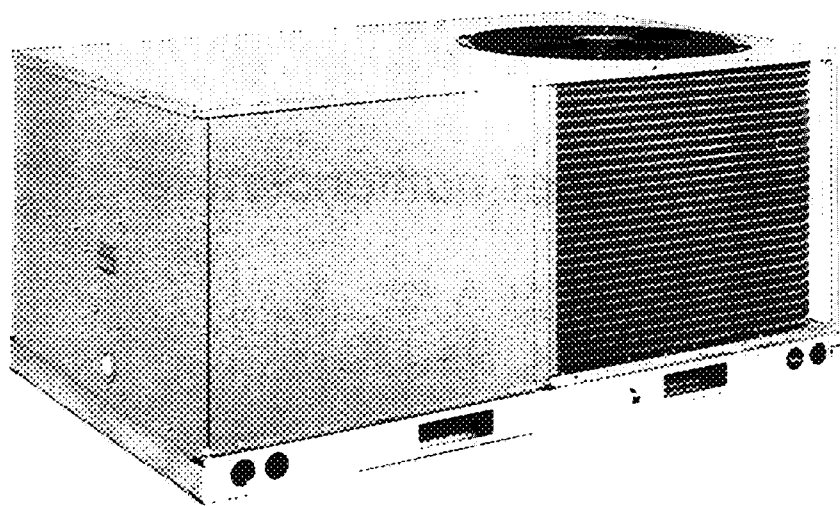




Advance Product Data

48LJD/LJE Single-Package Rooftop Units Electric Cooling/Gas Heating

3 to 6 Nominal Tons



Single-Package Rooftop Units with
Energy Saving Features

- direct spark ignition
- induced draft fan
- Turbo-tubular™ heat exchangers

Features/Benefits

Compact, vertical discharge units convert to horizontal discharge, combining installation flexibility with efficient performance and easy maintenance

Easy maintenance and installation

All units are shipped in the vertical discharge configuration for fit-up to standard roof curbs. One accessory curb fits sizes 004-007. 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. Stretch-wrap packaging protects the unit during shipment and storage.

Imprints on side panel of unit provide location for convenient conversion from vertical to horizontal discharge 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 wiring to be routed through the curb, thereby minimizing roof penetrations. Both power and control connections are made on the same side of the unit to simplify installation.

Rounded corners on panels help to prevent damage or puncture of roof materials. Weather resistant cabinet is coated with a pre-painted enamel finish to ensure long life and good looks.

Quiet, efficient operation and dependable performance

Compressors are fully hermetic with internal vibration isolators and mufflers for extremely quiet operation. Efficient condenser fan and motor design permits operation at low sound levels.

All coils use state-of-the-art internally enhanced copper tubing with low-velocity aluminum fins.

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, turbulators 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.

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.

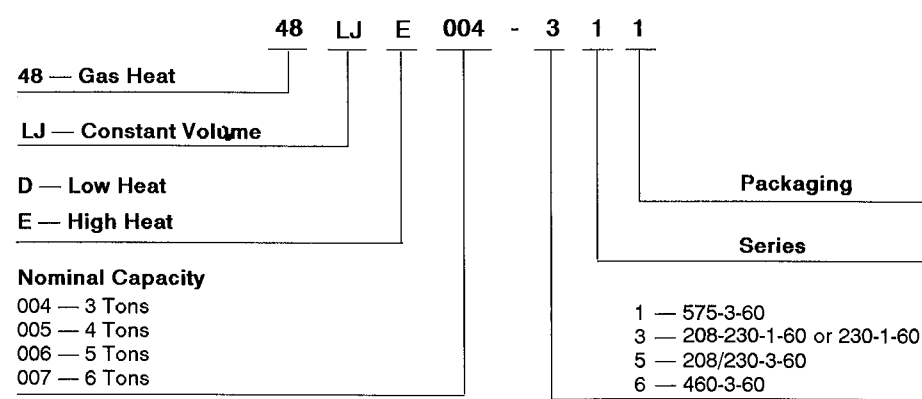
Compressor overcurrent and over-temperature protection assures dependability. Crankcase heater prevents refrigerant dilution of oil during off cycles, ensuring proper lubrication at startup — prolonging compressor life. Carrier's exclusive Acutrol™ metering device precisely controls refrigerant flow, preventing slugging and floodback, while maintaining optimum unit performance.

Accessory Varislide™ economizer permits low-cost operation by utilizing cool outdoor air for free cooling. Reliable sliding plate damper is easily adjusted for 100% outdoor air, 100% return air, or any proportions of mixed air. Economizer operation is controlled by Accusensor I™ dry-bulb thermostat which senses outdoor air temperature. Optional accessory upgrade kits include Accusensor II™ solid state enthalpy control and Accusensor III™ differential enthalpy control.

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Model number nomenclature



ARI capacities

UNIT MODEL 48	NOMINAL TONS	STANDARD CFM	NET COOLING CAPACITY (Btuh)		TOTAL kW	SEER*		SOUND RATING (Bels)
			Single-Phase Units	Three-Phase Units		With Timer†	Without Timer	
LJE004	3	1200	34,800	34,600	4.1	9.7	9.5	8.4
LJD/LJE005	4	1600	48,000	48,000	5.7	9.3	9.1	8.4
LJD/LJE006	5	2000	60,000	59,500	7.1	9.5	9.3	8.4

UNIT MODEL 48	NOMINAL TONS	STANDARD CFM	NET COOLING CAPACITY (Btuh)	TOTAL kW	EER	SOUND RATING (Bels)
LJD/LJE007	6	2400	71,000	8.4	8.4	8.4

Bels — Sound Levels (1 bel = 10 decibels)

EER — Energy Efficiency Ratio

SEER — Seasonal Energy Efficiency Ratio

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

†Ratings with timer apply to single-phase units only.

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 air entering outdoor unit.

HEATING CAPACITIES AND EFFICIENCIES

UNIT MODEL 48	HEATING INPUT (Btuh)	OUTPUT CAPACITY (Btuh)	TEMPERATURE RISE (°F)	AFUE (%)	STEADY STATE EFFICIENCY (%)	CALIFORNIA SEASONAL EFFICIENCY (%)
LJE004	74,000	58,460	25-55	75.7	79	73.3
LJD005	74,000	58,460	25-55	75.7	79	73.3
LJE005	115,000	90,850	35-65	75.7	79	74.1
LJD006	74,000	58,460	25-55	75.5	79	73.3
LJE006	115,000	90,850	35-65	75.7	79	74.1
LJD007	74,000	58,460	25-55	75.7	79	73.3
LJE007	115,000	90,850	35-65	75.7	79	74.1

