

GreenSource iSeries Model SL Water Source Heat Pump 6 to 10 Ton

Engineering
Submittal
Sheet



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Overview and Certifications



Standard Features, Factory Installed Options, and Field Installed Accessories

Standard Features

- ▶ **SL Model 072, 096 and 120**
 - 3 Models from 6 through 10 tons
 - Horizontal and Vertical Configurations
- ▶ **Cabinet**
 - Cabinetry is constructed using heavy-gauge, G90 galvanized steel
- ▶ **Quiet Operation**
 - All panels are insulated with ½" thick, 1.5 lb./cu.ft. density micromat fiberglass insulation for both thermal insulation and noise reduction
- ▶ **Serviceability**
 - All units are designed to be serviced from the front of the unit
 - Insulated bulkheads (vertical configuration only) allow the unit to be serviced during operation
- ▶ **Unit Configurations**
 - All units are available in horizontal, vertical configurations

- ▶ **Filter Racks**
 - Units come standard with a 1" filter rack and construction filter
- ▶ **Fan Motor**
 - The standard motor for all SL series heat pumps is a belt drive motor
- ▶ **Angle Section Supports**
 - Horizontal units are equipped with angle section supports for hanging the unit. Field supplied spring or rubber isolation must be installed to isolate the unit from the building structure
- ▶ **Water Connections**
 - All water connections are heavy duty copper FPT fittings securely fastened to the unit corner post
- ▶ **Refrigerant Circuit**
 - SL units are designed using the optimum combination of compressor, water and copper aluminum-fin evaporator coils with TXV to provide peak performance.
 - R-410A refrigerant

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Standard Features, Factory Installed Options, and Field Installed Accessories continued..

- ▶ **Copper Coax Coil**
- ▶ **TXV (Thermal Expansion Valve)**
 - Improves refrigerant management and efficiencies
- ▶ **75 VA Transformer**
- ▶ **Standard Range (WLS / Towers / Boiler)**
- ▶ **Unit Protection Module**
 - Each SV unit is factory provided with a Unit Protection Module (UPM) that controls the unit operation and monitors the safety controls that protect the unit
 - The UPM interfaces with the thermostat or direct digital controller
 - Water and Air coil freeze protection
 - Condensate Overflow Sensor
 - Brown-out Protection
 - Low and High Pressure Protection
- ▶ **Warranty**
 - 5 year compressor limited warranty
 - 1 year parts limited warranty
- ▶ **Compressor Monitor Relay (2 required)**
- ▶ **Phase Protection Monitor**
- ▶ **Wire for 208 Volt**
- ▶ **Optional Filter Rack**
 - A 2" four-sided filter rack and pleated MERV 8 filter is optional and greatly improves air filtration
- ▶ **Hot Gas Bypass**
- ▶ **Modulating Hot Gas Bypass**
- ▶ **Hot Gas Reheat**
 - Passive Dehumidification
- ▶ **Waterside Economizer**
- ▶ **Cupro-nickel Coil:**
 - Recommended in conditions anticipating moderate scale formation or in brackish water
- ▶ **Pump Interlock Relay**
 - Helps ensure the external flow/pump center operates when unit is operating
- ▶ **Extended Range Option**
 - Vertical units only, standard on horizontal units.
 - Includes insulated piping
- ▶ **100VA Transformer**
- ▶ **DDC Controls**
 - The factory and field installed DDC Controller is preprogrammed and installed in the unit with the Unit Protection Module
 - The unit will operate in a 100% stand-alone control mode or connect to a Building Automation System (BAS) using open protocols BACnet, Modbus and N2

Factory and Field Installed Options

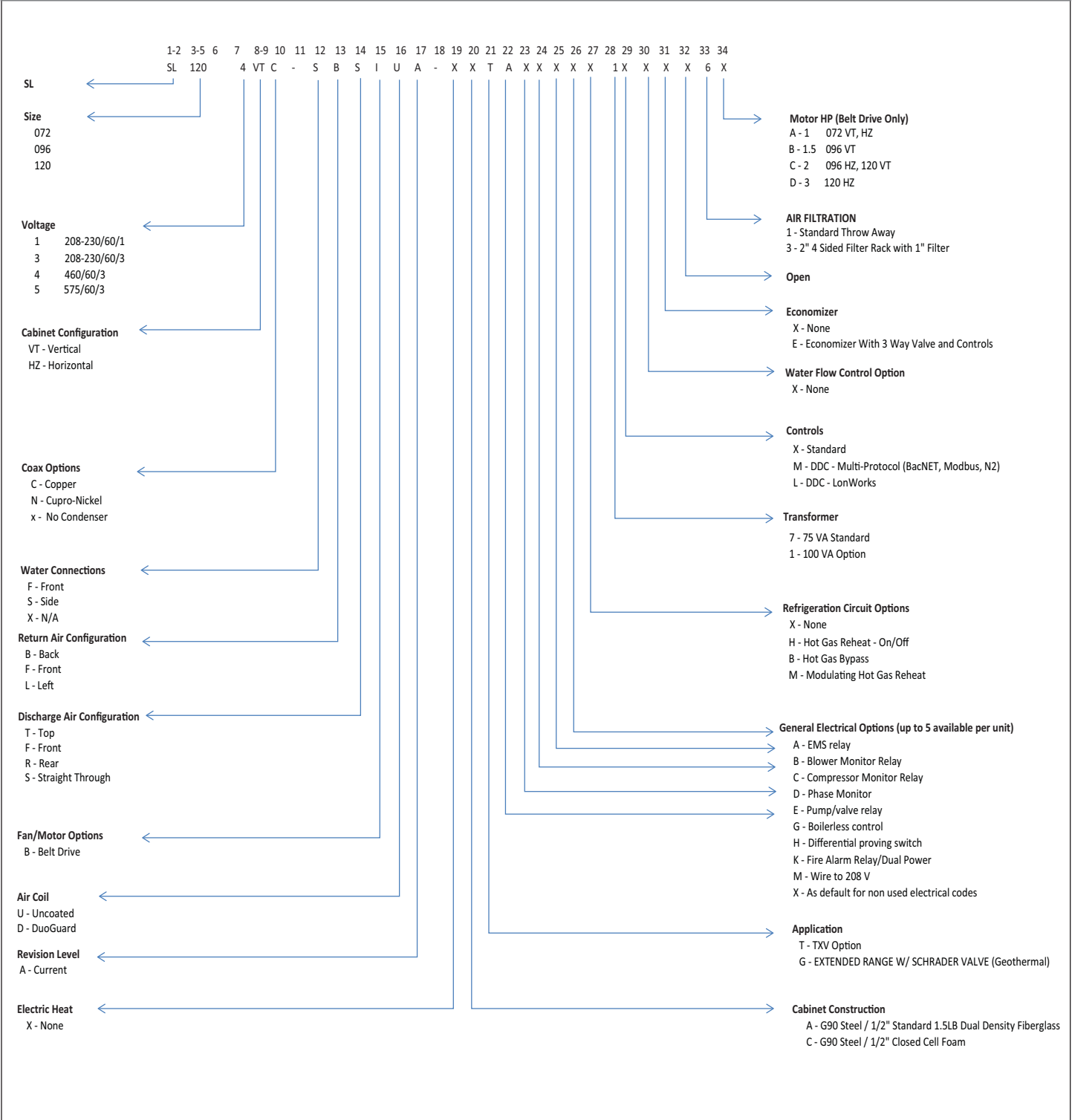
- ▶ **Boilerless Control**
- ▶ **DuoGuard Evaporator Coil**
 - Tin Electro-Plated Copper Tubing with High-Tech Polymer Coated Aluminum Fins will protect the evaporator coil from all forms of corrosive elements in the airstream
- ▶ **Differential Pressure Switch**
- ▶ **Closed Cell Foam Insulation (Coming Soon)**
- ▶ **Fire Alarm Relay**
- ▶ **EMS Relay**
 - Energy management relay to tie into a building's energy management system
- ▶ **Blower Monitor Relay**

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Model Nomenclature



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AHRI/ANSI 13256-1 Capacity and Efficiency Data

Models	Water Flow (GPM)	Water Loop				Ground Water				Ground Loop			
		Cooling (86°F)		Heating (68°F)		Cooling (59°F)		Heating (50°F)		Cooling (77°F)		Heating (32°F)	
		Capacity (Btuh)	EER (Btuh/W)	Capacity (Btuh)	COP	Capacity (Btuh)	EER (Btuh/W)	Capacity (Btuh)	COP	Capacity (Btuh)	EER (Btuh/W)	Capacity (Btuh)	COP
072	16	72000	13.0	92000	4.5	80400	18.6	72400	3.8	75600	14.2	54800	3.2
096	21	96000	14.0	116000	4.8	116000	20.6	93200	4.2	104000	15.4	73600	3.5
120	28	124000	13.2	158000	4.4	134000	18.3	123000	3.9	127200	14.7	100000	3.2

Physical Data

Description	Unit	Value		
		072	096	120
Compressor Type (Qty 1)	–	Reciprocating	Reciprocating	Scroll
Refrigeration Charge	Oz	124	148	166
Max Water Working Pressure	PSIG/kPa	450/3100	450/3100	450/3100
Number of Refrigeration Circuits	–	2	2	2
Evaporator Coil				
Coil Type	–	Tube-Fin	Tube-Fin	Tube-Fin
Air Coil Dimensions Vertical	H x L	18 x 28 (2)	20 x 32.5 (2)	20 x 32.5 (2)
Air Coil Dimensions Horizontal	H x L	18 x 28 (2)	20 x 32.5 (2)	20 x 32.5 (2)
Row(s)	–	3	3	3
Motor & Blower				
Fan Motor Type/Speeds	–	Belt Drive/1	Belt Drive/1	Belt Drive/1
Fan Motor	HP	1	1 1/2 (Vertical Units) 2 (Horizontal Units)	2 (Vertical Units) 3 (Horizontal Units)
Blower Wheel Size	Dia. x W x Qty	12 x 12 x 1	12 x 12 x 1	12 x 9 x 2
Water Connection				
Type	–	FPT	FPT	FPT
Size	–	1"	1"	1 1/4"
Water Coil Type	–	Coaxial	Coaxial	Coaxial
Coaxial Coil Volume (gal)	gal	0.42	0.64	0.87
Vertical Cabinet				
Nominal size of Standard Filter - 1"	H x L	20 x 34.5 (2)	20 x 34.5 (2)	20 x 34.5 (2)
Weight - Operating	lbs	670	702	935
Weight - Shipping	lbs	715	752	980
Horizontal Cabinet				
Nominal size of Standard Filter - 1"	H x L	20 x 34.5 (2)	20 x 34.5 (2)	20 x 34.5 (2)
Weight - Operating	lbs	670	702	935
Weight - Shipping	lbs	715	752	980

