E SERIES

Geothermal/Water Source Split Heat Pumps

- R-410A Refrigerant
- 2, 2.5 Ton Single Speed
- 3, 4, 5, 6 Ton Dual Capacity

ES Split Specification Catalog

ENERGY STAR

CERTIFICATION APPLIES ONLY WHEN THE COMPLETE SYSTEM IS LISTED

ETL LISTED

E SERIES

ES Series splits are designed for either indoor or outdoor installations, and are connected to an indoor air handler via refrigerant lines and control wiring. ES units utilize the ozone-safe R-410A refrigerant to meet the most stringent EPA requirements now and for many years to come. Easily accessible controls and connections for refrigerant piping and water piping make this unit simple to install in a wide variety of applications. Heavy gauge metal cabinets are coated with durable poly paint for long lasting beauty and protection. For outdoor installations that require an aesthetic touch, an optional decorative rock cover is available in four colors (brown granite, gray granite, salt & pepper, and charcoal basalt). Whether the unit is installed indoors or out, the ES Series split will provide exceptional performance and comfort for many years. And because there is no outdoor fan like ordinary air conditioners or heat pumps, the ES is “whisper quiet”.

ES Series units 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 ES Series products, you can be assured that your customer is investing in an exceptional comfort system and peace of mind for many years to come.

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ARI Data

Ground Loop Performance Ratings

UNIT SIZE	AIR HANDLER	COMP. MODE	CFM	GPM	COOLING 77º F EWT		HEATING 32º F EWT		COOLING 68º F EWT		HEATING 41º F EWT	
					BTU/HR	EER	BTU/HR	COP	BTU/HR	EER	BTU/HR	COP
Single Speed												
ES024	3 Ton	High	800	6.0	25,300	19.6	16,000	3.9	–	–	–	–
ES030	3 Ton	High	1000	8.0	30,800	19.2	20,800	4.0	–	–	–	–
Dual Capacity												
ES036	4 Ton	High	1200	9.0	38,500	17.1	26,000	3.6	–	–	–	–
		Low	800	5.0	–	–	–	–	19,000	25.0	13,000	4.5
ES048	5 Ton	High	1500	12.0	52,800	17.5	35,400	3.7	–	–	–	–
		Low	1000	6.0	–	–	–	–	29,600	22.9	20,800	4.4
ES060	5 Ton	High	1850	14.0	62,400	18.4	41,200	4.0	–	–	–	–
		Low	1100	8.0	–	–	–	–	32,600	24.9	22,000	4.6
ES072	5 Ton	High	1850	16.0	68,000	16.2	47,000	3.8	–	–	–	–
		Low	1100	10.0	–	–	–	–	35,000	24.2	24,500	4.6

Notes: Rated in accordance with ARI/ISO Standard 13256-1, and certified with ARI.
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.

CERTIFICATION APPLIES ONLY WHEN THE COMPLETE SYSTEM IS LISTED

Optional air handler matches. Rated in accordance with ARI/ISO Standard 13256-1 - Not certified with ARI.

ES036	3 Ton	High	1200	9.0	38,200	16.5	26,500	3.5	–	–	–	–
		Low	800	5.0	–	–	–	–	19,000	24.0	13,200	4.5
ES048	4 Ton	High	1450	12.0	50,400	16.5	35,000	3.6	–	–	–	–
		Low	900	6.0	–	–	–	–	28,200	21.7	20,800	4.3
ES060	4 Ton	High	1700	14.0	61,600	15.2	41,000	3.8	–	–	–	–
		Low	1100	8.0	–	–	–	–	31,000	22.5	22,000	4.4

Model Nomenclature

ES 036 S 1 A N B SS A

Family
ES = E Series Split

Unit Capacity
024 MBTUH 048 MBTUH
030 MBTUH 060 MBTUH
036 MBTUH 072 MBTUH

Control Option
S = Standard Controls

Voltage
1 = 208-230/60/1

Loop Pump Options
A = Standard Loop Connections

Vintage
A = 024-030
B = 036-072

Non-Standard Option Details
S = Standard
A-R, T-Z Non-standard Options

Sound Kit
A = None
B = Blanket

Coax Options
N = Cupronickel

Design Features

Application Flexibility

- Approved for both indoor and outdoor installation.
- 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).
- Easily accessible loop pump wiring.

Operating Efficiencies

- ARI 13256-1 rating for heating COPs, cooling EERs and low water flow requirements.
- Optional field installed heat recovery unit 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.
- Efficient Bristol twin single (TS) compressors provide superior comfort leveles in dual capacity units.
- Efficient Bristol reciprocating compressors in single speed units.
- Oversized coaxial tube water-to-refrigerant heat exchanger operates at low liquid pressure drops.
- Convoluted cupronickel water tube functions efficiently at low flow rates, and provides freeze-damage resistance.

Service Advantages

- Easily removable top and cabinet sides. Removable panel for electrical access provides quick access to electrical components.
- Easily accessible thermal expansion valve.
- Brass, swivel-type water connections will connect to optional internal loop pump(s) assembly or 3-way valves.
- High- and low-pressure service ports in refrigerant circuit.

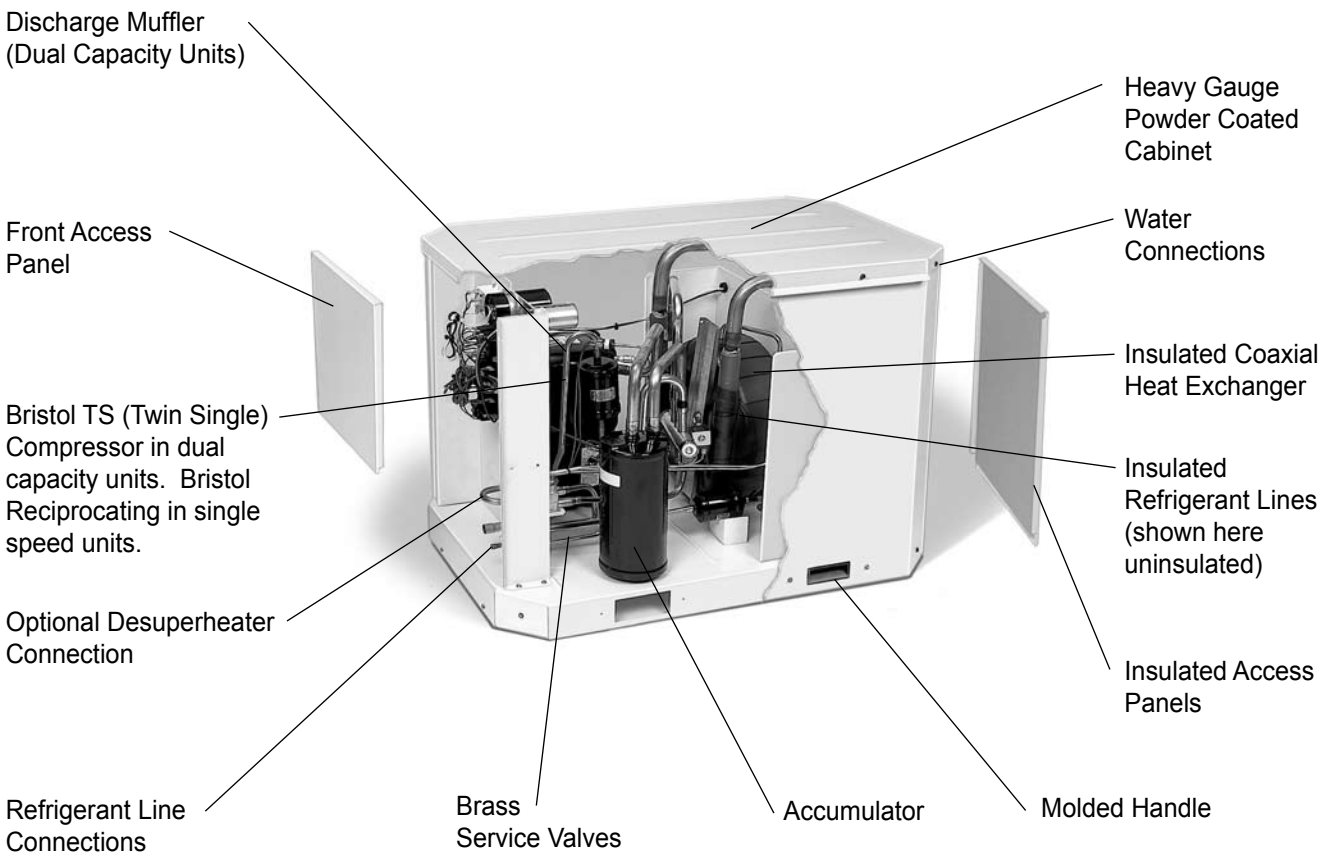
Factory Quality

- 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.
- Freeze protection switch to automatically turn on loop pump(s) during off cycle when loop temperature is below 20°F.
- Noise reduction features: isolation mounted compressors; insulated cabinet using 1/2-inch coated glass fiber.
- Safety features include high- and low-pressure refrigerant controls to protect the compressor.

Options & Accessories

- Optional field installed heat recovery unit.
- Electronic auto-changeover thermostat with 3-stage heat/2-stage cool and indicator LEDs.
- Closed loop flow center and loop circulating kits.
- Hose kits.
- Additional accessory relay.
- Bramec III, 6x6 modular mounting pad.
- Decorative rock cover for outdoor use. Available in brown granite, gray granite, salt & pepper, charcoal basalt.

