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ASTON ADVANCED SERIES

*OptiHeat*

VAPOR INJECTION TECHNOLOGY

**SINGLE HYDRONIC**

Residential 3 - 5 Ton  
Water-to-Water Geothermal Heat Pump

Submittal Data  
English Language  
IP/Metric Units  
SD2508WGA 06/23

**GEOSTAR**

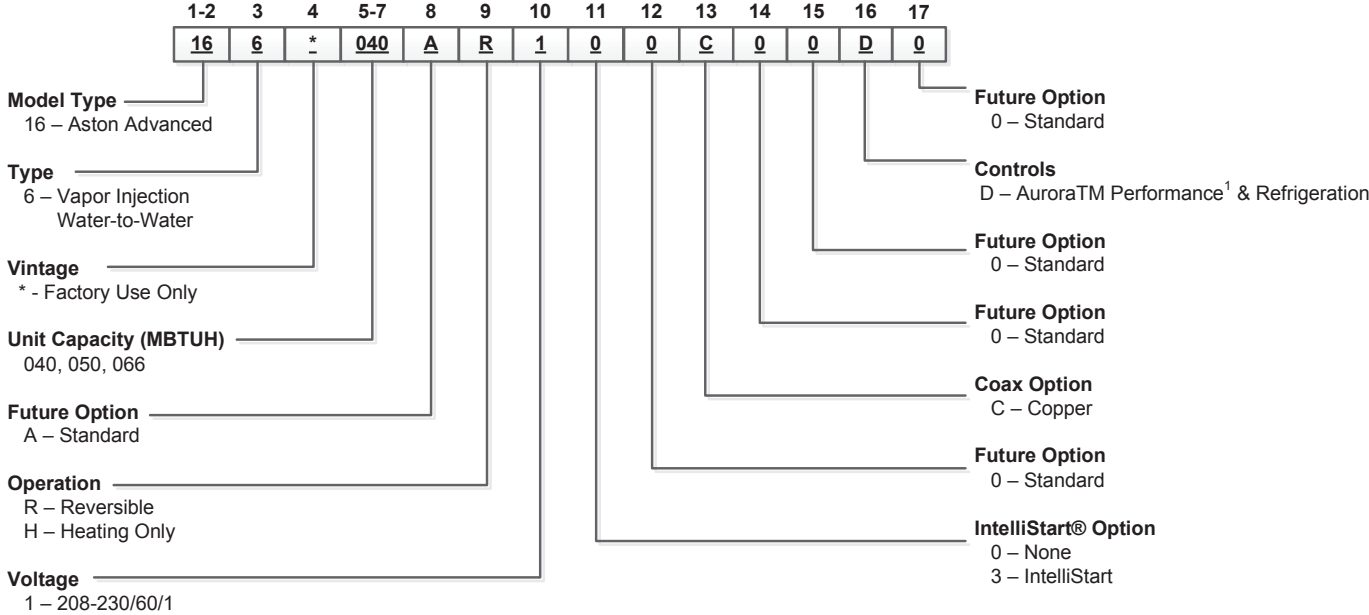
**ASTON ADVANCED SINGLE HYDRONIC  
WITH OPTIHEAT  
3 TO 5 TONS**

Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

**Model Nomenclature**



Rev.: 2/9/2023

NOTES: 1 – Flow meter for Performance and Refrigeration option is shipped inside the unit and must be externally field installed.



All Aston Single Hydronic with OptiHeat products are safety listed under UL1995 thru ETL and performance listed with AHRI in accordance with standard 13256-2. The Aston Single Hydronic with OptiHeat is also ENERGY STAR® rated.

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## AHRI/ISO 13256-2 Performance Ratings

The performance standard AHRI/ASHRAE/ISO 13256-2 became effective January 1, 2000. This new standard has three major categories: Water Loop, Ground Water, and Ground Loop.

### Unit of Measure: The Cooling COP

The cooling efficiency is measured in EER (US version measured in Btu/h per Watt. The Metric version is measured in a cooling COP (Watt per Watt) similar to the traditional COP measurement.

### Pump Power Correction Calculation

Within each model, only one water flow rate is specified for all three groups and pumping Watts are calculated using the following formula. This additional power is added onto the existing power consumption.

- Pump power correction = (gpm x 0.0631) x (Press Drop x 2990) / 300

Where 'gpm' is waterflow in gpm and 'Press Drop' is the pressure drop through the unit heat exchanger at rated water flow in feet of head.

### ISO Capacity and Efficiency Calculations

The following equations illustrate cooling calculations:

- ISO Cooling Capacity = Cooling Capacity (Btuh) x [Fan Power Correction (Watts) x 3.412]
- ISO EER Efficiency (Btuh/W) = ISO Cooling Capacity (Btuh) x [Power Input (Watts) - Fan Power Correction (Watts) + Pump Power Correction (Watts)]

The following equations illustrate heating calculations:

- ISO Heating Capacity = Heating Capacity (Btuh) x [Fan Power Correction (Watts) x 3.412]
- ISO COP Efficiency (Btuh/Btuh) = ISO Heating Capacity (Btuh) x 3.412/[Power Input (Watts) - Fan Power Correction (Watts) + Pump Power Correction (Watts)]

### Test Conditions

	ISO/AHRI 13256-2 WLHP	ISO/AHRI 13256-2 GWHP	ISO/AHRI 13256-2 GLHP
<b>Cooling</b>			
Liquid Entering Indoor Side - °F <i>Standard Rating Test</i>	53.6	53.6	53.6
Liquid Entering Heat Exchanger - °F <i>Part-load Rating Test</i>	86	59	77
Liquid Entering Heat Exchanger Fluid Flow Rate	86 *	59 *	68 *
<b>Heating</b>			
Liquid Entering Indoor Side - °F <i>Standard Rating Test</i>	104	104	104
Liquid Entering Outdoor-side Heat Exchanger - °F <i>Part-load Rating Test</i>	68	50	32
Liquid Entering Outdoor-side Heat Exchanger Fluid Flow Rate	68 *	50 *	41 *

**NOTES:** \*Flow rate is specified by the manufacturer

WLHP = Water Loop Heat Pump; GWHP = Ground Water Heat Pump;

GLHP = Ground Loop Heat Pump

### Conversions

Water Flow (lps) = gpm x 0.0631

Press Drop (Pascals) = Press Drop (ft hd) x 2990

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**AHRI/ISO 13256-2 Performance Ratings cont.**

**English (IP) Units**

Model	Flow Rate		Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
			Cooling 86°F Source 53.6°F Load		Heating 68°F Source 104°F Load		Cooling 59°F Source 53.6°F Load		Heating 50°F Source 104°F Load		Cooling 77°F Source 53.6°F Load		Heating 32°F Source 104°F Load	
	Load GPM	Source GPM	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP
<b>040</b>	10	10	29,100	13.4	43,500	4.6	33,000	20.1	40,000	4.0	30,600	16.1	34,000	3.3
<b>050</b>	15	15	41,500	13.3	66,000	4.7	47,000	20.1	54,900	3.9	44,500	16.1	45,000	3.3
<b>066</b>	20	20	52,000	12.7	83,000	4.4	57,000	20.1	70,000	3.7	54,000	16.1	56,500	3.2

7/8/14



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Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

