

# tetco<sup>®</sup>geothermal



## ESIII-X Series Split Units 2.5 - 5.5 Tons Specification Catalog

Model TST028 - 066





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## Product Introduction & Unit Features

The ESIII-X Split Series product line is highly efficient, reliable and quiet operating, year-round comfort solution for your home or business. It is perfect for new construction, or retrofit applications.

The ESIII-X Series provides exceptional operating efficiency throughout a wide range of entering water temperatures between 25°F to 110°F.

The ESIII-X Series is manufactured in the heart of America. Pride in workmanship has been deeply embedded in the culture of our company. Every department places a high value on integrity and complete customer satisfaction. "World Class Service - Hometown Values" is far more than a slogan, it's a way of life.

The ESIII-X Series comes standard with a rugged powder coated steel cabinet designed for long life and extraordinary beauty. The cabinet is bolted together, rather than using screws for unmatched integral strength. The cabinet is also insulated with 3/8" recycled blue-jean insulation (foil faced) for quiet operation and easy clean up. Another noise reduction feature is rubber mounted Scroll compressors, and rubber mounted blowers. The features work in concert to reduce vibration, which reduces noise.

All coaxial heat exchangers are insulated to reduce corrosion, but also avoids condensation problems at low temperatures. Specially coated air coils add durability and longer equipment life.

Utilizing Copeland's UltraTech® unloading scroll compressor technology, the ESIII-X Split Series delivers high efficiencies and comfort for any application.

### Unit Features at a Glance

- Non-Ozone Depleting R-410A Refrigerant
- Rugged Powder Coated Steel Construction
- Cabinet Bolted Together
- All Panels Removable for Easy Service
- ETL Certified to UL & CSA Standards
- AHRI Certified to ISO Standards
- Copper Coaxial Water Heat Exchanger
- Flow Switch Protected
- Fault Retry To Eliminate Nuisance Service Calls
- DSH Feature (Desuperheater / Hot Water Generator)
- High Efficiency Copeland UltraTech Scroll Compressors
- 5/5 Year Limited Residential Warranty

### Optional features

- Cupro-nickel heat exchanger
- Extended warranty

## MP Series Multi-Position Air Handlers & AC Series Uncased "A" Coils

### Features (DX air handlers):

- AHRI match for TETCO split systems
- Multi-position air pattern
  - Ships in upflow and horizontal left configuration
  - Field convertible to downflow and horizontal right configuration (downflow kit required for downflow operation)
- Variable speed G.E. ECM fan motor
- Factory-installed R-410A TXV
- Corrosion-proof plastic drain pan with primary and secondary drain connections
- Oversized copper tube/aluminum fine "A" coil for maximum efficiency
- Sweat refrigerant line set connections
- Narrow width (22" maximum) for small closet installations
- Slide-out blower assembly
- Standard 5-year parts and 5-year labor allowance\*
- Optional 10-year parts warranty and 10-year labor allowance\*
- Optional downflow kit
- Optional field-installed internal electric heat with circuit breakers
- Optional filter rack with standard size 1" filters



### Features (DX "A" coils):

- AHRI match for TETCO split systems
- Uncased design for maximum flexibility, especially on retrofit applications
- Factory-installed R-410A TXV
- Corrosion-proof plastic drain pan with primary and secondary drain connections
- Oversized copper tube/aluminum fine "A" coil for maximum efficiency
- Sweat refrigerant line set connections
- Standard 5-year parts and 5-year labor allowance\*
- Optional 10-year parts warranty and 10-year labor allowance\*

\*90 day DOA coverage, Dealer covers labor for year one.

## Unit Performance: AHRI Data

### Ground Loop Heat Pump

Model	Capacity	Heating		Cooling	
		Btu/hr	COP	Btu/hr	EER
TST028	Full Load	21,000	3.5	27,500	15.1
	Part Load	15,500	4.0	20,300	19.1
TST040	Full Load	29,800	3.4	37,400	17.1
	Part Load	19,800	4.3	24,900	22.8
TST054	Full Load	43,300	3.3	54,300	16.7
	Part Load	28,700	4.1	36,000	22.6
TST066	Full Load	49,500	3.3	62,100	16.5
	Part Load	34,600	4.1	43,400	22.4



**Note:**

Rated in accordance with ISO Standard 13256-1 which includes Pump Penalties.  
 Heating capacities based on 68.0°F DB, 59.0°F WB entering air temperature.  
 Cooling capacities based on 80.6°F DB, 66.2°F WB entering air temperature.  
 Entering water temperatures Full Load: 32°F heating / 77°F cooling.  
 Entering water temperatures Part Load: 41°F heating / 68°F cooling.

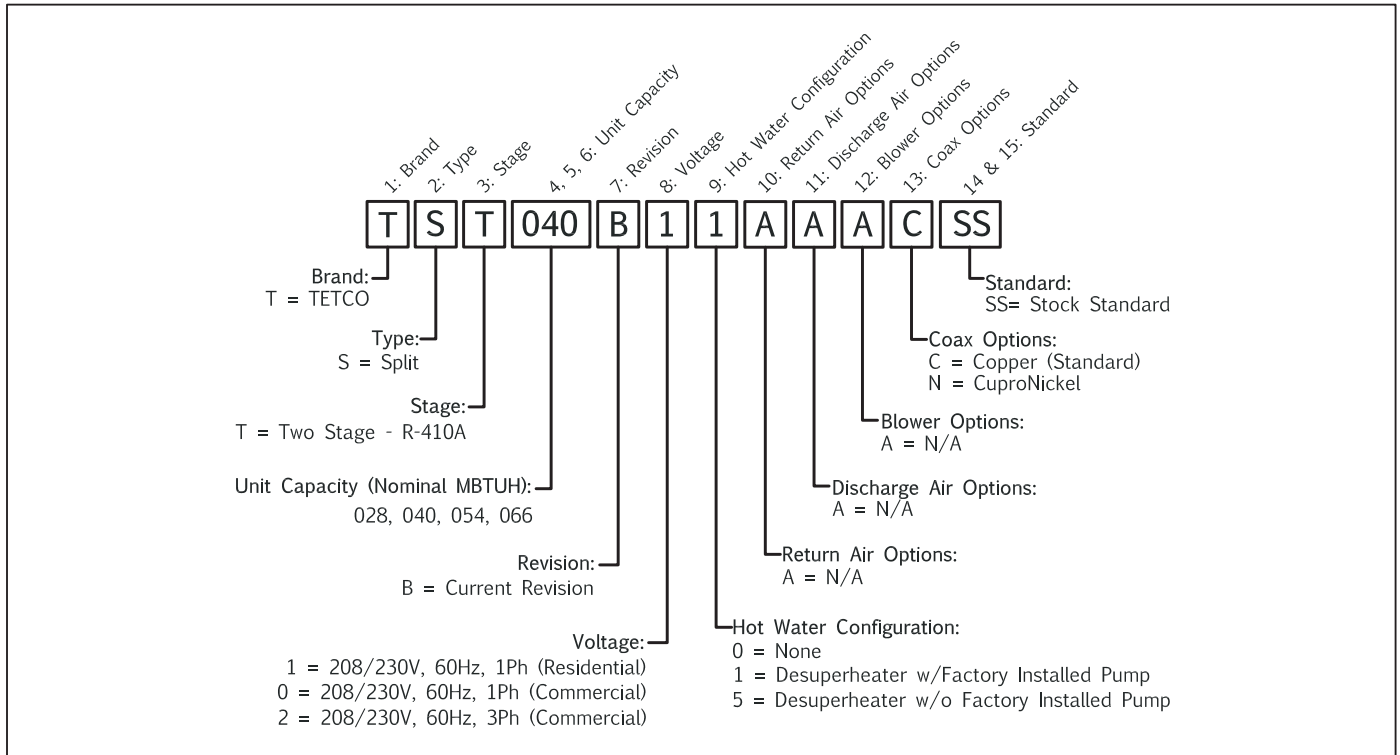
### Ground Water Heat Pump

Model	Capacity	Heating		Cooling	
		Btu/hr	COP	Btu/hr	EER
TST028	Full Load	24,100	4.0	28,800	17.4
	Part Load	18,000	4.5	21,000	21.9
TST040	Full Load	34,200	3.9	39,200	19.7
	Part Load	22,800	4.9	26,200	26.2
TST054	Full Load	49,700	3.8	57,000	19.2
	Part Load	33,000	4.7	37,700	26.0
TST066	Full Load	57,000	3.8	65,100	19.0
	Part Load	39,800	4.7	45,500	25.8

**Note:**

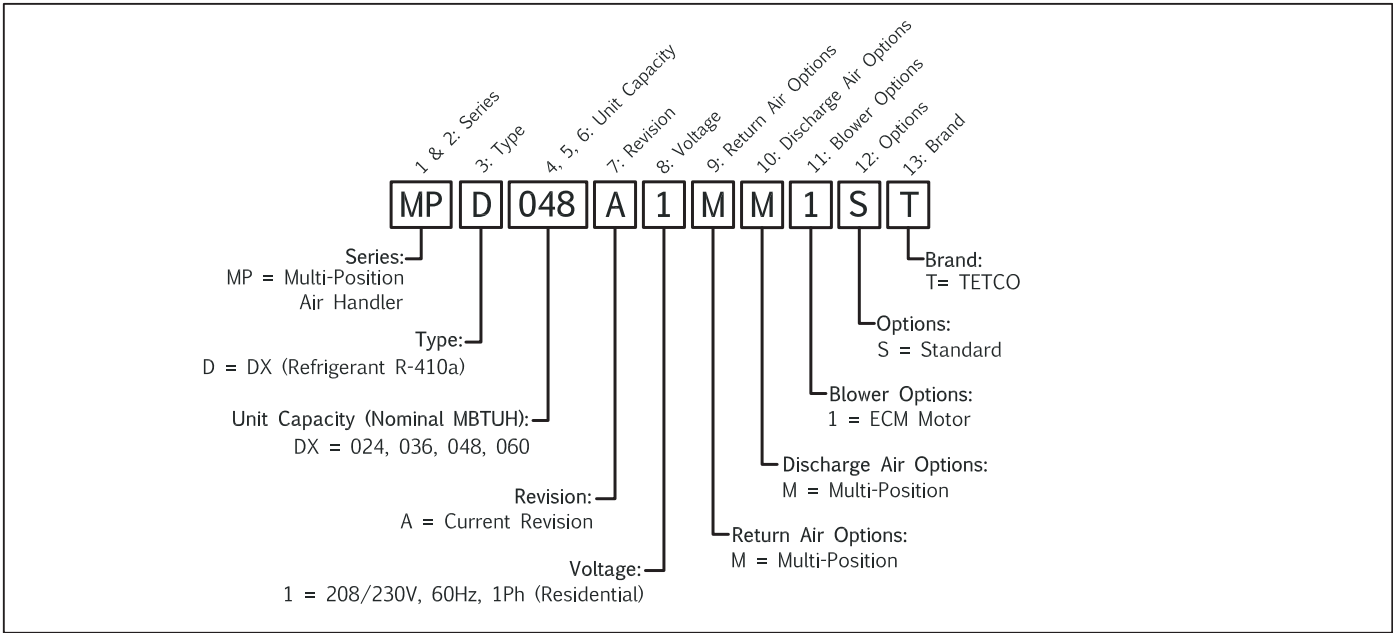
Rated in accordance with ISO Standard 13256-1 which includes Pump Penalties.  
 Heating capacities based on 68.0°F DB, 59.0°F WB entering air temperature.  
 Cooling capacities based on 80.6°F DB, 66.2°F WB entering air temperature.  
 Entering water temperatures: 50°F heating / 59°F cooling.

# Unit Nomenclature



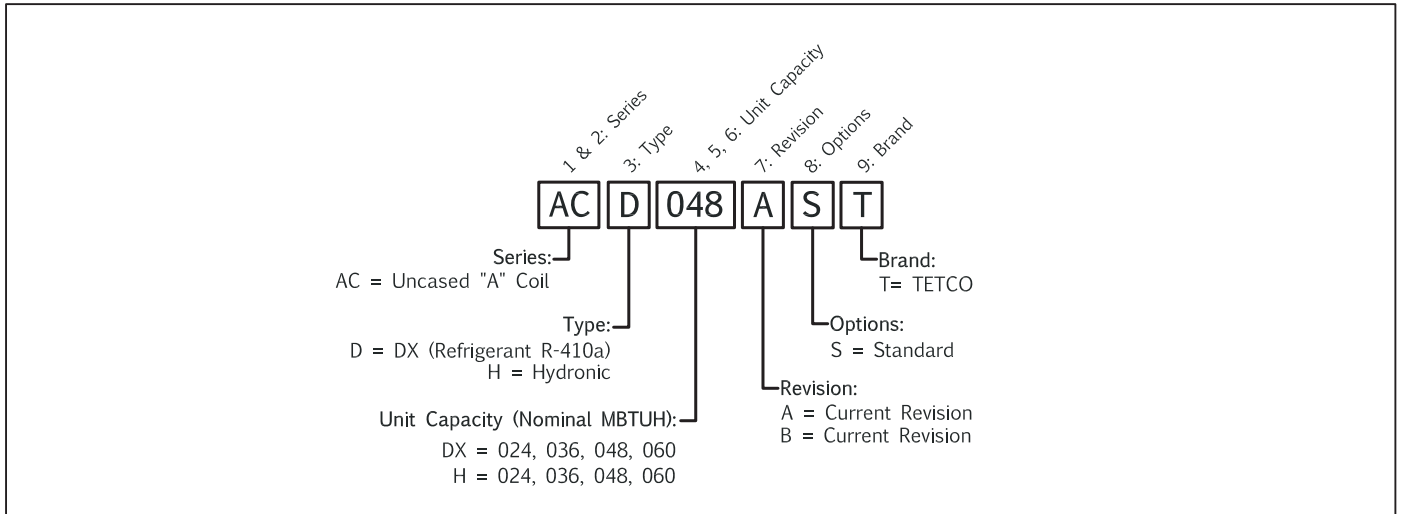
Rev.: 12 Oct 2010E

# Unit Nomenclature: MPD Series Air Handlers



Rev.: 12 Oct 2010E

# Unit Nomenclature: AC Series "A" Coils



Rev.: 19 April 2011E

## Glossary & AHRI Air Handler & "A" Coil Matches

### Glossary of Terms

CFM = Airflow, Cubic Feet/Minute	HR = Total Heat Of Rejection, Btu/hr
COP = Coefficient of Performance = BTU Output / BTU Input	KW = Total Power Unit Input, Kilowatts
DH = Desuperheater Capacity, Btu/hr	LAT = Leaving Air Temperature, Fahrenheit
EAT = Entering Air Temperature, Fahrenheit (Dry Bulb/Wet Bulb)	LC = Latent Cooling Capacity, Btu/hr
EER = Energy Efficiency Ratio = BTU output/Watts input	SC = Sensible Cooling Capacity, Btu/hr
EWT = Entering Source Water Temperature, Fahrenheit	LWT = Leaving Source Water Temperature, Fahrenheit
ELT = Entering Load Water Temperature, Fahrenheit	LLT = Leaving Load Water Temperature, Fahrenheit
GPM = Water Flow, Gallons Per Minute	TC = Total Cooling Capacity, Btu/hr
HC = Total Heating Capacity, Btu/hr	WPD = Water Pressure Drop, PSI & Feet of Water
HE = Total Heat Of Extraction, Btu/hr	

### AHRI Air Handler and "A" Coil Matches

Compressor Section	Air Handler Match	"A" Coil Match
TST028	MPD024	ACD024
TST040	MPD036	ACD036
TST054	MPD048	ACD048
TST066	MPD060	ACD060

# Calculations, & Water Flow Selection

## Heating & Cooling Calculations

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

## Water Flow Selection

Proper flow rate is crucial for reliable operation of geothermal heat pumps. The performance data shows three flow rates for each entering water temperature (EWT column). The general "rule of thumb" when selecting flow rates is the following:

Top flow rate: Open loop systems (1.5 to 2.0 gpm per ton)

Middle flow rate: Minimum closed loop system flow rate (2.25 to 2.50 gpm/ton)

Bottom flow rate: Nominal (optimum) closed loop system flow rate (3.0 gpm/ton)

Although the "rule of thumb" is adequate in most areas of North America, it is important to consider the application type before applying this "rule of thumb." Antifreeze is generally required for all closed loop (geothermal) applications. Extreme Southern U.S. locations are the only exception. Open loop (well water) systems cannot use antifreeze, and must have enough flow rate in order to avoid freezing conditions at the Leaving Source Water Temperature (LWT) connection.

Calculations must be made for all systems without antifreeze to determine if the top flow rate is adequate to prevent LWT at or near freezing conditions. The following steps should be taken in making this calculation:

Determine minimum EWT based upon your geographical area. Go to the performance data table for the heat pump model selected and look up the Heat of Extraction (HE) at the "rule of thumb" water flow rate (GPM) and at the design Entering Air Temperature (EAT).

Calculate the temperature difference (TD) based upon the HE and GPM of the model (step 4).

$$TD = HE / (GPM \times 500).$$

Calculate the LWT (step 6).

$$LWT = EWT - TD.$$

If the LWT is below 35-38°F, there is potential for freezing conditions if the flow rate or water temperature is less than ideal conditions, and the flow rate must be increased.

### Example 1:

$$EWT = 50^{\circ}F.$$

Model TST040, high capacity. Flow rate = 5 GPM. HE = 26,700 Btuh.

$$TD = 26,700 / (5 \times 500) = 10.7^{\circ}F$$

$$LWT = 50 - 10.7 = 39.3^{\circ}F$$

Water flow rate should be adequate under these conditions.

### Example 2:

$$EWT = 40^{\circ}F.$$

Model TST040, high capacity. Flow rate = 5 GPM. HE = 22,900 Btuh.

$$TD = 22,900 / (5 \times 500) = 9.2^{\circ}F$$

$$LWT = 40 - 10.7 = 30.8^{\circ}F$$

Water flow rate must be increased.