AFUE — Annual Fuel Utilization Efficiency

NOx Levels — 40 nanograms/joule with accessory kit



Physical data

BASE UNIT 48	LJE004	LJD/LJE005	LJD/LJE006	LJD/LJE007
NOMINAL CAPACITY	3	4	5	6
OPERATING WEIGHT (lb)				
Unit	530	540	560	615
With Economizer	560	570	590	645
Roof Curb	115	115	115	115
COMPRESSOR			Hermetic	
Quantity	1	1	1	1
REFRIGERANT			R-22	
Operating Charge (lb-oz)	3-13	5-8	6-11	9-0
CONDENSER FAN			Propeller	
Quantity	1	1	1	1
Nominal Cfm	3500	4100	4100	3800
Motor Hp	1/3	1/3	1/3	1/3
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fin		
Rows...Fins/in.	1.. 17	1.. 17	1.. 17	2.. 17
Total Face Area (sq ft)	7 78	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	Direct	Direct	Belt	Belt
Nominal Cfm	1200	1600	2000	2400
Motor Hp	1/3	1/2	1 0	1 5
Motor Frame	48	48	56	56
Nominal Rpm High/Low Speed	860/845	1080/970	—	—
Fan Rpm Range	—	—	875-1190	1040-1435
Maximum Fan Rpm	2100	2100	2100	2100
Motor Pulley Pitch Diameter (in.)	—	—	2 8-3 8	2 8-3 8
Fan Pulley Pitch Diameter (in.)	—	—	5 5	4 5
Belt — Type...Length (in.)	—	—	A.. 43	A.. 41
Pulley Center Line Distance (in.)	—	—	14 7-15 5	14 7-15 5
Speed Change Per Full Turn of Movable Pulley Flange (rpm)	—	—	63	79
Movable Pulley Maximum Full Turns from Closed Position	—	—	5	5
Factory Setting — Full Turns Open	—	—	5	5
Factory Speed Setting (rpm)	—	—	875	1040
Fan Shaft Diameter at Pulley (in.)	—	—	5/8	5/8
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double Wavy Fin		
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				
Burner 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 v	1.0	1 0	1 0	1 0
Gas Input	74,000	74,000/115,000	74,000/115,000	74,000/115,000
Efficiency (AGA Steady State) (%)	79	79	79	79
Temperature Rise Range	25-55	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
Maximum Static Pressure (in. wg)	75	.75	75	75
Field Gas Connection Size (in.)	5	.5	5	5
OUTSIDE AIR INLET SCREENS			Cleanable	
Quantity...Size (in.)			1 20 x 24 x 1	
RETURN AIR FILTERS			Disposable	
Quantity...Size (in.)			2 16 x 25 x 2	

*48LJD005-007 and 48LJE004 (74,000 Btuh) units have 2 burners
48LJE005-007 (115,000 Btuh) units have 3 burners

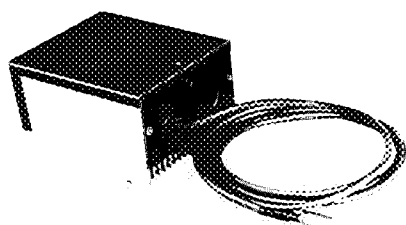
Field-installed accessories

ITEM
Economizer
Manual Outside Air Damper
Two-Position Damper
Roof Curb
Thru-the-Curb Service Connections
Flue Shield
Thermostat and Subbase
Electronic Programmable Thermostat
Time Guard®II Control Circuit
Motormaster® Head Pressure Control
Motormaster II® Head Pressure Control
Accusensor II™ Enthalpy Control
Accusensor III™ Differential Enthalpy Control
LP Conversion Kit
Hair Guard
Remote Control Panel
NOx Reduction Kit
Duct Panels

NOTE: Alternate motors and drives are available through Replacement Components Division

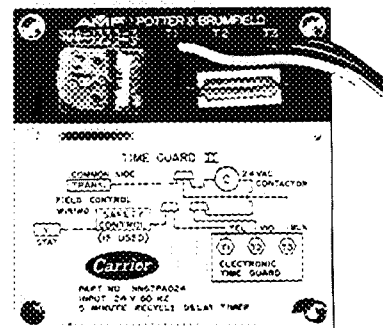
HEAD PRESSURE CONTROL

48LJ004-007 standard units are designed to operate at outdoor temperatures down to 25 F. With accessory Motormaster control (outdoor fan speed modulation) or Motormaster II control (outdoor fan cycling) units can operate at outdoor temperatures down to -20 F. The head pressure controls, which mount in the condenser section, modulate the outdoor fan motor to maintain correct condensing temperature.



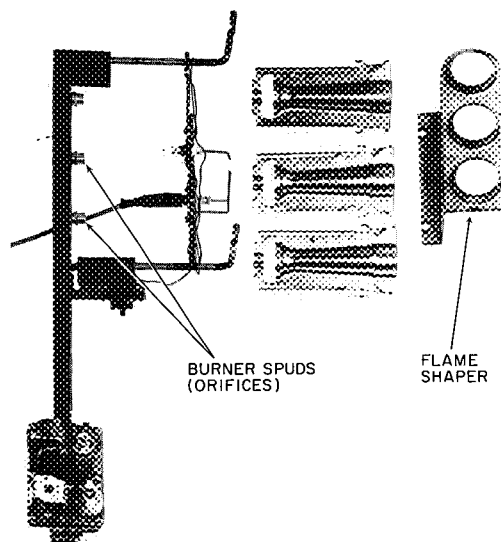
Motormaster control is shown.

TIME GUARD II CONTROL



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

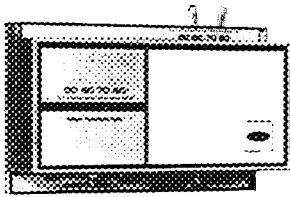
LP CONVERSION KIT



LP conversion kit allows the unit to utilize a liquid propane fuel supply in areas where natural gas is unavailable.

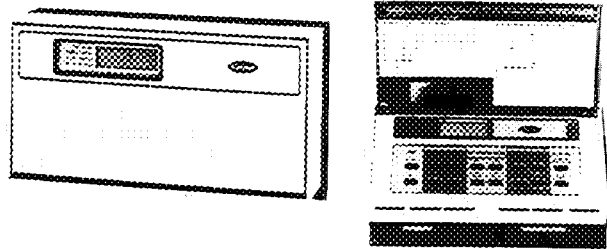
Field-installed accessories (cont)

THERMOSTAT



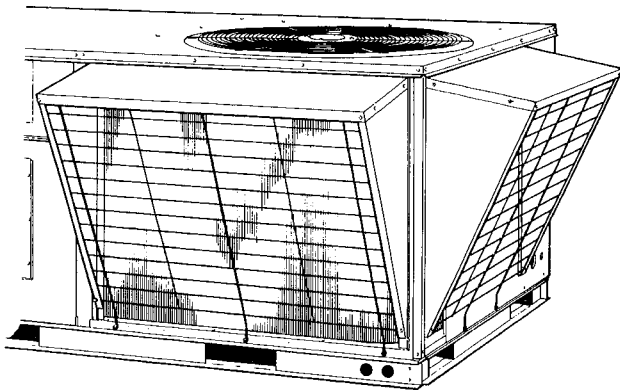
Zone thermostat (24 volts) provides one- or 2-stage cooling for control of unit. Matching subbases are available with or without tamperproof switches and automatic changeover.

ELECTRONIC PROGRAMMABLE THERMOSTAT



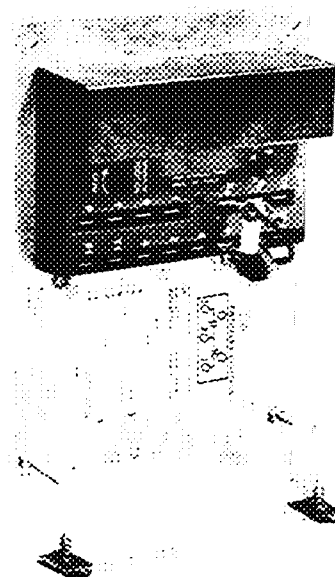
Electronic programmable thermostat provides efficient temperature control by allowing you to program heating and cooling set-backs and setups with provisions for weekends and holidays. Accessory remote sensing package is also available to provide tamperproof control in high traffic spaces.

