LENNOX

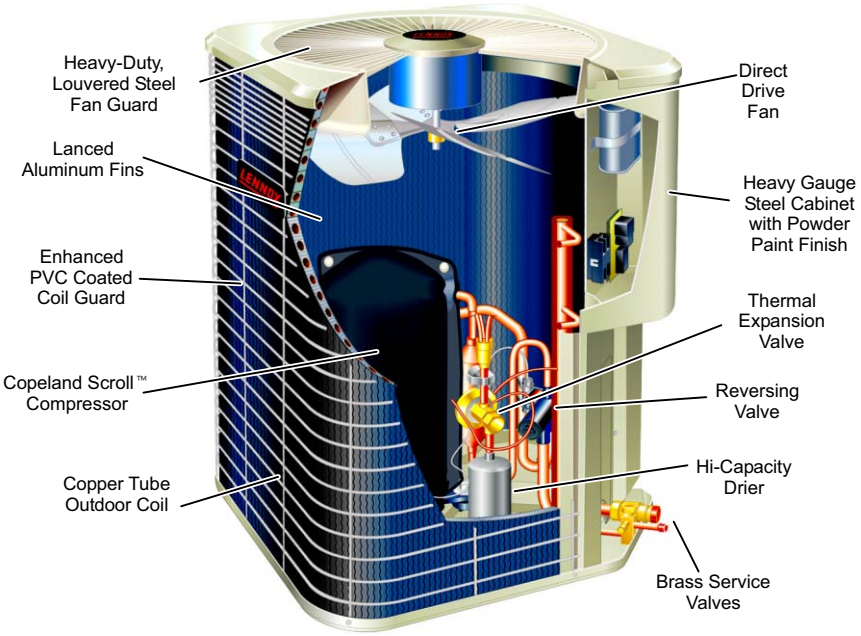
ENGINEERING DATA

HEAT PUMP OUTDOOR UNITS

HP40 - 50HZ

Cooling Capacity - 6.2 to 16.3 kW (21 200 to 55 500 Btuh)
Heating Capacity - 6.4 to 16.1 kW (21 800 to 55 500 Btuh)

Bulletin No. 490088
October 2004
Supersedes August 1999



ISO 9001 REGISTERED QUALITY SYSTEMS

MODEL NUMBER IDENTIFICATION

HP40 - 024 - 2 T

Unit Type
HP = Heat Pump Outdoor Unit

Series

Nominal Capacity
024 = 7 kW (2 tons)
036 = 10.5 kW (3 tons)
048 = 14 kW (4 tons)
060 = 17.5 kW (5 tons)

Minor Revision Number

Voltage
T = 220/240V-1 phase-50hz
M = 380/420V-3 phase-50hz

FEATURES

CONTENTS

APPLICATIONS

Energy Efficiency Ratios (EER's) of up to 9.21.
7 through 17.5 kW (2 through 5 Ton) sizes.
Vertical air discharge allows concealment behind shrubs at grade level or out of sight on a roof.
Matching up-flow, down-flow and horizontal air handlers with supplemental electric heat provide a wide range of cooling and heating capacities and applications. See ratings table for match-ups.
For air handler unit data, see Air Handlers, this section.
Units shipped completely factory assembled, piped and wired. Each unit is test operated at the factory ensuring proper operation.
Installer must set outdoor unit, connect refrigerant lines and make electrical connections to complete job.

FEATURES

TESTING

Tested in the Lennox Research Laboratory environmental test rooms which meet American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Standard 37 requirements.

Rating test conditions are those included in Air-Conditioning and Refrigeration Institute (ARI) Standard 210/240 while operating at rated voltages and air volumes.

Sound rated in Lennox reverberant sound test room in accordance with test conditions for Air-Conditioning and Refrigeration Institute (ARI) Standard 270.

Outdoor units and components within bonded for grounding to meet safety standards for servicing required by Underwriters Laboratories (U.L.) and the International Electrotechnical Commission (IEC).

ISO 9001 Registered Manufacturing Quality System.

REFRIGERANT SYSTEM

Refrigerant

For use with non-chlorine, ozone friendly, R-407C.

Unit is shipped with nitrogen holding charge.

Unit **Must be Field Charged** with refrigerant. See unit name plate for amount required.

Copper Tube/Enhanced Fin Coil

Lennox designed and fabricated coil.

Ripple-edged aluminum fins.

Copper tube construction.

Lanced fins provide maximum exposure of fin surface to air stream resulting in excellent heat transfer.

Fin collars grip tubing for maximum contact area.

Flared shoulder tubing connections/silver soldering construction.

Coil is factory tested under high pressure to insure leakproof construction.

