



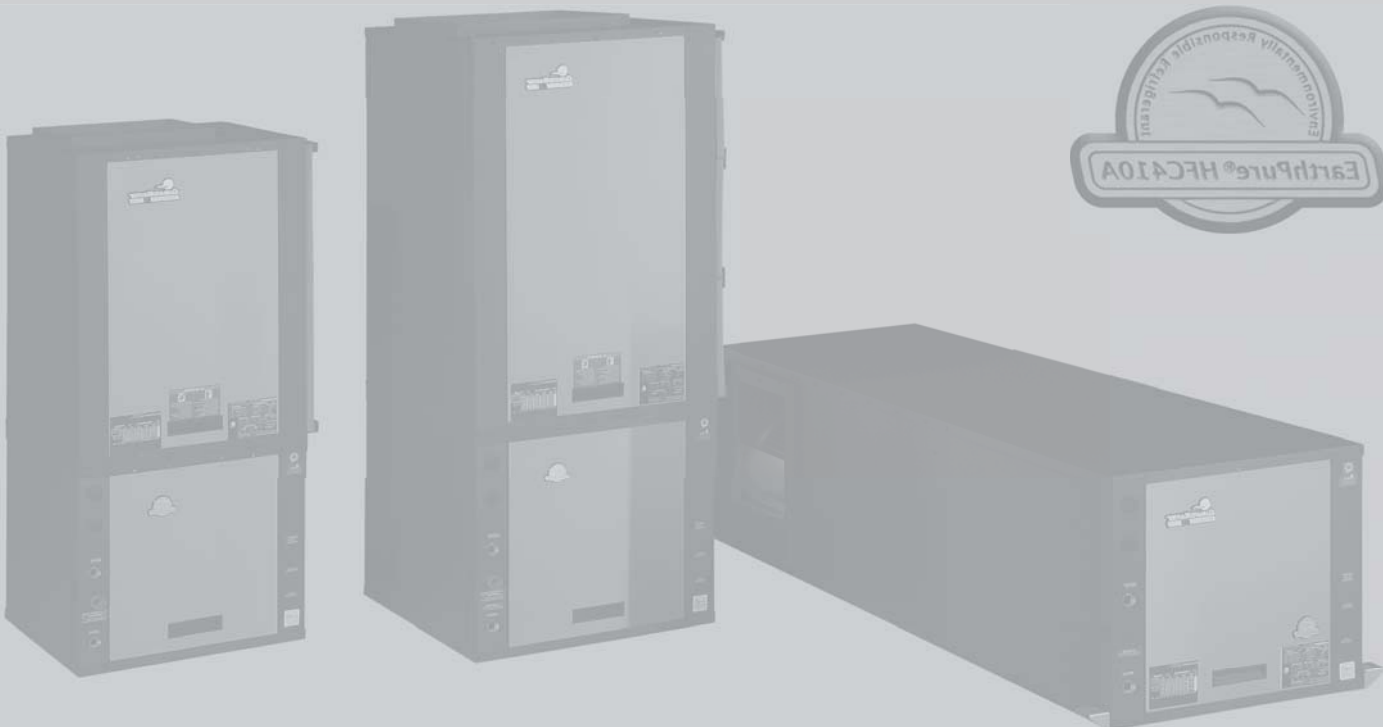
TRANQUILITY 27™ TWO-STAGE (TT) SERIES



SIZE 026 - 072 (7.0kW - 19.3kW)
HORIZONTAL, VERTICAL & DOWNFLOW
R410A - 60Hz STANDARD & EXTENDED RANGE



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R410A - 60Hz STANDARD & EXTENDED RANGE
HORIZONTAL, VERTICAL & DOWNFLOW
SIZE 056 - 075 (7.0kW - 19.3kW)

THE TRANQUILITY 27™ TWO-STAGE (TT) SERIES

As the highest efficiency water-source heat pump on the planet, the Tranquility 27™ series raises the bar for water-source heat pump efficiencies, features and application flexibility. Not only does the Tranquility 27™ far exceed ASHRAE 90.1 efficiencies, but it also uses EarthPure® HFC-410A zero ozone depletion refrigerant, making it an extremely environmentally-friendly option. Tranquility 27™ is eligible for additional LEED® (Leadership in Energy and Environmental Design) points because of its "green" technology design.

Available in sizes 2 tons (7.0 kW) through 6 tons (19.3 kW) with multiple cabinet options (vertical upflow, vertical downflow and horizontal) the Tranquility 27™ offers a wide range of units for most any installation. The Tranquility 27™ has an extended range refrigerant circuit, capable of ground loop (geothermal) applications as well as water loop (boiler-tower) applications. Standard features are many. Copeland UltraTech™ two-stage unloading scroll compressor, GE ECM variable fan motor, microprocessor controls, galvanized steel cabinet, polyester powder coat paint, stainless steel drain pan and foil-backed air handler insulation are just some of the features of the innovative Tranquility 27™ series.

ClimateMaster's exclusive double isolation compressor mounting system makes the Tranquility 27™ the quietest unit on the market. Compressors are mounted on vibration isolation springs to a heavy gauge mounting plate, which is then isolated from the cabinet base with rubber grommets for maximized vibration/sound attenuation. The unique low profile slanted control box makes installing and maintaining the unit easier than any other water-source heat pump currently in production. Options such as e-coated air coil, DDC controls, internal pump and high efficiency MERV 11 two-inch (51mm) air filters allow customized design solutions.

The Tranquility 27™ (TT) Series water-source heat pumps are designed to meet the challenges of today's HVAC demands with one of the most innovative products available on the market.

UNIT FEATURES

- Sizes 026 (2 ton, 7.0 kW) through 072 (6 tons, 19.3 kW)
- EarthPure® HFC-410A refrigerant
- Copeland UltraTech™ two-stage unloading scroll compressors
- GE ECM variable speed fan motor with soft start
- Exceeds ASHRAE 90.1 efficiencies
- Part load operation significantly lowers annual operating costs
- Galvanized steel construction with attractive black mat polyester powder coat paint and silver accents
- Stainless steel drain pan
- Foil-backed insulation in air handler section
- Unique double isolation compressor mounting with vibration isolation springs for quiet operation
- Insulated divider and separate compressor/air handler compartments
- TXV metering device
- Extended range (20 to 120°F, -6.7 to 48.9°C) operation
- Microprocessor controls standard (optional DXM and/or DDC controls)
- LonWorks, BACnet, Modbus and Johnson N2 compatibility options for DDC controls
- Field convertible discharge air arrangement for horizontal units
- Low profile slanted control box for easy access
- Internally trapped condensate drain line (vertical units only)
- Flush securely-mounted corner post water connections (no backup wrench required)
- Unit Performance Sentinel performance monitoring system
- Eight Safeties Standard
- Wide variety of options including ClimaDry modulating reheat, e-coated air coils and internal pumps

Selection Procedure

Reference Calculations

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

Legend and Glossary of Abbreviations

BTUH = BTU(British Thermal Unit) per hour	HWC = hot water generator (desuperheater) capacity, Mbtuh
CFM = airflow, cubic feet/minute	IPT = internal pipe thread
COP = coefficient of performance = BTUH output/BTUH input	KW = total power unit input, kilowatts
DB = dry bulb temperature (°F)	LAT = leaving air temperature, °F
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)	LC = latent cooling capacity, BTUH
EER = energy efficiency ratio = BTUH output/Watt input	LWT = leaving water temperature, °F
EPT = external pipe thread	MBTUH = 1000 BTU per hour
ESP = external static pressure (inches w.g.)	S/T = sensible to total cooling ratio
EWT = entering water temperature	SC = sensible cooling capacity, BTUH
GPM = water flow in U.S. gallons/minute	TC = total cooling capacity, BTUH
HE = total heat of extraction, BTUH	WB = wet bulb temperature (°F)
HC = air heating capacity, BTUH	WPD = waterside pressure drop (psi & ft. of hd.)
HR = total heat of rejection, BTUH	

Conversion Table - to convert inch-pound (English) to SI (Metric)

Air Flow	Water Flow	Ext Static Pressure	Water Pressure Drop
Airflow (L/s) = CFM x 0.472	Water Flow (L/s) = gpm x 0.0631	ESP (Pa) = ESP (in of wg) x 249	PD (kPa) = PD (ft of hd) x 2.99

Selection Procedure

- Step 1 Determine the actual heating and cooling loads at the desired dry bulb and wet bulb conditions.
- Step 2 Obtain the following design parameters: Entering water temperature, water flow rate in GPM, air flow in CFM, water flow pressure drop and design wet and dry bulb temperatures. Air flow CFM should be between 300 and 450 CFM per ton. Unit water pressure drop should be kept as close as possible to each other to make water balancing easier. Go to the appropriate tables and find the proper indicated water flow and water temperature.
- Step 3 Select a unit based on total and sensible cooling conditions. Select a unit which is closest to, but no larger than, the actual cooling load.
- Step 4 Enter tables at the design water flow and water temperature. Read the total and sensible cooling capacities (Note: interpolation is permissible, extrapolation is not).
- Step 5 Read the heating capacity. If it exceeds the design criteria it is acceptable. It is quite normal for Water-Source Heat Pumps to be selected on cooling capacity only since the heating output is usually greater than the cooling capacity.
- Step 6 Determine the correction factors associated with the variable factors of dry bulb and wet bulb (page 14).

 Corrected Total Cooling =
 tabulated total cooling x wet bulb correction.
 Corrected Sensible Cooling =
 tabulated sensible cooling x wet/dry bulb correction.
- Step 7 Compare the corrected capacities to the load requirements. Normally if the capacities are within 10% of the loads, the equipment is acceptable. It is better to undersize than oversize, as undersizing improves humidity control, reduces sound levels and extends the life of the equipment.
- Step 8 When completed, calculate water temperature rise and assess the selection. If the units selected are not within 10% of the load calculations, then review what effect changing the GPM, water temperature and/or air flow and air temperature would have on the corrected capacities. If the desired capacity cannot be achieved, select the next larger or smaller unit and repeat the procedure. Remember, when in doubt, undersize slightly for best performance.

Example Equipment Selection For Cooling

Step 1 Load Determination:
 Assume we have determined that the appropriate cooling load at the desired dry bulb 80°F and wet bulb 65°F conditions is as follows:

Total Cooling 22,100 BTUH
 Sensible Cooling 16,500 BTUH
 Entering Air Temp.... 80°F Dry Bulb / 65°F Wet Bulb

Step 2 Design Conditions:
 Similarly, we have also obtained the following design parameters:

Entering Water Temp 90°F
 Water Flow (Based upon 10°F rise in temp.) 6.0 GPM
 Air Flow 730 CFM

Step 3, 4 & 5 HP Selection:
 After making our preliminary selection (TTH026 - Full Load), we enter the tables at design water flow and water temperature and read Total Cooling, Sens. Cooling and Heat of Rej. capacities:

Total Cooling 24,200 BTUH
 Sensible Cooling 16,300 BTUH
 Heat of Rejection 29,900 BTUH

Step 6 & 7 Entering Air and Airflow Corrections:
 Next, we determine our correction factors.

