

PREMIER®

Geothermal/Water Source Heat Pumps
• 3/4 thru 6 Ton

Design Features

Factory Options

Accessories

Dimensional Data

Physical Data

Performance Data

Engineering Guide Specifications



PREMIER®



WaterFurnace Premier Series products changed the standards for efficiency throughout the industry when the company introduced the product line over a decade ago. Since then, many manufacturers have attempted to duplicate the performance, quality, reliability and quiet operation of our Premier products. With continuous improvements, updates and upgrades through the years, the Premier family of products has maintained a leadership position in the industry and has earned a reputation for quality, efficiency and innovation.

Premier Series units are available in 10 sizes (3/4 through 6 tons) and in vertical and horizontal cabinet configurations. Cabinets are constructed with heavy-gauge metal and are coated with durable poly paint for long lasting beauty and protection. Units sized 1 1/2 ton and larger feature Copeland Scroll compressors for the ultimate in performance and reliability. Coated air coils add durability and longer life. A sophisticated microprocessor control sequences all components during operation for optimum performance, and provides easy-to-use troubleshooting features with fault lights and on-board diagnostics. For added flexibility, units are available with either PSC or variable speed ECM blower motors (except 3/4 & 1 ton — PSC only).

Premier products are performance-certified to ARI ISO 13256-1 standards, are ETL listed, and are ENERGYSTAR® qualified.

As a leader in the industry, WaterFurnace is dedicated to innovation, quality and customer satisfaction. In fact, every unit built is exposed to a wide range of quality control procedures throughout the assembly process and is then subjected to a rigorous battery of computerized run tests to certify that it meets or exceeds performance standards for efficiency and safety, and will perform flawlessly at startup. As further affirmation of our quality standards, each unit carries our exclusive Quality Assurance emblem, signed by the final test technician.

WaterFurnace International's corporate headquarters and manufacturing facility is located in Fort Wayne, IN. A scenic three-acre pond located in front of the building serves as our geothermal heating and cooling source to comfort-condition our 110,000 square feet of manufacturing and office space. As a pioneer, and now a leader in the industry, the team of WaterFurnace engineers, customer support staff and skilled assembly technicians is dedicated to providing the finest comfort systems available.

By choosing or specifying WaterFurnace Premier products, you can be assured that your customer is investing in the ultimate comfort system and peace of mind for many years to come.

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ARI Data

Water Loop Performance Ratings (WLHP)

UNIT SIZE	CFM	GPM	COOLING 86° F EWT		HEATING 68° F EWT	
			BTU/HR	EER	BTU/HR	COP
P 010	350	2.5	9,600	14.5	12,200	5.2
P 013	400	3.5	12,400	14.3	14,600	4.8
P 019	600	5.0	19,000	15.0	22,000	5.0
P 022	700	6.0	22,000	16.7	24,600	5.0
P 028	900	7.0	27,500	15.7	33,200	5.1
P 034	1100	9.0	32,900	15.3	40,000	4.9
P 040	1300	11.0	39,700	16.7	46,000	4.9
P 046	1500	12.0	44,800	15.0	54,400	4.9
P 056	1800	14.0	55,700	14.9	65,800	4.7
P 066	2200	16.0	65,200	13.2	80,000	4.4



Notes: Rated in accordance with ARI/ISO Standard 13256-1, WLHP.
Cooling capacities based on 80.6°F DB, 66.2°F WB.
Heating capacities based on 68°F DB.

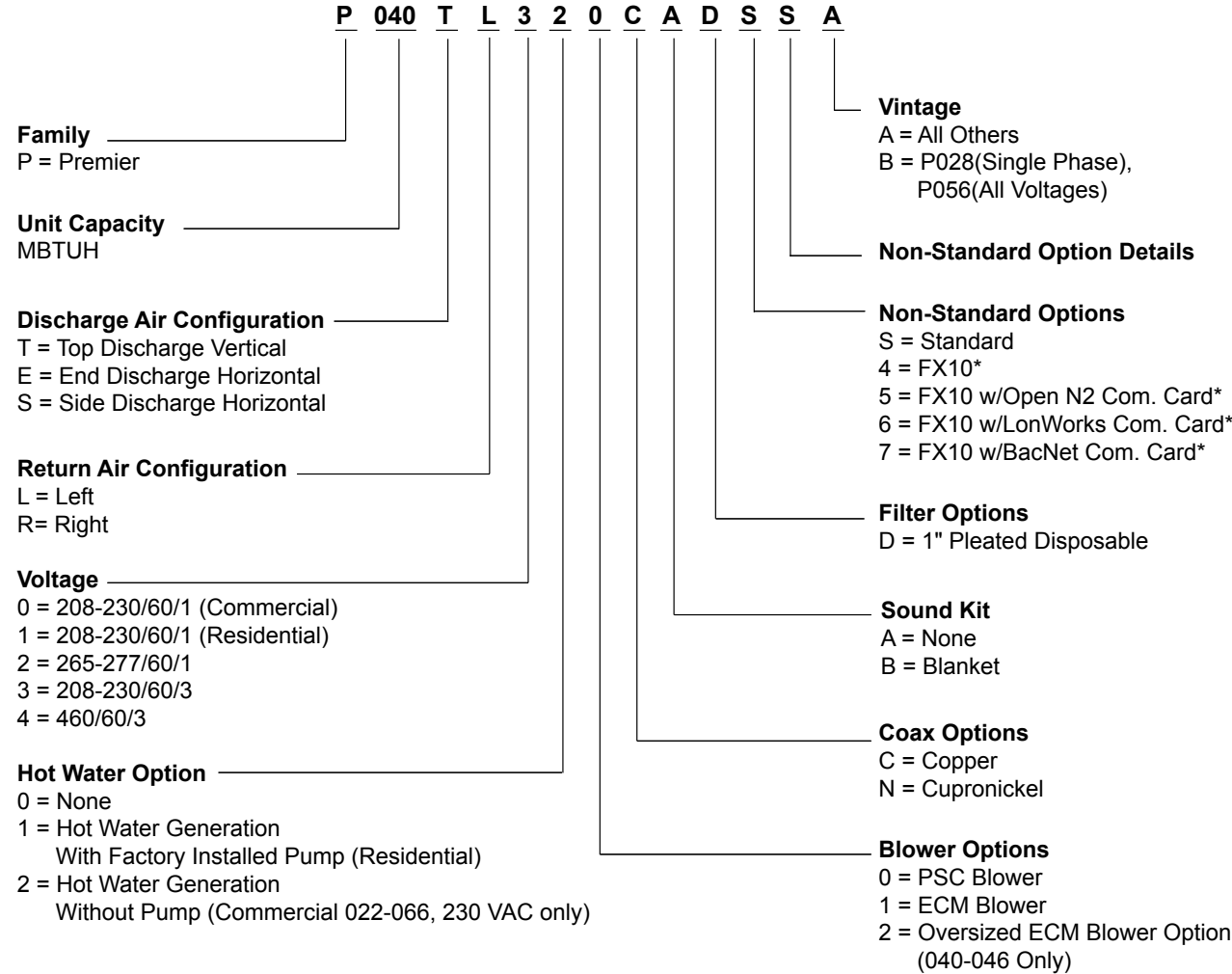
Ground Loop Performance Ratings (GLHP)

UNIT SIZE	CFM	GPM	COOLING 77° F EWT		HEATING 32° F EWT	
			BTU/HR	EER	BTU/HR	COP
P 010	350	2.5	10,000	17.4	7,600	3.7
P 013	400	3.5	13,100	16.6	9,500	3.5
P 019	600	5.0	19,700	16.9	13,800	3.7
P 022	700	6.0	22,700	18.9	15,400	3.8
P 028	900	7.0	28,600	16.9	20,800	3.8
P 034	1100	9.0	34,000	16.9	25,000	3.7
P 040	1300	11.0	41,000	18.0	28,800	3.7
P 046	1500	12.0	46,200	16.4	34,000	3.6
P 056	1800	14.0	57,500	16.1	43,800	3.5
P 066	2200	16.0	66,200	14.7	50,000	3.3



Notes: Rated in accordance with ARI/ISO Standard 13256-1, GLHP.
Cooling capacities based on 80.6°F DB, 66.2°F WB entering air temperature.
Heating capacities based on 68°F DB entering air temperature.

Model Nomenclature



Note: * FX10 available only on units with PSC blowers without desuperheaters.

Design Features

Application Flexibility

- Safe, efficient operation in a wide range of liquid temperatures (25° F to 110° F) and flow rates (as low as 1.5 GPM/ton in open loop applications when EWT >50°F).
- Top air discharge for upflow installations in vertical units, side or end discharge for horizontal units.
- True left or right return air locations - vertical units include filter rack/duct collar.
- Variable-speed ECM2 blowers permit various duct applications (optional PSC fan available).
- Narrow cabinet for easy movement through doorways.
- Internally trapped condensate piping for neat, compact installation (vertical units only).
- Optional field-installed auxiliary electric heater.
- Corner-located electrical box for field wiring from two sides.
- Fuse-protected loop pump power block for easy wiring.
- Loop pump slaving feature allows multiple units to share one flow center.
- Relay to control field-mounted accessories.
- Field-selectable freeze protection setting for well or closed loop systems.

Operating Efficiencies

- ARI/ISO 13256-1 rating for heating COPs, cooling EERs and low water flow requirements.
- Optional desuperheater with internal pump generates hot water at considerable savings while improving overall system efficiency.
- High-stability expansion valve delivers optimum refrigerant flow over a wide range of conditions and provides bidirectional operation without troublesome check valves.
- Efficient reciprocating and scroll compressors operate quietly.
- Oversized coaxial tube water-to-refrigerant heat exchanger operates at low liquid pressure drops.
- Convoluted cupronickel water tube functions efficiently at low flow rates.
- Oversized rifed copper tube/lanced aluminum fin air-to-refrigerant heat exchanger provides high efficiencies at low-face velocity.
- Large, low-RPM blowers with variable-speed motors provide quiet and efficient air movement with high static capability.

Service Advantages

- Removable panels (three for the compressor compartment and one or two for the air handling compartment) provide quick access to all internal components with ductwork in place.
- Easily accessible thermal expansion valve.
- Brass, swivel-type water connections for quick connection union, and elimination of wrenches and sealants during installations (residential units).
- Insulated divider and separate air handling/compressor access panels permit service testing without air bypass.
- Designed for front access in tight applications.
- LED fault and status lights with memory for easy diagnostics.
- Detachable thermostat connection strip for wiring convenience.
- Hot water pump shut-off switch for easy startup and service.
- Control box and fan motors have quick-attach wiring plugs for easy removal.
- Internal drop-out blower with permanently-lubricated ball bearing motor.
- High- and low-pressure service ports in refrigerant circuit.
- Fan and transformer powered from auxiliary heat supply (when installed) to provide emergency heat with open compressor circuit breaker.

Design Features (cont.)

Factory Quality

- All units are computer run-tested, with conditioned source water, in all modes to insure efficiency and reliability.
- Heavy-gauge steel cabinets are painted with durable powder coat paint for long lasting beauty and service.
- All refrigerant brazing is performed in a nitrogen atmosphere.
- All units are deep evacuated to less than 150 microns prior to refrigerant charging.
- All joints are helium leak-tested to insure an annual leak rate of less than 1/4 ounce.
- Coaxial heat exchanger, refrigerant suction lines, desuperheater coil, and all water pipes are fully insulated to reduce condensation problems in low temperature operation.
- Electro-coated air coils for extended life.
- Noise reduction features include isolation mounted compressors and soft starting blower motors; insulated compressor compartment; interior cabinet insulation using 1/2-inch coated glass fiber. Compressor blanket for quiet operation available as an option.
- Safety features include high- and low-pressure refrigerant controls to protect the compressor; condensate overflow protection; freeze protection sensor to safeguard the coaxial heat exchanger; fan start detection; hot water high-limit desuperheater pump shutdown; fault lockout enables emergency heat and prevents compressor operation until thermostat or circuit breaker is reset.

Standard Microprocessor

- Digital auto-changeover thermostat with 3-stage heating/2-stage cooling holds precise temperature and provides varying fan speed control.
- Component sequencing delays for quiet startup, shutdown, and timed staging of auxiliary electric heat.
- ECM2 fan speed control provides higher supply air temperature in heating, better dehumidification in cooling, and quiet operation at reduced airflows in all modes.
- Hot water limit prevents scalding, and pump shuts down automatically when full unit capacity is needed for heating.

Optional FX10 Controller

- Provides control for entire unit.
- Input ports for Open N2, LonTalk, BacNet communications protocols.
- Input port for user interface.
- Operational sequencing, short cycle protection, random start, emergency shutdown, high- and low-pressure switch monitoring, general lockout, freeze protection, fault retry, and condensate overflow.
- 3 installation options -- stand alone controlled by room thermostat, stand alone with zone temperature sensor, or integrated into BAS with command module.
- FX10 options include: communication modules, user interface, room command module.
- Available for units with PSC blowers, without desuperheaters only.

Note: For more information, refer to Submittal Data SD1981 or Application Guide AFGX10.

Options & Accessories

- Optional desuperheater with internally mounted pump and water heater plumbing connector.
- Electronic auto-changeover thermostat with 3-stage heating/2-stage cooling and indicator LEDs.
- 97% efficient, 24 Volt, 1-inch electronic air cleaner.
- 90% efficient, cleanable electrostatic filters.
- Closed loop flow center.
- Auxiliary electric heater.
- Hose kits.
- Filter rack/duct collar for horizontal units.
- Additional accessory relay.
- Sound blanket for compressor.

