.50	843	1.83	905	2.28	943	2.62
2400	536	0.63	613	0.85	680	1.09	741	1.34	796	1.59	849	1.88	910	2.31	952	2.74
2500	551	0.69	626	0.93	693	1.17	753	1.43	808	1.69	859	1.96	912	2.31	963	2.81
2550	559	0.72	634	0.97	700	1.21	759	1.48	814	1.74	864	2.01	915	2.34	968	2.81
2600	567	0.75	641	1.00	706	1.25	764	1.52	819	1.79	869	2.06	918	2.37	973	2.81
2700	582	0.83	655	1.08	719	1.34	776	1.61	831	1.89	880	2.17	927	2.47	976	2.84
2800	598	0.90	670	1.17	732	1.43	789	1.71	842	2.00	892	2.29	938	2.58	983	2.92
2900	614	0.98	684	1.25	745	1.53	802	1.81	854	2.11	903	2.42	949	2.71	993	3.03
3000	630	1.07	699	1.35	759	1.63	815	1.92	866	2.23	915	2.54	961	2.95	1003	3.17
3100	646	1.16	714	1.45	773	1.74	828	2.04	878	2.35	926	2.67	972	3.09	1015	3.32
3200	662	1.26	729	1.55	787	1.86	841	2.16	891	2.48	938	2.81	983	3.14	1026	3.47
3300	679	1.36	744	1.66	801	1.98	854	2.29	904	2.61	950	2.95	995	3.30	—	—
3400	695	1.47	759	1.78	816	2.10	867	2.42	917	2.75	963	3.10	1007	3.45	—	—
3500	712	1.59	774	1.90	830	2.23	881	2.56	930	2.90	976	3.25	—	—	—	—
3600	729	1.71	790	2.03	845	2.37	895	2.71	943	3.05	988	3.41	—	—	—	—
3700	745	1.84	805	2.17	860	2.52	909	2.87	956	3.22	—	—	—	—	—	—
3750	754	1.91	813	2.24	868	2.59	917	2.95	963	3.30	—	—	—	—	—	—
3800	762	1.98	821	2.31	875	2.66	924	3.03	970	3.38	—	—	—	—	—	—
3900	779	2.12	836	2.46	890	2.82	938	3.19	—	—	—	—	—	—	—	—
4000	796	2.27	852	2.61	905	2.98	953	3.37	—	—	—	—	—	—	—	—
4100	813	2.42	868	2.78	920	3.15	—	—	—	—	—	—	—	—	—	—
4200	830	2.59	884	2.95	935	3.33	—	—	—	—	—	—	—	—	—	—
4250	839	2.68	892	3.04	—	—	—	—	—	—	—	—	—	—	—	—
4300	847	2.76	900	3.12	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

- 1 **Shading** indicates alternate motor required (See Note 7)
- 2 **Boldface** indicates field-supplied drive required (See Note 7)
- 3 **Shading** indicates field-supplied motor and drive required
- 4 Maximum usable bhp is 2.4 with the standard motor and 2.9 with the alternate motor. Extensive motor and electrical testing on the Weathermaster® units ensures that the full horsepower range of the

- motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
- 5 Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- 6 Values include losses for filters, unit casing, and wet coils.
- 7 Standard motor drive range: 590 to 840 rpm. Alternate motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive.

48HJD/HJE012 (10 TONS)

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		1.8	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	592	0.76	661	0.93	722	1.09	779	1.26	804	1.34	829	1.42	880	1.58	924	1.73	970	1.89	1019	2.00
3100	607	0.83	676	1.01	734	1.17	791	1.34	816	1.42	840	1.51	890	1.68	935	1.84	977	2.00	1026	2.17
3200	622	0.90	690	1.09	746	1.25	803	1.43	827	1.52	852	1.60	900	1.77	946	1.95	987	2.11	1029	2.28
3300	638	0.98	705	1.17	759	1.33	815	1.52	839	1.61	864	1.70	910	1.88	957	2.06	998	2.23	1037	2.40
3400	653	1.06	719	1.26	772	1.43	826	1.62	851	1.71	876	1.81	921	1.98	967	2.17	1009	2.35	1047	2.53
3500	669	1.15	733	1.35	786	1.53	838	1.72	863	1.81	888	1.91	933	2.10	976	2.29	1020	2.48	1058	2.66
3600	684	1.24	747	1.44	800	1.64	850	1.82	875	1.92	900	2.03	945	2.22	986	2.41	1030	2.61	1069	2.80
3700	700	1.33	760	1.54	814	1.75	863	1.92	887	2.03	912	2.14	957	2.34	998	2.54	1039	2.74	1081	2.94
3800	715	1.43	774	1.64	828	1.86	875	2.04	899	2.15	924	2.26	969	2.47	1010	2.67	1049	2.87	1091	3.08
3900	731	1.54	787	1.74	843	1.98	888	2.16	912	2.27	936	2.38	981	2.60	1022	2.81	1060	3.02	1100	3.23
4000	747	1.64	801	1.85	857	2.10	902	2.30	925	2.40	948	2.51	993	2.74	1034	2.96	1072	3.17	1110	3.38
4100	763	1.76	816	1.97	872	2.23	916	2.44	938	2.54	960	2.64	1005	2.88	1046	3.11	1084	3.32	—	—
4200	778	1.88	831	2.10	886	2.36	929	2.58	950	2.68	972	2.78	1016	3.03	1058	3.26	—	—	—	—
4300	794	2.00	846	2.23	900	2.50	943	2.73	964	2.83	985	2.93	1028	3.17	—	—	—	—	—	—
4400	810	2.13	861	2.37	913	2.64	958	2.89	978	2.99	999	3.09	1040	3.32	—	—	—	—	—	—
4500	826	2.27	876	2.52	927	2.78	973	3.04	992	3.15	1012	3.26	—	—	—	—	—	—	—	—
4600	842	2.41	892	2.67	940	2.92	987	3.21	—	—	—	—	—	—	—	—	—	—	—	—
4700	858	2.55	907	2.83	954	3.08	1002	3.38	—	—	—	—	—	—	—	—	—	—	—	—
4800	874	2.70	922	2.99	968	3.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	890	2.86	938	3.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	906	3.03	953	3.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