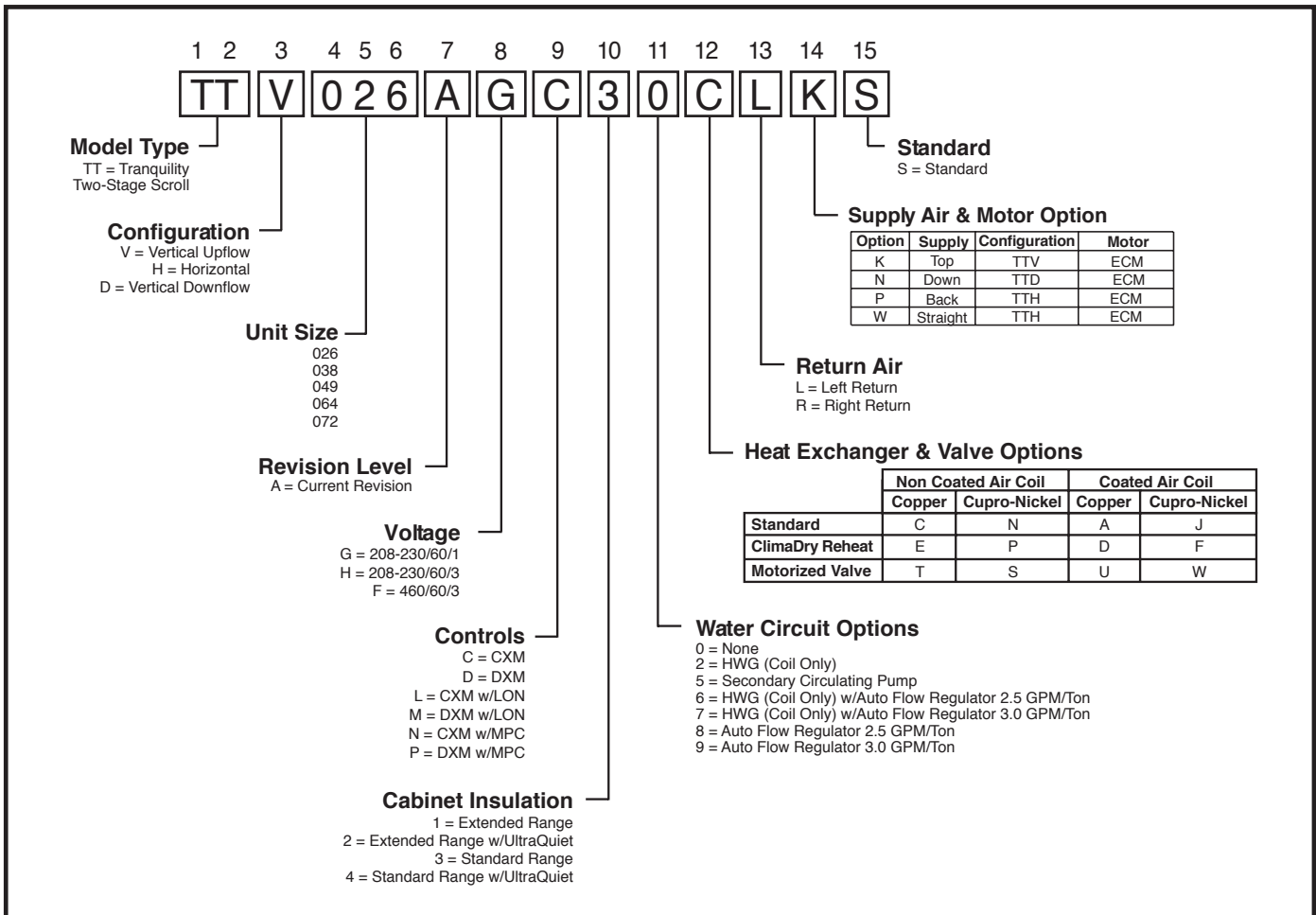
	Table	Ent Air	Air Flow	Corrected
Corrected Total Cooling =	24,200	x 0.975	x 0.978	= 23,076
Corrected Sensible Cooling =	16,300	x 1.096	x 0.926	= 16,543
Corrected Heat of Reject =	29,900	x 0.979	x 0.978	= 28,628

Step 8 Water Temperature Rise Calculation & Assessment:

Actual Temperature Rise 9.5°F

When we compare the Corrected Total Cooling and Corrected Sensible Cooling figures with our load requirements stated in Step 1, we discover that our selection is within +/- 10% of our sensible load requirement. Furthermore, we see that our Corrected Total Cooling figure is within 1,000 Btuh the actual indicated load.

TT Series Nomenclature



Rev.: 03/02/06D

**Performance Data
ARI/ASHRAE/ISO 13256-1**

ASHRAE/ARI/ISO 13256-1. English (IP) Units

Model	Capacity Modulation	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
		Cooling 86°F		Heating 68°F		Cooling 59°F		Heating 50°F		Cooling Full Load 77°F Part Load 68°F		Heating Full Load 32°F Part Load 41°F	
		Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP
TTH/V/D 026	Full	25,300	15.9	30,800	5.3	28,900	24.5	25,700	4.8	26,600	18.5	19,800	4.0
	Part	19,400	18.3	22,400	6.1	22,200	30.8	18,600	5.1	21,300	26.0	16,500	4.6
TTH/V/D 038	Full	36,200	15.6	44,800	5.3	41,200	23.0	36,700	4.7	38,200	18.2	29,000	4.0
	Part	26,200	18.5	30,800	6.3	30,200	31.5	24,800	5.1	28,900	27.0	22,100	4.5
TTH/V/D 049	Full	48,400	15.7	59,900	5.2	54,600	22.5	48,300	4.7	50,600	17.9	37,500	4.0
	Part	36,100	18.0	44,300	6.2	40,700	28.7	35,400	5.1	39,600	24.9	31,200	4.6
TTH/V/D 064	Full	61,500	15.0	72,300	5.0	68,600	22.0	59,600	4.4	64,800	17.5	48,000	3.9
	Part	44,900	17.6	51,100	5.7	51,900	29.7	41,800	4.7	49,800	25.3	37,500	4.3
TTH/V/D 072	Full	68,700	14.2	88,600	4.9	77,100	19.9	70,200	4.3	71,600	16.2	54,100	3.6
	Part	52,800	16.0	65,200	5.1	59,800	24.5	51,700	4.3	57,700	21.4	45,400	3.9

Cooling capacities based upon 80.6°F DB, 66.2°F WB entering air temperature
 Heating capacities based upon 68°F DB, 59°F WB entering air temperature
 Ground Loop Heat Pump ratings based on 15% antifreeze solution
 All ratings based upon operation at lower voltage of dual voltage rated models

ASHRAE/ARI/ISO 13256-1. Metric (SI) Units

Model	Capacity Modulation	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
		Cooling 30°C		Heating 20°C		Cooling 15°C		Heating 10°C		Cooling Full Load 25°C Part Load 20°C		Heating Full Load 0°C Part Load 5°C	
		Capacity Watts	EER W/W	Capacity Watts	COP	Capacity Watts	EER W/W	Capacity Watts	COP	Capacity Watts	EER W/W	Capacity Watts	COP
TTH/V/D 026	Full	7,415	4.7	9,027	5.3	8,470	7.2	7,532	4.8	7,796	5.4	5,803	4.0
	Part	5,686	5.4	6,565	6.1	6,506	9.0	5,451	5.1	6,243	7.6	4,836	4.6
TTH/V/D 038	Full	10,610	4.6	13,130	5.3	12,075	6.7	10,756	4.7	11,196	5.3	8,499	4.0
	Part	7,679	5.4	9,027	6.3	8,851	9.2	7,268	5.1	8,470	7.9	6,477	4.5
TTH/V/D 049	Full	14,185	4.6	17,556	5.2	16,002	6.6	14,156	4.7	14,830	5.2	10,991	4.0
	Part	10,580	5.3	12,984	6.2	11,928	8.4	10,375	5.1	11,606	7.3	9,144	4.6
TTH/V/D 064	Full	18,025	4.4	21,190	5.0	20,106	6.4	17,468	4.4	18,992	5.1	14,068	3.9
	Part	13,159	5.2	14,977	5.7	15,211	8.7	12,251	4.7	14,596	7.4	10,991	4.3
TTH/V/D 072	Full	20,135	4.2	25,967	4.9	22,597	5.8	20,574	4.3	20,985	4.7	15,856	3.6
	Part	15,475	4.7	19,109	5.1	17,526	7.2	15,152	4.3	16,910	6.3	13,306	3.9

Cooling capacities based upon 27°C DB, 19°C WB entering air temperature
 Heating capacities based upon 20°C DB, 15°C WB entering air temperature
 Ground Loop Heat Pump ratings based on 15% antifreeze solution
 All ratings based upon operation at lower voltage of dual voltage rated models

**Performance Data
 Selection Notes**

For operation in the shaded area when water is used in lieu of an anti-freeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 40°F [4.4°C] when the JW3 jumper is not clipped (see example below). This is due to the potential of the refrigerant temperature being as low as 32°F [0°C] with 40°F [4.4°C] LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for standard range equipment or systems without antifreeze.

Example:

At 50°F EWT (Entering Water Temperature) and 1.5 gpm/ton, a 3 ton unit has a HE of 22,500 Btuh. To calculate LWT, rearrange the formula for HE as follows:

HE = TD x GPM x 500, where HE = Heat of Extraction (Btuh); TD = temperature difference (EWT - LWT) and GPM = U.S. Gallons per Minute.

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

$$TD = 22,500 / (1.5 \times 500)$$

$$TD = 10^\circ F$$

$$LWT = EWT - TD$$

$$LWT = 50 - 10 = 40^\circ F$$

In this example, as long as the EWT does not fall below 50°F, the system will operate as designed. For EWTs below 50°F, higher flow rates will be required (open loop systems, for example, require at least 2 gpm/ton when EWT is below 50°F).

Heating - EAT 70°F						
LR	Airflow CFM	HC	kW	HE	LAT	COP
	710	11.6	1.05	8.2	85.1	3.25
	825	11.7	1.02	8.4	83.2	3.38
38.3	710	13.6	1.09	10.1	87.8	3.66
38.3	825	13.8	1.06	10.3	85.5	3.81
39.2	710	14.2	1.09	10.7	88.5	3.81
39.2	825	14.4	1.06	10.9	86.1	3.97
39.8	710	14.4	1.09	10.9	88.8	3.86
39.8	825	14.6	1.06	11.1	86.3	4.02
35.3	710	16.1	1.15	12.3	90.9	4.08
35.3	825	16.2	1.12	12.6	88.2	4.25
37.9	710	16.7	1.15	13.0	91.8	4.25
37.9	825	16.9	1.12	13.3	89.0	4.42
38.3	710	16.9	1.16	13.2	92.1	4.30
38.3	825	17.1	1.12	13.5	89.2	4.47
30.7	710	18.3	1.18	14.5	93.9	4.56
30.7	825	18.5	1.14	14.8	90.8	4.75
34.4	710	19.1	1.18	15.2	94.8	4.73
34.4	825	19.3	1.15	15.5	91.6	4.93
	710	19.3	1.18	15.4	95.1	4.78
	825	19.5	1.15	15.7	91.9	4.98
	710	20.4	1.21	16.5	96.6	4.98
	825	20.6	1.18	16.8	93.2	5.18
	710	21.2	1.22	17.3	97.5	5.18
	825	21.4	1.19	17.8	94.1	5.38

Performance Data
TTH/V/D 026 (Part Load)