## TST028 Performance Data: 2.5 Ton, High Capacity Heating

EWT	GPM	WPD		Heating						Heating with Desuperheater					
		PSI	FT	EAT	HC	HE	LAT	KW	COP	HC	HE	LAT	KW	DH	COP
30	3.9	1.4	3.2	60	21.7	15.5	82.3	1.77	3.58	19.0	15.6	79.5	1.75	2.7	3.62
				70	21.0	14.6	91.6	1.87	3.3	18.3	14.7	88.8	1.83	2.8	3.36
				80	20.4	13.8	101.0	1.96	3.05	17.5	13.8	98.0	1.92	2.9	3.11
	5.4	2.6	6.0	60	22.3	16.2	83.0	1.79	3.65	19.5	16.2	80.1	1.75	2.8	3.73
				70	21.7	15.2	92.3	1.89	3.37	18.8	15.3	89.1	1.85	2.9	3.44
				80	21.1	14.3	101.7	1.98	3.12	18.1	14.4	98.7	1.94	3.0	3.19
	7.0	4.1	9.6	60	22.6	16.5	83.3	1.79	3.70	19.8	16.6	80.4	1.75	2.8	3.78
				70	22.0	15.6	92.6	1.89	3.42	19.1	13.4	89.6	1.85	2.9	3.49
				80	21.4	14.6	102.0	1.98	3.17	18.4	14.7	98.9	1.94	3.0	3.23
50	3.9	1.3	3.0	60	28.0	21.7	88.8	1.86	4.42	24.5	21.9	85.2	1.80	3.5	4.57
				70	27.2	20.4	98.0	1.96	4.07	23.6	20.6	94.3	1.90	3.6	4.20
				80	26.3	19.2	107.0	2.05	3.75	22.6	19.4	103.2	1.99	3.7	3.86
	5.4	2.4	5.5	60	29.2	22.7	90.0	1.89	4.52	25.6	23.0	86.3	1.83	3.6	4.67
				70	28.2	21.5	99.1	1.99	4.15	24.5	21.7	95.2	1.93	3.7	4.29
				80	27.3	20.1	108.1	2.10	3.82	23.5	20.4	104.2	2.03	3.8	3.95
	7.0	3.9	8.9	60	29.8	23.3	90.7	1.90	4.59	26.1	23.5	86.8	1.83	3.7	4.76
				70	28.8	22.0	99.7	2.00	4.22	25.0	22.3	95.7	1.94	3.8	4.36
				80	27.9	20.7	108.7	2.10	3.88	23.9	20.9	104.6	2.04	3.9	4.01
70	3.9	1.3	3.0	60	34.1	27.4	95.1	1.97	5.06	29.8	27.7	90.7	1.88	4.2	5.30
				70	32.9	25.8	103.8	2.08	4.64	28.5	26.2	99.4	1.99	4.3	4.85
				80	31.7	24.2	112.6	2.18	4.26	27.2	24.6	108	2.08	4.4	4.45
	5.4	2.3	5.3	60	35.8	28.8	96.8	2.03	5.16	31.3	29.3	92.2	1.94	4.5	5.41
				70	34.5	27.2	105.5	2.14	4.73	30.0	27.6	100.8	2.04	4.6	4.95
				80	33.3	25.6	114.2	2.25	4.33	28.6	26.0	109.4	2.15	4.7	4.54
	7.0	3.7	8.5	60	36.8	29.7	97.8	2.06	5.24	32.2	30.2	93.1	1.95	4.6	5.51
				70	35.4	28.1	106.5	2.16	4.80	30.7	28.5	101.6	2.06	4.7	5.04
				80	34.1	26.4	115.1	2.27	4.40	29.3	26.8	110.2	2.16	4.8	4.62
90	3.9	1.2	2.8	60	39.3	32.3	100.4	1.96	5.88	34.4	32.9	95.4	1.95	4.9	5.91
				70	37.9	30.4	108.9	2.22	5.01	32.8	31.0	103.8	2.05	5.0	5.40
				80	36.4	28.6	117.4	2.28	4.68	31.3	29.1	112.2	2.16	5.1	4.94
	5.4	2.1	4.9	60	41.5	34.2	102.7	2.15	5.66	36.4	34.9	97.4	2.02	5.2	6.02
				70	40.0	32.3	111.2	2.26	5.18	34.7	33.0	105.7	2.13	5.3	5.50
				80	38.5	30.4	119.6	2.38	4.74	33.1	31.0	114.0	2.24	5.4	5.03
	7.0	3.4	7.9	60	42.9	35.4	104.2	2.18	5.76	37.6	36.2	98.7	2.05	5.3	6.14
				70	41.3	33.4	112.5	2.30	5.27	35.8	34.2	106.9	2.16	5.5	5.60
				80	39.7	31.4	120.8	2.41	4.82	34.1	32.1	115.1	2.27	5.6	5.12

Notes:

1. Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
2. Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
3. The manufacturer reserves the right to make changes in design and construction at any time without notice.
4. Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
5. See Flow Rate Selection on page 9 for proper application.

## TST028 Performance Data: 2.5 Ton, Low Capacity Heating

EWT	GPM	WPD		Heating						Heating with Desuperheater					
		PSI	FT	EAT	HC	HE	LAT	KW	COP	HC	HE	LAT	KW	DH	COP
30	2.2	0.9	2.1	60	14.9	10.7	87.7	0.98	4.47	13.1	10.7	84.2	0.97	1.9	4.53
				70	14.5	10.1	96.9	1.03	4.12	12.6	10.2	93.3	1.01	1.9	4.20
				80	14.1	9.5	106.0	1.08	3.81	12.1	9.5	102.4	1.06	2.0	3.89
	3.1	1.7	3.9	60	15.4	10.5	88.5	0.99	4.56	13.5	11.2	85.0	0.97	1.9	4.66
				70	15.0	10.5	97.7	1.04	4.21	13.0	10.6	94.1	1.02	2.0	4.30
				80	14.6	9.9	107.0	1.09	3.9	12.5	9.9	103.2	1.07	2.0	3.99
	4.0	2.7	6.2	60	15.6	11.4	88.9	0.99	4.62	13.7	11.5	85.3	0.97	1.9	4.73
				70	15.2	10.8	98.1	1.04	4.28	13.2	9.3	94.4	1.02	2.0	4.36
				80	14.8	10.1	107.4	1.09	3.96	12.7	10.2	103.5	1.07	2.1	4.04
50	2.2	0.8	1.9	60	19.3	15.0	95.8	1.03	5.53	16.9	15.1	91.3	0.99	2.4	5.72
				70	18.8	14.1	104.7	1.08	5.09	16.3	14.2	100.1	1.05	2.5	5.25
				80	18.1	13.3	113.5	1.13	4.69	15.6	13.4	108.8	1.10	2.5	4.83
	3.1	1.6	3.6	60	20.1	15.7	97.3	1.05	5.65	17.6	15.9	92.7	1.01	2.5	5.84
				70	19.5	14.8	106.1	1.10	5.19	16.9	14.9	101.3	1.06	2.6	5.36
				80	18.9	13.9	114.9	1.16	4.78	16.2	14.1	110.0	1.12	2.6	4.94
	4.0	2.5	5.8	60	20.6	16.1	98.1	1.05	5.74	18.0	16.2	93.3	1.01	2.6	5.95
				70	19.9	15.2	106.8	1.11	5.28	17.3	15.4	102.0	1.07	2.6	5.45
				80	19.2	14.3	115.6	1.16	4.85	16.5	14.4	110.6	1.12	2.7	5.01
70	2.2	0.8	1.9	60	23.5	18.9	103.6	1.09	6.32	20.6	19.1	98.1	1.04	2.9	6.63
				70	22.7	17.8	112.0	1.15	5.80	19.7	18.0	106.5	1.10	3.0	6.07
				80	21.8	16.7	120.5	1.20	5.32	18.8	17.0	114.8	1.15	3.1	5.57
	3.1	1.5	3.5	60	24.7	19.9	105.7	1.12	6.45	21.6	20.2	100.0	1.07	3.1	6.77
				70	23.8	18.8	114.1	1.18	5.91	20.7	19.1	108.3	1.13	3.1	6.19
				80	22.9	17.6	122.5	1.24	5.41	19.7	17.9	116.5	1.18	3.2	5.68
	4.0	2.4	5.5	60	25.4	20.5	107.0	1.13	6.55	22.2	20.9	101.1	1.08	3.2	6.89
				70	24.4	19.4	115.3	1.19	6.00	21.2	19.7	109.3	1.14	3.2	6.30
				80	23.5	18.2	123.6	1.25	5.50	20.2	18.5	117.5	1.19	3.3	5.78
90	2.2	0.8	1.8	60	27.1	22.3	110.2	1.08	7.35	23.7	22.7	104.0	1.08	3.4	7.39
				70	26.1	21.0	118.4	1.22	6.26	22.7	21.4	112.0	1.13	3.5	6.75
				80	25.1	19.7	126.5	1.26	5.85	21.6	20.1	120.0	1.19	3.5	6.18
	3.1	1.4	3.2	60	28.7	23.6	113.1	1.19	7.07	25.1	24.1	106.5	1.12	3.6	7.53
				70	27.6	22.3	121.1	1.25	6.48	24.0	22.7	114.4	1.18	3.7	6.88
				80	26.5	20.9	129.1	1.31	5.92	22.8	21.4	122.2	1.24	3.7	6.29
	4.0	2.2	5.1	60	29.6	24.4	114.8	1.21	7.20	25.9	25.0	108.0	1.13	3.7	7.68
				70	28.5	23.1	122.8	1.27	6.59	24.7	23.6	115.8	1.19	3.8	7.00
				80	27.4	21.7	130.7	1.33	6.03	23.5	22.2	123.6	1.25	3.8	6.40

### Notes:

- Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
- Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
- The manufacturer reserves the right to make changes in design and construction at any time without notice.
- Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
- See Flow Rate Selection on page 9 for proper application.

## TST028 Performance Data: 2.5 Ton, High Capacity Cooling

EWT	GPM	WPD		EAT DB/ WB	Cooling					Cooling with Desuperheater					
		PSI	FT		TC	SC	HR	KW	EER	TC	SC	HR	KW	DH	EER
50	3.9	1.3	3.1	75/63	28.0	19.6	33.0	1.44	19.5	28.0	19.6	33.0	1.41	2.4	19.9
				80/67	30.4	20.4	35.1	1.47	20.7	30.4	20.4	35.1	1.44	2.4	21.2
				85/71	32.9	21.2	37.2	1.50	21.9	32.9	21.2	37.2	1.47	2.5	22.4
	5.4	2.4	5.5	75/63	28.3	19.8	33.1	1.37	20.6	28.3	19.8	33.1	1.35	2.2	20.9
				80/67	30.7	20.6	35.2	1.40	21.9	30.7	20.6	35.2	1.38	2.3	22.2
				85/71	33.2	21.4	37.3	1.43	23.2	33.2	21.4	37.3	1.41	2.4	23.5
	7.0	3.9	8.9	75/63	28.6	19.8	33.3	1.33	21.5	28.6	19.8	33.3	1.33	2.1	21.5
				80/67	31.1	20.6	35.4	1.36	22.8	31.1	20.8	35.4	1.35	2.2	22.9
				85/71	33.6	21.4	37.5	1.39	24.2	33.6	21.4	37.6	1.38	2.2	24.3
70	3.9	1.3	3.0	75/63	26.3	19.2	32.1	1.73	15.2	26.4	19.3	32.2	1.69	3.4	15.7
				80/67	28.5	20.0	34.1	1.77	16.1	28.7	20.1	34.2	1.72	3.5	16.7
				85/71	30.8	20.8	36.2	1.80	17.2	31.0	20.9	36.3	1.76	3.6	17.6
	5.4	2.3	5.3	75/63	26.7	19.4	32.2	1.64	16.2	26.8	19.5	32.3	1.62	3.3	16.6
				80/67	29.0	20.2	34.3	1.68	17.3	29.2	20.3	34.4	1.65	3.4	17.6
				85/71	31.3	21.0	36.4	1.71	18.3	31.5	21.1	36.5	1.68	3.5	18.7
	7.0	3.7	8.5	75/63	26.9	19.4	32.4	1.59	16.9	27.1	19.5	32.5	1.59	3.1	17.1
				80/67	29.3	20.2	34.5	1.63	18.0	29.5	20.3	34.6	1.62	3.2	18.2
				85/71	31.6	21.0	36.5	1.66	19.0	31.8	21.1	36.7	1.65	3.3	19.3
90	3.9	1.2	2.8	75/63	23.9	18.4	30.9	2.14	11.2	24.1	18.6	31.0	2.07	4.5	11.7
				80/67	26.0	19.2	32.9	2.18	11.9	26.2	19.3	33.0	2.12	4.6	12.4
				85/71	28.1	20.0	34.9	2.21	12.7	28.3	20.1	35.0	2.15	4.7	13.2
	5.4	2.1	4.9	75/63	24.4	18.6	31.1	2.01	12.1	24.6	18.7	31.2	1.97	4.3	12.5
				80/67	26.5	19.4	33.0	2.06	12.9	26.8	19.5	33.2	2.01	4.4	13.3
				85/71	28.6	20.2	35.0	2.09	13.7	28.9	20.3	35.2	2.05	4.5	14.1
	7.0	3.4	7.9	75/63	24.7	18.6	31.1	1.96	12.6	24.9	18.7	31.4	1.93	4.1	12.9
				80/67	26.8	19.4	33.1	2.00	13.4	27.1	19.5	33.4	1.97	4.3	13.7
				85/71	28.9	20.2	35.1	2.04	14.2	29.2	20.3	35.4	2.01	4.4	14.5
110	3.9	1.2	2.7	75/63	20.9	17.3	29.4	2.66	7.8	21.2	17.4	29.5	2.58	5.5	8.2
				80/67	22.6	18.0	31.3	2.70	8.4	23.0	18.1	31.4	2.63	5.7	8.8
				85/71	24.5	18.7	33.2	2.76	8.9	24.9	18.9	33.3	2.67	5.9	9.3
	5.4	2.1	4.9	75/63	21.4	17.4	29.5	2.49	8.6	21.7	17.6	29.7	2.45	5.4	8.9
				80/67	23.3	18.1	31.4	2.55	9.1	23.7	18.3	31.6	2.49	5.5	9.5
				85/71	25.1	18.9	33.3	2.62	9.6	25.5	19.0	33.5	2.54	5.6	10.1
	7.0	3.4	7.8	75/63	21.6	17.4	29.5	2.44	8.9	22.0	17.6	29.8	2.4	5.1	9.1
				80/67	23.5	18.1	31.4	2.47	9.5	23.9	18.3	31.7	2.46	5.3	9.7
				85/71	25.4	18.9	33.3	2.52	10.1	25.8	19.0	33.6	2.49	5.5	10.4

Notes:

1. Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
2. Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
3. The manufacturer reserves the right to make changes in design and construction at any time without notice.
4. Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
5. See Flow Rate Selection on page 9 for proper application.

## TST028 Performance Data: 2.5 Ton, Low Capacity Cooling

EWT	GPM	WPD		EAT DB/ WB	Cooling					Cooling with Desuperheater					
		PSI	FT		TC	SC	HR	KW	EER	TC	SC	HR	KW	DH	EER
50	2.2	0.9	2.0	75/63	19.3	13.5	22.8	0.74	26.0	19.3	13.5	22.8	0.73	1.6	26.5
				80/67	21.0	14.1	24.2	0.76	27.6	21.0	14.1	24.2	0.74	1.7	28.2
				85/71	22.7	14.6	25.7	0.78	29.2	22.7	14.7	25.7	0.76	1.7	29.8
	3.1	1.6	3.6	75/63	19.5	13.6	22.8	0.71	27.5	19.5	13.7	22.8	0.7	1.5	27.9
				80/67	21.2	14.2	24.3	0.73	29.2	21.2	14.2	24.3	0.72	1.6	29.6
				85/71	22.9	14.7	25.7	0.74	31.0	22.9	14.8	25.7	0.73	1.6	31.3
	4.0	2.5	5.8	75/63	19.7	13.6	23.0	0.69	28.6	19.7	13.7	23.0	0.69	1.5	28.7
				80/67	21.4	14.2	24.4	0.70	30.5	21.4	14.2	24.4	0.70	1.5	30.6
				85/71	23.2	14.7	25.9	0.72	32.2	23.2	14.8	25.9	0.71	1.5	32.5
70	2.2	0.8	1.9	75/63	18.1	13.3	22.2	0.89	20.3	18.2	13.3	22.2	0.87	2.3	20.9
				80/67	19.7	13.8	23.6	0.92	21.5	19.8	13.9	22.3	0.89	2.4	22.3
				85/71	21.3	14.3	25	0.93	22.9	21.4	14.4	25.0	0.91	2.5	23.5
	3.1	1.5	3.5	75/63	18.4	13.4	22.2	0.85	21.6	18.5	13.5	22.3	0.84	2.3	22.1
				80/67	20.0	13.9	23.7	0.87	23.0	20.1	14.0	23.8	0.86	2.3	23.5
				85/71	21.6	14.5	25.1	0.89	24.4	21.7	14.6	25.2	0.87	2.4	25.0
	4.0	2.4	5.5	75/63	18.6	13.4	22.4	0.83	22.5	18.7	13.5	22.4	0.82	2.1	22.8
				80/67	20.2	13.9	23.8	0.84	24.0	20.3	14.0	23.9	0.84	2.2	24.2
				85/71	21.8	14.5	25.2	0.86	25.4	21.9	14.6	25.3	0.85	2.3	25.7
90	2.2	0.8	1.8	75/63	16.5	12.7	21.3	1.11	14.9	16.7	12.8	21.4	1.07	3.1	15.5
				80/67	17.9	13.2	22.7	1.13	15.9	18.1	13.3	22.8	1.09	3.2	16.5
				85/71	19.4	13.8	24.1	1.15	16.9	19.6	13.9	24.2	1.12	3.3	17.5
	3.1	1.4	3.2	75/63	16.8	12.8	21.4	1.04	16.2	17.0	12.9	21.6	1.02	3.0	16.7
				80/67	18.3	13.4	22.8	1.07	17.2	18.5	13.5	22.9	1.04	3.1	17.8
				85/71	19.8	13.9	24.1	1.08	18.3	20.0	14.0	24.3	1.06	3.1	18.8
	4.0	2.2	5.2	75/63	17.0	12.8	21.5	0.01	16.8	17.2	12.9	21.6	1.00	2.9	17.2
				80/67	18.5	13.4	22.8	0.03	17.9	18.7	13.5	23.0	1.02	2.9	18.3
				85/71	20	13.9	24.2	0.06	18.9	20.2	14.0	24.4	1.04	3.0	19.4
110	2.2	0.8	1.7	75/63	14.4	11.9	20.3	1.38	10.4	14.6	12.0	10.4	1.34	3.8	10.9
				80/67	15.6	12.4	21.6	1.40	11.2	15.9	12.5	21.7	1.36	3.9	11.7
				85/71	16.9	12.9	22.9	1.43	11.8	17.2	13.0	23.0	1.38	4.0	12.4
	3.1	1.4	3.2	75/63	14.7	12.0	20.4	1.29	11.4	15.0	12.1	20.5	1.27	3.7	11.8
				80/67	16.1	12.5	21.6	1.32	12.2	16.3	12.6	21.8	1.29	3.8	12.7
				85/71	17.3	13.0	23.0	1.35	12.8	17.6	13.1	23.1	1.31	3.9	13.4
	4.0	2.2	5.1	75/63	14.9	12.0	20.4	1.26	11.8	15.2	12.1	20.6	1.24	3.5	12.2
				80/67	16.2	12.5	21.6	1.28	12.7	16.5	12.6	21.9	1.28	3.7	12.9
				85/71	17.5	13.0	23.0	1.30	13.4	17.8	13.1	23.2	1.29	3.8	13.8

### Notes:

- Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
- Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
- The manufacturer reserves the right to make changes in design and construction at any time without notice.
- Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
- See Flow Rate Selection on page 9 for proper application.