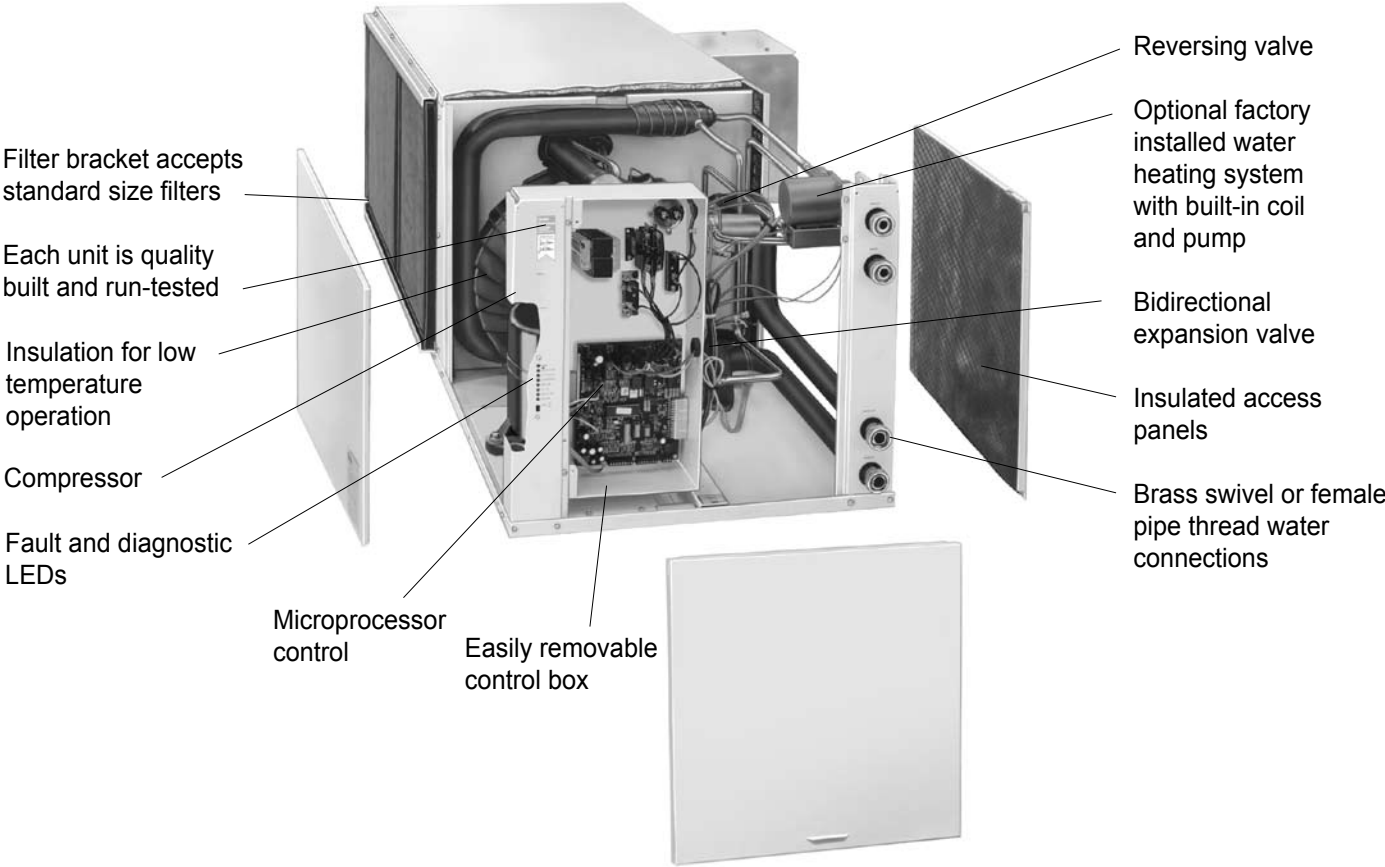
Vertical Features

Top Air Discharge

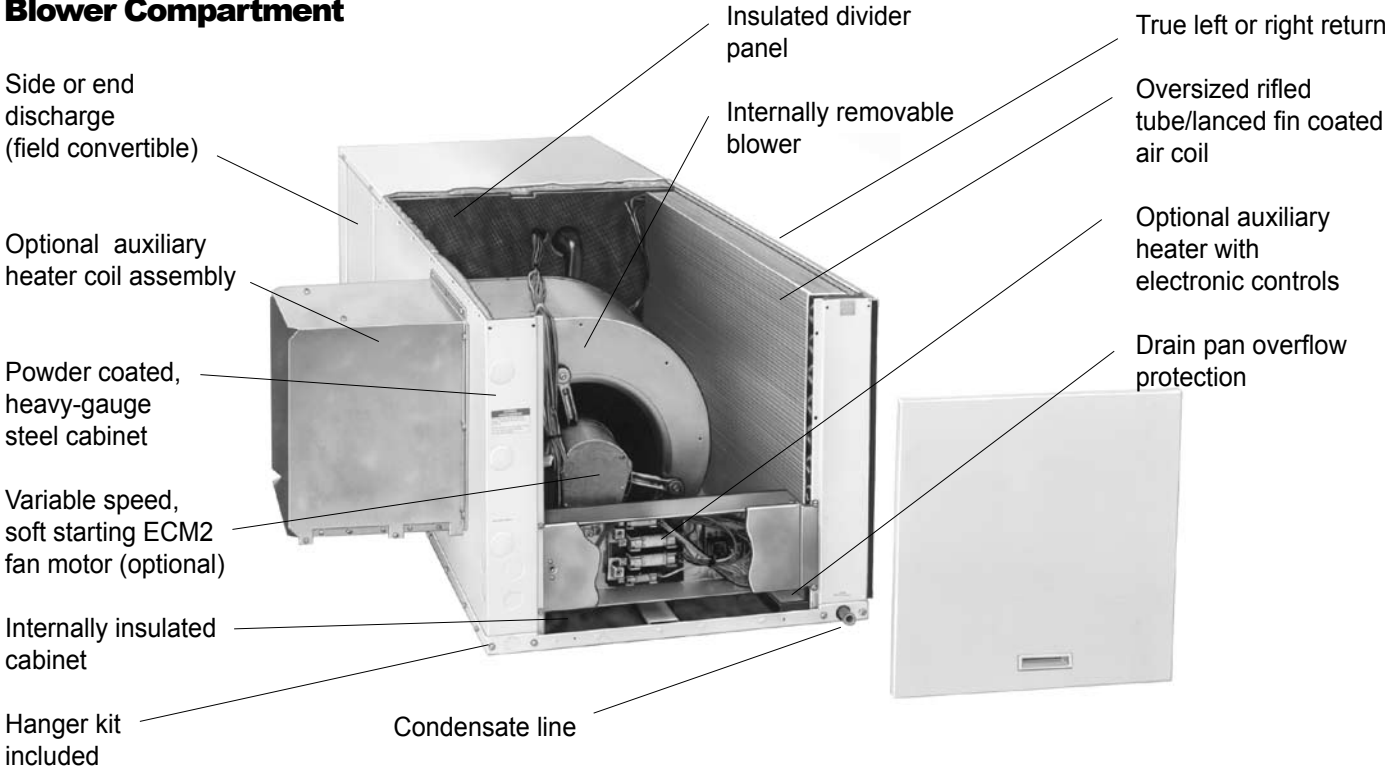


Horizontal Features

Compressor Compartment

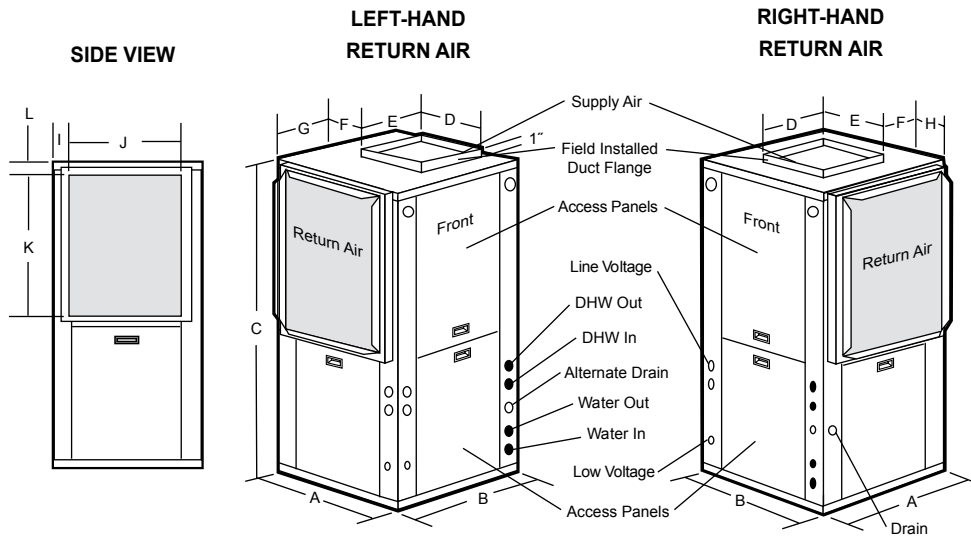


Blower Compartment



Vertical Dimensional Data

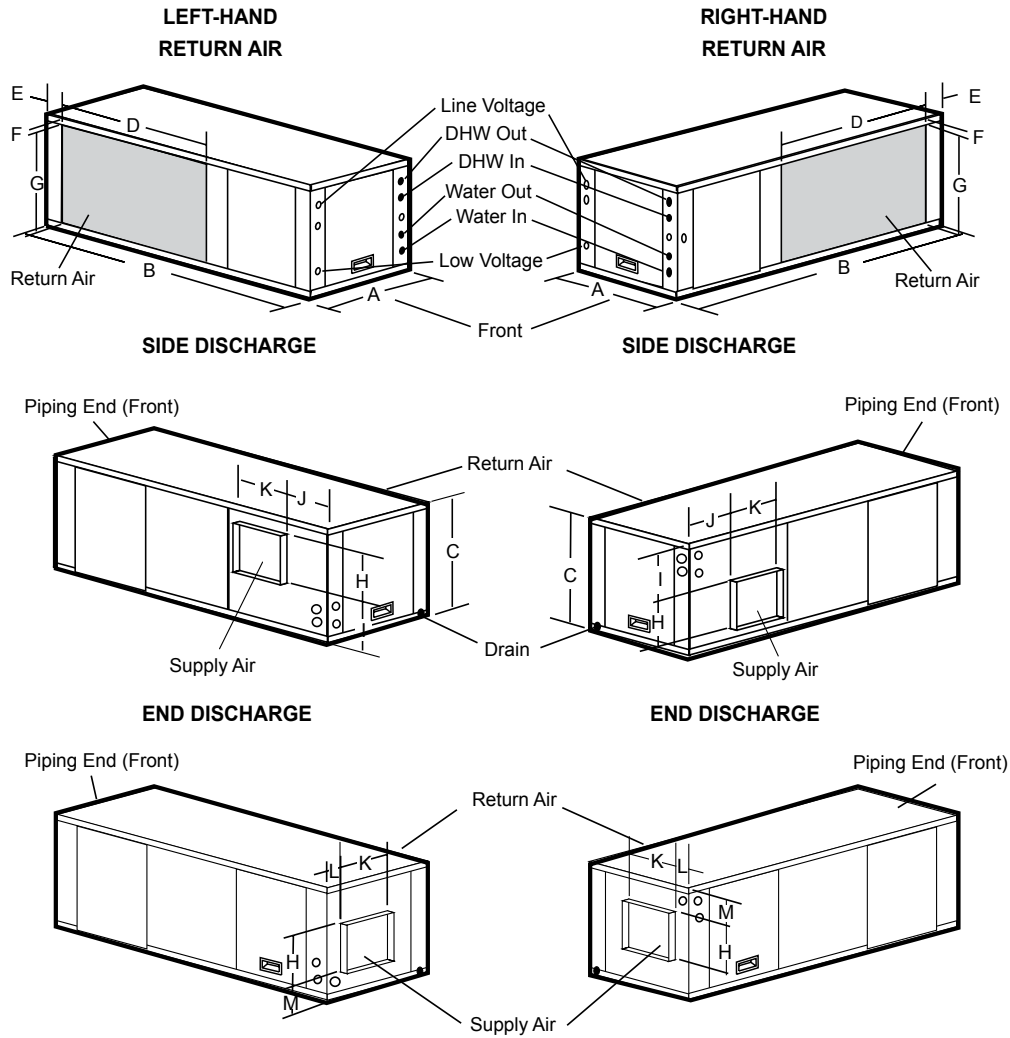
Top Air Discharge



MODEL	WATER CONNECTION*	AUX HEAT KNOCKOUTS	A	B	C	D	E	F	G	H	I	J	K	L
P010-013	0.5 FPT	1-1/8"	22.2	22.5	34.4	10.0	10.0	6.1	11.5	8.8	2.1	18.0	13.9	1.0
P019-034	0.75 FPT	1-3/8"	26.2	22.5	49.0	14.0	14.0	6.1	7.5	4.4	2.4	22.0	25.9	1.7
P040-066	1.0 FPT	1-3/8"	31.2	25.5	58.4	18.0	18.0	6.6	6.5	3.8	1.6	28.0	33.9	1.7

Notes: All dimensions are in inches.
 All low voltage knockouts are 7/8-inch.
 Unit line voltage knockouts are 1 1/8-inch.
 Filter bracket extends beyond side of cabinet 1 1/8-inch and are removable.
 Electric heater power knockouts 1 1/8-inch and 1 3/8-inch.
 *Residential "1" voltage code water connections 1-inch swivel.

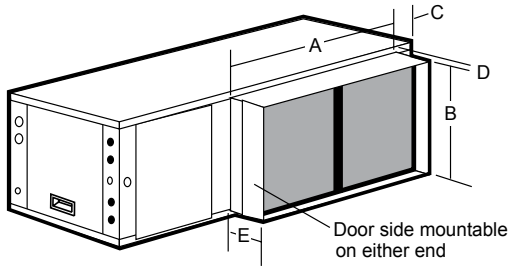
Horizontal Dimensional Data



MODEL	WATER CONNECTION*	A	B	C	D	E	F	G	H	I	J	K	L	M
P010, 013	0.50 FPT	22.50	44.00	17.25	17.00	2.56	1.00	15.25	7.24	7.35	7.94	9.56	5.84	4.08
P019	0.75 FPT	22.50	53.00	19.14	22.00	2.56	1.00	17.14	10.49	6.97	8.25	9.30	5.75	2.17
P022, 028	0.75 FPT	22.50	63.00	19.14	28.00	6.56	1.00	17.14	10.49	6.97	8.25	9.30	5.75	2.17
P034	0.75 FPT	22.50	63.00	19.14	31.00	3.56	1.00	17.14	10.49	6.97	8.25	9.30	5.75	2.17
P040, 046	1.00 FPT	25.50	72.00	21.25	36.00	2.56	1.00	19.25	13.74	5.66	7.77	13.24	5.02	1.85
P056	1.00 FPT	25.50	77.00	21.25	41.00	2.56	1.00	19.25	13.74	5.66	7.77	13.24	5.02	1.85
P060	1.00 FPT	25.50	82.00	21.25	46.00	2.56	1.00	19.25	13.74	5.66	7.77	13.24	5.02	1.85

Notes: All dimensions are in inches.
 All low voltage knockouts are 7/8-inch.
 Unit line voltage knockouts are 1 1/8-inch.
 Filter bracket extends beyond side of cabinet 1 1/8-inch and are removable.
 Electric heater power knockouts 1 1/8-inch and 1 3/8-inch.
 *Residential "1" voltage code water connections 1-inch swivel.

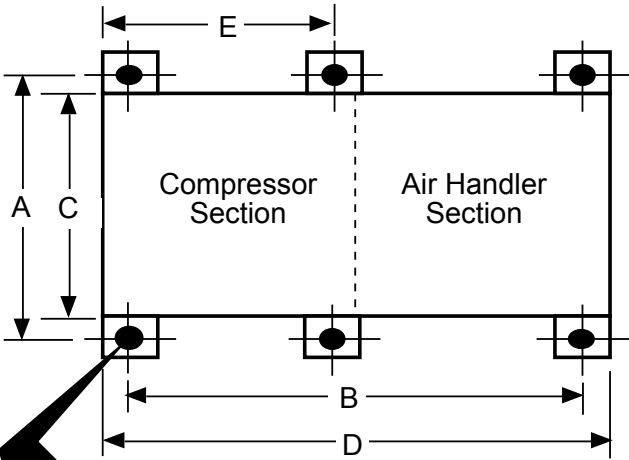
Optional Filter Rack/Duct Collar



MODEL	A	B	C	D	E	MODEL NO.
P010, 013	20.37	16.08	2.08	0.59	5.50	DCH1620
P019	24.54	18.08	2.52	0.53	5.50	DCH1824
P022, 028, 034	36.12	18.08	2.00	0.53	5.50	DCH1836
P040, 046	37.12	20.08	2.23	0.59	5.50	DCH2037
P056	42.12	20.08	2.23	0.59	5.50	DCH2042
P066	47.12	20.08	2.23	0.59	5.50	DCH2037

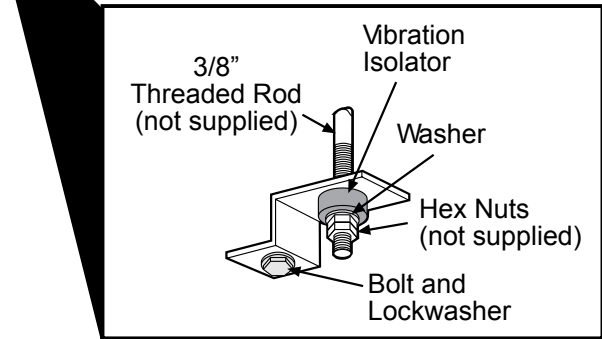
Notes: All dimensions are in inches.
 1-inch duct connection provided.
 Air tight construction.

Hanger Brackets for Horizontal Units



MODEL	A	B	C	D	E
P010, 013	24.8	42.5	22.5	44.0	–
P019	24.8	51.5	22.5	53.0	–
P022, 028, 034	24.8	61.5	22.5	63.0	–
P040, 046	27.8	70.5	25.5	72.0	29.9
P056	27.8	75.5	25.5	77.0	29.9
P066	27.8	80.5	25.5	82.0	29.9

Note: All dimensions are in inches.



Physical Data

MODEL	P010	P013	P019	P022	P028	P034	P040	P046	P056	P066
Fan Wheel	6 X 8	6 X 8	9 X 7	9 X 7	9 X 7	9 X 7	11 X 10	11 X 10	11 X 10	11 X 10
Fan Motor, Horsepower	- PSC 1/10	- PSC 1/10	ECM 1/2 PSC 1/6	ECM 1/2 PSC 1/5	ECM 1/2 PSC 1/3	ECM 1/2 PSC 1/2	ECM 1/2* PSC 1/2	ECM 1/2* PSC 1/2	ECM 1 PSC 3/4	ECM 1 PSC 1
Compressor	Rotary	Rotary	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Air Coil: (Vertical)										
Dimensions	12 X 16	16 X 16	19 X 20	24 X 20	24 X 20	27 X 20	28 X 25	28 X 25	32 X 25	36 X 25
Area (sq. ft.)	1.3	1.8	2.6	3.3	3.3	3.8	4.9	4.9	5.6	6.3
Rows	3	3	3	3	3	3	3	3	3	3
Air Coil: (Horizontal)										
Dimensions:	12 X 16	16 X 16	18 X 21	18 X 27	18 X 27	18 X 30	20 X 35	20 X 35	20 X 40	20 X 45
Area (sq. ft.)	1.3	1.8	2.6	3.4	3.4	3.8	4.9	4.9	5.6	6.3
Rows	3	3	3	3	3	3	3	3	3	3
R22 (oz)	28.0	36.0	37.0	56.0	62.0	65.0	85.0	88.0	116.0	98.0
Weight (lbs)										
Vertical	150	163	189	252	258	274	320	336	399	426
Horizontal	155	164	210	256	260	270	337	339	429	456
Filter - 1" Vertical										
Disposable	(1) 16 x 20			(1) 24 x 28				(1) 30 x 36		
Electrostatic	EAF1620			EAF2428				EAF3036		
Electronic	EAC1620			EAC2428				EAC3036		
Filter - 1" Horizontal										
Disposable	(1) 16 x 20	(1) 18 x 24	(2) 18 x 18	(2) 18 x 18	(1) 20 x 37	(1) 20 x 20	(1) 20 x 25	(2) 20 x 25		
Electrostatic	EAF1620	EAF1824	EAF1836	EAF1836	EAF2037	EAF2042	EAF2042	EAF2048		
Electronic	EAC1620	EAC1824	EAC1836	EAC1836	EAC2037	EAC2042	EAC2042	EAC2048		

Notes: *Optional 1 HP ECM2 fan motor available.

Unit Electrical Data

ECM2 Motor

MODEL	RATED VOLTAGE	VOLTAGE MIN/MAX	COMPRESSOR			FAN MOTOR FLA	EXT PUMP FLA	INT PUMP FLA	TOTAL UNIT FLA	MIN CIRCUIT AMP	MAX FUSE	MAX HACR BREAKER
			MCC	RLA	LRA							
P019	208-230/60/1 Res.	197/253	14.0	9.0	41.0	4.0	5.4	0.4	18.8	21.0	30	30
	208-230/60/1	197/253	14.0	9.0	41.0	4.0	-	-	13.0	15.2	20	20
	265/60/1	239/292	12.0	7.7	36.8	4.1	-	-	11.8	13.7	20	20
P022	208-230/60/1 Res.	197/253	15.0	9.6	44.9	4.0	5.4	0.4	19.4	21.8	30	30
	208-230/60/1	197/253	15.0	9.6	44.9	4.0	-	-	13.6	16.0	25	25
	265/60/1	239/292	12.0	7.7	39.0	4.1	-	-	11.8	13.7	20	20
P028	208-230/60/1 Res.	197/253	19.0	12.2	63.0	4.0	5.4	0.4	22.0	25.0	35	35
	208-230/60/1	197/253	19.0	12.2	63.0	4.0	-	-	16.2	19.2	30	30
	265/60/1	239/292	14.5	9.3	52.0	4.1	-	-	13.4	15.7	25	25
	208-230/60/3	197/253	12.0	7.7	55.0	4.0	-	-	11.7	13.6	20	20
	460/60/3**	414/506	6.0	3.8	27.0	4.1	-	-	7.9	8.9	10	10
P034	208-230/60/1 Res.	197/253	21.0	13.5	72.5	4.0	5.4	0.4	23.3	26.6	40	40
	208-230/60/1	197/253	21.0	13.5	72.5	4.0	-	-	17.5	20.8	30	30
	265/60/1	239/292	18.0	11.5	61.0	4.1	-	-	15.6	18.5	30	30
	208-230/60/3	197/253	14.0	9.0	63.0	4.0	-	-	13.0	15.2	20	20
	460/60/3**	414/506	7.0	4.5	31.0	4.1	-	-	8.6	9.7	10	10
P040	208-230/60/1 Res.	197/253	25.0	16.0	90.0	4.0	5.4	0.4	25.8	29.8	45	45
	208-230/60/1	197/253	25.0	16.0	90.0	4.0	-	-	20.0	24.0	40	40
	208-230/60/3	197/253	16.0	10.3	77.0	4.0	-	-	14.3	16.8	25	25
	460/60/3**	414/506	8.0	5.1	39.0	4.1	-	-	9.2	10.5	15	15
P040*	208-230/60/1 Res.	197/253	25.0	16.0	90.0	7.0	5.4	0.4	28.8	32.8	45	45
	208-230/60/1	197/253	25.0	16.0	90.0	7.0	-	-	23.0	27.0	40	40
	208-230/60/3	197/253	16.0	10.3	77.0	7.0	-	-	17.3	19.8	30	30
	460/60/3**	414/506	8.0	5.1	39.0	6.9	-	-	12.0	13.3	15	15
P046	208-230/60/1 Res.	197/253	28.0	17.9	104.0	4.0	5.4	0.4	27.7	32.2	50	50
	208-230/60/1	197/253	28.0	17.9	104.0	4.0	-	-	21.9	26.4	40	40
	208-230/60/3	197/253	19.4	12.4	88.0	4.0	-	-	16.4	19.5	30	30
	460/60/3**	414/506	9.0	5.8	44.0	4.1	-	-	9.9	11.3	15	15
P046*	208-230/60/1 Res.	197/253	28.0	17.9	104.0	7.0	5.4	0.4	30.7	35.2	50	50
	208-230/60/1	197/253	28.0	17.9	104.0	7.0	-	-	24.9	29.4	45	45
	208-230/60/3	197/253	19.4	12.4	88.0	7.0	-	-	19.4	22.5	35	35
	460/60/3**	414/506	9.0	5.8	44.0	6.9	-	-	12.7	14.1	15	15
P056	208-230/60/1 Res.	197/253	31.0	19.9	137.0	7.0	5.4	0.4	32.7	37.6	50	50
	208-230/60/1	197/253	31.0	19.9	137.0	7.0	-	-	26.9	31.8	50	50
	208-230/60/3	197/253	23.0	14.7	91.0	7.0	-	-	21.7	25.4	40	40
	460/60/3**	414/506	11.0	7.1	50.0	6.9	-	-	14.0	15.7	20	20
P066	208-230/60/1 Res.	197/253	45.0	28.8	169.0	7.0	5.4	0.4	41.6	48.9	70	70
	208-230/60/1	197/253	45.0	28.8	169.0	7.0	-	-	35.8	43.1	70	70
	208-230/60/3	197/253	27.0	17.3	137.0	7.0	-	-	24.3	28.6	45	45
	460/60/3**	414/506	14.0	9.0	62.0	6.9	-	-	15.9	18.1	25	25

Notes: 208-230/60/1 Res. Indicates residential installation with external loop pump and internal desuperheater pump. Always refer to unit nameplate data prior to installation. HACR circuit breaker in United States only. All fuses are class RK-5.