## 040 - Performance Data

### 040 - Heating - 1 of 2

Source		Load Flow - 8 GPM							Load Flow - 10 GPM					Load Flow - 12 GPM									
EST °F	Flow GPM	ELT °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F			
30	5	60	68.0	32.0	1.80	25.8	5.22	19.3	66.4	32.2	1.76	26.2	5.36	19.2	65.4	32.2	1.76	26.2	5.36	19.2			
		80	88.2	32.8	2.27	25.1	4.24	19.7	86.6	33.0	2.23	25.4	4.35	19.5	85.5	33.0	2.23	25.4	4.35	19.5			
		100	108.4	33.7	2.87	23.9	3.44	20.2	106.8	33.9	2.82	24.3	3.53	20.0	105.6	33.9	2.82	24.3	3.53	20.0			
		130	138.8	35.3	3.77	22.5	2.75	20.7	137.1	35.5	3.69	22.9	2.82	20.5	135.9	35.5	3.69	22.9	2.82	20.5			
		140	148.9	35.5	4.20	21.2	2.48	21.3	147.1	35.7	4.12	21.7	2.54	21.1	146.0	35.7	4.12	21.7	2.54	21.1			
	8	60	68.2	32.7	1.81	26.5	5.31	23.2	66.6	32.9	1.77	26.9	5.45	23.1	65.5	32.9	1.77	26.9	5.45	23.1			
		80	88.4	33.5	2.41	25.3	4.07	23.5	86.7	33.7	2.36	25.6	4.18	23.4	85.6	33.7	2.36	25.6	4.18	23.4			
		100	108.6	34.3	3.01	24.0	3.33	23.8	106.9	34.5	2.95	24.4	3.42	23.7	105.7	34.5	2.95	24.4	3.42	23.7			
		130	138.9	35.4	3.92	22.0	2.65	24.3	137.1	35.6	3.84	22.5	2.72	24.2	135.9	35.6	3.84	22.5	2.72	24.2			
		140	149.0	35.8	4.22	21.4	2.49	24.5	147.2	36.0	4.14	21.9	2.55	24.4	146.0	36.0	4.14	21.9	2.55	24.4			
	10	60	68.3	33.2	1.81	27.0	5.37	24.4	66.7	33.4	1.78	27.3	5.51	24.4	65.6	33.4	1.78	27.3	5.51	24.4			
		80	88.5	34.1	2.30	26.3	4.35	24.6	86.9	34.3	2.25	26.6	4.47	24.5	85.7	34.3	2.25	26.6	4.47	24.5			
		100	108.7	34.8	2.89	24.9	3.53	24.9	107.0	35.0	2.83	25.3	3.62	24.8	105.8	35.0	2.83	25.3	3.62	24.8			
		130	138.9	35.8	3.79	22.8	2.76	25.3	137.2	36.0	3.72	23.3	2.84	25.2	136.0	36.0	3.72	23.3	2.84	25.2			
		140	149.0	36.0	4.23	21.5	2.49	25.6	147.2	36.2	4.15	22.0	2.56	25.5	146.0	36.2	4.15	22.0	2.56	25.5			
	50	5	60	69.3	37.3	1.74	31.4	6.30	37.1	67.5	37.5	1.70	31.7	6.46	36.9	66.3	37.5	1.67	31.8	6.59	36.9		
			80	89.6	38.4	2.20	30.9	5.13	37.2	87.7	38.7	2.15	31.3	5.26	37.1	86.4	38.7	2.11	31.5	5.37	37.1		
			100	109.8	39.4	2.87	29.6	4.02	37.8	107.9	39.6	2.82	30.0	4.13	37.6	106.6	39.6	2.76	30.2	4.21	37.6		
130			140.3	41.3	3.66	28.9	3.31	38.1	138.3	41.6	3.58	29.3	3.40	37.9	136.9	41.6	3.51	29.6	3.47	37.9			
140			150.4	41.8	4.25	27.3	2.88	38.8	148.4	42.0	4.17	27.8	2.95	38.5	147.0	42.0	4.09	28.1	3.02	38.5			
8		60	69.5	38.2	1.75	32.2	6.40	41.7	67.7	38.4	1.71	32.6	6.57	41.6	66.4	38.4	1.68	32.7	6.70	41.6			
		80	89.8	39.2	2.38	31.0	4.82	42.0	87.9	39.4	2.33	31.4	4.95	41.9	86.6	39.4	2.29	31.6	5.05	41.9			
		100	110.0	40.1	3.01	29.9	3.91	42.3	108.1	40.4	2.95	30.3	4.01	42.2	106.7	40.4	2.89	30.5	4.09	42.2			
		130	140.4	41.6	3.96	28.1	3.08	42.8	138.4	41.9	3.88	28.6	3.16	42.6	137.0	41.9	3.80	28.9	3.23	42.6			
		140	150.5	42.1	4.27	27.5	2.89	42.9	148.5	42.4	4.19	28.1	2.96	42.8	147.1	42.4	4.10	28.4	3.03	42.8			
10		60	69.7	38.7	1.75	32.8	6.47	43.2	67.8	39.0	1.72	33.1	6.64	43.2	66.5	39.0	1.69	33.2	6.78	43.2			
		80	90.0	39.9	2.22	32.3	5.27	43.3	88.0	40.1	2.18	32.7	5.41	43.3	86.7	40.1	2.13	32.9	5.52	43.3			
		100	110.2	40.7	2.89	30.9	4.13	43.6	108.2	40.9	2.83	31.3	4.24	43.5	106.8	40.9	2.77	31.5	4.33	43.5			
		120	130.4	41.5	3.42	29.8	3.60	43.9	128.3	41.7	3.35	30.3	3.69	43.8	127.0	41.7	3.28	30.5	3.77	43.8			
		125	135.4	41.7	3.5	29.6	3.5	43.9	133.4	41.9	3.5	30.0	3.6	43.8	132.0	41.9	3.4	30.3	3.6	43.8			
		130	140.5	41.9	3.68	29.3	3.33	44.0	138.4	42.1	3.61	29.8	3.42	43.9	137.0	42.1	3.54	30.0	3.49	43.9			
		135	145.5	42.1	3.98	28.5	3.11	44.1	143.5	42.3	3.90	29.0	3.20	44.0	142.1	42.3	3.83	29.3	3.26	44.0			
		140	150.6	42.3	4.28	27.7	2.90	44.3	148.5	42.6	4.20	28.3	2.97	44.2	147.1	42.6	4.12	28.5	3.03	44.2			

Shaded area represents LLT above 145°F. Operating the heat pump with a LLT above 145°F results in the compressor running out of envelope and reducing compressor reliability. You may need to increase load water flow or decrease the set point. Increasing the load water flow will lower the discharge pressure and compressor temperature. Load flow may have to be adjusted based on source temperature variations. 04/10/23

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Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

## 050 - Performance Data

### 050 - Heating - 1 of 2

Source		Load Flow - 11.5 GPM							Load Flow - 15 GPM						Load Flow - 18.5 GPM					
EST °F	Flow GPM	ELT °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F
30	8	60	67.6	43.5	2.54	34.8	5.02	21.0	65.8	43.8	2.48	35.4	5.19	20.9	64.8	44.1	2.41	35.9	5.36	20.7
		80	87.7	44.3	3.25	33.2	3.99	21.5	85.9	44.6	3.17	33.8	4.12	21.3	84.9	44.9	5.79	25.2	2.27	23.5
		100	107.9	45.2	3.92	31.8	3.38	21.8	106.1	45.5	3.82	32.5	3.49	21.6	105.0	45.8	3.73	33.1	3.61	21.5
		130	138.2	47.2	5.07	29.9	2.73	22.3	136.3	47.6	4.95	30.7	2.82	22.1	135.2	47.9	4.82	31.5	2.91	21.9
		135	143.2	47.4	5.44	28.9	2.57	22.6	141.4	47.8	5.30	29.7	2.65	22.3	140.2	48.1	5.17	30.5	2.73	31.1
		140	148.3	47.6	5.80	27.8	2.41	22.8	146.4	48.0	5.66	28.7	2.48	22.6	145.2	48.3	5.52	29.5	2.57	22.4
	12	60	67.7	44.3	2.55	35.6	5.09	23.6	66.0	44.7	2.49	36.2	5.26	23.5	64.9	45.0	2.43	36.7	5.44	23.4
		80	87.9	45.2	3.37	33.7	3.94	24.0	86.1	45.6	3.29	34.4	4.06	23.8	85.0	45.9	3.19	35.0	4.22	23.7
		100	108.0	46.1	4.19	31.8	3.23	24.3	106.2	46.5	4.08	32.5	3.34	24.2	105.1	46.8	3.96	33.3	3.47	24.0
		130	138.3	47.5	5.41	29.0	2.57	24.8	136.4	47.8	5.28	29.8	2.65	24.7	135.2	48.2	5.11	30.8	2.76	24.5
		135	143.3	47.7	5.62	28.5	2.49	24.9	141.4	48.1	5.48	29.4	2.57	24.7	140.2	48.4	5.30	30.3	2.68	24.8
		140	148.3	47.9	5.82	28.1	2.41	25.0	146.4	48.3	5.68	28.9	2.49	24.8	145.3	48.7	5.49	29.9	2.60	24.6
	15	60	67.9	45.2	2.56	36.4	5.16	25.0	66.1	45.5	2.50	37.0	5.33	24.9	65.0	45.8	2.44	37.5	5.51	24.8
		80	88.0	46.0	3.28	34.8	4.11	25.2	86.2	46.3	3.20	35.4	4.24	25.1	85.0	46.6	5.85	26.7	2.34	26.3
		100	108.1	46.6	3.94	33.2	3.47	25.4	106.3	47.0	3.84	33.9	3.59	25.3	105.1	47.4	3.74	34.6	3.71	25.2
		130	138.3	47.8	5.10	30.4	2.75	25.8	136.4	48.2	4.98	31.2	2.84	25.7	135.2	48.6	4.86	32.0	2.93	25.6
		135	143.4	48.0	5.47	29.4	2.58	26.0	141.5	48.4	5.34	30.2	2.67	25.9	140.3	48.8	5.21	31.0	2.74	25.7
		140	148.4	48.2	5.84	28.3	2.42	26.1	146.5	48.6	5.70	29.2	2.50	26.0	145.3	49.0	5.56	30.0	2.58	25.9
50	8	60	68.5	49.0	2.44	40.7	5.90	39.5	66.6	49.4	2.38	41.3	6.09	39.4	65.4	49.8	2.32	41.9	6.30	39.2
		80	88.8	50.8	3.30	39.5	4.51	39.8	86.8	51.1	3.22	40.2	4.66	39.7	85.6	51.5	3.14	40.8	4.81	39.5
		100	109.2	52.7	3.98	39.2	3.89	39.9	107.1	53.1	3.88	39.9	4.01	39.7	105.8	53.5	3.78	40.6	4.15	39.5
		130	139.8	56.4	5.12	39.0	3.23	40.0	137.6	56.9	4.99	39.8	3.34	39.7	136.2	57.3	4.87	40.7	3.45	39.5
		135	144.9	56.9	5.48	38.2	3.06	40.1	142.6	57.4	5.34	39.1	3.16	39.9	141.2	57.8	5.21	40.0	3.25	39.7
		140	150.0	57.4	5.83	37.5	2.89	40.3	147.7	57.9	5.69	38.4	2.98	40.1	146.3	58.3	5.55	39.4	3.08	39.9
	12	60	68.7	50.0	2.45	41.6	5.98	42.5	66.7	50.4	2.39	42.2	6.18	42.4	65.5	50.7	2.33	42.8	6.39	42.3
		80	89.0	51.9	3.30	40.7	4.61	42.7	87.0	52.3	3.22	41.3	4.76	42.6	85.7	52.7	3.14	42.0	4.92	42.5
		100	109.4	53.9	4.15	39.7	3.81	42.9	107.2	54.3	4.05	40.5	3.93	42.7	105.9	54.7	3.95	41.2	4.06	42.6
		130	139.9	56.8	5.43	38.3	3.07	43.1	137.6	57.2	5.29	39.2	3.17	43.0	136.2	57.7	5.16	40.1	3.27	42.8
		135	145.0	57.3	5.64	38.1	2.98	43.2	142.7	57.7	5.50	39.0	3.08	43.0	141.3	58.2	5.36	39.9	3.18	43.2
		140	150.1	57.8	5.85	37.8	2.89	43.2	147.8	58.2	5.71	38.7	2.99	43.1	146.3	58.7	5.57	39.7	3.09	42.9
	15	60	68.9	50.9	2.46	42.5	6.07	44.2	66.8	51.3	2.40	43.1	6.26	44.1	65.6	51.7	2.98	41.5	5.08	44.3
		80	89.2	52.7	3.33	41.3	4.64	44.3	87.1	53.1	3.25	42.0	4.79	44.2	85.8	53.5	3.95	40.0	3.97	44.5
		100	109.5	54.5	4.00	40.8	3.99	44.4	107.3	54.9	3.90	41.6	4.13	44.3	106.0	55.3	5.15	37.7	3.15	44.8
		130	139.9	57.2	5.16	39.6	3.25	44.6	137.7	57.6	5.03	40.4	3.36	44.4	136.3	58.0	6.80	34.8	2.50	45.2
		135	145.0	57.7	5.51	38.8	3.08	44.7	142.7	58.1	5.38	39.7	3.18	44.5	141.3	58.5	7.20	34.0	2.39	45.3
		140	150.1	58.2	5.87	38.1	2.90	44.8	147.8	58.6	5.73	39.0	3.00	44.6	146.4	59.0	7.59	33.1	2.28	45.4