HAIL GUARD

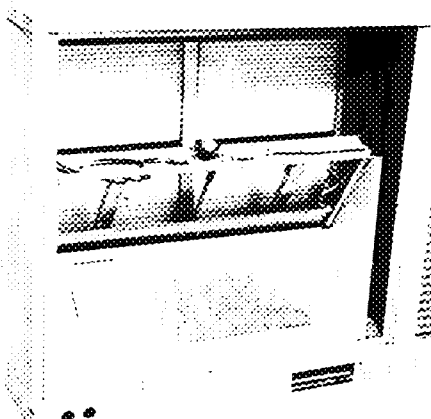


Hail guard accessory protects coils against damage from hail and other flying debris.

ACCUSENSOR II™

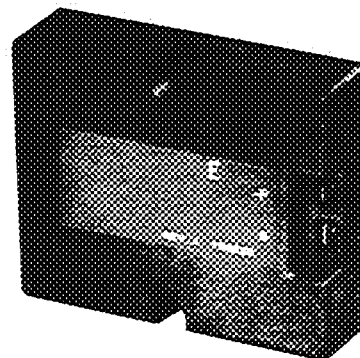


VARISLIDE™ ECONOMIZER



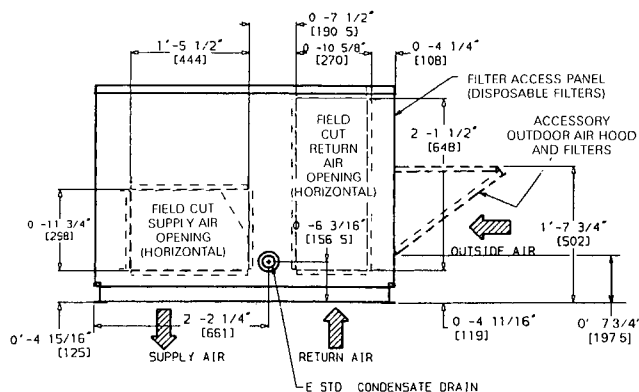
Exclusive Varislide™ economizer damper design saves energy while providing economical and reliable cooling. A sliding plate on the face of the economizer controls the amount of outdoor air entering the system. Closed, it provides a leakproof seal which prevents ambient air from seeping in or conditioned air from seeping out. It can be easily adjusted for 100% outdoor air or any proportions of mixed air. 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 — 48LJ004-007



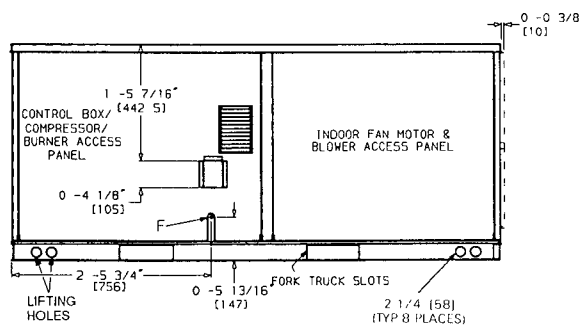
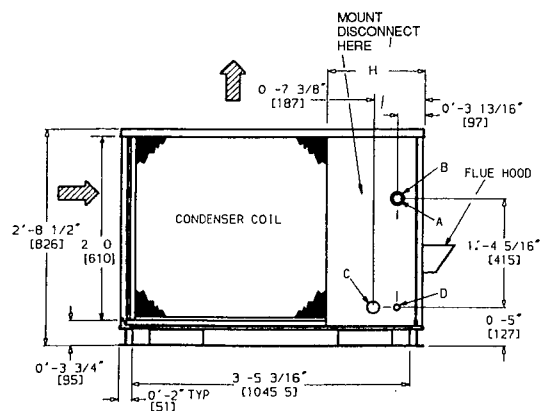
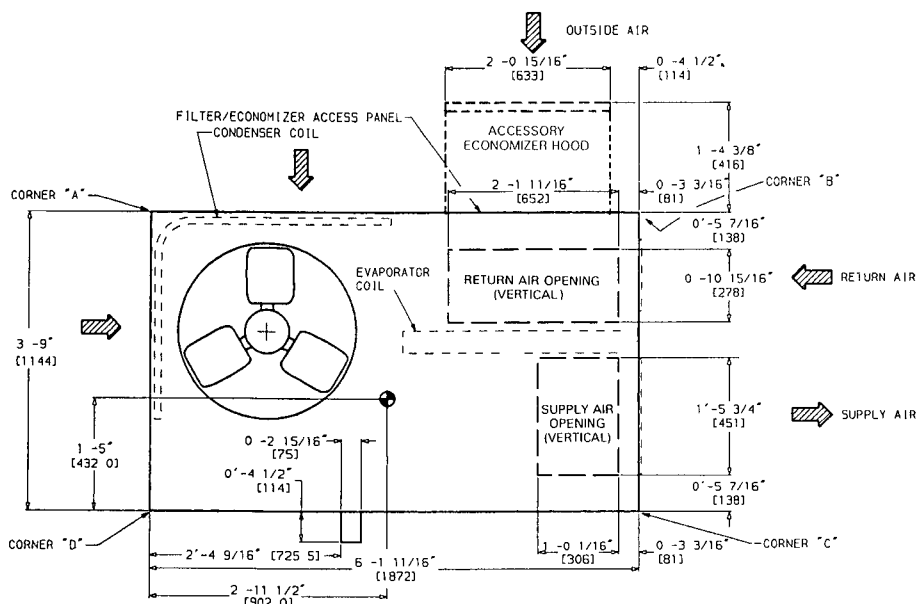
UNIT	STD UNIT WEIGHT		ECONOMIZER WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)	
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.
48LJE004	530	240	30	14	104	47.2	97	44.0
48LJD/LJE005	540	245	30	14	106	48.1	98	44.5
48LJD/LJE006	560	254	30	14	110	49.9	102	46.3
48LJD/LJE007	615	279	30	14	120	54.4	112	50.8

UNIT	CORNER WEIGHT (C)		CORNER WEIGHT (D)		H	
	LBS.	KG.	LBS.	KG.	FT IN.	MM
48LJE004	159	72.1	171	77.6	3'-1 1/4"	947
48LJD/LJE005	162	73.5	174	78.9	1'-2 1/4"	362
48LJD/LJE006	168	76.2	180	81.6	1'-2 1/4"	362
48LJD/LJE007	185	83.9	198	89.8	1'-2 1/4"	362

- Center of Gravity
- Direction of Airflow

- NOTES:
- Dimensions () are in millimeters
 - Minimum clearance to combustibles: 36 in. flue side, zero in. all other sides
 - Minimum clearance from condenser coil for proper airflow: 36 in. opposite one side of coil; 12 in. opposite other side of coil (optional as to which side); 60 in. overhead
 - Minimum recommended clearance for service: 48 in. all 4 sides, 60 in. overhead
 - On vertical applications, ductwork to be attached to accessory roof curb only