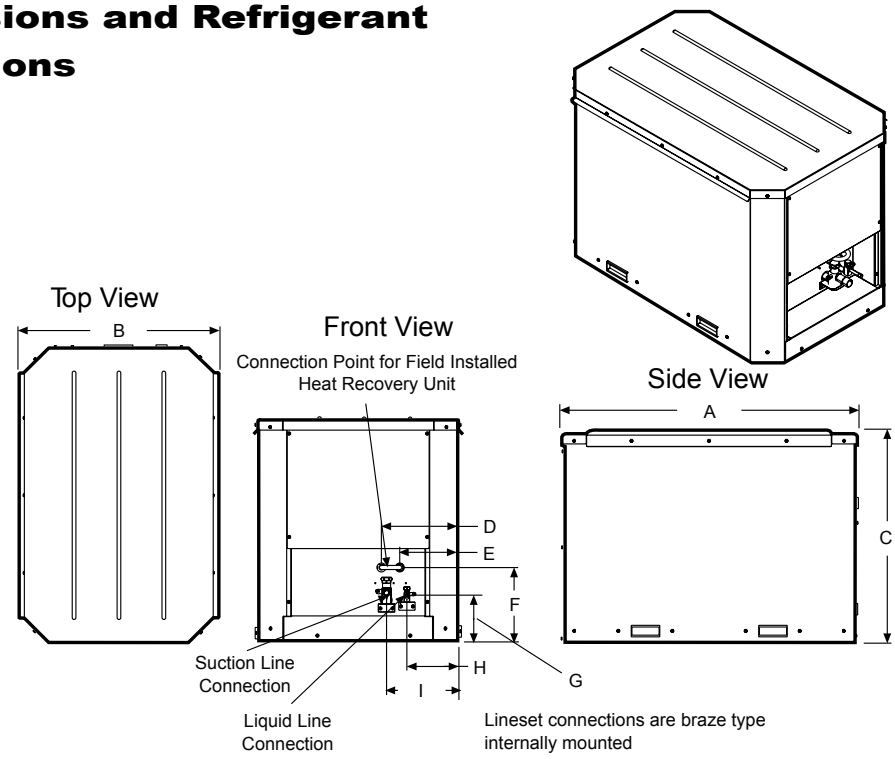
ES Split Features



Physical Dimensions and Piping Connections

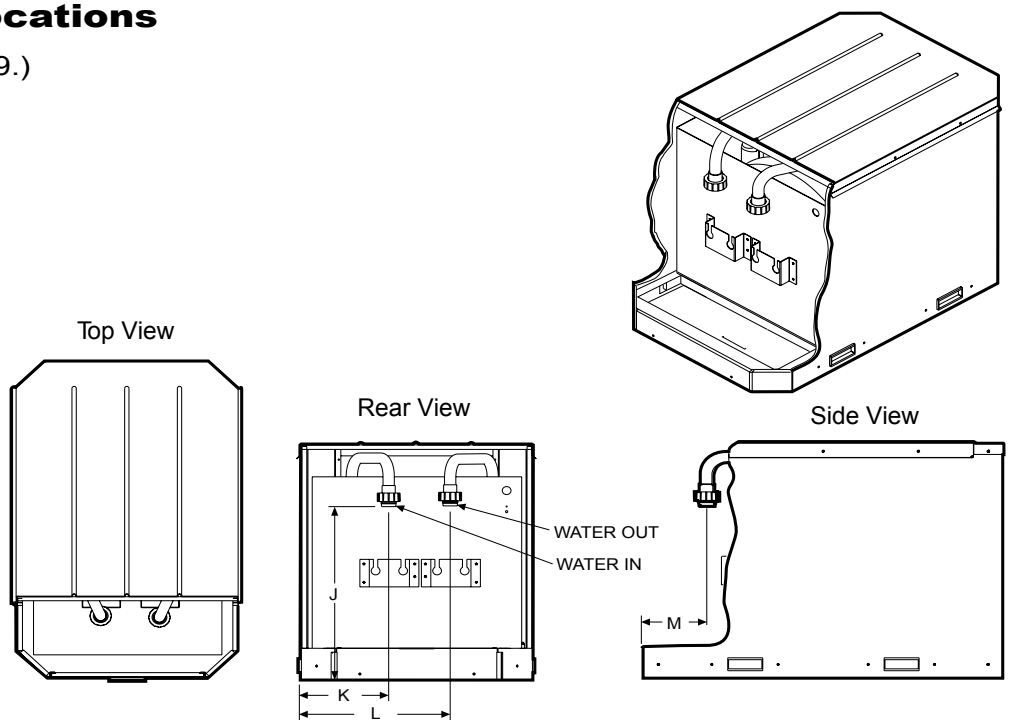
Cabinet Dimensions and Refrigerant Piping Connections

(See table on page 9.)



Water Line Locations

(See table on page 9.)



Physical Dimensions

PHYSICAL DIMENSIONS													
MODEL	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**
ES024 thru ES072	36.0	23.9	25.7	9.3	7.1	9.0	5.6	8.2	10.7	18.9	8.7	14.8	7.0
	[91.4]	[60.7]	[65.2]	[23.7]	[18.0]	[22.8]	[14.2]	[20.9]	[27.2]	[48.0]	[22.1]	[37.6]	[17.8]

Notes: Refer to the drawings on page 8.
Inches [cm]

Physical Data

MODEL	ES024	ES030	ES036	ES048	ES060	ES070
Compressor	Bristol Single Speed		Bristol Twin Single			
Liquid Line Connection*	3/8" [0.95]	3/8" [0.95]	3/8" [0.95]	3/8" [0.95]	3/8" [0.95]	3/8" [0.95]
Suction Line Connection	5/8" [1.59]	5/8" [1.59]	3/4" [1.90]	3/4" [1.90]	7/8" [2.22]	7/8" [2.22]
Water Inlet/Outlet Size	1" Brass Swivel [2.54]					
Optional Desuperheater Connection	1/2" Service Valve [1.27]					
Shipping Weight	240 [109]	242 [110]	287 [130]	312 [142]	354 [161]	359 [163]

Notes: * Line set connections are braze type
Inches [cm], Pounds [Kg]

Air Handlers

ES MODEL	MATCHING VARIABLE SPEED AIR HANDLER*
ES024	FV4ANF003 (3 TON)
ES030	FV4ANF003 (3 TON)
ES036	FV4ANF003 (3 TON)
ES036	FV4ANF005 (4 TON)
ES048	FV4ANF005 (4 TON)
ES048	FV4ANF006 (5 TON)
ES060	FV4ANF005 (4 TON)
ES060	FV4ANF006 (5 TON)
ES072	FV4ANF006 (5 TON)

Note: * Carrier models

Unit Electrical Data

MODEL	RATED VOLTAGE	VOLTAGE MIN./MAX.	COMPRESSOR			TOTAL UNIT FLA	MIN. CIRCUIT AMP.	RESIDENTIAL	
			MCC	RLA	LRA			MAX FUSE	MAX. HACR BRAKER
ES024	208-230/60/1	197/253	13.0	8.3	48.0	8.3	10.4	15	15
ES030	208-230/60/1	197/253	15.5	9.9	55.0	9.9	12.4	20	20
ES036	208-230/60/1	197/253	19.5	12.5	66.0	12.5	15.6	25	25
ES048	208-230/60/1	197/253	28.0	17.9	96.0	17.9	22.4	40	40
ES060	208-230/60/1	197/253	38.5	24.7	130.0	24.7	30.9	50	50
ES072	208-230/60/1	197/253	41.0	26.3	130.0	26.3	32.9	50	50

Notes: Always refer to unit nameplate data prior to installation.
HACR circuit breaker in United States only. All fuses are class RK-5.

Unit Electrical Data with Internal Loop Pump(s)

MODEL	RATED VOLTAGE	VOLTAGE MIN./MAX.	COMPRESSOR			INTERNAL LOOP PUMP FLA	TOTAL UNIT FLA	MIN. CIRCUIT AMP.	RESIDENTIAL	
			MCC	RLA	LRA				MAX FUSE	MAX. HACR BRAKER
ES024	208-230/60/1	197/253	13.0	8.3	48.0	1.8	10.1	12.2	20	20
ES030	208-230/60/1	197/253	15.5	9.9	55.0	1.8	11.7	14.2	20	20
ES036	208-230/60/1	197/253	19.5	12.5	66.0	1.8	14.3	17.4	25	25
ES048	208-230/60/1	197/253	28.0	17.9	96.0	1.8	19.7	24.1	40	40
ES060	208-230/60/1	197/253	38.5	24.7	130.0	3.5	28.2	34.1	50	50
ES072	208-230/60/1	197/253	41.0	26.3	130.0	3.5	29.8	36.4	60	60

Notes: Always refer to unit nameplate data prior to installation.
HACR circuit breaker in United States only. All fuses are class RK-5.

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
			= BTU output/BTU input
HC	= air heating capacity, MBTUH	LWT	= leaving water temperature, °F
TC	= total cooling capacity, MBTUH	LAT	= leaving air temperature, °F
SC	= sensible cooling capacity, MBTUH	TH	= total heating capacity, MBTUH
KW	= total power unit input, kilowatts	LC	= latent cooling capacity, MBTUH
HR	= total heat of rejection, 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 12-43 do not include water pumping watts and are based upon 15% (by volume) methanol antifreeze solution. 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.

ES024

Heating Capacity Data
With 3 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	3.0	1.0	2.3	700	14.6	1.08	10.9	89.3	3.94
				800	14.9	1.13	11.1	87.3	3.88
	4.5	1.9	4.4	700	15.0	1.09	11.3	89.8	4.02
				800	15.3	1.14	11.5	87.8	3.94
	6.0	2.9	6.7	700	15.4	1.10	11.6	90.4	4.09
				800	15.8	1.16	11.8	88.3	4.00
50	3.0	1.0	2.3	700	21.4	1.31	16.9	98.3	4.79
				800	21.8	1.33	17.3	95.2	4.82
	4.5	1.8	4.2	700	21.8	1.31	17.3	98.8	4.88
				800	22.4	1.34	17.8	95.9	4.91
	6.0	2.7	6.2	700	22.1	1.30	17.6	99.2	4.97
				800	23.0	1.35	18.4	96.7	5.00
70	3.0	0.8	1.8	700	26.9	1.42	22.0	105.5	5.55
				800	27.3	1.43	22.4	101.6	5.59
	4.5	1.6	3.7	700	27.4	1.42	22.5	106.2	5.64
				800	28.1	1.45	23.2	102.6	5.70
	6.0	2.6	6.0	700	27.9	1.43	23.0	106.9	5.72
				800	28.9	1.46	24.0	103.5	5.81
90	3.0	0.8	1.8	700	31.9	1.50	26.8	112.2	6.22
				800	32.5	1.52	27.3	107.6	6.26
	4.5	1.5	3.5	700	32.9	1.51	27.7	113.5	6.37
				800	33.5	1.54	28.2	108.7	6.39
	6.0	2.5	5.8	700	33.8	1.52	28.6	114.7	6.53
				800	34.4	1.55	29.1	109.9	6.51

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.