* With optional 1 HP ECM2 motor

** 460 volt units use a 265 volt single phase ECM motor and require a dedicated neutral from the service panel.

Unit Electrical Data

PSC Motor

MODEL	RATED VOLTAGE	VOLTAGE MIN/MAX	COMPRESSOR			FAN MOTOR FLA	EXT PUMP FLA	INT PUMP FLA	TOTAL UNIT FLA	MIN CIRCUIT AMP	MAX FUSE	MAX HACR BREAKER
			MCC	RLA	LRA							
P010	208-230/60/1	197/253	6.9	4.4	23	0.6	-	-	5.0	6.1	10	10
	265/60/1	239/292	4.6	2.9	16	0.6	-	-	3.5	4.3	6	6
P013	208-230/60/1	197/253	7.4	4.7	27	0.6	-	-	5.3	6.5	10	10
	265/60/1	239/292	5.4	3.5	22	0.6	-	-	4.1	4.9	6	6
P019	208-230/60/1 Res.	197/253	14.0	9.0	41.0	1.1	5.4	0.4	15.9	18.1	25	25
	208-230/60/1	197/253	14.0	9.0	41.0	1.1	-	-	10.1	12.3	20	20
	265/60/1	239/292	12.0	7.7	36.8	1.0	-	-	8.7	10.6	15	15
P022	208-230/60/1 Res.	197/253	15.0	9.6	44.9	1.2	5.4	0.4	16.6	19.0	25	25
	208-230/60/1	197/253	15.0	9.6	44.9	1.2	-	-	10.8	13.2	20	20
	265/60/1	239/292	12.0	7.7	39.0	1.1	-	-	8.8	10.7	15	15
P028	208-230/60/1 Res.	197/253	19.0	12.2	63.0	1.5	5.4	0.4	19.5	22.5	30	30
	208-230/60/1	197/253	19.0	12.2	63.0	1.5	-	-	13.7	16.7	25	25
	265/60/1	239/292	14.5	9.3	52.0	2.0	-	-	11.3	13.6	20	20
	208-230/60/3	197/253	12.0	7.7	55.0	1.5	-	-	9.2	11.1	15	15
	460/60/3	414/506	6.0	3.8	31.0	1.1	-	-	4.9	5.9	10	10
P034	208-230/60/1 Res.	197/253	21.0	13.5	72.5	2.2	5.4	0.4	21.5	24.8	35	35
	208-230/60/1	197/253	21.0	13.5	72.5	2.2	-	-	15.7	19.0	30	30
	265/60/1	239/292	18.0	11.5	61.0	2.0	-	-	13.5	16.4	25	25
	208-230/60/3	197/253	14.0	9.0	63.0	2.2	-	-	11.2	13.4	20	20
	460/60/3	414/506	7.0	4.5	31.0	1.1	-	-	5.6	6.7	10	10
P040	208-230/60/1 Res.	197/253	25.0	16.0	90.0	2.8	5.4	0.4	24.6	28.6	40	40
	208-230/60/1	197/253	25.0	16.0	90.0	2.8	-	-	18.8	22.8	35	35
	208-230/60/3	197/253	16.0	10.3	77.0	2.8	-	-	13.1	15.6	25	25
	460/60/3	414/506	8.0	5.1	39.0	1.4	-	-	6.5	7.8	10	10
P046	208-230/60/1 Res.	197/253	28.0	17.9	104.0	3.5	5.4	0.4	27.2	31.7	45	45
	208-230/60/1	197/253	28.0	17.9	104.0	3.5	-	-	21.4	25.9	40	40
	208-230/60/3	197/253	19.4	12.4	88.0	3.5	-	-	15.9	19.0	30	30
	460/60/3	414/506	9.0	5.8	44.0	1.8	-	-	7.6	9.0	10	10
P056	208-230/60/1 Res.	197/253	31.0	19.9	137.0	4.6	5.4	0.4	30.3	35.2	50	50
	208-230/60/1	197/253	31.0	19.9	137.0	4.6	-	-	24.5	29.4	45	45
	208-230/60/3	197/253	23.0	14.7	91.0	4.6	-	-	19.3	23.0	35	35
	460/60/3	414/506	11.0	7.1	50.0	2.3	-	-	9.4	11.1	15	15
P066	208-230/60/1 Res.	197/253	45.0	28.8	169.0	5.9	5.4	0.4	40.5	47.8	70	70
	208-230/60/1	197/253	45.0	28.8	169.0	5.9	-	-	34.7	42.0	70	70
	208-230/60/3	197/253	27.0	17.3	137.0	5.9	-	-	23.2	27.5	40	40
	460/60/3	414/506	14.0	9.0	62.0	3.0	-	-	12.0	14.2	20	20

Notes: Always refer to unit nameplate data prior to installation.

HACR circuit breaker in United States only. All fuses are class RK-5.

208-230/60/1 Res. Indicates residential installation with external loop pump and internal desuperheater pump.

Fan Performance Data

ECM2 Motor

MODEL	MAX ESP	AIRFLOW DIP SWITCH SETTINGS											
		1	2	3	4	5	6	7	8	9	10	11	12
P019	0.5	300	400 L	500 M	600 H	700	800	-	-	-	-	-	-
P022	0.5	-	400	500 L	600 M	700 H	800	900	-	-	-	-	-
P028	0.5	-	400	500 L	600	700 M	800	900 H	1000	1100	-	-	-
P034	0.5	-	-	-	600	700 L	800	900 M	1000	1100 H	1150	1225	1300
P040	0.5	650	750	850 L	950	1050 M	1150	1250	1325 H	1375	1475	-	-
P046	0.5	650	750	850	950	1050 L	1150	1250 M	1325	1375	1475	1550 H	1600
P040 w/1hp*	0.75	800 L	1000 M	1100	1300 H	1500	-	-	-	-	-	-	-
P046 w/1hp*	0.75	800	1000 L	1100 M	1300	1500 H	1600	1800	-	-	-	-	-
P056	0.75	750	900	1000	1200 L	1400 M	1600	1700	1850 H	2000	2200	2300	2400
P066	0.75	750	900	1000	1200	1400 L	1600	1700 M	1850	2000	2200 H	2300	2400

Notes: Factory settings are at recommended L-M-H DIP switch locations.

Factory L setting is minimum allowed for cooling.

M-H settings must be located within shaded CFM range.

CFM is controlled within 5% up to the maximum ESP.

Max ESP includes allowance for wet coil and standard filter.

* With optional 1 HP fan motor.

A 12-position DIP switch package on the control allows the airflow levels to be set for low, medium, and high speed when using the ECM2 blower motor. Only three of the DIP switches can be in the "on" position.

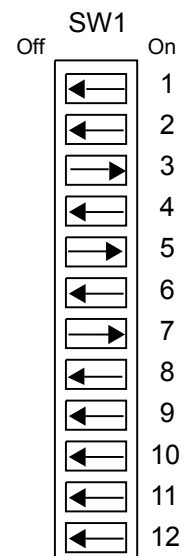
- The first "on" switch (the lowest position number) determines the low speed fan setting.
- The second "on" switch determines the medium speed fan setting.
- The third "on" switch determines the high speed fan setting.

The example to the right shows SW1 on the control board configured for the following P028 airflow settings.

Low Speed Fan: 500 CFM

Medium Speed Fan: 700 CFM

High Speed Fan: 900 CFM



Fan Performance Data

PSC Motor

MODEL	FAN SPEED	MOTOR HP	AIRFLOW (CFM) AT EXTERNAL STATIC PRESSURE (IN. WG)														
			0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
P010	H	1/10	450	440	420	410	380	360	340	330	310	300	-	-	-	-	-
	MH		410	400	380	370	350	330	310	300	280	270	-	-	-	-	-
	ML*		370	360	340	330	310	290	280	270	250	240	-	-	-	-	-
	L		310	300	280	270	250	240	230	220	210	200	-	-	-	-	-
P013	H	1/10	450	440	420	410	390	370	350	340	320	310	-	-	-	-	-
	MH*		400	390	380	370	350	340	320	310	290	280	-	-	-	-	-
	ML		370	360	340	330	310	300	290	280	260	250	-	-	-	-	-
	L		330	320	310	300	290	280	260	250	230	220	-	-	-	-	-
P019	H	1/6	790	780	775	770	765	760	740	720	690	670	610	-	-	-	-
	M		720	690	685	680	670	660	650	640	620	600	-	-	-	-	-
	L		590	570	560	550	545	540	530	520	510	500	-	-	-	-	-
P022	H	1/5	1020	990	960	930	900	870	850	830	800	770	690	-	-	-	-
	M		860	840	820	800	780	760	740	720	690	670	-	-	-	-	-
	L		720	700	680	650	640	620	600	580	570	550	-	-	-	-	-
P028	H	1/3	1120	1100	1070	1050	1040	1030	1020	1010	1000	980	830	-	-	-	-
	M		1020	1000	980	960	920	880	860	840	820	790	-	-	-	-	-
	L		860	850	840	830	810	800	780	760	740	710	-	-	-	-	-
P034	H	1/2	1360	1340	1300	1270	1230	1200	1170	1150	1120	1090	990	870	-	-	-
	M		1190	1170	1140	1120	1090	1060	1030	1010	970	930	-	-	-	-	-
	L		1010	990	970	950	940	920	900	880	860	840	-	-	-	-	-
P040	H	1/2	-	-	1730	1700	1670	1650	1620	1580	1540	1490	1400	1290	-	-	-
	M		1510	1500	1490	1480	1450	1430	1400	1380	1350	1320	-	-	-	-	-
	L		1170	1160	1150	1140	1130	1120	1100	1080	1050	1030	-	-	-	-	-
P046	H	1/2	-	-	1870	1820	1780	1750	1720	1680	1630	1580	1450	1330	1190	-	-
	M		1710	1660	1630	1590	1560	1530	1490	1460	1410	1370	-	-	-	-	-
	L		1280	1250	1230	1220	1200	1180	1150	1120	1090	1050	-	-	-	-	-
P056	H	3/4	-	-	-	-	2180	2160	2130	2100	2070	2040	1990	1910	1810	1690	-
	M		2030	2010	1990	1970	1950	1930	1910	1880	1850	1830	1780	-	-	-	-
	L		1790	1770	1760	1750	1730	1720	1700	1690	1670	1640	-	-	-	-	-
P066	H	1	-	-	-	-	2540	2520	2490	2460	2430	2410	2320	2230	2130	1980	1820
	M		2430	2390	2360	2340	2310	2290	2270	2250	2220	2190	2120	2050	-	-	-
	L		2000	1980	1970	1950	1930	1920	1900	1860	1830	1780	-	-	-	-	-

Notes: Includes allowance for wet coil and clean factory installed filter.

A “-” in the table indicates operating range is not recommended.

Factory settings indicated in bold print.

* At 265V, the P010 is shipped on ML and the P013 on MH.

Auxiliary Heat Ratings

MODEL	KW		STAGES	BTU/HR		MIN CFM	MODEL COMPATIBILITY							
	280 V	240 V		208 V	240 V		19	22	28	34	40	46	56	66
EAM(H)5	3.6	4.8	1	12300	16300	450	•	•	•	•				
EAM(H)8	5.7	7.6	2	19400	25900	550		•	•	•				
EAM(H)10	7.2	9.6	2	24600	32700	650			•	•				
EAL(H)10	7.2	9.6	2	24600	32700	1100					•	•	•	•
EAL(H)15	10.8	14.4	3	36900	49100	1250					•	•	•	•
EAL(H)15-3	10.8	14.4	3	36900	49100	1250					•	•	•	•
EAL(H)20	14.4	19.2	4	49200	65500	1500						•	•	•

Notes: High fan tap setting must be above the minimum CFM for the heater selected.
 Part numbers with "H" included are for the horizontal units only.

Auxiliary Heat Electrical Data

MODEL	SUPPLY CIRC	HEATER AMPS		MIN CIRC AMP		FUSE (USA)		FUSE (CAN)		CKT BRK (CAN)	
		208V	240V	208V	240V	208V	240V	280V	240V	280V	240V
EAM(H)5	Single	17.3	20.0	26.7	30.0	30	30	30	30	30	30
EAM(H)8	Single	27.5	31.7	39.3	44.6	40	45	40	45	40	50
EAM(H)10	Single	34.7	40.0	48.3	55.0	50	60	50	60	50	60
EAL(H)10	Single	34.7	40.0	53.3	60.0	60	60	60	60	60	60
EAL(H)15	Single	52	60.0	75.0	85.0	80	90	80	90	70	100
	L1/L2	34.7	40.0	53.3	60.0	60	60	60	60	60	60
	L3/L4	17.3	20.0	21.7	25.0	25	25	25	25	20	30
EAL(H)15-3	Single	30	34.7	47.5	53.3	50	60	50	60	50	60
EAL(H)20	Single	69.3	80.0	96.7	110.0	100	110	100	110	100	100
	L1/L2	34.7	40.0	53.3	60.0	60	60	60	60	60	60
	L3/L4	34.7	40.0	43.3	50.0	45	50	45	50	40	50

Notes: All heaters rated single phase 60 cycle (Except EAL (H) 15-3 is 3 phase 60 cycle and includes the unit fan load.

All fuses type "D" time delay (or HACR circuit breaker in USA).

(H) indicates horizontal part number.

Supply wire size to be determined by local codes.

Reference Calculations

Heating Calculations:	Cooling Calculations:
$LWT = EWT - \frac{HE}{GPM \times 500}$	$LWT = EWT + \frac{HR}{GPM \times 500}$
$LAT = EAT + \frac{HC}{CFM \times 1.08}$	$LAT (DB) = EAT (DB) - \frac{SC}{CFM \times 1.08}$
$TH = HC + HW$	$LC = TC - SC$
	$S/T = \frac{SC}{TC}$

Legends and Notes

ABBREVIATIONS AND DEFINITIONS:

CFM = airflow, cubic feet/minute	HE = total heat of extraction, MBTUH
EWT = entering water temperature, Fahrenheit	HW = desuperheater capacity, MBTUH
GPM = water flow in gallons/minute	EER = Energy Efficient Ratio
WPD = water pressure drop, PSI and feet of water	= BTU output/Watt input
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)	COP = Coefficient of Performance
HC = air heating capacity, MBTUH	= BTU output/BTU input
TC = total cooling capacity, MBTUH	LWT = leaving water temperature, °F
SC = sensible cooling capacity, MBTUH	LAT = leaving air temperature, °F
KW = total power unit input, kilowatts	TH = total heating capacity, MBTUH
HR = total heat of rejection, MBTUH	LC = latent cooling capacity, MBTUH
	S/T = sensible to total cooling ratio

Desuperheater capacity based on 0.4 GPM flow per nominal unit ton at 90°F entering hot water temperature. Capacity data on pages 22-41 does not include water pumping watts and are based upon 15% (by volume) methanol antifreeze solution. For non-standard EAT conditions, apply the appropriate correction factors found below. Interpolation between EWT, GPM and CFM data is permissible. Extrapolation for heating data down to 25°F is permissible. Catalog illustrations cover the general appearance of products at time of publication. We reserve the right to make changes in design and construction at any time without notice.

Entering Air Correction Factors

COOLING					HEATING			
EAT	TC	SC	KW	HR	EAT	HC	KW	HE
75/63	0.92	0.96	0.98	0.94	60	1.09	0.95	1.06
80/67	1.00	1.00	1.00	1.00	70	1.00	1.00	1.00
85/71	1.08	1.04	1.02	1.06	80	0.97	1.05	0.94

ECM Only

P010

Heating Capacity Data

EWT	GPM	WPD		CFM	HEATING ONLY					HEATING WITH HOT WATER					
		PSI	FT		HC	KW	HE	LAT	COP	HC	KW	HE	LAT	HW	COP
30	1.5	2.1	4.9	250	7.0	0.59	5.0	96.0	3.50	6.4	0.57	5.1	93.7	0.7	3.62
				350	7.2	0.59	5.2	89.1	3.57	6.6	0.58	5.3	87.4	0.7	3.65
	2.0	3.4	7.8	250	7.3	0.59	5.3	97.0	3.60	6.7	0.58	5.4	94.7	0.7	3.73
				350	7.5	0.60	5.5	89.9	3.68	6.9	0.59	5.5	88.1	0.7	3.76
	2.5	5.2	11.9	250	7.4	0.59	5.4	97.4	3.65	6.8	0.58	5.5	95.0	0.7	3.79
				350	7.6	0.60	5.6	90.2	3.73	7.0	0.59	5.7	88.4	0.7	3.82
50	1.5	2.0	4.6	250	9.2	0.63	7.0	103.9	4.23	8.3	0.61	7.2	100.7	0.9	4.46
				350	9.5	0.63	7.4	95.2	4.43	8.7	0.62	7.5	93.1	0.8	4.55
	2.0	3.2	7.4	250	9.5	0.65	7.3	105.1	4.31	8.6	0.62	7.5	101.8	1.0	4.55
				350	9.9	0.64	7.7	96.2	4.53	9.1	0.62	7.8	94.0	0.8	4.65
	2.5	4.9	11.4	250	9.7	0.65	7.5	105.8	4.38	8.8	0.62	7.7	102.4	1.0	4.63
				350	10.1	0.64	7.9	96.7	4.62	9.3	0.62	8.0	94.5	0.9	4.75
70	1.5	2.0	4.6	250	11.2	0.66	9.0	111.5	4.95	10.1	0.63	9.2	107.5	1.2	5.31
				350	11.8	0.65	9.6	101.2	5.34	10.9	0.63	9.7	98.7	1.0	5.52
	2.0	3.1	7.1	250	11.5	0.68	9.2	112.7	4.98	10.4	0.64	9.5	108.5	1.3	5.35
				350	12.1	0.66	9.9	102.1	5.39	11.2	0.64	10.0	99.6	1.0	5.57
	2.5	4.7	10.9	250	11.8	0.68	9.5	113.7	5.09	10.7	0.64	9.8	109.5	1.3	5.48
				350	12.5	0.66	10.2	102.9	5.53	11.5	0.64	10.3	100.4	1.0	5.71
90	1.5	1.9	4.4	250	13.1	0.70	10.7	118.4	5.45	11.8	0.65	11.0	113.5	1.5	5.96
				350	13.9	0.67	11.6	106.8	6.06	12.9	0.65	11.7	104.0	1.1	6.29
	2.0	3.0	6.9	250	13.3	0.72	10.9	119.4	5.41	12.0	0.67	11.3	114.3	1.6	5.92
				350	14.2	0.69	11.9	107.6	6.04	13.1	0.67	12.0	104.7	1.1	6.27
	2.5	4.6	10.6	250	13.7	0.72	11.3	120.8	5.55	12.3	0.67	11.6	115.7	1.6	6.09
				350	14.7	0.69	12.3	108.8	6.22	13.5	0.67	12.4	105.8	1.2	6.47