725 CFM Nominal (Rated) Airflow Cooling, 825 CFM Nominal (Rated) Airflow Heating

Performance capacities shown in thousands of Btuh

EWT °F	GPM	WPD		Cooling - EAT 80/67°F							Heating - EAT 70°F					
		PSI	FT	Airflow CFM	TC	SC	Sens/Tot Ratio	kW	HR	EER	Airflow CFM	HC	kW	HE	LAT	COP
20	7.0	4.5	10.3	Operation not recommended							710	11.6	1.05	8.2	85.1	3.25
	7.0	4.5	10.3	Operation not recommended							825	11.7	1.02	8.4	83.2	3.38
30	3.5	1.2	2.8	620	22.2	14.0	0.63	0.58	24.1	38.3	710	13.6	1.09	10.1	87.8	3.66
	3.5	1.2	2.8	725	22.5	14.7	0.65	0.59	24.4	38.3	825	13.8	1.06	10.3	85.5	3.81
	5.8	2.9	6.6	620	22.4	14.0	0.63	0.57	24.3	39.2	710	14.2	1.09	10.7	88.5	3.81
	5.8	2.9	6.6	725	22.7	14.7	0.65	0.58	24.7	39.2	825	14.4	1.06	10.9	86.1	3.97
	7.0	4.1	9.4	620	22.5	14.0	0.62	0.56	24.4	39.8	710	14.4	1.09	10.9	88.8	3.86
	7.0	4.1	9.4	725	22.8	14.7	0.65	0.57	24.7	39.8	825	14.6	1.06	11.1	86.3	4.02
40	3.5	1.1	2.5	620	22.9	15.1	0.66	0.65	25.1	35.3	710	16.1	1.15	12.3	90.9	4.08
	3.5	1.1	2.5	725	23.3	15.8	0.68	0.66	25.5	35.3	825	16.2	1.12	12.6	88.2	4.25
	5.8	2.6	5.9	620	23.1	15.1	0.65	0.61	25.2	37.9	710	16.7	1.15	13.0	91.8	4.25
	5.8	2.6	5.9	725	23.4	15.9	0.68	0.62	25.5	37.9	825	16.9	1.12	13.3	89.0	4.42
	7.0	3.6	8.4	620	23.2	15.1	0.65	0.6	25.2	38.3	710	16.9	1.16	13.2	92.1	4.30
	7.0	3.6	8.4	725	23.5	15.9	0.68	0.61	25.6	38.3	825	17.1	1.12	13.5	89.2	4.47
50	3.5	1.0	2.3	620	22.7	15.4	0.68	0.74	25.2	30.7	710	18.3	1.18	14.5	93.9	4.56
	3.5	1.0	2.3	725	23.0	16.2	0.70	0.75	25.6	30.7	825	18.5	1.14	14.8	90.8	4.75
	5.8	2.4	5.6	620	22.9	15.5	0.67	0.69	25.3	33.4	710	19.1	1.18	15.2	94.8	4.73
	5.8	2.4	5.6	725	23.3	16.3	0.70	0.70	25.6	33.4	825	19.3	1.15	15.5	91.6	4.93
	7.0	3.4	7.9	620	23.0	15.5	0.67	0.67	25.3	34.1	710	19.3	1.18	15.4	95.1	4.78
	7.0	3.4	7.9	725	23.3	16.3	0.70	0.68	25.6	34.1	825	19.5	1.15	15.7	91.9	4.98
60	3.5	1.0	2.2	620	21.9	15.3	0.70	0.85	24.8	25.9	710	20.4	1.21	16.5	96.6	4.93
	3.5	1.0	2.2	725	22.2	16.1	0.73	0.86	25.1	25.9	825	20.6	1.18	16.8	93.2	5.13
	5.8	2.3	5.2	620	22.4	15.5	0.69	0.78	25.1	28.6	710	21.2	1.22	17.3	97.7	5.10
	5.8	2.3	5.2	725	22.7	16.3	0.72	0.80	25.4	28.6	825	21.5	1.18	17.6	94.1	5.31
	7.0	3.2	7.4	620	22.5	15.5	0.69	0.77	25.1	29.4	710	21.5	1.22	17.5	98.0	5.15
	7.0	3.2	7.4	725	22.9	16.3	0.71	0.78	25.5	29.4	825	21.7	1.19	17.8	94.3	5.36
70	3.5	0.9	2.1	620	20.7	14.8	0.72	0.97	24.0	21.4	710	22.4	1.23	18.4	99.2	5.35
	3.5	0.9	2.1	725	21.0	15.6	0.74	0.98	24.3	21.4	825	22.7	1.19	18.8	95.4	5.57
	5.8	2.1	4.9	620	21.4	15.1	0.71	0.90	24.4	23.8	710	23.3	1.24	19.3	100.4	5.52
	5.8	2.1	4.9	725	21.7	15.9	0.73	0.91	24.8	23.8	825	23.5	1.20	19.6	96.4	5.75
	7.0	3.0	7.0	620	21.6	15.2	0.71	0.88	24.6	24.5	710	23.5	1.24	19.5	100.7	5.57
	7.0	3.0	7.0	725	21.9	16.0	0.73	0.89	24.9	24.5	825	23.8	1.20	19.9	96.7	5.80
80	3.5	0.8	1.9	620	19.3	14.2	0.73	1.10	23.1	17.5	710	24.4	1.25	20.3	101.8	5.73
	3.5	0.8	1.9	725	19.6	14.9	0.76	1.12	23.4	17.5	825	24.6	1.21	20.7	97.7	5.97
	5.8	2.0	4.6	620	20.1	14.5	0.72	1.03	23.6	19.5	710	25.3	1.26	21.2	103.0	5.90
	5.8	2.0	4.6	725	20.4	15.3	0.75	1.04	23.9	19.5	825	25.6	1.22	21.6	98.7	6.15
	7.0	2.8	6.5	620	20.3	14.6	0.72	1.01	23.7	20.1	710	25.6	1.26	21.5	103.4	5.95
	7.0	2.8	6.5	725	20.6	15.4	0.75	1.02	24.0	20.1	825	25.9	1.22	21.9	99.0	6.20
85	3.5	0.8	1.9	620	18.7	13.9	0.75	1.18	22.7	15.9	710	25.3	1.26	21.2	103.0	5.91
	3.5	0.8	1.9	725	18.9	14.6	0.77	1.19	23.0	15.9	825	25.6	1.22	21.7	98.7	6.15
	5.8	1.9	4.5	620	19.3	14.2	0.73	1.10	23.1	17.5	710	26.3	1.27	22.2	104.3	6.08
	5.8	1.9	4.5	725	19.6	14.9	0.76	1.12	23.4	17.5	825	26.6	1.23	22.6	99.9	6.33
	7.0	2.7	6.3	620	19.5	14.3	0.73	1.08	23.2	18.0	710	26.6	1.27	22.5	104.7	6.13
	7.0	2.7	6.3	725	19.8	15.0	0.76	1.10	23.6	18.0	825	26.9	1.24	22.9	100.2	6.38
90	3.5	0.8	1.8	620	18.0	13.7	0.76	1.25	22.3	14.4	710	26.3	1.27	22.2	104.3	6.08
	3.5	0.8	1.8	725	18.3	14.4	0.78	1.27	22.6	14.4	825	26.6	1.23	22.6	99.8	6.33
	5.8	1.9	4.4	620	18.6	13.8	0.74	1.18	22.6	15.8	710	27.3	1.28	23.1	105.6	6.25
	5.8	1.9	4.4	725	18.9	14.6	0.77	1.20	22.9	15.8	825	27.6	1.24	23.6	101.0	6.51
	7.0	2.7	6.2	620	18.8	13.9	0.74	1.16	22.7	16.3	710	27.6	1.28	23.4	106.0	6.30
	7.0	2.7	6.2	725	19.1	14.7	0.77	1.17	23.1	16.3	825	27.9	1.25	23.9	101.3	6.56
100	3.5	0.8	1.8	620	16.6	13.0	0.78	1.41	21.4	11.7	Operation not recommended					
	3.5	0.8	1.8	725	16.8	13.7	0.81	1.43	21.7	11.7						
	5.8	1.8	4.2	620	17.1	13.2	0.77	1.34	21.7	12.7						
	5.8	1.8	4.2	725	17.4	13.8	0.80	1.36	22.0	12.7						
	7.0	2.6	6.0	620	17.3	13.3	0.77	1.32	21.8	13.1						
	7.0	2.6	6.0	725	17.5	13.9	0.79	1.34	22.1	13.1						
110	3.5	0.7	1.7	620	15.5	12.7	0.82	1.59	20.9	9.7						
	3.5	0.7	1.7	725	15.7	13.4	0.85	1.61	21.2	9.7						
	5.8	1.7	4.0	620	15.8	12.7	0.80	1.53	21.0	10.3						
	5.8	1.7	4.0	725	16.0	13.3	0.83	1.55	21.3	10.3						
	7.0	2.5	5.7	620	16.0	12.7	0.80	1.50	21.1	10.6						
	7.0	2.5	5.7	725	16.2	13.4	0.83	1.52	21.4	10.6						
120	3.5	0.7	1.6	620	14.5	12.6	0.87	1.84	20.8	7.9						
	3.5	0.7	1.6	725	14.7	13.3	0.90	1.86	21.1	7.9						
	5.8	1.7	3.9	620	14.8	12.5	0.85	1.73	20.7	8.6						
	5.8	1.7	3.9	725	15.0	13.2	0.88	1.76	21.0	8.6						
	7.0	2.4	5.5	620	14.9	12.5	0.84	1.71	20.7	8.7						
	7.0	2.4	5.5	725	15.1	13.2	0.87	1.73	21.0	8.7						

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.
 ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
 Table does not reflect fan or pump power corrections for ARI/ISO conditions.
 All performance is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 40°F EWT is based upon a 15% antifreeze solution.
 Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in the shaded areas.

CLIMATEMASTER WATER-SOURCE HEAT PUMPS

Tranquility 27™ Two-Stage (TT) Series

Rev.: 05/23/07D

Performance Data TTH/V/D 026 (Full Load)