ES024

Cooling Capacity Data
With 3 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	3.0	1.0	2.3	700	30.9	19.7	0.9	34.1	32.6
				800	32.0	21.7	1.0	35.5	30.9
	4.5	1.8	4.2	700	31.2	19.5	0.9	34.2	34.9
				800	32.0	21.4	1.0	35.4	32.8
	6.0	2.7	6.2	700	31.5	19.8	0.9	34.6	34.7
				800	32.1	21.5	1.0	35.4	33.1
70	3.0	0.8	1.8	700	26.4	18.1	1.2	30.5	22.0
				800	27.1	19.9	1.3	31.5	21.1
	4.5	1.6	3.7	700	26.9	18.2	1.2	30.8	23.3
				800	27.6	20.0	1.2	31.8	22.3
	6.0	2.6	6.0	700	27.4	18.4	1.1	31.3	24.1
				800	28.1	20.2	1.2	32.3	23.0
90	3.0	0.8	1.8	700	22.6	16.7	1.5	27.6	15.3
				800	22.8	18.4	1.6	28.1	14.7
	4.5	1.5	3.5	700	22.9	16.8	1.4	27.8	15.9
				800	23.3	18.5	1.5	28.4	15.4
	6.0	2.5	5.8	700	23.2	16.9	1.4	28.0	16.5
				800	23.7	18.7	1.5	28.8	16.0
110	3.0	0.7	1.6	700	18.3	14.9	1.8	24.4	10.2
				800	18.5	16.3	1.9	24.8	10.0
	4.5	1.3	3.0	700	18.6	15.1	1.7	24.5	10.8
				800	18.8	16.6	1.8	24.9	10.6
	6.0	2.4	5.5	700	19.0	15.3	1.7	24.7	11.3
				800	19.2	16.8	1.7	25.1	11.1

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.

ES030

Heating Capacity Data
With 3 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	4.0	1.7	3.9	850	18.6	1.41	13.8	90.2	3.87
				1050	19.0	1.46	14.0	86.8	3.81
	6.0	2.9	6.7	850	19.1	1.42	14.3	90.8	3.95
				1050	19.6	1.48	14.5	87.3	3.87
	8.0	4.7	10.9	850	19.6	1.43	14.8	91.4	4.02
				1050	20.1	1.50	15.0	87.8	3.93
50	4.0	1.6	3.7	850	26.2	1.60	20.7	98.5	4.79
				1050	26.6	1.62	21.1	93.5	4.82
	6.0	2.7	6.3	850	26.6	1.60	21.1	99.0	4.88
				1050	27.4	1.63	21.8	94.2	4.91
	8.0	4.4	10.2	850	27.0	1.59	21.6	99.4	4.97
				1050	28.1	1.65	22.5	94.8	5.00
70	4.0	1.5	3.1	850	33.0	1.84	26.7	106.0	5.25
				1050	33.6	1.86	27.2	99.6	5.28
	6.0	2.6	6.0	850	33.7	1.85	27.3	106.7	5.32
				1050	34.6	1.88	28.2	100.5	5.38
	8.0	4.2	9.7	850	34.3	1.86	27.9	107.4	5.40
				1050	35.6	1.90	29.1	101.4	5.48
90	4.0	1.4	3.1	850	38.7	1.85	32.3	112.1	6.11
				1050	39.4	1.87	33.0	104.7	6.15
	6.0	2.5	5.7	850	39.8	1.86	33.4	113.3	6.26
				1050	40.5	1.89	34.1	105.7	6.28
	8.0	4.0	9.2	850	40.9	1.87	34.5	114.6	6.41
				1050	41.7	1.91	35.2	106.8	6.40

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.

ES030

Cooling Capacity Data
With 3 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	4.0	1.6	3.7	850	36.6	24.1	1.2	40.6	31.6
				1050	37.9	26.5	1.3	42.2	29.9
	6.0	2.7	6.3	850	37.0	23.9	1.1	40.7	33.7
				1050	38.0	26.2	1.2	42.1	31.7
	8.0	4.4	10.2	850	37.3	24.2	1.1	41.1	33.6
				1050	38.1	26.3	1.2	42.1	32.0
70	4.0	1.5	3.1	850	32.0	22.2	1.5	37.1	21.6
				1050	32.8	24.4	1.6	38.2	20.7
	6.0	2.6	6.0	850	32.6	22.3	1.4	37.5	22.8
				1050	33.5	24.5	1.5	38.7	21.9
	8.0	4.2	9.7	850	33.2	22.5	1.4	38.0	23.6
				1050	34.1	24.7	1.5	39.2	22.6
90	4.0	1.4	3.1	850	28.0	20.6	1.8	34.2	15.3
				1050	28.3	22.6	1.9	34.8	14.7
	6.0	2.5	5.7	850	28.3	20.7	1.8	34.4	16.0
				1050	28.8	22.7	1.9	35.2	15.5
	8.0	4.0	9.2	850	28.7	20.7	1.7	34.7	16.5
				1050	29.4	23.0	1.8	35.6	16.1
110	4.0	1.3	3.1	850	22.8	18.7	2.2	30.1	10.5
				1050	23.0	20.5	2.2	30.6	10.3
	6.0	2.4	5.4	850	23.2	19.0	2.1	30.3	11.2
				1050	23.5	20.8	2.1	30.7	11.0
	8.0	3.8	8.8	850	23.6	19.2	2.0	30.5	11.7
				1050	23.9	21.1	2.1	31.0	11.5

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.

ES036 High-Speed

Heating Capacity Data
With 3 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	5.0	1.8	4.2	1000	24.3	2.08	17.2	92.5	3.43
				1200	24.9	2.17	17.5	89.2	3.37
	7.0	3.1	7.1	1000	25.0	2.10	17.8	93.2	3.49
				1200	25.6	2.19	18.2	89.8	3.43
	9.0	5.0	11.6	1000	25.7	2.12	18.5	93.8	3.55
				1200	26.4	2.22	18.8	90.3	3.48
50	5.0	1.7	3.9	1000	33.6	2.43	25.4	101.2	4.06
				1200	34.2	2.45	25.9	96.4	4.09
	7.0	2.9	6.7	1000	34.1	2.42	25.9	101.6	4.13
				1200	35.2	2.48	26.7	97.1	4.16
	9.0	4.7	10.9	1000	34.6	2.41	26.4	102.1	4.21
				1200	36.1	2.50	27.6	97.9	4.23
70	5.0	1.6	3.4	1000	41.8	2.44	33.5	108.7	5.02
				1200	42.6	2.47	34.1	102.8	5.06
	7.0	2.8	6.4	1000	42.6	2.45	34.2	109.5	5.10
				1200	43.8	2.49	35.3	103.8	5.15
	9.0	4.5	10.4	1000	43.4	2.46	35.0	110.2	5.17
				1200	45.0	2.51	36.4	104.7	5.25
90	5.0	1.5	3.4	1000	50.5	2.93	40.5	116.7	5.05
				1200	51.3	2.96	41.2	109.6	5.08
	7.0	2.7	6.1	1000	51.9	2.94	41.8	118.0	5.17
				1200	52.8	2.99	42.6	110.8	5.18
	9.0	4.3	9.9	1000	53.3	2.96	43.2	119.4	5.28
				1200	54.3	3.02	44.0	111.9	5.27

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.

ES036 High-Speed

Cooling Capacity Data
With 3 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	5.0	1.7	3.9	1000	44.3	27.6	1.8	50.6	24.1
				1200	45.8	30.3	2.0	52.7	22.8
	7.0	2.9	6.7	1000	44.7	27.3	1.7	50.7	25.7
				1200	45.9	30.0	1.9	52.4	24.2
	9.0	4.7	10.9	1000	45.2	27.7	1.8	51.2	25.6
				1200	46.0	30.2	1.9	52.5	24.4
70	5.0	1.6	3.4	1000	39.0	26.0	2.2	46.6	17.5
				1200	40.0	28.6	2.4	48.1	16.7
	7.0	2.8	6.4	1000	39.7	26.2	2.1	47.1	18.5
				1200	40.7	28.7	2.3	48.6	17.7
	9.0	4.5	10.4	1000	40.5	26.4	2.1	47.7	19.1
				1200	41.5	29.0	2.3	49.3	18.3
90	5.0	1.5	3.4	1000	34.6	24.4	2.7	43.7	13.0
				1200	35.0	26.8	2.8	44.5	12.5
	7.0	2.7	6.1	1000	35.1	24.6	2.6	43.9	13.6
				1200	35.7	27.0	2.7	44.9	13.2
	9.0	4.3	9.9	1000	35.5	24.7	2.5	44.2	14.0
				1200	36.3	27.3	2.7	45.4	13.7
110	5.0	1.4	3.3	1000	29.1	22.4	3.2	39.9	9.2
				1200	29.4	24.7	3.3	40.6	9.0
	7.0	2.5	5.9	1000	29.7	22.8	3.0	40.0	9.8
				1200	30.0	25.0	3.1	40.7	9.6
	9.0	4.1	9.5	1000	30.2	23.0	3.0	40.3	10.2
				1200	30.6	25.3	3.1	41.0	10.0

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.

ES036 Low-Speed

Heating Capacity Data
With 3 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	3.0	0.8	1.8	600	10.0	0.86	7.1	85.5	3.43
				800	10.2	0.87	7.3	81.9	3.45
	4.0	1.2	2.9	600	10.3	0.86	7.4	86.0	3.52
				800	10.6	0.87	7.6	82.3	3.56
	5.0	1.8	4.2	600	10.6	0.86	7.7	86.4	3.61
				800	11.0	0.88	8.0	82.7	3.67
50	3.0	0.7	1.7	600	14.7	0.90	11.6	92.7	4.79
				800	14.8	0.90	11.7	87.2	4.81
	4.0	1.2	2.7	600	15.1	0.90	12.0	93.3	4.88
				800	15.4	0.91	12.3	87.8	4.95
	5.0	1.7	3.9	600	15.4	0.91	12.3	93.8	4.97
				800	16.0	0.92	12.9	88.5	5.09
70	3.0	0.7	1.5	600	18.9	0.94	15.7	99.2	5.89
				800	19.1	0.95	15.9	92.1	5.91
	4.0	1.1	2.5	600	19.7	0.95	16.5	100.4	6.09
				800	19.9	0.95	16.6	93.0	6.11
	5.0	1.6	3.7	600	20.5	0.96	17.2	101.6	6.28
				800	20.7	0.96	17.4	93.9	6.31
90	3.0	0.7	1.5	600	23.0	0.95	19.7	105.5	7.07
				800	23.2	0.96	19.9	96.9	7.10
	4.0	1.0	2.4	600	24.0	0.96	20.7	107.0	7.32
				800	24.2	0.96	20.9	98.0	7.35
	5.0	1.5	3.5	600	24.9	0.97	21.6	108.5	7.57
				800	25.2	0.97	21.8	99.1	7.60

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.