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Operating Limits - Cooling & Heating		
Description	Standard Unit	Extended Range Option
COOLING		
Minimum ambient air temperature °F	50	50
Maximum ambient air temperature °F	100	100
Minimum evaporator entering air db/wb °F	68/57	68/57
Rated air coil entering air db/wb °F	80/67	80/67
Maximum evaporator entering air db/wb °F	95/85	95/85
Minimum water coil entering fluid temperature °F	50	50
Water loop typical coil entering fluid range temperature °F	70/90	70/90
Maximum water coil entering fluid temperature °F	110	110
HEATING		
Minimum ambient air temperature °F	50	40
Maximum ambient air temperature °F	100	85
Minimum evaporator entering air db °F	50	50
Rated air coil entering air °F	68	68
Maximum evaporator entering air db °F	80	80
Normal water coil entering fluid range °F	50-80	25-80
Minimum water coil entering Fluid °F	50	20*

* antifreeze solution is required at these fluid temperatures.

Electrical Data - Belt Drive Motor														
Model	Voltage Code	Voltage/Phase/Hz	Voltage Min/Max	Compressor			Total Unit w/ Belt Drive Motor				Compressor Service			Run Capacitor (µF/V)
				QTY	RLA (each)	LRA (each)	Motor Qty	FLA	Min Circuit Amps	Max Fuse/HACR	Cold Winding Resistance (Ω)			
											Single Phase: R-C	Single Phase: S-C	Three-Phase: Line-Line	
072	1	208-230/1/60	197/253	2	13.0	74	1	7	36.3	45	0.82	1.63	-	40/370
	3	208-230/3/60	197/253	2	7.8	68	1	3.6	21.2	25	-	-	1.15	-
	4	460/3/60	414/506	2	3.9	34	1	1.8	10.6	15	-	-	4.61	-
096	1	208-230/1/60	197/253	2	15.7	84	1	8.4/9.8	47.6/45.1	50/60	0.54	1.60	-	45/370
	3	208-230/3/60	197/253	2	11.0	88	1	4.8/6.2	29.5/31.0	40/40	-	-	0.93	-
	4	460/3/60	414/506	2	5.4	44	1	2.4/3.1	14.6/15.2	15/20	-	-	3.59	-
	5	575/3/60	518/632	2	4.4	36	1	2.0/2.6	11.9/12.5	15/15	-	-	5.68	-
120	1	208-230/1/60	197/253	2	26.3	134	1	9.8	69.0	90	0.45	0.79	-	80/370
	3	208-230/3/60	197/253	2	15.6	110	1	6.2/9.2	41.3/44.3	50/50	-	-	0.68	-
	4	460/3/60	414/506	2	7.8	52	1	3.1/4.3	20.6/21.9	25/25	-	-	3.20	-
		575/3/60	518/632	2	5.8	39	1	2.6/3.7	15.7/16.8	20/20	-	-	5.33	-

* First value is for vertical configurations and second value is for horizontals.

* Resistance value tolerance +/- 7%. All resistance values must be measured with compressor at room temperature..

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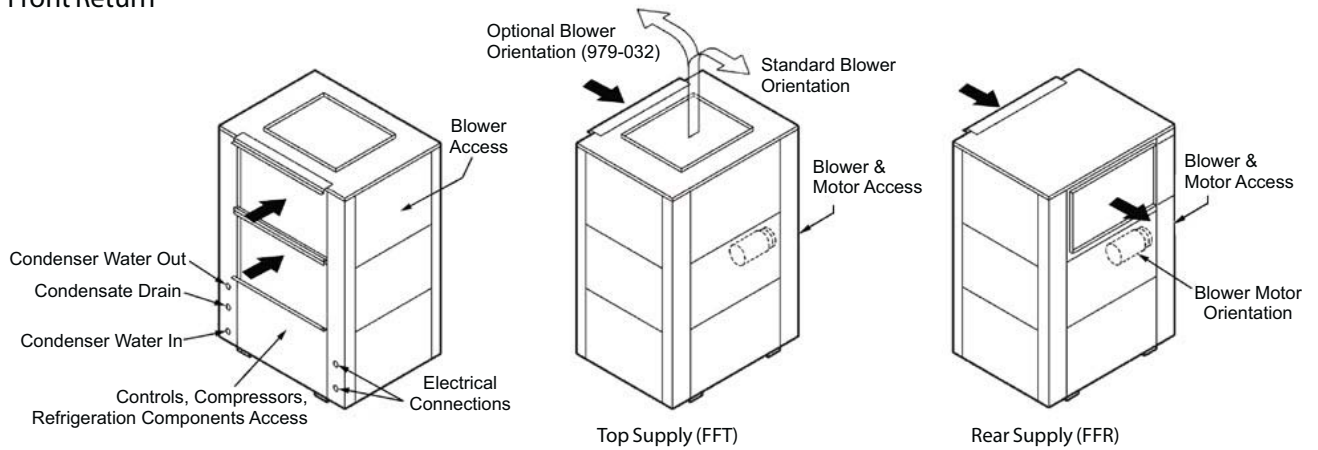
Blower Performance Drive Belt Motor															
Model	Motor Sheave	Rated Airflow	Available External Static Pressure (in. wc. Wet coil and filter included)												
			0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	
072	Closed		-	-	-	-	-	-	-	-	-	2420	2160	1900	1700
	Half Open	2,300	-	-	2980	2800	2610	2400	2100	1800	-	-	-	-	
	Open		2780	2590	2350	2050	1780	-	-	-	-	-	-	-	
096	Closed		-	-	-	-	-	-	-	-	2800	2650	2450	2300	2200
	Half Open	2,800	-	-	3480	3340	3230	3075	2880	2690	2555	2355	-	-	
	Open		3110	2965	2835	2615	2460	2275	-	-	-	-	-	-	
120	Closed		-	-	-	-	-	-	-	-	-	4400	4150	3830	3600
	Half Open	4,000	-	-	-	4660	4490	4240	3959	4600	3000	-	-	-	
	Open		4680	4490	4270	4000	3700	3370	-	-	-	-	-	-	

Horizontal Cabinet Corner Weights											
Configuration			Left Hand Evaporator				Right Hand Evaporator				
Model	Unit	Total	Left Front*	Right Front*	Left Back	Right Back	Left Front*	Right Front*	Left Back	Right Back	
072	Lbs	670	147	274	137	112	-	-	-	-	
	kg	305	67	125	62	51	-	-	-	-	
096	Lbs	702	155	287	143	117	-	-	-	-	
	kg	319	70	130	65	53	-	-	-	-	
120	Lbs	935	206	382	191	156	-	-	-	-	
	kg	425	94	174	87	71	-	-	-	-	