- 1 **Boldface** indicates field-supplied drive required
- 2 **Shading** indicates alternate motor required (See Note 6)
- 3 Maximum usable bhp is 2.4 with the standard motor and 4.2 with the alternate motor. Extensive motor and electrical testing on the Weathermaster units ensures that the full horsepower range of the motor

- can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
- 4 Use of field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- 5 Values include losses for filters, unit casing, and wet coils.
- 6 Standard motor drive range: 690 to 935 rpm. Alternate motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

Performance data (cont)

FAN RPM AT MOTOR PULLEY SETTINGS, 48HJ004

UNIT 48HJE/HJF	MOTOR/ DRIVE	MOTOR/FAN PULLEY TURNS OPEN							
		0* / 3†	0 / 2	0 / 1	0 / 0	1 / 0	2 / 0	3 / 0	4 / 0
004	Std	1105	1055	1000	950	900	850	800	750

* Motor Pulley Turns Open

† Fan Pulley Turns Open

FAN RPM AT MOTOR PULLEY SETTINGS, 48HJ005-012

UNIT 48	MOTOR/ DRIVE	MOTOR PULLEY TURNS OPEN											
		0	1/2	1	1½	2	2½	3	3½	4	4½	5	
HJD/HJE005	Std	1130	1095	1160	1030	995	960	930	900	860	830	800	
HJD/HJE006	Std	1390	1265	1230	1190	1150	1110	1075	1035	1000	960	920	
HJD/HJE007	Std	1460	1420	1380	1340	1300	1265	1230	1190	1130	1110	1070	
HJD/HJE/HJF008,009	Std	840	815	790	765	740	715	690	665	640	615	590	
	Alt	1085	1060	1035	1010	985	960	935	910	890	865	840	
HJD/HJE012	Std	935	910	890	865	840	815	790	765	740	715	690	
	Alt	1080	1060	1035	1015	990	970	950	930	905	885	860	

EVAPORATOR-FAN MOTOR EFFICIENCY

MOTOR	EFFICIENCY %
48HJ004*	65
48HJ004†	63
48HJ005*, 48HJ006*†	81
48HJ005†	79
48HJ007-012*	80
48HJ008, 009†	83
48HJ012†	85

* Standard

† Alternate

NOTE: Convert bhp to Watts using the following formula

$$\text{Watts} = \frac{746 \times \text{Bhp}}{\text{Motor Efficiency}}$$

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) — 48HJ008-012

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

ALTITUDE COMPENSATION* — 48HJ004-007

ELEVATION	NATURAL GAS Orifice Size†	LIQUID PROPANE Orifice Size
0-2,000	33	43
2,000	34	43
3,000	35	44
4,000	36	44
5,000	36	44
6,000	37	45
7,000	37	45
8,000	38	46
9,000	39	47
10,000	41	48
11,000	43	48
12,000	44	49
13,000	44	49
14,000	45	50

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, heat input rate should be reduced at higher altitudes.

†Orifices available through your Carrier Distributor.

ALTITUDE COMPENSATION* — 48HJ008-012

ELEVATION	NATURAL GAS Orifice Size†	LIQUID PROPANE Orifice Size
0-2,000	31	41
2,000	32	42
3,000	32	42
4,000	32	42
5,000	33	43
6,000	34	43
7,000	35	44
8,000	36	44
9,000	37	45
10,000	38	46
11,000	39	47
12,000	40	47
13,000	41	48
14,000	42	48

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, heat input rate should be reduced at higher altitudes.

†Orifices available through your Carrier Distributor.