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P010**Cooling Capacity Data**

EWT	GPM	WPD		CFM	COOLING ONLY					COOLING WITH HOT WATER					
		PSI	FT		TC	SC	KW	HR	EER	TC	SC	KW	HR	HW	EER
50	1.5	2.0	4.6	250	11.1	7.7	0.47	12.7	23.8	11.1	7.7	0.45	12.2	0.5	24.5
				350	11.7	8.6	0.50	13.4	23.3	11.7	8.6	0.49	12.8	0.5	24.0
	2.0	3.2	7.4	250	11.1	7.7	0.44	12.6	25.4	11.1	7.7	0.43	12.1	0.4	26.1
				350	11.7	8.6	0.47	13.3	24.9	11.7	8.6	0.46	12.8	0.5	25.5
	2.5	4.9	11.4	250	11.2	7.7	0.43	12.7	26.2	11.2	7.7	0.42	12.3	0.4	26.7
				350	11.8	8.6	0.46	13.4	25.7	11.8	8.6	0.45	12.9	0.4	26.2
70	1.5	2.0	4.6	250	10.4	7.5	0.58	12.4	17.9	10.4	7.5	0.56	11.4	0.9	18.6
				350	10.9	8.4	0.62	13.1	17.6	11.0	8.4	0.60	12.1	1.0	18.3
	2.0	3.1	7.1	250	10.4	7.5	0.55	12.3	19.0	10.5	7.5	0.53	11.5	0.8	19.7
				350	11.0	8.4	0.59	13.0	18.7	11.0	8.4	0.57	12.1	0.9	19.3
	2.5	4.7	10.9	250	10.5	7.5	0.54	12.4	19.4	10.6	7.5	0.53	11.7	0.7	20.0
				350	11.1	8.4	0.58	13.1	19.1	11.2	8.4	0.57	12.3	0.8	19.7
90	1.5	1.9	4.4	250	9.6	7.3	0.69	11.9	13.9	9.7	7.3	0.66	10.6	1.3	14.6
				350	10.1	8.2	0.74	12.6	13.7	10.2	8.2	0.71	11.2	1.4	14.4
	2.0	3.0	6.9	250	9.7	7.3	0.66	12.0	14.6	9.8	7.3	0.64	10.8	1.2	15.3
				350	10.2	8.2	0.71	12.6	14.4	10.3	8.2	0.68	11.4	1.3	15.1
	2.5	4.6	10.6	250	9.8	7.3	0.66	12.0	14.9	9.9	7.3	0.64	11.0	1.0	15.5
				350	10.3	8.2	0.70	12.7	14.7	10.4	8.2	0.68	11.6	1.1	15.3
110	1.5	1.8	4.3	250	8.8	7.2	0.80	11.5	11.0	8.9	7.2	0.76	9.8	1.8	11.7
				350	9.3	8.1	0.84	12.1	11.0	9.4	8.1	0.81	10.3	1.9	11.7
	2.0	2.9	6.7	250	8.9	7.2	0.78	11.6	11.5	9.1	7.2	0.75	10.1	1.6	12.1
				350	9.4	8.1	0.82	12.2	11.4	9.5	8.1	0.79	10.6	1.7	12.1
	2.5	4.5	10.3	250	9.0	7.2	0.77	11.7	11.6	9.2	7.2	0.75	10.3	1.4	12.3
				350	9.5	8.1	0.82	12.3	11.6	9.6	8.1	0.79	10.9	1.5	12.2

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P013

Heating Capacity Data

EWT	GPM	WPD		CFM	HEATING ONLY					HEATING WITH HOT WATER					
		PSI	FT		HC	KW	HE	LAT	COP	HC	KW	HE	LAT	HW	COP
30	1.5	2.0	4.7	300	8.6	0.75	6.0	96.5	3.38	7.7	0.73	6.1	93.7	0.9	3.46
				400	8.9	0.76	6.3	90.5	3.43	7.9	0.73	6.3	88.4	0.8	3.50
	2.5	4.6	10.6	300	9.0	0.76	6.4	97.9	3.47	8.1	0.74	6.5	94.9	1.0	3.57
				400	9.3	0.77	6.7	91.6	3.54	8.4	0.75	6.7	89.4	0.9	3.62
	3.5	8.1	18.6	300	9.3	0.77	6.6	98.6	3.51	8.2	0.75	6.7	95.5	1.0	3.62
				400	9.6	0.78	6.9	92.1	3.59	8.6	0.76	6.9	89.9	0.9	3.67
50	1.5	1.9	4.4	300	11.3	0.81	8.6	104.9	4.10	10.0	0.77	8.6	101.0	1.2	4.28
				400	11.8	0.81	9.0	97.2	4.28	10.6	0.78	9.0	94.6	1.1	4.39
	2.5	4.4	10.1	300	11.9	0.83	9.1	106.8	4.22	10.6	0.79	9.2	102.6	1.3	4.41
				400	12.4	0.82	9.6	98.7	4.42	11.2	0.80	9.6	96.0	1.1	4.55
	3.5	7.7	17.8	300	12.2	0.84	9.4	107.7	4.27	10.8	0.80	9.4	103.4	1.3	4.48
				400	12.7	0.83	9.9	99.5	4.49	11.5	0.81	9.9	96.7	1.2	4.62
70	1.5	1.9	4.4	300	14.0	0.88	11.0	113.2	4.65	12.4	0.83	11.1	108.2	1.6	4.93
				400	14.7	0.86	11.7	104.0	4.98	13.4	0.84	11.8	101.0	1.3	5.14
	2.5	4.2	9.8	300	14.8	0.91	11.7	115.5	4.77	13.0	0.84	11.8	110.1	1.7	5.09
				400	15.5	0.88	12.5	105.9	5.16	14.2	0.85	12.6	102.8	1.4	5.33
	3.5	7.4	17.1	300	15.1	0.92	12.0	116.7	4.83	13.3	0.85	12.1	111.1	1.7	5.16
				400	15.9	0.89	12.9	106.9	5.25	14.6	0.86	13.0	103.7	1.4	5.42
90	1.5	1.8	4.2	300	15.4	0.93	12.2	117.6	4.86	13.4	0.85	12.4	111.3	1.9	5.24
				400	16.3	0.89	13.3	107.8	5.36	14.9	0.87	13.5	104.4	1.5	5.55
	2.5	4.1	9.5	300	16.2	0.95	13.0	120.1	4.99	14.1	0.87	13.1	113.4	2.0	5.41
				400	17.3	0.91	14.2	110.0	5.56	15.8	0.88	14.4	106.5	1.6	5.76
	3.5	7.2	16.6	300	16.6	0.97	13.3	121.4	5.05	14.4	0.88	13.5	114.5	2.1	5.49
				400	17.7	0.92	14.6	111.1	5.65	16.2	0.89	14.8	107.5	1.7	5.87

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P013

Cooling Capacity Data

EWT	GPM	WPD		CFM	COOLING ONLY					COOLING WITH HOT WATER					
		PSI	FT		TC	SC	KW	HR	EER	TC	SC	KW	HR	HW	EER
50	1.5	1.9	4.4	300	14.2	9.3	0.66	16.4	21.5	14.2	9.4	0.65	15.6	0.8	21.9
				400	14.9	10.5	0.70	17.3	21.3	14.9	10.6	0.69	16.5	0.8	21.7
	2.5	4.4	10.1	300	14.5	9.4	0.59	16.5	24.7	14.5	9.5	0.58	15.8	0.7	25.1
				400	15.2	10.6	0.62	17.4	24.4	15.2	10.7	0.61	16.6	0.7	24.8
	3.5	7.7	17.8	300	14.6	9.4	0.56	16.6	25.9	14.6	9.4	0.56	16.0	0.6	26.2
				400	15.4	10.6	0.60	17.4	25.7	15.4	10.6	0.59	16.8	0.6	25.9
70	1.5	1.9	4.4	300	13.3	9.0	0.79	16.0	16.8	13.3	9.0	0.77	14.7	1.3	17.3
				400	14.0	10.1	0.83	16.8	16.8	14.0	10.1	0.81	15.5	1.4	17.3
	2.5	4.2	9.8	300	13.5	9.1	0.72	16.0	18.9	13.6	9.1	0.70	14.8	1.2	19.3
				400	14.3	10.2	0.76	16.8	18.9	14.3	10.2	0.74	15.6	1.2	19.3
	3.5	7.4	17.1	300	13.7	9.1	0.69	16.0	19.7	13.7	9.1	0.68	15.0	1.0	20.1
				400	14.4	10.2	0.73	16.9	19.7	14.5	10.2	0.72	15.8	1.1	20.1
90	1.5	1.8	4.2	300	11.9	8.4	0.97	15.2	12.3	12.0	8.4	0.94	13.4	1.8	12.8
				400	12.5	9.4	1.01	16.0	12.4	12.6	9.4	0.98	14.1	1.9	12.9
	2.5	4.1	9.5	300	12.1	8.5	0.90	15.2	13.5	12.3	8.5	0.88	13.6	1.7	14.0
				400	12.8	9.5	0.94	16.0	13.6	12.9	9.5	0.91	14.3	1.8	14.1
	3.5	7.2	16.6	300	12.3	8.5	0.87	15.2	14.0	12.4	8.5	0.86	13.8	1.5	14.5
				400	12.9	9.5	0.91	16.0	14.2	13.0	9.5	0.89	14.5	1.6	14.6
110	1.5	1.7	4.0	300	10.4	7.8	1.15	14.3	9.0	10.6	7.8	1.11	12.0	2.3	9.5
				400	11.0	8.8	1.19	15.0	9.2	11.1	8.8	1.15	12.6	2.5	9.7
	2.5	4.0	9.2	300	10.6	7.9	1.09	14.4	9.7	10.8	7.9	1.06	12.2	2.2	10.2
				400	11.2	8.9	1.13	15.0	9.9	11.4	8.9	1.09	12.8	2.3	10.4
	3.5	7.0	16.1	300	10.7	7.9	1.07	14.4	10.1	10.9	7.9	1.04	12.4	2.0	10.5
				400	11.3	8.9	1.10	15.1	10.3	11.5	8.9	1.07	13.0	2.1	10.7

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P019

Heating Capacity Data

EWT	GPM	WPD		CFM	HEATING ONLY					HEATING WITH HOT WATER					
		PSI	FT		HC	KW	HE	LAT	COP	HC	KW	HE	LAT	HW	COP
30	3.0	1.2	2.8	500	13.2	1.09	9.5	94.5	3.57	11.4	1.06	9.6	91.1	1.8	3.67
				600	13.4	1.09	9.7	90.7	3.61	11.7	1.06	9.7	88.0	1.6	3.69
	4.0	2.1	4.9	500	13.7	1.10	9.9	95.3	3.64	11.8	1.07	10.0	91.8	1.9	3.75
				600	13.9	1.10	10.1	91.4	3.70	12.1	1.07	10.1	88.6	1.7	3.78
	5.0	3.5	8.0	500	13.9	1.11	10.1	95.7	3.67	12.0	1.08	10.2	92.2	1.9	3.78
				600	14.1	1.11	10.3	91.8	3.72	12.3	1.08	10.3	89.0	1.7	3.81
50	3.0	1.2	2.8	500	15.8	1.21	11.7	99.2	3.82	13.3	1.16	11.8	94.6	2.5	3.98
				600	16.1	1.20	12.0	94.8	3.94	13.8	1.15	12.0	91.3	2.2	4.07
	4.0	2.0	4.6	500	16.3	1.22	12.1	100.2	3.90	13.7	1.17	12.3	95.4	2.5	4.07
				600	16.6	1.21	12.5	95.7	4.03	14.3	1.16	12.6	92.0	2.2	4.18
	5.0	3.3	7.7	500	16.6	1.24	12.4	100.8	3.91	14.0	1.19	12.5	95.9	2.6	4.08
				600	16.9	1.22	12.8	96.1	4.06	14.5	1.17	12.8	92.5	2.3	4.21
70	3.0	1.1	2.5	500	22.0	1.30	17.5	110.7	4.95	18.8	1.23	17.7	104.8	3.1	5.22
				600	22.5	1.27	18.2	104.8	5.21	19.8	1.21	18.4	100.6	2.7	5.46
	4.0	2.0	4.6	500	22.7	1.32	18.2	112.1	5.06	19.5	1.24	18.4	106.1	3.2	5.36
				600	23.4	1.28	19.0	106.0	5.35	20.6	1.22	19.2	101.7	2.7	5.61
	5.0	3.2	7.4	500	23.1	1.33	18.6	112.9	5.09	19.9	1.25	18.8	106.8	3.2	5.40
				600	23.8	1.29	19.4	106.7	5.39	21.0	1.23	19.6	102.3	2.8	5.67
90	3.0	1.1	2.5	500	27.0	1.48	21.9	120.0	5.35	23.1	1.37	22.2	112.8	3.7	5.73
				600	27.9	1.42	23.0	113.0	5.76	24.7	1.34	23.3	108.2	3.2	6.11
	4.0	1.9	4.4	500	27.9	1.50	22.8	121.7	5.47	24.0	1.39	23.1	114.4	3.8	5.88
				600	28.9	1.43	24.0	114.6	5.91	25.7	1.35	24.4	109.6	3.3	6.29
	5.0	3.1	7.2	500	28.4	1.51	23.3	122.7	5.51	24.4	1.40	23.5	115.2	3.9	5.92
				600	29.4	1.45	24.5	115.4	5.96	26.2	1.36	24.9	110.4	3.3	6.35

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P019

Cooling Capacity Data

EWT	GPM	WPD		CFM	COOLING ONLY					COOLING WITH HOT WATER					
		PSI	FT		TC	SC	KW	HR	EER	TC	SC	KW	HR	HW	EER
50	3.0	1.2	2.8	400	21.0	12.4	0.92	24.1	22.9	21.0	12.4	0.90	22.4	1.3	23.4
				500	21.6	13.8	0.94	24.8	22.9	21.6	13.8	0.93	23.1	1.4	23.3
				600	22.1	15.3	0.98	25.4	22.4	22.1	15.3	0.96	24.0	1.4	22.9
	4.0	2.0	4.6	400	21.0	12.4	0.86	23.9	24.5	21.0	12.4	0.84	22.4	1.2	24.8
				500	21.6	13.8	0.88	24.6	24.5	21.6	13.8	0.87	23.1	1.2	24.8
				600	22.1	15.3	0.92	25.2	24.0	22.1	15.3	0.91	23.9	1.3	24.3
	5.0	3.3	7.7	400	21.2	12.4	0.84	24.0	25.2	21.2	12.4	0.83	22.7	1.0	25.5
				500	21.8	13.8	0.87	24.8	25.2	21.8	13.8	0.86	23.4	1.1	25.4
				600	22.3	15.3	0.90	25.4	24.7	22.3	15.3	0.89	24.2	1.1	24.9
70	3.0	1.1	2.5	400	19.4	11.8	1.12	23.2	17.3	19.5	11.8	1.09	20.2	2.3	17.8
				500	20.0	13.1	1.15	24.0	17.4	20.1	13.1	1.12	20.8	2.4	17.9
				600	20.4	14.5	1.19	24.5	17.1	20.5	14.6	1.16	22.1	2.5	17.7
	4.0	2.0	4.6	400	19.5	11.8	1.06	23.1	18.3	19.6	11.8	1.04	20.3	2.1	18.8
				500	20.1	13.1	1.09	23.9	18.4	20.2	13.2	1.07	21.0	2.2	18.9
				600	20.5	14.6	1.13	24.4	18.1	20.6	14.6	1.11	22.2	2.3	18.6
	5.0	3.2	7.4	400	19.7	11.8	1.04	23.3	18.9	19.8	11.8	1.03	20.7	1.9	19.3
				500	20.3	13.1	1.07	24.0	19.0	20.4	13.2	1.06	21.3	2.0	19.4
				600	20.8	14.6	1.11	24.5	18.7	20.9	14.6	1.09	22.5	2.1	19.1
90	3.0	1.1	2.5	400	18.0	11.4	1.34	22.5	13.4	18.1	11.5	1.30	18.2	3.3	13.9
				500	18.5	12.7	1.37	23.2	13.5	18.7	12.7	1.33	18.7	3.4	14.1
				600	18.9	14.1	1.41	23.7	13.4	19.1	14.1	1.37	20.3	3.5	13.9
	4.0	1.9	4.4	400	18.1	11.5	1.29	22.5	14.0	18.3	11.6	1.26	18.5	3.1	14.5
				500	18.7	12.8	1.32	23.2	14.2	18.9	12.9	1.29	19.0	3.2	14.7
				600	19.1	14.2	1.36	23.7	14.0	19.3	14.3	1.33	20.6	3.3	14.5
	5.0	3.1	7.2	400	18.3	11.5	1.27	22.6	14.5	18.5	11.6	1.24	18.8	2.9	14.9
				500	18.9	12.8	1.29	23.3	14.6	19.1	12.9	1.27	19.4	2.9	15.1
				600	19.3	14.2	1.33	23.8	14.5	19.5	14.3	1.31	20.9	3.0	14.9
110	3.0	1.1	2.5	400	16.2	10.7	1.70	22.0	9.6	16.4	10.8	1.64	16.2	4.3	10.1
				500	16.7	11.9	1.72	22.6	9.7	17.0	12.0	1.66	16.6	4.5	10.2
				600	17.1	13.3	1.77	23.1	9.7	17.3	13.4	1.70	18.6	4.6	10.2
	4.0	1.8	4.3	400	16.4	10.9	1.65	22.1	9.9	16.7	11.0	1.61	16.6	4.0	10.4
				500	17.0	12.1	1.68	22.7	10.1	17.2	12.2	1.63	17.1	4.2	10.6
				600	17.3	13.5	1.72	23.2	10.0	17.6	13.6	1.67	19.0	4.3	10.5
	5.0	3.0	6.9	400	16.6	10.9	1.62	22.2	10.2	16.9	11.0	1.58	17.0	3.8	10.7
				500	17.1	12.1	1.65	22.8	10.4	17.4	12.2	1.61	17.5	3.9	10.8
				600	17.5	13.5	1.69	23.3	10.3	17.8	13.6	1.65	19.4	4.0	10.8