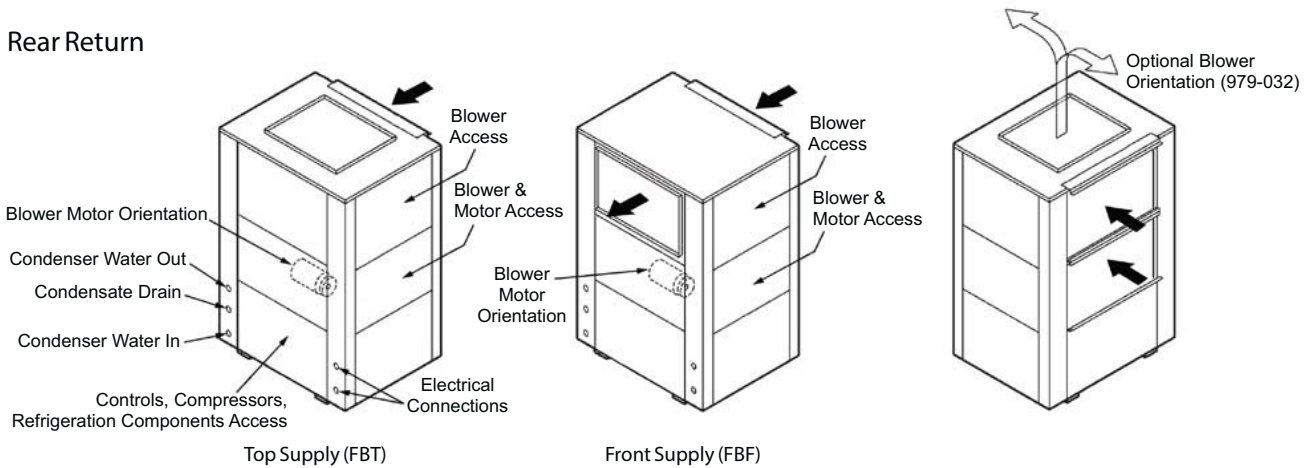
* Front is control box end

SL 72-120 Vertical Single Blower Large Commercial Unit Configurations

Front Return



Rear Return

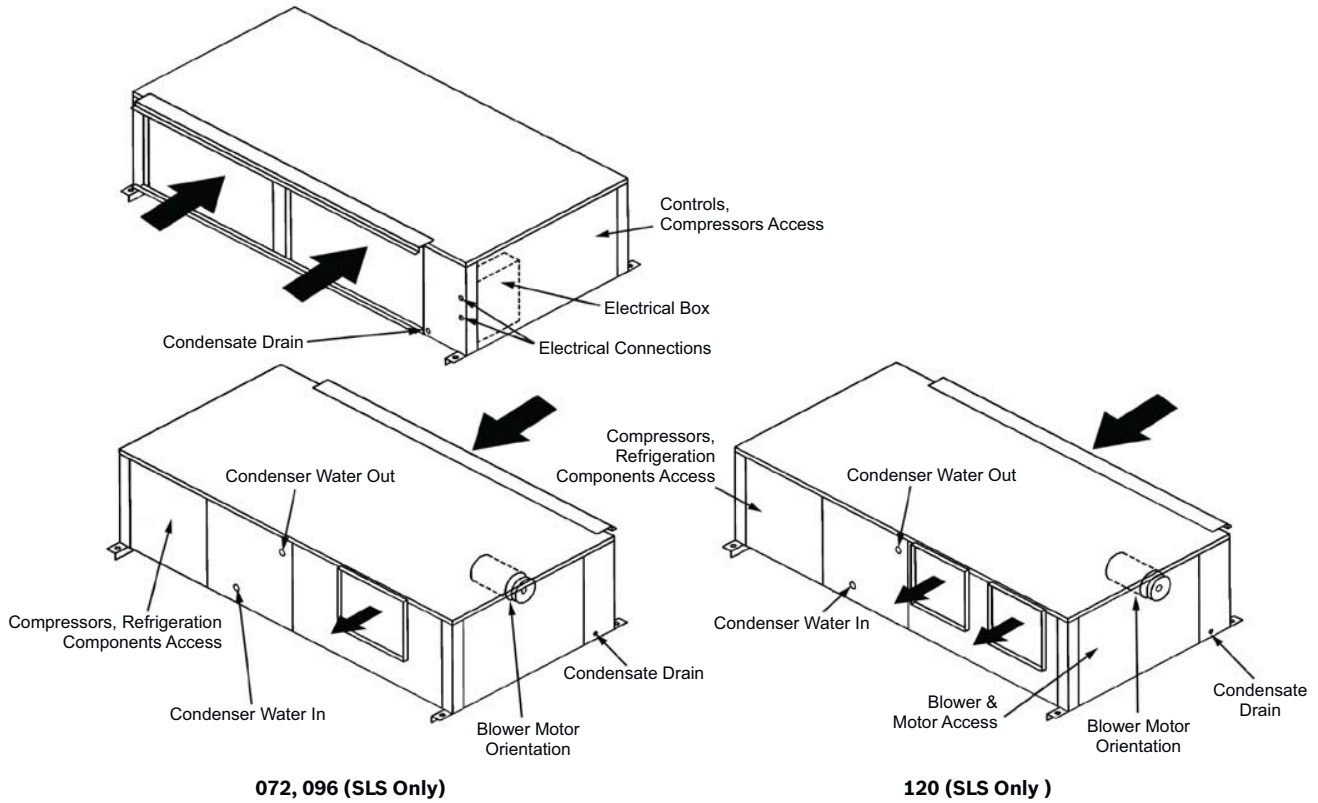


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SL 72-120 Horizontal Large Commercial Unit Configurations



Overall Dimensions

Model	Unit of Measure	Vertical Cabinet			Horizontal Cabinet		
		Width	Depth	Height	Width	Depth	Height
072	in	42.00	32.00	62.00	38.00	78.00	21.50
	mm	1067	813	1575	965	1981	546
096	in	42.00	32.00	62.00	38.00	78.00	21.50
	mm	1067	813	1575	965	1981	546
120	in	42.00	32.00	62.00	38.00	78.00	21.50
	mm	1067	813	1575	965	1981	546

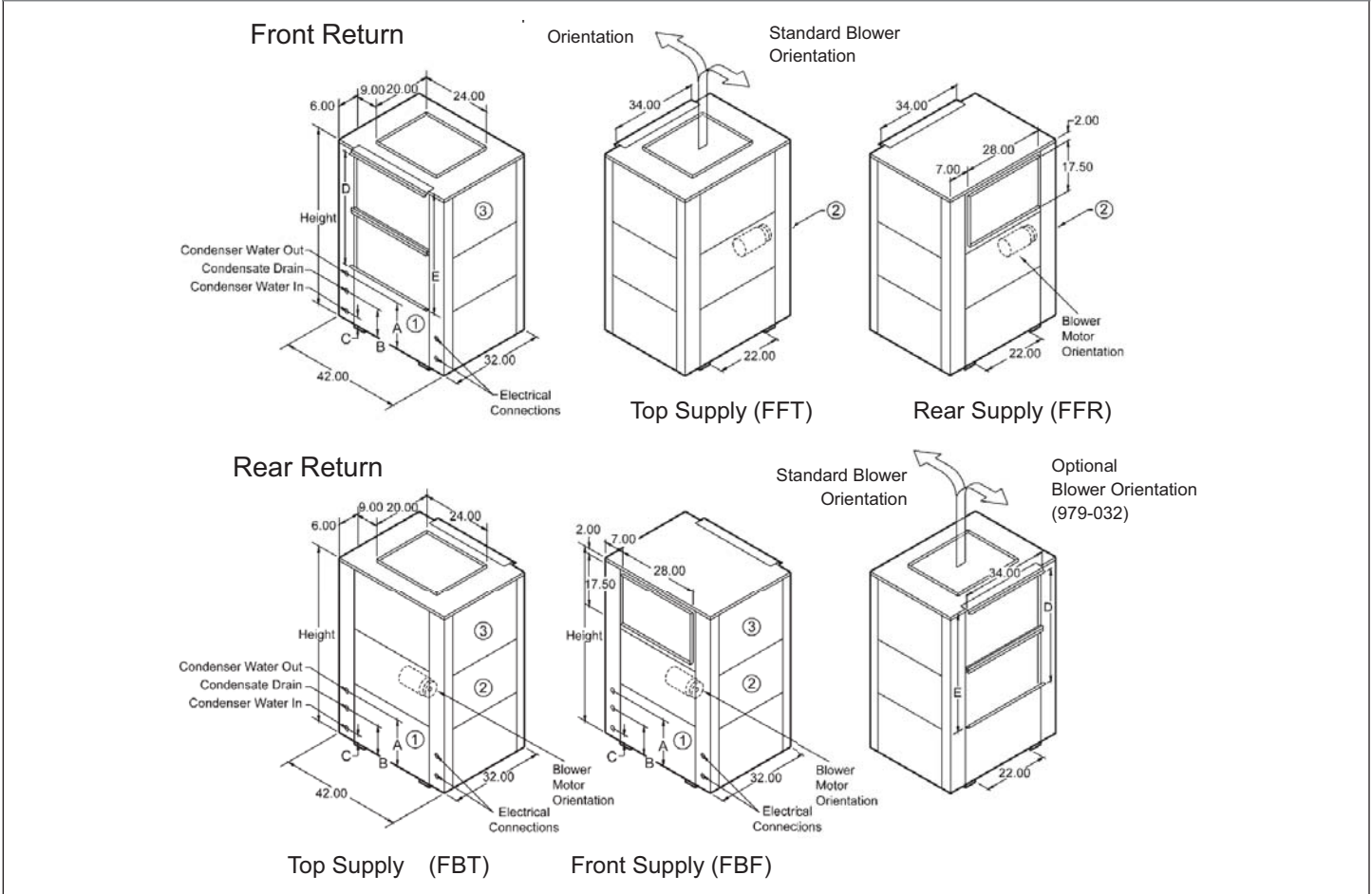
i All dimensions within +/- 0.125". Specifications subject to change without notice.

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SL Vertical Dimensions and Connections



SL Vertical Dimensions and Connections

Model	Width	Depth	Height	Distance Between Base Rails	Top Supply: Supply Depth	Top Supply: Supply Width	Top Supply: Front to Supply	Top Supply: Left Side to Supply	Rear Supply: Supply Height	Rear Supply: Supply Width	Rear Supply: Top to Supply	Rear Supply: Right Side to Supply
072	42.00	32.00	62.00	22.00	20.00	24.00	6.00	9.00	17.50	28.00	2.00	7.00
096	42.00	32.00	62.00	22.00	20.00	24.00	6.00	9.00	17.50	28.00	2.00	7.00
120	42.00	32.00	62.00	22.00	20.00	24.00	6.00	9.00	17.50	28.00	2.00	7.00

SL Vertical Dimensions and Connections Continued

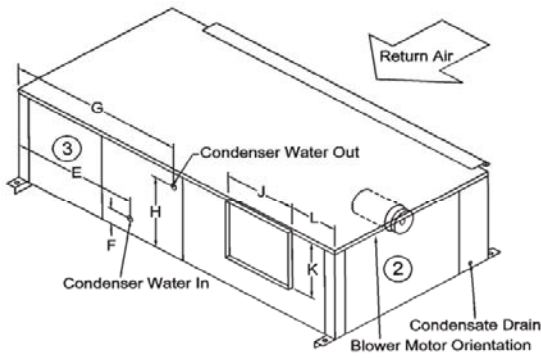
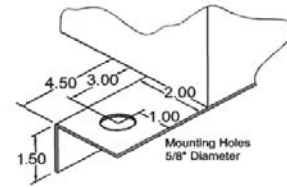
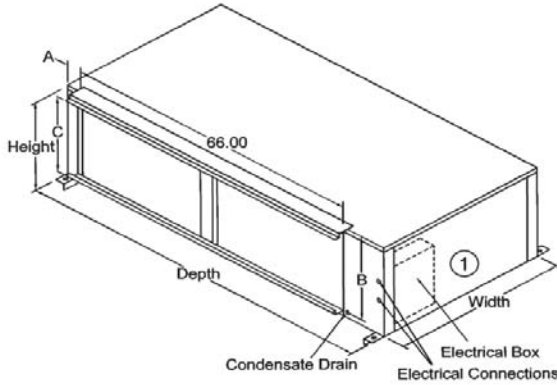
Model	A	B	C	"R/A Duct Width"	D	E	"Condenser Water Connections"	Condensate Drain Connection	"Recommended Replacement Filter Size - 1" "thick"
	Water Out	Bottom to Condensate Drain	Water In		"R/A Duct Flange Height"	"Filter Rack Height"			
072	14.75	8.50	2.75	34.00	38.00	40.00	1" FPT	3/4" FPT	20 x 34.5 (2)
096	14.75	8.50	2.75	34.00	38.00	40.00	1" FPT	3/4" FPT	20 x 34.5 (2)
120	15.00	9.00	3.00	34.00	38.00	40.00	1 1/4" FPT	3/4" FPT	20 x 34.5 (2)