SOUND POWER (Total Unit)

48HJ	ARI RATING (60 Hz)	OCTAVE BANDS							
		63	125	250	500	1000	2000	4000	8000
004-006	8.0 Bels	63.2	69.5	70.0	73.7	73.5	70.6	66.7	60.3
007	8.2 Bels	78.5	84.0	77.5	73.0	70.5	72.0	65.0	58.5
008-012	8.6 Bels	63.7	69.9	72.5	78.2	81.1	77.3	73.3	66.8

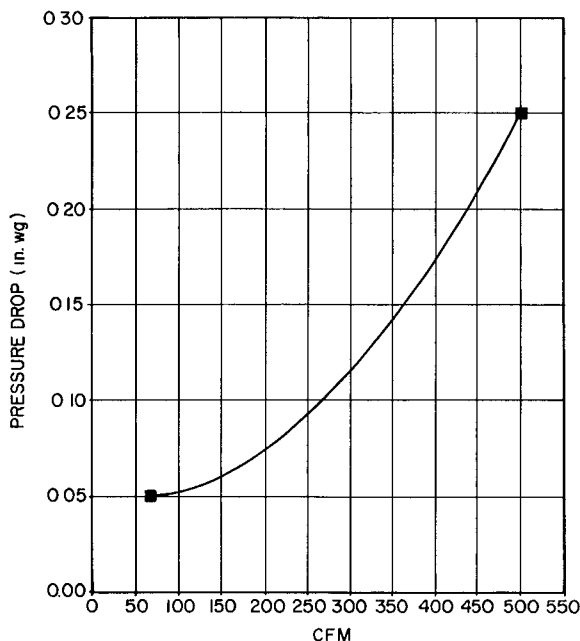
ARI — Air Conditioning and Refrigeration Institute
Bels — Sound Levels (1 bel = 10 decibels)

ALTITUDE DERATING FACTOR* — 48HJ004-012

ELEVATION	MAXIMUM HEATING VALUE (Btu/ft³)
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.

ECONOMIZER/TWO POSITION DAMPER BAROMETRIC RELIEF DAMPER CHARACTERISTICS — 48HJ004-012



Electrical data

UNIT	NOMINAL V-PH-HZ	IFM TYPE	VOLTAGE RANGE		COMPR (each)		OFM FLA	IFM FLA	COMBUSTION FAN MOTOR FLA	POWER SUPPLY		DISCONNECT SIZE*	
			Min	Max	RLA	LRA				MCA	MOCPT	FLA	LRA
48HJE/HJF 004 (3 Tons)	208/230-1-60	Std Alt	187	254	16.2	96.0	1.9	3.8 2.8	.57	26/26 25/25	35/35 35/35	25/25 24/24	110/110 108/108
	208/230-3-60	Std Alt	187	254	10.2	75.0	1.9	3.8 2.8	.57	18.5/18.5 17.5/17.5	25/25 20/20	18/18 17/17	89/89 87/87
	460-3-60	Std Alt	414	508	4.3	37.0	1.0	1.9 1.5	30	8.3 7.9	15 15	8 8	43 43
	575-3-60	Std Alt	518	632	3.7	31.0	1.9	3.8 2.8	.57	10.3 9.3	15 15	11 10	45 43
48HJD/HJE 005 (4 Tons)	208/230-1-60	Std Alt	187	254	23.1	129.0	1.9	7.6 3.8	.57	39.1/39.1 35.3/35.3	50/50 45/45	38/38 34/34	167/167 143/143
	208/230-3-60	Std Alt	187	254	13.5	99.0	1.9	3.1 3.8	.57	21.9/21.9 22.6/22.6	30/30 30/30	21/21 22/22	125/125 113/113
	460-3-60	Std Alt	414	508	7.4	49.5	1.0	1.5 1.9	.30	11.7 12.1	15 15	11 12	111 105
	575-3-60	Std Alt	518	632	5.8	40.0	1.9	7.6 3.8	.57	16.8 13.0	20 15	18 13	118 94
48HJD/HJE 006 (5 Tons)	230-1-60	Std Alt	207	254	28.8	169.0	1.9	8.8 8.8	.57	46.7 46.7	60 60	45 45	218 218
	208/230-3-60	Std Alt	187	254	17.3	123.0	1.9	4.0 4.0	.57	27.5/27.5 27.5/27.5	35/35 35/35	27/27 27/27	154/154 154/154
	460-3-60	Std Alt	414	508	9.0	62.0	1.0	1.8 1.8	30	14.1 14.1	20 20	14 14	82 82
	575-3-60	Std Alt	518	632	7.1	50.0	1.9	8.8 8.8	.57	19.6 19.6	25 25	20 20	99 99
48HJD/HJE 007 (6 Tons)	208/230-3-60	Std Alt	187	254	21.9	142.0	1.9	5.8 —	.57	35.1/35.1 —	45/45 —	34/34 —	188/188 —
	460-3-60	Std Alt	414	508	10.4	72.0	1.0	2.6 —	30	16.6 —	20 —	16 —	94 —
	575-3-60	Std Alt	518	632	9.6	58.0	1.9	11.0 —	.57	24.9 —	30 —	26 —	113 —
48HJD/HJE/HJF 008 (7½ Tons)	208/230-3-60	Std Alt	187	254	13.1	99.0	3.0	5.8 7.5	.57	39.2/39.2 40.9/40.9	45/45 45/45	41/41 43/43	257/257 276/276
	460-3-60	Std Alt	414	508	7.4	49.5	1.5	2.6 3.4	.30	20.8 21.6	25 25	22 23	129 138
	575-3-60	Std Alt	518	632	5.8	40.0	1.5	2.6 3.4	30	17.2 18.0	20 20	18 19	110 119
48HJD/HJE/HJF 009 (8½ Tons)	208/230-3-60	Std Alt	187	254	13.5	99.0	3.0	5.8 7.5	.57	39.2/39.2 40.9/40.9	45/45 45/45	41/41 43/43	257/257 276/276
	460-3-60	Std Alt	414	508	7.4	49.5	1.5	2.6 3.4	30	20.8 21.6	25 25	22 23	129 138
	575-3-60	Std Alt	518	632	5.8	40.0	1.5	2.6 3.4	.30	17.2 18.0	20 20	18 19	110 119
48HJD/HJE 012 (10 Tons)	208/230-3-60	Std Alt	187	254	17.3	123.0	3.0	5.8 12.0	.57	47.7/47.7 53.9/53.9	60/60 60/60	50/50 57/57	305/305 348/348
	460-3-60	Std Alt	414	508	9.0	62.0	1.5	2.6 5.4	.30	24.4 27.2	30 30	25 29	154 175
	575-3-60	Std Alt	518	632	7.1	50.0	1.5	2.6 5.4	30	20.1 22.9	25 25	21 24	130 151