850 CFM Nominal (Rated) Airflow Cooling, 950 CFM Nominal (Rated) Airflow Heating

Performance capacities shown in thousands of Btu/h

EWT °F	GPM	WPD		Cooling - EAT 80/67°F							Heating - EAT 70°F					
		PSI	FT	Airflow CFM	TC	SC	Sens/Tot Ratio	kW	HR	EER	Airflow CFM	HC	kW	HE	LAT	COP
20	8.0	5.6	12.9	Operation not recommended							820	15.0	1.47	10.2	86.9	3.00
	8.0	5.6	12.9	Operation not recommended							950	15.3	1.41	10.6	84.9	3.19
30	4.0	1.5	3.5	730	30.2	17.9	0.59	0.97	33.4	31.0	820	17.8	1.53	12.7	90.1	3.41
	4.0	1.5	3.5	850	30.9	19.6	0.63	1.02	34.3	30.4	950	18.1	1.46	13.2	87.7	3.63
	6.0	3.1	7.2	730	30.3	17.9	0.59	0.93	33.4	32.7	820	18.6	1.54	13.5	91.0	3.53
	6.0	3.1	7.2	850	31.1	19.6	0.63	0.97	34.4	32.1	950	19.0	1.48	14.0	88.5	3.76
	8.0	5.1	11.7	730	30.5	17.9	0.59	0.91	33.5	33.7	820	19.1	1.55	13.9	91.5	3.59
	8.0	5.1	11.7	850	31.2	19.6	0.63	0.95	34.5	33.1	950	19.4	1.49	14.4	88.9	3.82
40	4.0	1.4	3.1	730	29.9	18.2	0.61	1.07	33.5	28.1	820	21.2	1.61	15.9	94.0	3.88
	4.0	1.4	3.1	850	30.6	20.0	0.65	1.11	34.4	27.5	950	21.6	1.54	16.4	91.1	4.12
	6.0	2.8	6.5	730	30.2	18.3	0.61	1.01	33.6	29.8	820	22.2	1.63	16.7	95.0	3.99
	6.0	2.8	6.5	850	30.9	20.0	0.65	1.06	34.5	29.2	950	22.6	1.56	17.3	92.0	4.24
	8.0	4.6	10.5	730	30.3	18.3	0.60	0.99	33.6	30.7	820	22.7	1.64	17.2	95.6	4.05
	8.0	4.6	10.5	850	31.0	20.0	0.65	1.03	34.5	30.1	950	23.1	1.57	17.8	92.5	4.31
50	4.0	1.3	2.9	730	29.1	18.3	0.63	1.17	33.1	24.8	820	24.4	1.69	18.7	97.5	4.24
	4.0	1.3	2.9	850	29.8	20.0	0.67	1.23	34.0	24.3	950	24.9	1.62	19.4	94.2	4.51
	6.0	2.6	6.1	730	29.6	18.4	0.62	1.11	33.4	26.7	820	25.4	1.71	19.6	98.7	4.34
	6.0	2.6	6.1	850	30.3	20.1	0.66	1.16	34.3	26.1	950	25.9	1.64	20.3	95.2	4.62
	8.0	4.3	9.9	730	29.9	18.4	0.62	1.08	33.5	27.6	820	25.9	1.73	20.1	99.3	4.40
	8.0	4.3	9.9	850	30.6	20.2	0.66	1.13	34.4	27.0	950	26.4	1.66	20.8	95.7	4.68
60	4.0	1.2	2.8	730	28.0	17.9	0.64	1.30	32.4	21.6	820	27.2	1.77	21.3	100.8	4.52
	4.0	1.2	2.8	850	28.6	19.6	0.69	1.35	33.3	21.2	950	27.8	1.69	22.0	97.1	4.81
	6.0	2.5	5.7	730	28.7	18.1	0.63	1.23	32.8	23.4	820	28.3	1.8	22.2	101.9	4.62
	6.0	2.5	5.7	850	29.3	19.9	0.68	1.28	33.7	22.9	950	28.8	1.72	23.0	98.1	4.91
	8.0	4.0	9.3	730	29.0	18.2	0.63	1.19	33.0	24.3	820	28.8	1.81	22.7	102.6	4.66
	8.0	4.0	9.3	850	29.7	20.0	0.67	1.24	33.9	23.8	950	29.4	1.74	23.5	98.6	4.96
70	4.0	1.1	2.6	730	26.6	17.3	0.65	1.43	31.4	18.5	820	29.9	1.84	23.6	103.7	4.75
	4.0	1.1	2.6	850	27.2	19.0	0.70	1.50	32.3	18.2	950	30.5	1.77	24.4	99.7	5.05
	6.0	2.3	5.4	730	27.4	17.7	0.65	1.36	31.9	20.2	820	31.0	1.88	24.6	105.0	4.83
	6.0	2.3	5.4	850	28.0	19.4	0.69	1.42	32.8	19.8	950	31.6	1.80	25.4	100.8	5.14
	8.0	3.8	8.7	730	27.7	17.8	0.64	1.32	32.2	21.0	820	31.5	1.90	25.1	105.6	4.87
	8.0	3.8	8.7	850	28.4	19.5	0.69	1.38	33.1	20.6	950	32.1	1.82	25.9	101.3	5.18
80	4.0	1.0	2.4	730	25.0	16.6	0.67	1.59	30.4	15.7	820	32.3	1.92	25.8	106.5	4.93
	4.0	1.0	2.4	850	25.6	18.3	0.71	1.66	31.2	15.4	950	33.0	1.84	26.7	102.1	5.24
	6.0	2.2	5.0	730	25.8	17.0	0.66	1.50	30.9	17.2	820	33.5	1.96	26.8	107.8	5.01
	6.0	2.2	5.0	850	26.4	18.7	0.71	1.57	31.8	16.8	950	34.1	1.88	27.7	103.2	5.32
	8.0	3.5	8.1	730	26.3	17.2	0.66	1.46	31.2	17.9	820	34.0	1.98	27.3	108.4	5.04
	8.0	3.5	8.1	850	26.9	18.9	0.70	1.53	32.1	17.6	950	34.7	1.90	28.2	103.8	5.36
85	4.0	1.0	2.4	730	24.2	16.3	0.67	1.68	29.9	14.4	820	33.5	1.96	26.8	107.8	5.01
	4.0	1.0	2.4	850	24.7	17.8	0.72	1.75	30.7	14.1	950	34.2	1.88	27.8	103.3	5.33
	6.0	2.1	4.9	730	25.0	16.7	0.67	1.59	30.4	15.7	820	34.7	2.00	27.8	109.1	5.08
	6.0	2.1	4.9	850	25.6	18.3	0.71	1.66	31.3	15.4	950	35.3	1.92	28.8	104.4	5.40
	8.0	3.4	7.9	730	25.4	16.8	0.66	1.55	30.7	16.5	820	35.2	2.02	28.4	109.8	5.12
	8.0	3.4	7.9	850	26.0	18.5	0.71	1.61	31.5	16.1	950	35.9	1.93	29.3	105.0	5.44
90	4.0	1.0	2.3	730	23.3	15.9	0.68	1.77	29.4	13.2	820	34.7	2.00	27.9	109.2	5.09
	4.0	1.0	2.3	850	23.9	17.4	0.73	1.84	30.2	13.0	950	35.4	1.92	28.8	104.5	5.41
	6.0	2.1	4.8	730	24.2	16.3	0.67	1.67	29.9	14.4	820	35.9	2.04	28.9	110.5	5.16
	6.0	2.1	4.8	850	24.7	17.9	0.72	1.75	30.7	14.2	950	36.6	1.95	29.9	105.6	5.48
	8.0	3.4	7.8	730	24.6	16.5	0.67	1.63	30.2	15.1	820	36.5	2.06	29.4	111.2	5.19
	8.0	3.4	7.8	850	25.2	18.1	0.72	1.70	31.0	14.8	950	37.2	1.97	30.4	106.2	5.52
100	4.0	1.0	2.2	730	21.7	15.2	0.70	1.97	28.4	11.0	Operation not recommended					
	4.0	1.0	2.2	850	22.2	16.7	0.75	2.05	29.2	10.8						
	6.0	2.0	4.6	730	22.5	15.5	0.69	1.86	28.9	12.1						
	6.0	2.0	4.6	850	23.0	17.0	0.74	1.95	29.7	11.8						
	8.0	3.2	7.4	730	22.9	15.7	0.69	1.81	29.1	12.6						
	8.0	3.2	7.4	850	23.4	17.2	0.74	1.89	29.9	12.4						
110	4.0	0.9	2.1	730	20.1	14.6	0.72	2.19	27.7	9.2	Operation not recommended					
	4.0	0.9	2.1	850	20.6	16.0	0.77	2.29	28.4	9.0						
	6.0	1.9	4.4	730	20.9	14.8	0.71	2.08	28.0	10.0						
	6.0	1.9	4.4	850	21.3	16.3	0.76	2.17	28.8	9.8						
	8.0	3.1	7.2	730	21.2	15.0	0.71	2.03	28.2	10.5						
	8.0	3.1	7.2	850	21.7	16.4	0.76	2.11	29.0	10.3						
120	4.0	0.9	2.0	730	18.8	14.1	0.75	2.45	27.2	7.7	Operation not recommended					
	4.0	0.9	2.0	850	19.2	15.5	0.80	2.55	28.0	7.5						
	6.0	1.8	4.2	730	19.4	14.3	0.74	2.32	27.4	8.3						
	6.0	1.8	4.2	850	19.8	15.7	0.79	2.43	28.2	8.2						
	8.0	3.0	6.9	730	19.7	14.4	0.73	2.26	27.5	8.7						
	8.0	3.0	6.9	850	20.2	15.8	0.78	2.36	28.3	8.5						

Interpolation is permissible; extrapolation is not.

All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.

ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Table does not reflect fan or pump power corrections for ARI/ISO conditions.

All performance is based upon the lower voltage of dual voltage rated units.

Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

Operation below 40°F EWT is based upon a 15% antifreeze solution.

Operation below 60°F EWT requires optional insulated water/refrigerant circuit.

See performance correction tables for operating conditions other than those listed above.

See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
TT H/V/D 038 (Part Load)