## TST040 Performance Data: 3.5 Ton, High Capacity Heating

EWT	GPM	WPD		Heating						Heating with Desuperheater					
		PSI	FT	EAT	HC	HE	LAT	KW	COP	HC	HE	LAT	KW	DH	COP
30	5.0	1.8	4.2	60	30.0	21.6	81.4	2.46	3.58	26.3	21.6	78.7	2.43	3.7	3.62
				70	29.2	20.3	90.8	2.59	3.30	25.3	20.4	88.0	2.55	3.9	3.36
				80	28.3	19.1	100.1	2.72	3.05	24.3	19.2	97.3	2.66	4.0	3.11
	7.0	3.4	7.8	60	31.0	22.5	82.1	2.49	3.65	27.1	22.5	79.3	2.43	3.9	3.73
				70	30.1	21.1	91.4	2.62	3.37	26.1	21.3	88.6	2.56	4.0	3.44
				80	29.3	19.9	100.9	2.75	3.12	25.2	20.0	97.9	2.69	4.1	3.19
	9.0	5.4	12.5	60	31.4	22.9	82.3	2.48	3.70	27.5	23.0	79.6	2.43	3.9	3.78
				70	30.5	21.6	91.8	2.62	3.42	26.5	18.6	88.9	2.56	4.0	3.49
				80	29.7	20.3	101.2	2.75	3.17	25.5	20.4	98.2	2.69	4.2	3.23
50	5.0	1.7	3.9	60	38.9	30.1	87.7	2.58	4.42	34.0	30.4	84.2	2.49	4.8	4.57
				70	37.7	28.4	96.9	2.72	4.07	32.7	28.6	93.3	2.63	5.0	4.20
				80	36.4	26.7	105.9	2.85	3.75	31.3	26.9	102.3	2.76	5.1	3.86
	7.0	3.1	7.2	60	40.5	31.5	88.9	2.63	4.52	35.5	31.9	85.3	2.54	5.0	4.67
				70	39.5	29.8	97.9	2.77	4.15	34.0	30.0	94.2	2.68	5.2	4.29
				80	37.9	27.9	107.0	2.91	3.82	32.6	28.3	103.2	2.81	5.3	3.95
	9.0	5.0	11.6	60	41.3	32.4	89.4	2.64	4.59	36.2	32.7	85.8	2.54	5.1	4.76
				70	40.0	30.5	98.5	2.78	4.22	34.7	30.9	94.7	2.69	5.3	4.36
				80	38.7	28.7	107.5	2.92	3.88	33.2	29.0	103.7	2.82	5.4	4.01
70	5.0	1.7	3.9	60	47.3	38.0	93.7	2.74	5.06	41.4	38.5	89.5	2.61	5.9	5.30
				70	45.6	35.8	102.5	2.88	4.64	39.6	36.3	98.2	2.76	6.0	4.85
				80	43.9	33.6	111.3	3.02	4.26	37.8	34.2	106.9	2.89	6.2	4.45
	7.0	3.0	6.9	60	49.7	40.0	95.4	2.82	5.16	43.5	40.7	91.0	2.69	6.2	5.41
				70	47.9	37.8	104.1	2.97	4.73	41.6	38.3	99.6	2.84	6.3	4.95
				80	46.1	35.5	112.9	3.12	4.33	39.7	36.0	108.3	2.98	6.5	4.54
	9.0	4.8	11.1	60	51.0	41.3	96.3	2.85	5.24	44.7	42.0	91.8	2.71	6.4	5.51
				70	49.2	38.9	105.0	3.00	4.80	42.7	39.6	100.4	2.86	6.5	5.04
				80	47.3	36.6	113.7	3.15	4.40	40.7	37.2	109.0	3.00	6.6	4.62
90	5.0	1.6	3.6	60	54.5	44.8	98.8	2.72	5.88	47.7	45.7	94.0	2.70	6.8	5.91
				70	52.5	42.2	107.4	3.07	5.01	45.6	43.0	102.5	2.85	6.9	5.40
				80	50.5	39.7	116.0	3.16	4.68	43.4	40.4	110.9	3.00	7.1	4.94
	7.0	2.8	6.4	60	57.6	47.5	101.1	2.98	5.66	50.5	48.4	95.9	2.80	7.2	6.02
				70	55.5	44.8	109.6	3.14	5.18	48.2	45.7	104.3	2.96	7.3	5.50
				80	53.4	42.1	118.0	3.30	4.74	45.9	43.0	112.7	3.11	7.5	5.03
	9.0	4.4	10.3	60	59.6	49.2	102.4	3.03	5.76	52.2	50.2	97.1	2.84	7.4	6.14
				70	57.3	46.4	110.8	3.19	5.27	49.7	47.4	105.4	3.00	7.6	5.60
				80	55.0	43.6	119.2	3.35	4.82	47.3	44.6	113.7	3.15	7.7	5.12

Notes:

1. Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
2. Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
3. The manufacturer reserves the right to make changes in design and construction at any time without notice.
4. Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
5. See Flow Rate Selection on page 9 for proper application.

## TST040 Performance Data: 3.5 Ton, Low Capacity Heating

EWT	GPM	WPD		Heating						Heating with Desuperheater					
		PSI	FT	EAT	HC	HE	LAT	KW	COP	HC	HE	LAT	KW	DH	COP
30	2.8	1.2	2.7	60	20.1	14.4	80.6	1.31	4.47	17.6	14.4	78.1	1.30	2.5	4.53
				70	19.5	13.6	90.1	1.38	4.12	16.9	13.6	87.4	1.36	2.6	4.20
				80	18.9	12.8	99.4	1.45	3.81	16.2	12.8	96.7	1.42	2.7	3.89
	3.9	2.2	5.0	60	20.7	15.0	81.3	1.33	4.56	18.1	15.0	78.6	1.30	2.6	4.66
				70	20.1	14.1	90.7	1.40	4.21	17.4	14.2	87.9	1.37	2.7	4.30
				80	19.6	13.3	100.1	1.47	3.90	16.8	13.4	97.3	1.44	2.7	3.99
	5.0	3.5	8.1	60	20.9	15.3	81.5	1.33	4.62	18.3	15.4	78.9	1.30	2.6	4.73
				70	20.4	14.5	91.0	1.4	4.28	17.7	12.4	88.2	1.37	2.7	4.36
				80	19.8	13.6	100.4	1.47	3.96	17.1	13.6	97.5	1.44	2.8	4.04
50	2.8	1.1	2.5	60	26.0	20.1	86.7	1.38	5.53	22.7	20.3	83.4	1.33	3.2	5.72
				70	25.2	18.9	95.9	1.45	5.09	21.8	19.1	92.5	1.40	3.3	5.25
				80	24.3	17.8	105.0	1.52	4.69	20.9	18.0	101.5	1.48	3.4	4.83
	3.9	2.0	4.7	60	27.1	21.1	87.8	1.40	5.65	23.7	21.3	84.4	1.36	3.4	5.84
				70	26.2	19.9	96.9	1.48	5.19	22.7	20.1	93.4	1.43	3.5	5.36
				80	25.3	18.7	106.0	1.55	4.78	21.8	18.9	102.4	1.50	3.6	4.94
	5.0	3.3	7.6	60	27.6	21.6	88.4	1.41	5.74	24.2	21.8	84.9	1.36	3.4	5.95
				70	26.7	20.4	97.5	1.48	5.28	23.2	20.6	93.9	1.44	3.5	5.45
				80	25.8	19.2	106.0	1.56	4.85	22.2	19.4	102.8	1.51	3.6	5.01
70	2.8	1.1	2.5	60	31.6	25.4	92.5	1.46	6.32	27.6	25.7	88.4	1.40	3.9	6.63
				70	30.5	23.9	101.3	1.54	5.80	26.4	24.2	97.2	1.47	4.0	6.07
				80	29.3	22.5	110.2	1.61	5.32	25.2	22.8	105.9	1.55	4.1	5.57
	3.9	2.0	4.5	60	33.2	26.7	94.1	1.51	6.45	29.0	27.2	89.9	1.44	4.1	6.77
				70	32.0	25.2	102.9	1.59	5.91	27.8	25.6	98.6	1.51	4.2	6.19
				80	30.8	23.7	111.7	1.67	5.41	26.5	24.1	107.2	1.59	4.3	5.68
	5.0	3.1	7.2	60	34.1	27.6	95.0	1.52	6.55	29.8	28.0	90.7	1.45	4.2	6.89
				70	32.8	26.0	103.8	1.60	6.00	28.5	26.4	99.3	1.53	4.3	6.30
				80	31.6	24.4	112.5	1.68	5.50	27.2	24.9	107.9	1.60	4.4	5.78
90	2.8	1.0	2.3	60	36.4	29.9	97.5	1.45	7.35	31.9	30.5	92.8	1.44	4.5	7.39
				70	35.1	28.2	106.1	1.64	6.26	30.4	28.7	101.3	1.52	4.6	6.75
				80	33.7	26.5	114.7	1.69	5.85	29.0	27.0	109.8	1.60	4.7	6.18
	3.9	1.8	4.1	60	38.5	31.7	99.6	1.59	7.07	33.7	32.3	94.7	1.50	4.8	7.53
				70	37.1	29.9	108.1	1.68	6.48	32.2	30.5	103.1	1.58	4.9	6.88
				80	35.6	28.1	116.6	1.76	5.92	30.6	28.7	111.5	1.66	5.0	6.29
	5.0	2.9	6.7	60	39.8	32.8	100.9	1.62	7.20	34.8	33.5	95.8	1.52	5.0	7.68
				70	38.3	31.0	109.4	1.70	6.59	33.2	31.7	104.2	1.60	5.1	7.00
				80	36.7	29.1	117.8	1.79	6.03	31.6	29.8	112.5	1.68	5.2	6.40

## Notes:

1. Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
2. Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
3. The manufacturer reserves the right to make changes in design and construction at any time without notice.
4. Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
5. See Flow Rate Selection on page 9 for proper application.

## TST040 Performance Data: 3.5 Ton, High Capacity Cooling

EWT	GPM	WPD		EAT	Cooling					Cooling with Desuperheater					
		PSI	FT	DB/ WB	TC	SC	HR	KW	EER	TC	SC	HR	KW	DH	EER
50	5.0	1.7	4.0	75/63	38.9	27.2	45.8	1.99	19.5	38.9	27.2	45.8	1.96	3.3	19.9
				80/67	42.2	28.3	48.7	2.04	20.7	42.2	28.3	48.7	1.99	3.4	21.2
				85/71	45.6	29.4	51.6	2.08	21.9	45.6	29.5	51.6	2.04	3.4	22.4
	7.0	3.1	7.2	75/63	39.3	27.4	45.9	1.91	20.6	39.3	27.5	45.9	1.88	3.1	20.9
				80/67	42.6	28.5	48.8	1.95	21.9	42.6	28.6	48.9	1.92	3.2	22.2
				85/71	46.1	29.7	51.8	1.98	23.2	46.1	29.7	51.8	1.96	3.3	23.5
	9.0	5.0	11.6	75/63	39.7	27.4	46.2	1.85	21.5	39.7	27.5	46.2	1.84	3.0	21.5
				80/67	43.1	28.5	49.1	1.89	22.8	43.1	28.6	49.1	1.88	3.0	22.9
				85/71	46.6	29.7	52.0	1.93	24.2	46.6	29.7	52.1	1.91	3.1	24.3
70	5.0	1.7	3.9	75/63	36.5	26.7	44.6	2.40	15.2	36.7	26.7	44.6	2.34	4.7	15.7
				80/67	39.6	27.7	47.4	2.45	16.1	39.8	27.9	47.5	2.39	4.9	16.7
				85/71	42.8	28.9	50.3	2.49	17.2	43.0	29.0	50.3	2.44	5.0	17.6
	7.0	3.0	6.9	75/63	37.0	26.9	44.7	2.28	16.2	37.2	27.1	44.9	2.24	4.6	16.6
				80/67	40.2	28.1	47.6	2.33	17.3	40.5	28.2	47.8	2.30	4.7	17.6
				85/71	43.4	29.2	50.5	2.38	18.3	43.7	29.3	50.7	2.33	4.8	18.7
	9.0	4.8	11.1	75/63	37.3	26.9	45.0	2.21	16.9	37.6	27.1	45.1	2.20	4.3	17.1
				80/67	40.6	28.1	47.8	2.26	18.0	40.9	28.2	48.0	2.25	4.5	18.2
				85/71	43.8	29.2	50.7	2.30	19.0	44.1	29.3	50.9	2.28	4.6	19.3
90	5.0	1.6	3.6	75/63	33.2	25.6	42.9	2.96	11.2	33.5	25.8	43.0	2.87	6.2	11.7
				80/67	36.1	26.6	45.6	3.02	11.9	36.4	26.8	45.8	2.94	6.4	12.4
				85/71	38.9	27.7	48.4	3.07	12.7	39.3	27.9	48.6	2.99	6.5	13.2
	7.0	2.8	6.4	75/63	33.8	25.8	43.1	2.79	12.1	34.1	26.0	43.4	2.73	6.0	12.5
				80/67	36.8	26.9	45.8	2.86	12.9	37.1	27.1	46.1	2.78	6.1	13.3
				85/71	39.8	28.0	48.6	2.90	13.7	40.1	28.2	48.9	2.85	6.3	14.1
	9.0	4.5	10.3	75/63	34.2	25.8	43.2	2.72	12.6	34.6	26.0	43.5	2.68	5.7	12.9
				80/67	37.2	26.9	45.9	2.77	13.4	37.5	27.1	46.3	2.74	5.9	13.7
				85/71	40.2	28.0	48.7	2.83	14.2	40.5	28.2	49.1	2.79	6.1	14.5
110	5.0	1.5	3.5	75/63	28.9	24.0	40.8	3.69	7.8	29.4	24.2	40.9	3.58	7.7	8.2
				80/67	31.4	24.9	43.4	3.74	8.4	31.9	25.1	43.6	3.64	7.9	8.8
				85/71	34.0	25.9	46.0	3.84	8.9	34.6	26.2	46.2	3.70	8.1	9.3
	7.0	2.8	6.4	75/63	29.7	24.2	41.0	3.46	8.6	30.2	24.4	41.2	3.40	7.4	8.9
				80/67	32.3	25.2	43.5	3.53	9.1	32.8	25.4	43.8	3.45	7.7	9.5
				85/71	34.9	26.2	46.2	3.63	9.6	35.5	26.4	46.5	3.52	7.8	10.1
	9.0	4.4	10.1	75/63	30.0	24.2	41.0	3.38	8.9	30.5	24.4	41.3	3.33	7.1	9.1
				80/67	32.6	25.2	43.5	3.43	9.5	33.2	25.4	44.0	3.42	7.3	9.7
				85/71	35.2	26.2	46.2	3.49	10.1	35.8	26.4	46.6	3.46	7.6	10.4

Notes:

1. Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
2. Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
3. The manufacturer reserves the right to make changes in design and construction at any time without notice.
4. Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
5. See Flow Rate Selection on page 9 for proper application.

## TST040 Performance Data: 3.5 Ton, Low Capacity Cooling

EWT	GPM	WPD		EAT DB/ WB	Cooling					Cooling with Desuperheater					
		PSI	FT		TC	SC	HR	KW	EER	TC	SC	HR	KW	DH	EER
50	2.8	1.1	2.6	75/63	25.9	18.1	30.6	1.00	26	25.9	18.2	30.6	0.98	2.2	26.5
				80/67	28.2	18.9	32.5	1.02	27.6	28.2	18.9	32.5	1.00	2.2	28.2
				85/71	30.4	19.6	34.5	1.04	29.2	30.4	19.7	34.5	1.02	2.3	29.8
	3.9	2.0	4.7	75/63	26.2	18.3	30.7	0.95	27.5	26.2	18.3	30.7	0.94	2.1	27.9
				80/67	28.5	19.0	32.6	0.97	29.2	28.5	19.1	32.6	0.96	2.1	29.6
				85/71	30.8	19.8	34.6	0.99	31.0	30.8	19.8	34.6	0.98	2.2	31.3
	5.0	3.3	7.6	75/63	26.5	18.3	30.8	0.93	28.6	26.5	18.3	30.8	0.92	2.0	28.7
				80/67	28.8	19.0	32.8	0.94	30.5	28.8	19.1	32.8	0.94	2.0	30.6
				85/71	31.1	19.8	34.7	0.97	32.2	31.1	19.8	34.8	0.96	2.1	32.5
70	2.8	1.1	2.5	75/63	24.3	17.8	29.7	1.20	20.3	24.5	17.8	29.8	1.17	3.1	20.5
				80/67	26.4	18.5	31.6	1.23	21.5	26.6	18.6	31.7	1.19	3.3	22.3
				85/71	28.6	19.3	33.5	1.25	22.9	28.7	19.3	33.6	1.22	3.4	23.5
	3.9	2.0	4.5	75/63	24.7	18.0	29.9	1.14	21.6	24.9	18.1	30.0	1.12	3.0	22.1
				80/67	26.9	18.7	31.8	1.17	23.0	27.0	18.8	31.9	1.15	3.1	23.5
				85/71	29.0	19.5	33.7	1.19	24.4	29.2	19.6	33.8	1.17	3.2	25.0
	5.0	3.1	7.2	75/63	24.9	18.0	30.0	1.11	22.5	25.1	18.1	30.1	1.10	2.9	22.8
				80/67	27.1	18.7	31.9	1.13	24.0	27.3	18.8	32.1	1.13	3.0	24.2
				85/71	29.3	19.5	33.8	1.15	25.4	29.4	19.6	34.0	1.14	3.1	25.7
90	2.8	1.0	2.3	75/63	22.2	17.1	28.6	1.48	14.9	22.4	17.2	28.7	1.44	4.2	15.5
				80/67	24.1	17.8	30.4	1.51	15.9	24.3	17.9	30.6	1.47	4.3	16.5
				85/71	26.0	18.5	32.3	1.54	16.9	26.3	18.6	32.4	1.50	4.4	17.5
	3.9	1.8	4.2	75/63	22.6	17.2	28.8	1.40	16.2	22.8	17.4	28.9	1.37	4.0	16.7
				80/67	24.6	18.0	30.6	1.43	17.2	24.8	18.1	30.8	1.39	4.1	17.8
				85/71	26.5	18.7	32.4	1.45	18.3	26.8	18.8	32.6	1.43	4.2	18.8
	5.0	2.9	6.7	75/63	22.8	17.2	28.8	1.36	16.8	23.1	17.4	29.1	1.34	3.8	17.2
				80/67	24.8	18.0	30.7	1.39	17.9	25.1	18.1	30.9	1.37	3.9	18.3
				85/71	26.8	18.7	32.5	1.42	18.9	27.1	18.8	32.8	1.40	4.1	19.4
110	2.8	1.0	2.3	75/63	19.3	16.0	27.2	1.85	10.4	19.6	16.1	27.3	1.79	5.1	10.9
				80/67	21.0	16.6	29.0	1.87	11.2	21.3	16.8	29.1	1.82	5.3	11.7
				85/71	22.7	17.3	30.7	1.92	11.8	23.1	17.5	30.8	1.86	5.4	12.4
	3.9	1.8	4.1	75/63	19.8	16.2	27.3	1.73	11.4	20.1	16.3	27.5	1.70	5.0	11.8
				80/67	21.6	16.8	29.1	1.77	12.2	21.9	16.9	29.3	1.73	5.1	12.7
				85/71	23.3	17.5	30.8	1.82	12.8	23.7	17.6	31.0	1.76	5.2	13.4
	5.0	2.8	6.6	75/63	20.0	16.2	27.3	1.69	11.8	20.3	16.3	27.6	1.67	4.7	12.2
				80/67	21.8	16.8	29.1	1.72	12.7	22.1	16.9	29.4	1.71	4.9	12.9
				85/71	23.5	17.5	30.8	1.75	13.4	23.9	17.6	31.1	1.73	5.1	13.8

### Notes:

- Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
- Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
- The manufacturer reserves the right to make changes in design and construction at any time without notice.
- Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
- See Flow Rate Selection on page 9 for proper application.