CONNECTION SIZES	
A	1 3/8" DIA. (35) FIELD POWER SUPPLY HOLE
B	2" DIA. (50.5) POWER SUPPLY KNOCK-OUT
C	2 3/16" DIA. (55) CHARGING PORT HOLE
D	7/8" DIA. (22) FIELD CONTROL WIRING HOLE
E	3/4" CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONNECTION



Accessory dimensions

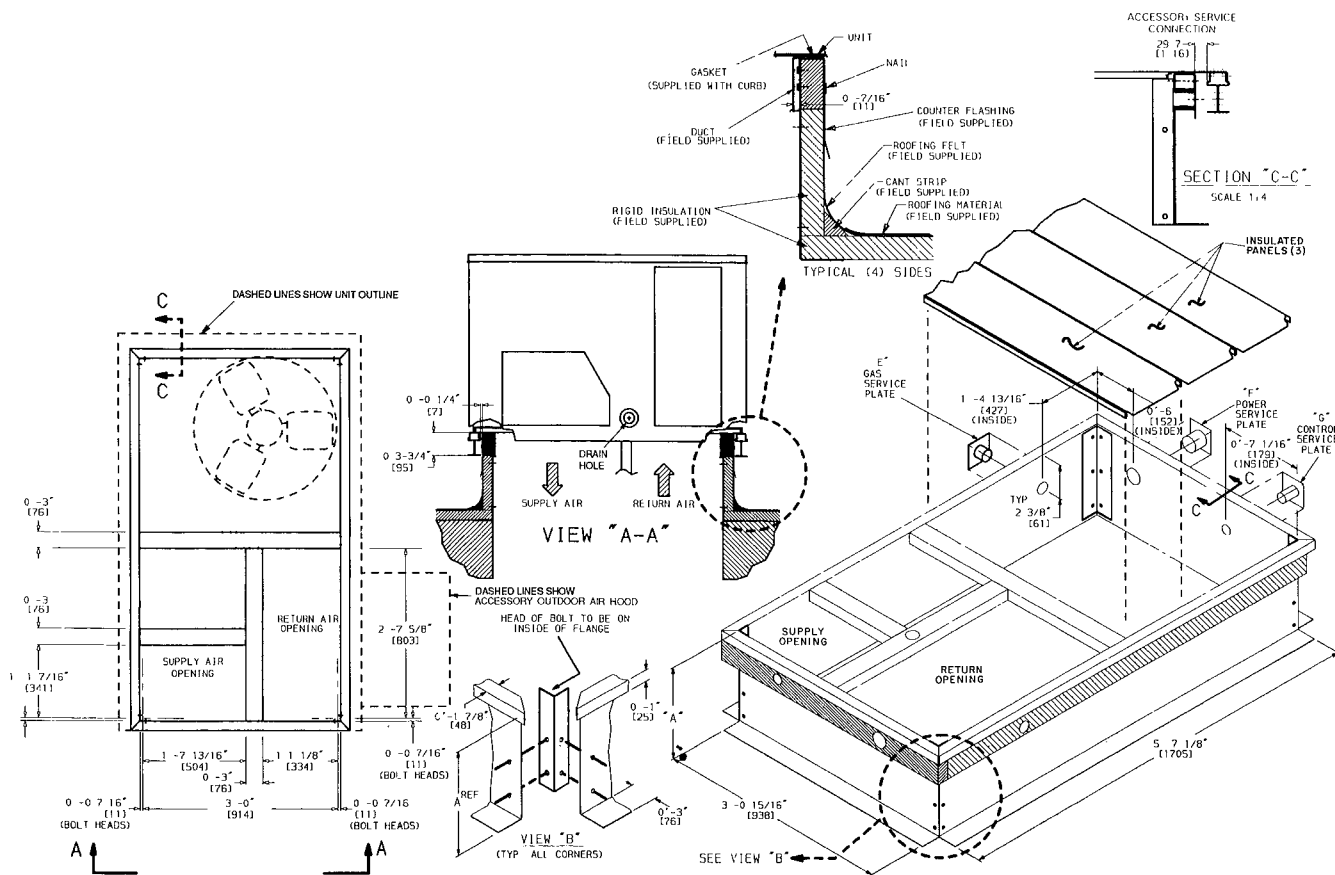
ROOF CURB — 48LJ004-007

A	UNIT SIZE
1'-2" (356)	48LJE004 48LJD/LJE005-007

ACCESSORY CONNECTOR PACKAGE SERVICE PLATE SIZES			
Unit Size	"E" Gas	"F" Power	"G" Control
48LJE004 48LJD/LJE005-007	3/4" (19)	3/4" (19) or 1 1/4" (31.7)	3/4" (19)

NOTES

1. Roof curb is shipped disassembled.
2. Dimensions in () are in millimeters.
3. Attach ductwork to curb (Flanges of duct rest on curb).
4. Service clearance is 4 ft on each side.
5.  Direction of airflow.
6. Control, gas and power service plate connections are part of a separately shipped accessory package.



Selection procedure (with 48LJE005 example)

I Determine cooling and heating requirements at design conditions.

Given:

Required Cooling Capacity (TC) 47,000 Btuh
Sensible Heat Capacity (SHC) 32,000 Btuh
Required Heating Capacity 85,000 Btuh
Condenser Entering Air Temperature 95 F
Evaporator Entering Air
Temperature 80 F edb, 67 F ewb
Evaporator Air Quantity 1600 cfm
External Static Pressure (ESP) 35 in. wg
Electrical Characteristics (V-Ph-Hz) 230-1-60

II Select unit based on required cooling capacity.

Entering Cooling Capacities table at condenser entering temperature of 95 F, evaporator air entering at 1600 cfm and 80 F db and 67 F wb. The 48LJE005 unit will provide a total cooling capacity of 50,800 Btuh and a sensible heat capacity of 35,600 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 table.

NOTE: Unit ratings are gross capacities and do not include the effect of indoor 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 table (page 3) note that unit 48LJE005 will provide output capacity of 90,850 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 find:

External static pressure 35 in. wg
Economizer 05 in. wg
Total static pressure = .40 in. wg

Enter the Fan Performance table for 48LJE005 vertical discharge units. At 1600 cfm and 230 volts high speed, the standard motor will deliver 50 in. wg static pressure and 79 bhp. This will adequately handle the job requirements.

To determine the input power to the motor, convert bhp to Watts using the Indoor Fan Motor Efficiency table found on page 13.