ES036 Low-Speed

Cooling Capacity Data
With 3 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	3.0	0.7	1.7	600	21.0	14.8	0.7	23.3	31.2
				800	21.2	16.0	0.7	23.6	30.6
	4.0	1.2	2.7	600	21.1	14.8	0.7	23.4	32.4
				800	21.6	16.2	0.7	23.9	31.9
	5.0	1.7	3.9	600	21.3	14.7	0.6	23.4	33.6
				800	21.9	16.4	0.7	24.2	33.2
70	3.0	0.7	1.5	600	18.3	14.0	0.8	21.1	22.6
				800	18.5	15.1	0.8	21.4	22.1
	4.0	1.1	2.5	600	18.7	14.1	0.8	21.4	22.9
				800	18.8	15.3	0.8	21.7	22.5
	5.0	1.6	3.7	600	19.0	14.3	0.8	21.7	23.3
				800	19.2	15.5	0.8	22.0	22.9
90	3.0	0.7	1.5	600	15.4	13.3	1.0	18.8	15.6
				800	15.5	14.1	1.0	19.1	14.9
	4.0	1.0	2.4	600	15.4	13.1	1.0	18.7	15.9
				800	15.9	14.3	1.0	19.3	15.5
	5.0	1.5	3.5	600	15.5	13.0	1.0	18.7	16.3
				800	16.2	14.4	1.0	19.6	16.2
110	3.0	0.6	1.4	600	12.3	12.0	1.1	16.0	11.1
				800	12.4	12.8	1.2	16.4	10.6
	4.0	1.0	2.2	600	12.5	12.2	1.1	16.3	11.3
				800	12.6	12.9	1.2	16.6	10.9
	5.0	1.4	3.2	600	12.8	12.3	1.1	16.6	11.5
				800	12.9	13.1	1.2	16.9	11.1

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.

ES036 High-Speed

Heating Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	5.0	1.8	4.2	1000	23.6	1.92	17.0	91.8	3.60
				1200	24.2	2.00	17.3	88.7	3.54
	7.0	3.1	7.1	1000	24.3	1.94	17.6	92.5	3.67
				1200	24.9	2.03	18.0	89.2	3.60
	9.0	5.0	11.6	1000	24.9	1.96	18.3	93.1	3.73
				1200	25.6	2.05	18.6	89.7	3.65
50	5.0	1.7	3.9	1000	32.2	2.23	24.5	99.8	4.22
				1200	32.7	2.26	25.0	95.2	4.25
	7.0	2.9	6.7	1000	32.6	2.23	25.0	100.2	4.30
				1200	33.6	2.28	25.8	95.9	4.32
	9.0	4.7	10.9	1000	33.1	2.22	25.5	100.7	4.38
				1200	34.5	2.30	26.7	96.6	4.40
70	5.0	1.6	3.6	1000	38.8	2.38	30.6	105.9	4.78
				1200	39.4	2.40	31.2	100.4	4.81
	7.0	2.8	6.4	1000	39.5	2.39	31.3	106.6	4.85
				1200	40.6	2.43	32.3	101.3	4.90
	9.0	4.5	10.4	1000	40.2	2.40	32.0	107.2	4.91
				1200	41.7	2.45	33.3	102.2	4.99
90	5.0	1.5	3.6	1000	42.8	2.47	34.4	109.6	5.07
				1200	43.6	2.50	35.0	103.6	5.10
	7.0	2.7	6.1	1000	44.0	2.49	35.5	110.8	5.19
				1200	44.8	2.53	36.2	104.6	5.20
	9.0	4.3	9.9	1000	45.2	2.50	36.7	111.9	5.31
				1200	46.1	2.55	37.4	105.6	5.30

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.

ES036 High-Speed

Cooling Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	5.0	1.7	3.9	1000	46.3	28.6	1.8	52.3	26.1
				1200	47.9	31.4	1.9	54.5	24.8
	7.0	2.9	6.7	1000	46.7	28.3	1.7	52.5	27.9
				1200	48.0	31.0	1.8	54.2	26.3
	9.0	4.7	10.9	1000	47.2	28.7	1.7	53.0	27.8
				1200	48.1	31.2	1.8	54.3	26.5
70	5.0	1.6	3.6	1000	40.8	27.1	2.2	48.2	18.9
				1200	41.9	29.8	2.3	49.8	18.1
	7.0	2.8	6.4	1000	41.6	27.3	2.1	48.7	20.0
				1200	42.7	30.0	2.2	50.3	19.2
	9.0	4.5	10.4	1000	42.4	27.5	2.1	49.4	20.7
				1200	43.5	30.2	2.2	51.0	19.8
90	5.0	1.5	3.6	1000	35.4	25.0	2.6	44.2	13.7
				1200	35.8	27.5	2.7	45.1	13.2
	7.0	2.7	6.1	1000	35.9	25.2	2.5	44.4	14.3
				1200	36.5	27.7	2.6	45.5	13.8
	9.0	4.3	9.9	1000	36.4	25.3	2.5	44.8	14.8
				1200	37.2	28.0	2.6	46.0	14.4
110	5.0	1.4	3.3	1000	29.7	22.9	3.1	40.3	9.5
				1200	30.0	25.2	3.2	41.0	9.4
	7.0	2.5	5.9	1000	30.3	23.2	3.0	40.4	10.1
				1200	30.6	25.5	3.1	41.1	9.9
	9.0	4.1	9.5	1000	30.8	23.5	2.9	40.7	10.6
				1200	31.2	25.8	3.0	41.4	10.4

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.

ES036 Low-Speed

Heating Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	3.0	0.8	1.8	600	9.6	0.86	6.6	84.7	3.26
				800	9.7	0.87	6.8	81.3	3.28
	4.0	1.2	2.9	600	9.8	0.86	6.9	85.2	3.35
				800	10.1	0.87	7.1	81.7	3.38
	5.0	1.8	4.2	600	10.1	0.86	7.2	85.6	3.43
				800	10.5	0.88	7.5	82.1	3.48
50	3.0	0.7	1.7	600	14.6	0.90	11.6	92.6	4.77
				800	14.8	0.90	11.7	87.1	4.79
	4.0	1.2	2.7	600	15.0	0.90	11.9	93.2	4.86
				800	15.3	0.91	12.2	87.8	4.93
	5.0	1.7	3.9	600	15.4	0.91	12.3	93.7	4.95
				800	15.9	0.92	12.8	88.4	5.07
70	3.0	0.7	1.5	600	18.3	0.92	15.1	98.2	5.80
				800	18.4	0.93	15.3	91.3	5.82
	4.0	1.1	2.5	600	19.0	0.93	15.8	99.3	5.99
				800	19.2	0.93	16.0	92.2	6.02
	5.0	1.6	3.7	600	19.7	0.94	16.6	100.5	6.19
				800	19.9	0.94	16.7	93.1	6.21
90	3.0	0.7	1.5	600	22.2	0.94	19.0	104.2	6.93
				800	22.4	0.94	19.2	95.9	6.96
	4.0	1.0	2.4	600	23.1	0.94	19.9	105.7	7.18
				800	23.3	0.95	20.1	97.0	7.21
	5.0	1.5	3.5	600	24.0	0.95	20.8	107.1	7.41
				800	24.3	0.96	21.0	98.1	7.45

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.

ES036 Low-Speed

Cooling Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	3.0	0.7	1.7	600	22.0	16.0	0.7	24.3	33.3
				800	22.3	17.3	0.7	24.6	32.6
	4.0	1.2	2.7	600	22.2	15.9	0.6	24.4	34.5
				800	22.6	17.5	0.7	24.9	34.0
	5.0	1.7	3.9	600	22.3	15.9	0.6	24.5	35.8
				800	23.0	17.7	0.7	25.2	35.4
70	3.0	0.7	1.5	600	19.5	15.2	0.7	22.0	26.9
				800	19.7	16.4	0.8	22.3	26.3
	4.0	1.1	2.5	600	19.9	15.4	0.7	22.4	27.3
				800	20.1	16.6	0.8	22.6	26.8
	5.0	1.6	3.7	600	20.2	15.5	0.7	22.7	27.8
				800	20.4	16.8	0.8	23.0	27.2
90	3.0	0.7	1.5	600	16.2	14.3	1.0	19.6	16.1
				800	16.3	15.2	1.1	20.0	15.4
	4.0	1.0	2.4	600	16.2	14.1	1.0	19.6	16.4
				800	16.7	15.4	1.0	20.2	16.0
	5.0	1.5	3.5	600	16.3	14.0	1.0	19.6	16.8
				800	17.0	15.5	1.0	20.5	16.7
110	3.0	0.6	1.4	600	13.0	13.1	1.1	16.8	11.7
				800	13.1	14.0	1.2	17.1	11.2
	4.0	1.0	2.2	600	13.3	13.3	1.1	17.1	11.9
				800	13.4	14.1	1.2	17.4	11.4
	5.0	1.4	3.2	600	13.5	13.5	1.1	17.3	12.2
				800	13.7	14.3	1.2	17.7	11.7

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.

ES048 High-Speed

Heating Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	6.0	2.0	4.6	1150	32.7	2.53	24.1	96.3	3.79
				1450	33.5	2.64	24.5	91.4	3.72
	9.0	3.7	8.5	1150	33.6	2.55	24.9	97.1	3.86
				1450	34.5	2.67	25.4	92.0	3.79
	12.0	5.9	13.6	1150	34.6	2.58	25.8	97.8	3.93
				1450	35.4	2.70	26.2	92.6	3.85
50	6.0	1.9	4.4	1150	44.7	3.01	34.4	106.0	4.35
				1450	45.5	3.04	35.1	99.0	4.38
	9.0	3.5	8.2	1150	45.4	3.00	35.1	106.5	4.43
				1450	46.8	3.07	36.3	99.9	4.46
	12.0	5.6	12.9	1150	46.1	2.99	35.9	107.1	4.52
				1450	48.0	3.10	37.4	100.7	4.54
70	6.0	1.8	3.9	1150	55.7	3.35	44.2	114.8	4.87
				1450	56.6	3.38	45.1	106.2	4.90
	9.0	3.3	7.6	1150	56.7	3.36	45.2	115.7	4.94
				1450	58.3	3.42	46.6	107.2	5.00
	12.0	5.3	12.2	1150	57.8	3.38	46.2	116.5	5.01
				1450	59.9	3.45	48.1	108.2	5.09
90	6.0	1.7	3.9	1150	64.8	3.59	52.6	122.2	5.29
				1450	66.0	3.63	53.6	112.1	5.33
	9.0	3.3	7.6	1150	66.7	3.61	54.4	123.7	5.42
				1450	67.9	3.66	55.4	113.4	5.43
	12.0	5.2	12.0	1150	68.5	3.62	56.2	125.2	5.54
				1450	69.8	3.70	57.2	114.6	5.53

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.