Bosch Thermotechnology Corp.
Londerry, NH • Ft. Lauderdale, FL

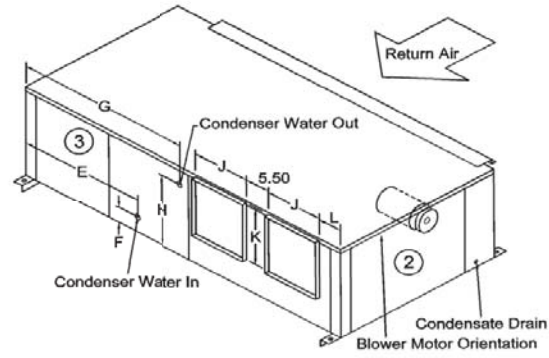
Greensource iSeries Model SL Water Source Heat Pump 6 to 10 Ton



SL Horizontal Dimensions and Connections



072, 096



120

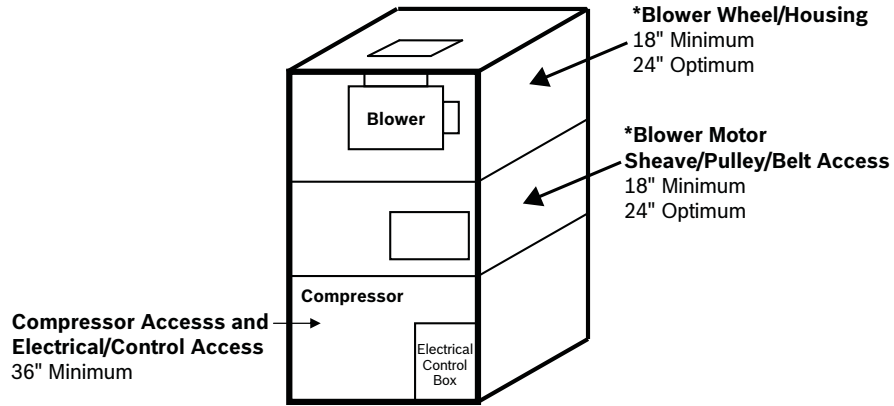
SL Horizontal Dimensions and Connections

Model	Width	Depth	Height	A	B	C	R/A Duct Width	E	F
				Cab End to Filter Rack	Filter Rack Height	R/ADuct Flange Height		Front to Water In	Water In Height
072	38.00	78.00	21.50	2.00	20.50	18.50	66.00	28.00	2.75
096	38.00	78.00	21.50	2.00	20.50	18.50	66.00	26.25	3.50
120	38.00	78.00	21.50	2.00	20.50	18.50	66.00	27.50	3.38

SL Horizontal Dimensions and Connections Continued

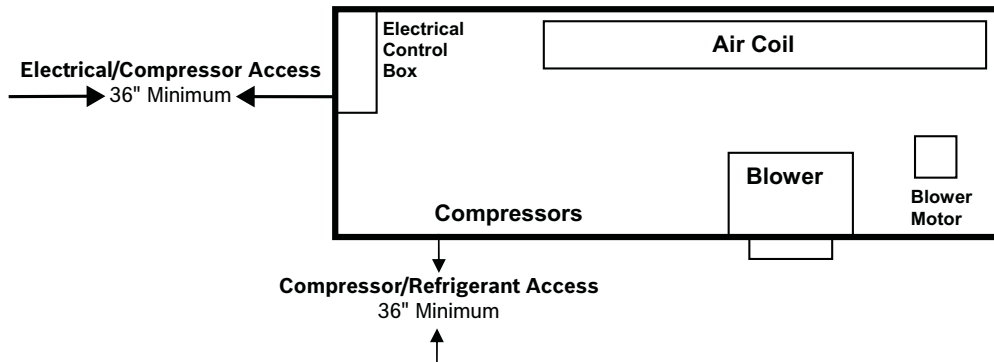
Model	G	H	J	K	L	M	Condenser Water Connections	Condensate Drain Connection	Recommended Replacement Nominal Filter Size - 1" thick"
	Front to Water Out	Water Out Height	Supply Width	Supply Height	Rear to Supply	Distance b/t Supply Ducts			
072	28.00	14.50	15.50	13.50	10.50	5.50	1" FPT	3/4" FPT	20 x 34.5 (2)
096	28.00	19.25	15.50	13.50	10.50	5.50	1" FPT	3/4" FPT	20 x 34.5 (2)
120	28.00	16.75	12.50	13.50	5.25	5.50	1 1/4" FPT	3/4" FPT	20 x 34.5 (2)

SL Vertical - Service Clearances



* Rear Return Air Pattern shown. For Front Return Air, blower motor and blower housing access is on the LEFT HAND SIDE of the unit

SL Horizontal - Service Clearances



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SL072 Cooling Performance Data - Full Load @ 2300CFM									
Entering Water Temp °F	Water flow GPM	Pressure Drop (FOH)	Pressure Drop (PSI)	Ent. Air db/wb, °F	Total kBtu/hr.	Sensible kBtu/hr.	Ht. Rej. kBtu/hr.	Unit kW	EER
50	9	5.3	2.3	75/63	81.4	61.2	93.8	4.0	20.3
				80/67	87.5	63.5	100.1	4.0	21.9
				85/71	93.8	65.6	106.6	4.0	23.6
	12	8.9	3.9	75/63	83.6	62.0	95.7	3.8	21.8
				80/67	90.0	64.4	102.2	3.8	23.7
				85/71	96.6	66.5	109.0	3.7	25.8
	18	18.5	8.0	75/63	85.9	62.9	97.6	3.7	23.5
				80/67	92.6	65.3	104.4	3.6	25.8
				85/71	99.6	67.5	111.5	3.5	28.4
60	9	5.1	2.2	75/63	77.0	58.9	90.1	4.4	17.5
				80/67	82.8	61.3	96.2	4.4	18.8
				85/71	88.8	63.5	102.4	4.4	20.2
	12	8.6	3.7	75/63	79.0	59.9	91.8	4.2	18.7
				80/67	85.1	62.2	98.1	4.2	20.2
				85/71	91.5	64.4	104.7	4.2	22.0
	18	17.9	7.7	75/63	81.2	60.8	93.6	4.0	20.1
				80/67	87.6	63.2	100.2	4.0	21.9
				85/71	94.2	65.7	106.9	3.9	23.9
70	9	5.0	2.1	75/63	72.2	57.2	86.0	4.8	15.1
				80/67	77.8	59.3	92.0	4.8	16.2
				85/71	83.6	61.6	98.1	4.8	17.3
	12	8.3	3.6	75/63	74.2	57.8	87.7	4.6	16.0
				80/67	80.1	60.2	93.9	4.6	17.3
				85/71	86.1	62.5	100.2	4.6	18.7
	18	17.3	7.5	75/63	76.2	58.8	89.3	4.5	17.1
				80/67	82.3	61.4	95.7	4.4	18.6
				85/71	88.8	63.4	102.4	4.4	20.2
80	9	4.8	2.1	75/63	67.5	54.9	82.0	5.2	13.0
				80/67	72.7	57.4	87.7	5.2	13.9
				85/71	78.1	59.9	93.5	5.3	14.9
	12	8.1	3.5	75/63	69.2	55.8	83.5	5.0	13.7
				80/67	74.8	58.1	89.5	5.1	14.8
				85/71	80.6	60.5	95.6	5.1	15.9
	18	16.7	7.2	75/63	71.1	56.4	85.1	4.9	14.6
				80/67	76.9	59.2	91.2	4.9	15.7
				85/71	82.9	61.8	97.5	4.9	17.1
85	9	4.7	2.0	75/63	64.9	54.2	79.8	5.4	12.1
				80/67	70.1	56.4	85.5	5.4	12.9
				85/71	75.4	58.7	91.3	5.5	13.8
	12	7.9	3.4	75/63	66.7	54.5	81.4	5.2	12.7
				80/67	72.1	57.2	87.2	5.3	13.7
				85/71	77.6	59.8	93.1	5.3	14.7
	18	16.5	7.1	75/63	68.5	55.3	82.9	5.1	13.4
				80/67	74.1	58.2	88.9	5.1	14.5
				85/71	80.2	60.2	95.3	5.1	15.7
90	9	4.7	2.0	75/63	62.6	52.9	77.8	5.6	11.3
				80/67	67.5	55.2	83.3	5.6	12.0
				85/71	72.6	57.7	88.9	5.7	12.7
	12	7.8	3.4	75/63	64.1	53.6	79.1	5.4	11.8
				80/67	69.3	56.1	84.9	5.5	12.6
				85/71	74.9	58.4	90.9	5.5	13.5
	18	16.2	7.0	75/63	65.8	54.2	80.6	5.3	12.4
				80/67	71.4	56.7	86.7	5.3	13.4
				85/71	77.1	59.7	92.6	5.3	14.4
100	9	4.5	2.0	75/63	57.9	49.5	73.7	5.9	9.8
				80/67	62.4	52.3	78.9	6.0	10.4
				85/71	67.2	56.0	84.3	6.1	11.0
	12	7.6	3.3	75/63	59.3	50.2	75.0	5.8	10.2
				80/67	64.0	54.3	80.3	5.9	10.9
				85/71	69.1	56.4	86.0	6.0	11.5
	18	15.7	6.8	75/63	60.8	50.8	76.2	5.7	10.7
				80/67	65.7	54.9	81.8	5.8	11.4
				85/71	71.1	57.1	87.7	5.8	12.2
110	9	4.4	1.9	75/63	52.8	47.5	69.3	6.2	8.5
				80/67	57.2	50.0	74.4	6.4	8.9
				85/71	61.6	52.3	79.5	6.5	9.4
	12	7.4	3.2	75/63	54.1	48.0	70.4	6.2	8.8
				80/67	58.7	50.6	75.7	6.3	9.3
				85/71	63.3	53.1	81.1	6.4	9.9
	18	15.3	6.6	75/63	55.5	48.7	71.7	6.1	9.2
				80/67	60.3	51.2	77.1	6.2	9.8
				85/71	65.2	53.7	82.6	6.3	10.4