Entire coil is accessible for cleaning.

Polyvinyl Chloride (PVC) coated steel wire coil guard furnished as standard.

Reversing Valve

Factory installed 4-way reversing valve provides rapid change in refrigerant flow direction resulting in quick changeover from cooling to heating and vice-versa.

Valve operates on pressure differential between outdoor unit and indoor unit.

Expansion Valve

Factory installed and piped expansion valve is designed and sized specifically for use in heat pump system.

Sensing bulb is located on suction line between reversing valve and compressor to sense suction temperature in any cycle.

Outdoor Coil Fan

Direct drive fan moves large air volumes uniformly through entire outdoor coil for high refrigerant cooling capacity.

Vertical air discharge minimizes operating sounds and eliminates damage to lawn and shrubs.

Fan motor has sleeve bearings and is inherently protected.

Motor totally enclosed for maximum protection from weather, dust and corrosion.

Rain shield on motor provides additional protection from moisture.

Louvered steel top fan guard furnished as standard.

Fan service access accomplished by removal of fan guard.

Hi-Capacity Drier

Factory installed.

Drier traps any moisture or dirt that could contaminate the refrigerant system.

High Pressure Switch

Automatic reset switch shuts off unit if abnormal operating conditions cause discharge pressure to rise above setting.

Check and Expansion Valve Kits

Check and Expansion valve shipped with outdoor unit MUST be field installed on indoor unit. Factory installed check and expansion valves on indoor units MUST be replaced with valve shipped with outdoor unit.

Chatleff style fitting.

Furnished as standard for field installation.

OPTIONS

Refrigerant Line Kits

Refrigerant lines (suction & liquid) are shipped refrigeration clean.

Lines are cleaned, dried, pressurized and sealed at factory.

Suction line fully insulated.

L15 lines are stubbed at both ends.

See Specification table for selection.

COMPRESSOR

Copeland Scroll™ Compressor

Compressor features high efficiency with uniform suction flow, constant discharge flow and high volumetric efficiency and quiet operation.

Compressor consists of two involute spiral scrolls matched together to generate a series of crescent shaped gas pockets between them.

During compression, one scroll remains stationary while the other scroll orbits around it.

Gas is drawn into the outer pocket, the pocket is sealed as the scroll rotates.

As the spiral movement continues, gas pockets are pushed to the center of the scrolls. Volume between the pockets is simultaneously reduced.

When pocket reaches the center, gas is now at high pressure and is forced out of a port located in the center of the fixed scrolls.

During compression, several pockets are compressed simultaneously resulting in a smooth continuous compression cycle.

Continuous flank contact, maintained by centrifugal force, minimizes gas leakage and maximizes efficiency.

Scroll compressor is tolerant to the effects of slugging and contaminants. If this occurs, scrolls separate, allowing liquid or contaminants to to be worked toward the center and discharged.

Low gas pulses during compression reduces operational sound levels.

Compressor motor is internally protected from excessive current and temperature.

Compressor is installed in the unit on resilient rubber mounts for vibration free operation.

OPTIONS

Crankcase Heater

Crankcase heater prevents migration of liquid refrigerant into compressor and ensures proper compressor lubrication.

FEATURES

CONTROLS

Defrost Control

Solid-state time/temperature defrost control is furnished as standard equipment.

Control initiates a defrost cycle every 30, 60 or 90 minutes of compressor “on” time at outdoor temperatures below 2°C (35° F) (factory setting 60 minutes).

Maximum defrost cycle 14 minutes.

Defrost thermostat mounted on liquid line determines when defrost cycle is required and when to terminate cycle.

OPTIONS

Low Ambient Kit

Outdoor units operate satisfactorily in the cooling mode down to 7°C (45°F) outdoor air temperature without any additional controls.

Low Ambient Control Kit can be field installed, allowing proper unit operation in the cooling mode down to -1°C (30°F).

Thermostat

Thermostat not furnished with unit. See Lennox Price Book.

CABINET

Heavy gauge steel cabinet with five station metal wash process. Powder paint finish provides rust and corrosion protection.

Painted base section.

Control box is conveniently located with all controls factory wired.

Corner patch plate allows access to compressor.

Drainage holes are provided in base section for moisture removal.

Refrigerant Line Connections, Electrical Inlets, Service Valves

Sweat connection suction and liquid lines are located on corner of unit cabinet.

Fully serviceable brass service valves prevent corrosion and provide access to refrigerant system. Suction valve can be fully shut off, while liquid valve may be front seated to manage refrigerant charge while servicing system.

45° elbow furnished for ease of suction line connection.