## TST054 Performance Data: 4.5 Ton, High Capacity Heating

EWT	GPM	WPD		Heating						Heating with Desuperheater					
		PSI	FT	EAT	HC	HE	LAT	KW	COP	HC	HE	LAT	KW	DH	COP
30	6.7	2.2	5.0	60	43.6	31.3	83.8	3.68	3.48	38.2	31.4	80.8	3.63	5.4	3.52
				70	42.4	29.5	93.1	3.87	3.21	36.8	29.7	90.0	3.80	5.6	3.27
				80	41.1	27.8	102.4	4.06	2.97	35.3	27.8	99.2	3.98	5.8	3.03
	9.3	4.0	9.3	60	45.0	32.7	84.5	3.71	3.55	39.4	32.7	81.4	3.63	5.6	3.63
				70	43.7	30.7	93.8	3.91	3.28	38.0	30.9	90.7	3.83	5.8	3.35
				80	42.5	28.9	103.2	4.11	3.03	36.6	29.1	99.9	4.02	6.0	3.10
	12.0	6.5	15.0	60	45.6	33.3	84.8	3.71	3.60	39.9	33.5	81.7	3.63	5.7	3.68
				70	44.4	31.4	94.2	3.91	3.33	38.5	27.0	91.0	3.83	5.7	3.39
				80	43.2	29.5	103.5	4.10	3.08	37.1	29.7	100.2	4.03	6.1	3.14
50	6.7	2.0	4.7	60	56.5	43.8	90.8	3.85	4.30	49.4	44.1	86.9	3.72	7.0	4.45
				70	54.8	41.2	99.8	4.06	3.96	47.5	41.6	95.9	3.93	7.2	4.09
				80	52.9	38.8	108.8	4.25	3.65	45.5	39.1	104.8	4.13	7.4	3.75
	9.3	3.7	8.6	60	58.9	45.8	92.1	3.93	4.39	51.5	46.3	88.1	3.80	7.3	4.54
				70	56.9	43.3	101.0	4.13	4.03	49.4	43.6	96.9	4.00	7.5	4.17
				80	55.1	40.6	110.0	4.35	3.71	47.4	41.1	105.8	4.20	7.7	3.84
	12.0	6.0	14.0	60	60.1	47.0	92.7	3.94	4.46	52.6	47.4	88.6	3.80	7.5	4.63
				70	58.1	44.4	101.7	4.15	4.10	50.4	44.9	97.5	4.02	7.7	4.24
				80	56.2	41.7	110.6	4.36	3.77	48.3	42.2	106.3	4.22	7.9	3.90
70	6.7	2.0	4.7	60	68.7	55.2	97.4	4.09	4.92	60.2	55.9	92.8	3.91	8.6	5.16
				70	66.3	52.0	106.1	4.31	4.51	57.5	52.7	101.3	4.12	8.8	4.72
				80	63.8	48.9	114.8	4.52	4.14	54.9	49.7	109.9	4.32	9.0	4.33
	9.3	3.6	8.3	60	72.1	58.1	99.3	4.21	5.02	63.2	59.1	94.4	4.02	9.0	5.26
				70	69.6	54.8	107.9	4.43	4.60	60.4	55.7	102.9	4.24	9.2	4.81
				80	67.0	51.5	116.5	4.67	4.21	57.6	52.4	111.4	4.45	9.4	4.42
	12.0	5.8	13.3	60	74.1	60.0	100.4	4.26	5.09	64.9	60.9	95.3	4.05	9.2	5.36
				70	71.4	56.5	108.9	4.49	4.67	62.0	57.5	103.8	4.27	9.4	4.90
				80	68.7	53.1	117.4	4.71	4.28	59.1	54.1	112.2	4.48	9.7	4.49
90	6.7	1.9	4.3	60	79.2	65.1	103.1	4.06	5.72	69.4	66.3	97.8	4.04	9.9	5.75
				70	76.3	61.3	111.6	4.59	4.87	66.2	62.5	106.1	4.26	10.1	5.25
				80	73.4	57.6	120.0	4.73	4.55	63.1	58.7	114.3	4.47	10.3	4.80
	9.3	3.3	7.7	60	83.7	69.0	105.6	4.46	5.50	73.3	70.4	99.9	4.19	10.4	5.86
				70	80.7	65.1	113.9	4.70	5.04	70.0	66.5	108.1	4.42	10.7	5.35
				80	77.5	61.2	122.2	4.93	4.61	66.6	62.4	116.3	4.64	10.9	4.89
	12.0	5.3	12.3	60	86.5	71.4	107.1	4.53	5.60	75.8	72.9	101.3	4.25	10.8	5.97
				70	83.2	67.4	115.3	4.76	5.12	72.2	68.9	109.3	4.48	11.0	5.45
				80	79.9	63.4	123.5	5.00	4.69	68.7	64.7	117.4	4.70	11.2	4.98

Notes:

1. Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
2. Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
3. The manufacturer reserves the right to make changes in design and construction at any time without notice.
4. Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
5. See Flow Rate Selection on page 9 for proper application.

# TST054 Performance Data: 4.5 Ton, Low Capacity Heating

EWT	GPM	WPD		Heating						Heating with Desuperheater					
		PSI	FT	EAT	HC	HE	LAT	KW	COP	HC	HE	LAT	KW	DH	COP
30	3.9	1.4	3.2	60	29.0	20.8	84.4	1.98	4.28	25.4	20.8	81.3	1.96	3.6	4.33
				70	28.1	19.6	93.7	2.09	3.94	24.4	19.7	90.6	2.05	3.7	4.02
				80	27.3	18.4	102.9	2.19	3.64	23.4	18.5	99.7	2.15	3.8	3.72
	5.4	2.6	6.0	60	29.8	21.7	85.1	2.01	4.36	26.1	21.7	82.0	1.96	3.7	4.46
				70	29.0	20.4	94.4	2.11	4.03	25.2	20.5	91.2	2.07	3.8	4.11
				80	28.2	19.2	103.8	2.22	3.73	24.3	19.3	100.4	2.17	4.0	3.81
	7.0	4.1	9.6	60	30.2	22.1	85.4	2.00	4.42	26.5	22.2	82.3	1.96	3.8	4.52
				70	29.4	20.9	94.8	2.11	4.09	25.5	17.9	91.5	2.07	3.9	4.17
				80	28.6	19.6	104.1	2.22	3.79	24.6	19.7	100.7	2.17	4.0	3.86
50	3.9	1.3	3.0	60	37.5	29.0	91.5	2.08	5.28	37.5	29.3	87.6	2.01	4.7	5.46
				70	36.3	27.3	100.6	2.19	4.86	36.0	27.6	96.5	2.12	4.8	5.02
				80	35.1	25.7	109.6	2.30	4.48	34.5	25.9	105.4	2.23	4.9	4.61
	5.4	2.4	5.5	60	39.1	30.4	92.9	2.12	5.40	34.2	30.7	88.8	2.05	4.9	5.58
				70	37.8	28.7	101.8	2.23	4.96	32.8	29.0	97.6	2.16	5.0	5.13
				80	36.5	26.9	110.8	2.35	4.56	31.4	27.2	106.4	2.27	5.1	4.72
	7.0	3.9	8.9	60	39.8	31.2	93.5	2.13	5.48	34.9	31.5	89.4	2.05	5.0	5.69
				70	38.6	29.4	102.5	2.24	5.04	33.5	29.8	98.2	2.17	5.1	5.21
				80	37.3	27.7	111.4	2.36	4.63	32.0	28.0	107.0	2.28	5.2	4.79
70	3.9	1.3	3.0	60	45.6	36.6	98.4	2.21	6.04	39.9	37.1	93.6	2.11	5.7	6.33
				70	44.0	34.5	107.0	2.33	5.54	38.2	35.0	102.1	2.22	5.8	5.80
				80	42.3	32.4	115.6	2.44	5.09	36.4	32.9	110.6	2.33	5.9	5.32
	5.4	2.3	5.3	60	47.9	38.6	100.3	2.28	6.16	41.9	39.2	95.3	2.17	6.0	6.46
				70	46.2	36.4	108.9	2.39	5.65	40.1	36.9	103.7	2.29	6.1	5.92
				80	44.5	34.2	117.4	2.52	5.17	38.0	34.7	112.2	2.40	6.2	5.43
	7.0	3.7	8.5	60	49.2	39.8	101.4	2.30	6.26	43.0	40.4	96.2	2.19	6.1	6.58
				70	47.4	37.5	109.9	2.42	5.73	41.1	38.1	104.6	2.31	6.3	6.02
				80	45.6	35.3	118.4	2.54	5.26	39.2	35.9	113.0	2.42	6.4	5.52
90	3.9	1.2	2.8	60	52.6	43.2	104.2	2.19	7.02	46.0	44.0	98.7	2.18	6.5	7.06
				70	50.6	40.7	112.6	2.48	5.98	43.9	41.5	107.0	2.30	6.7	6.45
				80	48.7	38.2	121.0	2.55	5.59	41.8	39.0	115.2	2.42	6.8	5.90
	5.4	2.1	4.9	60	55.5	45.8	106.8	2.41	6.76	48.6	46.7	100.9	2.26	6.9	7.19
				70	53.5	43.2	115.1	2.54	6.19	46.4	44.1	109.1	2.39	7.1	6.57
				80	51.4	40.6	123.3	2.66	5.66	44.2	41.4	117.2	2.51	7.2	6.01
	7.0	3.4	7.9	60	57.4	47.4	108.3	2.45	6.88	50.3	48.4	102.3	2.29	7.1	7.34
				70	55.2	44.7	116.5	2.57	6.29	47.9	45.7	110.3	2.42	7.3	6.69
				80	53.0	42.0	124.6	2.70	5.76	45.6	42.9	118.4	2.54	7.4	6.12

Notes:

1. Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
2. Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
3. The manufacturer reserves the right to make changes in design and construction at any time without notice.
4. Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
5. See Flow Rate Selection on page 9 for proper application.

## TST054 Performance Data: 4.5 Ton, High Capacity Cooling

EWT	GPM	WPD		EAT	Cooling					Cooling with Desuperheater					
		PSI	FT	DB/ WB	TC	SC	HR	KW	EER	TC	SC	HR	KW	DH	EER
50	6.7	2.1	4.8	75/63	56.5	39.5	66.5	2.96	19.1	56.5	39.5	66.5	2.91	4.5	19.4
				80/67	61.3	41.1	70.8	3.03	20.2	61.3	41.2	70.7	2.96	4.6	20.7
				85/71	66.2	42.7	75.0	3.09	21.4	66.2	42.8	75.0	3.03	4.7	21.9
	9.3	3.7	8.6	75/63	57.0	39.8	66.7	2.83	20.2	57.0	39.9	66.7	2.79	4.5	20.4
				80/67	61.9	41.4	70.9	2.89	21.4	61.9	41.5	71.0	2.85	4.6	21.7
				85/71	66.9	43.1	75.2	2.95	22.7	66.9	43.1	75.2	2.91	4.8	23.0
	12.0	6.0	14.0	75/63	57.6	39.8	67.1	2.75	21.0	57.6	39.9	67.1	2.74	4.3	21.1
				80/67	62.6	41.4	71.4	2.80	22.3	62.6	41.5	71.4	2.79	4.4	22.4
				85/71	67.6	43.1	75.6	2.86	23.6	67.6	43.1	75.7	2.84	4.5	23.8
70	6.7	2.0	4.7	75/63	53.0	38.3	64.7	3.56	14.9	53.3	38.8	64.8	3.48	6.8	15.3
				80/67	57.5	40.3	68.8	3.65	15.8	57.8	40.5	68.9	3.54	7.1	16.3
				85/71	62.2	41.9	73.0	3.70	16.8	62.5	42.1	73.1	3.63	7.3	17.2
	9.3	3.6	8.3	75/63	53.8	39.1	65.0	3.39	15.9	54.1	39.3	65.2	3.33	6.6	16.2
				80/67	58.4	40.7	69.1	3.46	16.9	58.8	40.9	69.4	3.41	6.8	17.2
				85/71	63.1	42.4	73.3	3.53	17.9	63.5	42.6	73.6	3.46	7.0	18.3
	12.0	5.8	13.3	75/63	54.2	39.1	65.3	3.29	16.5	54.6	39.3	65.5	3.27	6.3	16.7
				80/67	59.0	40.7	69.5	3.35	17.6	59.4	40.9	69.7	3.34	6.5	17.8
				85/71	63.7	42.4	73.6	3.42	18.6	64.0	42.6	73.9	3.39	6.7	18.9
90	6.7	1.9	4.3	75/63	48.2	37.1	62.3	4.40	10.9	48.7	37.4	62.5	4.27	9.0	11.4
				80/67	52.4	38.6	66.2	4.49	11.7	52.9	39.0	66.5	4.36	9.3	12.1
				85/71	56.6	40.3	70.3	4.56	12.4	57.1	40.5	70.6	4.44	9.5	12.9
	9.3	3.3	7.7	75/63	49.1	37.5	62.6	4.14	11.9	49.6	37.8	63.0	4.06	8.7	12.2
				80/67	53.4	39.1	66.6	4.25	12.6	53.9	39.3	66.9	4.14	8.9	13.0
				85/71	57.7	40.6	70.5	4.31	13.4	58.3	40.9	71.0	4.23	9.2	13.8
	12.0	5.4	12.4	75/63	49.7	37.5	62.7	4.04	12.3	50.2	37.8	63.2	3.99	8.3	12.6
				80/67	54.0	39.1	66.7	4.11	13.1	54.5	39.3	67.3	4.07	8.6	13.4
				85/71	58.3	40.6	70.8	4.21	13.9	58.9	40.9	71.4	4.14	8.8	14.2
110	6.7	1.8	4.2	75/63	42.0	34.8	59.3	5.49	7.7	42.7	35.1	59.5	5.33	11.1	8.0
				80/67	45.6	36.2	63.1	5.56	8.2	46.4	36.5	63.3	5.41	11.5	8.6
				85/71	49.4	37.6	66.8	5.70	8.7	50.2	38.0	67.1	5.50	11.8	9.1
	9.3	3.3	7.7	75/63	43.1	35.2	59.5	5.13	8.4	43.8	35.5	59.8	5.06	10.8	8.7
				80/67	46.9	36.6	63.2	5.25	8.9	47.7	36.9	63.7	5.13	11.1	9.3
				85/71	50.6	38.1	67.1	5.39	9.4	51.5	38.4	67.5	5.23	11.4	9.8
	12.0	5.3	12.1	75/63	43.5	35.2	59.5	5.03	8.7	44.3	35.5	60.1	4.95	10.3	8.9
				80/67	47.4	36.6	63.2	5.09	9.3	48.2	36.9	63.9	5.08	10.7	9.5
				85/71	51.1	38.1	67.1	5.19	9.8	52.0	38.4	67.8	5.13	11.0	10.1

Notes:

1. Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
2. Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
3. The manufacturer reserves the right to make changes in design and construction at any time without notice.
4. Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
5. See Flow Rate Selection on page 9 for proper application.

## TST054 Performance Data: 4.5 Ton, Low Capacity Cooling

EWT	GPM	WPD		EAT DB/ WB	Cooling					Cooling with Desuperheater					
		PSI	FT		TC	SC	HR	KW	EER	TC	SC	HR	KW	DH	EER
50	3.9	1.3	3.1	75/63	37.5	26.2	44.1	1.45	25.8	37.5	26.2	44.1	1.43	3.2	26.3
				80/67	40.7	27.3	47.0	1.49	27.4	40.7	27.3	46.9	1.45	3.2	28.0
				85/71	43.9	28.3	49.7	1.52	29.0	43.9	28.4	49.8	1.48	3.3	29.6
	5.4	2.4	5.5	75/63	37.8	26.4	44.3	1.39	27.3	37.8	26.5	44.3	1.37	3.0	27.6
				80/67	41.1	27.5	47.0	1.42	29.0	41.1	27.5	47.1	1.40	3.1	29.4
				85/71	44.4	28.6	49.9	1.45	30.7	44.4	28.6	49.9	1.43	3.2	31.1
	7.0	3.9	8.9	75/63	38.2	26.4	44.5	1.35	28.4	38.2	26.5	44.5	1.34	2.8	28.5
				80/67	41.6	27.5	47.3	1.38	30.2	41.6	27.5	47.4	1.37	2.9	30.3
				85/71	44.9	28.6	50.1	1.40	31.9	44.9	28.6	50.2	1.39	3.0	32.2
70	3.9	1.3	3.0	75/63	35.1	25.7	42.9	1.75	20.1	35.3	25.8	43.0	1.71	4.5	20.7
				80/67	38.2	26.7	45.6	1.79	21.3	38.4	26.8	45.7	1.74	4.7	22.1
				85/71	41.2	27.8	48.4	1.82	22.7	41.5	27.9	48.5	1.78	4.8	23.3
	5.4	2.3	5.3	75/63	35.7	26.0	43.1	1.66	21.5	35.9	26.1	43.3	1.63	4.4	22.0
				80/67	38.8	27.0	45.9	1.70	22.8	39.0	27.2	46.0	1.67	4.5	23.3
				85/71	41.9	28.1	48.7	1.73	24.2	42.1	28.2	48.8	1.70	4.6	24.8
	7.0	3.7	8.5	75/63	36.0	26.0	43.3	1.61	22.3	36.2	26.1	43.5	1.60	4.2	22.6
				80/67	39.2	27.0	46.1	1.65	23.8	39.4	27.2	46.3	1.64	4.3	24.0
				85/71	42.2	28.1	48.8	1.68	25.2	42.5	28.2	49.1	1.66	4.5	25.5
90	3.9	1.2	2.8	75/63	32.0	24.6	41.3	2.16	14.8	32.3	24.8	41.5	2.09	6.0	15.4
				80/67	34.8	25.6	43.9	2.2	15.8	35.1	25.8	44.1	2.14	6.2	16.4
				85/71	37.5	26.7	46.6	2.24	16.8	37.9	26.8	46.8	2.18	6.3	17.4
	5.4	2.1	4.9	75/63	32.6	24.9	41.6	2.03	16.0	32.9	25.1	41.8	1.99	5.8	16.5
				80/67	35.5	26.0	44.2	2.08	17.0	35.8	26.1	44.4	2.03	5.9	17.6
				85/71	38.3	27.0	46.8	2.11	17.1	38.7	27.2	47.1	2.08	6.1	18.6
	7.0	3.4	7.9	75/63	33.0	24.9	41.6	1.98	16.6	33.3	25.1	41.9	1.96	5.5	17.0
				80/67	35.8	26.0	44.3	2.02	17.8	36.2	26.1	44.6	2.00	5.7	18.1
				85/71	38.7	27.0	47.0	2.06	18.7	39.1	27.2	47.4	2.03	5.8	19.2
110	3.9	1.2	2.7	75/63	27.9	23.1	39.3	2.69	10.4	28.4	23.3	39.5	2.61	7.4	10.9
				80/67	30.3	24.0	41.9	2.73	11.1	30.8	24.2	42.0	2.66	7.6	11.6
				85/71	32.7	24.9	44.3	2.80	11.7	33.3	25.2	44.5	2.70	7.8	12.3
	5.4	2.1	4.9	75/63	28.6	23.3	39.5	2.52	11.3	29.1	23.5	39.7	2.48	7.2	11.7
				80/67	31.3	24.3	41.9	2.58	12.1	31.7	24.4	42.2	2.52	7.4	12.6
				85/71	33.6	25.3	44.5	2.65	12.7	34.2	25.5	44.8	2.57	7.5	13.3
	7.0	3.4	7.8	75/63	28.9	23.3	39.5	2.47	11.7	29.4	23.5	39.8	2.43	6.8	12.1
				80/67	31.4	24.3	41.9	2.50	12.6	32.0	24.4	42.4	2.49	7.1	12.8
				85/71	33.9	25.3	44.5	2.55	13.3	34.5	25.5	45.0	2.52	7.3	13.7

### Notes:

- Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
- Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
- The manufacturer reserves the right to make changes in design and construction at any time without notice.
- Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
- See Flow Rate Selection on page 9 for proper application.