Shaded area represents LLT above 145°F. Operating the heat pump with a LLT above 145°F results in the compressor running out of envelope and reducing compressor reliability. You may need to increase load water flow or decrease the set point. Increasing the load water flow will lower the discharge pressure and compressor temperature. Load flow may have to be adjusted based on source temperature variations. 04/10/23

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WITH OPTIHEAT  
3 TO 5 TONS**

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Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

**050 - Performance Data cont.**

**050 - Heating - 2 of 2**

Source		Load Flow - 11.5 GPM							Load Flow - 15 GPM							Load Flow - 18.5 GPM						
EST °F	Flow GPM	ELT °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F		
70	8	60	70.2	58.6	2.48	50.1	6.91	57.1	68.0	60.3	2.48	51.8	7.14	56.6	66.7	62.0	3.49	50.1	5.21	57.1		
		80	90.6	60.9	3.72	48.2	4.80	57.6	88.3	62.4	3.69	49.8	4.95	57.2	86.9	63.8	3.188	-45.0	0.59	81.6		
		100	111.0	63.4	4.55	47.9	4.08	57.7	108.6	64.8	4.11	50.8	4.62	56.9	107.2	66.2	24.91	-18.8	0.78	74.8		
		125	136.6	66.5	5.91	46.3	3.33	58.1	134.0	67.7	5.27	49.7	3.80	57.2	132.4	68.8	8.84	38.7	2.28	60.0		
		130	141.7	67.1	6.18	46.0	3.18	58.1	139.1	68.2	5.50	49.5	3.64	57.3	137.5	69.4	7.06	44.6	3.04	58.5		
		135	146.7	67.3	6.51	45.0	3.04	58.4	144.1	67.9	5.85	47.9	3.42	57.6	142.4	68.5	5.28	50.5	3.80	57.0		
	140	151.7	67.4	6.84	44.1	2.89	58.6	149.0	67.6	6.19	46.4	3.20	58.0	147.3	67.7	3.51	55.7	5.66	55.6			
	12	60	70.4	60.1	2.48	51.6	7.11	60.7	68.2	61.4	2.49	53.0	7.24	60.5	66.8	62.8	32.17	-47.0	0.57	78.4		
		80	90.9	62.4	3.58	50.2	5.11	61.0	88.4	63.1	3.42	51.4	5.41	60.8	86.9	63.8	25.01	-21.5	0.75	73.9		
		100	111.3	64.7	4.67	48.8	4.06	61.3	108.6	64.7	4.35	49.9	4.36	61.1	107.0	64.7	11.57	26.1	1.94	65.5		
		125	136.8	67.6	6.05	47.0	3.31	61.6	133.9	66.8	5.52	47.9	3.58	61.4	132.1	65.9	8.88	35.6	2.18	63.9		
		130	141.9	68.2	6.32	46.6	3.16	61.6	139.0	67.2	5.75	47.6	3.43	61.5	137.2	66.2	7.09	42.0	2.92	62.8		
		135	147.0	68.8	6.60	46.3	3.06	61.7	144.0	67.6	5.98	47.2	3.32	61.5	142.2	66.4	5.30	48.3	3.67	61.7		
	140	152.1	69.4	6.87	45.9	2.96	61.8	149.1	68.0	6.21	46.8	3.21	61.6	147.2	66.6	3.53	54.6	5.54	60.2			
	15	60	70.7	61.6	2.47	53.1	7.30	62.7	68.3	62.6	2.50	54.1	7.34	62.6	66.9	63.6	32.20	-46.3	0.58	76.4		
		80	91.2	64.4	3.73	51.6	5.06	62.9	88.6	64.8	3.73	52.0	5.09	62.8	87.0	65.1	25.03	-20.3	0.76	72.8		
		100	111.7	67.2	4.57	51.6	4.31	62.9	108.9	67.0	4.14	52.8	4.75	62.7	107.2	66.8	11.59	27.4	1.97	66.2		
		125	137.2	70.2	5.95	49.9	3.49	63.1	134.2	68.7	5.30	50.6	3.84	63.0	132.3	67.3	8.90	36.9	2.22	64.9		
		130	142.3	70.8	6.23	49.5	3.33	63.2	139.2	69.1	5.54	50.2	3.66	63.1	137.3	67.4	7.11	42.6	2.94	64.1		
		135	147.4	71.0	6.57	48.6	3.18	63.3	144.2	68.8	5.89	48.7	3.44	63.3	142.2	66.5	5.32	48.4	3.67	63.4		
	140	152.4	71.3	6.90	47.7	3.03	63.4	149.1	68.4	6.24	47.2	3.22	63.5	147.1	65.6	4.67	49.6	4.11	63.2			
	90	8	60	72.1	69.4	2.32	61.5	8.78	74.2	69.3	69.9	2.28	62.1	9.00	74.0	67.6	70.4	4.84	53.9	4.27	76.1	
			80	92.3	70.5	3.22	59.5	6.41	74.7	89.5	71.1	3.17	60.3	6.57	74.5	87.7	71.6	2.25	63.9	9.33	73.5	
			100	112.9	74.3	4.00	60.7	5.45	74.4	110.0	74.9	3.93	61.5	5.59	74.2	108.2	75.5	3.59	63.1	6.38	73.7	
125			138.0	74.9	5.21	57.2	4.27	75.3	135.1	75.5	5.12	58.0	4.38	75.0	133.2	76.1	3.85	62.9	5.79	73.8		
130			143.1	75.1	5.46	56.4	4.03	75.5	140.1	75.6	5.36	57.3	4.13	75.2	138.2	76.2	4.44	60.2	5.06	74.5		
135			148.7	78.6	6.54	56.3	3.59	75.5	145.2	76.6	5.81	56.7	3.88	75.4	143.1	74.6	5.03	57.4	4.34	75.2		
140		154.3	82.1	7.62	56.1	3.16	75.5	150.3	77.5	6.26	56.2	3.63	75.5	147.9	72.9	4.70	56.9	4.55	75.3			
12		60	72.3	70.7	2.33	62.8	8.90	78.7	69.5	71.3	2.29	63.4	9.13	78.6	67.8	71.8	7.51	46.2	2.80	81.7		
		80	92.9	73.9	3.66	61.4	5.91	79.0	89.7	72.9	3.29	61.7	6.51	78.9	87.8	72.0	6.81	48.8	3.10	81.3		
		100	113.4	77.1	5.00	60.0	4.52	79.2	110.0	74.6	4.28	60.0	5.11	79.2	107.8	72.2	5.64	53.1	3.79	80.8		
		120	134.0	80.2	6.33	58.6	3.79	79.5	130.2	76.3	5.28	58.3	4.31	79.5	127.8	72.4	5.40	54.0	3.93	80.7		
		125	139.1	81.0	6.67	58.3	3.61	79.6	135.2	76.7	5.53	57.9	4.11	79.6	132.8	72.4	5.23	54.6	4.07	80.4		
		130	144.2	81.8	7.00	57.9	3.43	79.6	140.3	77.2	5.78	57.4	3.91	79.7	137.8	72.5	5.05	55.3	4.21	80.1		
15		60	72.5	72.1	2.34	64.1	9.02	81.2	69.7	72.6	2.30	64.8	9.25	81.1	67.9	73.1	2.26	65.4	9.49	81.0		
		80	92.7	73.2	3.26	62.1	6.59	81.5	89.8	73.8	3.20	62.9	6.76	81.4	88.0	74.4	3.14	63.6	6.93	81.3		
		100	113.4	76.8	4.02	63.1	5.60	81.3	110.3	77.4	3.95	63.9	5.74	81.2	108.4	78.0	3.88	64.7	5.89	81.1		
		120	133.3	76.3	5.00	59.2	4.57	81.9	130.2	76.9	4.92	60.1	4.69	81.7	128.4	77.4	4.83	61.0	4.70	81.6		
		125	138.2	76.2	5.25	58.2	4.31	82.0	135.2	76.7	5.16	59.1	4.42	81.9	133.4	77.3	5.07	60.0	4.47	81.8		
		130	143.2	76.0	5.49	57.3	4.06	82.1	140.2	76.6	5.40	58.2	4.16	82.0	138.3	77.2	5.31	59.1	4.26	81.9		
135		149.0	80.4	6.61	57.8	3.64	82.0	145.3	77.6	5.85	57.6	3.90	82.1	143.1	74.7	5.09	57.3	4.30	82.1			
140		154.7	84.7	7.72	58.4	3.22	82.0	150.5	78.5	6.30	57.0	3.65	82.2	147.8	72.3	4.88	55.6	4.34	82.4			

Shaded area represents LLT above 145°F. Operating the heat pump with a LLT above 145°F results in the compressor running out of envelope and reducing compressor reliability. You may need to increase load water flow or decrease the set point. Increasing the load water flow will lower the discharge pressure and compressor temperature. Load flow may have to be adjusted based on source temperature variations. 04/10/23

The manufacturer works continually to improve its products. As a result, the design and specifications of each product at the time of order may be changed without notice. Purchaser's approval of this data set signifies that the equipment is acceptable under the provisions of the job specification. Statements and other information contained herein are not express warranties and do not form the basis of any bargain between the parties, but are merely the manufacturer's opinion or commendation of its products.



Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

## 066 - Performance Data cont.

### 066 - Heating - 1 of 2

Source		Load Flow - 20 GPM							Load Flow - 20 GPM					Load Flow - 25 GPM						
EST °F	Flow GPM	ELT °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F
30	10	60	65.4	54.0	2.90	44.1	5.45	20.9	64.4	54.4	2.83	44.8	5.64	20.8	64.4	54.4	2.83	44.8	5.64	20.8
		80	85.5	54.9	3.77	42.0	4.27	21.3	84.4	55.3	3.68	42.8	4.41	21.2	84.4	55.3	3.68	42.8	4.41	21.2
		100	105.6	56.0	4.90	39.3	3.36	21.9	104.5	56.5	4.77	40.2	3.47	21.7	104.5	56.5	4.77	40.2	3.47	21.7
		130	135.9	58.5	6.55	36.2	2.62	22.5	134.7	59.0	6.39	37.2	2.71	22.3	134.7	59.0	6.39	37.2	2.71	22.3
		135	140.9	58.7	6.94	35.1	2.5	22.8	139.7	59.2	6.77	36.1	2.56	22.6	139.7	59.2	6.77	36.1	2.56	22.6
		140	145.9	58.9	7.33	33.9	2.36	23.0	144.8	59.4	7.15	35.0	2.44	22.8	144.8	59.4	7.15	35.0	2.44	22.8
	15	60	65.5	55.1	2.92	45.1	5.53	23.8	64.4	55.5	2.84	45.8	5.72	23.7	64.4	55.5	2.84	45.8	5.72	23.7
		80	85.6	56.1	4.03	42.4	4.09	24.2	84.5	56.5	3.95	43.1	4.19	24.1	84.5	56.5	3.95	43.1	4.19	24.1
		100	105.7	57.2	5.14	39.7	3.26	24.5	104.6	57.6	5.06	40.4	3.34	24.5	104.6	57.6	5.06	40.4	3.34	24.5
		130	135.9	58.8	6.80	35.6	2.53	25.1	134.7	59.2	6.72	36.3	2.58	25.0	134.7	59.2	6.72	36.3	2.58	25.0
		135	140.9	59.1	7.08	34.9	2.4	25.2	139.8	59.5	7.00	35.6	2.49	25.1	139.8	59.5	7.00	35.6	2.49	25.1
		140	145.9	59.3	7.35	34.2	2.36	25.3	144.8	59.8	7.27	34.9	2.41	25.2	144.8	59.8	7.27	34.9	2.41	25.2
	20	60	65.6	56.1	2.93	46.1	5.61	25.2	64.5	56.5	2.86	46.8	5.79	25.2	64.5	56.5	2.86	46.8	5.79	25.2
		80	85.7	57.0	3.81	44.0	4.38	25.5	84.6	57.4	3.71	44.8	4.53	25.4	84.6	57.4	3.71	44.8	4.53	25.4
		100	105.8	57.9	4.92	41.1	3.45	25.8	104.7	58.3	4.80	42.0	3.56	25.7	104.7	58.3	4.80	42.0	3.56	25.7
		130	135.9	59.3	6.60	36.8	2.63	26.2	134.8	59.7	6.44	37.8	2.72	26.1	134.8	59.7	6.44	37.8	2.72	26.1
		135	141.0	59.5	6.99	35.7	2.5	26.3	139.8	59.9	6.82	36.7	2.58	26.2	139.8	59.9	6.82	36.7	2.58	26.2
		140	146.0	59.7	7.38	34.5	2.37	26.4	144.8	60.1	7.20	35.6	2.45	26.3	144.8	60.1	7.20	35.6	2.45	26.3
50	10	60	66.5	65.2	2.95	55.1	6.48	38.6	65.3	65.7	2.88	55.9	6.69	38.5	65.3	65.7	2.88	55.9	6.69	38.5
		80	86.7	67.4	3.91	54.1	5.05	38.9	85.4	67.9	3.81	54.9	5.22	38.7	85.4	67.9	3.81	54.9	5.22	38.7
		100	106.9	68.9	5.12	51.4	3.94	39.4	105.6	69.4	5.00	52.4	4.07	39.2	105.6	69.4	5.00	52.4	4.07	39.2
		130	137.1	71.1	6.75	48.0	3.09	40.1	135.7	71.6	6.58	49.2	3.19	39.9	135.7	71.6	6.58	49.2	3.19	39.9
		135	142.1	71.5	7.14	47.1	2.9	40.3	140.8	72.0	6.97	48.2	3.03	40.1	140.8	72.0	6.97	48.2	3.03	40.1
		140	147.2	71.9	7.54	46.2	2.79	40.5	145.8	72.4	7.35	47.3	2.89	40.2	145.8	72.4	7.35	47.3	2.89	40.2
	15	60	66.6	66.4	2.97	56.3	6.57	42.3	65.4	66.9	2.89	57.1	6.79	42.2	65.4	66.9	2.89	57.1	6.79	42.2
		80	86.8	67.9	4.11	53.9	4.84	42.6	85.5	68.4	4.01	54.7	5.00	42.5	85.5	68.4	4.01	54.7	5.00	42.5
		100	106.9	69.4	5.26	51.4	3.86	42.9	105.6	69.9	5.13	52.4	3.99	42.8	105.6	69.9	5.13	52.4	3.99	42.8
		130	137.2	71.6	6.99	47.8	3.00	43.4	135.8	72.1	6.81	48.9	3.10	43.3	135.8	72.1	6.81	48.9	3.10	43.3
		135	142.2	72.0	7.28	47.1	2.90	43.5	140.8	72.5	7.09	48.3	3.00	43.4	140.8	72.5	7.09	48.3	3.00	43.4
		140	147.2	72.3	7.56	46.5	2.80	43.6	145.8	72.9	7.37	47.7	2.90	43.4	145.8	72.9	7.37	47.7	2.90	43.4
	20	60	66.8	67.7	2.98	57.5	6.66	44.1	65.5	68.2	2.98	58.0	6.71	44.0	65.5	68.2	2.98	58.0	6.71	44.0
		80	87.0	70.0	3.95	56.5	5.19	44.2	85.6	70.5	3.95	57.0	5.23	44.1	85.6	70.5	3.95	57.0	5.23	44.1
		100	107.1	71.2	5.15	53.6	4.05	44.5	105.7	71.7	5.15	54.2	4.08	44.4	105.7	71.7	5.15	54.2	4.08	44.4
		130	137.2	72.0	6.80	48.8	3.10	45.0	135.8	72.5	6.80	49.3	3.13	44.9	135.8	72.5	6.80	49.3	3.13	44.9
		135	142.2	72.4	7.20	47.9	2.96	45.1	140.8	72.9	7.20	48.4	2.98	45.0	140.8	72.9	7.20	48.4	2.98	45.0
		140	147.3	72.8	7.59	46.9	2.81	45.2	145.9	73.3	7.59	47.4	2.83	45.1	145.9	73.3	7.59	47.4	2.83	45.1

Shaded area represents LLT above 145°F. Operating the heat pump with a LLT above 145°F results in the compressor running out of envelope and reducing compressor reliability. You may need to increase load water flow or decrease the set point. Increasing the load water flow will lower the discharge pressure and compressor temperature. Load flow may have to be adjusted based on source temperature variations. 04/10/23

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Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