HP40-024 models are stubbed with 9.5 mm (3/8 in.) liquid line connection. 9.5 mm x 7.9 mm (3/8 in. x 5/16 in.) reducer bushing furnished with for liquid line connection.

Refrigerant line connections and field wiring inlets are located in one central area of cabinet for easy access. See dimension drawing.

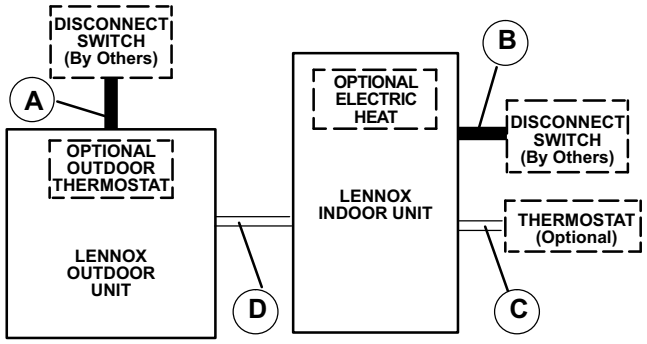
OPTIONS

Unit Stand-Off Kit

Black high density polyethylene feet are available to raise unit off of mounting surface away from damaging moisture.

Four feet are furnished per order number.

FIELD WIRING



A — Single Or Three Phase With Neutral (see Electrical Data)

B — Single Phase (size to heater capacity)

C — Twelve Wire Low Voltage — 18 ga. minimum

— Fourteen Wire Low Voltage with Optional Outdoor Thermostat

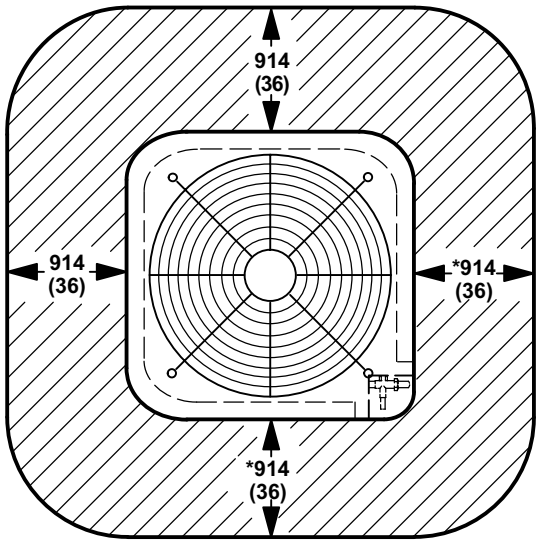
D — Eight Wire Low Voltage — 18 ga. minimum

— Ten Wire Low Voltage with Optional Outdoor Thermostat

— Field Wiring Not Furnished —

All wiring must conform to local electrical codes.

INSTALLATION CLEARANCES - MM (IN.)



NOTE—1219 mm (48 in.) clearance required on top of unit.
***NOTE—One side must be 914 mm (36 in.) for service.**
Two of the remaining three sides may be 305 mm (12 in.).