Greensource iSeries Model SL
Water Source Heat Pump 6 to 10 Ton



BOSCH

SL072 Heating Performance Data - Full Load @ 2300CFM								
Entering Water Temp °F	Water flow GPM	Pressure Drop (FOH)	Pressure Drop (PSI)	Ent. Air db/wb, °F	Total kBtu/hr.	Ht. Abs. kBtu/hr.	Unit kW	COP
30	9	6.1	2.6	60	49.2	36.4	3.7	3.9
				70	46.9	33.3	3.9	3.5
				80	44.5	30.1	4.1	3.2
	12	10.2	4.4	60	51.2	38.2	3.8	4.0
				70	48.7	34.9	4.0	3.6
				80	46.2	31.5	4.1	3.3
	18	21.1	9.2	60	53.5	40.3	3.9	4.1
				70	50.8	36.7	4.1	3.7
				80	47.9	33.2	4.2	3.3
40	9	5.9	2.5	60	57.5	43.9	4.0	4.2
				70	55.2	40.6	4.2	3.8
				80	52.7	37.3	4.4	3.5
	12	9.8	4.3	60	60.0	46.2	4.1	4.3
				70	57.5	42.7	4.3	3.9
				80	54.8	39.1	4.5	3.6
	18	20.4	8.8	60	62.9	48.8	4.2	4.4
				70	60.1	45.0	4.4	4.0
				80	57.2	41.2	4.6	3.6
50	9	5.3	2.3	60	68.3	53.7	4.3	4.6
				70	65.6	50.0	4.6	4.2
				80	63.1	46.2	4.9	3.8
	12	8.9	3.9	60	71.2	56.5	4.4	4.7
				70	68.4	52.5	4.7	4.3
				80	65.6	48.4	5.0	3.9
	18	18.5	8.0	60	74.6	59.5	4.5	4.9
				70	71.6	55.4	4.8	4.4
				80	68.5	50.8	5.1	4.0
60	9	5.1	2.2	60	78.3	62.9	4.6	5.0
				70	75.7	59.1	4.9	4.5
				80	73.0	54.9	5.2	4.1
	12	8.6	3.7	60	81.8	66.3	4.7	5.1
				70	78.9	62.2	5.0	4.6
				80	76.1	57.7	5.3	4.2
	18	17.9	7.7	60	85.8	70.0	4.8	5.3
				70	82.6	65.5	5.1	4.8
				80	79.4	60.8	5.4	4.3
70	9	5.0	2.1	60	88.5	72.6	4.8	5.4
				70	85.8	68.4	5.2	4.9
				80	82.9	64.2	5.5	4.4
	12	8.3	3.6	60	92.6	76.5	4.9	5.5
				70	89.6	72.0	5.3	5.0
				80	86.3	67.4	5.6	4.5
	18	17.3	7.5	60	97.2	80.9	5.0	5.7
				70	93.7	75.9	5.4	5.1
				80	90.2	70.9	5.7	4.6
80	9	4.8	2.1	60	98.9	82.5	5.0	5.8
				70	95.9	78.0	5.4	5.2
				80	92.8	73.4	5.8	4.7
	12	8.1	3.5	60	103.6	87.0	5.1	5.9
				70	100.2	82.1	5.5	5.3
				80	96.7	77.0	5.9	4.8
	18	16.7	7.2	60	108.7	92.0	5.2	6.2
				70	104.9	86.6	5.6	5.5
				80	101.0	81.1	6.0	5.0

Greensource iSeries Model SL
Water Source Heat Pump 6 to 10 Ton



SL096 Cooling Performance Data - Full Load @ 2800CFM									
Entering Water Temp °F	Water flow GPM	Pressure Drop (FOH)	Pressure Drop (PSI)	Ent. Air db/wb, °F	Total kBtu/hr.	Sensible kBtu/hr.	Ht. Rej. kBtu/hr.	Unit kW	EER
50	12	6.0	2.6	75/63	106.9	77.7	122.9	5.0	21.2
				80/67	113.9	80.0	130.3	5.1	22.5
				85/71	121.3	82.1	138.0	5.1	23.9
	16	10.1	4.4	75/63	109.3	78.7	124.7	4.7	23.1
				80/67	116.7	81.1	132.3	4.7	24.7
				85/71	124.4	83.2	140.3	4.7	26.3
	24	21.1	9.1	75/63	111.9	79.7	126.5	4.4	25.3
				80/67	119.6	82.2	134.4	4.4	27.2
				85/71	127.7	84.3	142.7	4.4	29.3
60	12	5.8	2.5	75/63	102.6	75.6	120.0	5.6	18.3
				80/67	109.4	78.0	127.2	5.6	19.4
				85/71	116.5	79.9	134.7	5.7	20.5
	16	9.8	4.2	75/63	104.9	76.7	121.6	5.3	19.8
				80/67	112.1	79.0	129.0	5.3	21.1
				85/71	119.4	81.6	136.6	5.3	22.5
	24	20.3	8.8	75/63	107.4	77.7	123.3	5.0	21.5
				80/67	114.8	80.1	131.0	5.0	23.1
				85/71	122.5	82.8	138.9	4.9	24.8
70	12	5.7	2.4	75/63	98.2	73.6	117.1	6.2	15.8
				80/67	104.6	76.2	123.9	6.3	16.7
				85/71	111.4	78.0	131.1	6.3	17.6
	16	9.5	4.1	75/63	100.4	74.6	118.5	5.9	17.0
				80/67	107.1	77.3	125.6	5.9	18.1
				85/71	114.3	79.1	133.1	6.0	19.2
	24	19.7	8.5	75/63	102.7	75.6	120.1	5.6	18.3
				80/67	109.8	78.4	127.4	5.6	19.6
				85/71	117.3	80.3	135.2	5.6	21.0
80	12	5.5	2.4	75/63	93.5	71.7	114.1	6.9	13.5
				80/67	99.7	73.9	120.8	7.0	14.3
				85/71	106.1	76.2	127.6	7.0	15.1
	16	9.2	4.0	75/63	95.6	72.6	115.4	6.6	14.5
				80/67	102.2	74.8	122.4	6.6	15.4
				85/71	108.7	77.8	129.2	6.6	16.4
	24	19.0	8.2	75/63	97.8	73.7	116.8	6.3	15.6
				80/67	104.7	76.0	124.0	6.3	16.7
				85/71	111.6	78.8	131.2	6.3	17.8
85	12	5.4	2.3	75/63	91.1	70.8	112.6	7.3	12.5
				80/67	97.2	72.8	119.3	7.3	13.3
				85/71	103.2	75.7	125.7	7.4	14.0
	16	9.0	3.9	75/63	93.2	71.6	113.9	7.0	13.4
				80/67	99.6	73.7	120.7	7.0	14.3
				85/71	106.1	76.2	127.6	7.0	15.1
	24	18.7	8.1	75/63	95.4	72.6	115.2	6.6	14.4
				80/67	102.1	74.7	122.3	6.6	15.4
				85/71	108.9	77.3	129.5	6.6	16.4
90	12	5.3	2.3	75/63	88.7	69.8	111.2	7.7	11.6
				80/67	94.5	72.3	117.5	7.7	12.2
				85/71	100.6	74.2	124.1	7.8	12.9
	16	8.9	3.9	75/63	90.7	70.7	112.4	7.3	12.4
				80/67	96.8	73.2	118.9	7.4	13.1
				85/71	103.1	75.7	125.6	7.4	13.9
	24	18.5	8.0	75/63	92.8	71.5	113.7	7.0	13.3
				80/67	99.2	74.1	120.4	7.0	14.1
				85/71	106.0	76.1	127.6	7.0	15.1
100	12	5.1	2.2	75/63	83.8	67.7	108.5	8.5	9.9
				80/67	89.2	70.3	114.4	8.5	10.4
				85/71	94.7	72.7	120.4	8.6	11.0
	16	8.6	3.7	75/63	85.9	68.1	109.7	8.2	10.5
				80/67	91.4	71.1	115.7	8.2	11.2
				85/71	97.2	73.6	121.9	8.2	11.8
	24	17.9	7.8	75/63	87.8	68.9	110.8	7.8	11.2
				80/67	93.9	71.5	117.2	7.8	12.0
				85/71	100.1	74.0	123.8	7.9	12.7
110	12	5.0	2.2	75/63	78.8	65.2	106.1	9.4	8.4
				80/67	83.9	67.7	111.7	9.5	8.9
				85/71	88.7	70.7	117.0	9.5	9.3
	16	8.4	3.6	75/63	80.6	65.9	106.9	9.1	8.9
				80/67	85.7	68.9	112.5	9.1	9.4
				85/71	91.2	71.5	118.4	9.1	10.0
	24	17.4	7.5	75/63	82.5	66.8	107.9	8.7	9.4
				80/67	88.1	69.3	113.9	8.8	10.1
				85/71	93.6	72.4	119.8	8.8	10.7