LEGEND

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

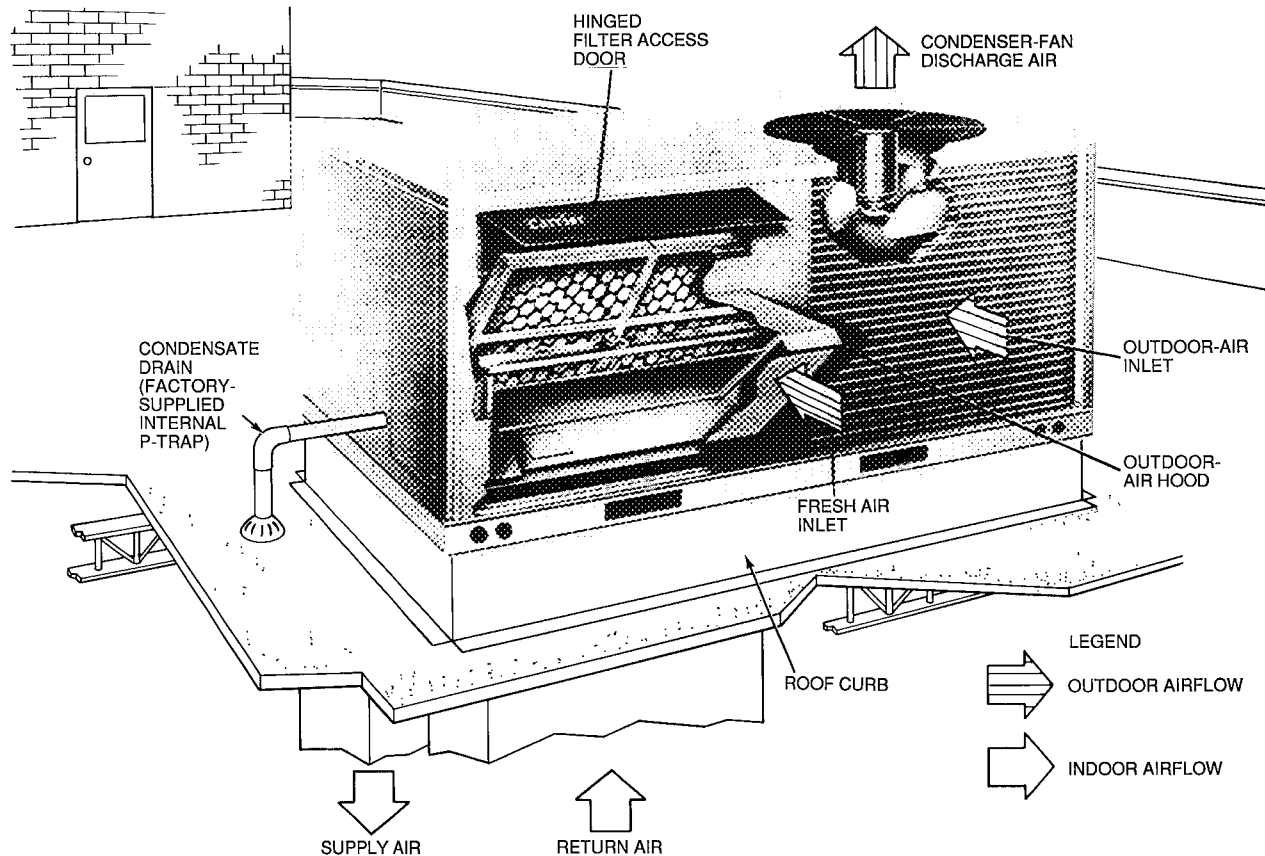
*Used to determine minimum disconnect size per NEC.