SPECIFICATIONS

Model Number			HP40-024	HP40-036		HP40-048	HP40-060
Nominal kW (Tonnage)			7 (2)	10.5 (3)		14 (4)	17.5 (5)
Connections - mm (in.) sweat	Liquid line - outside diameter		[1] 9.5 (3/8)	9.5 (3/8)		9.5 (3/8)	9.5 (3/8)
	Vapor line - outside diameter		15.9 (5/8)	19.1 (3/4)		22.2 (7/8)	28.6 (1-1/8)
[2] **Refrigerant charge**			Nitrogen holding charge				
Outdoor Coil	Net face area m^2 ($ft.^2$)	Inner coil	- - -	1.34 (14.4)		1.34 (14.4)	1.88 (20.2)
		Outer coil	1.06 (11.41)	1.40 (15.11)		1.40 (15.11)	1.95 (21.0)
	Tube outside diameter - mm (in.)		7.9 (5/16)	7.9 (5/16)		7.9 (5/16)	7.9 (5/16)
	Number of rows		1	2		2	2
	Fins per m (inch)		867 (22)	710 (18)		710 (18)	710 (18)
Outdoor Coil Fan	Diameter - mm (in.)		457 (18)	457 (18)		457 (18)	559 (22)
	Number of blades		3	4		4	4
	Motor output - W (hp)		125 (1/6)	125 (1/6)		250 (1/3)	250 (1/3)
	Air volume - L/s (cfm)		945 (2000)	985 (2085)		1190 (2520)	1705 (3610)
	Rev/Min		920	920		940	900
	Motor input - W		140	155		255	320
Shipping weight - kg (lbs.) 1 package			69 (152)	87 (192)		86 (190)	117 (257)
ELECTRICAL DATA							
Line voltage and phase (50hz)			220/240V 1 phase	220/240V 1 phase	380/420V 3 phase	[3] 380/420V 3 phase	[3] 380/420V 3 phase
Voltage range (minimum - maximum)			198 - 264V	198 - 264V	342 - 462V	342 - 462V	342 - 462V
Compressor	Rated load amps		10.3	15.4	6.41	9.0	9.0
	Locked rotor amps		60	97	46	64	74
Outdoor Coil Fan Motor (1 phase)	Full load amps		1.0	1.0	0.6	0.8	0.8
	Locked rotor amps		1.9	1.9	1.0	2.1	2.1
OPTIONAL ACCESSORIES - MUST BE ORDERED EXTRA							
Low Ambient Kit			**27J00**	**27J00**		**27J00**	**27J00**
Unit Stand-Off Kit			**94J45**	**94J45**		**94J45**	**94J45**
Crankcase Heater			**90P12**	**90P12**		**90P12**	**90P12**
Refrigerant Line Set	4.6 m (15 ft.) length		L15-21-15	L15-41-15		L15-65-15	Field Fabricate
	6 m (20 ft.) length		L15-21-20	L15-41-20		- - -	
	8 m (25 ft.) length		L15-21-25	- - -		- - -	
	9 m (30 ft.) length		- - -	L15-41-30		L15-65-30	
	10.6 m (35 ft.) length		L15-21-35	- - -		- - -	
	12 m (40 ft.) length		- - -	L15-41-40		L15-65-40	
	15 m (50 ft.) length		L15-21-50	L15-41-50		L15-65-50	

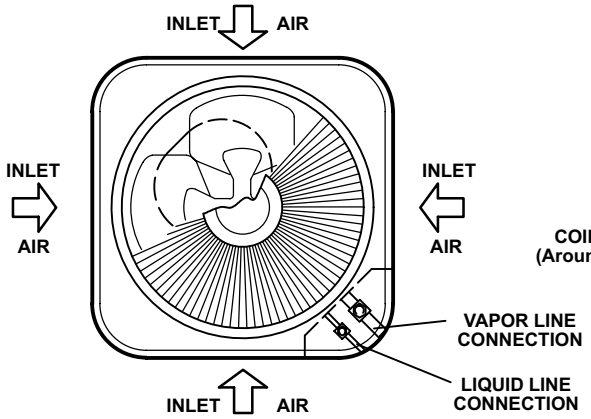
NOTE — Refer to local electrical codes to determine wire, fuse and disconnect size requirements.
[1] R-407C refrigerant MUST be field supplied, see name plate for required amount
[2] Furnished with 9.5 mm x 8 mm (3/8 inch x 5/16 inch) reducer adaptor for refrigerant line connections.
[3] Neutral required with optional Transformer Kit **(16F34)**.

RATINGS

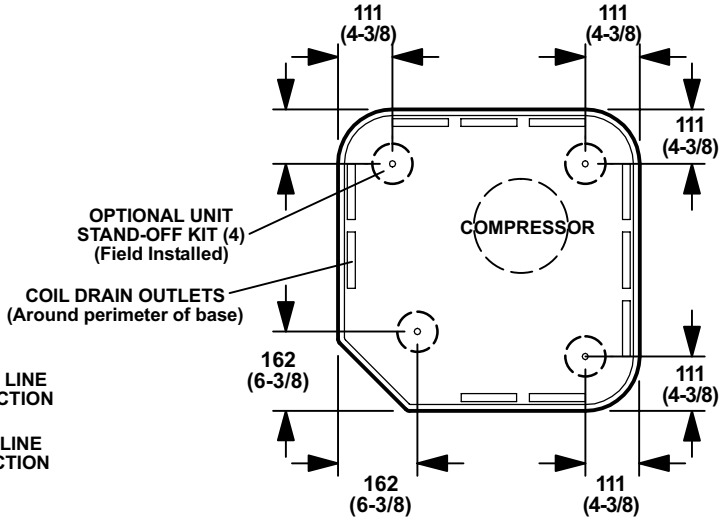
Outdoor Unit Model Number ([2] Sound Rating Number db)	[1] Net Cooling and Heating Ratings													Air Handler	Check and Expansion Kit Required
	Cooling					High Temperature Heating				Low Temperature Heating					
	Capacity		Total Power Input kW	Coefficient of Performance (Output/Input)	Energy Efficiency Ratio (Btuh/Watts)	Capacity		Total Power Input kW	Coefficient of Performance (Output/Input)	Capacity		Total Power Input kW	Coefficient of Performance (Output/Input)		
	kW	Btuh				kW	Btuh			kW	Btuh				
HP40-024 (76)	6.2	21 200	2.91	2.58	8.80	6.4	21 800	2.12	3.01	4.1	14 000	1.94	2.11	CB29M-21/26	Check and expansion valve shipped with outdoor unit **MUST** be field installed on indoor unit. Factory installed check and expansion valves on indoor units **MUST** be replaced with valve shipped with outdoor unit.
HP40-036 (76)	9.8	33 600	3.65	2.70	9.21	10.8	36 800	3.83	2.01	7.0	24 000	3.45	2.04	CB29M-31/41	
HP40-048 (84)	13.5	46 000	5.04	2.67	9.13	12.3	42 000	4.27	2.88	7.9	27 000	3.85	2.05	CB29M-51	
HP40-060 (84)	16.3	55 500	6.73	2.41	8.25	16.1	55 000	5.99	2.69	10.4	35 500	5.32	1.95	CB29M-65	