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P022

Heating Capacity Data

EWT	GPM	WPD		CFM	HEATING ONLY					HEATING WITH HOT WATER					
		PSI	FT		HC	KW	HE	LAT	COP	HC	KW	HE	LAT	HW	COP
30	3.0	1.5	3.4	600	14.7	1.17	10.7	92.7	3.69	12.4	1.14	10.8	89.2	2.3	3.79
				700	15.0	1.18	10.9	89.8	3.70	13.0	1.16	10.9	87.2	1.9	3.75
	4.5	3.2	7.5	600	15.5	1.19	11.4	93.9	3.80	13.1	1.16	11.5	90.2	2.4	3.91
				700	15.8	1.21	11.6	90.8	3.82	13.7	1.18	11.6	88.1	2.0	3.88
	6.0	6.0	14.0	600	15.8	1.21	11.6	94.3	3.82	13.3	1.17	11.7	90.6	2.4	3.94
				700	16.0	1.22	11.9	91.2	3.85	14.0	1.20	11.9	88.5	2.0	3.91
50	3.0	1.4	3.2	600	19.6	1.28	15.2	100.2	4.49	16.7	1.23	15.4	95.8	2.8	4.68
				700	20.0	1.28	15.7	96.5	4.59	17.6	1.24	15.7	93.3	2.4	4.71
	4.5	3.1	7.2	600	20.6	1.31	16.1	101.7	4.61	17.6	1.25	16.3	97.1	2.9	4.81
				700	21.0	1.30	16.6	97.8	4.73	18.5	1.26	16.7	94.5	2.5	4.86
	6.0	5.8	13.3	600	20.9	1.32	16.4	102.3	4.64	17.9	1.26	16.6	97.6	3.0	4.85
				700	21.4	1.32	16.9	98.3	4.77	18.9	1.28	17.0	95.0	2.5	4.90
70	3.0	1.3	3.0	600	24.6	1.37	19.9	108.0	5.27	21.2	1.29	20.1	102.7	3.4	5.57
				700	25.3	1.35	20.7	103.5	5.50	22.5	1.30	20.9	99.7	2.8	5.71
	4.5	3.0	6.9	600	25.8	1.40	21.0	109.7	5.39	22.2	1.32	21.2	104.2	3.5	5.71
				700	26.5	1.38	21.8	105.1	5.65	23.6	1.32	22.0	101.2	2.9	5.88
	6.0	5.6	12.8	600	26.2	1.42	21.4	110.4	5.42	22.5	1.33	21.6	104.8	3.6	5.75
				700	27.0	1.39	22.3	105.7	5.70	24.0	1.33	22.5	101.8	3.0	5.94
90	3.0	1.3	3.0	600	29.6	1.54	24.3	115.7	5.63	25.5	1.43	24.6	109.4	4.0	6.02
				700	30.6	1.50	25.5	110.5	6.00	27.4	1.43	25.8	106.3	3.3	6.30
	4.5	2.9	6.7	600	30.8	1.58	25.4	117.6	5.72	26.6	1.46	25.7	111.0	4.1	6.15
				700	32.0	1.53	26.7	112.3	6.13	28.7	1.45	27.1	107.9	3.4	6.47
	6.0	5.4	12.5	600	31.4	1.60	25.9	118.4	5.76	27.0	1.48	26.2	111.7	4.2	6.19
				700	32.6	1.54	27.3	113.1	6.18	29.2	1.47	27.7	108.6	3.5	6.54

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P022

Cooling Capacity Data

EWT	GPM	WPD		CFM	COOLING ONLY					COOLING WITH HOT WATER					
		PSI	FT		TC	SC	KW	HR	EER	TC	SC	KW	HR	HW	EER
50	3.0	1.4	3.2	500	23.7	14.3	0.99	27.1	23.9	23.7	14.3	0.97	25.4	1.6	24.3
				600	24.2	15.6	1.02	27.7	23.6	24.2	15.6	1.00	25.9	1.7	24.1
				700	24.7	17.0	1.07	28.3	23.1	24.7	17.0	1.05	26.5	1.7	23.6
	4.5	3.1	7.2	500	23.9	14.4	0.94	27.1	25.5	23.9	14.4	0.92	25.6	1.5	25.9
				600	24.4	15.8	0.97	27.7	25.2	24.4	15.8	0.95	26.2	1.5	25.6
				700	24.9	17.2	1.01	28.4	24.7	24.9	17.2	0.99	26.8	1.6	25.1
	6.0	5.8	13.3	500	24.2	14.4	0.91	27.3	26.5	24.2	14.4	0.90	25.9	1.3	26.8
				600	24.7	15.8	0.94	27.9	26.2	24.7	15.8	0.93	26.5	1.4	26.5
				700	25.2	17.2	0.98	28.5	25.7	25.2	17.2	0.97	27.1	1.4	26.0
70	3.0	1.3	3.0	500	22.2	13.9	1.19	26.2	18.7	22.3	13.9	1.16	23.4	2.9	19.3
				600	22.7	15.2	1.22	26.8	18.6	22.8	15.3	1.19	23.9	2.9	19.2
				700	23.1	16.6	1.26	27.4	18.3	23.2	16.6	1.23	24.4	3.0	18.9
	4.5	3.0	6.9	500	22.4	14.1	1.12	26.2	20.0	22.5	14.1	1.10	23.6	2.7	20.5
				600	22.9	15.4	1.15	26.8	19.9	23.0	15.4	1.13	24.1	2.7	20.3
				700	23.4	16.7	1.19	27.4	19.6	23.5	16.8	1.17	24.7	2.8	20.0
	6.0	5.6	12.8	500	22.6	14.1	1.09	26.4	20.8	22.8	14.1	1.08	24.0	2.4	21.1
				600	23.1	15.4	1.12	26.9	20.7	23.2	15.4	1.11	24.5	2.5	21.0
				700	23.6	16.7	1.16	27.5	20.4	23.7	16.8	1.15	25.1	2.6	20.7
90	3.0	1.3	3.0	500	21.0	13.5	1.46	26.0	14.4	21.2	13.6	1.42	21.9	4.1	15.0
				600	21.5	14.8	1.49	26.5	14.4	21.7	14.9	1.45	22.4	4.2	15.0
				700	21.9	16.1	1.54	27.1	14.3	22.1	16.1	1.49	22.9	4.3	14.8
	4.5	2.9	6.7	500	21.2	13.6	1.38	25.9	15.4	21.4	13.7	1.35	22.2	3.8	15.9
				600	21.7	14.9	1.41	26.5	15.4	21.9	15.0	1.38	22.7	3.9	15.9
				700	22.1	16.2	1.45	27.1	15.2	22.3	16.3	1.42	23.2	4.0	15.7
	6.0	5.4	12.5	500	21.4	13.6	1.34	26.0	16.0	21.7	13.7	1.33	22.6	3.5	16.3
				600	21.9	14.9	1.37	26.6	16.0	22.1	15.0	1.35	23.1	3.6	16.3
				700	22.3	16.2	1.41	27.1	15.9	22.6	16.3	1.39	23.6	3.7	16.2
110	3.0	1.3	3.0	500	19.0	12.8	1.83	25.2	10.4	19.3	12.9	1.76	19.9	5.4	10.9
				600	19.4	14.0	1.86	25.7	10.4	19.7	14.1	1.79	20.3	5.5	11.0
				700	19.8	15.2	1.90	26.3	10.4	20.1	15.3	1.84	20.7	5.6	10.9
	4.5	2.8	6.5	500	19.2	12.9	1.73	25.1	11.1	19.5	13.0	1.69	20.2	5.0	11.5
				600	19.6	14.1	1.75	25.6	11.2	19.9	14.2	1.71	20.6	5.1	11.6
				700	20.0	15.4	1.80	26.1	11.1	20.3	15.5	1.76	21.1	5.2	11.5
	6.0	5.2	12.1	500	19.4	12.9	1.68	25.1	11.5	19.7	13.0	1.66	20.7	4.7	11.8
				600	19.8	14.1	1.70	25.6	11.6	20.1	14.2	1.69	21.1	4.7	11.9
				700	20.2	15.4	1.75	26.1	11.5	20.5	15.5	1.73	21.5	4.9	11.8

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P028

Heating Capacity Data

EWT	GPM	WPD		CFM	HEATING ONLY					HEATING WITH HOT WATER					
		PSI	FT		HC	KW	HE	LAT	COP	HC	KW	HE	LAT	HW	COP
30	4.0	1.2	2.8	700	18.5	1.49	13.4	94.5	3.64	15.9	1.45	13.6	91.0	2.6	3.74
				900	18.9	1.52	13.7	89.4	3.63	16.5	1.50	13.7	87.0	2.2	3.68
	5.5	2.1	4.9	700	19.1	1.49	14.0	95.2	3.74	16.3	1.45	14.1	91.6	2.7	3.85
				900	19.5	1.52	14.3	90.0	3.74	17.0	1.49	14.3	87.5	2.3	3.79
	7.0	3.2	7.5	700	19.6	1.51	14.4	95.9	3.80	16.7	1.46	14.6	92.2	2.8	3.91
				900	20.0	1.54	14.7	90.5	3.80	17.5	1.51	14.7	88.0	2.4	3.85
50	4.0	1.2	2.7	700	24.4	1.62	18.9	102.3	4.41	20.7	1.55	19.1	97.4	3.7	4.60
				900	25.0	1.64	19.4	95.7	4.48	21.7	1.59	19.5	92.3	3.2	4.60
	5.5	2.0	4.7	700	25.3	1.63	19.7	103.4	4.53	21.4	1.56	19.9	98.2	3.9	4.73
				900	25.9	1.64	20.3	96.6	4.62	22.5	1.60	20.4	93.1	3.4	4.74
	7.0	3.1	7.2	700	25.8	1.65	20.2	104.1	4.58	21.8	1.58	20.4	98.9	3.9	4.79
				900	26.5	1.66	20.8	97.2	4.67	23.0	1.61	20.9	93.6	3.4	4.80
70	4.0	1.1	2.5	700	30.4	1.79	24.2	110.2	4.96	25.5	1.69	24.5	103.7	4.8	5.24
				900	31.3	1.78	25.2	102.2	5.14	27.1	1.72	25.4	97.8	4.2	5.34
	5.5	2.0	4.5	700	31.4	1.82	25.2	111.6	5.07	26.3	1.71	25.5	104.8	5.0	5.37
				900	32.4	1.80	26.3	103.3	5.27	28.0	1.73	26.5	98.8	4.4	5.49
	7.0	3.0	6.9	700	32.0	1.84	25.7	112.3	5.10	26.8	1.73	26.0	105.4	5.1	5.41
				900	33.0	1.82	26.8	104.0	5.31	28.5	1.75	27.1	99.4	4.5	5.54
90	4.0	1.1	2.5	700	35.7	1.95	29.1	117.3	5.37	29.7	1.81	29.4	109.2	5.9	5.75
				900	37.0	1.91	30.5	108.1	5.68	31.9	1.82	30.9	102.9	5.2	5.98
	5.5	1.9	4.4	700	37.0	1.99	30.3	119.0	5.46	30.7	1.84	30.6	110.6	6.1	5.87
				900	38.4	1.94	31.8	109.5	5.80	33.1	1.85	32.3	104.1	5.4	6.12
	7.0	2.9	6.7	700	37.5	2.01	30.7	119.7	5.47	31.1	1.86	31.0	111.1	6.3	5.89
				900	39.0	1.96	32.3	110.1	5.83	33.6	1.86	32.8	104.5	5.6	6.16

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P028

Cooling Capacity Data

EWT	GPM	WPD		CFM	COOLING ONLY					COOLING WITH HOT WATER					
		PSI	FT		TC	SC	KW	HR	EER	TC	SC	KW	HR	HW	EER
50	4.0	1.2	2.7	500	28.9	19.2	1.27	33.3	22.8	28.9	19.2	1.25	31.3	1.9	23.2
				700	29.9	21.6	1.36	34.5	22.0	29.9	21.6	1.33	32.5	1.9	22.4
				900	30.8	24.3	1.44	35.7	21.4	30.8	24.3	1.42	33.6	2.0	21.7
	5.5	2.0	4.7	500	29.0	19.3	1.22	33.2	23.8	29.0	19.3	1.21	31.4	1.7	24.0
				700	30.0	21.7	1.30	34.4	23.0	30.0	21.7	1.29	32.6	1.8	23.2
				900	30.9	24.4	1.39	35.6	22.3	30.9	24.4	1.37	33.7	1.9	22.5
	7.0	3.1	7.2	500	29.3	19.3	1.20	33.4	24.5	29.3	19.3	1.19	31.8	1.6	24.7
				700	30.3	21.7	1.28	34.6	23.7	30.3	21.7	1.27	33.0	1.6	23.8
				900	31.2	24.4	1.36	35.8	22.9	31.2	24.4	1.35	34.1	1.7	23.1
70	4.0	1.1	2.5	500	26.9	18.5	1.42	31.7	18.9	27.0	18.5	1.39	28.3	3.5	19.4
				700	27.7	20.9	1.51	32.9	18.4	27.9	20.9	1.48	29.3	3.6	18.9
				900	28.6	23.4	1.59	34.0	18.0	28.7	23.4	1.55	30.3	3.7	18.5
	5.5	2.0	4.5	500	27.0	18.5	1.37	31.7	19.7	27.1	18.6	1.35	28.5	3.2	20.1
				700	27.8	20.9	1.45	32.8	19.2	28.0	21.0	1.43	29.5	3.3	19.6
				900	28.7	23.5	1.53	33.9	18.8	28.9	23.5	1.51	30.5	3.5	19.2
	7.0	3.0	6.9	500	27.3	18.6	1.34	31.8	20.3	27.4	18.6	1.33	29.0	3.0	20.6
				700	28.1	21.0	1.43	33.0	19.7	28.3	21.0	1.41	30.0	3.1	20.0
				900	29.0	23.5	1.50	34.1	19.3	29.1	23.6	1.49	31.0	3.2	19.6
90	4.0	1.1	2.5	500	24.8	17.5	1.80	31.0	13.8	25.1	17.5	1.75	26.0	5.0	14.3
				700	25.6	19.8	1.90	32.1	13.5	25.9	19.9	1.85	26.9	5.2	14.0
				900	26.4	22.1	1.98	33.2	13.3	26.7	22.2	1.92	27.8	5.4	13.9
	5.5	1.9	4.4	500	24.9	17.5	1.74	30.9	14.4	25.2	17.6	1.70	26.3	4.7	14.8
				700	25.7	19.8	1.83	32.0	14.1	26.0	19.9	1.79	27.2	4.9	14.5
				900	26.5	22.1	1.91	33.0	13.9	26.8	22.2	1.87	28.1	5.1	14.3
	7.0	2.9	6.7	500	25.2	17.5	1.70	31.0	14.8	25.4	17.6	1.68	26.8	4.4	15.1
				700	26.0	19.9	1.80	32.1	14.5	26.3	20.0	1.78	27.8	4.6	14.8
				900	26.8	22.2	1.87	33.2	14.3	27.1	22.3	1.85	28.7	4.7	14.6
110	4.0	1.1	2.5	500	22.7	16.4	2.24	30.3	10.1	23.0	16.6	2.15	23.7	6.6	10.7
				700	23.4	18.7	2.34	31.4	10.0	23.7	18.8	2.26	24.5	6.9	10.5
				900	24.1	20.8	2.42	32.4	10.0	24.5	21.0	2.33	25.3	7.1	10.5
	5.5	1.8	4.3	500	22.8	16.4	2.15	30.1	10.6	23.1	16.6	2.10	24.1	6.2	11.0
				700	23.5	18.7	2.26	31.2	10.4	23.9	18.8	2.20	24.9	6.5	10.9
				900	24.3	20.8	2.33	32.2	10.4	24.6	21.0	2.27	25.7	6.7	10.9
	7.0	2.8	6.5	500	23.0	16.5	2.11	30.2	10.9	23.4	16.6	2.08	24.7	5.8	11.2
				700	23.8	18.8	2.21	31.3	10.7	24.1	18.9	2.19	25.6	6.0	11.0
				900	24.5	20.9	2.28	32.3	10.7	24.9	21.1	2.25	26.4	6.2	11.0

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P034

Heating Capacity Data

EWT	GPM	WPD		CFM	HEATING ONLY					HEATING WITH HOT WATER					
		PSI	FT		HC	KW	HE	LAT	COP	HC	KW	HE	LAT	HW	COP
30	5.0	2.4	5.4	900	22.5	1.84	16.2	93.1	3.58	19.0	1.79	16.4	89.5	3.5	3.68
				1100	23.0	1.90	16.5	89.3	3.55	19.7	1.84	16.4	86.5	3.1	3.62
	7.0	3.9	9.1	900	23.2	1.86	16.9	93.9	3.66	19.6	1.80	17.0	90.2	3.5	3.77
				1100	23.7	1.92	17.2	90.0	3.63	20.3	1.86	17.2	87.1	3.2	3.70
	9.0	6.2	14.2	900	23.6	1.88	17.2	94.3	3.68	20.0	1.82	17.4	90.6	3.6	3.79
				1100	24.2	1.94	17.6	90.3	3.66	20.7	1.88	17.5	87.4	3.2	3.73
50	5.0	2.2	5.1	900	29.6	2.00	22.8	100.5	4.35	25.2	1.90	23.0	95.9	4.4	4.55
				1100	30.4	2.03	23.5	95.6	4.38	26.4	1.96	23.5	92.2	3.8	4.51
	7.0	3.7	8.7	900	30.7	2.02	23.8	101.5	4.45	26.0	1.92	24.0	96.8	4.5	4.66
				1100	31.5	2.05	24.5	96.5	4.49	27.4	1.98	24.6	93.1	3.9	4.63
	9.0	5.9	13.6	900	31.2	2.04	24.2	102.1	4.47	26.5	1.94	24.5	97.3	4.6	4.69
				1100	32.0	2.07	25.0	97.0	4.53	27.9	2.00	25.1	93.5	4.0	4.67
70	5.0	2.2	5.1	900	35.9	2.16	28.5	107.0	4.87	30.4	2.02	28.8	101.3	5.3	5.18
				1100	37.1	2.17	29.7	101.2	5.00	32.4	2.09	29.9	97.3	4.6	5.20
	7.0	3.6	8.3	900	37.2	2.19	29.7	108.3	4.98	31.5	2.04	30.0	102.4	5.5	5.31
				1100	38.4	2.19	30.9	102.3	5.13	33.7	2.11	31.2	98.3	4.7	5.34
	9.0	5.7	13.1	900	37.8	2.22	30.3	108.9	5.01	32.0	2.06	30.6	102.9	5.6	5.35
				1100	39.1	2.22	31.6	102.9	5.17	34.3	2.13	31.9	98.9	4.8	5.39
90	5.0	2.1	4.9	900	42.0	2.34	34.0	113.2	5.27	35.4	2.14	34.4	106.4	6.3	5.71
				1100	43.6	2.31	35.7	106.7	5.52	38.4	2.21	36.2	102.3	5.4	5.80
	7.0	3.5	8.1	900	43.5	2.37	35.4	114.7	5.38	36.6	2.16	35.8	107.7	6.5	5.85
				1100	45.2	2.34	37.2	108.0	5.67	39.9	2.23	37.8	103.6	5.5	5.96
	9.0	5.5	12.7	900	44.3	2.39	36.1	115.5	5.41	37.3	2.18	36.4	108.3	6.6	5.90
				1100	46.0	2.36	38.0	108.7	5.72	40.7	2.25	38.6	104.2	5.6	6.02