†Fuse or HACR circuit breaker

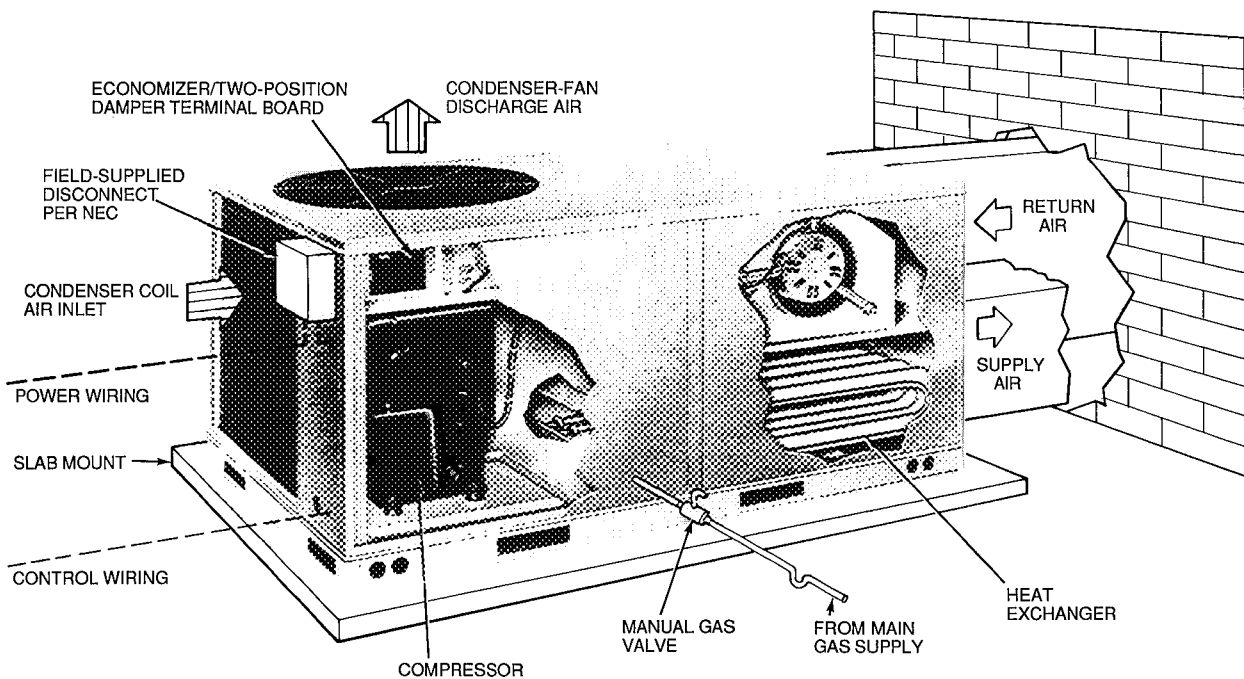


Typical piping and wiring

VERTICAL DISCHARGE DUCTING



HORIZONTAL DISCHARGE DUCTING



Application data

Internal condensate trap — Internally trapped condensate pan is supplied on all units. An external trap is not required. *Attachment of external trap could cause leakage of water into the building.* Condensate drain is located on the bottom side of the unit.

Ductwork — Secure vertical discharge ductwork to roof curb. For horizontal discharge applications, attach ductwork to unit, or 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 or 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 or two-position damper 90 degrees (until the economizer 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.

IMPORTANT: On horizontal discharge units equipped with economizer or two-position damper, the air filters **MUST** be installed external to the unit, or economizer will have to be partially removed

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 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 for cooling is 300 cfm/ton.

Minimum ambient operating temperature for size 004-012 standard units is 25 F. With accessory Motormaster® control (for unit sizes 004-007) or Motormaster® II control (for unit sizes 004-012), units can operate at outdoor temperatures down to -20 F.

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

High altitudes may require a change to the gas orifice. Refer to Altitude Compensation tables on page 23.

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

Internal unit design — Due to Carrier's internal unit design (draw-thru over the motor), air path, and specially designed motors, the full horsepower (maximum continuous bhp) listed in the Physical Data table and the notes following each Fan Performance table can be utilized with extreme confidence

Using Carrier motors to the values listed in the Physical Data and Fan Performance tables *will not* result in nuisance tripping or premature motor failure, and the unit warranty will not be affected. Refer to the table below for nominal horsepower of the standard and alternate motors.