## TST066 Performance Data: 5.5 Ton, High Capacity Heating

EWT	GPM	WPD		Heating						Heating with Desuperheater					
		PSI	FT	EAT	HC	HE	LAT	KW	COP	HC	HE	LAT	KW	DH	COP
30	8.3	2.2	5.1	60	49.9	35.8	82.0	4.21	3.48	43.7	35.9	79.3	4.16	6.2	3.52
				70	48.5	33.7	91.4	4.43	3.21	42.1	33.9	88.6	4.35	6.4	3.27
				80	47.0	31.8	100.7	4.65	2.97	40.4	31.8	97.8	4.55	6.6	3.03
	11.7	4.1	9.6	60	51.5	37.4	82.7	4.25	3.55	45.1	37.5	79.9	4.16	6.4	3.63
				70	50.0	35.1	92.1	4.48	3.28	43.4	35.4	89.1	4.38	6.6	3.35
				80	48.7	33.0	101.5	4.70	3.03	41.8	33.2	98.4	4.60	6.8	3.10
	15.0	6.7	15.4	60	52.1	38.1	83.0	4.25	3.60	45.6	38.3	80.1	4.16	6.5	3.68
				70	50.8	36.0	92.4	4.47	3.33	44.0	30.9	89.4	4.38	6.7	3.39
				80	49.4	33.7	101.8	4.70	3.08	42.4	33.9	98.7	4.61	6.9	3.14
50	8.3	2.1	4.8	60	64.6	50.1	88.5	4.41	4.30	56.6	50.5	84.9	4.26	8.0	4.45
				70	62.7	47.1	97.6	4.64	3.96	54.4	47.6	94.0	4.50	8.3	4.09
				80	60.5	44.3	106.7	4.87	3.65	52.0	44.8	102.9	4.73	8.5	3.75
	11.7	3.8	8.9	60	67.3	52.4	89.7	4.49	4.39	59.0	53.0	86.0	4.35	8.4	4.54
				70	65.1	49.5	98.7	4.73	4.03	56.5	49.9	94.9	4.57	8.6	4.17
				80	63.0	46.4	107.8	4.97	3.71	54.2	47.0	103.9	4.81	8.8	3.84
	15.0	6.2	14.4	60	68.7	53.8	90.3	4.51	4.46	60.2	54.3	86.5	4.35	8.6	4.63
				70	66.5	50.8	99.3	4.75	4.10	57.7	51.3	95.4	4.60	8.8	4.24
				80	64.3	47.7	108.3	4.99	3.77	55.2	48.3	104.4	4.83	9.0	3.90
70	8.3	2.1	4.8	60	78.6	63.2	94.7	4.68	4.92	68.8	64.0	90.3	4.47	9.8	5.16
				70	75.8	59.5	103.4	4.93	4.51	65.8	60.3	99.0	4.71	10.0	4.72
				80	73.0	55.9	112.2	5.17	4.14	62.8	56.8	107.7	4.95	10.3	4.33
	11.7	3.7	8.5	60	82.6	66.5	96.4	4.82	5.02	72.3	67.6	91.9	4.60	10.3	5.26
				70	79.6	62.8	105.1	5.07	4.60	69.1	63.7	100.5	4.85	10.5	4.81
				80	76.7	58.9	113.8	5.34	4.21	65.9	59.9	109.1	5.09	10.8	4.42
	15.0	5.9	13.7	60	84.8	68.6	97.4	4.88	5.09	74.2	69.7	92.7	4.64	10.6	5.36
				70	81.7	64.7	106.0	5.13	4.67	70.9	65.8	101.3	4.89	10.8	4.90
				80	78.6	60.8	114.7	5.39	4.28	67.6	61.9	109.8	5.13	11.0	4.49
90	8.3	1.9	4.4	60	90.6	74.5	100.0	4.65	5.72	79.4	75.9	95.0	4.62	11.3	5.75
				70	87.3	70.1	108.5	5.26	4.87	75.8	71.5	103.4	4.87	11.5	5.25
				80	83.9	66.0	117.0	5.41	4.55	72.2	67.2	111.8	5.12	11.8	4.80
	11.7	3.4	7.9	60	95.8	78.9	102.2	5.10	5.50	83.9	80.5	97.0	4.80	11.9	5.86
				70	92.3	74.5	110.7	5.37	5.04	80.1	76.0	105.3	5.06	12.2	5.35
				80	88.7	70.0	119.1	5.64	4.61	76.2	71.4	113.6	5.31	12.5	4.89
	15.0	5.5	12.6	60	99.0	81.7	103.7	5.18	5.60	86.7	83.5	98.2	4.86	12.3	5.97
				70	95.2	77.1	112.0	5.45	5.12	82.7	78.8	106.4	5.12	12.6	5.45
				80	91.5	72.5	120.3	5.72	4.69	78.6	74.1	114.7	5.38	12.8	4.98

Notes:

1. Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
2. Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
3. The manufacturer reserves the right to make changes in design and construction at any time without notice.
4. Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
5. See Flow Rate Selection on page 9 for proper application.

## TST066 Performance Data: 5.5 Ton, Low Capacity Heating

EWT	GPM	WPD		Heating						Heating with Desuperheater					
		PSI	FT	EAT	HC	HE	LAT	KW	COP	HC	HE	LAT	KW	DH	COP
30	5.6	1.4	3.3	60	34.9	25.1	84.9	2.39	4.28	30.6	25.1	81.8	2.37	4.3	4.33
				70	33.9	23.6	94.2	2.52	3.94	29.4	23.7	91	2.48	4.5	4.02
				80	32.9	22.2	103.4	2.64	3.64	28.2	22.3	100.1	2.59	4.6	3.72
	7.8	2.7	6.2	60	36.0	26.1	85.6	2.42	4.36	31.5	26.2	82.4	2.37	4.5	4.46
				70	35.0	24.6	94.9	2.55	4.03	30.4	24.7	91.6	2.49	4.6	4.11
				80	34.0	23.1	104.2	2.68	3.73	29.3	23.2	100.8	2.62	4.8	3.81
	10.0	4.3	10	60	36.4	26.6	86.0	2.42	4.42	31.9	26.8	82.7	2.36	4.5	4.52
				70	35.5	25.2	95.3	2.55	4.09	30.8	21.6	91.9	2.49	4.7	4.17
				80	34.5	23.6	104.6	2.67	3.79	29.7	23.7	101.1	2.62	4.8	3.86
50	5.6	1.3	3.1	60	45.2	35.0	92.2	2.51	5.28	39.5	35.3	88.2	2.42	5.6	5.46
				70	43.8	33.0	101.2	2.64	4.86	38.0	33.2	97.1	2.56	5.8	5.02
				80	42.3	31.0	110.2	2.77	4.48	36.4	31.3	105.9	2.69	5.9	4.61
	7.8	2.5	5.8	60	47.1	36.7	93.5	2.56	5.40	41.2	37.1	89.4	2.47	5.9	5.58
				70	45.5	34.6	102.4	2.69	4.96	39.5	34.9	98.1	2.60	6.0	5.13
				80	44.1	32.5	111.4	2.83	4.56	37.9	32.9	107.0	2.74	6.2	4.72
	10.0	4.0	9.3	60	48.0	37.6	94.2	2.57	5.48	42.1	38.0	90.0	2.48	6.0	5.69
				70	46.5	35.5	103.1	2.70	5.04	40.4	35.9	98.7	2.62	6.1	5.21
				80	44.9	33.3	112.0	2.84	4.63	38.6	33.7	107.5	2.75	6.3	4.79
70	5.6	1.3	3.1	60	55.0	44.2	99.1	2.67	6.04	48.1	44.7	94.3	2.54	6.8	6.33
				70	53.0	41.6	107.8	2.80	5.54	46.0	42.2	102.8	2.68	7.0	5.80
				80	51.1	39.1	116.4	2.94	5.09	43.9	39.7	111.3	2.81	7.2	5.32
	7.8	2.4	5.5	60	57.7	46.5	101.1	2.74	6.16	50.5	47.3	96.0	2.62	7.2	6.46
				70	55.7	43.9	109.7	2.89	5.65	48.3	44.5	104.4	2.76	7.4	5.92
				80	53.6	41.2	118.2	3.04	5.17	46.1	41.9	112.8	2.90	7.5	5.43
	10.0	3.8	8.9	60	59.3	48.0	102.2	2.78	6.26	51.9	48.7	97.0	2.64	7.4	6.58
				70	57.1	45.2	110.7	2.92	5.73	49.6	46.0	105.3	2.78	7.6	6.02
				80	55.0	42.5	119.2	3.07	5.26	47.3	43.3	113.7	2.92	7.7	5.52
90	5.6	1.2	2.9	60	63.4	52.1	105.1	2.64	7.02	55.5	53.1	99.5	2.63	7.9	7.06
				70	61.0	49.0	113.5	2.99	5.98	53.0	50.0	107.7	2.77	8.1	6.45
				80	58.7	46.1	121.8	3.08	5.59	50.5	47.0	115.9	2.91	8.2	5.90
	7.8	2.2	5.1	60	67.0	55.2	107.7	2.90	6.76	58.6	56.3	101.8	2.73	8.3	7.19
				70	64.5	52.1	116.0	3.06	6.19	56.0	53.2	109.9	2.88	8.5	6.57
				80	62.0	48.9	124.2	3.21	5.66	53.3	49.9	118.0	3.02	8.7	6.01
	10.0	3.6	8.2	60	69.2	57.1	109.3	2.95	6.88	60.6	58.4	103.2	2.76	8.6	7.34
				70	66.6	53.9	117.4	3.10	6.29	57.8	55.1	111.2	2.92	8.8	6.69
				80	64.0	50.7	125.6	3.26	5.76	55.0	51.8	119.2	3.06	9.0	6.12

### Notes:

- Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
- Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
- The manufacturer reserves the right to make changes in design and construction at any time without notice.
- Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
- See Flow Rate Selection on page 9 for proper application.

## TST066 Performance Data: 5.5 Ton, High Capacity Cooling

EWT	GPM	WPD		EAT	Cooling					Cooling with Desuperheater					
		PSI	FT	DB/ WB	TC	SC	HR	KW	EER	TC	SC	HR	KW	DH	EER
50	8.3	2.1	5.0	75/63	64.6	45.2	76.1	3.43	18.8	64.6	45.2	76.1	3.36	5.4	19.2
				80/67	70.2	47.0	81.0	3.51	20.2	70.2	47.1	80.9	3.43	5.6	20.5
				85/71	75.8	48.9	85.8	3.58	21.2	75.8	49.0	85.8	3.50	5.7	21.6
	11.7	3.8	8.9	75/63	65.3	45.6	76.3	3.28	19.9	65.3	45.6	76.3	3.23	5.2	20.2
				80/67	70.9	47.4	81.1	3.34	21.2	70.9	47.5	81.3	3.30	5.3	21.5
				85/71	76.6	49.3	86.0	3.41	22.4	76.6	49.4	86.1	3.37	5.4	22.7
	15.0	6.2	14.4	75/63	65.9	45.6	76.7	3.18	20.7	65.9	45.6	76.7	3.17	4.9	20.8
				80/67	71.7	47.4	81.7	3.24	22.1	71.7	47.5	81.7	3.23	5.0	22.2
				85/71	77.4	49.3	86.4	3.31	23.4	77.4	49.4	86.6	3.29	5.2	23.5
70	8.3	2.1	4.8	75/63	60.6	44.4	74.1	4.12	14.7	61.0	44.4	74.2	4.02	7.8	15.1
				80/67	65.8	46.1	78.7	4.22	15.6	66.2	46.3	78.9	4.10	8.1	16.1
				85/71	71.1	48.0	83.5	4.29	16.6	71.5	48.2	83.7	4.20	8.4	17.0
	11.7	3.7	8.5	75/63	61.5	44.8	74.3	3.92	15.7	61.9	45.0	74.6	3.86	7.6	16.0
				80/67	66.9	46.6	79.1	4.01	16.7	67.3	46.8	79.4	3.95	7.8	17.0
				85/71	72.2	48.5	83.9	4.09	17.7	72.6	48.7	84.2	4.01	8.0	18.1
	15.0	5.9	13.7	75/63	62.1	44.8	74.7	3.80	16.3	62.4	45.0	75.0	3.78	7.2	16.5
				80/67	67.5	46.6	79.5	3.88	17.4	67.9	46.8	79.8	3.86	7.4	17.6
				85/71	72.9	48.5	84.2	3.96	18.4	73.3	48.7	84.6	3.93	7.7	18.7
90	8.3	1.9	4.4	75/63	55.1	42.5	71.3	5.10	10.8	55.7	42.8	71.5	4.94	10.3	11.3
				80/67	59.9	44.2	75.8	5.19	11.5	60.5	44.6	76.1	5.05	10.6	12.0
				85/71	64.7	46.1	80.5	5.28	12.3	65.4	46.3	80.7	5.14	10.9	12.7
	11.7	3.4	7.9	75/63	56.2	42.9	71.7	4.80	11.7	56.8	43.2	72.1	4.70	10.0	12.1
				80/67	61.1	44.8	76.2	4.91	12.4	61.7	45.0	76.6	4.79	10.2	12.9
				85/71	66.1	46.5	80.7	4.99	13.3	66.7	46.8	81.3	4.90	10.5	13.6
	15.0	5.5	12.7	75/63	56.9	42.9	71.8	4.67	12.2	57.4	43.2	72.3	4.62	9.6	12.4
				80/67	61.8	44.8	76.3	4.76	13.0	62.4	45.0	77.0	4.71	9.8	13.3
				85/71	66.7	46.5	81.0	4.87	13.7	67.4	46.8	81.7	4.79	10.1	14.1
110	8.3	1.9	4.3	75/63	48.1	39.8	67.8	6.35	7.6	48.9	40.2	68.1	6.16	12.7	7.9
				80/67	52.2	41.4	72.2	6.44	8.1	53.1	41.8	72.5	6.27	13.1	8.5
				85/71	56.5	43.0	76.5	6.59	8.6	57.4	43.5	76.7	6.37	13.5	9.0
	11.7	3.4	7.9	75/63	49.3	40.2	68.1	5.94	8.3	50.1	40.6	68.5	5.85	12.3	8.6
				80/67	53.7	41.8	72.3	6.08	8.8	54.6	42.2	72.9	5.94	12.7	9.2
				85/71	57.9	43.6	76.7	6.24	9.3	58.9	43.9	77.3	6.05	13.0	9.7
	15.0	5.4	12.5	75/63	49.8	40.2	68.1	5.82	8.6	50.7	40.6	68.7	5.73	11.8	8.8
				80/67	54.2	41.8	72.3	5.90	9.2	55.1	42.2	73.1	5.88	12.2	9.4
				85/71	58.5	43.6	76.7	6.01	9.7	59.5	43.9	77.5	5.94	12.6	10.0

Notes:

1. Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
2. Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
3. The manufacturer reserves the right to make changes in design and construction at any time without notice.
4. Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
5. See Flow Rate Selection on page 9 for proper application.

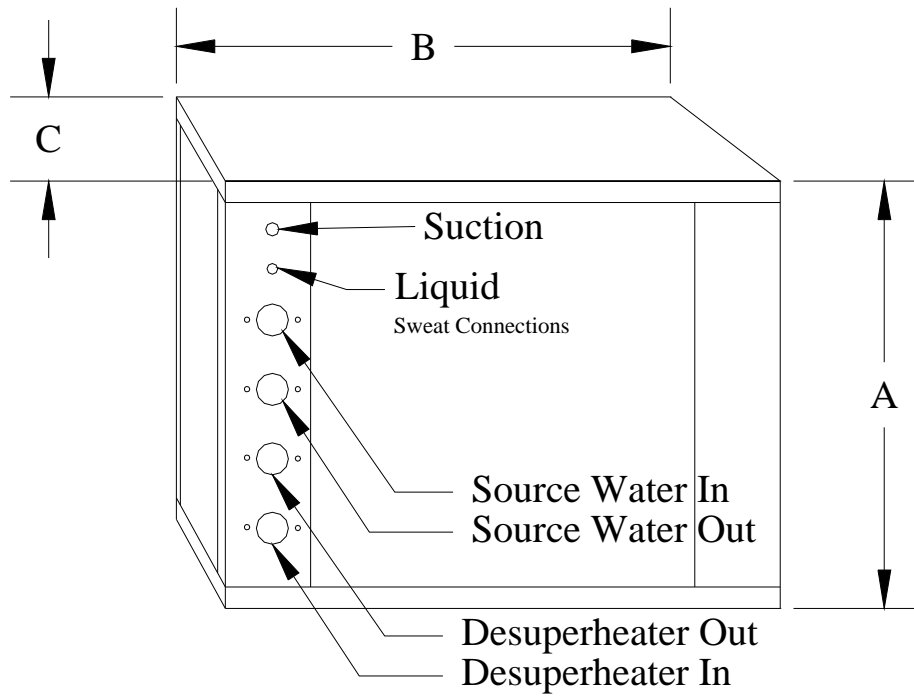
## TST066 Performance Data: 5.5 Ton, Low Capacity Cooling