ES048 High-Speed

Cooling Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	6.0	1.9	4.4	1150	59.3	36.2	2.4	67.4	25.0
				1450	61.4	39.8	2.6	70.3	23.7
	9.0	3.5	8.2	1150	59.9	35.8	2.2	67.6	26.8
				1450	61.6	39.3	2.4	69.9	25.2
	12.0	5.6	12.9	1150	60.5	36.4	2.3	68.3	26.6
				1450	61.7	39.5	2.4	70.0	25.4
70	6.0	1.8	3.9	1150	53.5	34.3	2.8	63.3	18.8
				1450	54.9	37.6	3.1	65.3	18.0
	9.0	3.3	7.6	1150	54.6	34.5	2.7	63.9	19.9
				1450	56.0	37.9	2.9	66.0	19.1
	12.0	5.3	12.2	1150	55.6	34.7	2.7	64.8	20.5
				1450	57.0	38.2	2.9	66.9	19.7
90	6.0	1.7	3.9	1150	47.8	32.0	3.4	59.5	13.9
				1450	48.3	35.1	3.6	60.6	13.4
	9.0	3.3	7.6	1150	48.4	32.2	3.3	59.8	14.6
				1450	49.2	35.3	3.5	61.1	14.1
	12.0	5.2	12.0	1150	49.0	32.3	3.3	60.2	15.0
				1450	50.1	35.7	3.4	61.9	14.6
110	6.0	1.6	3.8	1150	41.0	29.8	4.1	55.0	10.0
				1450	41.4	32.7	4.2	55.8	9.8
	9.0	3.0	6.9	1150	41.8	30.2	3.9	55.2	10.6
				1450	42.2	33.2	4.1	56.0	10.4
	12.0	4.8	11.1	1150	42.5	30.6	3.8	55.6	11.1
				1450	43.0	33.6	4.0	56.5	10.9

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.

ES048 Low-Speed

Heating Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	3.0	1.4	3.2	700	16.5	1.39	11.7	91.8	3.47
				900	16.8	1.41	12.0	87.3	3.49
	6.0	2.0	4.6	700	16.9	1.39	12.2	92.4	3.56
				900	17.4	1.42	12.6	87.9	3.60
	9.0	3.7	8.5	700	17.4	1.40	12.7	93.0	3.66
				900	18.0	1.43	13.2	88.6	3.71
50	3.0	1.3	3.0	700	23.9	1.49	18.8	101.6	4.72
				900	24.1	1.49	19.0	94.8	4.73
	6.0	1.9	4.4	700	24.5	1.50	19.4	102.4	4.81
				900	25.1	1.51	19.9	95.8	4.88
	9.0	3.5	8.1	700	25.1	1.50	20.0	103.2	4.89
				900	26.0	1.52	20.8	96.8	5.02
70	3.0	1.2	2.8	700	29.9	1.58	24.5	109.6	5.54
				900	30.2	1.59	24.8	101.1	5.57
	6.0	1.8	4.2	700	31.1	1.59	25.7	111.2	5.73
				900	31.4	1.60	26.0	102.3	5.75
	9.0	3.3	7.6	700	32.3	1.60	26.9	112.8	5.91
				900	32.6	1.61	27.1	103.6	5.94
90	3.0	1.2	2.8	700	35.9	1.69	30.1	117.4	6.21
				900	36.2	1.70	30.4	107.2	6.24
	6.0	1.7	3.9	700	37.3	1.70	31.5	119.4	6.43
				900	37.7	1.71	31.8	108.8	6.45
	9.0	3.3	7.6	700	38.8	1.71	33.0	121.3	6.64
				900	39.2	1.72	33.3	110.3	6.67

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.

ES048 Low-Speed

Cooling Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	3.0	1.3	3.0	700	32.8	20.8	1.1	36.4	30.7
				900	33.1	22.5	1.1	36.9	30.0
	6.0	1.9	4.4	700	33.0	20.8	1.0	36.6	31.8
				900	33.7	22.8	1.1	37.4	31.3
	9.0	3.5	8.1	700	33.2	20.7	1.0	36.7	33.0
				900	34.3	23.0	1.1	37.8	32.6
70	3.0	1.2	2.8	700	29.1	19.5	1.3	33.5	22.8
				900	29.4	21.0	1.3	33.9	22.4
	6.0	1.8	4.2	700	29.6	19.7	1.3	34.0	23.2
				900	29.9	21.3	1.3	34.4	22.7
	9.0	3.3	7.6	700	30.1	19.9	1.3	34.5	23.6
				900	30.4	21.6	1.3	34.9	23.1
90	3.0	1.2	2.8	700	24.7	18.9	1.6	30.1	15.6
				900	24.9	20.0	1.7	30.6	15.0
	6.0	1.7	3.9	700	24.7	18.6	1.6	30.0	15.9
				900	25.4	20.3	1.6	31.0	15.6
	9.0	3.3	7.6	700	24.8	18.4	1.5	30.0	16.3
				900	25.9	20.5	1.6	31.4	16.2
110	3.0	1.1	2.5	700	20.5	17.4	1.8	26.5	11.5
				900	20.7	18.5	1.9	27.1	11.1
	6.0	1.6	3.8	700	20.9	17.6	1.8	27.0	11.8
				900	21.1	18.7	1.9	27.5	11.3
	9.0	3.0	6.9	700	21.3	17.8	1.8	27.4	12.0
				900	21.6	18.9	1.9	27.9	11.5

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.

ES048 High-Speed

Heating Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	6.0	2.0	4.6	1150	31.9	2.44	23.5	95.6	3.83
				1450	32.6	2.54	24.0	90.8	3.77
	9.0	3.7	8.5	1150	32.8	2.46	24.4	96.4	3.90
				1450	33.6	2.57	24.8	91.4	3.83
	12.0	5.9	13.6	1150	33.7	2.48	25.2	97.1	3.98
				1450	34.5	2.60	25.7	92.1	3.89
50	6.0	1.9	4.4	1150	44.1	2.91	34.2	105.5	4.44
				1450	44.9	2.94	34.8	98.7	4.47
	9.0	3.5	8.2	1150	44.8	2.90	34.9	106.1	4.52
				1450	46.1	2.97	36.0	99.5	4.55
	12.0	5.6	12.9	1150	45.5	2.89	35.6	106.6	4.61
				1450	47.4	3.00	37.2	100.3	4.63
70	6.0	1.8	3.9	1150	54.5	3.20	43.6	113.9	4.99
				1450	55.5	3.24	44.4	105.4	5.02
	9.0	3.3	7.6	1150	55.5	3.22	44.6	114.7	5.06
				1450	57.1	3.27	45.9	106.4	5.11
	12.0	5.3	12.2	1150	56.6	3.23	45.5	115.5	5.13
				1450	58.7	3.30	47.4	107.5	5.21
90	6.0	1.7	3.9	1150	61.4	3.35	50.0	119.4	5.37
				1450	62.5	3.39	50.9	109.9	5.41
	9.0	3.3	7.6	1150	63.1	3.36	51.7	120.8	5.50
				1450	64.3	3.42	52.6	111.1	5.51
	12.0	5.2	12.0	1150	64.9	3.38	53.4	122.2	5.63
				1450	66.1	3.45	54.3	112.2	5.61

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.

ES048 High-Speed

Cooling Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	6.0	1.9	4.4	1150	61.2	38.4	2.4	69.3	26.0
				1450	63.4	42.2	2.6	72.2	24.6
	9.0	3.5	8.2	1150	61.8	38.0	2.2	69.5	27.7
				1450	63.5	41.7	2.4	71.8	26.1
	12.0	5.6	12.9	1150	62.4	38.5	2.3	70.2	27.6
				1450	63.7	41.9	2.4	71.9	26.3
70	6.0	1.8	3.9	1150	53.7	34.8	2.8	63.4	18.8
				1450	55.0	38.2	3.1	65.4	18.0
	9.0	3.3	7.6	1150	54.7	35.0	2.7	64.0	19.9
				1450	56.1	38.5	2.9	66.1	19.1
	12.0	5.3	12.2	1150	55.7	35.3	2.7	65.0	20.6
				1450	57.1	38.7	2.9	67.0	19.7
90	6.0	1.7	3.9	1150	48.1	33.4	3.4	59.7	14.1
				1450	48.6	36.7	3.6	60.8	13.6
	9.0	3.3	7.6	1150	48.7	33.6	3.3	60.0	14.8
				1450	49.5	37.0	3.5	61.4	14.3
	12.0	5.2	12.0	1150	49.4	33.7	3.2	60.4	15.3
				1450	50.5	37.3	3.4	62.1	14.8
110	6.0	1.6	3.8	1150	41.0	30.7	4.1	55.0	10.0
				1450	41.4	33.7	4.2	55.9	9.8
	9.0	3.0	6.9	1150	41.8	31.1	3.9	55.2	10.6
				1450	42.2	34.2	4.1	56.1	10.4
	12.0	4.8	11.1	1150	42.6	31.5	3.8	55.6	11.1
				1450	43.0	34.6	4.0	56.5	10.9

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.

ES048 Low-Speed

Heating Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	3.0	1.4	3.2	700	16.7	1.34	12.2	92.1	3.67
				900	17.0	1.35	12.4	87.5	3.69
	6.0	2.0	4.6	700	17.2	1.34	12.7	92.8	3.77
				900	17.7	1.36	13.1	88.2	3.81
	9.0	3.7	8.5	700	17.7	1.34	13.1	93.4	3.87
				900	18.4	1.37	13.7	88.9	3.93
50	3.0	1.3	3.0	700	23.8	1.45	18.9	101.5	4.81
				900	24.0	1.46	19.1	94.7	4.82
	6.0	1.9	4.4	700	24.4	1.46	19.5	102.3	4.90
				900	25.0	1.47	20.0	95.7	4.97
	9.0	3.5	8.1	700	25.1	1.47	20.0	103.1	4.99
				900	25.9	1.49	20.9	96.7	5.11
70	3.0	1.2	2.8	700	29.7	1.54	24.5	109.4	5.65
				900	30.0	1.55	24.7	100.9	5.67
	6.0	1.8	4.2	700	31.0	1.55	25.6	110.9	5.84
				900	31.2	1.56	25.9	102.1	5.86
	9.0	3.3	7.6	700	32.2	1.56	26.8	112.5	6.02
				900	32.4	1.57	27.1	103.4	6.05
90	3.0	1.2	2.8	700	35.1	1.60	29.7	116.5	6.43
				900	35.5	1.61	30.0	106.5	6.46
	6.0	1.7	3.9	700	36.6	1.61	31.1	118.4	6.65
				900	36.9	1.62	31.4	108.0	6.68
	9.0	3.3	7.6	700	38.0	1.62	32.5	120.3	6.87
				900	38.4	1.63	32.8	109.5	6.90

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.