[1] The rating test conditions are those included in Air-Conditioning and Refrigeration Institute (ARI) Standard 210/240-89 while operating at rated voltage and air volumes;
Cooling Ratings — 35°C (95°F) outdoor air temperature, 26.7°C (80°F) dry bulb and 19.4°C (67°F) wet bulb entering indoor coil air.
High Temperature Heating Ratings — 8.3°C (47°F) dry bulb, 6.1°C (43°F) wet bulb outdoor air temperature and 21.1°C (70°F) entering indoor coil air.
Low Temperature Heating Ratings — minus 8.3°C (17°F) dry bulb, minus 9.4°C (15°F) wet bulb outdoor air temperature and 21.1°C (70°F) entering indoor coil air.
[2] Sound rating number rated at test conditions for Air-Conditioning and Refrigeration Institute (ARI) Standard 270.

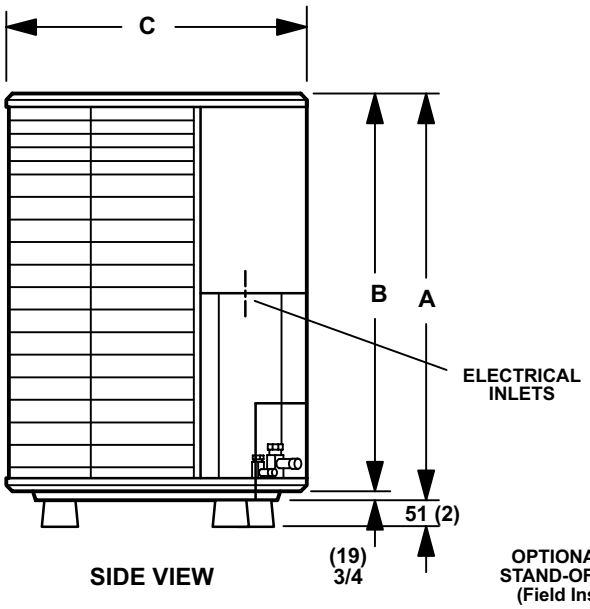
DIMENSIONS – MM (INCHES)



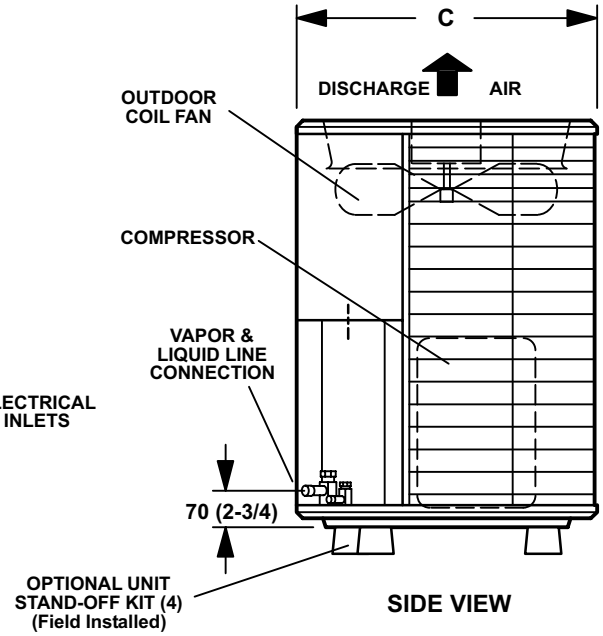
TOP VIEW



TOP VIEW BASE SECTION



SIDE VIEW



SIDE VIEW

Model Number		A	B	C
HP40-024	mm	641	616	616
	in.	25-1/4	24-1/4	24-1/4
HP40-036 HP40-048	mm	845	819	616
	in.	33-1/4	32-1/4	24-1/4
HP40-060	mm	946	927	718
	in.	37-1/4	36-1/2	28-1/4

COOLING AND HEATING RATINGS – 50HZ

NOTE — For Temperatures and Capacities not shown in tables, see bulletin — Cooling Unit Rating Table Correction Factor Data in Miscellaneous Engineering Data Section. All values are gross capacities and do not include evaporator blower motor heat deduction.