Bosch Thermotechnology Corp.
Londonderry, NH • Ft. Lauderdale, FL

Greensource iSeries Model SL

Water Source Heat Pump 6 to 10 Ton



BOSCH

SL096 Heating Performance Data - Full Load @ 2800CFM								
Entering Water Temp °F	Water flow GPM	Pressure Drop (FOH)	Pressure Drop (PSI)	Ent. Air db/wb, °F	Total kBtu/hr.	Ht. Abs. kBtu/hr.	Unit kW	COP
30	12	6.9	3.0	60	73.2	54.0	5.6	3.9
				70	71.0	49.3	6.1	3.4
				80	69.2	45.5	6.7	3.0
	16	11.6	5.0	60	75.4	55.8	5.6	3.9
				70	73.2	51.3	6.2	3.5
				80	71.3	47.2	6.8	3.1
	24	24.1	10.4	60	77.9	58.3	5.7	4.0
				70	75.7	53.6	6.2	3.6
				80	73.8	49.7	6.9	3.2
40	12	6.7	2.9	60	80.5	60.7	5.7	4.1
				70	78.9	56.7	6.3	3.7
				80	77.7	53.1	7.0	3.3
	16	11.2	4.8	60	83.4	63.6	5.8	4.2
				70	81.7	59.8	6.4	3.8
				80	80.1	55.9	7.0	3.3
	24	23.2	10.1	60	87.0	66.9	5.9	4.3
				70	85.2	62.9	6.5	3.9
				80	84.1	58.5	7.1	3.5
50	12	6.0	2.6	60	91.7	71.3	6.0	4.5
				70	90.5	67.7	6.6	4.0
				80	89.3	64.1	7.3	3.6
	16	10.1	4.4	60	95.3	74.6	6.1	4.6
				70	93.9	71.0	6.7	4.1
				80	92.6	67.1	7.4	3.7
	24	21.1	9.1	60	99.6	78.8	6.1	4.8
				70	97.7	74.4	6.8	4.2
				80	96.3	70.5	7.5	3.8
60	12	5.8	2.5	60	102.5	81.5	6.2	4.8
				70	101.2	77.7	6.9	4.3
				80	100.0	74.0	7.6	3.9
	16	9.8	4.2	60	107.0	85.8	6.3	5.0
				70	105.4	81.7	7.0	4.4
				80	104.0	77.6	7.7	4.0
	24	20.3	8.8	60	112.0	90.6	6.4	5.1
				70	110.1	86.1	7.1	4.6
				80	108.1	81.3	7.8	4.1
70	12	5.7	2.4	60	114.2	92.5	6.4	5.2
				70	112.7	88.4	7.1	4.6
				80	111.1	84.3	7.9	4.1
	16	9.5	4.1	60	119.3	97.5	6.5	5.3
				70	117.4	93.0	7.2	4.8
				80	115.6	88.4	8.0	4.2
	24	19.7	8.5	60	125.1	103.1	6.7	5.5
				70	122.7	98.0	7.4	4.9
				80	120.5	92.9	8.1	4.4
80	12	5.5	2.4	60	126.1	104.0	6.7	5.5
				70	124.2	99.4	7.4	4.9
				80	122.3	94.7	8.2	4.4
	16	9.2	4.0	60	131.9	109.4	6.8	5.7
				70	129.4	104.2	7.5	5.1
				80	127.1	98.9	8.3	4.5
	24	19.0	8.2	60	138.5	115.7	6.9	5.9
				70	135.4	110.0	7.6	5.2
				80	132.5	104.1	8.4	4.6

Greensource iSeries Model SL
Water Source Heat Pump 6 to 10 Ton



SL120 Cooling Performance Data - Full Load @ 4000CFM									
Entering Water Temp °F	Water flow GPM	Pressure Drop (FOH)	Pressure Drop (PSI)	Ent. Air db/wb, °F	Total kBtu/hr.	Sensible kBtu/hr.	Ht. Rej. kBtu/hr.	Unit kW	EER
50	15	4.6	2.0	75/63	132.0	99.0	153.8	6.7	19.6
				80/67	141.2	102.2	163.7	6.8	20.7
				85/71	150.7	105.1	173.7	6.9	21.9
	20	7.7	3.3	75/63	134.9	100.3	156.1	6.4	21.0
				80/67	144.5	103.4	166.3	6.5	22.2
				85/71	154.4	106.4	176.7	6.6	23.5
	30	16.0	6.9	75/63	138.0	101.2	158.6	6.1	22.4
				80/67	148.0	104.7	169.0	6.2	23.9
				85/71	158.3	107.8	179.9	6.2	25.4
60	15	4.4	1.9	75/63	126.7	96.2	149.9	7.3	17.3
				80/67	135.6	99.6	159.4	7.4	18.3
				85/71	144.7	102.7	169.0	7.5	19.3
	20	7.5	3.2	75/63	129.5	97.4	152.0	7.0	18.4
				80/67	138.7	100.8	161.8	7.1	19.6
				85/71	148.2	104.0	171.8	7.1	20.8
	30	15.5	6.7	75/63	132.4	98.6	154.2	6.7	19.7
				80/67	142.0	102.1	164.4	6.8	21.0
				85/71	151.9	105.5	174.7	6.8	22.4
70	15	4.3	1.9	75/63	121.0	93.6	146.0	8.0	15.1
				80/67	129.7	96.9	155.1	8.1	16.0
				85/71	138.1	100.8	164.1	8.1	17.0
	20	7.2	3.1	75/63	123.7	94.8	147.9	7.7	16.1
				80/67	132.5	98.6	157.1	7.7	17.1
				85/71	141.5	102.1	166.6	7.8	18.2
	30	15.0	6.5	75/63	126.5	95.9	149.9	7.4	17.2
				80/67	135.6	99.9	159.4	7.4	18.4
				85/71	145.1	103.4	169.3	7.4	19.6
80	15	4.2	1.8	75/63	115.3	90.9	142.1	8.8	13.1
				80/67	123.3	94.8	150.7	8.9	13.9
				85/71	131.6	98.2	159.5	8.9	14.8
	20	7.0	3.0	75/63	117.8	92.0	143.8	8.5	13.9
				80/67	126.4	95.5	152.8	8.5	14.9
				85/71	134.8	99.5	161.8	8.5	15.8
	30	14.5	6.3	75/63	120.5	93.1	145.6	8.1	14.9
				80/67	129.4	96.8	154.9	8.1	15.9
				85/71	138.5	100.2	164.5	8.1	17.0
85	15	4.1	1.8	75/63	112.1	90.0	140.1	9.2	12.2
				80/67	120.3	93.1	148.8	9.3	13.0
				85/71	128.0	97.5	156.9	9.3	13.7
	20	6.9	3.0	75/63	114.6	91.0	141.6	8.9	12.9
				80/67	123.1	94.3	150.6	8.9	13.8
				85/71	131.6	97.7	159.6	8.9	14.7
	30	14.2	6.2	75/63	117.2	92.2	143.3	8.5	13.8
				80/67	125.8	95.9	152.4	8.5	14.8
				85/71	135.0	99.0	161.9	8.5	15.8
90	15	4.0	1.7	75/63	109.3	88.2	138.4	9.7	11.3
				80/67	117.0	91.9	146.7	9.7	12.0
				85/71	124.5	96.3	154.7	9.8	12.7
	20	6.8	2.9	75/63	111.7	89.3	139.9	9.3	12.0
				80/67	119.6	93.4	148.3	9.3	12.8
				85/71	127.9	96.9	157.0	9.4	13.7
	30	14.0	6.1	75/63	114.2	90.4	141.4	9.0	12.7
				80/67	122.7	94.1	150.4	9.0	13.7
				85/71	131.2	98.1	159.2	9.0	14.6
100	15	3.9	1.7	75/63	102.8	86.4	134.5	10.7	9.6
				80/67	110.5	89.6	142.9	10.7	10.3
				85/71	117.7	94.1	150.5	10.8	10.9
	20	6.6	2.8	75/63	105.3	86.6	136.1	10.3	10.2
				80/67	112.6	91.3	143.8	10.3	10.9
				85/71	120.5	95.6	152.1	10.3	11.7
	30	13.6	5.9	75/63	107.6	87.6	137.4	9.9	10.9
				80/67	115.4	92.2	145.5	9.9	11.6
				85/71	123.8	95.5	154.3	9.9	12.5
110	15	3.8	1.6	75/63	96.9	83.0	131.7	11.8	8.2
				80/67	103.9	86.8	139.3	11.8	8.8
				85/71	110.8	90.9	146.7	11.9	9.3
	20	6.4	2.8	75/63	99.0	84.0	132.8	11.4	8.7
				80/67	106.3	87.8	140.5	11.4	9.3
				85/71	113.6	92.0	148.3	11.4	10.0
	30	13.2	5.7	75/63	101.1	84.9	133.9	11.0	9.2
				80/67	108.7	88.8	141.9	11.0	9.9
				85/71	116.3	93.5	149.7	11.0	10.6

Greensource iSeries Model SL
Water Source Heat Pump 6 to 10 Ton



SL120 Heating Performance Data - Full Load @ 4000CFM								
Entering Water Temp °F	Water flow GPM	Pressure Drop (FOH)	Pressure Drop (PSI)	Ent. Air db/wb, °F	Total kBtu/hr.	Ht. Abs. kBtu/hr.	Unit kW	COP
30	15	5.3	2.3	60	88.8	63.1	7.4	3.5
				70	88.0	59.3	8.2	3.2
				80	87.7	55.5	9.1	2.8
	20	8.8	3.8	60	92.1	66.1	7.5	3.6
				70	90.8	61.8	8.2	3.2
				80	90.3	58.1	9.1	2.9
	30	18.3	7.9	60	96.0	69.6	7.5	3.7
				70	94.1	65.0	8.3	3.3
				80	93.1	60.6	9.2	3.0
40	15	5.1	2.2	60	101.1	74.8	7.6	3.9
				70	100.1	70.7	8.4	3.5
				80	99.2	66.5	9.3	3.1
	20	8.5	3.7	60	105.4	78.7	7.7	4.0
				70	104.0	74.4	8.5	3.6
				80	102.6	69.8	9.4	3.2
	30	17.7	7.6	60	110.5	83.2	7.8	4.1
				70	108.6	78.5	8.6	3.7
				80	106.5	73.4	9.4	3.3
50	15	4.6	2.0	60	117.9	90.7	8.0	4.3
				70	116.4	86.6	8.8	3.9
				80	115.1	81.6	9.6	3.5
	20	7.7	3.3	60	122.9	95.4	8.1	4.5
				70	120.4	90.4	8.8	4.0
				80	119.3	85.6	9.7	3.6
	30	16.0	6.9	60	128.7	100.5	8.2	4.6
				70	125.4	94.9	8.9	4.1
				80	123.9	89.9	9.8	3.7
60	15	4.4	1.9	60	133.4	105.5	8.2	4.7
				70	131.6	100.6	9.1	4.3
				80	129.9	95.5	9.9	3.8
	20	7.5	3.2	60	139.5	111.1	8.4	4.9
				70	137.0	105.8	9.2	4.4
				80	134.3	100.1	10.0	3.9
	30	15.5	6.7	60	146.5	117.2	8.5	5.1
				70	143.4	111.2	9.3	4.5
				80	139.7	105.0	10.1	4.0
70	15	4.3	1.9	60	149.4	121.2	8.5	5.1
				70	147.6	116.0	9.4	4.6
				80	145.4	110.5	10.3	4.2
	20	7.2	3.1	60	156.9	127.7	8.7	5.3
				70	153.9	121.8	9.5	4.8
				80	151.3	115.8	10.4	4.3
	30	15.0	6.5	60	165.1	134.7	8.8	5.5
				70	161.5	128.1	9.6	4.9
				80	158.1	121.4	10.5	4.4
80	15	4.2	1.8	60	166.9	137.7	8.9	5.5
				70	164.0	131.8	9.7	5.0
				80	161.3	126.0	10.6	4.5
	20	7.0	3.0	60	175.0	145.0	9.0	5.7
				70	171.6	139.1	9.8	5.1
				80	168.3	132.6	10.7	4.6
	30	14.5	6.3	60	184.3	153.0	9.1	5.9
				70	180.1	145.5	10.0	5.3
				80	176.1	138.0	10.9	4.8