ES048 Low-Speed

Cooling Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	3.0	1.3	3.0	700	33.4	22.1	1.0	37.0	32.5
				900	33.8	23.9	1.1	37.4	31.9
	6.0	1.9	4.4	700	33.7	22.1	1.0	37.1	33.7
				900	34.4	24.2	1.0	37.9	33.2
	9.0	3.5	8.1	700	33.9	22.0	1.0	37.2	35.0
				900	34.9	24.4	1.0	38.4	34.6
70	3.0	1.2	2.8	700	29.4	20.8	1.3	33.7	23.2
				900	29.7	22.5	1.3	34.1	22.7
	6.0	1.8	4.2	700	29.9	21.1	1.3	34.2	23.6
				900	30.2	22.8	1.3	34.6	23.1
	9.0	3.3	7.6	700	30.4	21.4	1.3	34.7	24.0
				900	30.7	23.1	1.3	35.1	23.5
90	3.0	1.2	2.8	700	25.2	19.8	1.6	30.5	15.9
				900	25.4	21.0	1.7	31.1	15.3
	6.0	1.7	3.9	700	25.2	19.5	1.6	30.5	16.3
				900	25.9	21.2	1.6	31.5	15.9
	9.0	3.3	7.6	700	25.3	19.3	1.5	30.5	16.6
				900	26.5	21.4	1.6	31.9	16.5
110	3.0	1.1	2.5	700	21.0	18.3	1.8	27.1	11.7
				900	21.2	19.4	1.9	27.6	11.2
	6.0	1.6	3.7	700	21.4	18.5	1.8	27.5	11.9
				900	21.6	19.7	1.9	28.1	11.4
	9.0	3.0	6.9	700	21.9	18.8	1.8	28.0	12.2
				900	22.1	19.9	1.9	28.5	11.7

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.

ES060 High-Speed

Heating Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	8.0	2.1	4.9	1400	36.0	2.71	26.8	93.8	3.90
				1700	36.9	2.82	27.3	90.1	3.84
	11.0	3.1	7.2	1400	37.1	2.75	27.7	94.5	3.96
				1700	38.0	2.86	28.2	90.7	3.89
	14.0	4.8	11.1	1400	38.2	2.79	28.7	95.3	4.01
				1700	39.1	2.90	29.2	91.3	3.95
50	8.0	2.0	4.7	1400	51.7	3.20	40.7	104.2	4.72
				1700	52.6	3.24	41.5	98.6	4.75
	11.0	2.9	6.7	1400	53.1	3.22	42.1	105.1	4.83
				1700	54.1	3.27	42.9	99.4	4.84
	14.0	4.6	10.6	1400	54.5	3.23	43.5	106.0	4.94
				1700	55.5	3.30	44.3	100.2	4.93
70	8.0	2.0	4.4	1400	67.2	3.88	54.0	114.5	5.08
				1700	68.4	3.92	55.0	107.3	5.11
	11.0	2.8	6.4	1400	68.6	3.91	55.2	115.4	5.13
				1700	70.4	3.96	56.9	108.4	5.21
	14.0	4.4	10.2	1400	69.9	3.95	56.5	116.3	5.19
				1700	72.4	4.00	58.7	109.4	5.30
90	8.0	1.9	4.4	1400	79.3	4.17	65.0	122.4	5.57
				1700	80.7	4.22	66.3	114.0	5.61
	11.0	2.7	6.2	1400	81.6	4.19	67.3	123.9	5.70
				1700	83.1	4.26	68.5	115.2	5.71
	14.0	4.2	9.7	1400	83.9	4.21	69.5	125.5	5.84
				1700	85.4	4.30	70.8	116.5	5.82

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.

ES060 High-Speed

Cooling Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	8.0	2.0	4.7	1450	65.2	41.7	3.0	75.5	21.7
				1700	67.5	45.8	3.3	78.7	20.6
	11.0	2.9	6.7	1450	66.1	41.3	2.9	75.9	23.2
				1700	68.4	45.3	3.1	79.1	22.0
	14.0	4.6	10.6	1450	67.0	41.4	2.9	76.9	23.1
				1700	69.4	45.5	3.1	80.0	22.4
70	8.0	2.0	4.4	1450	60.1	38.6	3.6	72.4	16.6
				1700	61.6	42.4	3.9	74.8	15.9
	11.0	2.8	6.4	1450	61.2	38.8	3.5	73.1	17.6
				1700	62.8	42.6	3.7	75.5	16.9
	14.0	4.4	10.2	1450	62.4	39.1	3.4	74.1	18.2
				1700	64.0	42.9	3.7	76.5	17.4
90	8.0	1.9	4.4	1450	53.0	36.3	4.2	67.4	12.5
				1700	53.6	39.9	4.4	68.8	12.0
	11.0	2.7	6.2	1450	54.0	36.6	4.1	68.0	13.1
				1700	54.6	40.2	4.3	69.3	12.6
	14.0	4.2	9.7	1450	55.0	36.5	3.9	68.5	14.0
				1700	55.6	40.6	4.2	70.1	13.1
110	8.0	1.8	4.3	1450	44.9	33.3	5.0	62.0	9.0
				1700	45.4	36.7	5.2	63.1	8.8
	11.0	2.6	6.0	1450	45.8	33.8	4.8	62.2	9.6
				1700	46.3	37.2	4.9	63.2	9.4
	14.0	4.1	9.4	1450	46.7	34.3	4.7	62.6	10.0
				1700	47.2	37.7	4.8	63.7	9.8

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.

ES060 Low-Speed

Heating Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	5.0	1.1	2.5	900	17.9	1.43	13.0	88.4	3.66
				1100	18.3	1.45	13.3	85.4	3.68
	8.0	2.1	4.9	900	18.4	1.44	13.5	89.0	3.76
				1100	19.0	1.46	14.0	86.0	3.80
	11.0	3.1	7.2	900	19.0	1.44	14.1	89.5	3.86
				1100	19.7	1.47	14.6	86.5	3.92
50	5.0	1.1	2.5	900	27.6	1.59	22.2	98.4	5.10
				1100	27.9	1.59	22.4	93.4	5.12
	8.0	2.0	4.6	900	28.3	1.60	22.9	99.2	5.20
				1100	29.0	1.61	23.5	94.4	5.28
	11.0	2.9	6.7	900	29.1	1.61	23.6	99.9	5.30
				1100	30.1	1.62	24.5	95.3	5.43
70	5.0	1.0	2.1	900	36.8	1.73	30.9	107.9	6.25
				1100	37.2	1.74	31.3	101.3	6.28
	8.0	2.0	4.6	900	38.3	1.74	32.4	109.5	6.47
				1100	38.7	1.75	32.7	102.6	6.49
	11.0	2.8	6.5	900	39.9	1.75	33.9	111.0	6.68
				1100	40.2	1.76	34.2	103.9	6.71
90	5.0	0.9	2.1	900	43.5	1.81	37.3	114.8	7.03
				1100	43.9	1.82	37.7	107.0	7.06
	8.0	1.8	4.2	900	45.3	1.82	39.1	116.7	7.28
				1100	45.8	1.83	39.5	108.5	7.31
	11.0	2.7	6.2	900	47.2	1.84	40.9	118.5	7.52
				1100	47.6	1.85	41.3	110.1	7.56

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.

ES060 Low-Speed

Cooling Capacity Data
With 4 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	5.0	1.1	2.5	900	39.2	25.9	1.0	42.8	37.8
				1100	39.6	28.0	1.1	43.3	37.0
	8.0	2.0	4.6	900	39.5	25.8	1.0	42.9	39.1
				1100	40.3	28.3	1.0	43.9	38.5
	11.0	2.9	6.7	900	39.7	25.7	1.0	43.1	40.6
				1100	41.0	28.6	1.0	44.4	40.2
70	5.0	1.0	2.1	900	35.1	24.5	1.3	39.4	27.8
				1100	35.4	26.5	1.3	39.8	27.2
	8.0	2.0	4.6	900	35.7	24.8	1.3	40.0	28.3
				1100	36.0	26.9	1.3	40.4	27.7
	11.0	2.8	6.5	900	36.2	25.1	1.3	40.6	28.7
				1100	36.6	27.2	1.3	41.1	28.2
90	5.0	0.9	2.1	900	29.3	23.1	1.6	34.6	18.7
				1100	29.6	24.5	1.6	35.2	18.0
	8.0	1.8	4.2	900	29.3	22.8	1.5	34.6	19.2
				1100	30.2	24.8	1.6	35.7	18.7
	11.0	2.7	6.2	900	29.4	22.5	1.5	34.5	19.6
				1100	30.8	25.0	1.6	36.2	19.5
110	5.0	0.9	2.0	900	23.8	20.9	1.6	29.3	14.7
				1100	24.0	22.2	1.7	29.8	14.1
	8.0	1.8	4.2	900	24.3	21.2	1.6	29.8	15.0
				1100	24.5	22.5	1.7	30.3	14.4
	11.0	2.6	6.1	900	24.8	21.5	1.6	30.3	15.4
				1100	25.0	22.8	1.7	30.8	14.7

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.

ES060 High-Speed

Heating Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	8.0	2.1	4.9	1650	36.5	2.69	27.4	90.5	3.98
				1850	37.4	2.80	27.9	88.7	3.92
	11.0	3.1	7.2	1650	37.7	2.74	28.4	91.2	4.04
				1850	38.6	2.85	28.9	89.3	3.97
	14.0	4.8	11.1	1650	38.9	2.79	29.4	91.8	4.09
				1850	39.8	2.90	29.9	89.9	4.02
50	8.0	2.0	4.7	1650	52.1	3.21	41.2	99.3	4.77
				1850	53.1	3.24	42.0	96.6	4.80
	11.0	2.9	6.7	1650	53.6	3.22	42.6	100.1	4.88
				1850	54.5	3.27	43.4	97.3	4.89
	14.0	4.6	10.6	1650	55.0	3.23	44.0	100.9	4.99
				1850	56.0	3.30	44.8	98.0	4.97
70	8.0	2.0	4.4	1650	66.6	3.59	54.3	107.4	5.43
				1850	67.8	3.63	55.4	103.9	5.47
	11.0	2.8	6.4	1650	67.9	3.62	55.6	108.1	5.50
				1850	69.7	3.66	57.2	104.9	5.58
	14.0	4.4	10.2	1650	69.3	3.65	56.8	108.9	5.56
				1850	71.7	3.70	59.1	105.9	5.68
90	8.0	1.9	4.4	1650	76.6	3.88	63.4	113.0	5.78
				1850	78.0	3.92	64.6	109.0	5.82
	11.0	2.7	6.2	1650	78.8	3.90	65.5	114.2	5.92
				1850	80.3	3.96	66.8	110.2	5.94
	14.0	4.2	9.7	1650	81.1	3.92	67.7	115.5	6.06
				1850	82.6	4.00	68.9	111.3	6.05

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.