HP40-024 — CB29M-21/26 COOLING CAPACITY

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Air Temperature Entering Outdoor Coil																									
			29°C (85°F)						35°C (95°F)						41°C (105°F)						46°C (115°F)							
			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb		
	m^3/s	cfm	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F
17°C (63°F)	.30	650	6.2	21.2	1.71	.74	.88	.99	5.9	20.1	1.95	.76	.91	1.00	5.6	19.0	2.23	.78	.93	1.00	5.2	17.8	2.56	.80	.96	1.00
	.38	800	6.4	21.9	1.72	.79	.95	1.00	6.1	20.9	1.96	.81	.96	1.00	5.8	19.8	2.23	.84	.98	1.00	5.5	18.6	2.57	.86	1.00	1.00
	.45	950	6.6	22.6	1.73	.84	.99	1.00	6.3	21.6	1.96	.86	1.00	1.00	6.0	20.5	2.24	.89	1.00	1.00	5.7	19.3	2.58	.91	1.00	1.00
19°C (67°F)	.30	650	6.6	22.6	1.72	.58	.71	.85	6.3	21.4	1.96	.58	.73	.87	5.9	20.2	2.24	.60	.75	.90	5.5	18.9	2.58	.61	.78	.93
	.38	800	6.8	23.2	1.73	.60	.77	.91	6.4	22.0	1.97	.62	.79	.93	6.1	20.7	2.25	.63	.81	.96	5.7	19.4	2.58	.65	.84	.98
	.45	950	6.9	23.6	1.74	.64	.82	.97	6.6	22.4	1.97	.65	.84	.98	6.2	21.2	2.25	.67	.86	1.00	5.8	19.8	2.59	.69	.89	1.00
22°C (71°F)	.30	650	7.1	24.1	1.74	.43	.56	.69	6.7	22.9	1.98	.43	.57	.71	6.3	21.6	2.26	.44	.58	.73	5.9	20.2	2.60	.44	.60	.75
	.38	800	7.2	24.7	1.74	.44	.59	.74	6.9	23.5	1.98	.44	.60	.76	6.5	22.1	2.27	.45	.62	.79	6.1	20.7	2.60	.45	.64	.82
	.45	950	7.4	25.2	1.75	.45	.62	.79	7.0	23.9	1.99	.46	.64	.82	6.6	22.5	2.27	.47	.66	.85	6.2	21.0	2.61	.47	.68	.88

HP40-024 - CB29M-21/26 - HEATING CAPACITY

Indoor Coil Air Volume 21°C db (70°F db)		Air Temperature Entering Outdoor Coil															
		18°C (65°F)			7°C (45°F)			minus 4°C (25°F)			minus 15°C (5°F)			minus 28°C (minus 15°F)		
		Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input
m^3/s	cfm	kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh	
.30	650	7.6	26.0	1.92	6.0	20.6	1.78	4.4	15.0	1.64	3.0	10.4	1.47	1.5	5.1	1.10
.38	800	7.7	26.4	1.81	6.2	21.0	1.68	4.5	15.4	1.53	3.2	10.8	1.37	1.6	5.5	1.00
.45	950	7.9	26.8	1.74	6.3	21.4	1.61	4.6	15.8	1.46	3.3	11.2	1.30	1.7	5.9	.93