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Water Source Heat Pump 6 to 10 Ton



BOSCH

Antifreeze Correction							
Antifreeze Type	Antifreeze %	Cooling			Heating		WPD Correction Factor EWT 30 °F
		EWT 90 Deg.F			EWT 30 Deg. F		
		Total Cap.	Sens. Cap	Power	Htg. Cap	Power	
Water	0	1.000	1.000	1.000	1.000	1.000	1.000
Propylene Glycol	5	0.997	0.997	1.004	0.989	0.997	1.060
	10	0.994	0.994	1.006	0.986	0.995	1.125
	15	0.990	0.990	1.009	0.978	0.988	1.190
	25	0.983	0.983	1.016	0.960	0.979	1.300
Methanol	5	0.997	0.997	1.003	0.990	0.997	1.060
	10	0.996	0.996	1.005	0.979	0.993	1.100
	15	0.994	0.994	1.008	0.970	0.990	1.140
Ethanol	5	0.998	0.998	1.002	0.981	0.994	1.160
	10	0.996	0.996	1.004	0.960	0.988	1.230
	15	0.992	0.992	1.006	0.944	0.983	1.280
	25	0.986	0.986	1.009	0.917	0.974	1.400
Ethylene Glycol	5	0.997	0.997	1.003	0.993	0.998	1.060
	10	0.995	0.995	1.004	0.986	0.996	1.120
	15	0.992	0.992	1.005	0.980	0.993	1.190
	25	0.988	0.988	1.009	0.970	0.990	1.330
	30	0.985	0.985	1.012	0.965	0.987	1.400

Sound Data									
Model	Octave Band Sound Power Levels dB, re 10 ⁻¹² Watts Center Frequency - Hz							Overall	A weighted overall (dBA)
	125	250	500	1000	2000	4000	8000		ARI-260:2001 (100hz-10kHz)
072	67	64	64	65	61	56	49	72	68
096	69	66	66	67	63	58	51	74	70
120 VT	74	71	71	72	68	63	56	79	75
120 HZ	67	64	64	65	61	56	49	72	68

* Data is based on blower only manufacturer's data.
 * Overall calculated using 125-8000 Hz octave bands.

GreenSource iSeries Model SL
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BOSCH

Field Installed Accessory - Duct Mounted Electric Heaters 208/230V				
Kilowatt Heater - 208/230V	Part Number	Nominal Dimensions (inches)	Duct Flange Connection (Inches)	Min. CFM Required
Duct Heater 5 kW	7738000004	14 x 14	13.75 x 13.75	600
Duct Heater 5 kW	7738000005	14 x 16	13.75 x 13.75	600
Duct Heater 5 kW	7738000006	16 x 16	15.75 x 15.75	600
Duct Heater 5 kW	7738000007	18 x 18	17.75 x 17.75	600
Duct Heater 10 kW	7738000008	14 x 16	13.75 x 13.75	800
Duct Heater 10 kW	7738000009	16 x 16	17.75 x 17.75	800
Duct Heater 10 kW	7738000010	18 x 18	17.75 x 17.75	800
Duct Heater 15 kW	7738000011	18 x 18	17.75 x 17.75	1400
Duct Heater 20 kW	7738000012	18 x 18	17.75 x 17.75	2000

i It is recommended to use a seven (7) conductor cable for thermostat interface.

i In fiber glass duct systems, a metal sleeve **MUST** be used to support the heater.

i It is required for the duct mounted heater to have an independent power supply.

Greensource iSeries Model SL Water Source Heat Pump 6 to 10 Ton



Field Installed Option - Communicating Thermostats



Model/Order Number:	7738002994	7738002993
Description:	TSTBT4H2CPHM - KA	TSTBT4H2CP - M - KA
Features:	4 stages of heat, 2nd stage latching, Low temp alert, High temp alert, Inefficient heating and cooling operation alerts	
Application:	Communicating Thermostat Kit w/ Humidity Control	Communicating Thermostat Kit
Warranty:	5 Year Limited Warranty	
Communicating Thermostat Accessories		
Model/Order Number:	7738002978	7738002979
Description:	ZONB - OTS - - - M - - A	ZONB - LAS - - - M - - A
Features:	Wired Outdoor Temperature Sensor	Leaving Air and/or Return Air Sensor

Field Installed Option - 24V Conventional Thermostat



Model/Order Number:	7738002984	
Description:	TSTBM3H2CPH6W - A	
Features:	Smoke detection, Semi-wireless, Filter change/clean notification, Programmable fan	
Application:	If smoke is detected in ducting, unit will stop, preventing circulation of smoke to other rooms.	
Warranty:	5 Year Limited Warranty	
24V Conventional Thermostat Accessories		
Model/Order Number:	7738002985	7738002986
Description:	TSTBM - RRS - - TW - A	TSTBM - OTS - - TW - A
Features:	Wireless Remote Room Sensor Thermostat	Wireless Outdoor Temperature Sensor

Field Installed Option - Smoke Detector

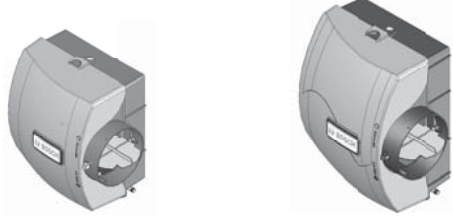


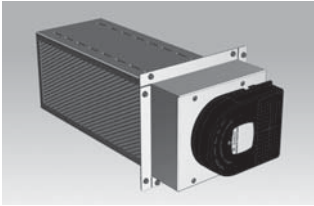
Model/Order Number:	7738002987	7738002988
Description:	SMKB - - - 040 - 6 - - A	SMKB - 02FST - 6 - - A
Features:	Duct Smoke Detector	2 Foot Air Sampling Tube
Application:	If smoke is detected in ducting, unit will stop, preventing circulation of smoke to other rooms. Manual reset is required which let's customer know there was an occurrence.	
Warranty:	5 Year Limited Warranty on Parts	


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Water Source Heat Pump 6 to 10 Ton



Field Installed Option - Bosch Humidifiers			
 <p>HUMBSP-12H6--A HUMBSP-17H6--A</p>	Model/Order Number:	7738002895	7738002896
	Description:	HUMBXSBP12H6 -- A	HUMBXLBP17H6 -- A
	Features:	Small Bypass Humidifier, Manual Summer/Winter Damper, Humidistat included	Large Bypass Humidifier, Manual Summer/Winter Damper, Humidistat Included
	Application:	12 Gallons per Day	17 Gallons per Day
	Warranty:	1 Year Limited Warranty on Humidifer Pad 5 Year Limited Warranty on Assembly	

Field Installed Option - Bosch Photo Catalytic Oxidizer (PCO)			
	Model/Order Number:	7738002879	7738002880
	Description:	PCOB - 09012 - 0 -- A	PCOB - 14024 - 0 -- A
	Features:	9" UVC Light Bulb	14" UVC Light Bulb
	Application:	up to 1500 CFM units or House up to 2000 sq. ft.	up to 2400 CFM units or House up to 4700 sq. ft.
	Warranty:	1 Year Limited Warranty on Bulb 2 Year Limited Warranty on Ballast 5 Year Limited Warranty on Assembly	

Field Installed Option - Bosch Fresh Air Damper (FAD)				
	Model/Order Number:	7738002927	7738002928	7738002929
	Description:	FADB - 04007 - 6 -- A	FADB - 050011 - 6 -- A	FADB - 060015 - 6 -- A
	Size	4" Fresh Air Damper	5" Fresh Air Damper	6" Fresh Air Damper
	Features:	<ul style="list-style-type: none"> Variable Capacity Control (settings from 0 to 100 of available CFM) Variable Position Damper Included Variable Position Control Included Vent Hood with Screen Included 		
	Application:	A minimum of 70 CFM of fresh air from outside up to 1300 sq. ft. home	A minimum of 110 CFM of fresh air from outside up to 2100 sq. ft. home	A minimum of 150 CFM of fresh air from outside up to 3000 sq. ft. home
Warranty:	5 Year Limited Warranty on Assembly			

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Factory Installed Options and Applicable Models	
Description	Applicable Model Numbers
100VA Transformer	All Models
DuoGuard Coil coating	All Models
Closed Cell Insulation	All Models
EMS Relay	All Models
Blower Monitor Relay	All Models
Compressor Monitor Relay ⁽¹⁾	All Models
Phase Protection Monitor	All Models
Fan/Pump Interlock Relay	All Models
Boilerless Control	All Models
Differential Pressure Switch	All Models
Fire Alarm Relay	All Models
Wire for 208 Volt	All Models
Hot Gas Bypass	All Models
Hot Gas Reheat	All Models
Modulating Hot Gas Reheat ⁽²⁾	All Models
DDC 7.03 with LonWorks Card	All Models
DDC Option	All Models
Water Side Economizer	All Models
4 Sided MERV-8 2" Filter Rack	All Models
Extended Range ⁽³⁾	All Models

(1) Unit sizes 072 - 120 require 2 each of these items. You must use a quantity of 2 when you price them.