1000 CFM Nominal (Rated) Airflow Cooling, 1000 CFM Nominal (Rated) Airflow Heating

Performance capacities shown in thousands of Btu/h

EWT °F	GPM	WPD		Cooling - EAT 80/67°F							Heating - EAT 70°F					
		PSI	FT	Airflow CFM	TC	SC	Sens/Tot Ratio	kW	HR	EER	Airflow CFM	HC	kW	HE	LAT	COP
20	8.0	4.7	10.9	Operation not recommended							860	17.5	1.60	12.4	88.9	3.21
	8.0	4.7	10.9	Operation not recommended							1000	17.7	1.55	12.6	86.4	3.34
30	4.0	1.2	2.8	860	30.4	19.2	0.63	0.79	33.0	38.3	860	19.3	1.61	14.1	90.8	3.52
	4.0	1.2	2.8	1000	30.8	20.2	0.66	0.80	33.5	38.3	1000	19.5	1.56	14.4	88.1	3.67
	6.0	2.6	6.1	860	30.7	19.2	0.63	0.75	33.2	40.9	860	20.0	1.61	14.8	91.5	3.64
	6.0	2.6	6.1	1000	31.1	20.2	0.65	0.76	33.6	40.9	1000	20.2	1.56	15.1	88.7	3.79
	8.0	4.5	10.4	860	30.9	19.3	0.63	0.73	33.3	42.2	860	20.4	1.61	15.2	91.9	3.70
	8.0	4.5	10.4	1000	31.3	20.3	0.65	0.74	33.8	42.2	1000	20.6	1.57	15.5	89.1	3.85
40	4.0	1.1	2.5	860	31.1	20.8	0.67	0.90	34.1	34.5	860	22.0	1.62	16.8	93.7	3.98
	4.0	1.1	2.5	1000	31.6	21.8	0.69	0.91	34.6	34.5	1000	22.3	1.57	17.1	90.6	4.15
	6.0	2.6	5.9	860	31.3	20.8	0.66	0.84	34.2	37.3	860	22.9	1.63	17.6	94.6	4.12
	6.0	2.6	5.9	1000	31.8	21.9	0.69	0.85	34.6	37.3	1000	23.1	1.58	18.0	91.4	4.30
	8.0	4.4	10.2	860	31.5	20.8	0.66	0.81	34.2	38.8	860	23.3	1.63	18.1	95.1	4.20
	8.0	4.4	10.2	1000	32.0	21.9	0.69	0.82	34.7	38.8	1000	23.6	1.58	18.4	91.9	4.37
50	4.0	1.0	2.2	860	30.9	21.4	0.69	1.04	34.4	29.8	860	24.9	1.64	19.6	96.8	4.45
	4.0	1.0	2.2	1000	31.3	22.5	0.72	1.05	34.8	29.8	1000	25.2	1.59	20.0	93.3	4.64
	6.0	2.5	5.7	860	31.2	21.6	0.69	0.96	34.4	32.6	860	25.9	1.64	20.6	97.9	4.62
	6.0	2.5	5.7	1000	31.7	22.7	0.72	0.97	34.9	32.6	1000	26.2	1.60	21.0	94.3	4.81
	8.0	4.2	9.7	860	31.4	21.6	0.69	0.92	34.5	34.1	860	26.5	1.65	21.1	98.5	4.70
	8.0	4.2	9.7	1000	31.8	22.7	0.71	0.93	35.0	34.1	1000	26.8	1.60	21.5	94.8	4.89
60	4.0	0.9	2.0	860	29.7	21.5	0.72	1.19	33.8	25.0	860	27.8	1.66	22.5	100.0	4.93
	4.0	0.9	2.0	1000	30.2	22.6	0.75	1.21	34.2	25.0	1000	28.1	1.61	22.9	96.1	5.13
	6.0	2.4	5.5	860	30.4	21.7	0.71	1.10	34.2	27.7	860	29.0	1.66	23.7	101.3	5.12
	6.0	2.4	5.5	1000	30.9	22.8	0.74	1.11	34.6	27.7	1000	29.4	1.62	24.1	97.2	5.33
	8.0	4.1	9.5	860	30.7	21.7	0.71	1.06	34.3	29.1	860	29.7	1.67	24.3	102.0	5.22
	8.0	4.1	9.5	1000	31.2	22.8	0.73	1.07	34.8	29.1	1000	30.0	1.62	24.8	97.8	5.44
70	4.0	0.8	1.8	860	28.2	20.9	0.74	1.37	32.8	20.6	860	30.9	1.68	25.4	103.2	5.40
	4.0	0.8	1.8	1000	28.6	22.0	0.77	1.39	33.3	20.6	1000	31.2	1.63	25.9	98.9	5.63
	6.0	2.3	5.3	860	29.1	21.3	0.73	1.27	33.4	23.0	860	32.3	1.68	26.8	104.8	5.62
	6.0	2.3	5.3	1000	29.5	22.4	0.76	1.28	33.8	23.0	1000	32.7	1.64	27.4	100.3	5.85
	8.0	4.0	9.2	860	29.5	21.4	0.73	1.22	33.6	24.3	860	33.1	1.69	27.6	105.6	5.74
	8.0	4.0	9.2	1000	29.9	22.5	0.75	1.23	34.1	24.3	1000	33.5	1.64	28.1	101.0	5.98
80	4.0	0.7	1.7	860	26.4	20.1	0.76	1.56	31.7	16.9	860	34.0	1.70	28.5	106.7	5.88
	4.0	0.7	1.7	1000	26.8	21.2	0.79	1.59	32.2	16.9	1000	34.4	1.65	29.1	101.9	6.13
	6.0	2.3	5.2	860	27.4	20.6	0.75	1.45	32.3	18.8	860	35.7	1.71	30.2	108.4	6.13
	6.0	2.3	5.2	1000	27.8	21.6	0.78	1.47	32.8	18.8	1000	36.1	1.66	30.7	103.4	6.38
	8.0	3.9	9.0	860	27.9	20.8	0.75	1.40	32.6	19.9	860	36.6	1.71	31.0	109.4	6.27
	8.0	3.9	9.0	1000	28.3	21.8	0.77	1.42	33.1	19.9	1000	37.0	1.66	31.7	104.3	6.53
85	4.0	0.7	1.6	860	25.5	19.7	0.77	1.67	31.2	15.3	860	35.7	1.71	30.1	108.4	6.13
	4.0	0.7	1.6	1000	25.9	20.8	0.80	1.70	31.7	15.3	1000	36.1	1.66	30.7	103.4	6.38
	6.0	2.2	5.1	860	26.5	20.2	0.76	1.56	31.8	17.0	860	37.5	1.72	31.9	110.3	6.39
	6.0	2.2	5.1	1000	26.9	21.2	0.79	1.58	32.2	17.0	1000	37.9	1.67	32.5	105.1	6.66
	8.0	3.8	8.8	860	27.0	20.4	0.76	1.50	32.1	17.9	860	38.5	1.73	32.8	111.4	6.54
	8.0	3.8	8.8	1000	27.4	21.4	0.78	1.53	32.5	17.9	1000	38.9	1.67	33.5	106.0	6.81
90	4.0	0.7	1.5	860	24.7	19.3	0.78	1.79	30.7	13.8	860	37.3	1.72	31.7	110.2	6.37
	4.0	0.7	1.5	1000	25.0	20.3	0.81	1.81	31.2	13.8	1000	37.7	1.67	32.3	104.9	6.63
	6.0	2.1	4.9	860	25.6	19.7	0.77	1.67	31.2	15.3	860	39.2	1.73	33.6	112.2	6.65
	6.0	2.1	4.9	1000	25.9	20.8	0.80	1.69	31.7	15.3	1000	39.7	1.68	34.2	106.7	6.92
	8.0	3.7	8.5	860	26.1	20.0	0.77	1.61	31.5	16.2	860	40.3	1.74	34.6	113.4	6.80
	8.0	3.7	8.5	1000	26.4	21.0	0.79	1.63	32.0	16.2	1000	40.8	1.69	35.3	107.7	7.08
100	4.0	0.6	1.4	860	23.1	18.8	0.81	2.03	30.0	11.4	Operation not recommended					
	4.0	0.6	1.4	1000	23.4	19.7	0.84	2.06	30.4	11.4						
	6.0	2.1	4.8	860	23.8	19.0	0.80	1.90	30.3	12.5						
	6.0	2.1	4.8	1000	24.2	20.0	0.83	1.93	30.8	12.5						
	8.0	3.6	8.3	860	24.3	19.2	0.79	1.84	30.5	13.2						
	8.0	3.6	8.3	1000	24.6	20.2	0.82	1.87	31.0	13.2						
110	4.0	0.6	1.3	860	21.9	18.6	0.85	2.30	29.7	9.5	Operation not recommended					
	4.0	0.6	1.3	1000	22.2	19.6	0.88	2.34	30.2	9.5						
	6.0	2.0	4.6	860	22.4	18.6	0.83	2.16	29.8	10.4						
	6.0	2.0	4.6	1000	22.7	19.6	0.86	2.19	30.2	10.4						
	8.0	3.4	7.9	860	22.7	18.7	0.82	2.10	29.9	10.8						
	8.0	3.4	7.9	1000	23.0	19.6	0.85	2.13	30.3	10.8						
120	4.0	0.5	1.2	860	21.0	18.2	0.87	2.58	29.9	8.2	Operation not recommended					
	4.0	0.5	1.2	1000	21.3	19.2	0.90	2.61	30.3	8.2						
	6.0	1.9	4.5	860	21.5	18.6	0.87	2.45	29.9	8.8						
	6.0	1.9	4.5	1000	21.8	19.6	0.90	2.49	30.3	8.8						
	8.0	3.3	7.7	860	21.7	18.7	0.86	2.41	29.9	9.0						
	8.0	3.3	7.7	1000	22.0	19.7	0.90	2.45	30.3	9.0						

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.
 ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
 Table does not reflect fan or pump power corrections for ARI/ISO conditions.
 All performance is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 40°F EWT is based upon a 15% antifreeze solution.
 Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
TT H/V/D 038 (Full Load)

1250 CFM Nominal (Rated) Airflow Cooling, 1250 CFM Nominal (Rated) Airflow Heating

Performance capacities shown in thousands of Btu/h

EWT °F	GPM	WPD		Cooling - EAT 80/67°F							Heating - EAT 70°F					
		PSI	FT	Airflow CFM	TC	SC	Sens/Tot Ratio	kW	HR	EER	Airflow CFM	HC	kW	HE	LAT	COP
20	9.0	5.9	13.7	Operation not recommended							1080	25.7	2.28	18.2	92.0	3.30
	9.0	5.9	13.7	Operation not recommended							1250	26.2	2.18	18.8	89.4	3.51
30	4.5	1.7	3.9	1080	43.1	27.4	0.64	1.55	48.3	27.9	1080	27.9	2.32	20.2	93.9	3.52
	4.5	1.7	3.9	1250	44.1	30.1	0.68	1.61	49.6	27.3	1250	28.4	2.22	20.9	91.1	3.75
	6.8	3.3	7.7	1080	43.3	27.5	0.63	1.44	48.1	30.0	1080	29.2	2.35	21.4	95.0	3.64
	6.8	3.3	7.7	1250	44.3	30.1	0.68	1.51	49.4	29.4	1250	29.7	2.25	22.1	92.0	3.87
	9.0	5.7	13.1	1080	43.4	27.5	0.63	1.39	48.1	31.2	1080	29.9	2.36	22.0	95.6	3.71
	9.0	5.7	13.1	1250	44.4	30.1	0.68	1.45	49.4	30.6	1250	30.4	2.26	22.8	92.5	3.94
40	4.5	1.5	3.5	1080	42.3	27.5	0.65	1.69	48.0	25.0	1080	31.8	2.40	23.8	97.2	3.88
	4.5	1.5	3.5	1250	43.3	30.1	0.69	1.77	49.4	24.5	1250	32.4	2.30	24.6	94.0	4.12
	6.8	3.2	7.4	1080	42.9	27.6	0.64	1.59	48.2	27.1	1080	33.3	2.44	25.2	98.6	4.01
	6.8	3.2	7.4	1250	43.9	30.2	0.69	1.66	49.6	26.5	1250	33.9	2.34	26.0	95.1	4.26
	9.0	5.4	12.5	1080	43.1	27.6	0.64	1.53	48.3	28.1	1080	34.1	2.46	25.9	99.3	4.08
	9.0	5.4	12.5	1250	44.1	30.3	0.69	1.60	49.6	27.6	1250	34.8	2.35	26.8	95.8	4.33
50	4.5	1.3	3.1	1080	41.1	27.1	0.66	1.85	47.4	22.2	1080	35.7	2.49	27.4	100.6	4.20
	4.5	1.3	3.1	1250	42.1	29.7	0.70	1.93	48.7	21.8	1250	36.4	2.39	28.3	97.0	4.47
	6.8	3.1	7.2	1080	42.0	27.4	0.65	1.74	47.9	24.2	1080	37.5	2.54	29.0	102.2	4.34
	6.8	3.1	7.2	1250	43.0	30.0	0.70	1.81	49.2	23.7	1250	38.3	2.43	30.0	98.3	4.61
	9.0	5.2	12.0	1080	42.4	27.5	0.65	1.68	48.1	25.2	1080	38.5	2.56	29.9	103.0	4.41
	9.0	5.2	12.0	1250	43.4	30.1	0.69	1.75	49.4	24.8	1250	39.3	2.46	30.9	99.1	4.68
60	4.5	1.2	2.8	1080	39.6	26.4	0.67	2.02	46.4	19.6	1080	39.8	2.60	31.0	104.1	4.50
	4.5	1.2	2.8	1250	40.5	29.0	0.72	2.11	47.7	19.2	1250	40.6	2.49	32.1	100.1	4.78
	6.8	3.0	6.9	1080	40.7	26.9	0.66	1.90	47.1	21.4	1080	41.9	2.65	32.9	105.9	4.63
	6.8	3.0	6.9	1250	41.7	29.5	0.71	1.98	48.4	21.0	1250	42.7	2.54	34.1	101.6	4.92
	9.0	5.0	11.6	1080	41.2	27.1	0.66	1.84	47.4	22.4	1080	43.1	2.69	34.0	106.9	4.70
	9.0	5.0	11.6	1250	42.2	29.7	0.70	1.92	48.7	22.0	1250	43.9	2.58	35.1	102.5	5.00
70	4.5	1.1	2.5	1080	37.8	25.7	0.68	2.22	45.3	17.0	1080	44.0	2.71	34.8	107.7	4.75
	4.5	1.1	2.5	1250	38.7	28.2	0.73	2.32	46.6	16.7	1250	44.8	2.60	36.0	103.2	5.05
	6.8	2.9	6.7	1080	39.1	26.2	0.67	2.08	46.1	18.8	1080	46.4	2.79	36.9	109.8	4.88
	6.8	2.9	6.7	1250	40.0	28.8	0.72	2.17	47.4	18.4	1250	47.3	2.67	38.2	105.0	5.19
	9.0	4.8	11.0	1080	39.7	26.5	0.67	2.01	46.5	19.7	1080	47.8	2.83	38.2	111.0	4.95
	9.0	4.8	11.0	1250	40.6	29.0	0.72	2.10	47.8	19.3	1250	48.7	2.71	39.5	106.1	5.27
80	4.5	1.0	2.3	1080	35.8	24.8	0.69	2.44	44.2	14.7	1080	48.3	2.84	38.6	111.4	4.98
	4.5	1.0	2.3	1250	36.7	27.2	0.74	2.55	45.4	14.4	1250	49.2	2.73	39.9	106.5	5.29
	6.8	2.8	6.6	1080	37.2	25.4	0.68	2.29	45.0	16.3	1080	51.1	2.93	41.1	113.8	5.10
	6.8	2.8	6.6	1250	38.0	27.9	0.73	2.39	46.2	15.9	1250	52.1	2.81	42.5	108.6	5.43
	9.0	4.5	10.4	1080	37.8	25.7	0.68	2.21	45.4	17.1	1080	52.7	2.99	42.4	115.1	5.17
	9.0	4.5	10.4	1250	38.7	28.2	0.73	2.31	46.6	16.8	1250	53.7	2.86	43.9	109.8	5.50
85	4.5	1.0	2.2	1080	34.8	24.3	0.70	2.57	43.6	13.6	1080	50.5	2.92	40.6	113.3	5.08
	4.5	1.0	2.2	1250	35.6	26.7	0.75	2.68	44.8	13.3	1250	51.5	2.80	41.9	108.1	5.40
	6.8	2.8	6.4	1080	36.2	25.0	0.69	2.40	44.4	15.0	1080	53.5	3.02	43.2	115.9	5.20
	6.8	2.8	6.4	1250	37.0	27.4	0.74	2.51	45.6	14.7	1250	54.5	2.89	44.7	110.4	5.53
	9.0	4.5	10.3	1080	36.8	25.3	0.69	2.33	44.8	15.8	1080	55.2	3.07	44.7	117.3	5.26
	9.0	4.5	10.3	1250	37.7	27.7	0.73	2.43	46.0	15.5	1250	56.3	2.95	46.2	111.7	5.59
90	4.5	0.9	2.1	1080	33.8	23.9	0.71	2.70	43.0	12.5	1080	52.7	2.99	42.5	115.2	5.17
	4.5	0.9	2.1	1250	34.6	26.2	0.76	2.81	44.2	12.3	1250	53.7	2.86	44.0	109.8	5.50
	6.8	2.7	6.2	1080	35.1	24.5	0.70	2.52	43.8	13.9	1080	55.9	3.10	45.3	117.9	5.29
	6.8	2.7	6.2	1250	36.0	26.9	0.75	2.63	45.0	13.7	1250	57.0	2.97	46.9	112.2	5.62
	9.0	4.4	10.2	1080	35.8	24.8	0.69	2.44	44.2	14.7	1080	57.7	3.16	46.9	119.5	5.35
	9.0	4.4	10.2	1250	36.7	27.2	0.74	2.55	45.4	14.4	1250	58.8	3.03	48.5	113.6	5.69
100	4.5	0.8	1.9	1080	31.8	22.9	0.72	2.99	42.0	10.6	Operation not recommended					
	4.5	0.8	1.9	1250	32.5	25.2	0.77	3.12	43.2	10.4						
	6.8	2.6	6.1	1080	33.1	23.5	0.71	2.80	42.6	11.8						
	6.8	2.6	6.1	1250	33.8	25.8	0.76	2.92	43.8	11.6						
	9.0	4.2	9.7	1080	33.7	23.9	0.71	2.70	43.0	12.5						
	9.0	4.2	9.7	1250	34.5	26.2	0.76	2.82	44.2	12.2						
110	4.5	0.8	1.8	1080	29.8	22.1	0.74	3.34	41.3	8.9	Operation not recommended					
	4.5	0.8	1.8	1250	30.5	24.2	0.79	3.49	42.4	8.7						
	6.8	2.5	5.9	1080	31.0	22.6	0.73	3.12	41.7	10.0						
	6.8	2.5	5.9	1250	31.7	24.8	0.78	3.25	42.9	9.8						
	9.0	4.0	9.2	1080	31.7	22.9	0.72	3.01	42.0	10.5						
	9.0	4.0	9.2	1250	32.4	25.1	0.77	3.14	43.1	10.3						
120	4.5	0.7	1.6	1080	28.0	21.3	0.76	3.74	40.9	7.5	Operation not recommended					
	4.5	0.7	1.6	1250	28.7	23.3	0.81	3.91	42.0	7.3						
	6.8	2.5	5.9	1080	29.1	21.7	0.75	3.49	41.1	8.3						
	6.8	2.5	5.9	1250	29.8	23.8	0.80	3.64	42.2	8.2						
	9.0	3.8	8.8	1080	29.7	22.0	0.74	3.36	41.2	8.8						
	9.0	3.8	8.8	1250	30.4	24.1	0.79	3.51	42.4	8.6						