MOTOR NOMINAL HORSEPOWER

UNIT 48	MOTOR	NOMINAL HORSEPOWER
HJD/HJF004	Std	0.50
	Alt	0.33
HJD/HJE005	Std	1.00
	Alt	0.75
HJD/HJE006	Std	1.50
	Alt	—
HJD/HJE007	Std	2.00
	Alt	—
HJD/HJE/HJF008,009	Std	2.00
	Alt	2.50
HJD/HJE012	Std	2.00
	Alt	4.00

Controls

Operating sequence

Cooling, units without economizer — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC), compressor contactor no. 1 (C1) and outdoor (condenser) fan contactor (OFC) (48HJ008-012 units) are energized and evaporator fan motor, compressor no. 1 and condenser fan start. The condenser-fan motor runs continuously while unit is cooling. On 008-012 units, if the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts.

Heating, units without economizer — When thermostat calls for heating, terminal W1 is energized, induced draft relay (IDR) is energized and burner ignition sequence begins. When time delay sequence is complete (55 ± 10 seconds after W1 is energized) indoor (evaporator) fan contactor (IFC) is energized and evaporator-fan motor starts. On size 008-012 units equipped for 2 stages of heat, when additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve is energized.

When the thermostat is satisfied and W1 is deenergized, evaporator-fan motor remains on for 45 ± 15 seconds.

Cooling, units with economizer — When the outdoor ambient temperature is above the outdoor-air thermostat (OAT) or enthalpy control setting and the thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC) is energized and the economizer damper blade opens to the minimum position, compressor contactor no. 1 (C1) and outdoor (condenser) fan contactor (OFC) (48HJ008-012 units only) are energized and evaporator-fan motor, compressor no. 1 and condenser fan start. On 008-012 units, if thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts.

If the outdoor ambient temperature is below the OAT setting and the thermostat calls for cooling, the IFC is energized, the evaporator fan is started and the economizer modulates open. The economizer acts as the first stage of cooling, providing free cooling with outdoor air. The position of the damper blade is determined by the discharge air thermistor.

If outdoor air alone cannot satisfy the cooling requirements of the conditioned space, Y2 on the thermostat is energized and compressor no. 1 starts. The damper blade opens for 5 seconds and stops for 30 seconds until fully open.

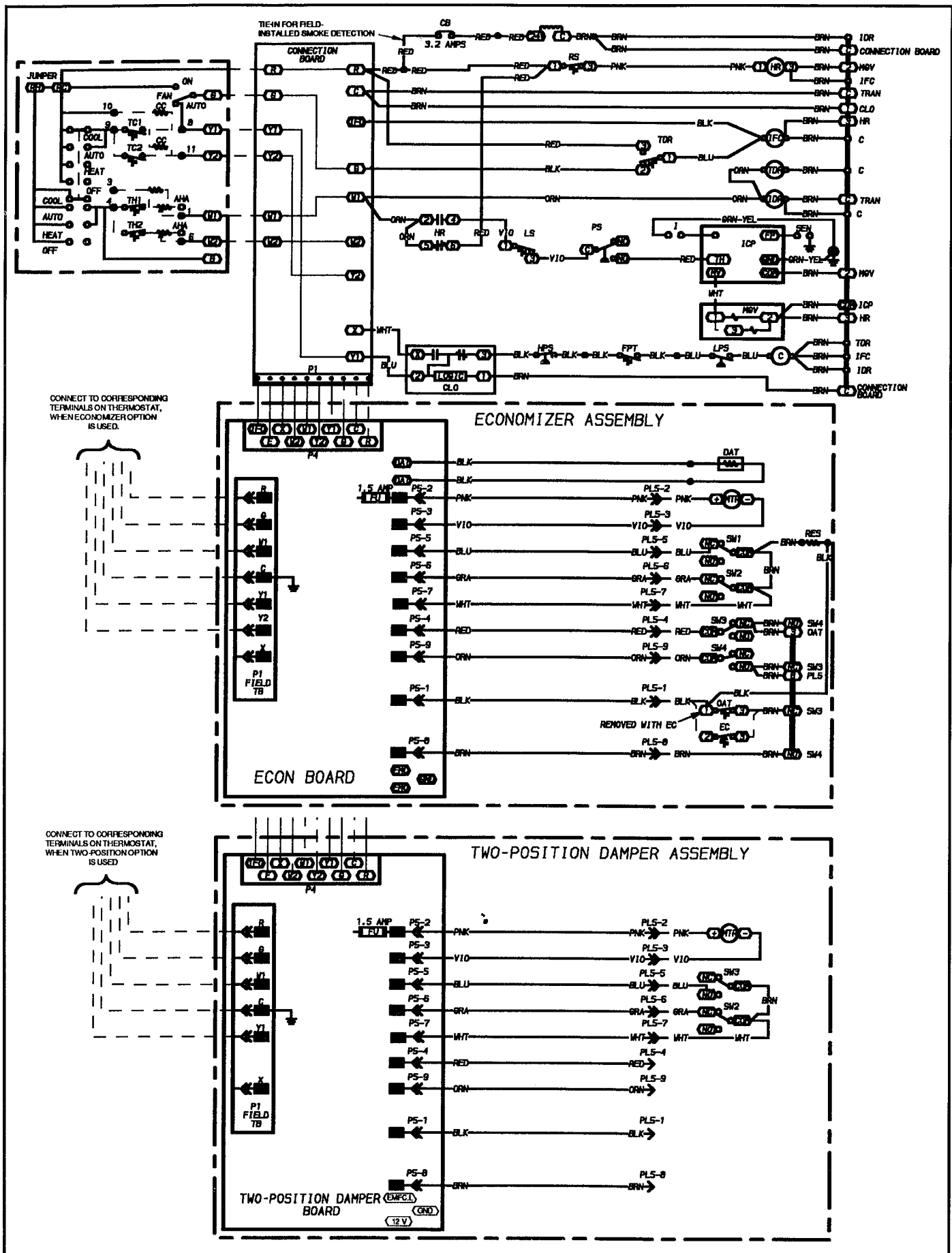
As conditioned space temperature approaches the thermostat's cooling set point, the mechanical cooling stage cycles off. After mechanical cooling shuts off, the economizer modulates to the minimum position.