For example:

$$\begin{aligned}\text{IFM Watts} &= \frac{\text{Bhp} \times 746 \frac{\text{Watts}}{\text{Bhp}}}{\text{Motor Efficiency}} \\ &= \frac{.79 \times 746}{79}\end{aligned}$$

$$\text{IFM Watts} = 746$$

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:

$$\begin{aligned}\text{Net capacity} &= \text{gross capacity} - \text{IFM heat} \\ &= 50,800 \text{ Btuh} - 746 \text{ Watts} \left(3.413 \frac{\text{Btuh}}{\text{Watts}} \right) \\ &= 50,800 \text{ Btuh} - 2546 \text{ Btuh}\end{aligned}$$

$$\text{Net capacity} = 48,254 \text{ Btuh}$$

$$\text{Net sensible capacity} = 35,600 \text{ Btuh} - 2546 \text{ Btuh}$$

$$\text{Net sensible capacity} = 33,054 \text{ Btuh}$$

Performance data

COOLING CAPACITIES

48LJ004 (3 Tons)

Temp (F) Air Ent Cond (Edb)		Evap Air — Cfm/BF								
		900/.156			1200/.193			1500/.224		
		Evap Air — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	40.0	36.5	32.9	41.7	38.3	35.2	42.9	39.6	36.5
	SHC	19.6	24.1	28.2	21.5	27.3	32.4	23.0	30.0	35.7
	kW	3.27	3.15	3.03	3.32	3.21	3.11	3.36	3.25	3.16
95	TC	38.0	34.7	30.9	39.7	36.4	33.3	40.7	37.6	34.6
	SHC	18.9	23.4	27.1	20.8	26.5	31.5	22.4	29.4	34.6
	kW	3.52	3.40	3.27	3.59	3.46	3.35	3.62	3.52	3.41
105	TC	36.1	32.9	29.2	37.7	34.4	30.8	38.6	35.4	33.0
	SHC	18.2	22.7	26.2	20.1	25.8	30.1	21.7	28.5	33.0
	kW	3.78	3.65	3.50	3.86	3.72	3.58	3.90	3.76	3.66
115	TC	34.0	30.9	27.5	35.6	32.4	29.0	36.6	33.3	31.3
	SHC	17.4	21.9	25.4	19.5	25.1	29.0	21.1	27.5	31.3
	kW	4.04	3.89	3.72	4.13	3.97	3.82	4.17	4.02	3.92

48LJ006 (5 Tons)

Temp (F) Air Ent Cond (Edb)		Evap Air — Cfm/BF								
		1500/.08			2000/.107			2500/.132		
		Evap Air — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	69.5	63.4	56.6	73.1	66.8	59.9	75.1	69.0	63.8
	SHC	34.6	42.8	49.9	38.6	49.0	57.7	42.0	54.8	63.8
	kW	5.60	5.35	5.10	5.76	5.51	5.26	5.85	5.60	5.39
95	TC	66.5	59.1	53.7	69.6	62.8	56.7	71.5	65.3	60.0
	SHC	33.5	41.0	48.4	37.3	47.5	55.9	40.9	53.5	60.1
	kW	5.99	5.69	5.41	6.14	5.85	5.57	6.02	5.96	5.76
105	TC	62.9	55.8	50.6	65.8	58.6	53.8	67.8	60.3	57.1
	SHC	32.3	39.6	46.9	36.2	45.9	53.8	39.9	51.6	57.2
	kW	6.34	6.01	5.70	6.50	6.18	5.90	6.61	6.29	6.10
115	TC	58.1	52.5	47.5	61.4	54.9	51.0	63.6	56.4	54.2
	SHC	30.5	38.2	45.3	34.7	44.5	51.0	38.6	50.0	54.2
	kW	6.68	6.31	5.98	6.84	6.68	6.23	6.95	6.52	6.45

48LJ005 (4 Tons)

Temp (F) Air Ent Cond (Edb)		Evap Air — Cfm/BF								
		1200/.157			1600/.194			2000/.226		
		Evap Air — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	54.4	50.4	46.6	56.3	52.9	49.0	57.7	54.4	50.7
	SHC	26.5	32.6	38.7	28.2	36.2	43.5	29.9	39.4	47.7
	KW	4.43	4.29	4.15	4.52	4.39	4.25	4.56	4.44	4.31
95	TC	52.0	48.1	44.2	54.6	50.8	46.7	55.5	52.2	48.2
	SHC	25.6	31.7	37.6	27.9	35.6	42.7	29.2	38.9	46.6
	KW	4.75	4.60	4.44	4.87	4.72	4.56	4.90	4.77	4.61
105	TC	49.6	45.7	41.9	51.8	48.0	44.2	53.0	49.3	45.8
	SHC	24.6	30.7	36.5	26.8	33.6	41.2	28.4	37.7	45.3
	KW	5.07	4.89	4.73	5.18	5.01	4.84	5.23	5.07	4.92
115	TC	46.9	43.3	39.6	48.0	45.4	41.7	50.2	46.8	43.3
	SHC	23.6	29.8	35.3	25.8	33.7	40.1	27.5	37.0	43.3
	KW	5.38	5.22	5.02	5.50	5.33	5.14	5.56	5.41	5.23

48LJ007 (6 Tons)

Temp (F) Air Ent Cond (Edb)		Evap Air — Cfm/BF								
		1800/.06			2400/.083			3000/.105		
		Evap Air — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	82.9	76.2	67.4	86.5	80.1	72.5	89.2	82.4	76.7
	SHC	41.5	51.7	60.3	45.9	59.4	70.7	50.2	66.3	76.7
	kW	6.37	6.13	5.93	6.51	6.29	6.09	6.63	6.38	6.24
95	TC	79.0	72.1	62.8	82.6	75.7	68.0	85.1	78.1	73.1
	SHC	40.1	50.0	58.2	44.8	57.7	67.9	49.3	64.8	73.1
	kW	6.83	6.53	6.31	7.00	6.70	6.49	7.11	6.81	6.68
105	TC	74.6	67.7	59.0	77.9	71.2	64.1	80.1	73.2	69.3
	SHC	38.5	48.3	56.2	43.2	56.1	64.1	47.7	63.0	69.3
	kW	7.24	6.93	6.66	7.41	7.10	6.90	7.54	7.21	7.10
115	TC	70.2	63.2	55.5	73.1	66.2	60.3	74.9	68.1	64.9
	SHC	37.0	46.5	54.5	41.6	54.2	60.3	46.1	61.0	64.9
	kW	7.67	7.30	6.96	7.83	7.48	7.30	7.94	7.59	7.51

Boldface — Standard Ratings

LEGEND

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

NOTES:

1 Direct interpolation is permissible. Do not extrapolate.

2 The following formulas may be used:

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

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

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

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

3 SHC is based on 80 F edb temperature of air entering evaporator coil

Below 80 F edb, subtract (corr factor x cfm) from SHC

Above 80 F edb, add (corr factor x cfm) to SHC

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

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS

48LJ004 (3 Tons)

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	0.21	0.48	0.24	0.49	0.26	0.51	0.29
1000	0.44	0.24	0.45	0.27	0.47	0.28	0.48	0.32
1100	0.40	0.25	0.42	0.29	0.44	0.29	0.45	0.33
1200	0.32	0.27	0.37	0.30	0.38	0.31	0.40	0.35
1300	0.28	0.29	0.32	0.31	0.32	0.32	0.34	0.36
1400	0.22	0.30	0.25	0.32	0.26	0.33	0.28	0.37
1500	0.16	0.31	0.18	0.33	0.20	0.35	0.21	0.38

ESP — External Static Pressure

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

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48LJ005 (4 Tons)

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	0.50	0.58	0.57	0.72	0.59	0.84	0.69
1300	0.44	0.54	0.50	0.59	0.64	0.64	0.75	0.71
1400	0.35	0.57	0.42	0.62	0.56	0.67	0.67	0.75
1500	0.25	0.62	0.33	0.65	0.47	0.69	0.58	0.77
1600	0.16	0.65	0.24	0.68	0.38	0.71	0.50	0.79
1700	0.09	0.67	0.15	0.69	0.30	0.74	0.40	0.82
1800	0.00	0.68	0.06	0.71	0.22	0.77	0.32	0.83
1900	—	—	—	—	0.12	0.78	0.24	0.85
2000	—	—	—	—	0.03	0.81	0.15	0.87

ESP — External Static Pressure

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

48LJ006 (5 Tons)

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	1314	1.59	1374	1.78	1439	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	1.96	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	—	—	—	—	—	—	—	—

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 Weathermaker I units has ensured 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: 875-1190. All other rpms require field-supplied drive.