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.
 ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
 Table does not reflect fan or pump power corrections for ARI/ISO conditions.
 All performance is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 40°F EWT is based upon a 15% antifreeze solution.
 Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
TT H/V/D 049 (Part Load)

1300 CFM Nominal (Rated) Airflow Cooling, 1400 CFM Nominal (Rated) Airflow Heating

Performance capacities shown in thousands of Btu/h

EWT °F	GPM	WPD		Cooling - EAT 80/67°F							Heating - EAT 70°F					
		PSI	FT	Airflow CFM	TC	SC	Sens/Tot Ratio	kW	HR	EER	Airflow CFM	HC	kW	HE	LAT	COP
20	11.0	4.0	9.3	Operation not recommended							1200	23.2	2.16	16.2	87.9	3.14
	11.0	4.0	9.3	Operation not recommended							1400	23.5	2.10	16.6	85.5	3.27
30	5.5	1.1	2.5	1120	38.6	24.0	0.62	1.20	42.6	32.0	1200	25.6	2.20	18.6	89.8	3.42
	5.5	1.1	2.5	1300	39.1	25.2	0.64	1.22	43.3	32.0	1400	25.9	2.14	18.9	87.2	3.56
	8.3	2.3	5.2	1120	38.8	24.0	0.62	1.14	42.6	34.2	1200	26.6	2.21	19.4	90.5	3.52
	8.3	2.3	5.2	1300	39.4	25.3	0.64	1.15	43.2	34.2	1400	26.9	2.15	19.8	87.8	3.67
	11.0	3.9	8.9	1120	39.0	24.0	0.61	1.10	42.7	35.4	1200	27.1	2.22	19.9	90.9	3.58
	11.0	3.9	8.9	1300	39.6	25.2	0.64	1.12	43.3	35.4	1400	27.4	2.15	20.3	88.1	3.73
40	5.5	1.0	2.3	1120	40.8	26.2	0.64	1.37	45.5	29.9	1200	29.6	2.24	22.4	92.9	3.88
	5.5	1.0	2.3	1300	41.4	27.6	0.67	1.38	46.1	29.9	1400	30.0	2.18	22.9	89.8	4.04
	8.3	2.2	5.0	1120	41.2	26.3	0.64	1.28	45.5	32.1	1200	30.9	2.25	23.6	93.8	4.02
	8.3	2.2	5.0	1300	41.8	27.6	0.66	1.30	46.2	32.1	1400	31.2	2.19	24.1	90.7	4.19
	11.0	3.7	8.6	1120	41.3	26.3	0.64	1.25	45.5	32.9	1200	31.6	2.26	24.3	94.4	4.10
	11.0	3.7	8.6	1300	41.9	27.6	0.66	1.27	46.1	32.9	1400	31.9	2.19	24.8	91.1	4.27
50	5.5	0.9	2.1	1120	40.8	26.8	0.66	1.49	45.9	27.3	1200	34.0	2.28	26.7	96.3	4.38
	5.5	0.9	2.1	1300	41.4	28.2	0.68	1.51	46.5	27.3	1400	34.4	2.21	27.2	92.8	4.56
	8.3	2.1	4.9	1120	41.2	26.9	0.65	1.41	45.9	29.1	1200	35.6	2.29	28.2	97.5	4.56
	8.3	2.1	4.9	1300	41.7	28.2	0.68	1.43	46.6	29.1	1400	36.0	2.23	28.8	93.8	4.74
	11.0	3.6	8.3	1120	41.3	26.9	0.65	1.40	46.0	29.4	1200	36.5	2.30	29.1	98.2	4.65
	11.0	3.6	8.3	1300	41.9	28.3	0.67	1.42	46.7	29.4	1400	36.9	2.23	29.6	94.4	4.85
60	5.5	0.8	2.0	1120	40.0	27.1	0.68	1.73	45.9	23.2	1200	38.7	2.32	31.2	99.8	4.89
	5.5	0.8	2.0	1300	40.6	28.5	0.70	1.75	46.5	23.2	1400	39.1	2.25	31.8	95.9	5.09
	8.3	2.0	4.7	1120	40.7	27.2	0.67	1.62	46.2	25.1	1200	40.6	2.33	33.0	101.3	5.10
	8.3	2.0	4.7	1300	41.3	28.6	0.69	1.64	46.9	25.1	1400	41.1	2.27	33.7	97.2	5.31
	11.0	3.5	8.1	1120	41.0	27.2	0.67	1.57	46.3	26.1	1200	41.7	2.34	34.1	102.1	5.21
	11.0	3.5	8.1	1300	41.5	28.7	0.69	1.59	46.9	26.1	1400	42.1	2.27	34.7	97.9	5.43
70	5.5	0.8	1.8	1120	38.2	26.5	0.69	1.94	44.8	19.7	1200	43.4	2.36	35.7	103.5	5.39
	5.5	0.8	1.8	1300	38.8	27.9	0.72	1.97	45.4	19.7	1400	43.9	2.29	36.4	99.0	5.62
	8.3	2.0	4.6	1120	39.3	26.9	0.68	1.82	45.5	21.6	1200	45.6	2.38	37.9	105.2	5.62
	8.3	2.0	4.6	1300	39.9	28.3	0.71	1.85	46.1	21.6	1400	46.1	2.31	38.6	100.5	5.85
	11.0	3.3	7.5	1120	39.8	27.1	0.68	1.76	45.7	22.6	1200	46.8	2.39	39.0	106.1	5.73
	11.0	3.3	7.5	1300	40.3	28.4	0.71	1.79	46.4	22.6	1400	47.3	2.32	39.7	101.3	5.97
80	5.5	0.7	1.7	1120	35.9	25.7	0.71	2.17	43.3	16.5	1200	48.0	2.40	40.2	107.1	5.86
	5.5	0.7	1.7	1300	36.5	27.0	0.74	2.20	43.9	16.5	1400	48.6	2.33	41.0	102.1	6.10
	8.3	1.9	4.5	1120	37.2	26.2	0.70	2.04	44.2	18.2	1200	50.4	2.43	42.5	108.9	6.07
	8.3	1.9	4.5	1300	37.7	27.5	0.73	2.07	44.8	18.2	1400	50.9	2.36	43.3	103.7	6.33
	11.0	3.2	7.3	1120	37.8	26.4	0.70	1.98	44.6	19.1	1200	51.6	2.45	43.7	109.8	6.18
	11.0	3.2	7.3	1300	38.4	27.8	0.72	2.01	45.2	19.1	1400	52.2	2.38	44.5	104.5	6.44
85	5.5	0.7	1.7	1120	34.7	25.2	0.73	2.30	42.5	15.0	1200	50.2	2.43	42.3	108.8	6.06
	5.5	0.7	1.7	1300	35.2	26.5	0.75	2.34	43.1	15.0	1400	50.8	2.36	43.1	103.6	6.31
	8.3	1.9	4.3	1120	36.0	25.7	0.71	2.17	43.4	16.6	1200	52.6	2.46	44.6	110.6	6.26
	8.3	1.9	4.3	1300	36.5	27.0	0.74	2.20	44.0	16.6	1400	53.2	2.39	45.4	105.2	6.52
	11.0	3.1	7.3	1120	36.6	25.9	0.71	2.10	43.8	17.4	1200	53.8	2.48	45.7	111.5	6.35
	11.0	3.1	7.3	1300	37.1	27.3	0.73	2.13	44.4	17.4	1400	54.4	2.41	46.6	106.0	6.62
90	5.5	0.7	1.6	1120	33.4	24.7	0.74	2.44	41.7	13.7	1200	52.4	2.46	44.4	110.5	6.25
	5.5	0.7	1.6	1300	33.9	25.9	0.77	2.47	42.3	13.7	1400	53.0	2.39	45.3	105.1	6.51
	8.3	1.8	4.2	1120	34.7	25.2	0.73	2.30	42.6	15.1	1200	54.8	2.50	46.7	112.3	6.44
	8.3	1.8	4.2	1300	35.2	26.5	0.75	2.33	43.2	15.1	1400	55.4	2.42	47.6	106.7	6.70
	11.0	3.1	7.2	1120	35.4	25.5	0.72	2.23	43.0	15.9	1200	56.0	2.52	47.8	113.2	6.52
	11.0	3.1	7.2	1300	35.9	26.8	0.75	2.26	43.6	15.9	1400	56.7	2.45	48.8	107.5	6.79
100	5.5	0.7	1.5	1120	30.9	23.7	0.77	2.73	40.2	11.3	Operation not recommended					
	5.5	0.7	1.5	1300	31.3	24.9	0.80	2.77	40.7	11.3						
	8.3	1.8	4.1	1120	32.1	24.2	0.75	2.58	40.9	12.5						
	8.3	1.8	4.1	1300	32.6	25.4	0.78	2.62	41.5	12.5						
	11.0	3.0	6.8	1120	32.8	24.4	0.74	2.50	41.3	13.1						
	11.0	3.0	6.8	1300	33.3	25.7	0.77	2.54	41.9	13.1						
110	5.5	0.6	1.5	1120	28.5	22.9	0.80	3.07	39.0	9.3	Operation not recommended					
	5.5	0.6	1.5	1300	28.9	24.1	0.83	3.11	39.6	9.3						
	8.3	1.7	4.0	1120	29.6	23.3	0.79	2.90	39.5	10.2						
	8.3	1.7	4.0	1300	30.0	24.5	0.81	2.94	40.1	10.2						
	11.0	2.8	6.6	1120	30.2	23.5	0.78	2.82	39.8	10.7						
	11.0	2.8	6.6	1300	30.6	24.7	0.81	2.86	40.4	10.7						
120	5.5	0.6	1.4	1120	26.7	22.7	0.85	3.45	38.4	7.7	Operation not recommended					
	5.5	0.6	1.4	1300	27.0	23.8	0.88	3.50	39.0	7.7						
	8.3	1.7	3.8	1120	27.5	22.7	0.83	3.26	38.6	8.4						
	8.3	1.7	3.8	1300	27.9	23.9	0.86	3.31	39.2	8.4						
	11.0	2.7	6.3	1120	27.9	22.8	0.82	3.17	38.8	8.8						
	11.0	2.7	6.3	1300	28.3	24.0	0.85	3.22	39.3	8.8						