Heating, units with economizer — Upon a call for heat through W1, the induced draft relay is energized to start the induced draft motor. The main burner lights, the IFC energizes to start the evaporator fan, and the economizer damper blade opens 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 008-012 units equipped with 2 stages of heat, when additional heat is needed, W2 is energized and the high fire solenoid on the main gas valve is energized.

After W1 is deenergized, the evaporator-fan motor continues to run for 45 ± 15 seconds.

As space temperature approaches the heating temperature set point, heating stage cycles off. The economizer or two-position damper returns to a fully closed position when fan shuts off.

Typical control wiring schematic (size 004-007 shown)



LEGEND FOR TYPICAL CONTROL WIRING SCHEMATIC

AHA	— Adjustable Heat Anticipator
C	— Compressor Contactor
CB	— Circuit Breaker
CC	— Cooling Compensator
CLO	— Compressor Lockout
COM	— Common
DAT	— Discharge Air Thermistor
EC	— Enthalpy Control
ECON	— Economizer
EMC/EMFC	— Energy Management Closed (Economizer)
EMFC.L	— Energy Management Fully Closed (Two-Position Damper)
EMO/EMFO	— Energy Management Open
FPT	— Freeze Protection Thermostat
FU	— Fuse
GND	— Ground
HC	— Heater Contactor (Strip Heat)
HPS	— High-Pressure Switch
HR	— Heater Relay
I	— Ignitor
ICP	— Ignitor Control Pack
IDR	— Induced Draft Relay
IFC	— Indoor (Evaporator) Fan Contactor
LPS	— Loss-of-Charge/Low-Pressure Switch
LS	— Limit Switch (Manual Reset)
MGV	— Main Gas Valve
MTR	— Motor
MV	— Main Valve
NC	— Normally Closed
NO	— Normally Open
OAT	— Outdoor-Air Thermostat
P	— Plug
PL	— Plug Assembly
PS	— Pressure Switch
RES	— Resistor
RS	— Rollout Switch
SEN	— Sensor
SW1	— Switch, Fully Open
SW2	— Switch, Fully Closed

SW3	— Switch, Minimum Vent Position
SW4	— Switch, Maximum Vent Position
TB	— Terminal Block
TC	— Thermostat, Cooling
TDR	— Time Delay Relay
TH	— Thermostat, Heating
TRAN	— Transformer

	Circuit Board Run
	Field Splice
	Marked Wire
	Terminal (Marked)
	Terminal (Unmarked)
	Terminal Block
	Terminal Econ Two-Position Board
	Splice
	Splice (Marked)
	Factory Wiring
	Field Control Wiring
	Field Power Wiring
	Accessory or Optional Wiring
	To indicate common potential only. Not to represent wiring

Guide specifications — 48HJ004-007

Packaged Rooftop Cooling Unit with Gas Heat — Constant Volume Application

HVAC Guide Specifications

Size Range: **3 to 6 Tons, Nominal (Cooling)**
74,000 – 115,000 Btuh, Nominal (Input Heating)

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

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Outdoor rooftop mounted, electrically controlled heating and cooling unit utilizing a scroll (005,006) or reciprocating (004,007) 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. Designed in accordance with UL Standard 1995.
- B. Unit shall be designed to conform to ANSI/ASHRAE 15.
- 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

- A. 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 hinged access door, and will require no panel or screw removal
- 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 internal condensate drain trap made of a non-corrosive material, providing a minimum 3/4-in. connection. Unit is shipped for a horizontal condensate drain, but is field convertible to vertical condensate drain if necessary. Condensate pan shall conform to ASHRAE Standard 62.

C. Fans:

1. Indoor blower (evaporator fan):

- a. Fan shall be direct- or belt-driven as shown on the equipment drawings. Belt drive shall include an adjustable-pitch motor pulley.
- b. Fan wheel shall be double-inlet type with forward-curved blades 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 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 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.
- 3. Equipped with a factory installed crankcase heater to minimize liquid refrigerant accumulation in compressor during shutdown and prevent refrigerant dilution of oil.

E. Coils:

- 1. Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless 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, degreased at the factory.