48LJ007 (6 Tons)

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	1516	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	2.46	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	—	—	—	—	—	—	—	—	—	—	—	—

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 with standard motor. Extensive motor and electrical testing on the Weathermaker I units has ensured 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: 1040-1435. All other rpms require field-supplied drive.

Performance data (cont)

FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS

48LJ004 (3 Tons)								
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	0.24	0.55	0.26	0.63	0.29	0.64	0.32
1000	0.48	0.26	0.51	0.27	0.57	0.30	0.60	0.34
1100	0.43	0.27	0.45	0.30	0.52	0.32	0.54	0.35
1200	0.36	0.29	0.40	0.31	0.47	0.33	0.47	0.37
1300	0.28	0.30	0.32	0.32	0.38	0.36	0.41	0.39
1400	0.20	0.33	0.24	0.36	0.31	0.38	0.32	0.40
1500	0.11	0.36	0.14	0.38	0.21	0.40	0.22	0.43

ESP — External Static Pressure

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

48LJ005 (4 Tons)								
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	0.47	0.85	0.49	0.92	0.54	1.01	0.58
1300	0.70	0.50	0.76	0.52	0.84	0.57	0.94	0.61
1400	0.62	0.55	0.68	0.56	0.78	0.59	0.87	0.64
1500	0.52	0.57	0.59	0.58	0.69	0.62	0.78	0.67
1600	0.44	0.59	0.50	0.60	0.61	0.66	0.70	0.69
1700	0.34	0.62	0.40	0.63	0.53	0.68	0.62	0.71
1800	0.22	0.66	0.30	0.68	0.45	0.72	0.54	0.75
1900	0.10	0.68	0.20	0.69	0.37	0.76	0.48	0.78
2000	—	—	0.09	0.72	0.29	0.78	0.39	0.81

ESP — External Static Pressure

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

48LJ006 (5 Tons)																		
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	1315	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	1343	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	—	—	—	—	—	—

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 Weathermaker I units has ensured 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 875-1190. All other rpms require field-supplied drive

FAN PERFORMANCE HORIZONTAL DISCHARGE UNITS (cont)

48LJ007 (6 Tons)

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	852	0.55	905	0.62	1002	0.78	1084	0.93	1163	1.10	1235	1.29	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	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	1362	1.73	1422	1.94	1485	2.16
2100	978	0.85	1024	0.93	1108	1.10	1190	1.29	1255	1.47	1327	1.66	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	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	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	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	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	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	1587	2.98	—	—	—	—
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	—	—	—	—	—	—	—	—	—	—

NOTES:

- Boldface** indicates field-supplied drive required (See note 6)
- Shading** indicates field-supplied motor and drive required
- Maximum usable bhp is 2.4 with standard motor. Extensive motor and electrical testing on Weathermaker I units has ensured 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.
- Motor drive range: 1040-1435. All other rpms require field-supplied drive.

FAN RPM AT MOTOR PULLEY SETTINGS

UNIT 48LJ	MOTOR PULLEY TURNS OPEN										
	0	½	1	1½	2	2½	3	3½	4	4½	5
006	1190	1159	1127	1096	1064	1033	1001	970	938	907	875
007	1435	1396	1356	1317	1277	1238	1198	1159	1119	1080	1040

INDOOR FAN MOTOR EFFICIENCY

MOTOR	EFFICIENCY (%)
⅓ HP, DIRECT DRIVE	.63
½ HP, DIRECT DRIVE	.79
1.0 HP, BELT DRIVE	.81
1.5 HP, BELT DRIVE	.80

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) 48LJ004-007

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

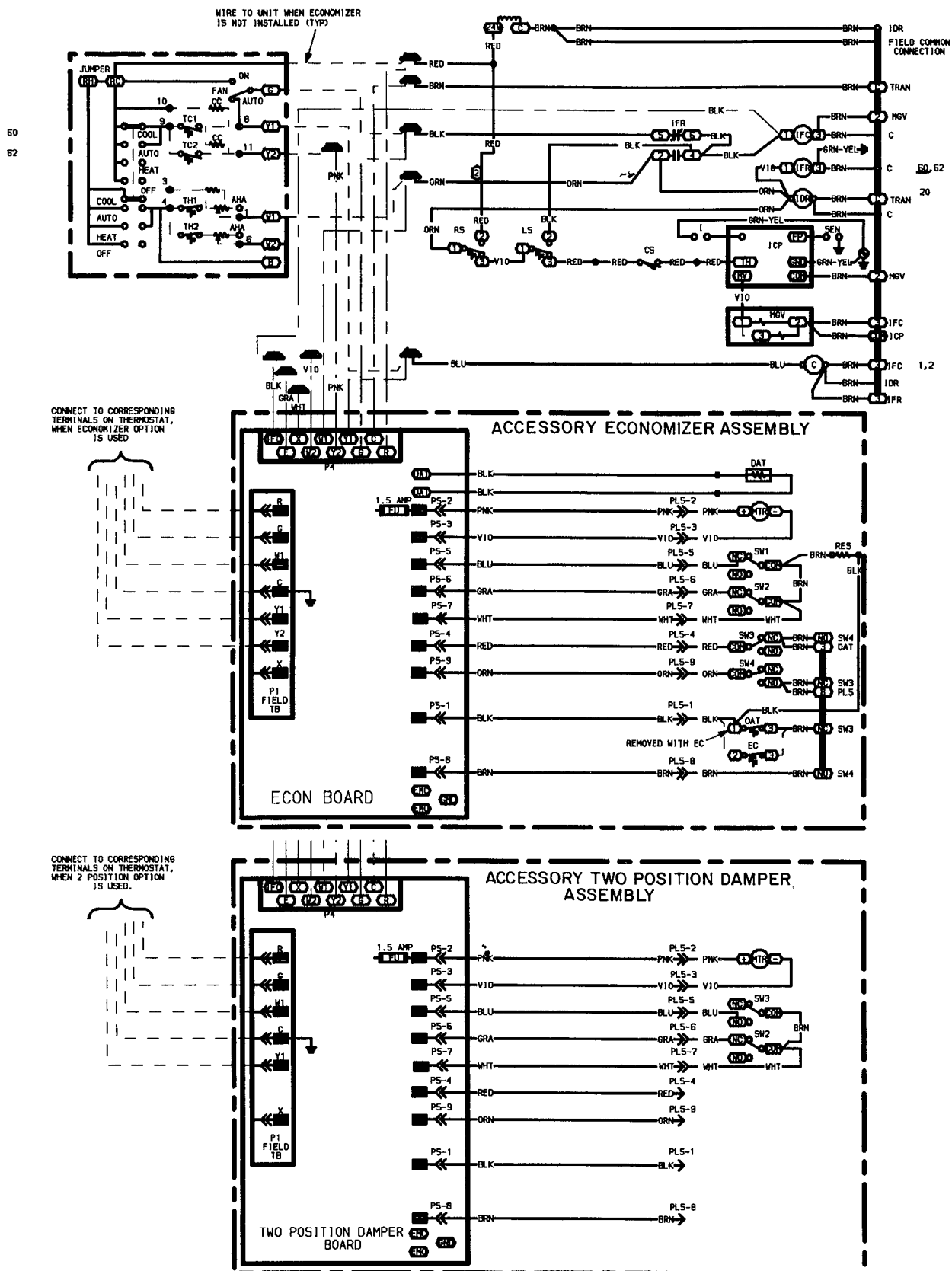
ALTITUDE COMPENSATION* — 48LJ004-007

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.