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P034

Cooling Capacity Data

EWT	GPM	WPD		CFM	COOLING ONLY					COOLING WITH HOT WATER					
		PSI	FT		TC	SC	KW	HR	EER	TC	SC	KW	HR	HW	EER
50	5.0	2.2	5.1	700	35.7	21.0	1.39	40.4	25.7	35.7	21.0	1.37	37.9	2.4	26.0
				900	36.8	23.3	1.49	41.9	24.8	36.8	23.3	1.47	39.3	2.5	25.0
				1100	37.6	25.5	1.63	43.1	23.0	37.6	25.5	1.62	40.5	2.6	23.2
	7.0	3.7	8.7	700	35.9	21.0	1.34	40.4	26.9	35.9	21.0	1.33	38.1	2.3	27.0
				900	37.0	23.3	1.43	41.9	25.9	37.0	23.3	1.42	39.5	2.4	26.0
				1100	37.8	25.6	1.57	43.1	24.0	37.8	25.6	1.56	40.6	2.5	24.2
	9.0	5.9	13.6	700	36.1	21.1	1.31	40.5	27.5	36.1	21.1	1.31	38.4	2.2	27.5
				900	37.2	23.4	1.40	42.0	26.5	37.2	23.4	1.40	39.7	2.2	26.5
				1100	38.0	25.7	1.54	43.2	24.6	38.0	25.7	1.54	40.9	2.3	24.6
70	5.0	2.2	5.1	700	32.8	19.7	1.62	38.3	20.2	32.9	19.7	1.60	34.4	4.0	20.6
				900	33.8	21.9	1.72	39.7	19.7	34.0	21.9	1.69	35.6	4.2	20.1
				1100	34.5	24.0	1.87	40.9	18.5	34.7	24.0	1.84	36.6	4.3	18.8
	7.0	3.6	8.3	700	33.2	19.9	1.57	38.5	21.1	33.4	19.9	1.55	34.9	3.8	21.5
				900	34.2	22.1	1.66	39.9	20.6	34.4	22.1	1.64	36.1	3.9	20.9
				1100	34.9	24.3	1.81	41.1	19.4	35.1	24.3	1.79	37.2	4.0	19.6
	9.0	5.7	13.1	700	33.4	20.0	1.54	38.7	21.7	33.6	20.0	1.53	35.4	3.5	21.9
				900	34.5	22.2	1.63	40.1	21.2	34.7	22.2	1.62	36.6	3.6	21.4
				1100	35.2	24.3	1.77	41.2	19.9	35.4	24.3	1.76	37.7	3.7	20.1
90	5.0	2.1	4.9	700	31.7	19.3	2.01	38.5	15.7	32.0	19.3	1.97	33.1	5.6	16.2
				900	32.7	21.5	2.11	39.8	15.5	33.0	21.5	2.06	34.2	5.8	16.0
				1100	33.3	23.6	2.26	41.1	14.7	33.7	23.6	2.22	35.2	6.0	15.2
	7.0	3.5	8.1	700	32.3	19.7	1.96	39.0	16.5	32.6	19.7	1.93	34.0	5.2	16.9
				900	33.3	21.8	2.05	40.3	16.3	33.7	21.8	2.01	35.2	5.4	16.7
				1100	34.0	24.0	2.20	41.5	15.5	34.4	24.0	2.17	36.2	5.6	15.9
	9.0	5.5	12.7	700	32.6	19.7	1.92	39.2	17.0	33.0	19.7	1.90	34.7	4.8	17.4
				900	33.7	21.9	2.01	40.5	16.8	34.0	21.9	1.99	35.8	5.0	17.1
				1100	34.4	24.1	2.16	41.7	15.9	34.7	24.1	2.13	36.9	5.1	16.3
110	5.0	2.0	4.7	700	28.6	18.1	2.44	36.9	11.7	29.0	18.1	2.38	29.9	7.2	12.2
				900	29.5	20.1	2.52	38.1	11.7	29.9	20.1	2.46	30.8	7.5	12.2
				1100	30.1	22.1	2.69	39.2	11.2	30.5	22.1	2.62	31.8	7.7	11.7
	7.0	3.4	7.8	700	29.4	18.5	2.39	37.5	12.3	29.8	18.5	2.34	31.1	6.7	12.8
				900	30.3	20.6	2.46	38.7	12.3	30.8	20.6	2.41	32.1	6.9	12.7
				1100	30.9	22.6	2.62	39.9	11.8	31.4	22.6	2.57	33.1	7.1	12.2
	9.0	5.3	12.3	700	29.8	18.6	2.34	37.7	12.7	30.2	18.6	2.30	32.0	6.1	13.1
				900	30.7	20.6	2.42	38.9	12.7	31.2	20.6	2.38	33.0	6.3	13.1
				1100	31.3	22.7	2.57	40.1	12.2	31.8	22.7	2.53	33.9	6.5	12.6

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P040

Heating Capacity Data

EWT	GPM	WPD		CFM	HEATING ONLY					HEATING WITH HOT WATER					
		PSI	FT		HC	KW	HE	LAT	COP	HC	KW	HE	LAT	HW	COP
30	5.0	2.1	4.9	1000	27.3	2.19	19.8	95.3	3.65	23.0	2.11	20.0	91.3	4.2	3.78
				1300	27.6	2.18	20.2	89.6	3.71	23.5	2.12	20.1	86.7	3.9	3.79
	8.0	4.7	10.9	1000	28.2	2.22	20.6	96.1	3.72	23.7	2.13	20.8	91.9	4.4	3.86
				1300	28.5	2.20	21.0	90.3	3.80	24.3	2.13	21.0	87.3	4.0	3.88
	11.0	9.5	21.9	1000	28.6	2.22	21.0	96.5	3.77	24.0	2.13	21.2	92.2	4.5	3.92
				1300	28.9	2.20	21.4	90.6	3.86	24.6	2.13	21.4	87.5	4.1	3.95
50	5.0	2.0	4.6	1000	35.8	2.36	27.7	103.1	4.44	30.3	2.25	28.0	98.0	5.4	4.64
				1300	36.4	2.32	28.5	95.9	4.60	31.5	2.23	28.6	92.4	4.7	4.75
	8.0	4.5	10.4	1000	37.2	2.42	29.0	104.5	4.51	31.5	2.30	29.3	99.1	5.7	4.73
				1300	37.9	2.36	29.8	97.0	4.70	32.8	2.27	30.0	93.4	4.9	4.87
	11.0	9.0	20.8	1000	38.0	2.43	29.7	105.2	4.57	32.1	2.31	30.0	99.7	5.8	4.80
				1300	38.7	2.38	30.6	97.6	4.78	33.5	2.28	30.8	93.9	5.0	4.95
70	5.0	2.0	4.6	1000	43.9	2.54	35.3	110.7	5.07	37.2	2.40	35.6	104.5	6.6	5.36
				1300	45.0	2.45	36.6	102.0	5.37	39.4	2.34	36.9	98.0	5.5	5.62
	8.0	4.3	9.9	1000	46.1	2.63	37.1	112.7	5.14	39.0	2.47	37.5	106.1	6.9	5.44
				1300	47.2	2.53	38.6	103.6	5.47	41.4	2.41	39.0	99.5	5.8	5.74
	11.0	8.7	20.1	1000	47.3	2.66	38.2	113.8	5.21	40.0	2.50	38.6	107.0	7.1	5.52
				1300	48.5	2.56	39.8	104.6	5.56	42.6	2.43	40.2	100.3	5.9	5.85
90	5.0	2.0	4.6	1000	50.2	2.68	41.0	116.4	5.47	42.1	2.51	41.4	109.0	7.8	5.84
				1300	51.7	2.56	43.0	106.8	5.92	45.4	2.42	43.5	102.3	6.4	6.27
	8.0	4.2	9.7	1000	52.9	2.81	43.3	119.0	5.52	44.5	2.62	43.8	111.2	8.2	5.90
				1300	54.7	2.67	45.5	108.9	6.00	48.1	2.51	46.2	104.3	6.7	6.39
	11.0	8.4	19.4	1000	54.6	2.86	44.8	120.5	5.59	45.9	2.66	45.3	112.5	8.4	5.99
				1300	56.4	2.71	47.2	110.2	6.11	49.8	2.55	47.9	105.5	6.8	6.51

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P040

Cooling Capacity Data

EWT	GPM	WPD		CFM	COOLING ONLY					COOLING WITH HOT WATER					
		PSI	FT		TC	SC	KW	HR	EER	TC	SC	KW	HR	HW	EER
50	5.0	2.0	4.6	800	41.9	23.5	1.71	47.7	24.4	41.9	23.5	1.68	44.3	3.3	24.9
				1000	44.7	27.5	1.83	50.9	24.4	44.7	27.5	1.79	47.2	3.5	24.9
				1300	46.5	30.9	1.92	53.1	24.2	46.5	30.9	1.89	49.2	3.7	24.7
	8.0	4.5	10.4	800	42.3	23.7	1.63	47.9	25.9	42.3	23.7	1.61	44.6	3.1	26.2
				1000	45.1	27.8	1.74	51.1	25.9	45.1	27.8	1.72	47.6	3.4	26.2
				1300	47.0	31.2	1.84	53.3	25.6	47.0	31.2	1.81	49.7	3.5	25.9
	11.0	9.0	20.8	800	42.7	23.7	1.59	48.1	26.9	42.7	23.7	1.58	45.1	3.0	27.1
				1000	45.6	27.8	1.69	51.3	26.9	45.6	27.8	1.68	48.1	3.2	27.1
				1300	47.5	31.2	1.78	53.5	26.6	47.5	31.2	1.77	50.2	3.3	26.8
70	5.0	2.0	4.6	800	39.4	22.7	1.99	46.1	19.8	39.5	22.7	1.94	40.9	5.2	20.4
				1000	41.7	26.5	2.10	48.9	19.9	41.9	26.6	2.04	43.4	5.5	20.5
				1300	43.2	29.8	2.20	50.7	19.7	43.5	29.9	2.14	45.0	5.8	20.3
	8.0	4.3	9.9	800	40.0	22.9	1.89	46.4	21.2	40.2	22.9	1.86	41.6	4.9	21.6
				1000	42.4	26.8	1.99	49.2	21.3	42.6	26.9	1.96	44.1	5.2	21.7
				1300	43.9	30.1	2.08	51.0	21.1	44.1	30.2	2.05	45.7	5.4	21.5
	11.0	8.7	20.1	800	40.4	22.9	1.83	46.6	22.0	40.6	22.9	1.82	42.2	4.5	22.3
				1000	42.8	26.8	1.93	49.4	22.1	43.0	26.9	1.92	44.7	4.8	22.4
				1300	44.4	30.1	2.02	51.3	21.9	44.6	30.2	2.01	46.4	5.0	22.2
90	5.0	2.0	4.6	800	37.7	21.9	2.56	46.4	14.7	38.1	22.0	2.48	39.4	7.2	15.4
				1000	39.8	25.6	2.67	48.9	14.9	40.2	25.8	2.59	41.4	7.6	15.5
				1300	41.0	28.8	2.78	50.5	14.7	41.4	29.0	2.70	42.8	7.8	15.4
	8.0	4.2	9.7	800	38.5	22.1	2.42	46.7	15.9	38.9	22.2	2.37	40.3	6.7	16.4
				1000	40.6	25.9	2.52	49.2	16.1	41.0	26.0	2.47	42.4	7.0	16.6
				1300	41.8	29.1	2.63	50.8	15.9	42.2	29.2	2.57	43.8	7.3	16.4
	11.0	8.4	19.4	800	38.9	22.1	2.35	46.9	16.6	39.3	22.2	2.32	41.0	6.2	16.9
				1000	41.0	25.9	2.45	49.3	16.7	41.4	26.0	2.42	43.2	6.5	17.1
				1300	42.3	29.1	2.55	51.0	16.6	42.7	29.2	2.52	44.6	6.7	16.9
110	5.0	1.9	4.6	800	34.8	20.8	3.13	45.5	11.1	35.4	20.9	3.02	36.5	9.2	11.7
				1000	36.5	24.3	3.23	47.6	11.3	37.1	24.5	3.12	38.1	9.6	11.9
				1300	37.5	27.3	3.35	48.9	11.2	38.0	27.5	3.23	39.2	9.9	11.8
	8.0	4.1	9.4	800	35.7	21.0	2.95	45.8	12.1	36.3	21.1	2.88	37.6	8.5	12.6
				1000	37.5	24.6	3.04	47.8	12.3	38.0	24.8	2.97	39.3	8.9	12.8
				1300	38.4	27.6	3.15	49.2	12.2	39.0	27.8	3.08	40.4	9.1	12.7
	11.0	8.1	18.8	800	36.1	21.0	2.86	45.9	12.6	36.6	21.1	2.83	38.5	7.8	13.0
				1000	37.8	24.6	2.95	47.9	12.8	38.4	24.8	2.92	40.2	8.2	13.2
				1300	38.8	27.6	3.06	49.3	12.7	39.4	27.8	3.02	41.3	8.4	13.0

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P046

Heating Capacity Data

EWT	GPM	WPD		CFM	HEATING ONLY					HEATING WITH HOT WATER					
		PSI	FT		HC	KW	HE	LAT	COP	HC	KW	HE	LAT	HW	COP
30	6.0	2.7	6.2	1200	31.8	2.54	23.2	94.6	3.67	26.9	2.44	23.4	90.7	4.8	3.80
				1500	32.4	2.58	23.6	90.0	3.68	27.6	2.50	23.6	87.0	4.5	3.76
	9.0	5.5	12.7	1200	33.0	2.60	24.1	95.4	3.72	27.9	2.50	24.3	91.5	5.0	3.86
				1500	33.6	2.63	24.6	90.7	3.74	28.6	2.55	24.6	87.7	4.6	3.82
	12.0	8.8	20.3	1200	33.5	2.60	24.6	95.8	3.77	28.3	2.50	24.8	91.8	5.1	3.91
				1500	34.1	2.63	25.1	91.0	3.79	29.1	2.55	25.1	88.0	4.7	3.88
50	6.0	2.6	6.0	1200	41.3	2.83	31.6	101.9	4.28	35.1	2.70	32.0	97.1	6.1	4.48
				1500	42.1	2.82	32.5	96.0	4.39	36.6	2.72	32.7	92.6	5.4	4.52
	9.0	5.2	12.0	1200	43.0	2.90	33.1	103.2	4.35	36.6	2.75	33.4	98.2	6.3	4.56
				1500	43.9	2.87	34.1	97.1	4.48	38.2	2.77	34.3	93.6	5.5	4.62
	12.0	8.3	19.2	1200	43.7	2.92	33.8	103.7	4.39	37.2	2.77	34.1	98.7	6.4	4.61
				1500	44.7	2.89	34.8	97.6	4.53	38.9	2.79	35.0	94.0	5.6	4.68
70	6.0	.2	6.0	1200	50.4	3.05	40.0	108.9	4.85	43.0	2.87	40.4	103.2	7.3	5.12
				1500	51.7	2.98	41.6	101.9	5.09	45.5	2.86	41.9	98.1	6.2	5.29
	9.0	4.7	10.9	1200	52.8	3.12	42.1	110.7	4.95	45.0	2.94	42.5	104.7	7.5	5.24
				1500	54.2	3.04	43.8	103.4	5.22	47.8	2.92	44.2	99.5	6.4	5.44
	12.0	7.6	17.6	1200	53.7	3.16	42.9	111.4	4.98	45.8	2.97	43.3	105.3	7.7	5.27
				1500	55.2	3.07	44.7	104.1	5.27	48.7	2.95	45.1	100.1	6.5	5.49
90	6.0	2.1	4.9	1200	62.3	3.42	50.6	118.0	5.34	53.6	3.19	51.1	111.3	8.4	5.69
				1500	64.2	3.28	53.0	109.6	5.74	57.4	3.14	53.7	105.4	7.0	6.01
	9.0	4.6	10.6	1200	65.4	3.50	53.5	120.5	5.47	56.4	3.26	54.0	113.5	8.8	5.85
				1500	67.6	3.35	56.2	111.7	5.92	60.6	3.20	57.0	107.4	7.2	6.21
	12.0	7.4	17.1	1200	66.6	3.57	54.5	121.4	5.47	57.4	3.32	55.0	114.3	9.0	5.86
				1500	68.9	3.40	57.3	112.5	5.94	61.9	3.25	58.2	108.2	7.4	6.25

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P046

Cooling Capacity Data

EWT	GPM	WPD		CFM	COOLING ONLY					COOLING WITH HOT WATER					
		PSI	FT		TC	SC	KW	HR	EER	TC	SC	KW	HR	HW	EER
50	6.0	2.6	6.0	1000	48.8	29.5	2.08	55.9	23.5	48.8	29.5	2.03	51.8	4.0	24.0
				1200	50.4	32.3	2.17	57.8	23.2	50.4	32.3	2.13	53.5	4.1	23.7
				1500	51.4	35.5	2.31	59.3	22.3	51.4	35.5	2.26	54.9	4.2	22.7
	9.0	5.2	12.0	1000	48.9	29.5	2.00	55.7	24.5	48.9	29.5	1.97	51.8	3.8	24.8
				1200	50.4	32.4	2.09	57.5	24.2	50.4	32.4	2.06	53.5	3.9	24.5
				1500	51.5	35.6	2.22	59.0	23.2	51.5	35.6	2.19	54.9	4.0	23.5
	12.0	8.3	19.2	1000	49.4	29.6	1.94	56.0	25.4	49.4	29.6	1.92	52.3	3.6	25.7
				1200	50.9	32.5	2.03	57.8	25.1	50.9	32.5	2.01	54.1	3.7	25.4
				1500	52.0	35.7	2.16	59.3	24.1	52.0	35.7	2.13	55.5	3.8	24.3
70	6.0	2.2	6.0	1000	47.0	30.3	2.47	55.4	19.0	47.2	30.4	2.41	49.4	6.0	19.6
				1200	48.4	33.2	2.54	57.1	19.1	48.7	33.3	2.47	50.9	6.2	19.7
				1500	49.4	36.5	2.70	58.6	18.3	49.7	36.6	2.63	52.3	6.4	18.9
	9.0	4.7	10.8	1000	47.2	30.4	2.39	55.4	19.8	47.5	30.5	2.34	49.8	5.7	20.3
				1200	48.7	33.4	2.45	57.1	19.8	48.9	33.5	2.41	51.3	5.8	20.4
				1500	49.7	36.7	2.61	58.6	19.0	49.9	36.8	2.56	52.7	6.0	19.5
	12.0	7.6	17.5	1000	47.7	30.5	2.33	55.6	20.5	47.9	30.6	2.30	50.5	5.3	20.9
				1200	49.2	33.5	2.39	57.4	20.5	49.4	33.5	2.36	52.0	5.5	21.0
				1500	50.2	36.8	2.55	58.9	19.7	50.5	36.9	2.51	53.4	5.6	20.1
90	6.0	2.1	4.8	1000	43.3	28.3	3.00	53.6	14.5	43.8	28.4	2.91	45.5	8.1	15.1
				1200	44.7	31.0	3.03	55.0	14.8	45.1	31.1	2.94	46.8	8.4	15.4
				1500	45.6	34.1	3.22	56.6	14.2	46.1	34.2	3.13	48.1	8.6	14.7
	9.0	4.6	10.6	1000	43.8	28.5	2.91	53.7	15.0	44.2	28.6	2.84	46.3	7.6	15.6
				1200	45.2	31.2	2.94	55.2	15.3	45.6	31.4	2.87	47.6	7.8	15.9
				1500	46.1	34.3	3.13	56.8	14.7	46.5	34.5	3.05	49.0	8.0	15.2
	12.0	7.4	17.1	1000	44.2	28.6	2.85	54.0	15.5	44.7	28.7	2.80	47.2	7.0	16.0
				1200	45.6	31.3	2.88	55.5	15.8	46.1	31.5	2.83	48.5	7.2	16.3
				1500	46.5	34.4	3.07	57.0	15.2	47.0	34.6	3.01	49.9	7.4	15.6
110	6.0	2.0	4.7	1000	38.2	27.0	3.67	50.8	10.4	38.8	27.2	3.54	40.6	10.2	11.0
				1200	39.4	29.6	3.65	51.9	10.8	40.0	29.8	3.52	41.6	10.5	11.4
				1500	40.2	32.5	3.88	53.5	10.4	40.9	32.8	3.75	42.8	10.8	10.9
	9.0	4.5	10.3	1000	38.8	27.3	3.58	51.0	10.8	39.4	27.5	3.47	41.7	9.5	11.3
				1200	40.0	29.9	3.56	52.2	11.2	40.6	30.2	3.45	42.7	9.7	11.8
				1500	40.8	32.9	3.79	53.8	10.8	41.5	33.1	3.67	44.0	10.0	11.3
	12.0	7.2	16.6	1000	39.2	27.3	3.53	51.2	11.1	39.8	27.5	3.44	42.8	8.7	11.6
				1200	40.4	30.0	3.51	52.4	11.5	41.0	30.2	3.42	43.8	8.9	12.0
				1500	41.3	32.9	3.73	54.0	11.1	41.9	33.2	3.64	45.1	9.2	11.5