ES060 High-Speed

Cooling Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	8.0	2.0	4.7	1450	72.1	47.4	2.8	81.6	26.1
				1850	74.7	52.0	3.0	85.0	24.7
	11.0	2.9	6.7	1450	73.1	46.9	2.6	82.1	27.9
				1850	75.7	51.5	2.9	85.5	26.4
	14.0	4.6	10.6	1450	74.1	47.0	2.7	83.2	27.8
				1850	76.7	51.7	2.9	86.5	26.9
70	8.0	2.0	4.4	1450	64.3	43.7	3.3	75.6	19.6
				1850	66.0	48.0	3.5	78.0	18.7
	11.0	2.8	6.4	1450	65.6	43.9	3.2	76.4	20.7
				1850	67.3	48.3	3.4	78.8	19.8
	14.0	4.4	10.2	1450	66.8	44.3	3.1	77.5	21.4
				1850	68.5	48.6	3.4	80.0	20.5
90	8.0	1.9	4.4	1450	56.6	41.1	3.9	69.9	14.6
				1850	57.2	45.1	4.1	71.2	14.0
	11.0	2.7	6.2	1450	57.7	41.3	3.8	70.6	15.3
				1850	58.3	45.4	4.0	71.9	14.7
	14.0	4.2	9.7	1450	58.8	41.3	3.6	71.1	16.3
				1850	59.4	45.9	3.9	72.7	15.3
110	8.0	1.8	4.3	1450	47.7	36.9	4.6	63.5	10.3
				1850	48.2	40.6	4.8	64.5	10.1
	11.0	2.6	6.1	1450	48.6	37.4	4.4	63.7	10.9
				1850	49.1	41.1	4.6	64.8	10.7
	14.0	4.1	9.4	1450	49.5	37.9	4.3	64.3	11.4
				1850	50.0	41.7	4.5	65.3	11.2

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.

ES060 Low-Speed

Heating Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	5.0	1.1	2.5	900	18.2	1.43	13.3	88.7	3.72
				1100	18.6	1.45	13.6	85.6	3.75
	8.0	2.1	4.9	900	18.8	1.44	13.9	89.3	3.83
				1100	19.3	1.46	14.3	86.2	3.87
	11.0	3.1	7.2	900	19.3	1.44	14.4	89.9	3.93
				1100	20.0	1.47	15.0	86.8	3.99
50	5.0	1.1	2.5	900	27.5	1.56	22.2	98.3	5.16
				1100	27.8	1.57	22.4	93.4	5.18
	8.0	2.0	4.6	900	28.3	1.57	22.9	99.1	5.26
				1100	28.9	1.59	23.5	94.3	5.34
	11.0	2.9	6.7	900	29.0	1.58	23.6	99.8	5.36
				1100	30.0	1.60	24.5	95.3	5.49
70	5.0	1.0	2.1	900	36.3	1.72	30.4	107.3	6.18
				1100	36.6	1.73	30.7	100.8	6.21
	8.0	2.0	4.6	900	37.8	1.73	31.9	108.8	6.40
				1100	38.1	1.74	32.2	102.1	6.42
	11.0	2.8	6.5	900	39.2	1.74	33.3	110.4	6.60
				1100	39.6	1.75	33.6	103.3	6.63
90	5.0	0.9	2.1	900	42.9	1.77	36.9	114.2	7.12
				1100	43.3	1.78	37.3	106.5	7.15
	8.0	1.8	4.2	900	44.7	1.78	38.7	116.0	7.36
				1100	45.1	1.79	39.0	108.0	7.40
	11.0	2.7	6.2	900	46.5	1.79	40.4	117.9	7.61
				1100	47.0	1.80	40.8	109.5	7.64

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.

ES060 Low-Speed

Cooling Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	5.0	1.1	2.5	900	40.5	27.7	0.9	43.7	43.3
				1100	41.0	29.9	1.0	44.2	42.4
	8.0	2.0	4.6	900	41.2	27.8	1.0	44.5	42.5
				1100	41.6	30.3	1.0	45.0	42.4
	11.0	2.9	6.7	900	41.8	27.9	1.0	45.2	41.8
				1100	42.3	30.7	1.0	45.8	42.3
70	5.0	1.0	2.1	900	35.3	25.5	1.3	39.6	28.2
				1100	35.7	27.6	1.3	40.1	27.6
	8.0	2.0	4.6	900	35.9	25.8	1.3	40.2	28.7
				1100	36.3	27.9	1.3	40.7	28.1
	11.0	2.8	6.5	900	36.5	26.1	1.3	40.8	29.1
				1100	36.9	28.3	1.3	41.3	28.6
90	5.0	0.9	2.1	900	29.7	23.9	1.6	35.0	19.1
				1100	30.0	25.4	1.6	35.5	18.4
	8.0	1.8	4.2	900	30.4	24.2	1.5	35.7	19.7
				1100	30.6	25.7	1.6	36.1	19.1
	11.0	2.7	6.2	900	31.2	24.5	1.5	36.5	20.3
				1100	31.2	26.1	1.6	36.6	19.8
110	5.0	0.9	2.0	900	23.9	21.3	1.7	29.8	14.0
				1100	24.2	22.6	1.8	30.3	13.4
	8.0	1.8	4.2	900	24.5	21.6	1.7	30.3	14.3
				1100	24.7	22.9	1.8	30.8	13.7
	11.0	2.6	6.0	900	25.0	21.8	1.7	30.8	14.6
				1100	25.2	23.2	1.8	31.4	14.0

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.

ES072 High-Speed

Heating Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	10.0	2.7	6.2	1650	44.0	3.33	32.6	94.7	3.87
				1850	45.0	3.46	33.2	92.5	3.81
	13.0	4.3	9.9	1650	45.3	3.37	33.8	95.4	3.94
				1850	46.3	3.51	34.4	93.2	3.87
	16.0	6.1	14.1	1650	46.6	3.41	34.9	96.1	4.00
				1850	47.7	3.55	35.5	93.9	3.93
50	10.0	2.6	6.0	1650	60.9	4.18	46.6	104.2	4.27
				1850	61.9	4.22	47.5	101.0	4.30
	13.0	4.1	9.5	1650	62.5	4.19	48.2	105.1	4.37
				1850	63.6	4.26	49.1	101.8	4.37
	16.0	5.8	13.4	1650	64.1	4.21	49.7	106.0	4.46
				1850	65.3	4.30	50.6	102.7	4.45
70	10.0	2.4	5.3	1650	75.7	4.66	59.8	112.5	4.76
				1850	77.0	4.71	60.9	108.5	4.79
	13.0	3.8	8.8	1650	77.2	4.70	61.1	113.3	4.81
				1850	79.2	4.75	63.0	109.6	4.88
	16.0	5.4	12.5	1650	78.7	4.74	62.5	114.1	4.86
				1850	81.4	4.80	65.0	110.7	4.97
90	10.0	2.3	5.3	1650	86.0	5.02	68.9	118.3	5.03
				1850	87.6	5.07	70.3	113.8	5.06
	13.0	3.6	8.3	1650	88.5	5.04	71.3	119.6	5.14
				1850	90.1	5.12	72.6	115.1	5.15
	16.0	5.1	11.8	1650	90.9	5.06	73.6	121.0	5.26
				1850	92.6	5.17	75.0	116.4	5.25

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.

ES072 High-Speed

Cooling Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	10.0	2.6	6.0	1450	75.1	46.3	3.2	86.1	23.2
				1850	77.7	50.8	3.5	89.7	22.0
	13.0	4.1	9.5	1450	76.1	45.8	3.1	86.6	24.8
				1850	78.8	50.3	3.4	90.2	23.5
	16.0	5.8	13.4	1450	77.1	45.9	3.1	87.8	24.8
				1850	79.9	50.5	3.3	91.2	24.0
70	10.0	2.4	5.3	1450	68.8	44.1	3.9	82.0	17.8
				1850	70.6	48.4	4.1	84.7	17.1
	13.0	3.8	8.8	1450	70.1	44.4	3.7	82.8	18.9
				1850	71.9	48.7	4.0	85.5	18.1
	16.0	5.4	12.5	1450	71.4	44.7	3.7	84.0	19.5
				1850	73.3	49.1	3.9	86.7	18.6
90	10.0	2.3	5.3	1450	61.4	41.1	4.6	77.0	13.4
				1850	62.1	45.2	4.8	78.5	12.9
	13.0	3.6	8.3	1450	62.6	41.4	4.4	77.7	14.1
				1850	63.3	45.4	4.7	79.2	13.6
	16.0	5.1	11.8	1450	63.8	41.3	4.3	78.3	15.0
				1850	64.5	45.9	4.6	80.1	14.1
110	10.0	2.2	5.2	1450	52.3	38.5	5.4	70.8	9.7
				1850	52.9	42.4	5.6	71.9	9.5
	13.0	3.4	7.9	1450	53.3	39.1	5.2	71.0	10.3
				1850	53.9	43.0	5.3	72.1	10.1
	16.0	4.8	11.2	1450	54.3	39.6	5.0	71.6	10.8
				1850	54.9	43.5	5.2	72.7	10.6

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.

ES072 Low-Speed

Heating Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	HEATING ONLY				
		PSI	FT		HC	KW	HE	LAT	COP
30	7.0	1.5	3.5	900	19.2	1.46	14.2	89.7	3.84
				1100	19.5	1.48	14.5	86.4	3.86
	10.0	2.7	6.2	900	19.7	1.47	14.7	90.3	3.94
				1100	20.3	1.49	15.2	87.1	3.99
	13.0	4.3	9.9	900	20.3	1.47	15.3	90.9	4.05
				1100	21.1	1.50	15.9	87.7	4.11
50	7.0	1.4	3.2	900	27.5	1.61	22.0	98.3	5.00
				1100	27.8	1.62	22.2	93.4	5.02
	10.0	2.6	6.0	900	28.2	1.62	22.7	99.1	5.10
				1100	28.9	1.64	23.3	94.3	5.17
	13.0	4.1	9.5	900	28.9	1.63	23.4	99.8	5.19
				1100	30.0	1.65	24.3	95.2	5.32
70	7.0	1.3	2.8	900	35.1	1.77	29.1	106.2	5.83
				1100	35.5	1.78	29.4	99.9	5.85
	10.0	2.4	5.5	900	36.6	1.78	30.5	107.6	6.02
				1100	36.9	1.79	30.8	101.1	6.05
	13.0	3.8	8.8	900	38.0	1.79	31.9	109.1	6.22
				1100	38.4	1.80	32.2	102.3	6.24
90	7.0	1.2	2.8	900	41.9	1.83	35.7	113.1	6.72
				1100	42.3	1.84	36.0	105.6	6.75
	10.0	2.3	5.3	900	43.7	1.84	37.4	114.9	6.96
				1100	44.1	1.85	37.8	107.1	6.99
	13.0	3.6	8.3	900	45.4	1.85	39.1	116.7	7.19
				1100	45.8	1.86	39.5	108.6	7.22

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.