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.
 ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
 Table does not reflect fan or pump power corrections for ARI/ISO conditions.
 All performance is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 40°F EWT is based upon a 15% antifreeze solution.
 Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in the shaded areas.

Performance Data TT H/V/D 049 (Full Load)

1550 CFM Nominal (Rated) Airflow Cooling, 1650 CFM Nominal (Rated) Airflow Heating

Performance capacities shown in thousands of Btu/h

EWT °F	GPM	WPD		Cooling - EAT 80/67°F							Heating - EAT 70°F					
		PSI	FT	Airflow CFM	TC	SC	Sens/Tot Ratio	kW	HR	EER	Airflow CFM	HC	kW	HE	LAT	COP
20	12.0	4.8	11.0	Operation not recommended							1430	31.6	2.90	22.1	90.5	3.20
	12.0	4.8	11.0								1650	32.3	2.78	22.9	88.1	3.40
30	6.0	1.3	2.9	1330	56.1	32.1	0.57	2.13	63.2	26.4	1430	34.7	2.98	24.9	92.5	3.41
	6.0	1.3	2.9	1550	57.4	35.1	0.61	2.22	65.0	25.9	1650	35.4	2.86	25.7	89.9	3.62
	9.0	2.7	6.1	1330	56.5	32.1	0.57	2.01	63.2	28.2	1430	36.3	3.03	26.3	93.5	3.51
	9.0	2.7	6.1	1550	57.9	35.2	0.61	2.09	65.0	27.6	1650	37.0	2.90	27.2	90.8	3.73
	12.0	4.6	10.5	1330	56.8	32.1	0.57	1.94	63.3	29.3	1430	37.2	3.05	27.0	94.1	3.57
	12.0	4.6	10.5	1550	58.2	35.2	0.61	2.03	65.1	28.7	1650	37.9	2.93	28.0	91.3	3.79
40	6.0	1.1	2.7	1330	55.8	33.0	0.59	2.32	63.6	24.1	1430	40.0	3.13	29.6	95.9	3.75
	6.0	1.1	2.7	1550	57.1	36.2	0.63	2.42	65.4	23.6	1650	40.8	3.00	30.6	92.9	3.99
	9.0	2.6	5.9	1330	56.4	33.0	0.59	2.19	63.7	25.8	1430	42.0	3.18	31.4	97.2	3.87
	9.0	2.6	5.9	1550	57.7	36.2	0.63	2.28	65.5	25.3	1650	42.8	3.05	32.4	94.0	4.11
	12.0	4.4	10.1	1330	56.6	33.0	0.58	2.12	63.8	26.7	1430	43.1	3.21	32.4	97.9	3.94
	12.0	4.4	10.1	1550	58.0	36.2	0.62	2.22	65.5	26.2	1650	43.9	3.08	33.5	94.6	4.19
50	6.0	1.1	2.5	1330	54.5	33.3	0.61	2.51	63.0	21.8	1430	45.5	3.27	34.6	99.5	4.08
	6.0	1.1	2.5	1550	55.8	36.5	0.65	2.62	64.7	21.3	1650	46.4	3.14	35.8	96.0	4.34
	9.0	2.5	5.7	1330	55.6	33.4	0.60	2.37	63.6	23.5	1430	48.0	3.33	36.8	101.1	4.22
	9.0	2.5	5.7	1550	56.9	36.6	0.64	2.47	65.4	23.0	1650	48.9	3.20	38.0	97.4	4.48
	12.0	4.2	9.6	1330	56.0	33.4	0.60	2.30	63.7	24.3	1430	49.3	3.37	38.0	101.9	4.29
	12.0	4.2	9.6	1550	57.3	36.7	0.64	2.40	65.5	23.8	1650	50.3	3.23	39.3	98.2	4.56
60	6.0	1.0	2.3	1330	52.5	32.6	0.62	2.71	61.7	19.4	1430	51.3	3.42	39.8	103.2	4.39
	6.0	1.0	2.3	1550	53.7	35.8	0.67	2.82	63.4	19.0	1650	52.3	3.28	41.1	99.3	4.67
	9.0	2.4	5.5	1330	54.0	33.1	0.61	2.56	62.7	21.1	1430	54.2	3.50	42.4	105.1	4.54
	9.0	2.4	5.5	1550	55.3	36.3	0.66	2.67	64.4	20.7	1650	55.2	3.36	43.8	101.0	4.83
	12.0	4.0	9.2	1330	54.7	33.3	0.61	2.49	63.1	21.9	1430	55.8	3.54	43.8	106.1	4.62
	12.0	4.0	9.2	1550	55.9	36.5	0.65	2.60	64.8	21.5	1650	56.9	3.40	45.3	101.9	4.91
70	6.0	0.9	2.2	1330	49.9	31.7	0.64	2.93	59.9	17.1	1430	57.2	3.58	45.1	107.1	4.68
	6.0	0.9	2.2	1550	51.1	34.8	0.68	3.06	61.6	16.7	1650	58.3	3.44	46.6	102.7	4.98
	9.0	2.3	5.4	1330	51.7	32.4	0.63	2.77	61.1	18.7	1430	60.6	3.68	48.1	109.2	4.83
	9.0	2.3	5.4	1550	53.0	35.5	0.67	2.89	62.8	18.3	1650	61.7	3.53	49.7	104.7	5.13
	12.0	3.8	8.8	1330	52.6	32.7	0.62	2.7	61.7	19.5	1430	62.4	3.73	49.7	110.4	4.90
	12.0	3.8	8.8	1550	53.8	35.8	0.67	2.81	63.4	19.1	1650	63.6	3.58	51.4	105.7	5.21
80	6.0	0.9	2.1	1330	47.1	30.6	0.65	3.18	57.9	14.8	1430	63.2	3.76	50.5	111.0	4.94
	6.0	0.9	2.1	1550	48.2	33.6	0.70	3.32	59.5	14.5	1650	64.5	3.60	52.2	106.2	5.25
	9.0	2.3	5.2	1330	49.0	31.4	0.64	3.01	59.3	16.3	1430	67.0	3.87	53.8	113.4	5.07
	9.0	2.3	5.2	1550	50.2	34.4	0.69	3.14	60.9	16.0	1650	68.3	3.71	55.7	108.3	5.39
	12.0	3.6	8.3	1330	50.0	31.7	0.63	2.92	59.9	17.1	1430	69.1	3.94	55.7	114.8	5.14
	12.0	3.6	8.3	1550	51.2	34.8	0.68	3.05	61.6	16.8	1650	70.5	3.78	57.6	109.5	5.47
85	6.0	0.9	2.0	1330	45.5	30.1	0.66	3.32	56.9	13.7	1430	66.3	3.85	53.2	112.9	5.04
	6.0	0.9	2.0	1550	46.6	33.0	0.71	3.47	58.5	13.4	1650	67.6	3.69	55.0	107.9	5.36
	9.0	2.2	5.1	1330	47.5	30.8	0.65	3.14	58.2	15.1	1430	70.3	3.98	56.7	115.5	5.18
	9.0	2.2	5.1	1550	48.6	33.8	0.69	3.28	59.8	14.8	1650	71.6	3.82	58.6	110.2	5.50
	12.0	3.6	8.2	1330	48.5	31.2	0.64	3.05	58.9	15.9	1430	72.5	4.06	58.6	116.9	5.24
	12.0	3.6	8.2	1550	49.6	34.2	0.69	3.19	60.5	15.6	1650	73.9	3.89	60.6	111.5	5.57
90	6.0	0.9	2.0	1330	44.0	29.5	0.67	3.47	55.9	12.7	1430	69.3	3.95	55.8	114.9	5.15
	6.0	0.9	2.0	1550	45.0	32.4	0.72	3.62	57.4	12.4	1650	70.7	3.78	57.7	109.7	5.47
	9.0	2.2	5.0	1330	46.0	30.2	0.66	3.28	57.2	14.0	1430	73.5	4.09	59.5	117.6	5.27
	9.0	2.2	5.0	1550	47.1	33.2	0.70	3.42	58.8	13.8	1650	74.9	3.92	61.6	112.1	5.60
	12.0	3.5	8.1	1330	47.0	30.6	0.65	3.18	57.9	14.8	1430	75.8	4.17	61.5	119.1	5.33
	12.0	3.5	8.1	1550	48.1	33.6	0.70	3.32	59.5	14.5	1650	77.3	4.00	63.6	113.4	5.66
100	6.0	0.8	1.9	1330	40.9	28.5	0.70	3.80	53.9	10.7	Operation not recommended					
	6.0	0.8	1.9	1550	41.8	31.2	0.75	3.97	55.4	10.5						
	9.0	2.1	4.8	1330	42.8	29.1	0.68	3.59	55.1	11.9						
	9.0	2.1	4.8	1550	43.8	31.9	0.73	3.74	56.6	11.7						
	12.0	3.3	7.7	1330	43.8	29.4	0.67	3.48	55.8	12.6						
	12.0	3.3	7.7	1550	44.9	32.3	0.72	3.64	57.3	12.3						
110	6.0	0.8	1.8	1330	37.8	27.6	0.73	4.19	52.2	9.0	Operation not recommended					
	6.0	0.8	1.8	1550	38.7	30.2	0.78	4.38	53.7	8.8						
	9.0	2.0	4.7	1330	39.6	28.1	0.71	3.95	53.2	10.0						
	9.0	2.0	4.7	1550	40.6	30.8	0.76	4.12	54.7	9.8						
	12.0	3.2	7.3	1330	40.6	28.4	0.70	3.83	53.7	10.6						
	12.0	3.2	7.3	1550	41.5	31.1	0.75	4.00	55.2	10.4						
120	6.0	0.8	1.7	1330	34.9	27.0	0.77	4.65	51.0	7.5	Operation not recommended					
	6.0	0.8	1.7	1550	35.8	29.6	0.83	4.86	52.4	7.4						
	9.0	2.0	4.5	1330	36.6	27.3	0.75	4.37	51.6	8.4						
	9.0	2.0	4.5	1550	37.4	29.9	0.80	4.57	53.1	8.2						
	12.0	3.0	7.0	1330	37.4	27.5	0.73	4.24	52.0	8.8						
	12.0	3.0	7.0	1550	38.3	30.1	0.79	4.43	53.5	8.7						