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P056

Heating Capacity Data

EWT	GPM	WPD		CFM	HEATING ONLY					HEATING WITH HOT WATER					
		PSI	FT		HC	KW	HE	LAT	COP	HC	KW	HE	LAT	HW	COP
30	8.0	3.0	6.9	1400	40.8	3.34	29.4	97.0	3.58	34.9	3.28	28.8	93.1	5.1	3.57
				1800	41.6	3.40	30.0	91.4	3.58	36.9	3.33	30.3	89.0	4.8	3.66
	11.0	5.5	12.7	1400	41.7	3.37	30.2	97.6	3.62	35.6	3.31	29.6	93.5	5.3	3.62
				1800	42.5	3.44	30.8	91.9	3.63	37.6	3.37	31.1	89.4	5.0	3.71
	14.0	8.6	19.9	1400	43.0	3.38	31.5	98.4	3.73	36.7	3.31	30.8	94.3	5.4	3.73
				1800	43.8	3.44	32.1	92.5	3.74	38.8	3.37	32.4	90.0	5.1	3.82
50	8.0	2.9	6.7	1400	53.8	3.67	41.2	105.6	4.29	45.5	3.57	40.4	100.1	7.1	4.32
				1800	54.7	3.71	42.1	98.2	4.32	48.3	3.64	42.2	94.9	6.3	4.40
	11.0	5.2	12.0	1400	55.4	3.71	42.7	106.6	4.37	46.8	3.61	41.8	100.9	7.4	4.40
				1800	56.4	3.75	43.6	99.0	4.40	49.6	3.67	43.6	95.5	6.5	4.48
	14.0	7.2	16.6	1400	56.8	3.74	44.0	107.5	4.45	48.0	3.62	43.1	101.7	7.5	4.49
				1800	57.8	3.77	44.9	99.7	4.49	50.9	3.69	44.9	96.2	6.6	4.56
70	8.0	2.8	6.2	1400	69.1	4.09	55.1	115.7	4.95	58.5	3.94	54.0	108.7	9.0	5.02
				1800	70.2	4.10	56.2	106.1	5.02	61.9	4.02	55.9	101.9	7.7	5.07
	11.0	4.8	11.1	1400	71.6	4.14	57.5	117.3	5.07	60.5	3.98	56.3	110.0	9.4	5.15
				1800	72.8	4.14	58.6	107.4	5.15	64.0	4.06	58.2	102.9	8.0	5.20
	14.0	7.0	16.2	1400	72.9	4.19	58.6	118.2	5.10	61.6	4.02	57.5	110.7	9.6	5.19
				1800	74.1	4.19	59.8	108.1	5.19	65.1	4.10	59.3	103.5	8.2	5.23
90	8.0	2.7	6.2	1400	83.4	4.48	68.1	125.1	5.45	70.4	4.27	66.7	116.5	10.9	5.57
				1800	84.7	4.46	69.5	113.6	5.57	74.2	4.37	68.4	108.2	9.1	5.59
	11.0	4.7	10.9	1400	86.9	4.54	71.5	127.5	5.61	73.3	4.32	70.0	118.5	11.4	5.75
				1800	88.3	4.50	72.9	115.4	5.74	77.3	4.41	71.7	109.7	9.5	5.76
	14.0	6.8	15.7	1400	87.9	4.61	72.2	128.1	5.59	74.0	4.38	70.7	118.9	11.7	5.73
				1800	89.3	4.57	73.7	115.9	5.72	77.9	4.48	72.3	110.1	9.7	5.73

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P056

Cooling Capacity Data

EWT	GPM	WPD		CFM	COOLING ONLY					COOLING WITH HOT WATER					
		PSI	FT		TC	SC	KW	HR	EER	TC	SC	KW	HR	HW	EER
50	8.0	2.9	6.7	1200	59.9	37.3	2.49	68.4	24.0	59.9	37.3	2.47	64.0	4.3	24.3
				1400	60.9	40.2	2.57	69.7	23.8	60.9	40.2	2.54	65.3	4.3	24.0
				1800	62.6	44.1	2.80	72.1	22.3	62.6	44.1	2.77	67.5	4.5	22.6
	11.0	5.2	12.0	1200	60.0	37.4	2.40	68.2	24.9	60.0	37.3	2.38	64.0	4.2	25.2
				1400	61.1	40.3	2.47	69.5	24.7	61.1	40.2	2.45	65.2	4.3	25.0
				1800	62.7	44.2	2.70	71.9	23.2	62.8	44.1	2.68	67.5	4.4	23.5
	14.0	7.2	16.6	1200	60.6	37.5	2.39	68.7	25.3	60.6	37.4	2.37	64.6	4.1	25.6
				1400	61.7	40.5	2.46	70.1	25.1	61.7	40.3	2.44	65.9	4.2	25.4
				1800	63.3	44.4	2.69	72.5	23.6	63.4	44.2	2.66	68.2	4.3	23.8
70	8.0	2.8	6.2	1200	57.4	36.5	3.02	67.7	19.0	57.6	36.8	2.99	60.9	6.9	19.3
				1400	58.8	39.7	3.10	69.4	19.0	59.0	40.0	3.06	62.4	7.0	19.3
				1800	60.2	43.6	3.32	71.5	18.2	60.4	43.9	3.28	64.4	7.3	18.4
	11.0	4.8	11.1	1200	57.7	36.8	2.90	67.6	19.9	57.8	36.8	2.87	61.1	6.5	20.2
				1400	59.1	40.0	2.98	69.3	19.8	59.3	40.0	2.94	62.6	6.7	20.1
				1800	60.5	43.9	3.19	71.4	19.0	60.6	44.0	3.15	64.5	6.9	19.2
	14.0	7.0	16.2	1200	58.2	37.0	2.87	68.0	20.3	58.3	37.0	2.82	61.8	6.2	20.7
				1400	59.7	40.3	2.94	69.7	20.3	59.8	40.2	2.90	63.4	6.3	20.6
				1800	61.1	44.2	3.15	71.9	19.4	61.2	44.1	3.10	65.3	6.5	19.7
90	8.0	2.7	6.2	1200	53.6	34.6	3.74	66.4	14.3	54.0	35.1	3.70	57.2	9.5	14.6
				1400	55.3	38.0	3.83	68.4	14.4	55.7	38.5	3.79	58.9	9.7	14.7
				1800	56.5	41.7	4.03	70.2	14.0	56.9	42.3	3.98	60.5	10.0	14.3
	11.0	4.7	10.9	1200	54.0	35.0	3.59	66.3	15.0	54.3	35.2	3.54	57.5	8.8	15.3
				1400	55.8	38.4	3.68	68.3	15.2	56.0	38.6	3.62	59.3	9.1	15.5
				1800	56.9	42.2	3.87	70.1	14.7	57.1	42.4	3.81	60.8	9.4	15.0
	14.0	6.8	15.7	1200	54.6	35.3	3.53	66.6	15.5	54.7	35.3	3.46	58.3	8.2	15.8
				1400	56.3	38.8	3.61	68.6	15.6	56.4	38.8	3.54	60.0	8.5	15.9
				1800	57.5	42.6	3.79	70.4	15.1	57.6	42.6	3.72	61.6	8.7	15.5
110	8.0	2.6	6.1	1200	48.5	32.6	4.68	64.5	10.4	49.0	33.2	4.63	52.7	12.1	10.6
				1400	50.4	36.0	4.78	66.7	10.5	50.9	36.7	4.73	54.6	12.5	10.8
				1800	51.2	39.6	4.93	68.1	10.4	51.8	40.4	4.88	55.7	12.8	10.6
	11.0	4.6	10.5	1200	49.0	33.0	4.49	64.3	10.9	49.3	33.4	4.41	53.1	11.2	11.2
				1400	50.9	36.5	4.58	66.5	11.1	51.2	36.9	4.50	55.0	11.6	11.4
				1800	51.8	40.2	4.73	67.9	11.0	52.1	40.6	4.64	56.1	11.8	11.2
	14.0	6.6	15.2	1200	49.5	33.4	4.37	64.4	11.3	49.6	33.5	4.26	53.9	10.3	11.6
				1400	51.4	37.0	4.47	66.7	11.5	51.5	37.1	4.36	55.7	10.7	11.8
				1800	52.3	40.7	4.61	68.0	11.3	52.4	40.8	4.49	56.9	10.9	11.7

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P066

Heating Capacity Data

EWT	GPM	WPD		CFM	HEATING ONLY					HEATING WITH HOT WATER					
		PSI	FT		HC	KW	HE	LAT	COP	HC	KW	HE	LAT	HW	COP
30	10.0	4.3	9.9	1700	49.8	4.19	35.5	97.1	3.48	43.9	4.06	35.4	93.9	5.3	3.55
				2200	51.0	4.29	36.4	91.5	3.48	45.8	4.23	36.4	89.3	5.1	3.52
	13.0	7.0	16.2	1700	50.1	4.20	35.8	97.3	3.49	43.9	4.06	35.6	93.9	5.5	3.57
				2200	51.3	4.29	36.7	91.6	3.50	45.8	4.23	36.7	89.3	5.3	3.54
	16.0	10.7	24.7	1700	50.3	4.22	35.9	97.4	3.49	43.9	4.07	35.7	93.9	5.7	3.57
				2200	51.5	4.30	36.8	91.7	3.51	45.9	4.24	36.9	89.3	5.4	3.55
50	10.0	4.0	9.2	1700	60.6	4.94	43.7	103.0	3.59	51.0	4.69	43.3	97.8	8.3	3.71
				2200	62.0	4.96	45.1	96.1	3.67	54.5	4.83	45.2	92.9	7.2	3.75
	13.0	6.7	15.5	1700	61.8	4.99	44.8	103.7	3.63	51.9	4.73	44.4	98.3	8.6	3.75
				2200	63.3	4.99	46.3	96.6	3.71	55.5	4.86	46.4	93.4	7.4	3.80
	16.0	10.3	23.8	1700	62.3	5.02	45.2	104.0	3.64	52.2	4.75	44.8	98.4	8.8	3.76
				2200	63.9	5.02	46.7	96.9	3.73	55.9	4.88	46.9	93.5	7.6	3.82
70	10.0	3.5	8.1	1700	81.4	5.18	63.7	114.3	4.61	68.5	4.83	63.0	107.3	11.0	4.82
				2200	83.7	5.11	66.3	105.2	4.80	74.2	4.91	66.5	101.2	9.0	4.97
	13.0	5.8	13.4	1700	84.4	5.27	66.4	116.0	4.69	71.0	4.91	65.6	108.7	11.4	4.92
				2200	86.9	5.18	69.2	106.6	4.91	77.1	4.98	69.4	102.4	9.3	5.09
	16.0	8.9	20.6	1700	85.6	5.32	67.5	116.6	4.72	71.8	4.94	66.6	109.1	11.7	4.95
				2200	88.1	5.22	70.3	107.1	4.95	78.1	5.01	70.6	102.9	9.6	5.13
90	10.0	3.4	7.9	1700	95.7	5.80	75.9	122.1	4.84	78.9	5.31	74.7	113.0	13.9	5.12
				2200	98.7	5.61	79.5	111.5	5.16	87.1	5.33	79.9	106.6	11.1	5.40
	13.0	5.6	12.9	1700	100.9	5.95	80.6	124.9	4.97	83.4	5.43	79.2	115.4	14.3	5.28
				2200	104.1	5.74	84.5	113.8	5.32	92.1	5.44	85.0	108.8	11.4	5.58
	16.0	8.6	19.9	1700	102.6	6.01	82.1	125.9	5.00	84.7	5.48	80.7	116.1	14.7	5.32
				2200	106.2	5.79	86.4	114.7	5.37	93.9	5.48	86.9	109.5	11.7	5.65

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

P066

Cooling Capacity Data

EWT	GPM	WPD		CFM	COOLING ONLY					COOLING WITH HOT WATER					
		PSI	FT		TC	SC	KW	HR	EER	TC	SC	KW	HR	HW	EER
50	10.0	4.0	9.2	1400	64.7	40.5	3.23	75.7	20.0	65.3	40.6	3.22	71.0	5.4	20.3
				1700	65.8	44.1	3.35	77.3	19.6	66.5	44.3	3.34	72.4	5.5	19.9
				2200	69.6	50.5	3.82	82.6	18.2	70.3	50.6	3.80	77.4	5.8	18.5
	13.0	6.7	15.5	1400	65.0	40.7	3.14	75.7	20.7	65.5	40.7	3.11	71.3	4.8	21.1
				1700	66.2	44.4	3.25	77.3	20.3	66.7	44.4	3.22	72.8	4.9	20.7
				2200	69.9	50.7	3.70	82.6	18.9	70.5	50.8	3.67	77.8	5.2	19.2
	16.0	10.3	23.8	1400	65.7	40.9	3.11	76.3	21.1	66.0	40.9	3.06	72.3	4.2	21.6
				1700	66.8	44.6	3.22	77.8	20.7	67.2	44.6	3.17	73.7	4.3	21.2
				2200	70.6	51.0	3.67	83.2	19.3	71.0	51.0	3.61	78.8	4.6	19.7
70	10.0	3.5	8.1	1400	61.9	38.8	3.87	75.1	16.0	62.5	39.1	3.81	67.6	7.9	16.4
				1700	63.5	42.9	4.00	77.2	15.9	64.2	43.1	3.94	69.5	8.1	16.3
				2200	66.6	49.1	4.45	81.8	15.0	67.3	49.4	4.39	73.7	8.6	15.3
	13.0	5.8	13.4	1400	62.1	38.9	3.76	74.9	16.5	62.6	39.1	3.71	67.9	7.3	16.9
				1700	63.8	42.9	3.89	77.0	16.4	64.2	43.1	3.83	69.8	7.5	16.8
				2200	66.9	49.2	4.33	81.6	15.5	67.4	49.4	4.27	74.0	7.9	15.8
	16.0	8.9	20.6	1400	63.0	39.8	3.70	75.7	17.1	63.3	39.9	3.64	69.1	6.7	17.4
				1700	64.7	43.9	3.82	77.8	16.9	65.0	44.0	3.77	71.0	6.9	17.3
				2200	67.9	50.3	4.26	82.4	15.9	68.2	50.4	4.19	75.2	7.3	16.3
90	10.0	3.4	7.9	1400	60.2	37.4	4.74	76.4	12.7	60.8	37.8	4.62	66.2	10.5	13.2
				1700	62.4	41.8	4.89	79.1	12.8	63.0	42.3	4.77	68.5	10.8	13.2
				2200	64.9	48.0	5.32	83.1	12.2	65.6	48.5	5.19	71.9	11.4	12.6
	13.0	5.6	12.9	1400	60.4	37.4	4.61	76.1	13.1	60.8	37.7	4.52	66.4	9.8	13.5
				1700	62.6	41.8	4.76	78.8	13.1	63.0	42.1	4.67	68.8	10.2	13.5
				2200	65.1	47.9	5.18	82.8	12.6	65.5	48.3	5.08	72.2	10.7	12.9
	16.0	8.6	19.9	1400	61.6	38.9	4.50	77.0	13.7	61.8	39.1	4.44	67.8	9.2	13.9
				1700	63.8	43.4	4.65	79.7	13.7	64.1	43.7	4.58	70.2	9.5	14.0
				2200	66.4	49.8	5.06	83.6	13.1	66.6	50.1	4.99	73.6	10.0	13.4
110	10.0	3.3	7.6	1400	52.2	32.9	5.86	72.2	8.9	52.7	33.3	5.66	59.0	13.1	9.3
				1700	54.6	37.2	6.04	75.2	9.0	55.1	37.7	5.82	61.4	13.6	9.5
				2200	56.3	42.7	6.43	78.2	8.8	56.9	43.3	6.20	63.9	14.1	9.2
	13.0	5.4	12.5	1400	52.3	32.7	5.72	71.8	9.1	52.6	33.1	5.58	59.2	12.4	9.4
				1700	54.6	37.0	5.89	74.7	9.3	55.0	37.4	5.74	61.7	12.9	9.6
				2200	56.4	42.5	6.27	77.8	9.0	56.7	43.0	6.12	64.2	13.4	9.3
	16.0	8.3	19.3	1400	53.5	34.6	5.54	72.5	9.7	53.7	35.0	5.47	60.6	11.8	9.8
				1700	56.0	39.2	5.71	75.5	9.8	56.2	39.6	5.63	63.1	12.3	10.0
				2200	57.8	45.0	6.08	78.5	9.5	58.0	45.4	6.00	65.7	12.8	9.7

Notes: Capacity ratings are based upon 80/67°F EAT for Cooling and 70°F EAT for Heating. See chart on page 21 for EAT correction factors. Multiple Flow Rates (for EWT) are shown in the table above. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum 50° F. The second flow rate shown is the minimum geothermal closed loop flow rate. The third flow rate shown is optimum for geothermal closed loop and the suggested flow rate for boiler tower applications.

Microprocessor Control Features and Operation (Standard Microprocessor)

The Premier control system is a microprocessor-based printed circuit board conveniently located in the unit control box for easy accessibility. All ECM2 airflow selections are conveniently configured on the control via DIP switches. The microprocessor provides control of the entire unit as well as outputs for status modes, faults, and diagnostics. Low voltage terminal strips provide all necessary terminals for field connections. LEDs are located on the front of the unit for quick inspection without removing any access panels. The control offers optimal space conditioning. The board accepts traditional 24-VAC thermostat inputs.