ES072 Low-Speed

Cooling Capacity Data
With 5 Ton Air Handler

EWT	GPM	WPD		CFM	COOLING ONLY				
		PSI	FT		TC	SC	KW	HR	EER
50	7.0	1.4	3.2	900	39.7	26.1	1.1	43.6	34.8
				1100	40.1	28.3	1.2	44.1	34.1
	10.0	2.6	6.0	900	40.3	26.2	1.1	44.2	35.9
				1100	40.8	28.6	1.1	44.7	35.6
	13.0	4.1	9.5	900	40.9	26.3	1.1	44.7	37.0
				1100	41.5	28.9	1.1	45.3	37.2
70	7.0	1.3	2.8	900	34.8	24.5	1.3	39.3	26.6
				1100	35.2	26.5	1.4	39.8	26.1
	10.0	2.4	5.5	900	35.4	24.8	1.3	39.9	27.1
				1100	35.8	26.9	1.4	40.4	26.5
	13.0	3.8	8.8	900	36.0	25.1	1.3	40.5	27.5
				1100	36.4	27.2	1.4	41.0	27.0
90	7.0	1.2	2.8	900	29.3	23.1	1.8	35.4	16.5
				1100	29.6	24.6	1.9	36.0	15.8
	10.0	2.3	5.3	900	30.1	23.4	1.7	36.1	17.3
				1100	30.3	24.9	1.8	36.5	16.5
	13.0	3.6	8.3	900	30.9	23.7	1.7	36.7	18.1
				1100	30.9	25.2	1.8	37.1	17.2
110	7.0	1.1	2.6	900	23.7	21.0	2.0	30.5	11.9
				1100	24.0	22.3	2.1	31.1	11.4
	10.0	2.2	5.2	900	24.2	21.3	2.0	31.0	12.1
				1100	24.5	22.6	2.1	31.6	11.7
	13.0	3.4	7.9	900	24.7	21.6	2.0	31.5	12.4
				1100	25.0	22.9	2.1	32.2	11.9

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

The ES control system is a microprocessor-based printed circuit board conveniently located in the unit control box for easy accessibility. The microprocessor control is specifically designed for the ES series heat pumps. 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. An optional LED board is available for quick diagnostics. The control offers optimal space conditioning. The board accepts traditional 24VAC 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 ES Series control boards at the slave inputs and outputs (SL1 In and Out) will provide for remote control of the loop pump on any unit.

Shutdown Input

A 24VAC common 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 ES 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 ES control allows service personnel to shorten most timing delays for faster diagnostics.

Fault Retry

All faults are retried twice before finally locking the unit out. The "fault retry" feature is designed to prevent nuisance service calls.

Diagnostics

The ES control board allows all inputs and outputs to be displayed on the LEDs for fast and simple control board diagnosis.

Heating Operation

Note: At first power up, a four-minute time delay is employed before the compressor is energized.

Heat, 1st Stage (Y1)

The compressor and loop pumps are energized 10 seconds after the Y1 input.

Heat, 2nd Stage (Y1,Y2) Single-Speed Units

The auxiliary heat relay will disconnect the compressor, and the auxiliary heat will operate normally.

Heat, 2nd Stage (Y1,Y2) Dual Capacity Units

The 1st stage compressor and loop pumps are de-energized 10 seconds after the Y2 input. The 2nd stage compressor and loop pumps are energized 1 minute after the 1st stage compressor is de-energized.

Heat, 3rd Stage (Y1,Y2,W) Dual Capacity Units

The auxiliary heat relay will disconnect the compressor, and the auxiliary heat will operate normally.

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 compressor and loop pumps are energized 10 seconds after the Y1 input.

Cool, 2nd Stage (Y1, Y2, O) Dual Capacity Units

The 1st stage compressor and loop pumps are de-energized 10 seconds after the Y2 input. The 2nd stage compressor and loop pumps are energized 1 minute after the 1st stage compressor is de-energized.

Fan Only Operation

The Fan Only mode is controlled directly from the unit thermostat to the unit air handler. No input is given to the microprocessor to operate the fan function.

Lockout Conditions

During lockout mode, the appropriate thermostat lockout LEDs (if available) will illuminate. The compressor and loop pumps are de-energized and if the thermostat calls for third stage heating, 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.

High Pressure

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

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 protection thermistor temperature (located between the TXV and coax) is at or below the selected freeze protection point (well 30°F or loop 15°F) for 30 continuous seconds.

The unit also contains a secondary freeze protection sensor located on the entering water line of the unit. If the loop reaches a temperature of 20°F the secondary freeze protection sensor will cycle the loop pumps "on" until the loop temperature rises to or above 25°F.

Single Speed Operation Logic

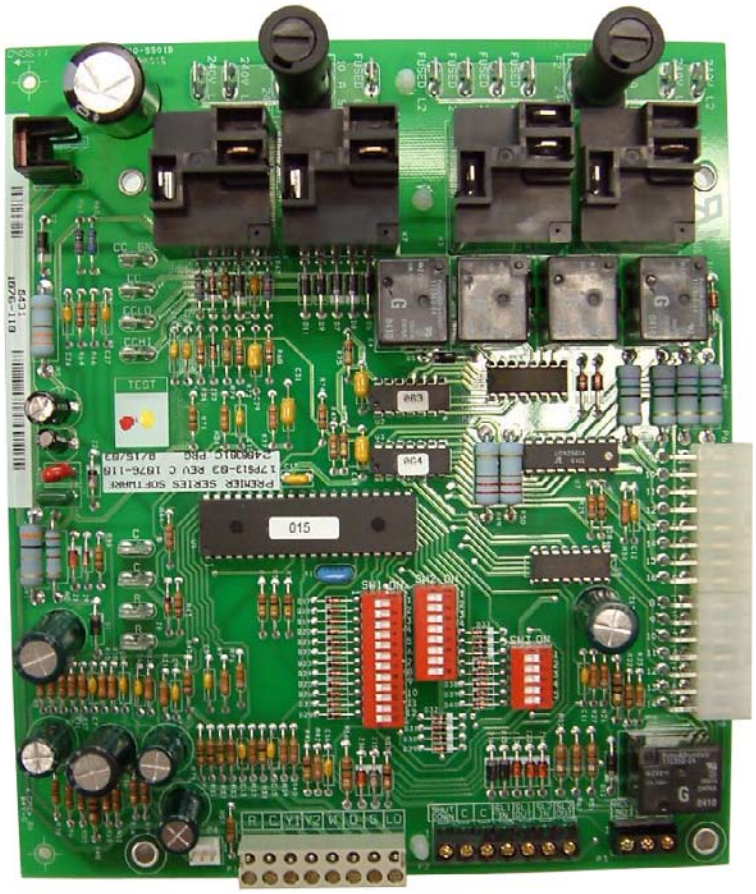
OPERATION	HEATING		COOLING
	STG1	STG2	STG1
Compressor	On	Off	On
Fan	On	On	On
Loop Pump	On	Off	On
Reversing Valve	Off	Off	On
T-Stat Signal	Y1	W	Y1, O

Dual Capacity Operation Logic

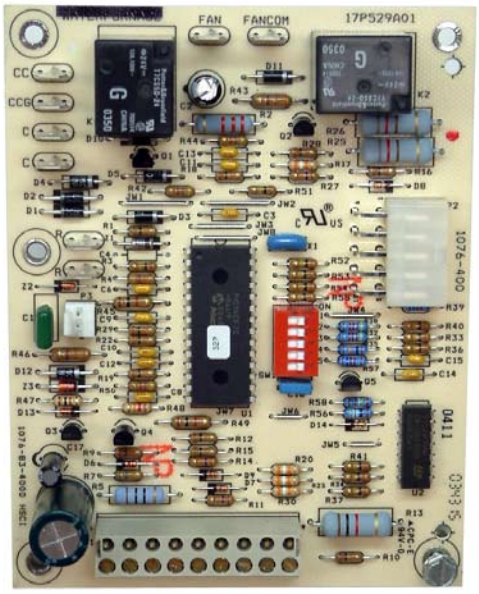
OPERATION	HEATING			COOLING	
	STG1	STG2	STG3	STG1	STG2*
Compressor-Low	On	Off	Off	On	Off
Compressor-Hi	Off	On	Off	Off	On
Fan	On	On	On	On	On
Loop Pump	On	On	Off	On	On
Reversing Valve	Off	Off	Off	On	On
T-Stat Signal	Y1	Y1, Y2	W	Y1, O	Y1, Y2, O

Logic Board Physical Layout

Dual Capacity



Single Speed



Engineering Guide Specifications

General

The geothermal heating/cooling units shall be reverse cycle split system configuration designed for use with DX heating and cooling coils. Units shall be ARI/ISO Standard 13256-1 performance 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 stretch-wrapped.

The geothermal units shall be designed to operate with entering liquid temperature between 25°F and 110°F as manufactured by WFI, of Fort Wayne, Indiana.

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.

Refrigerant Circuit

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

Compressors shall be high-efficiency reciprocating dual capacity or single speed type designed for heat pump duty and mounted on rubber vibration isolators. Compressor motors shall be single-phase PSC with overload protection.

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 water-to-refrigerant heat exchanger and refrigerant suction lines shall be insulated to prevent condensation at low liquid temperatures.

Electrical

The control shall provide operational sequencing, high- and low-pressure switch monitoring, lockout mode control, and loop pump control.

A 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.

Piping

Supply and return water connections shall be brass fittings which will connect to optional loop pump assembly or 3-way valves. All water piping shall be insulated to prevent condensation at low liquid temperatures.

Options & Accessories

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.

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, O, L). The relay shall be located on a factory-provided mount in the unit low-voltage control wiring compartment.

Internally Mounted Loop Pump(s)

1 or 2 pump and 3-way valve assemblies which connect to internally supplied fittings shall be available. Flush and fill fittings shall be available separately.

Internally Mounted 3-way Valves

3-way valves which can be adapted to threaded, barb, or fusion fittings, shall be provided. Fittings shall be available separately.

Heat Recovery Unit

An optional heat reclaiming unit with vented double-wall copper construction suitable for potable water shall be available. The coil and hot water circulating pump shall be factory mounted inside the recovery unit. A high temperature limit pump shut-off switch shall be provided as part of the recovery unit.

Decorative Rock Cover

For use with outdoor installations. (Specify brown granite, gray granite, salt & pepper, or charcoal basalt).

WaterFurnace | *Smarter from the Ground Up*™

WaterFurnace International, Inc.
9000 Conservation Way
Fort Wayne, IN 46809
www.waterfurnace.com

Product:	ES Series
Type:	Geothermal/Water Source Split Heat Pumps
Size:	2, 2.5 Ton Single Speed 3 thru 6 Ton Dual Capacity

Document Type:	Specification Catalog
Part Number:	SP1460
Release Date:	09/04
Supercedes:	SI1460 (11/03)