HP40-036 — CB29M-31/41 COOLING CAPACITY

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Air Temperature Entering Outdoor Coil																									
			29°C (85°F)						35°C (95°F)						41°C (105°F)						46°C (115°F)							
			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb		
	m^3/s	cfm	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F
17°C (63°F)	.47	1000	9.8	33.6	2.64	.72	.86	.98	9.4	32.1	3.00	.73	.88	.99	8.9	30.4	3.44	.75	.90	1.00	8.4	28.6	3.96	.78	.93	1.00
	.56	1200	10.2	34.7	2.65	.76	.91	1.00	9.7	33.1	3.02	.78	.93	1.00	9.2	31.4	3.45	.80	.96	1.00	8.7	29.6	3.97	.83	.98	1.00
	.66	1400	10.4	35.6	2.66	.80	.96	1.00	10.0	34.0	3.03	.82	.98	1.00	9.5	32.3	3.46	.85	.99	1.00	8.9	30.5	3.99	.87	1.00	1.00
19°C (67°F)	.47	1000	10.5	35.9	2.66	.56	.69	.83	10.0	34.2	3.03	.57	.71	.84	9.5	32.3	3.47	.58	.73	.87	8.9	30.3	3.99	.59	.75	.90
	.56	1200	10.8	36.7	2.67	.58	.74	.88	10.3	35.0	3.04	.60	.75	.90	9.7	33.1	3.48	.61	.78	.93	9.1	31.0	4.00	.62	.80	.96
	.66	1400	11.0	37.4	2.68	.61	.78	.93	10.4	35.6	3.05	.62	.80	.95	9.9	33.7	3.49	.64	.82	.98	9.3	31.6	4.01	.65	.85	.99
22°C (71°F)	.47	1000	11.2	38.3	2.69	.42	.54	.67	10.7	36.5	3.06	.42	.55	.68	10.1	34.6	3.50	.43	.56	.70	9.5	32.5	4.02	.43	.58	.72
	.56	1200	11.5	39.2	2.70	.43	.57	.71	10.9	37.3	3.07	.43	.58	.73	10.3	35.3	3.52	.44	.60	.75	9.7	33.1	4.04	.44	.61	.78
	.66	1400	11.7	39.9	2.71	.44	.60	.75	11.1	37.9	3.08	.44	.61	.77	10.5	35.8	3.52	.45	.63	.80	9.8	33.6	4.06	.46	.64	.83

HP40-036 - CB29M-31/41 - HEATING CAPACITY

Indoor Coil Air Volume 21°C db (70°F db)		Air Temperature Entering Outdoor Coil															
		18°C (65°F)			7°C (45°F)			minus 4°C (25°F)			minus 15°C (5°F)			minus 28°C (minus 15°F)		
		Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input
m^3/s	cfm	kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh	
.47	1000	12.9	44.1	3.68	10.3	35.1	3.40	7.6	25.8	3.11	5.3	18.2	2.77	2.7	9.1	2.08
.56	1200	13.0	44.5	3.49	10.4	35.5	3.21	7.7	26.2	2.92	5.5	18.6	2.58	2.8	9.5	1.89
.66	1400	13.2	44.9	3.38	10.5	35.9	3.10	7.8	26.6	2.80	5.6	19.0	2.47	2.9	9.9	1.77

COOLING AND HEATING RATINGS – 50HZ

NOTE — For Temperatures and Capacities not shown in tables, see bulletin — Cooling Unit Rating Table Correction Factor Data in Miscellaneous Engineering Data Section. All values are gross capacities and do not include evaporator blower motor heat deduction.

HP40-048 — CB29M-51 COOLING CAPACITY

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Air Temperature Entering Outdoor Coil																							
			29°C (85°F)						35°C (95°F)						41°C (105°F)						46°C (115°F)					
			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb		
	m^3/s	cfm	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F
17°C (63°F)	.66	1400	13.6	46.5	3.55	.72	.87	.99	13.0	44.2	4.05	.74	.90	1.00	12.3	41.8	4.62	.76	.92	1.00	11.5	39.3	5.28	.78	.95	1.00
	.75	1600	13.9	47.5	3.57	.75	.91	1.00	13.3	45.3	4.07	.77	.94	1.00	12.5	42.8	4.64	.80	.96	1.00	11.8	40.3	5.31	.83	.99	1.00
	.85	1800	14.2	48.4	3.59	.79	.95	1.00	13.5	46.2	4.08	.81	.97	1.00	12.8	43.8	4.66	.83	.99	1.00	12.1	41.3	5.34	.87	1.00	1.00
19°C (67°F)	.66	1400	14.5	49.4	3.60	.56	.70	.84	13.8	47.0	4.09	.57	.71	.86	13.0	44.4	4.68	.58	.73	.88	12.2	41.6	5.35	.60	.76	.92
	.75	1600	14.7	50.3	3.61	.58	.73	.88	14.0	47.8	4.12	.59	.75	.91	13.2	45.1	4.69	.60	.77	.93	12.4	42.3	5.36	.62	.80	.96
	.85	1800	14.9	51.0	3.62	.60	.76	.92	14.2	48.5	4.13	.61	.78	.95	13.4	45.8	4.71	.62	.81	.97	12.5	42.8	5.39	.64	.84	.99
22°C (71°F)	.66	1400	15.5	52.8	3.66	.42	.54	.67	14.7	50.2	4.16	.42	.56	.69	13.9	47.4	4.75	.43	.57	.71	13.0	44.4	5.42	.43	.58	.73
	.75	1600	15.7	53.6	3.67	.43	.57	.71	14.9	50.9	4.18	.43	.58	.72	14.1	48.1	4.76	.43	.59	.75	13.2	45.1	5.43	.44	.61	.78
	.85	1800	15.9	54.4	3.68	.43	.59	.74	15.1	51.6	4.19	.44	.60	.76	14.3	48.7	4.77	.44	.61	.79	13.3	45.5	5.46	.45	.63	.82