## 066 - Performance Data cont.

### 066 - Heating - 2 of 2

Source		Load Flow - 20 GPM							Load Flow - 20 GPM							Load Flow - 25 GPM						
EST °F	Flow GPM	ELT °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F	LLT °F	HC kBTUH	Power kW	HE kBTUH	COP	LST °F		
70	10	60	67.7	77.3	2.99	67.1	7.59	56.2	66.4	80.6	2.92	70.6	8.08	55.4	66.4	80.6	2.92	70.6	8.08	55.4		
		80	87.9	78.7	4.17	64.5	5.54	56.7	86.6	82.5	4.03	68.7	6.00	55.8	86.6	82.5	4.03	68.7	6.00	55.8		
		100	108.1	80.5	5.37	62.2	4.39	57.2	106.8	84.9	5.15	67.3	4.83	56.1	106.8	84.9	5.15	67.3	4.83	56.1		
		130	138.4	84.3	7.14	59.9	3.46	57.6	137.2	90.2	6.80	67.0	3.89	56.2	137.2	90.2	6.80	67.0	3.89	56.2		
		135	143.5	84.7	7.43	59.3	3.34	57.8	142.3	90.7	7.08	66.5	3.76	56.3	142.3	90.7	7.08	66.5	3.76	56.3		
		140	148.5	85.0	7.73	58.6	3.22	57.9	147.3	91.2	7.35	66.1	3.63	56.4	147.3	91.2	7.35	66.1	3.63	56.4		
	15	60	67.9	78.8	3.00	68.6	7.69	60.6	66.5	81.1	2.94	71.1	8.09	60.2	66.5	81.1	2.94	71.1	8.09	60.2		
		80	88.0	80.5	4.19	66.2	5.63	60.9	86.7	83.3	4.05	69.5	6.03	60.4	86.7	83.3	4.05	69.5	6.03	60.4		
		100	108.2	82.2	5.38	63.8	4.48	61.2	106.8	85.5	5.16	67.9	4.86	60.7	106.8	85.5	5.16	67.9	4.86	60.7		
		125	133.4	84.3	6.86	60.9	3.64	61.6	132.1	88.2	6.55	65.9	3.99	60.9	132.1	88.2	6.55	65.9	3.99	60.9		
		130	138.5	84.7	7.16	60.3	3.47	61.7	137.1	88.8	6.82	65.5	3.81	61.0	137.1	88.8	6.82	65.5	3.81	61.0		
		135	143.5	85.1	7.46	59.7	3.35	61.8	142.1	89.3	7.10	65.1	3.69	61.1	142.1	89.3	7.10	65.1	3.69	61.1		
	20	60	68.0	80.3	3.02	70.0	7.80	62.8	66.5	81.7	2.95	71.6	8.11	62.6	66.5	81.7	2.95	71.6	8.11	62.6		
		80	88.2	81.8	4.21	67.4	5.69	63.1	86.7	83.4	4.07	69.5	6.01	62.8	86.7	83.4	4.07	69.5	6.01	62.8		
		100	108.3	83.2	5.40	64.8	4.52	63.3	106.8	85.1	5.18	67.5	4.82	63.0	106.8	85.1	5.18	67.5	4.82	63.0		
		125	133.5	85.0	6.89	61.5	3.65	63.7	132.0	87.3	6.57	64.9	3.93	63.3	132.0	87.3	6.57	64.9	3.93	63.3		
		130	138.5	85.4	7.19	60.9	3.48	63.7	137.0	87.7	6.85	64.4	3.76	63.4	137.0	87.7	6.85	64.4	3.76	63.4		
		135	143.6	85.7	7.48	60.2	3.36	63.8	142.1	88.2	7.13	63.9	3.63	63.4	142.1	88.2	7.13	63.9	3.63	63.4		
	90	10	60	68.8	87.6	3.04	77.3	8.45	74.1	67.1	88.3	2.99	78.1	8.67	73.9	67.1	88.3	2.99	78.1	8.67	73.9	
			80	89.4	94.4	3.89	81.1	7.11	73.3	87.6	95.1	3.82	82.0	7.29	73.1	87.6	95.1	3.82	82.0	7.29	73.1	
			100	109.7	97.3	4.88	80.6	5.85	73.4	107.8	98.0	4.79	81.7	6.00	73.2	107.8	98.0	4.79	81.7	6.00	73.2	
			125	134.9	98.9	6.56	76.5	4.49	74.2	133.0	99.6	6.45	77.6	4.60	74.0	133.0	99.6	6.45	77.6	4.60	74.0	
			130	139.9	99.2	6.90	75.7	4.21	74.4	138.0	100.0	6.78	76.8	4.32	74.2	138.0	100.0	6.78	76.8	4.32	74.2	
			135	144.7	97.2	7.42	71.9	3.86	75.2	143.0	99.8	7.08	75.6	4.14	74.4	143.0	99.8	7.08	75.6	4.14	74.4	
15		60	68.9	89.3	3.05	78.9	8.57	79.2	67.2	90.0	3.00	79.7	8.79	79.0	67.2	90.0	3.00	79.7	8.79	79.0		
		80	89.1	91.0	4.28	76.3	6.22	79.5	87.4	92.3	4.10	78.4	6.60	79.2	87.4	92.3	4.10	78.4	6.60	79.2		
		100	109.3	92.6	5.51	73.8	4.92	79.9	107.6	94.7	5.20	77.0	5.33	79.4	107.6	94.7	5.20	77.0	5.33	79.4		
		125	134.5	94.7	7.05	70.6	3.98	80.3	132.8	97.7	6.58	75.2	4.39	79.7	132.8	97.7	6.58	75.2	4.39	79.7		
		130	139.5	95.1	7.36	70.0	3.79	80.4	137.9	98.2	6.86	74.9	4.20	79.7	137.9	98.2	6.86	74.9	4.20	79.7		
		135	144.5	95.5	7.66	69.3	3.7	80.5	142.9	98.8	7.13	74.5	4.07	79.8	142.9	98.8	7.13	74.5	4.07	79.8		
20		60	69.1	91.0	3.07	80.5	8.69	81.7	67.3	91.7	3.02	81.4	8.91	81.6	67.3	91.7	3.02	81.4	8.91	81.6		
		80	89.8	98.0	3.93	84.6	7.31	81.3	87.9	98.7	3.86	85.6	7.49	81.2	87.9	98.7	3.86	85.6	7.49	81.2		
		100	110.1	100.5	4.90	83.8	6.01	81.4	108.1	101.3	4.81	84.8	6.16	81.3	108.1	101.3	4.81	84.8	6.16	81.3		
		125	135.1	100.5	6.61	78.0	4.53	82.0	133.1	101.3	6.49	79.1	4.57	81.8	133.1	101.3	6.49	79.1	4.57	81.8		
		130	140.1	100.5	6.95	76.8	4.24	82.1	138.1	101.3	6.83	78.0	4.35	82.0	138.1	101.3	6.83	78.0	4.35	82.0		
		135	144.9	98.5	7.48	73.0	3.9	82.5	143.0	100.3	7.13	75.9	4.12	82.2	143.0	100.3	7.13	75.9	4.12	82.2		
140		149.7	96.5	8.00	69.2	3.54	82.9	147.9	99.3	7.43	73.9	3.91	82.4	147.9	99.3	7.43	73.9	3.91	82.4			

Shaded area represents LLT above 145°F. Operating the heat pump with a LLT above 145°F results in the compressor running out of envelope and reducing compressor reliability. You may need to increase load water flow or decrease the set point. Increasing the load water flow will lower the discharge pressure and compressor temperature. Load flow may have to be adjusted based on source temperature variations. 04/10/23

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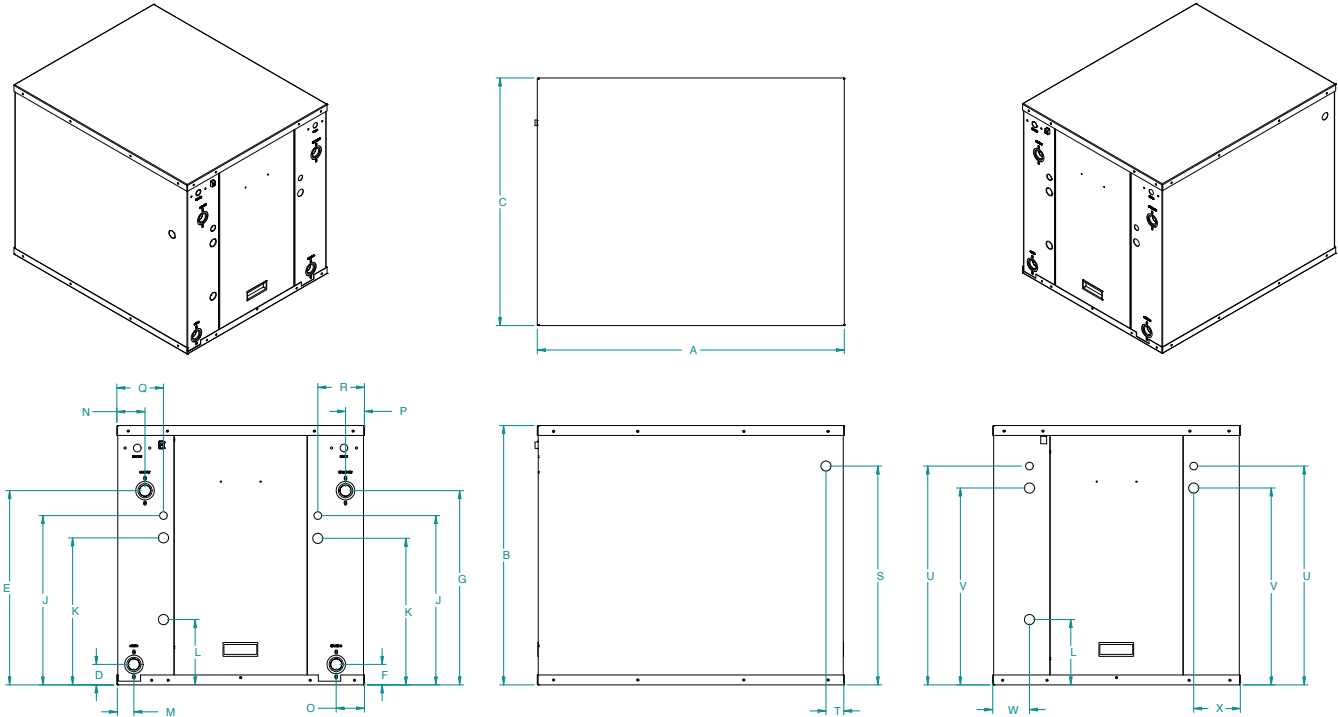
Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