Typical control wiring schematic (size 004-007 shown)



LEGEND FOR TYPICAL CONTROL WIRING SCHEMATIC

AHA	— Adjustable Heat Anticipator
C	— Contactor, Compressor
CC	— Cooling Compensator
CS	— Centrifugal Switch
CV	— Constant Volume
DAT	— Discharge Air Thermostat
EC	— Enthalpy Control
ECON	— Economizer
EMC	— Energy Management Closed
EMO	— Energy Management Open
EQUIP	— Equipment
FP	— Flame Prove
FU	— Fuse
GND	— Ground
I	— Ignitor
ICP	— Ignitor Control Pack
IDR	— Induced Draft Relay
IFC	— Indoor Fan Contactor
IFR	— Indoor Fan Relay
LS	— Limit Switch
MGV	— Main Gas Valve
MTR	— Motor
MV	— Main Valve
OAT.	— Outdoor Air Thermostat
P	— Plug
PL	— Plug Assembly
RES	— Resistor
RS	— Rollout Switch
SEN	— Sensor
SW	— Switch
TB	— Terminal Block
TC	— Thermostat-Cooling
TH	— Thermostat-Heating
TRAN	— Transformer

	Circuit Board Run
	Field Splice
	Marked Wire
	Terminal (Marked)
	Terminal (Unmarked)
	Terminal Block
	Terminal Econ 2-Position Board
	Terminal CV 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

Controls

Operating sequence

Cooling, unit without accessory economizer — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor fan contactor (IFC) and compressor contactor (C) are energized and indoor fan motor, compressor and outdoor fan start. The outdoor fan motor runs continuously while unit is cooling.

Heating, unit without accessory economizer — When thermostat calls for heating, terminal W1 is energized and induced draft relay (IDR) is energized and burner ignition sequence begins. Indoor fan contactor (IFC) is energized and indoor fan motor starts.

Cooling, unit with accessory economizer — When the outdoor ambient temperature is above the outdoor air thermostat (OAT) or accessory enthalpy control setting and the thermostat calls for cooling, terminals G and Y1 are energized. The indoor fan contactor (IFC) is energized and the economizer damper blade opens to the minimum position.

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

If outside 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, unit with accessory 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 indoor fan contactor energizes to start the indoor fan, and the economizer damper blade opens to the minimum position. If the 2-position damper is used, the outdoor air damper opens to the minimum position whenever the indoor fan runs.

As space temperature approaches the heating temperature set point, heating stage cycles off. Economizer or 2-position damper returns to a fully closed position when fan shuts off.

Electrical data

UNIT	NOMINAL VOLTS-PH-HZ	POWER SUPPLY		UNIT DISCONNECT SIZE	
		MCA	MOCP	FLA	LRA
48LJE004 (3 Tons)	208-230-1-60	27.1-27.1	35-35	26-26	105-105
	208/230-3-60	18.7/18.7	25/25	18/18	92/92
	460-3-60	10.1	15	10	45
	575-3-60	7.5	15	7	34
48LJD/LJE005 (4 Tons)	208-230-1-60	36.7-36.7	45-45	35-35	141-141
	208/230-3-60	25.3/25.3	30/30	25/25	113/113
	460-3-60	12.6	20	12	106
	575-3-60	9.5	15	9	45
48LJD/LJE006 (5 Tons)	230-1-60	44.7	60	43	180
	208/230-3-60	29.9/29.9	40/40	26/26	165/165
	460-3-60	14.8	20	14	84
	575-3-60	14.3	20	14	65
48LJD/LJE007 (6 Tons)	208/230-3-60	36.0/36.0	40/40	35/35	162/162
	460-3-60	16.6	20	16	91
	575-3-60	16.7	20	17	78

Application data

Outdoor installation — Units approved for outdoor installation only

Ductwork — Secure vertical discharge ductwork to roof curb. For horizontal discharge applications, attach ductwork to unit, or field-supplied flanges can be attached to side openings and all ductwork attached to flanges

Horizontal discharge — Imprints on side panel of unit provide location for convenient conversion from vertical to horizontal discharge at the jobsite

NOTE On horizontal discharge units equipped with economizer or 2-position damper, we recommend that the air filters be installed external to the unit.

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

Condensate line must be trapped external to the unit.

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

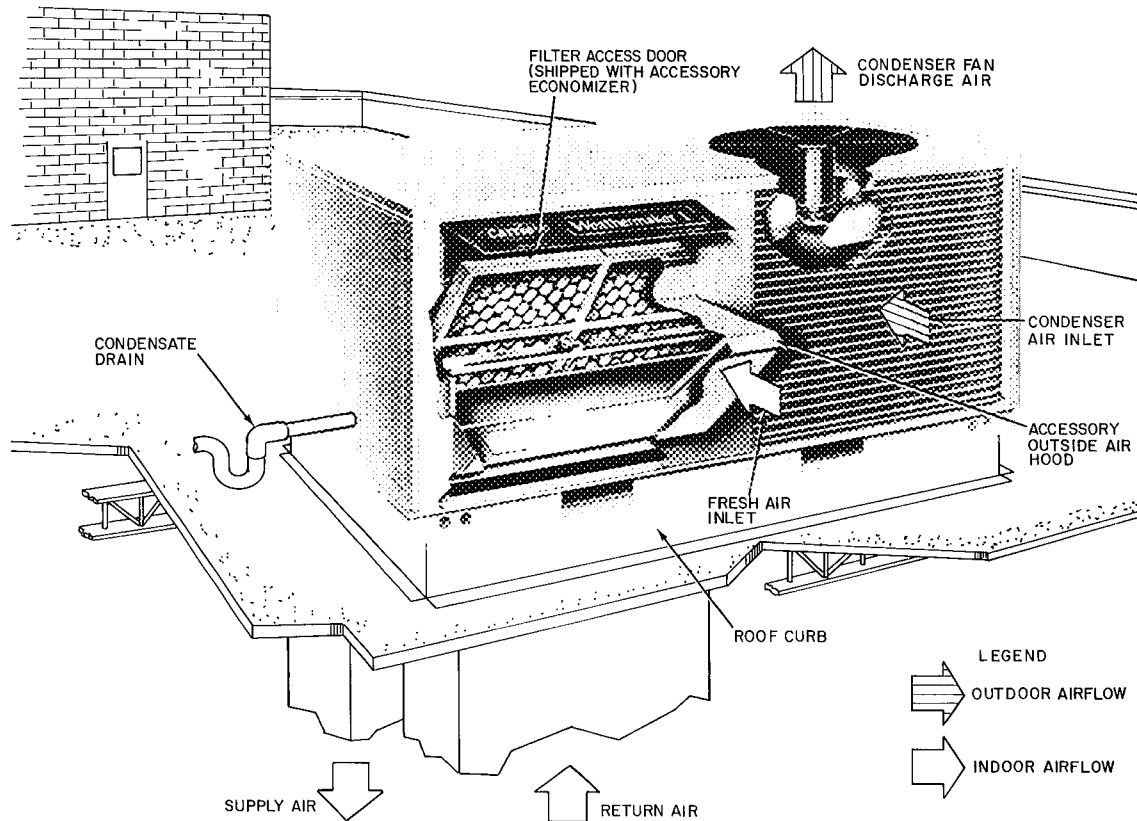
Maximum airflow — To minimize possibility of condensate blow-off from evaporator, airflow through units should not exceed 500 cfm/ton