F. Heating Section:

1. Induced draft combustion type with energy saving direct spark ignition system and redundant main gas valve.
2. The heat exchanger shall be of the tubular section type constructed of a minimum of 20 gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
3. Burners shall be of the in-shot type constructed of aluminum coated steel.
4. All gas piping shall enter the unit cabinet at a single location.

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.

H Filter Section:

1. Standard filter section shall consist of factory-installed low velocity, disposable 2-in. thick fiberglass filters of commercially available sizes.
2. Filter face velocity shall not exceed 320 fpm at nominal airflows.
3. Filter section should use only one size filter.

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 standard safety devices trip and shut off compressor:

- 1) Compressor overtemperature, overcurrent.
- 2) Loss-of-charge/low-pressure switch.
- 3) Freezestat, evaporator coil.
- 4) High-pressure switch.

The lock-out 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 pressure switch.
- 3) Flame rollout switch (manual 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 suction gas passing through motor windings and shall have line break thermal and current overload protection.
2. Indoor blower 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. Integrated Economizer:

- a. Integrated type capable of simultaneous economizer and compressor operation.
- b. Includes all hardware and controls to provide cooling with outside air
- c. Equipped with a single sliding-plate low leakage type damper.
- d. Capable of introducing up to 100% outdoor air.
- e. Equipped with a gravity relief damper.

* 3. 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.

* 4 Two-Position Damper:

- a. Two-position damper package shall include single blade damper and motor. Admits up to 50% outdoor air
- b. Damper shall close upon indoor fan shutoff.

* 5. Optional Compressor Cycle Delay:

Compressor shall be prevented from restarting for a minimum of 5 minutes after shutdown

* 6. 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.

Guide specifications — 48HJ004-007 (cont)

- * 7. 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.
- * 8. Head Pressure Control Package:

Consists of solid-state control and condenser-coil temperature sensor to maintain condensing temperature between 90 F and 110 F at outdoor ambient temperatures down to –20 F by either condenser-fan speed modulation or condenser-fan cycling.
- * 9. 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.
- * 10. 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
- 11. Thru-the-Curb Service Connections:

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

Capable of using deluxe full-featured electronic thermostat
- 13. Flue Shield:

Provides protection from the hot sides of the gas flue hood.
- * 14. Thermostat and Subbase:

Provides staged cooling and heating automatic (or manual) changeover, fan control, and indicator light.
- 15. Hail Guard:

Hail guard shall protect against damage from hail and flying debris.
- 16. 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.
- 17. 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

Guide specifications — 48HJ008-012

Packaged Rooftop Cooling Unit with Gas Heat — Constant Volume Application

HVAC Guide Specifications

Size Range: **7½ to 10 Tons, Nominal (Cooling)**
120,000 to 225,000 Btuh, Nominal
(Input Heating)

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

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. 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. Designated in accordance with UL Standard 1995.
- B. Unit shall be designed to conform to ANSI/ASHRAE 15-1978.
- 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

- A. 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 hinged access door, and will require no panel or screw removal

- 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 made of a non-corrosive material, providing a minimum ¾-in. connection. Unit is shipped for a horizontal condensate drain, but is field convertible to vertical condensate drain if necessary. Condensate pan shall 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) fan shall be of the direct driven propeller type and shall discharge air vertically upwards.
- 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, 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.
- 3. Equipped with a factory installed crankcase heater to minimize liquid refrigerant accumulation in compressor during shutdown and prevent refrigerant dilution of oil.

E. Coils:

- 1. Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless copper tubes with all joints brazed and degreased at the factory.
- 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 and redundant main gas valve.

Guide specifications — 48HJ008-012 (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.
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

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.

H. Filter Section:

1. Standard filter section shall consist of factory-installed low velocity, disposable 2-in. thick fiberglass filters of commercially available sizes.
2. Filter face velocity shall not exceed 320 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) Freezestat, 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 pressure switch.
 - 3) Flame rollout switch (manual 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 shall be cooled by suction gas passing through motor windings and shall have line break thermal and current overload protection.
2. Indoor blower 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.
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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. Integrated Economizer:

- a. Integrated type capable of simultaneous economizer and compressor operation
- b. Includes all hardware and controls to provide cooling with outside air.
- c. Equipped with low leakage dampers not to exceed 3% leakage, at 1.0 in. wg pressure differential.
- d. Capable of introducing up to 100% outdoor air.
- e. Equipped with a gravity relief damper.

* 3. 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.

* 4. 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 fan shutoff.

5. Optional Compressor Cycle Delay:

Compressor shall be prevented from restarting for a minimum of 5 minutes after shutdown.

* 6. 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

- * 7. 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.
- * 8. 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.
- * 9. 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.
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- * 10. 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.
- 11. Thru-the-Curb Service Connections:

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

Capable of using deluxe full-featured electronic thermostat.
- 13. Flue Shield:

Provides protection from the hot sides of the gas flue hood.
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Hail guard shall protect against damage from hail and flying debris.
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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.
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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.