**ASTON ADVANCED SINGLE HYDRONIC  
WITH OPTIHEAT  
3 TO 5 TONS**

**Dimensional Data**



Model	Overall Cabinet			Water Connections						Electrical Knockouts			
	A	B	C	D	E	F	G			J	K	L	
	Depth	Height	Width	Load Liquid In	Load Liquid Out	Source Liquid In	Source Liquid Out	Load Water FPT	Source Water FPT	1/2" cond Low Voltage	3/4" cond High Voltage	3/4" cond High Voltage	
040	in.	31.0	26.2	25.0	2.1	19.6	2.1	19.6	1"	1"	17.1	14.8	6.5
	mm	787.4	665.5	635.0	53.3	497.8	53.3	497.8	25.4	25.4	434.3	375.9	165.0
050	in.	31.0	26.2	25.0	2.2	20.6	2.2	20.6	1-1/4"	1-1/4"	17.1	14.8	6.5
	mm	787.4	665.5	635.0	55.9	523.2	55.9	523.2	31.8	31.8	434.3	375.9	165.0
066	in.	31.0	26.2	25.0	2.4	23.3	2.4	23.3	1-1/4"	1-1/4"	18.0	15.8	6.5
	mm	787.4	665.5	635.0	61.0	592.0	61.0	592.0	31.8	31.8	457.0	401.0	165.0

Model	Water Connections				Electrical Knockout		Electrical Knockout	Electrical Knockout	Electrical Knockout	Electrical Knockout			
	M	N	O	P	Q	R	S	T	U	V	W	X	
	Load Liquid In	Load Liquid Out	Source Liquid In	Source Liquid Out	High/Low Voltage	High/Low Voltage	Power Supply	Power Supply	Low Voltage	Power Supply	High/Low Voltage	High/Low Voltage	
040	in.	1.6	2.8	2.8	1.6	4.7	4.7	22.0	1.8	22.0	19.8	3.7	3.7
	mm	40.6	69.9	69.9	40.6	119.4	119.4	559.0	45.7	559.0	503.0	94.0	94.0
050	in.	1.8	3.6	3.6	2.0	4.7	4.7	22.0	1.8	22.0	19.8	3.7	3.7
	mm	45.7	91.4	91.4	50.8	119.4	119.4	559.0	45.7	559.0	503.0	94.0	94.0
066	in.	1.8	4.0	4.0	1.8	4.7	4.7	22.0	1.8	22.0	19.8	3.7	3.7
	mm	45.7	101.6	101.6	45.7	119.4	119.4	559.0	45.7	559.0	503.0	94.0	94.0

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**ASTON ADVANCED SINGLE HYDRONIC  
WITH OPTIHEAT  
3 TO 5 TONS**

Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

## Physical Data

Model	040	050	066
Compressor (1 each)	Scroll		
Factory Charge R410A, oz [kg]	94 [2.66]	108 [3.06]	142 [4.02]
Coax & Piping Water Volume - gal [l]	1.0 [3.94]	1.4 [5.25]	1.6 [6.13]
Weight - Operating, lb [kg]	313 [142.0]	348 [157.9]	368 [166.9]
Weight - Packaged, lb [kg]	328 [148.8]	363 [164.7]	383 [173.7]

6/13/19

## Electrical Data

Model	Rated Voltage	Voltage Min/Max	Compressor				Load Pump	Source Pump	Total Unit FLA	Min Ckt Amp	Maximum Fuse/HACR
			MCC	RLA	LRA	LRA*					
040	208-230/60/1	198/254	27.7	17.8	135.0	47.0	1.8	5.4	25.0	29.5	45
050	208-230/60/1	198/254	37.8	24.2	178.0	62.0	1.8	5.4	31.4	37.5	60
066	208-230/60/1	198/254	40.3	25.8	178.0	62.0	1.8	5.4	33.0	39.5	60

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

Source pump amps shown are for up to a 1/2 HP pump

Load pump amps shown are for small circulators.

\*LRA with IntelliStart installed

11/21/22

**ASTON ADVANCED SINGLE HYDRONIC  
WITH OPTIHEAT  
3 TO 5 TONS**

Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

**Pressure Drop**

Model	GPM	Pressure Drop (psi)						
		30°F	50°F	70°F	90°F	110°F	130°F	150°F
040	5.0	0.9	0.6	0.6	0.5	0.5	0.4	0.3
	7.5	2.3	2.1	2.0	1.9	1.8	1.6	1.5
	10.0	3.7	3.5	3.3	3.2	3.0	2.8	2.7
	12.5	5.0	4.7	4.4	4.2	4.1	3.9	3.7
050	8.0	1.7	1.4	1.4	1.3	1.3	1.2	1.1
	11.5	3.6	3.4	3.2	3.0	2.8	2.6	2.5
	15.0	5.6	5.4	5.0	4.6	4.4	4.3	4.1
	18.5	8.3	8.1	7.6	7.2	6.8	6.6	6.4
066	10.0	3.2	3.0	2.8	2.7	2.5	2.4	2.3
	14.5	5.5	5.3	5.1	4.9	4.7	4.6	4.5
	19.0	7.9	7.6	7.3	7.1	6.8	6.6	6.5
	23.5	11.5	11.3	11.0	10.8	10.3	10.1	9.9

7/8/14

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Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

## Correction Factor Tables

Catalog performance can be corrected for antifreeze use. Please use the following table and note the example given.

Antifreeze Type	Antifreeze % by wt	Heating		Cooling		Pressure Drop
		Load	Source	Load	Source	
<b>EWT - °F [°C]</b>		<b>80 [26.7]</b>	<b>30 [-1.1]</b>	<b>50 [10.0]</b>	<b>90 [32.2]</b>	<b>30 [-1.1]</b>
<b>Water</b>	0	1.000	1.000	1.000	1.000	1.000
<b>Ethylene Glycol</b>	10	0.990	0.973	0.976	0.991	1.075
	20	0.978	0.943	0.947	0.979	1.163
	30	0.964	0.917	0.921	0.965	1.225
	40	0.953	0.890	0.897	0.955	1.324
	50	0.942	0.865	0.872	0.943	1.419
<b>Propylene Glycol</b>	10	0.981	0.958	0.959	0.981	1.130
	20	0.967	0.913	0.921	0.969	1.270
	30	0.946	0.854	0.869	0.950	1.433
	40	0.932	0.813	0.834	0.937	1.614
	50	0.915	0.770	0.796	0.922	1.816
<b>Ethanol</b>	10	0.986	0.927	0.945	0.991	1.242
	20	0.967	0.887	0.906	0.972	1.343
	30	0.944	0.856	0.869	0.947	1.383
	40	0.926	0.815	0.830	0.930	1.523
	50	0.907	0.779	0.795	0.911	1.639
<b>Methanol</b>	10	0.985	0.957	0.962	0.986	1.127
	20	0.969	0.924	0.929	0.970	1.197
	30	0.950	0.895	0.897	0.951	1.235
	40	0.935	0.863	0.866	0.936	1.323
	50	0.919	0.833	0.836	0.920	1.399



**WARNING: Gray area represents antifreeze concentrations greater than 35% by weight and should be avoided due to the extreme performance penalty they represent.**

### Antifreeze Correction Example

Antifreeze solution is propylene glycol 20% by weight for the source and methanol 10% for the load. Determine the corrected heating at 30°F source and 80°F load as well as pressure drop at 30°F for an O50. Also, determine the corrected cooling at 90°F source and 50°F load.

The corrected heating capacity at 30°F/80°F would be:

$$45,600 \text{ BTU/H} \times 0.913 \times 0.985 = 41,008 \text{ BTU/H}$$

The corrected cooling capacity at 90°F/50°F would be:

$$41,700 \times 0.969 \times 0.962 = 38,871 \text{ BTU/H}$$

The corrected pressure drop at 30°F and 15 GPM would be:

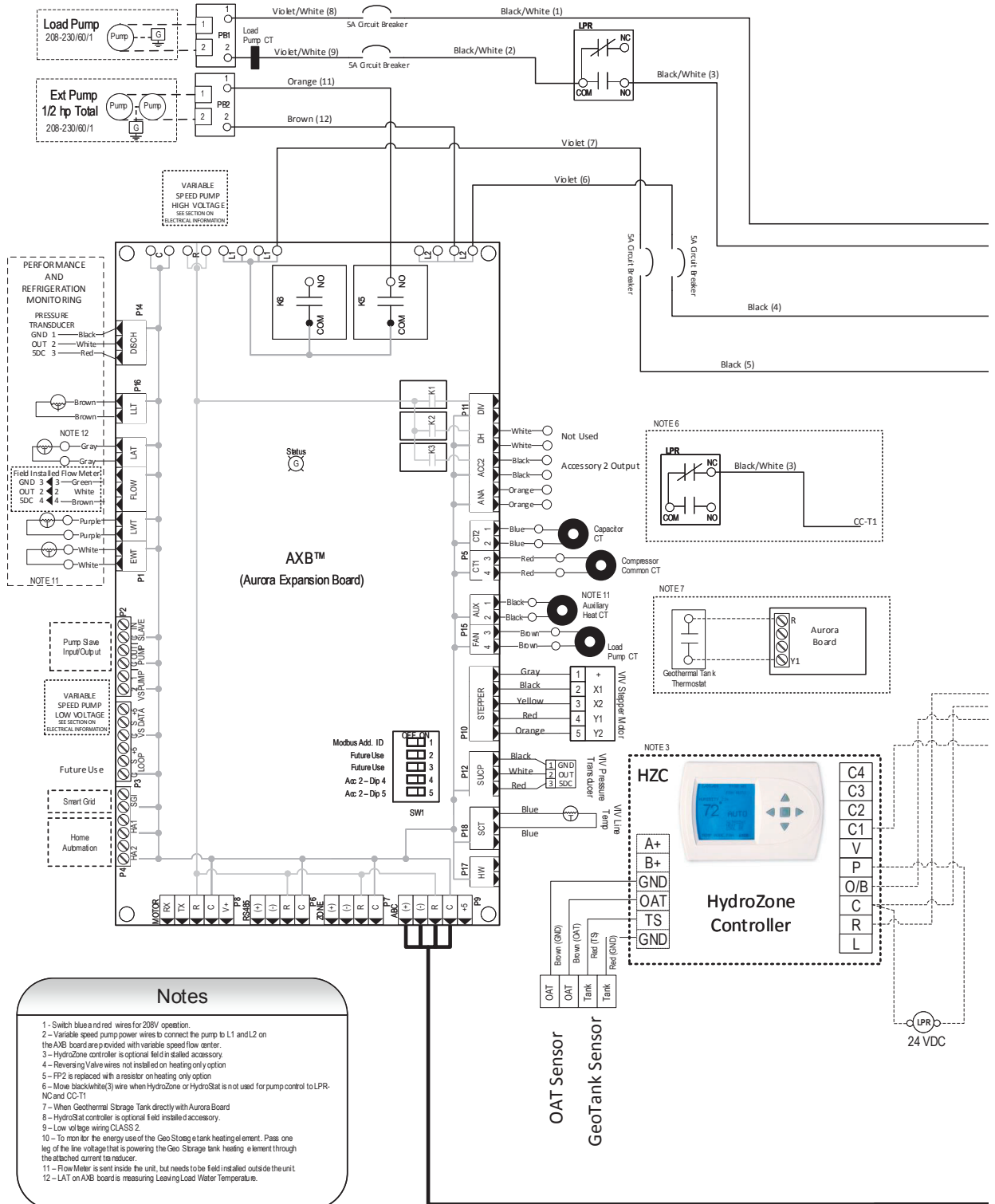
$$5.6 \text{ psi} \times 1.270 = 7.11 \text{ psi}$$

Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_  
 Engineer: \_\_\_\_\_  
 Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

**ASTON ADVANCED SINGLE HYDRONIC  
 WITH OPTIHEAT  
 3 TO 5 TONS**

**Wiring Schematics - Residential**

**Aurora Advanced EVI Water-Water 208-230/60/1**

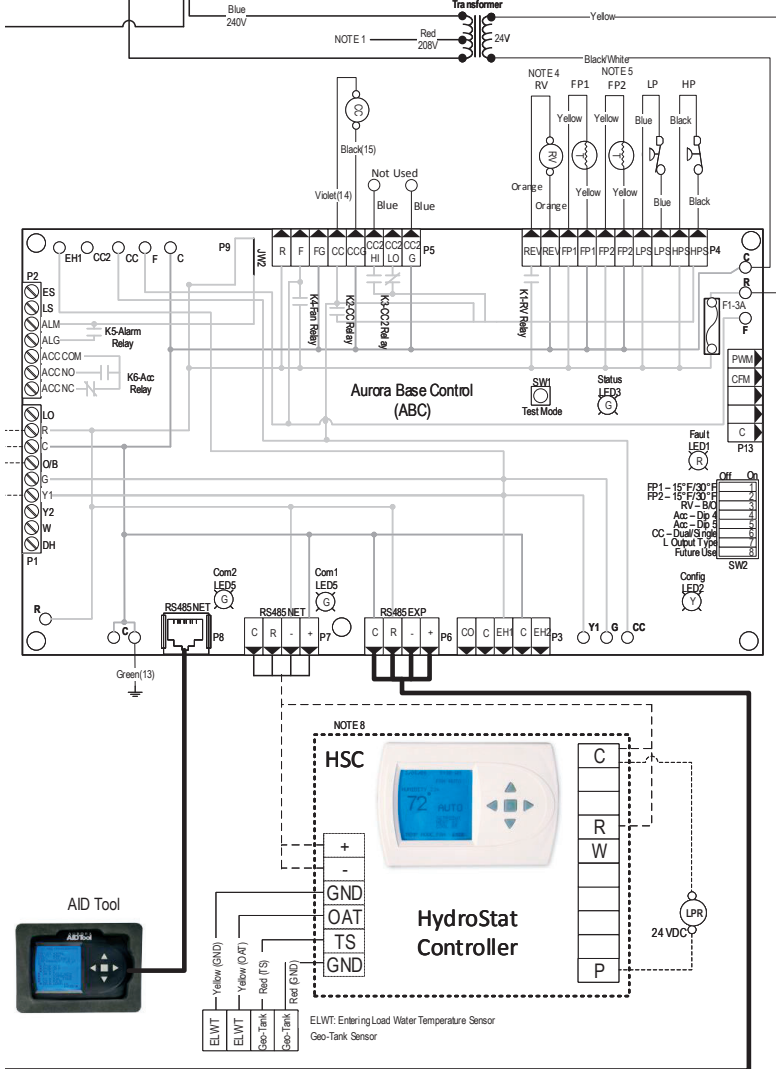
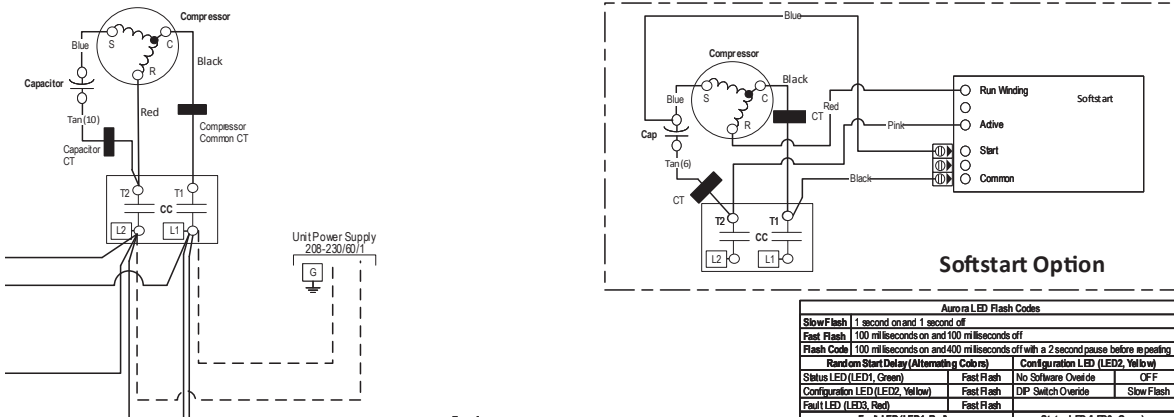


Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_  
 Engineer: \_\_\_\_\_  
 Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

**ASTON ADVANCED SINGLE HYDRONIC  
 WITH OPTIHEAT  
 3 TO 5 TONS**

**Wiring Schematics - Residential cont.**

**Aurora Advanced EVI Water-Water 208-230/60/1**



**Aurora LED Flash Codes**

<b>Slow Flash</b>	1 second on and 1 second off
<b>Fast Flash</b>	100 milliseconds on and 100 milliseconds off
<b>Flash Code</b>	100 milliseconds on and 400 milliseconds off with a 2 second pause before repeating
Random Start Delay (Alternating Colors)	
Status LED (LED1, Green)	Fast Flash No Software Override OFF
Configuration LED (LED2, Yellow)	Fast Flash DIP Switch Override Slow Flash
<b>Fast LED (LED3, Red)</b>	
Fast LED (LED1, Red)	Status LED (LED3, Green)
Normal Mode	OFF Normal Mode ON
Input Fault Lockout	Flash Code 1 Control is Non-Functional OFF
High Pressure Lockout	Flash Code 2 Test Mode Slow Flash
Low Pressure Lockout	Flash Code 3 Lockout Active Fast Flash
Future Use	Flash Code 4 Dehumidification Mode Flash Code 2
Freeze Detection - FP1	Flash Code 5 Future Use Flash Code 3
Reserved	Flash Code 6 Future Use Flash Code 4
Condensate Overflow Lockout	Flash Code 7 Load Shed Flash Code 5
Over/Under Voltage Shutdown	Flash Code 8 ESD Flash Code 6
Future Use	Flash Code 9 On Peak Mode Flash Code 7
Compressor Monitor	Flash Code 10
FP1 Sensor Error	Flash Code 11

**ABC SW2 Accessory Relay**

DESCRIPTION	SW2-4	SW2-5
Cycle with Blower	ON	ON
Cycle with Compressor	OFF	OFF
Water Valve Slow Opening	ON	OFF
Cycle with Comm. T-stat Hum Cmd	OFF	ON

**Aurora Timing Events**

Event	Normal Mode	Test Mode
Random Start Delay	5 to 80 seconds	1 second
Compressor On Delay	5 seconds	< 1 second
Compressor Minimum On Time	2 minutes	5 seconds
Compressor Short Cycle Delay	4 minutes	15 seconds
Fault Recognition Delay - High Pressure	Less than 1 second	Less than 1 second
Start-Up Bypass - Low Pressure	2 minutes	30 seconds
Fault Recognition Delay - Low Pressure	30 seconds	30 seconds
Start-Up Bypass - Low Water Cool Limit	2 minutes	30 seconds
Fault Recognition Delay - Low Water Cool Limit	30 seconds	30 seconds
Fault Recognition Delay - Condensate Overflow	30 seconds	30 seconds
HydroZone Call Recognition Time	2 seconds	2 seconds
Water Valve Slow Open Delay	90 seconds	90 seconds