Startup

The unit will not operate until all the inputs and safety controls are checked for normal conditions. At first power-up, a four-minute delay is employed before the compressor is energized.

Component Sequencing Delays

Components are sequenced and delayed for optimum space conditioning performance.

Accessory Relay

An accessory relay on the control board allows for field connection of solenoid valves, electronic air cleaners, etc. The accessory relay has a normally open output and a normally closed output. The accessory relay is factory set to control the optional electronic air-cleaner.

Short Cycle Protection

The control employs a minimum "off" time of four minutes and a minimum "on" time of one minute to provide for short cycle protection of the compressor.

Loop Pump Slaving Signals

A signal between multiple Premier control boards at the slave inputs and outputs (SL1-In and Out) will provide for remote control of the loop pump on any unit.

Condensate Overflow Protection

The Premier control board incorporates an impedance sensing liquid sensor at the top of the drain pan. Upon a continuous 30-second sensing of the condensate, compressor operation is suspended (see Fault Retry), the condensate overflow lockout LED begins flashing, and an output signal (LO) is made available for connection to a "fault" LED at the thermostat.

Shutdown Input

A simple grounded signal to the "shutdown" input on the control board puts the unit into shutdown mode. Compressor, hot water pump and fan operation are suspended.

Safety Controls

The Premier control receives separate signals for a high pressure switch for safety, a low pressure switch to prevent loss of charge damage, and a low suction temperature thermistor for freeze protection. Upon a continuous 30-second measurement of the fault (immediate for high pressure), compressor operation is suspended (see Fault Retry), the appropriate lockout LED begins flashing, and an output signal (LO) is made available for connection to a "fault" LED at the thermostat.

Testing

The Premier control allows service personnel to shorten most timing delays for faster diagnostics (see Field Selection DIP switch #1).

Fault Retry

All Faults (except for low RPM fault with the ECM2 fan motor) are retried twice before finally locking the unit out. The "fault retry" feature is designed to prevent nuisance service calls.

Diagnostics

The Premier control board allows all inputs and outputs to be displayed on the LEDs for fast and simple control board diagnosis (see Field Selection DIP switches #6 and #7).

Resistance Heat Control

For units equipped with internal electric heaters, the electric heat control module contains the appropriate high-voltage control relays. Control signals energize the relays in the proper sequence, and the LED display board indicates which stages are energized.

Fan Speed Control

A DIP switch on the Premier control allows field selection of low and medium fan speeds for cooling and the dehumidification mode or medium and high fan speeds for cooling in the normal mode (ECM2 version only).

Microprocessor Control Features and Operation (Standard Microprocessor)

Hot Water High Limit

This mode occurs when the hot water thermistor temperature is at or above 130°F for 30 continuous seconds. The DHW limit status LED on the unit illuminates, and the hot water pump de-energizes. Hot water pump operations resume on the next compressor cycle or after 30 minutes of continuous compressor operation during the current thermostat demand cycle.

Hot Water Pump Switch

When the pump switch is engaged, hot water pump operation is prevented, and the pump status LED on the unit illuminates.

ECM2 Airflow Selection DIP Switches (SW1)

A 12-position DIP switch package on the Premier control allows the airflow levels to be set for low, medium and high speed when using the ECM2 blower motor (see Premier Blower Table on page 17).

Only three of the DIP switches can be in the "on" position. The first "on" switch (the lowest position number) determines the "low speed fan" setting. The second "on" switch determines the "medium speed fan" setting, and the third "on" switch determines the "high speed fan" setting.

Field Selection DIP Switches (SW2)

An 8-position DIP switch package on the Premier control allows the following field selectable options:

1 - Service Test Mode. This DIP switch on the control allows field selection of "normal" or "test" operational modes. The test mode accelerates most timing function 16 times to allow faster troubleshooting. Test mode also allows viewing the "current" status of the fault inputs on the LED display.

2 - Freeze Protection Setting. This DIP switch allows field selection of freeze thermistor fault sensing temperatures for well water or antifreeze-protected earth loops.

3 - Accessory Relay. This DIP switch allows field selection of the accessory relay to operate with compressor or fan.

4 - Fan Speed Control. This DIP switch allows field selection of low and medium fan speeds for cooling in the dehumidification mode or medium and high fan speeds for cooling in the normal mode (ECM2 version only).

5 - Auxiliary Off. This DIP switch disables Heating 3rd-stage. Full emergency heat would still be available if needed.

6 - Diagnostics-Inputs. This DIP switch allows viewing the inputs from the thermostat to the control board such as Y1, Y2, O, G, W, SL1-In on the LED display.

7 - Diagnostics-Outputs. This DIP switch allows viewing the outputs from the control board such as compressor, reversing valve, blower, hot water pump, and loop pump on the LED display.

8 - Thermostat Selection. This DIP switch allows field selection of the type of thermostat being connected to the Premier control. The DIP switch should be in the "off" position for 24-VAC thermostats.

Factory Setup DIP Switches (SW3)

A 5-position DIP switch package on the Premier control allows the following factory setup options:

1 - Two-Speed/Single-Speed. This DIP switch configures the control for single-speed compressor operation or two-speed compressor operation.

2 - Zoned/Finish on Second Stage. This DIP switch configures the control for zoned or unzoned systems.

3 - No RPM/RPM. This DIP switch configures the control to monitor the RPM output of an ECM/ECM2 blower motor. When using a PSC blower motor or IntelliZone, the control should be configured for "no RPM" sensing.

4 - AT EH Board and ECM/Premier2 EH Board and ECM2. This DIP switch configures the control to operate with 17P501A01 electric heat board and ECM motor or with 17P514A01 electric heat board and ECM2 motor.

5 - Must be ON

Description of Operation (Standard Microprocessor)

Heating Operation

Heat, 1st Stage (Y1)

The fan motor is started on low speed immediately, the loop pump is energized 5 seconds after the "Y1" input is received, and the compressor is energized 10 seconds after the "Y1" input. In the ECM2 version, the fan is switched to medium speed 15 seconds after "Y1" input. The hot water pump is cycled 30 seconds after the Y1 input.

Heat, 2nd Stage (Y1, Y2)

The hot water pump is de-energized, which directs all heat to satisfying the thermostat, and the fan changes to high speed 15 seconds after the Y2 input.

Heat, 3rd Stage (Y1, Y2, W)

The first stage of resistance heat is energized 10 seconds after "W" input, and with continuous 3rd-stage demand, the additional stages of resistance heat engage sequentially every 5 minutes.

Emergency Heat (W only)

The fan is started on high speed, and the first stage of resistance heat is energized 10 seconds after the "W" input. Continuing demand will engage the additional stages of resistance heat sequentially every 2 minutes.

Cooling Operation

In all cooling operations, the reversing valve directly tracks the "O" input. Thus, anytime the "O" input is present, the reversing valve will be energized.

Cool, 1st Stage (Y1, O)

The fan motor is started on low speed immediately, the loop pump is energized 5 seconds after the "Y1" input is received, and the compressor is energized 10 seconds after the "Y1" input. In the ECM2 version, the fan is switched to medium speed 15 seconds after "Y1" input (remains in low speed if in dehumidification mode). The hot water pump is cycled 30 seconds after the "Y1" input.

Cool, 2nd Stage (Y1, Y2, O)

The fan changes to high speed in the ECM2 version (medium in dehumidification mode) 15 seconds after the "Y2" input.

Fan (G only)

The fan starts on low speed. Regardless of fan input "G" from thermostat, the fan will remain on low speed for 30 seconds at the end of each heating, cooling or emergency heat cycle.

Lockout Conditions

During lockout mode, the appropriate unit and thermostat lockout LEDs will illuminate. The compressor, loop pump, hot water pump, and accessory outputs are de-energized. Unless the lockout is caused by an ECM2 low RPM fault, the fan will continue to run on low speed. If the thermostat calls for heating 2nd or 3rd stage, emergency heat operation will occur.

Lockout modes of any kind can be reset at the thermostat after a 5-second waiting period, which restores normal operation but keeps the unit lockout LED illuminated. Interruption of power to the unit will reset a lockout without a waiting period and clear all lockout LEDs.

High Pressure

This lockout mode occurs when the normally closed safety switch is opened momentarily.

Low Pressure

This lockout mode occurs when the normally closed switch is opened for 30 continuous seconds.

Freeze Protection (Water Flow)

This lockout mode occurs when the freeze thermistor temperature is at or below the selected freeze protection point (well 30°F or loop 15°F) for 30 continuous seconds.

Condensate Overflow

This lockout mode occurs when the condensate overflow level has been reached for 30 continuous seconds.

Fan RPM (ECM2 version only)

When equipped with an ECM2 fan motor, the Premier control board monitors fan RPM to sense operation. This lockout mode occurs if the fan RPM falls below the low RPM limit (100 RPM) for 30 continuous seconds.

FX10 Controller (Optional Microprocessor)

FX10 Advanced Control

The Johnson Controls FX10 board is specifically designed for commercial heat pumps and provides control of the entire unit as well as input ports for Open N2, LonTalk, BacNet communication protocols as well as an input port for a user interface. The user interface is an accessory item that can be used to aid in diagnostics and unit setup. A 16-pin low voltage terminal board provides terminals for common field connections. The FX10 Control provides:

- Operational sequencing
- High and low-pressure switch monitoring
- General lockout
- Freeze protection
- Condensate overflow sensing
- Lockout mode control
- Emergency shutdown mode
- Random start and short cycle protection

Short Cycle Protection

Allows a minimum compressor "OFF" time of four minutes and a minimum "ON" time of two minutes.

Random Start

A delay of 1 to 120 seconds is generated after each power-up to prevent simultaneous startup of all units within a building after the release from an unoccupied cycle or power loss.

Emergency Shutdown

A field-applied dry contact can be used to place the control into emergency shutdown mode. During this mode, all outputs on the board are disabled.

Freeze Protection

Field selectable for 15° or 30°F (-9° or -1°C)

Installation Options

- Stand-alone controlled by standard room thermostat.
- Stand-alone with a Zone Temperature Sensor (must have user interface to change set points beyond the allowed +/- 5°F).
- Integrated into BAS by adding communication module.

Inputs/Outputs

- 6 Analog Inputs
- 12 Digital Inputs
- 9 Digital Output Relays (or 7 relays & 2 triacs)

Accessory Outputs

Quantity 2. One cycled with fan, other with compressor.

User Interface

4 x 20 backlit LCD.

Main FX 10 Board

(Shown with optional communication card)



Optional Plug-in Communication Modules - (compatible with standard BAS protocols)

- Open N2
- LonTalk
- BacNet

Display

Requires DLI Card/Kit. Up to 2 displays, either 1 local and 1 remote, or 2 remote. (A 2-display configuration requires identical displays.) Local display can be up to 3 meters from the controller, power supply, and data communication. Remote display can be up to 300 meters from the controller. Remote display must be independently powered with data communication done via 3 pole shielded cable.

Control Timing & Fault Recognition Delays

Lead compressor "ON" delay	30 seconds
Lag compressor "ON" delay	60 seconds
(not applicable for single compressor models)	
Minimum compressor "ON" time	2 minutes
(except for fault condition)	
Short cycle delay	4 minutes
Random start delay	0-120 seconds
High pressure fault	<1 second
Low pressure fault	30 seconds
Freeze protection fault	30 seconds
Condensate overflow fault	30 seconds
Low pressure fault bypass	2 minutes
Freeze protection fault bypass	2 minutes

Notes: Refer to Submittal Data SD1981, Application Guide AGFX10, or BACnet Protocol Implementation Conformance Statement for more information.

Engineering Guide Specifications

General

The reverse cycle heating/cooling units shall be either suspended type with horizontal air inlet and discharge or floor mounted type with horizontal air inlet and vertical upflow/downflow air discharge. Units shall be ARI/ISO 13256-1 certified and listed by a nationally recognized safety-testing laboratory or agency, such as ETL Testing Laboratory. Each unit shall be computer run-tested at the factory. Each unit shall be mounted on a pallet and shipped in a corrugated box or stretch-wrapped.

The units shall be designed to operate with entering liquid temperature between 25°F and 110°F as manufactured by WaterFurnace International, Inc.

Casing & Cabinet

The cabinet shall be fabricated from heavy-gauge steel and finished with corrosion-resistant powder coating. The interior shall be insulated with 1/2-inch thick, multi-density, coated glass fiber with edges sealed or tucked under flanges to prevent the introduction of glass fibers into the discharge air. One to two blower and three compressor compartment access panels shall be removable with supply and return ductwork in place. The internal component layout shall provide for service access from the front side for restricted installations.

A duct collar shall be provided on the supply air opening. Standard size 1-inch pleated filters shall be provided with each unit. Vertical units shall have a return air filter rack/duct collar; the horizontal units shall have a filter bracket. The upflow vertical units shall have a removable insulated divider panel between the air handling section and the compressor section to minimize the transmission of compressor noise and to permit operational service testing without air bypass. Vertical units shall be supplied with left or right horizontal air inlet and top or bottom vertical air discharge. Horizontal units shall be supplied with left or right air inlet and side or end air discharge.

Refrigerant Circuit

All units shall contain a sealed refrigerant circuit including a hermetic motor-compressor, bidirectional thermostatic expansion valve, finned tube air-to-refrigerant heat exchanger, reversing valve, coaxial tube water-to-refrigerant heat exchanger, optional desuperheater coil, and service ports.

Compressors shall be high-efficiency single speed reciprocating or scroll type, designed for heat pump duty and mounted on vibration isolators. Compressor motors shall be single-phase PSC with overload protection. The electro-coated coil shall be sized for low-face velocity and constructed of lanced aluminum fins bonded to rifled copper tubes in a staggered pattern not less than three rows deep.

The coaxial water-to-refrigerant heat exchanger shall be designed for low water pressure drop and constructed of a convoluted cupronickel inner tube and a steel outer tube. The thermostatic expansion valve shall provide proper superheat over the entire liquid temperature range with minimal "hunting." The valve shall operate bidirectionally without the use of check valves.

The water-to-refrigerant heat exchanger, optional desuperheater coil and refrigerant suction lines shall be insulated to prevent condensation at low liquid temperatures.

Fan Motor & Assembly

The fan shall be a direct drive centrifugal type with a dynamically balanced wheel. The housing and wheel shall be designed for quiet low outlet velocity operation. Tight fan housing geometry shall not be permitted. The fan housing shall be removable from the unit without disconnecting the supply air ductwork for servicing of the fan motor. The fan motor shall be a four-speed PSC type (P010-013), or three-speed PSC type (P019-066), or variable-speed ECM2 type (P019-066). The ECM2 fan motor shall be soft starting, shall maintain constant CFM over its operating static range, and shall provide 12 CFM settings. The fan motor shall be isolated from the housing by rubber grommets. The motor shall be permanently lubricated and have thermal overload protection. ECM2 motors shall be long-life ball bearing type.

Electrical

A microprocessor-based controller that interfaces with a multi-stage electronic thermostat to monitor and control unit operation shall be provided. The control shall provide operational sequencing, fan speed control, fan failure high and low pressure switch monitoring, freeze protection, hot water limit thermistor sensing, condensate overflow sensing, auxiliary heat staging, lockout mode control, hot water and loop pump control, LED status and fault indicators, fault memory, field selectable options, and accessory output.

A detachable terminal block with screw terminals will be provided for field control wiring. All units shall have knockouts for entrance of low and line voltage wiring. The fan motor and control box shall be harness plug wired for easy removal.

Piping

Supply and return water connections (and optional desuperheater connections) shall be 0.5-1.0 inch FPT (or 1" swivel on residential units). All water piping shall be insulated to prevent condensation at low liquid temperatures. On vertical units, the condensate connection shall be a 3/4-inch PVC socket with internally-trapped hose that can be routed to front or side locations.

Options and Accessories

FX10 Controller

A stand-alone mounted Johnson Controls FX10 controller that will monitor and control unit operation shall be provided. The control shall be capable of integration into a Building Automation System with Open N2, LonTalk or BacNet protocols. The control shall provide operational sequencing, short cycle protection, random start, emergency shutdown, high- and low-pressure switch monitoring, general lockout, freeze protection, fault retry, and condensate overflow. A terminal block with screw terminals, and a 75VA low voltage transformer shall be provided. Line voltage terminal block shall be provided for unit wiring on 460 volt units with ECM blowers. The control shall be factory mounted and tested. An optional communication module shall be provided for interface to the building automation system.

Hanger Kit

(field-installed horizontal units only)

The hanger kit shall consist of galvanized steel brackets, bolts, lock washers, and isolators and shall be designed to fasten to the unit bottom panel for suspension from 3/8-inch threaded rods.

Desuperheater

An optional heat reclaiming desuperheater coil of vented double-wall copper construction suitable for potable water shall be provided. The coil and hot water circulating pump shall be factory mounted inside the unit. A drain fitting for the DHW tank connection shall be provided.

Cupronickel Heat Exchanger

An optional corrosion resistant CuNi coaxial heat exchanger shall be factory installed in lieu of the standard copper construction.

Thermostat

(field-installed)

A multi-stage auto-changeover electronic digital thermostat shall be provided. The thermostat shall offer three heating and two cooling stages with precise temperature control. An OFF-HEAT-AUTO-COOL-EMERG system switch, OFF-AUTO fan switch, and indicating LEDs shall be provided. The thermostat shall display in °F or °C. An optional remote outdoor sensor shall be available.

Electronic Air Cleaner

(field-installed)

A 1-inch electronic air cleaner, cleanable 97% efficiency at 0.3 microns and larger, shall be provided in lieu of the standard throwaway filter. The pressure drop across the filter shall not exceed 0.2-inch w.g. at 300 fpm force velocity.

Earth Loop Flow Center

(field-installed)

A self-contained module shall provide all liquid flow, fill and connection requirements for ground source closed loop systems up to 20 GPM. The pumps shall be wired to a power block located in the nearest unit. The heat pump units shall contain low voltage pump slaving control so that two units may share one flow center.

Auxiliary Heater

(field-installed 208/230 VAC only)

An electric resistance heater shall provide supplemental and/or emergency heating capability. Vertical units shall have the control box and resistance heater coil assembly mounted internally. For horizontal units, the control box shall be mounted internally while the resistance heater coil assembly shall be mounted externally. A low voltage plug shall be provided in each unit for quick auxiliary heat connection. The heater shall operate in sequenced stages as controlled by the unit's microprocessor. The heater shall feed line voltage power to the unit fan and transformer to provide emergency heat capability in the event of an open compressor circuit breaker.

Accessory Relay

(field-installed)

An additional low-voltage accessory control relay shall be provided. This SPDT relay shall be capable of operation with any thermostat signal (Y1, Y2, WO, G, L1). The relay shall be located on a factory-provided mount in the unit low-voltage control wiring compartment.



Manufactured by
WaterFurnace International, Inc.
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Fort Wayne, IN 46809
www.waterfurnace.com



Product: **Premier**
Type: Geothermal/Water Source Heat Pump with
Water Heating for Radiant Floor Applications
Size: 3/4 thru 6 Ton
Document: Specification Catalog