EWT	GPM	WPD		EAT DB/ WB	Cooling					Cooling with Desuperheater					
		PSI	FT		TC	SC	HR	KW	EER	TC	SC	HR	KW	DH	EER
50	5.6	1.4	3.2	75/63	45.2	31.6	53.2	1.77	25.6	45.2	31.6	53.2	1.73	3.8	26.0
				80/67	49.1	32.9	56.6	1.81	27.1	49.1	32.9	56.5	1.77	3.9	27.8
				85/71	53.0	34.2	60.0	1.84	28.7	53.0	34.2	60.0	1.81	4.0	29.3
	7.8	2.5	5.8	75/63	45.6	31.8	53.4	1.69	27.0	45.6	31.9	53.4	1.67	3.6	27.4
				80/67	49.5	33.2	56.7	1.72	28.7	49.5	33.2	56.8	1.70	3.7	29.1
				85/71	53.5	34.5	60.2	1.76	30.4	53.5	34.5	60.2	1.74	3.8	30.8
	10.0	4.0	9.3	75/63	46.1	31.8	53.6	1.64	28.1	46.1	31.9	53.6	1.63	3.4	28.2
				80/67	50.1	33.2	57.1	1.67	30.0	50.1	33.2	57.1	1.67	3.5	30.1
				85/71	54.1	34.5	60.4	1.71	31.7	54.1	34.5	60.5	1.70	3.6	31.9
70	5.6	1.3	3.1	75/63	42.4	31.0	51.8	2.13	19.9	42.6	31.1	51.9	2.07	5.5	20.5
				80/67	46.0	32.2	55.0	2.17	21.2	46.3	32.4	55.1	2.11	5.7	21.9
				85/71	49.7	33.5	58.4	2.21	22.5	50.0	33.7	58.5	2.16	5.8	23.1
	7.8	2.4	5.5	75/63	43.0	31.3	52.0	2.02	21.3	43.3	31.4	52.2	1.99	5.3	21.8
				80/67	46.8	32.6	55.3	2.07	22.6	47.0	32.7	55.5	2.03	5.5	23.1
				85/71	50.5	33.9	58.7	2.11	24.0	50.8	34.1	58.9	2.07	5.6	24.6
	10.0	3.8	8.9	75/63	43.4	31.3	52.2	1.96	22.1	43.6	31.4	52.4	1.95	5.0	22.4
				80/67	47.2	32.6	55.6	2.00	23.6	47.5	32.7	55.8	1.99	5.2	23.8
				85/71	50.9	33.9	58.9	2.04	24.9	51.2	34.1	59.1	2.02	5.4	25.3
90	5.6	1.2	2.9	75/63	38.6	29.7	49.8	2.63	14.7	38.9	29.9	50.0	2.55	7.2	15.3
				80/67	41.9	30.9	53.0	2.68	15.7	42.3	31.2	53.2	2.60	7.4	16.3
				85/71	45.3	32.2	56.2	2.72	16.6	45.7	32.4	56.4	2.65	7.6	17.2
	7.8	2.2	5.2	75/63	39.3	30.0	50.1	2.47	15.9	39.7	30.2	50.4	2.42	7.0	16.4
				80/67	42.7	31.3	53.3	2.53	16.9	43.2	31.4	53.6	2.47	7.1	17.5
				85/71	46.2	32.5	56.4	2.57	18.0	46.6	32.7	56.8	2.53	7.3	18.5
	10.0	3.6	8.3	75/63	39.8	30.0	50.2	2.41	16.5	40.1	30.2	50.6	2.38	6.7	16.9
				80/67	43.2	31.3	53.4	2.45	17.6	43.6	31.4	53.8	2.43	6.9	18.0
				85/71	46.7	32.5	56.6	2.51	18.6	47.1	32.7	57.1	2.47	7.0	19.1
110	5.6	1.2	2.8	75/63	33.6	27.8	47.4	3.27	10.3	34.2	28.1	47.6	3.18	8.9	10.8
				80/67	36.5	29.0	50.5	3.32	11.0	37.1	29.2	50.7	3.23	9.2	11.5
				85/71	39.5	30.1	53.5	3.40	11.6	40.2	30.4	53.6	3.28	9.5	12.2
	7.8	2.2	5.1	75/63	34.5	28.1	47.6	3.06	11.2	35.0	28.4	47.9	3.02	8.6	11.6
				80/67	37.5	29.2	50.6	3.13	12.0	38.2	29.5	50.9	3.06	8.9	12.5
				85/71	40.5	30.5	53.6	3.22	12.6	41.2	30.7	54.0	3.12	9.1	13.2
	10.0	3.5	8.1	75/63	34.8	28.1	47.6	3.00	11.6	35.4	28.4	48.0	2.96	8.3	12.0
				80/67	37.9	29.2	50.6	3.04	12.5	38.5	29.5	51.1	3.03	8.5	12.7
				85/71	40.9	30.5	53.6	3.10	13.2	41.6	30.7	54.2	3.06	8.8	13.6

### Notes:

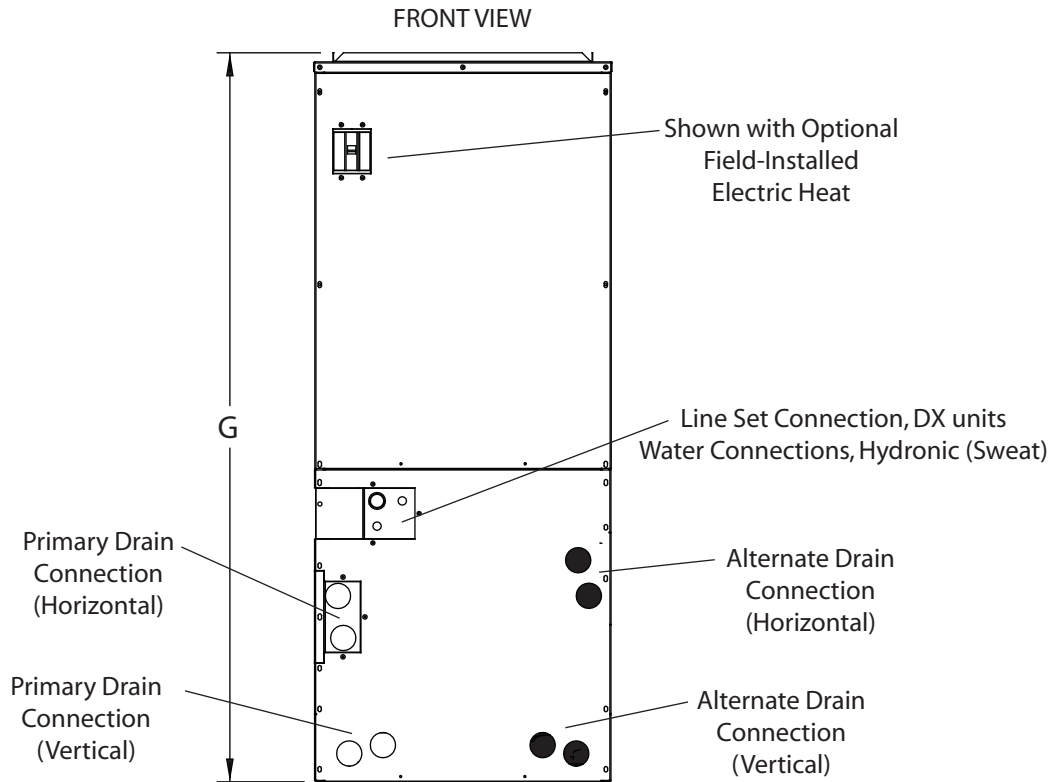
- Capacity data includes water pumping watts and are base upon 15% (by volume) propylene glycol antifreeze solution.
- Desuperheater Capacity is based upon 0.4 GPM Flow per nominal ton at 90°F entering hot water temperature.
- The manufacturer reserves the right to make changes in design and construction at any time without notice.
- Extrapolation data down to 25°F for heating and interpolation between CFM, EWT & GPM data is permissible.
- See Flow Rate Selection on page 9 for proper application.

## Dimensional Data: Split Cabinets

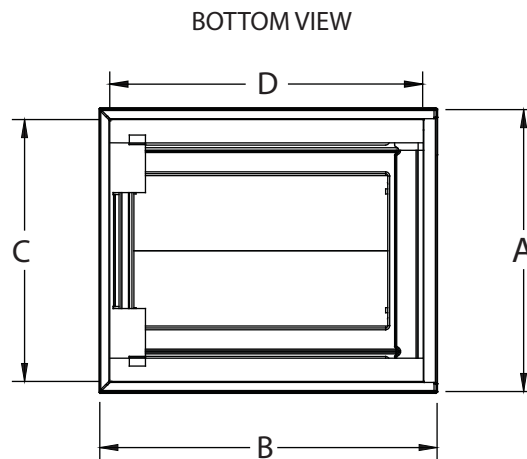
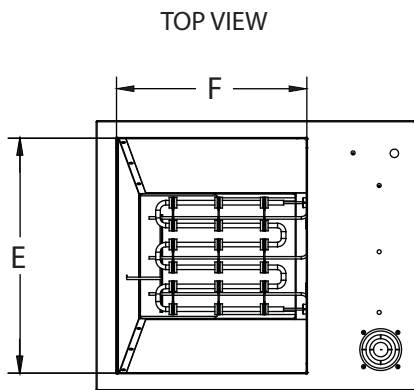


Model	Dimensional Data			Refrigeration Connection		Source Water Loop		Desuperheater		Unit Weight (Pounds)	Refrigerant Charge (oz)
	A	B	C	Liquid	Suction	IN	OUT	IN	OUT		
TST028	18.8	22.0	25.5	1/2"	5/8"	3/4"	3/4"	3/4"	3/4"	185	57
TST040	21.8	26.0	30.5	1/2"	3/4"	3/4"	3/4"	3/4"	3/4"	245	65
TST054	22.8	26.0	30.5	1/2"	3/4"	1.0"	1.0"	3/4"	3/4"	265	91
TST066	22.8	28.0	30.5	5/8"	7/8"	1.0"	1.0"	3/4"	3/4"	280	99

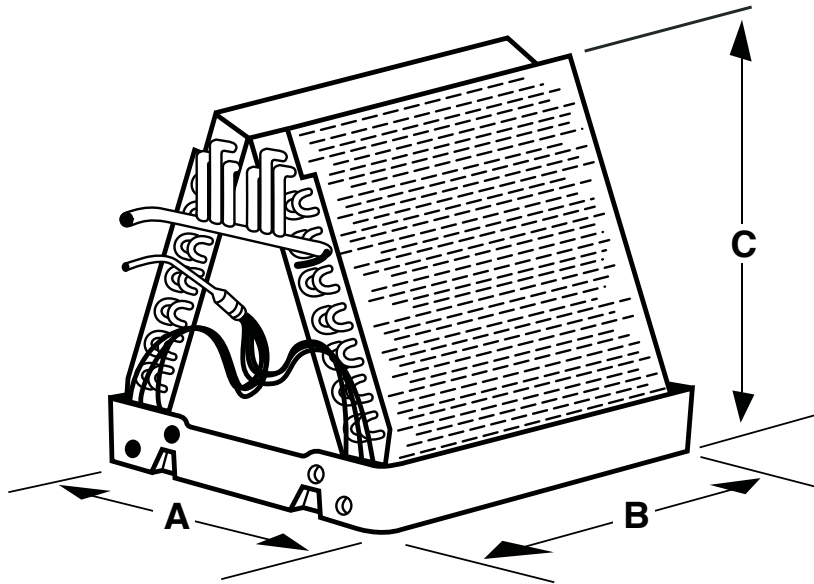
# Physical Data: Air Handlers



Model	Size (tons)	All Dimensions in Inches						
		A	B	C	D	E	F	G
024	2	17 5/8	21	16 1/3	20 1/4	15 1/2	12 1/2	43
036	3	21 1/8	21	19 3/4	20 1/4	19	12 1/2	48 1/4
042-060	3.5 - 5	25	22	23 3/8	20 1/2	22 1/4	14 1/4	58 3/4



## Physical Data: "A" Coils



### Current Product Dimensions

Model	Size (tons)	All Dimensions in Inches				
		A	B	C	Liquid	Suction
ACD024B	2	16 5/8	19	14 1/2	3/8	3/4
ACD036B	3	19 5/8	19	18 1/2	3/8	7/8
ACD048A	4	23 5/8	19	20 1/2	3/8	7/8
ACD060B	5	23 5/8	20 1/2	20 1/2	3/8	7/8

#### NOTES:

1. The AC series coils are designed as high efficiency "A" coils to be installed on new and existing indoor furnaces. These coils may be used in upflow and downflow applications.
2. Coils are ETL and CSA approved.
3. Primary and secondary drain connections are available on the LH or RH side of the drain pan, and are 3/4" FPT. Center line of drains located from pan corner, 1 1/2" for primary and 3 1/2" for secondary.
4. Drain pan is injection molded high temperature UL approved plastic (stainless steel for 5 ton DX coil).
5. All coils are equipped with factory-installed TXV, 15% bleed type.

## Electrical Data: Unit Electrical Data

Model	Voltage Code	60Hz Power		Compressor		HWG Pump FLA	Ext Loop Pump FLA*	Total Unit FLA	Min Circuit AMPS	Max Fuse HACR	Min AWG	Max Ft
		Volts	Phase	LRA	RLA							
028	1	208-230	1	70.0	14.1	0.5	4.0	18.6	22.1	35	12	53
040	1	208-230	1	96.0	16.7	0.5	4.0	21.2	25.4	40	10	78
054	1	208-230	1	118.0	25.6	0.5	5.5	31.6	38.0	60	8	81
066	1	208-230	1	150.0	27.2	0.5	5.5	33.2	40.0	60	8	77

### Notes:

1. All line and low voltage wiring must adhere to the National Electrical Code and Local Codes, whichever is the most stringent.
  2. Wire length based on a one way measurement with a 2% voltage drop.
  3. Wire size based on 60°C copper conductor and minimum circuit ampacity.
  3. All fuses class RK-5
  4. Min/Max Voltage: 208-230/60/1 = 197/243
- \* The external loop pump FLA is based on a maximum of three UP26-116F-230V pumps (1/2hp) for 048 - 060 and two pumps for 024 - 036

## Electrical Data: Air Handlers

Model	60 HZ Power		Field-Installed Elect Heat		Motor Amps / HP	Minimum Circuit Ampacity <sup>2</sup>	Maximum Fuse Size <sup>2</sup>	Minimum AWG	Maximum FT
	Volts	Phase	# Circuits	kW <sup>1</sup>					
024	208/230	1	None	0	2.8 / 0.33	3.5	10	14	500
			1	10		54.9	60	6	74
036	208/230	1	None	0	4.3 / 0.50	5.4	10	14	119
			1	10		56.4	60	4	114
			2	15		30.3 / 56.4	40 / 70	8 / 4	84 / 114
042-060	208/230	1	None	0	6.8 / 1.0	8.5	15	14	75
			1	10		58.9	70	4	109
			2	15		32.8 / 58.9	40 / 70	8 / 4	78 / 109
			2	20		58.9 / 58.9	70 / 70	4 / 4	109 / 109

Notes:

1. Nominal kW at 240V. Derate 25% for 208V.
2. Units with field-installed electric heat 15kW and larger have two circuits. Data shown as "XX/XX" refers to circuit 1 before the "/" and circuit 2 after the "/"
3. Always refer to unit nameplate data prior to installation
4. Wire size based on 60°C copper conductor and minimum circuit ampacity

## Controls

### MICROPROCESSOR FEATURES AND OPERATION

Enertech Manufacturing geothermal heat pump controls provide a unique modular approach for controlling heat pump operation. The control system uses one, two, or three printed circuit boards, depending upon the features of a particular unit. This approach simplifies installation and troubleshooting, and also eliminates features that are not applicable for some units. Split units include only the lockout board in the compressor section.

A microprocessor-based printed circuit board controls the inputs to the unit as well as outputs for status mode, faults, and diagnostics. A status LED and an LED for each fault is provided for diagnostics. Removable low voltage terminal strips provide all necessary terminals for field connections.

#### Startup/Random Start

The unit will not operate until all the inputs and safety controls are checked for normal conditions. At first power-up, the compressor is energized after a five minute delay. In addition, a zero to sixty second random start delay is added at first power-up to avoid multiple units from being energized at the same time.

#### Short Cycle Protection

A built-in five minute anti-short cycle timer provides short cycle protection of the compressor.

#### Component Sequencing Delays

Components are sequenced and delayed for optimum space conditioning performance and to make any startup noise less noticeable.

#### Test Mode

The microprocessor control allows the technician to shorten most timing delays for faster diagnostics by changing the position of a jumper located on the lockout board.

#### Water Solenoid Valve Connections

Two accessory relay outputs at the terminal strip provide a field connection for two types of water solenoid valves, a standard 24VAC

solenoid valve, or a 24VAC solenoid valve with an end switch. Additional field wiring is no longer required for operation of the end switch.

#### Loop Pump Circuit Breakers (Single Compressor Units)

The loop pump(s) and desuperheater pump are protected by control box mounted circuit breakers for easy wiring of pumps during installation. Circuit breakers eliminate the need to replace fuses.

#### Safety Controls

The control receives separate signals for high pressure, low pressure, low water flow, and condensate overflow faults. Upon a continuous 30-second measurement of the fault (immediate for high pressure), compressor operation is suspended (see Fault Retry below), and the appropriate LED flashes. Once the unit is locked out (see Fault Retry below), an output (terminal "L") is made available to a fault LED at the thermostat (water-to-water unit has fault LED on the corner post).

**Low Pressure:** If the low pressure switch is open for 30 continuous seconds, the compressor operation will be interrupted, and the control will go into fault retry mode. At startup, the low pressure switch is not monitored for 90 seconds to avoid nuisance faults.

**High Pressure:** If the high pressure switch opens, the compressor operation will be interrupted, and the control will go into fault retry mode. There is no delay from the time the switch opens and the board goes into fault retry mode. There is also no delay of switch monitoring at startup.

**Flow Switch:** If the flow switch is open for 30 continuous seconds, the compressor operation will be interrupted, and the control will go into fault retry mode. At startup, the flow switch is not monitored for 30 seconds to avoid nuisance faults.

## Controls

### **FAULT RETRY**

All faults are retried twice before finally locking the unit out. The fault retry feature is designed to prevent nuisance service calls. There is an anti-short cycle period between fault retries. On the third fault, the board will go into lockout mode.

### **Over/Under Voltage Shutdown**

The lockout board protects the compressor from operating when an over/under voltage condition exists. The control monitors secondary voltage (24VAC) to determine if an over/under voltage condition is occurring on the primary side of the transformer. For example, if the secondary voltage is 19 VAC, the primary voltage for a 240V unit would be approximately 190V, which is below the minimum voltage (197V) recommended by the compressor manufacturer. This feature is self-resetting. If the voltage comes back within range, normal operation is restored. Therefore, over/under voltage is not a lockout.

Under voltage (18 VAC) causes the compressor to disengage and restart when the voltage returns to 20 VAC. Over voltage (31 VAC) causes the compressor to disengage and restart when the voltage returns to 29 VAC. During an over or under voltage condition, all five fault LEDs will blink (HP + LP + FS + CO + Status). When voltage returns to normal operation, the four fault LED's will stop blinking, but the status LED will continue to flash. While the board LEDs are flashing, the thermostat fault light will be illuminated.

### **Intelligent Reset**

If the thermostat is powered off and back on (soft reset), the board will reset, but the last fault will be stored in memory for ease of troubleshooting. If power is interrupted to the board, the fault memory will be cleared.

### **Diagnostics**

The lockout board includes five LEDs (status, high pressure, low pressure, low water flow, condensate overflow) for fast and simple control board diagnosis. On the following page is a table showing LED function.

NOTE: Condensate overflow is not used for split systems. Any condensate overflow protection must be added to the air handler.

### **Hot Water Pump Control**

Controls for high water temperature and low compressor discharge line temperature prevent the hot water (desuperheater) pump from operating when the leaving water temperature is above 130°F, or when the compressor discharge line is too cool to provide adequate water heating.

### **Lockout Board Jumper Selection**

The lockout board includes three jumpers for field selection of various board features.

**Water Solenoid Valve Delay (WSD):** When the WSD jumper is installed, the "A" terminal is energized when the compressor is energized. When the jumper is removed, the "A" terminal is energized 10 seconds after the compressor. If using the Taco water solenoid valve (or a valve with an end switch), the unit terminal strip includes a means for connecting a valve of this type. The WSD jumper should be installed. If using a slow opening valve that does not have an end switch, the jumper should be removed.

**Test Mode (TEST):** When the TEST jumper is installed, the board operates in the normal mode. When the jumper is removed, the board operates in test mode, which speeds up all delays for easier troubleshooting. When service is complete, the jumper must be re-installed in order to make sure that the unit operates with normal sequencing delays.