HP40-048 - CB29M-51 - HEATING CAPACITY

Indoor Coil Air Volume 21°C db (70°F db)		Air Temperature Entering Outdoor Coil											
		18°C (65°F)			7°C (45°F)			minus 4°C (25°F)			minus 15°C (5°F)			minus 28°C (minus 15°F)		
		Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input
m^3/s	cfm	kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh	
.66	1400	15.1	51.6	4.04	12.0	40.8	3.64	8.7	29.6	3.23	6.0	20.6	2.81	3.0	10.3	2.10
.75	1600	15.3	52.1	3.90	12.1	41.3	3.50	8.8	30.1	3.08	6.2	21.1	2.66	3.2	10.8	1.96
.85	1800	4.0	13.6	3.79	.8	2.8	3.39	-2.5	-8.4	2.97	-5.1	-17.4	2.55	-8.1	-27.7	1.85

HP40-060 — CB29M-65 COOLING CAPACITY

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Air Temperature Entering Outdoor Coil																							
			29°C (85°F)						35°C (95°F)						41°C (105°F)						46°C (115°F)					
			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb		
	m^3/s	cfm	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F
17°C (63°F)	.80	1700	16.9	57.5	4.37	.68	.84	.97	16.1	55.0	4.94	.69	.86	.99	15.4	52.4	5.58	.71	.88	1.00	14.6	49.8	6.31	.73	.91	1.00
	.89	1900	17.1	58.5	4.39	.71	.88	1.00	16.4	56.0	4.96	.72	.90	1.00	15.6	53.4	5.60	.74	.92	1.00	14.9	50.8	6.34	.77	.95	1.00
	.99	2100	17.4	59.5	4.41	.73	.91	1.00	16.7	56.9	4.98	.75	.93	1.00	15.9	54.2	5.63	.78	.96	1.00	15.2	51.7	6.35	.80	.98	1.00
19°C (67°F)	.80	1700	17.9	61.2	4.44	.53	.66	.80	17.1	58.4	5.01	.54	.67	.82	16.3	55.6	5.65	.55	.69	.85	15.5	52.9	6.38	.56	.71	.87
	.89	1900	18.2	62.1	4.45	.55	.68	.84	17.4	59.3	5.03	.55	.70	.86	16.5	56.4	5.67	.56	.72	.89	15.7	53.6	6.40	.58	.74	.92
	.99	2100	18.4	62.8	4.47	.56	.71	.87	17.6	60.0	5.04	.57	.73	.90	16.7	57.1	5.69	.58	.75	.93	15.9	54.2	6.43	.59	.77	.95
22°C (71°F)	.80	1700	19.1	65.2	4.52	.40	.52	.63	18.3	62.3	5.09	.40	.53	.65	17.4	59.4	5.75	.40	.53	.66	16.5	56.4	6.49	.41	.54	.68
	.89	1900	19.4	66.2	4.53	.40	.53	.66	18.5	63.2	5.11	.41	.54	.67	17.6	60.1	5.77	.41	.55	.69	16.8	57.2	6.50	.41	.56	.71
	.99	2100	19.6	66.9	4.55	.41	.55	.68	18.7	63.9	5.13	.41	.56	.70	17.8	60.8	5.78	.42	.57	.72	16.9	57.7	6.52	.42	.58	.75

HP40-060 - CB29M-65 - HEATING CAPACITY

Indoor Coil Air Volume 21°C db (70°F db)		Air Temperature Entering Outdoor Coil											
		18°C (65°F)			7°C (45°F)			minus 4°C (25°F)			minus 15°C (5°F)			minus 28°C (minus 15°F)		
		Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input
m^3/s	cfm	kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh	
.80	1700	18.8	64.2	5.05	14.9	51.0	4.53	11.0	37.4	4.01	7.7	26.2	3.48	3.8	12.9	2.60
.89	1900	19.1	65.1	4.90	15.2	51.9	4.39	11.2	38.3	3.86	7.9	27.1	3.33	4.0	13.8	2.45
.99	2100	19.3	66.0	4.79	15.5	52.8	4.27	11.5	39.2	3.75	8.2	28.0	3.22	4.3	14.7	2.34