**Legend**

- Field Installed Item
- Factory Low voltage wiring
- Field low voltage wiring
- Field line voltage wiring
- Optional block
- DC Voltage/PCB traces
- Quick connect terminal
- Wire nut
- Field wire lug
- Ground
- Relay Contacts - N.D., N.C.
- Fuse
- Bealer
- Thermistor
- Light emitting diode - Green
- Relay coil
- Capacitor/w/ bleed resistor
- Switch - Condensate overflow
- Switch - High pressure
- Switch - Low pressure
- Polarized connector
- Current Transducer (CT)

CC - Compressor Contactor  
 CO - Condensate overflow sensor  
 KS - CHW pump relay  
 K5 - Loop pump relay  
 HP - High pressure switch  
 LP - Low pressure switch  
 LV - Vapor Injector Valve  
 LPR - Load Ramp Relay  
 PB1, PB2 - Power blocks  
 RV - Reversing Valve coil  
 SW1 - DIP package 5 position AVB  
 SW1 - TEST/MODE ABC Board  
 SW2 - DIP package 8 position ABC Board  
 FP - Freeze Protection  
 OAT - Outdoor Air Temperature

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Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

## Engineering Guide Specifications

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### General

The liquid source water-to-water heat pump shall be a single packaged heating only or reverse-cycle heating/cooling unit. The unit shall be listed by a nationally recognized safety-testing laboratory or agency, such as ETL Testing Laboratory, Underwriters Laboratory (UL), or Canadian Standards Association (CSA). The unit shall be rated in accordance with Air Conditioning, Heating, and Refrigeration Institute/International Standards Organization (AHRI/ISO) and Canadian Standards Association (CSA-US). The liquid source water-to-water heat pump unit, as manufactured shall be designed to operate with source liquid temperatures between 50°F [10°C] and 110°F [43.3°C] in cooling, and between 30°F [-1°C] and 90°F [32.2°C] in heating.

### Casing and Cabinet

The cabinet shall be fabricated from heavy-gauge galvanized steel and finished with corrosion-resistant powder coating. This corrosion protection system shall meet the stringent 1,000 hour salt spray test per ASTM B117. The interior shall be insulated with ½ in. thick, multi-density, coated glass fiber for noise suppression.

All units shall have separate holes and knockouts for entrance of line voltage and low voltage control wiring. All factory-installed wiring passing through factory knockouts and openings shall be protected from sheet metal edges at openings by plastic ferrules. The control box shall be hinged for ease of service and shall be field switchable from front to back for improved application flexibility with quick attach low voltage harnesses. The control box is shipped standard on the same end as the water connections.

### Refrigerant Circuit

All units shall utilize the non-ozone depleting and low global warming potential refrigerant R-410A. All units shall contain a sealed refrigerant circuit including a hermetic motor-compressor, bidirectional thermostatic expansion valve, reversing valve, coaxial tube water-to-refrigerant heat exchanger, electronic expansion valve (VI circuit), and service ports.

Compressors shall be high-efficiency scroll type designed for vapor injection, heat pump duty and mounted on vibration isolators. The compressor shall be double isolation mounted using selected durometer grommets to provide vibration free compressor mounting. All models will feature a compressor discharge muffler to help quiet compressor gas pulsations. A high density sound attenuating blanket shall be factory installed around the compressor to reduce sound. 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 copper inner tube and a steel outer tube. Refrigerant-to-water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design, rated to withstand 650 PSIG (4481 kPa) working refrigerant pressure and 450 PSIG (3101 kPa) working water pressure. The thermostatic expansion valve shall provide proper superheat over the entire liquid temperature range with minimal "hunting." The valve shall operate bidirectionally without the use of check valves.

### Piping and Connections

Supply and return water connections shall be 1 in. [25.4 mm] for the NEW040, 1 ¼ in. [31.75 mm] for the NEW050-066. The FPT fittings shall be fixed to the cabinet by use of a captive fitting, which eliminates the need for backup pipe wrenches.

### Electrical

A control box shall be located within the unit compressor compartment and shall contain a 75VA transformer with a built-in circuit breaker, 24 volt activated compressor contactor, terminal block for thermostat wiring and solid-state controller for complete unit operation. Electromechanical operation WILL NOT be accepted. Units shall be name-plated for use with time delay fuses or HACR circuit breakers. Unit controls shall be 24 volt and provide heating or cooling as required by the remote thermostat/sensor.

An Aurora, a microprocessor-based controller, interfaces with an external control to monitor and control unit operation shall be provided. The unit control shall provide operational sequencing, high and low pressure switch monitoring, freeze detection, lockout mode control, load and loop pump control, LED status and fault indicators, fault memory, field selectable options, and accessory output. The Lockout signal output shall have a pulsed option so that DDC systems can red specific lockout conditions from the control.

The Aurora Advanced Control shall also feature an Energy Monitoring Package that will provide real time total power consumption, compressor monitoring, On Peak input signal for utility controlled demand programs, loop pump linking for multiple units driving a common flow center and up to two optional home automation inputs. Optional Performance and Refrigerant Monitoring package will provide real time data of the refrigeration circuit.

Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

## Engineering Guide Specifications cont.

An optional Aurora Interface Diagnostic (AID) Tool shall communicate with the Aurora control allowing quick and easy access to monitoring, and troubleshooting of any Aurora control. The device shall include the features of fault description, and history, manual operation capability, sensor readings, timings, and other diagnostic tools.

A detachable terminal block with screw terminals will be provided for field control wiring. All units shall have knockouts for entrance of low and line voltage wiring.

**Optional IntelliStart (compressor Soft Starter)** shall be factory installed for use in applications that require low starting amps, reduced compressor start-up noise, off-grid, and improved start-up behavior. IntelliStart shall reduce normal starting current by 60% on 208-230/60/1 units.

### Accessories

#### Hose Kits - Automatic Balancing and Ball Valves with 'Y' strainer (field-installed)

*WaterFurnace P/N - WFI-AYH100XF-XXX-24MO*

*(1 in. hose kit for 040)*

*WFI-AYH125XF-XXX-24MO*

*(1 ¼ in. hose kit for 050-066)*

A flexible steel braid hose featuring Kevlar<sup>®</sup> reinforced EPDM core with ANSI 302/304 stainless steel outer braid and fire rated materials per ASTM E 84-00 (NFPA 255, ANSI/UL 723 & UBC 8-1). Ball valve at one end; swivel connector with adapter at the other end (swivel to adapter connection via fiber or EPDM gasket). Swivel connection provides union between heat pump and piping system. The hoses feature brass fittings, stainless steel ferrules. A "y" strainer is provided on one end for fluid straining and integral "blowdown" valve. A full port ball valve shall be provided with integral P/T (pressure/temperature) port on supply hose and automatic balancing valve with integral P/T ports and full port ball valve on return hose.

#### Hose Kit Specifications:

- Temperature range of 35°F [2°C] to 180°F [82°C].
- Max. working pressure of 400 psi [2756 kPa] for ½ in. and ¾ in. hose kits; max. working pressure of 350 psi [2413 kPa] for 1 in. and 1 ¼ in. hose kits.
- Minimum burst pressure of four times working pressure.

#### Geothermal Storage Tanks

Available in 80 or 119 gallon capacities and are specifically designed with large plumbing connections, 2 in. (R-16) insulation, built-in temperature sensor, and *chilled water approved* make these tanks the perfect choice for geothermal hydronic systems. A pair of 1 in. connections on top of the storage tanks allow for easy installation and trouble-free operation in geothermal hot water assist

systems. Large 1-1/2 in. FPT re-circulating side connections (shipped with threaded plugs) are included for high-flow water-to-water units. The upper element provides easy use of auxillary/backup heat. Sandhog low Watt density 4500 Watt Incoloy Steel Heating Element is designed to last 2 to 3 times longer than standard copper heating elements. The lower access panel houses a factory installed thermistor for accurate tank set-point control which is ideal for use with our HydroStat or HydroZone controllers.

#### Symphony/Aurora Weblink (if available)

Symphony is a Wi-Fi enabled smart comfort system for your geothermal heat pump that is unsurpassed in its ease of use, feature set and capability. Symphony marries the sophisticated Aurora controls of your Geothermal System with a web enabled Aurora Weblink Router giving you access to your comfort geothermal heat pump from practically anywhere. Symphony is cloud-based and includes your whole geothermal system and isn't limited to just the thermostat as in other 'smart thermostat' systems. Symphony web-portal provides control over many aspects of your geothermal heat pump including:

- View your geothermal system's operation from anywhere. Great for vacation or second homes.
- Dashboard for quick review of operation, alerts and energy use (if installed).
- Smart Device capability
- Observe and track energy use for the last 13 months (if installed).
- Receive equipment alerts and service reminders (as well as your dealer) via email and texts
- Monitor earth loop and tank temperature of your geothermal heat pump directly (if installed).

**ASTON ADVANCED SINGLE HYDRONIC  
WITH OPTIHEAT  
3 TO 5 TONS**

Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_

**Revision Guide**

<b>Pages:</b>	<b>Description:</b>	<b>Date:</b>	<b>By:</b>
Misc.	Standardized IntelliStart	14 June 2023	JM
1, 11	3 Inch Larger Cabinet	29 Feb 2020	JM
Misc.	Added Compressor Monitoring kit, misc. updates	15 Feb 2019	JM
5-10	Updated Heating Performance Data	01 May 2015	MA
All	Literature Creation	05 Feb 2015	MA

The manufacturer works continually to improve its products. As a result, the design and specifications of each product at the time of order may be changed without notice. Purchaser's approval of this data set signifies that the equipment is acceptable under the provisions of the job specification. Statements and other information contained herein are not express warranties and do not form the basis of any bargain between the parties, but are merely the manufacturer's opinion or commendation of its products.