**Over/Under Voltage Disable (O/V):** When the O/V jumper is installed, the over/under voltage feature is active. When the jumper is removed, the over/under voltage feature is disabled. On rare occasions, variations in voltage will be outside the range of the over/under voltage feature, which may require removal of the jumper. However, removal of the jumper could cause the unit to run under adverse conditions, and therefore should not be removed without

# Controls

## LED Identification

LED Color	Location <sup>1</sup>	Function	Normal Operation	Fault Retry <sup>2</sup>	Lockout <sup>2</sup>
Green	Top	High Pressure	OFF	Flashing <sup>3</sup>	ON <sup>3</sup>
Orange	2nd	Low Pressure	OFF	Flashing <sup>3</sup>	ON <sup>3</sup>
Red	3rd	Water Flow	OFF	Flashing <sup>3</sup>	ON <sup>3</sup>
Yellow	4th	Condensate* Overflow	OFF	Flashing <sup>3</sup>	ON <sup>3</sup>
Green	Bottom	Status	Flashing <sup>4</sup>	Flashing <sup>5</sup>	Flashing <sup>4</sup>

### Notes:

- Looking at the board when the LEDs are on the right hand side
  - If all five lights are flashing, the fault is over/under voltage
  - Only the light associated with the particular fault/lockout will be on or flashing.  
For example, if a high pressure lockout has occurred, the top green light will be on.  
The orange, red, and yellow lights will be off
  - Status lights will be off when in test mode
  - Flashes alternately with the fault LED
- \* Not applicable in split units

contacting technical services. An over/under voltage condition could cause premature component failure or damage to the unit controls. Any condition that would cause this fault must be thoroughly investigated before taking any action regarding the jumper removal. Likely causes of an over/under voltage condition include power company transformer selection, insufficient entrance wire sizing, defective breaker panel, incorrect transformer tap (unit control box), or other power-related issues.

### SEQUENCE OF OPERATION

Water-to-Air Units, Single Compressor, ECM Fan

#### **Heating, 1st Stage (Y1,G) Two-Stage Units**

The ECM fan is started immediately at 75% (of 1st stage operation) CFM level, first stage compressor and the loop/desuperheater pump(s) are energized 10 seconds after the "Y1" input is received, and the ECM fan adjusts to 100% (of 1st stage operation) CFM level 30 seconds after the "Y1" input.

#### **Heating, 2nd Stage (Y1,Y2,G) Two-Stage Units**

The ECM fan adjusts to 2nd stage CFM level, and the compressor full load solenoid valve is energized.

#### **Heat, 3rd Stage (Y1,Y2,W,G) Two-Stage Units**

The ECM fan remains at 100% of 2nd stage CFM level, and the electric backup heat is energized.

#### **Emergency Heat (W,G)**

The fan is started immediately at 100% of 2nd stage CFM level, and the electric backup heat is energized.

#### **Cooling Operation**

The reversing valve is energized for cooling operation. Terminal "O" from the thermostat is connected to the reversing valve solenoid.

#### **Cooling, 1st stage (Y1,O,G) Two-Stage Units**

The ECM fan is started immediately at 75% (of 1st stage operation) CFM level, first stage compressor and the loop/desuperheater pump(s) are energized 10 seconds after the "Y1" input is received, and the ECM fan adjusts to 100% (of 1st stage operation) CFM level 30 seconds after the "Y1" input.

#### **Cooling, 2nd Stage (Y1,Y2,O,G) Two-Stage Units**

The ECM fan adjusts to 2nd stage CFM level, and the compressor full load solenoid valve is energized.

# Controls

## Fan Only

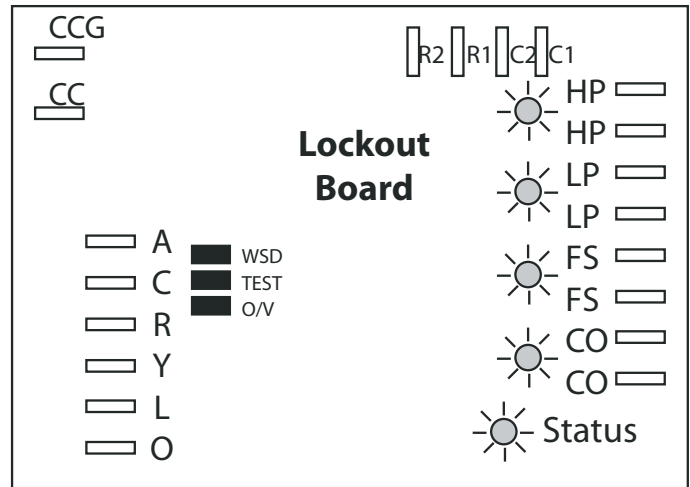
When the ECM control module receives a "G" call without a call for heating or cooling, the fan operates at 50% of the full load CFM level.

## Thermostat Wiring / Fan Speed Notes

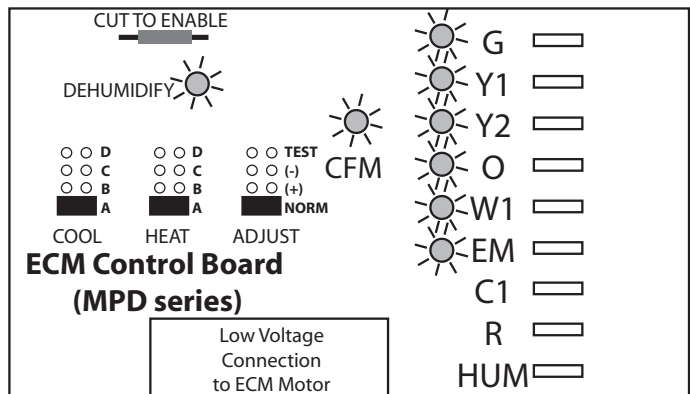
For two-stage compressor section units, wire as shown in the wiring diagram on the following page. For single stage units, jumper Y1 and Y2, and use the "CFM Y2" column in table 9b for determining jumper location. The ECM control board in the air handler is the thermostat connection point. Wire nut the thermostat wiring to the "pigtails" connected to the 1/4" spades on the ECM board.

For dehumidification in cooling, cut the resistor at the "DEHUMIDIFY" LED. Use either the HUM terminal (reverse logic -- designed to be used with a humidistat) to lower the fan speed when dehumidification is needed, or if the HUM terminal is not connected (and the resistor is cut), the air handler will operate at a lower fan speed in cooling and normal fan speed in heating.

## Lockout Board Layout



## ECM Board (Air Handler Section)



# Controls

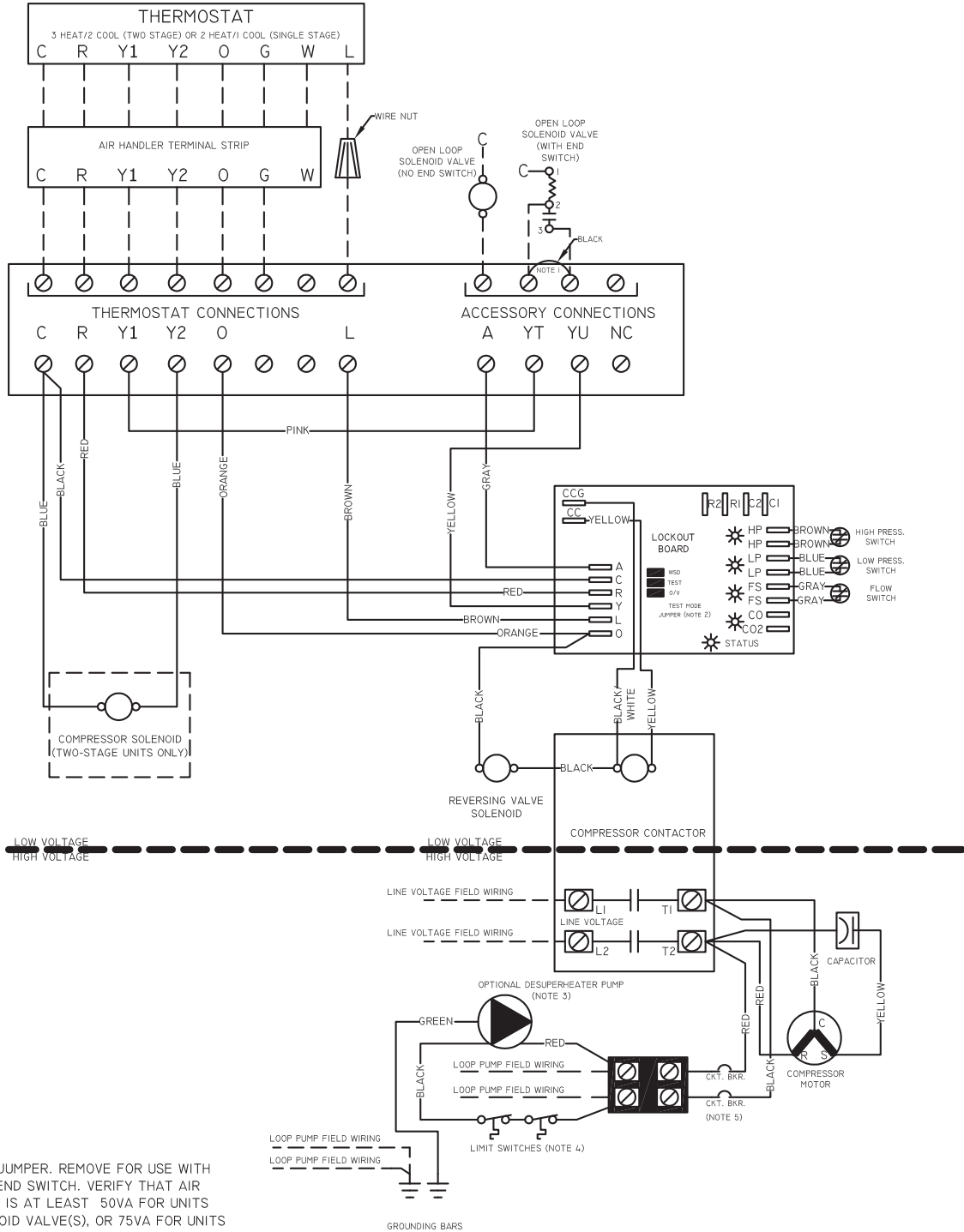
## MPD Air Handler Fan Speeds

Model	Jumpers - Notes 1,2			Full Load CFM (Y2)	Part Load CFM (Y1)	Fan Only (G)	Setting allowed with Dehumid jumper cut?
	HEAT	COOL	ADJUST	Note 3	Note 3	Note 3	
MPD024	A	A	+	1011	666	616	Yes
	B	B	+	997	614	431	Yes
	A	A	NORM	925	584	491	Yes
	C	C	+	893	569	381	Yes
	B	B	NORM	830	510	349	Yes
	D	D	+	809	492	345	Yes
	C	C	NORM	773	465	305	Yes
	D	D	NORM	699	391	259	<b>No</b>
MPD036	A	A	+	1545	983	776	Yes
	B	B	+	1526	975	719	Yes
	A	A	NORM	1425	901	674	Yes
	B	B	NORM	1325	832	623	Yes
	C	C	+	1177	726	540	Yes
	D	D	+	1082	655	470	Yes
	C	C	NORM	1037	624	442	<b>No</b>
	D	D	NORM	927	564	390	<b>No</b>
MPD048	A	A	+	1997	1366	1165	Yes
	B	B	+	1923	1283	1086	Yes
	C	C	+	1840	1240	1041	Yes
	A	A	NORM	1815	1232	994	Yes
	D	D	+	1732	1164	1000	Yes
	B	B	NORM	1684	1132	923	Yes
	C	C	NORM	1612	1091	891	Yes
	D	D	NORM	1506	1030	871	Yes
MPD060	B	B	+	2047	1437	1214	Yes
	C	C	+	2022	1354	1210	Yes
	A	A	+	2012	1437	1285	Yes
	A	A	NORM	2008	1388	1103	Yes
	D	D	+	1936	1312	1208	Yes
	B	B	NORM	1935	1308	1051	Yes
	C	C	NORM	1739	1193	1021	<b>No</b>
	D	D	NORM	1687	1138	955	<b>No</b>

### NOTES:

1. Gray shaded areas are recommended settings. Other settings may be used, depending upon application. DO NOT cut dehumidification jumper as CFM setting will cause airflow to be too low (see last column, above).
2. The COOL and HEAT jumpers should both be set at the same position. COOL controls heating and cooling airflow; HEAT controls electric heat airflow.
3. Above CFM will be maintained up to 0.50" ESP for models MPD024 and 036, and up to 0.75" ESP for models MPD048 and 60.

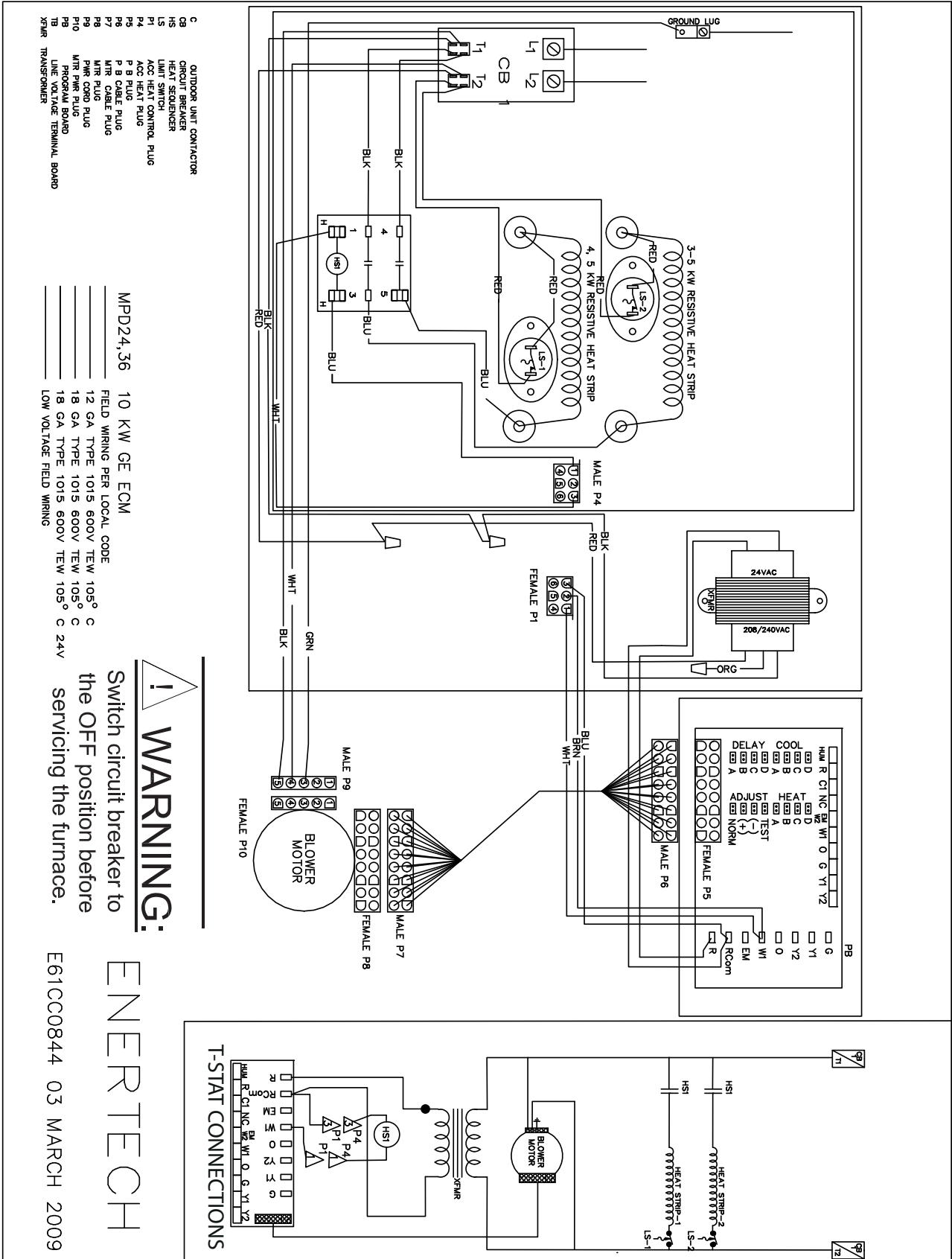
# Wiring Diagrams: Two-Stage Units



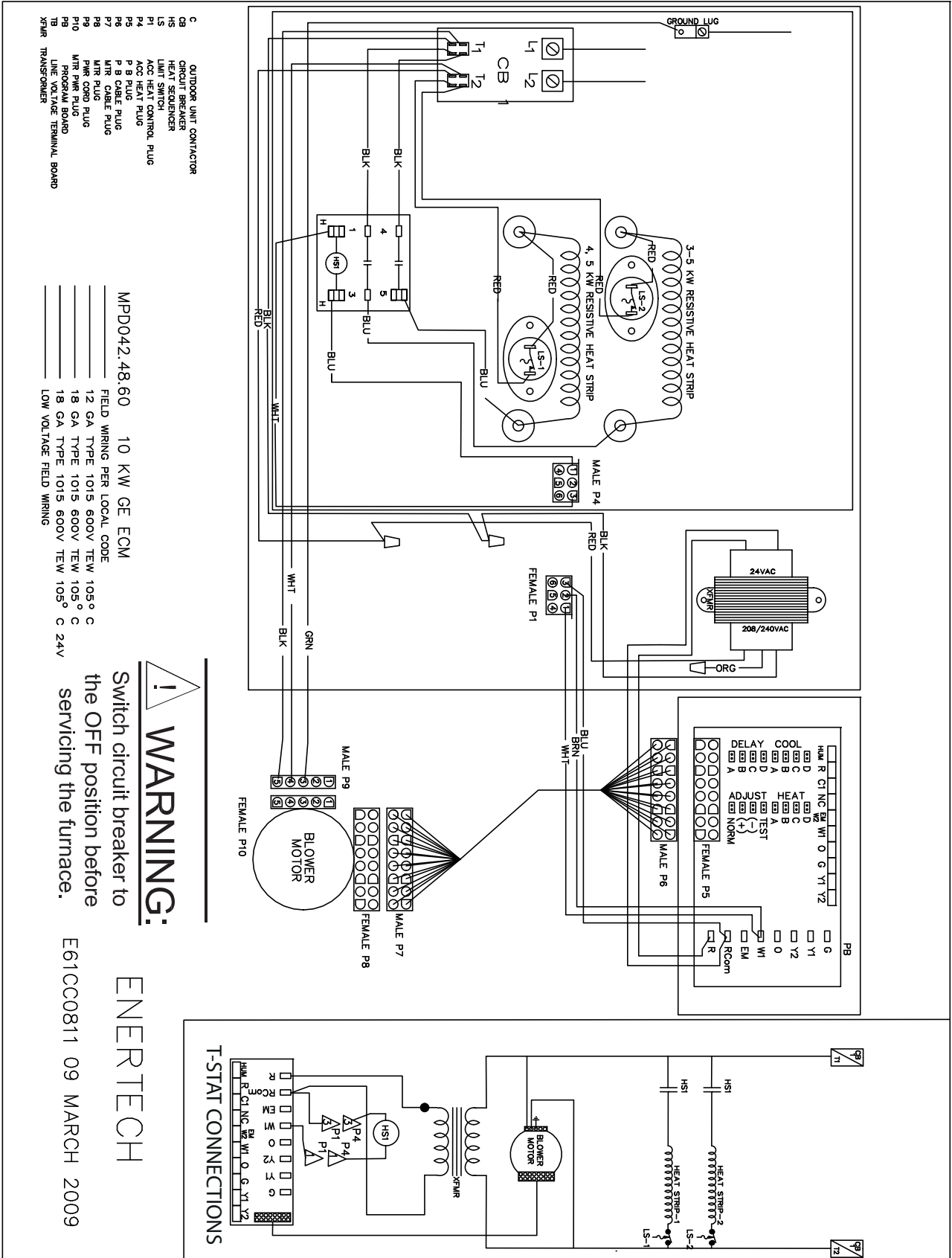
**NOTES:**

1. FACTORY INSTALLED JUMPER. REMOVE FOR USE WITH SOLENOID VALVE WITH END SWITCH. VERIFY THAT AIR HANDLER TRANSFORMER IS AT LEAST 50VA FOR UNITS WITHOUT WATER SOLENOID VALVE(S), OR 75VA FOR UNITS WITH WATER SOLENOID VALVE(S).
2. JUMPER INSTALLED=NORMAL; JUMPER REMOVED=TEST.
3. DESUPERHEAT PUMP POWER WIRES ARE NOT CONNECTED AT THE FACTORY. DO NOT CONNECT WIRES UNTIL THE PIPING IS COMPLETED AND PURGED OF AIR. RUNNING THE PUMP WITHOUT WATER WILL DAMAGE THE PUMP.
4. DESUPERHEAT LEAVING WATER TEMPERATURE SWITCH OR HOT GAS LINE TEMPERATURE SWITCH WILL DISENGAGE THE PUMP WHEN CONDITIONS ARE INAPPROPRIATE FOR WATER HEATING.
5. CIRCUIT BREAKERS ARE INSTALLED ON RESIDENTIAL MODELS ONLY.