(2) When you order HGRH, you need to order Duct Stat #854-007 and Leaving Air Temperature Sensor #854-008 (not required when ordering DDC).

(3) Vertical only.

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Water Source Heat Pump 6 to 10 Ton



Specification Guide

1.0 General

Furnish and install Bosch Thermotechnology Corp. water source heat pumps as indicated on the plans with capacities and characteristics as listed in the schedule and the specifications that follow. The units shall be manufactured in an ISO 9001:2000 certified facility.

2.0 Horizontal/Vertical Water Source Heat Pumps

Units shall be designed to operate throughout the range of entering fluid temperature of 50°F to 100°F in the cooling mode and 50°F to 80°F in the heating mode. Units shall have an operating range of 50°F to 110°F in the cooling mode and 25°F to 80°F in the heating mode when equipped with the optional extended range package. Equivalent units from other manufacturers can be proposed provided approval to bid is given 10 days prior to bid closing. All equipment with a nominal capacity of 135,000 BTUH Total Cooling or lower must be listed in the current AHRI Applied Equipment Directory under the AHRI Standard AHRI/ISO- 13256-1, WLHP, GWHP and GLHP certification points.

All equipment in this section must meet or exceed the DOE mandated minimum EER's and COP's as listed in ASHRAE 90.1.

2.01 Basic Construction

A. Units shall have the air flow arrangement as shown on the plans. If units with these arrangements are not used, the contractor supplying the water source heat pumps is responsible for any extra costs incurred by other trades and must submit detailed mechanical drawings showing ductwork requirements and changes or relocation of any other mechanical or electrical system. If other arrangements make servicing difficult the contractor must provide access panels and clear routes to ease service. The architect must approve all changes 10 days prior to bid.

B. All units shall have stainless steel drain pans to comply with this project's IAQ requirements. Painted steel or plastic material shall not be permitted.

C. All water source heat pumps shall be fabricated from heavy-gauge sheet metal steel. All interior surfaces shall be lined with 1/2 inch thick, multi density acoustic insulation. Insulation within the air handling section shall not have any exposed edges. All insulation must meet NFPA 90A and be certified to meet the GREENGUARD Indoor Air Quality Standard for Low Emitting Products. One blower access panel and two compressor compartment access panels shall be removable with supply and return air ductwork in place.

D. Unit compressors shall have rubber isolators to reduce transmission of vibration to the structure.

E. All units shall have a factory installed two sided filter rack capable of accepting one inch filters. Units shall have a 1 inch thick throwaway type glass fiber filter as standard. The filter rack shall incorporate a 1 inch duct flange. The contractor shall purchase one spare set of filters and replace factory-shipped filters upon completion of start-up.

F. Cabinets shall have separate holes and knockouts for entrance of line voltage and low voltage control wiring. Supply and return water connections shall be copper FPT fittings and shall be securely mounted flush to the cabinet allowing for connection to a flexible hose without the use of a back-up wrench. Water connections which protrude through the cabinet shall not be allowed.

G. Condensate overflow protection shall be provided as standard for horizontal units.

2.02 Fan and Motor Assembly

A. The fan(s) shall be belt driven DWDI forward curved type with dynamically balanced wheel(s). The fan motor(s) shall be 1725 or 3450 RPM 56 frame sealed ball bearing type.

The motor(s) shall be permanently lubricated and have thermal overload protection.

B. The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule. External static pressure rating of the unit shall be based on a wet coil. Ratings based on a dry coil shall NOT be acceptable.

2.03 Refrigerant Circuit

Units shall use R-410A refrigerant. Units that use R-22 refrigerant shall not be allowed.

All units shall have a factory sealed and fully charged refrigerant circuit with the following components:

A. Hermetic compressor: Hermetic reciprocating, or scroll compressors shall be specifically designed for R-410A refrigerant and shall be internally sprung (if reciprocating), externally isolated and with thermal overload protection.

B. Refrigerant metering thermal expansion valves.

C. Finned tube refrigerant to air heat exchanger. Refrigerant to air heat exchangers shall utilize enhanced aluminum fins and rifled copper tube construction rated to withstand 600 PSIG refrigerant working pressure. All air coils shall have non-ferrous aluminum end plates. Option for refrigerant to air coils to have Duo-Guard coating for enhanced protection against formic acid and other corrosion. Copper tubes shall be tin coated and aluminum fins coated to pass 1000 hour ASTM B117 salt fog testing.

D. Reversing valve. Reversing valves shall be four way solenoid activated refrigerant valves which shall fail to the heating operation should the solenoid fail to function. Reversing valves which fail to the cooling operation shall not be allowed.

E. Coaxial (tube in tube) refrigerant to water heat exchanger. Refrigerant to water heat exchangers shall be of copper inner water tube and steel outer refrigerant tube design rated to withstand 600 PSIG working refrigerant pressure and 400 PSIG working water pressure. Shell and Tube style refrigerant to water heat exchangers shall be treated as pressure vessels and shall require refrigerant pressure relief valves piped to the exterior of the building. The contractor supplying the water source heat pumps with Shell and Tube heat exchangers shall be responsible for any additional installation costs. Braze Plate water to refrigerant heat exchangers shall require additional centrifugal separators added to the supply water piping at each unit. Each separator shall have an automated clean out valve piped to a waste line. The contractor supplying water source heat pumps with Braze Plate heat exchangers shall be responsible for any additional costs.

Option for E: Cupro-Nickel water coil – The refrigerant to water heat exchanger shall be of cupro-nickel inner water tube construction.

F. Safety controls including both a high pressure and low pressure switch shall be provided on both circuits. Temperature sensors shall not replace these safety switches. See the controls section of this specification for additional information.

G. Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service.

H. Activation of any safety device shall prevent compressor operation via a lockout circuit, in the affected circuit. The lockout circuit shall be reset at the thermostat or at the contractor supplied disconnect switch. Units which may be reset at the disconnect switch only shall not be acceptable. Refer to solid state safety circuit below. A condensate alarm shall prevent both compressors from operating.

2.04 Electrical

A control box shall be located within the unit and shall contain a transformer, controls for the compressor, reversing valve and fan motor operation and shall have a terminal block for low voltage field wiring connections. The transformer shall be rated for a minimum 75 VA. All units shall be name-plated for use with time delay fuses or HACR circuit breakers. Unit controls shall be 24 volts.

2.05 Solid State Safety Circuit

All units shall have a solid-state UPM safety control circuit with the following features:

1. Anti-short cycle time delay on compressor operation.
2. Random start on power up mode.
3. Brown out/ Surge/Power Interruption protection.
4. Low Pressure Switch 120 second bypass timer.

Bosch Thermotechnology Corp.
Londonderry, NH • Ft. Lauderdale, FL

Greensource iSeries Model SL

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Specification Guide Continued

5. Shutdown on high or low refrigerant pressure safety switch.
6. Standard Evaporator Freeze Stat
7. Standard Condenser/Water Coil/Coaxial Heat exchanger Freeze Stat
8. Condensate overflow sensor will hard shut down upon first trip..
9. Alarm output which closes for selectable dry contact closure or 24 VAC remote fault indication.
10. Alarm output selectable for constant output for general alarm notification, or pulse output for annunciation of the specific fault alarm.
11. Reset unit at thermostat or disconnect.
12. Automatic intelligent reset. Unit shall automatically reset after a safety shut down and restart the unit after the anti-short cycle timer and random start timer expire. Should a fault re-occur within 60 minutes after reset, then a permanent lockout will occur. Reset attempts shall be selectable for either 2 or 4 tries.
13. Ability to defeat time delays for servicing.
14. A light emitting diode (LED) to indicate safety alarms shall be provided for each circuit. The LED shall annunciate the following alarms: high refrigerant pressure, low refrigerant pressure, low water temperature, a high level of condensate in the drain pan, or brown out/surge/ power interruption. The LED will display each fault condition as soon as the fault occurs. If a permanent lockout occurs, then the fault LED will display the type of fault until the unit is reset.
15. UL listed, CUL listed, and RFI, ESD, and transient protected.

2.06 Options:

A. Extra quiet construction: Optional compressor blankets shall be provided on units, for additional attenuation.

B. Hot Gas Reheat: Units as noted on the schedule shall be equipped with optional Hot Gas Reheat (HGRH). HGRH shall be either on/off control or modulating as noted in the specifications. On/Off HGRH shall be controlled by a humidistat connected to the unit H terminal and shall start the unit in the reheat mode should the humidity be above set point once the thermostat control is satisfied. Cooling or heating requirements shall take precedent over HGRH. Modulating Hot Gas Reheat (MHGRH) shall be active during the cooling mode. A 0 - 10 VDC signal from a sensor located in the unit discharge air supply shall modulate the hot gas valve to maintain an adjustable preset leaving air temperature to the conditioned space.

C. Hot Gas Bypass: For units as noted on the schedule, supply each unit with a UL listed and MEA listed modulating hot gas bypass valve with factory supplied and installed controls to prevent air coils from frost development by taking hot gas and bypassing the water coil and expansion device and reintroducing the hot gas into the refrigerant line prior to the air coil. The hot gas bypass valve shall maintain a minimum refrigerant suction pressure to allow for a light load cooling mode or a low entering air temperature cooling mode.

D. Water Differential Switch. Prevents unit operation if there is no fluid flow.

E. Water Side Economizer: water side economizer shall be completely installed at the factory, with condensate drain pan(s), motorized 3 way valve, aqua stat, and all internal electric controls. Water side economizer shall be rated at 400 psi and UL listed for application with the heat pump.

F. Factory-installed control options: phase loss and reversal protection

3.0 Hose Kits

All units shall be connected with hoses. The hoses shall be either 2 or 3 feet long, braided stainless steel, fire rated hoses complete with adapters. Non fire rated hoses are not acceptable. Optional ball valves with P/T ports, flow controller, Y strainer and electric valve shall be included as specified in the schedule.