Minimum airflow for cooling is 300 cfm/ton.

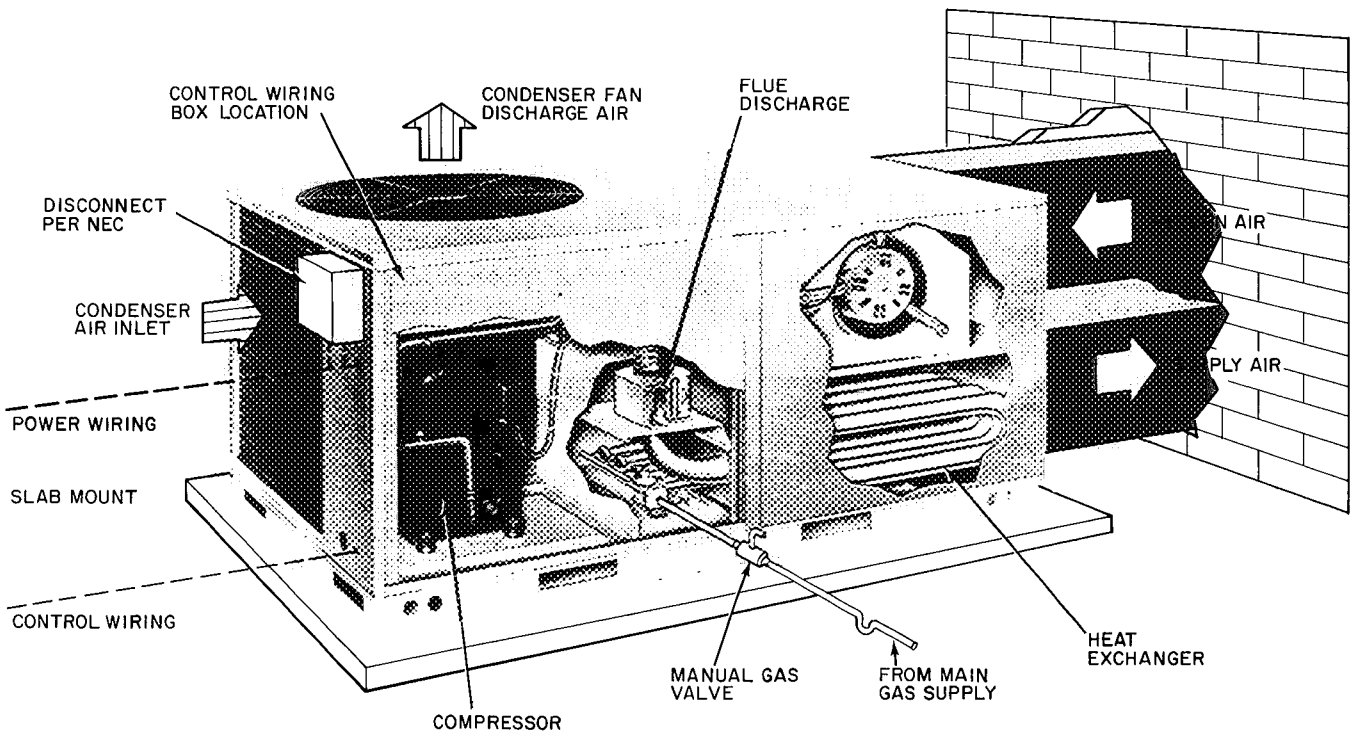
Minimum ambient operating temperature for standard units is 25 F. With accessory Motormaster® control or Motormaster II® control, units can operate at outdoor temperatures down to -20 F

Typical piping and wiring

VERTICAL DISCHARGE DUCTING



HORIZONTAL DISCHARGE DUCTING



Guide specifications — 48LJ004-007

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 **48LJD**
48LJE

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Outdoor rooftop mounted, electrically controlled, heating and cooling unit utilizing a reciprocating compressor for cooling duty and gas combustion for heating duty. Unit shall discharge supply air downward 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 465.
- 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.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT

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.
- 2. Indoor blower compartment interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, flexible glass fiber insulation, coated on the air side. Aluminum foil faced glass fiber insulation shall be used in the furnace compartment.
- 3. Cabinet panels shall be easily removable for servicing
- 4. Holes shall be provided in the base rails for rigging shackles to facilitate overhead rigging.

C. Fans:

- 1 Indoor blower (evaporator fan):

- a. Fan shall be directly driven with 2 speed or belt driven as shown on the equipment drawings. Belt drive shall include an adjustable-pitch motor pulley
- b. Fan wheel shall be double-inlet type with forward-curved blades.
- c. Bearings shall be sealed, permanently lubricated, ball-bearing type

- 2. Indoor blower 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 upward.
- 4. Outdoor fan shall have aluminum blades riveted to corrosion resistant steel spiders and dynamically balanced
- 5. Induced draft blower shall be of the direct driven single inlet forward curved centrifugal type, made from steel with a corrosion resistant finish and dynamically balanced.

D. Compressor:

- 1. Fully hermetic type.
- 2. Factory rubber shock mounted and internally spring mounted 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.

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™ feed system
- 2. Strainer
- 3. Service gage connections on suction, discharge and liquid lines.

H. Filter Section:

1. Standard filter section shall consist of factory-installed low velocity, disposable 2-in. thick glass fiber 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 control system.

2. Safeties:

- a. Compressor overtemperature protection
- b. Compressor overcurrent protection.
- c. Heating section shall be provided with the following minimum protections:
 - 1) High temperature limit switch
 - 2) Induced draft motor centrifugal switch.
 - 3) Flame rollout switch (manual reset).
 - 4) Flame proving controls.

J. Operating Characteristics:

1. Unit shall be capable of starting and running at 115 F ambient outdoor temperature per 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 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 * 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% outside 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 shut-off.

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 coil temperature sensor for head pressure control.
- b. Capable of maintaining condensing temperature between 90 F and 110 F at outdoor ambient temperatures down to -20 F.

Guide specifications — 48LJ004-007 (cont)

- * 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. NOx Reduction Kit:
Package shall contain all necessary hardware and instructions to convert a standard natural gas unit to reduce the nitrous oxide (NOx) emissions to a level of 40 nanograms/joule.