# Wiring Diagrams: AH Electric Heat: MPD024-036 - 10kW



# Wiring Diagrams: AH Electric Heat: MPD048-060 - 10kW



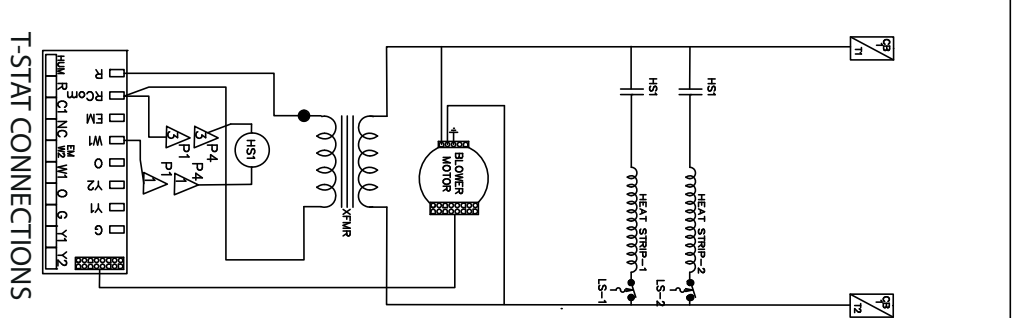
- C OUTDOOR UNIT CONTACTOR
- CB CIRCUIT BREAKER
- HS HEAT SEQUENCER
- LS LIMIT SWITCH
- P1 ACC HEAT CONTROL PLUG
- P2 P B PLUG
- P3 P B CABLE PLUG
- P4 MTR CABLE PLUG
- P5 MTR CABLE PLUG
- P6 MTR CABLE PLUG
- P7 MTR CABLE PLUG
- P8 MTR CABLE PLUG
- P9 MTR CABLE PLUG
- P10 MTR CABLE PLUG
- PB PROGRAM BOARD
- TS T-STAT
- TR TRANSFORMER

MPD042.48.60 10 KW GE ECM  
FIELD WIRING PER LOCAL CODE  
12 GA TYPE 1015 600V TEW 105° C  
18 GA TYPE 1015 600V TEW 105° C  
18 GA TYPE 1015 600V TEW 105° C  
LOW VOLTAGE FIELD WIRING

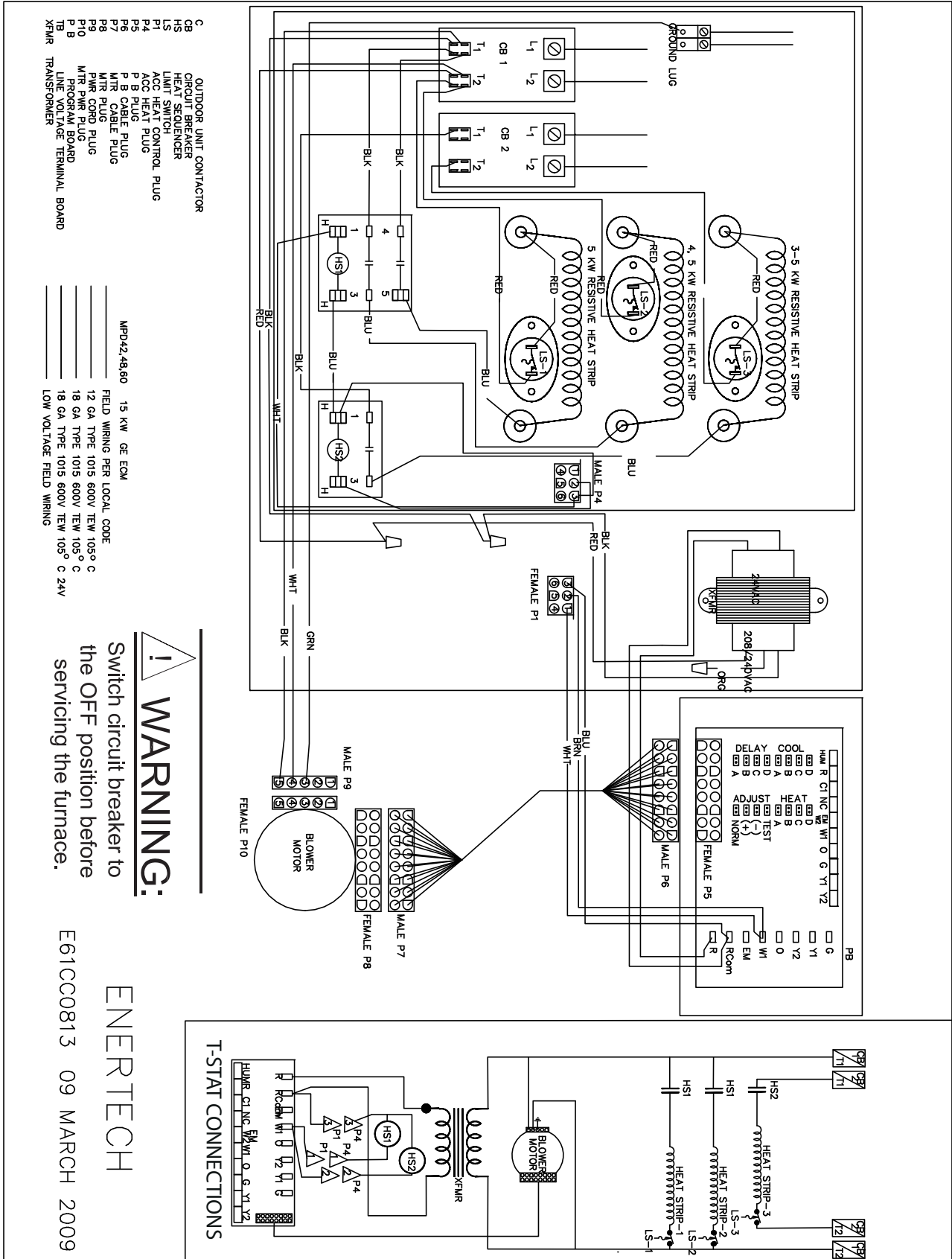
**WARNING:**  
Switch circuit breaker to the OFF position before servicing the furnace.

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E61CC0811 09 MARCH 2009

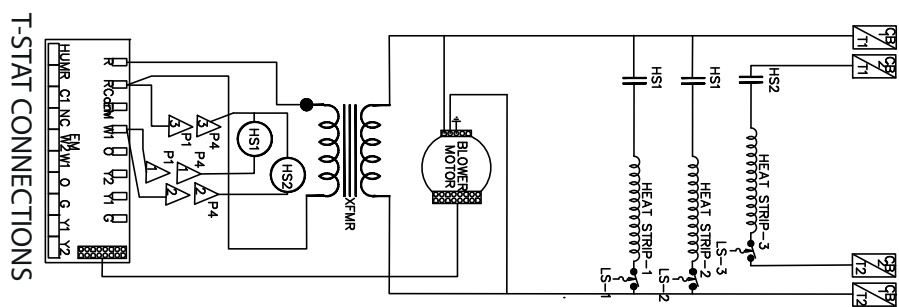


# Wiring Diagrams: AH Electric Heat: MPD048-060 - 15kW

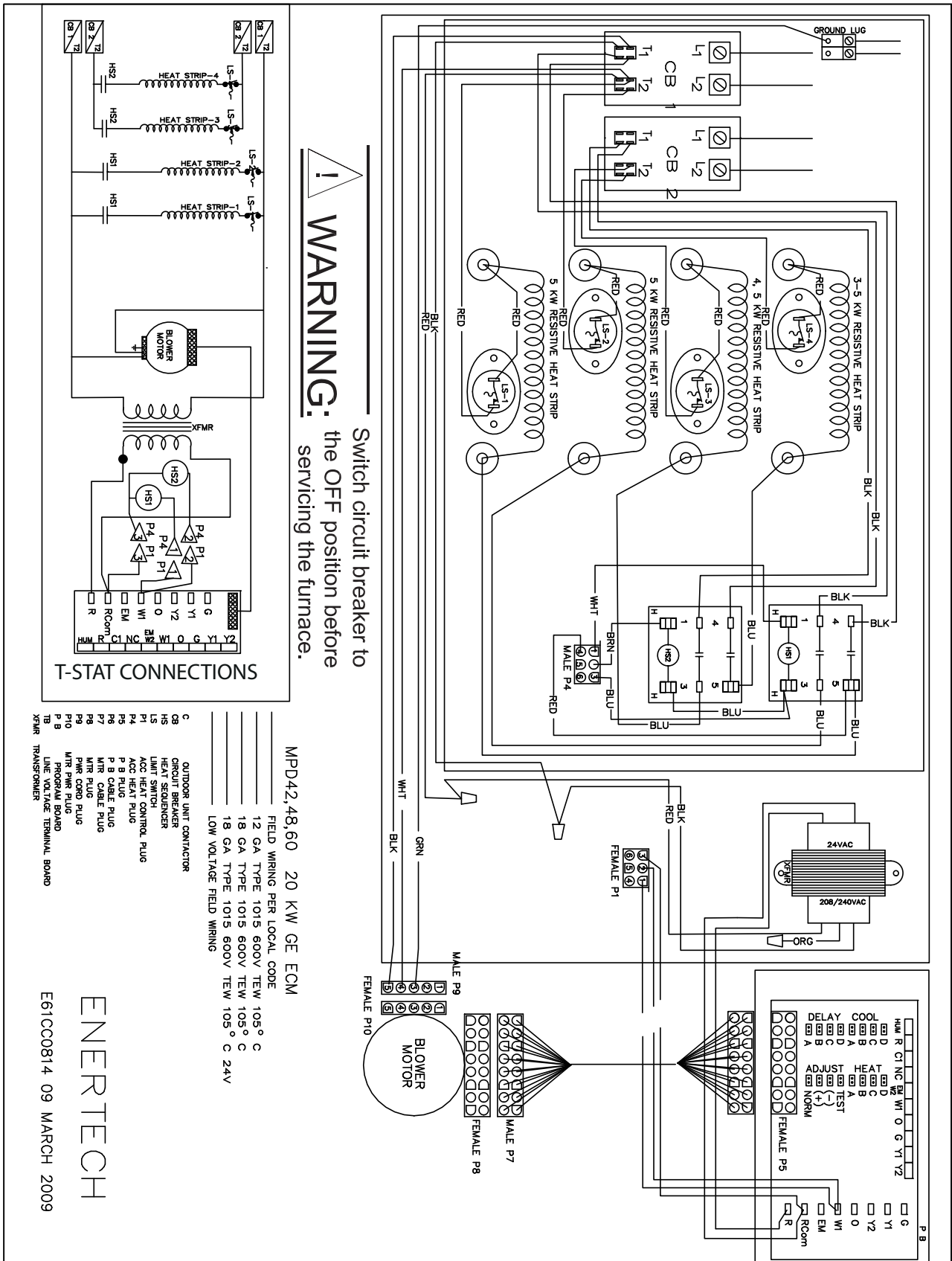


ENERTECH

E61CC0813 09 MARCH 2009



# Wiring Diagrams: AH Electric Heat: MPD048-060 - 20kW



# Engineering Specifications

## General

The Geothermal Heat Pump system and the earth loop shall be one system and include all interconnecting piping and controls to provide an efficient, harmoniously balanced package. All units shall be tested and rated by ETL in accordance with UL and CSA test laboratory safety and performance standards. Each unit shall be computer run-tested at the factory. Each unit shall be mounted on a pallet and shrinkwrapped. Units shall be designed to operate with entering liquid temperature between 25°F and 110°F.

## Refrigerant Circuit

Compressor shall be hermetically sealed high efficient scroll, mounted on vibration isolators. The coaxial water heat exchanger shall be designed for low water pressure drop and constructed of an optional cupro-nickel or standard copper inner tube and a steel outer tube with enhanced heat exchanger surface. A domestic water desuperheater coil of vented double wall copper construction for potable water with high limit control shall be employed. The thermostatic expansion device shall be bi-directional, mechanical controlled and shall provide proper superheat over the entire liquid temperature range with minimal hunting. The reversing valve shall be of copper construction with a 24V AC solenoid valve with fail-to-heating position.

## Cabinet

The cabinet shall be of heavy gauge powder coated steel. It shall be bolted together and be installed with high-density insulation, with smoke and flame spread of class 1 type and acoustic value of NRC .45. It shall be oriented to allow complete component service access from all sides. Electrical box shall be of heavy gauge steel located on the access panel side of the cabinet.

## Controls

Units shall incorporate a microprocessor based control board. All equipment shall incorporate both high and low pressure switches and freeze protection with total refrigerant circuit lockout with manual reset. The board shall provide a terminal block, LED status, fault indicators, fault memory and accessory output. All units shall have knockouts for entrance of line & low voltage wiring.

## Piping & Connections

Loop water connections (supply/Return) shall be ¾" or 1-inch FPT brass swivel connection, which provide a union for easy connection. All water piping shall be insulated.

## Secondary Drain Pan.

A secondary drain pan should be field furnished and installed under any unit that is mounted overhead in an attic, second floor.

## Options, Accessories, & Warranty

### Field Installed Hydronic Pump Module (Flow Center)

Pump module shall be self contained and provide all liquid flow, liquid fill and connection required for earth loop system. The pumps shall be wired to the pump terminal strip inside unit electric box.

### Field Installed Thermostat

A multiple-stage manual or autochangeover electronic/digital thermostat shall be provided with the unit. The thermostat shall provide two or three stage heating and one or two stage cooling with comfort temperature control. An AUTO-OFF fan switch, an EMERG-HEAT OFF- COOL-AUTO system switch, and indicating LEDs. The thermostat shall provide display in °F or °C. An option remote outdoor sensor shall be available.

### Field Installed Electric Auxiliary Heater (Air Handler Only)

An Electric resistance heater shall provide emergency and/or supplemental heating. Vertical unit shall have the control console and element (coils) assembly mounted internally. Horizontal units shall have the control board and elements (coils) assembly mounted inside on end discharge units and on side discharge the control board shall be mounted inside while the elements (coils) assembly should be mounted outside the cabinet. The heater shall provide operation control based upon signals from the thermostat or compressor section controls. A Low Voltage wiring harness shall be provided with electric heat package.

### Zone Control System

Call your Factory representative for information on Zoning.

### TETCO D-I-Y Policy

TETCO geothermal heat pumps and system installations may include electrical, refrigerant and/or water connections. Federal, state and local codes and regulations apply to various aspects of the installation. Improperly installed equipment can lead to equipment failure and health/safety concerns. For these reasons, only qualified technicians should install a TETCO geothermal system.

Because of the importance of proper installation, TETCO does not sell equipment direct to homeowners. Internet websites and HVAC outlets may allow for purchases directly by homeowners and do-it-yourselfers, but TETCO offers no warranty on equipment that is purchased via the internet or installed by persons without proper training.

TETCO has set forth this policy to ensure installations of TETCO geothermal systems are done safely and properly. The use of well-trained, qualified technicians helps ensure that your system provides many years of comfort and savings.

### Warranty

#### Residential Class Equipment

Enertech Manufacturing, LLC warrants the refrigerant system components, to include the compressor, coaxial exchanger, air coil, expansion valve and reversing valve, to be free from defects in material and workmanship for a period of five (5) years from the date of delivery† to the original purchaser-user, transferable to new owner.

Enertech Manufacturing, LLC warrants its geothermal unit against defect in materials and workmanship for five (5) years from the date of delivery† to the original purchaser-user, transferable to new owner. However, accessories (thermostat, flow center, electric heater, EWC zoning) purchased from Enertech Manufacturing, LLC. are warranted for two (2) years\*\*, and are not transferable.

Enertech Manufacturing, LLC warrants service labor allowances for five (5) years (second to fifth years, with dealer/installer warranting the first year) from the date of delivery† to the original purchaser-user, transferable to new owner, for the servicing, removing or reinstalling parts for the refrigerant system; and for five (5) years (year two, with dealer/installer warranting the first year) for any defect in materials and workmanship inside the unit as set forth above (does not include accessories). Labor allowances may not cover the full amount of labor charged, depending upon the servicing contractor.

† Warranty start date will be delivery date unless proof of startup (no later than 90 days after invoice\*) is presented. All warranties must be purchased within 90 days of invoice. For unoccupied spec homes, extended warranty may be purchased within 360 days of invoice. Warranty commences at startup date.

\* 90 Days of invoice date to installing contractor from the distributor or 180 days of invoice date to the distributor from Enertech MFG, whichever comes first.

\*\* EWC Zoning is warranted for ten (10) years; TETCO thermostats are warranted for five (5) years.

# Notes

## Revision Table

Date:	By:	Page:	Description:
14 Jun 2011	DS	28	Updated ACD024 & ACD036 to Revision B
22 Apr 2011	DS	28	Updated Dimensional Data
19 Apr 2011	DS	5-7	Updated Decoder
19 Apr 2011	DS	26	Updated Refrigerant Charge
19 Apr 2011	DS	28	Added Rev "B" ACD Product Dimensional Table
19 Apr 2011	DS	35	Updated CFM Table
05 Nov 2010	DS	5-7	Updated Decoder
03 Sept 2010	DS	All	Updated All Models to Revision "B"
3 Sept 2009	DS	29	Updated Electrical Data
20 Aug 2009	DS	29	Updated Unit Electrical Data
30 July 2009	DS	28	Updated "A" Coil Dimensional Data
28 July 2009	DS	All	First Published





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Enertech Manufacturing is continually working to improve its products. As a result, the design and specifications of each product may change without notice and may not be as described herein. For the most up-to-date information, please visit our website, or contact our Customer Service department at [info@enertechmfg.com](mailto:info@enertechmfg.com). 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 Enertech Manufacturing's opinion or commendation of its products.