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.
 ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
 Table does not reflect fan or pump power corrections for ARI/ISO conditions.
 All performance is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 40°F EWT is based upon a 15% antifreeze solution.
 Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in the shaded areas.

**Performance Data
TT H/V/D 064 (Part Load)**

1500 CFM Nominal (Rated) Airflow Cooling, 1650 CFM Nominal (Rated) Airflow Heating

Performance capacities shown in thousands of Btu/h

EWT °F	GPM	WPD		Cooling - EAT 80/67°F							Heating - EAT 70°F					
		PSI	FT	Airflow CFM	TC	SC	Sens/Tot Ratio	kW	HR	EER	Airflow CFM	HC	kW	HE	LAT	COP
20	14.0	4.1	9.4	Operation not recommended							1430	28.7	2.85	19.5	88.6	2.95
	14.0	4.1	9.4	Operation not recommended							1650	29.0	2.77	19.9	86.3	3.07
30	7.0	0.5	1.1	1280	49.1	33.2	0.68	1.54	54.2	31.8	1430	31.7	2.87	22.5	90.5	3.24
	7.0	0.5	1.1	1500	49.7	35.0	0.70	1.56	55.0	31.8	1650	32.0	2.78	22.9	88.0	3.37
	10.5	1.9	4.4	1280	50.1	33.6	0.67	1.5	55.1	33.4	1430	32.7	2.87	23.4	91.2	3.34
	10.5	1.9	4.4	1500	50.8	35.3	0.70	1.52	55.9	33.4	1650	33.0	2.79	23.9	88.5	3.47
	14.0	3.9	9.0	1280	51.6	34.4	0.67	1.48	56.6	34.7	1430	33.2	2.87	24.0	91.5	3.39
	14.0	3.9	9.0	1500	52.3	36.2	0.69	1.51	57.4	34.7	1650	33.6	2.79	24.4	88.8	3.53
40	7.0	0.4	0.9	1280	51.9	35.8	0.69	1.68	57.6	30.9	1430	36.1	2.89	26.8	93.4	3.67
	7.0	0.4	0.9	1500	52.7	37.6	0.71	1.71	58.4	30.9	1650	36.5	2.80	27.4	90.5	3.82
	10.5	1.8	4.3	1280	52.3	35.8	0.68	1.60	57.7	32.7	1430	37.4	2.89	28.1	94.2	3.79
	10.5	1.8	4.3	1500	53.1	37.7	0.71	1.63	58.5	32.7	1650	37.8	2.81	28.6	91.2	3.95
	14.0	3.7	8.6	1280	52.7	35.9	0.68	1.57	57.9	33.6	1430	38.1	2.90	28.8	94.7	3.86
	14.0	3.7	8.6	1500	53.4	37.7	0.71	1.59	58.8	33.6	1650	38.5	2.81	29.3	91.6	4.02
50	7.0	0.3	0.7	1280	52.0	36.5	0.70	1.88	58.4	27.7	1430	40.9	2.91	31.5	96.5	4.11
	7.0	0.3	0.7	1500	52.8	38.4	0.73	1.91	59.2	27.7	1650	41.3	2.83	32.1	93.2	4.28
	10.5	1.8	4.1	1280	52.6	36.5	0.69	1.76	58.5	29.8	1430	42.4	2.92	33.0	97.5	4.26
	10.5	1.8	4.1	1500	53.3	38.4	0.72	1.79	59.3	29.8	1650	42.9	2.83	33.6	94.1	4.43
	14.0	3.6	8.2	1280	52.7	36.5	0.69	1.71	58.5	30.8	1430	43.2	2.92	33.8	98.0	4.33
	14.0	3.6	8.2	1500	53.5	38.4	0.72	1.74	59.4	30.8	1650	43.7	2.84	34.4	94.5	4.51
60	7.0	0.3	0.6	1280	50.2	35.8	0.71	2.12	57.3	23.7	1430	45.7	2.94	36.2	99.6	4.55
	7.0	0.3	0.6	1500	50.9	37.6	0.74	2.15	58.2	23.7	1650	46.2	2.86	36.9	95.9	4.74
	10.5	1.7	4.0	1280	51.3	36.2	0.71	1.98	58.0	25.9	1430	47.5	2.96	37.9	100.8	4.71
	10.5	1.7	4.0	1500	52.0	38.1	0.73	2.01	58.8	25.9	1650	48.0	2.87	38.7	97.0	4.91
	14.0	3.4	7.8	1280	51.8	36.4	0.70	1.91	58.3	27.1	1430	48.5	2.96	38.9	101.4	4.79
	14.0	3.4	7.8	1500	52.5	38.3	0.73	1.94	59.1	27.1	1650	49.0	2.88	39.6	97.5	4.99
70	7.0	0.2	0.5	1280	47.5	34.5	0.73	2.41	55.7	19.8	1430	50.6	2.98	40.9	102.8	4.97
	7.0	0.2	0.5	1500	48.2	36.3	0.75	2.44	56.5	19.8	1650	51.2	2.90	41.7	98.7	5.18
	10.5	1.7	3.9	1280	49.1	35.2	0.72	2.24	56.7	21.9	1430	52.6	3.01	42.9	104.1	5.13
	10.5	1.7	3.9	1500	49.7	37.1	0.74	2.28	57.5	21.9	1650	53.2	2.92	43.7	99.9	5.35
	14.0	3.3	7.5	1280	49.8	35.6	0.71	2.17	57.1	23.0	1430	53.7	3.02	43.9	104.8	5.22
	14.0	3.3	7.5	1500	50.5	37.4	0.74	2.20	57.9	23.0	1650	54.3	2.93	44.8	100.5	5.43
80	7.0	0.2	0.4	1280	44.5	33.0	0.74	2.74	53.8	16.2	1430	55.4	3.04	45.6	105.9	5.35
	7.0	0.2	0.4	1500	45.1	34.7	0.77	2.78	54.5	16.2	1650	56.1	2.95	46.5	101.5	5.57
	10.5	1.6	3.8	1280	46.1	33.8	0.73	2.56	54.8	18.0	1430	57.6	3.07	47.7	107.3	5.50
	10.5	1.6	3.8	1500	46.8	35.6	0.76	2.59	55.6	18.0	1650	58.3	2.98	48.6	102.7	5.73
	14.0	3.1	7.2	1280	46.9	34.2	0.73	2.47	55.3	19.0	1430	58.8	3.09	48.8	108.1	5.58
	14.0	3.1	7.2	1500	47.6	36.0	0.76	2.51	56.1	19.0	1650	59.5	3.00	49.7	103.4	5.81
85	7.0	0.2	0.4	1280	42.8	32.3	0.75	2.93	52.8	14.6	1430	57.8	3.08	47.8	107.4	5.51
	7.0	0.2	0.4	1500	43.5	34.0	0.78	2.97	53.6	14.6	1650	58.4	2.99	48.7	102.8	5.73
	10.5	1.6	3.7	1280	44.5	33.1	0.74	2.74	53.8	16.2	1430	60.0	3.11	49.9	108.9	5.65
	10.5	1.6	3.7	1500	45.1	34.8	0.77	2.78	54.6	16.2	1650	60.7	3.02	50.9	104.1	5.88
	14.0	3.0	7.0	1280	45.3	33.5	0.74	2.65	54.3	17.1	1430	61.2	3.14	51.0	109.6	5.72
	14.0	3.0	7.0	1500	46.0	35.2	0.77	2.68	55.1	17.1	1650	61.9	3.04	52.0	104.7	5.96
90	7.0	0.1	0.3	1280	41.2	31.6	0.77	3.12	51.8	13.2	1430	60.1	3.11	50.0	108.9	5.66
	7.0	0.1	0.3	1500	41.8	33.2	0.79	3.16	52.6	13.2	1650	60.8	3.02	51.0	104.1	5.90
	10.5	1.5	3.6	1280	42.9	32.3	0.75	2.92	52.8	14.7	1430	62.4	3.16	52.1	110.4	5.80
	10.5	1.5	3.6	1500	43.5	34.0	0.78	2.96	53.6	14.7	1650	63.1	3.06	53.2	105.4	6.04
	14.0	3.0	6.8	1280	43.7	32.7	0.75	2.82	53.3	15.5	1430	63.6	3.18	53.2	111.2	5.86
	14.0	3.0	6.8	1500	44.3	34.4	0.78	2.86	54.1	15.5	1650	64.3	3.09	54.3	106.1	6.10
100	7.0	0.1	0.2	1280	38.1	30.3	0.79	3.54	50.2	10.8	Operation not recommended					
	7.0	0.1	0.2	1500	38.7	31.9	0.82	3.59	50.9	10.8						
	10.5	1.5	3.5	1280	39.6	30.9	0.78	3.33	51.0	11.9						
	10.5	1.5	3.5	1500	40.2	32.5	0.81	3.38	51.7	11.9						
	14.0	2.8	6.5	1280	40.4	31.2	0.77	3.22	51.4	12.5						
	14.0	2.8	6.5	1500	41.0	32.8	0.80	3.27	52.1	12.5						
110	7.0	0.1	0.2	1280	35.5	29.6	0.83	4.02	49.3	8.8	Operation not recommended					
	7.0	0.1	0.2	1500	36.0	31.1	0.86	4.08	49.9	8.8						
	10.5	1.5	3.3	1280	36.7	29.8	0.81	3.79	49.6	9.7						
	10.5	1.5	3.3	1500	37.2	31.4	0.84	3.84	50.3	9.7						
	14.0	2.7	6.2	1280	37.3	30.0	0.80	3.67	49.9	10.2						
	14.0	2.7	6.2	1500	37.9	31.6	0.83	3.73	50.6	10.2						
120	7.0	0.1	0.1	1280	33.7	29.2	0.87	4.57	49.3	7.4	Operation not recommended					
	7.0	0.1	0.1	1500	34.2	30.7	0.90	4.63	50.0	7.4						
	10.5	1.4	3.2	1280	34.4	29.3	0.85	4.30	49.1	8.0						
	10.5	1.4	3.2	1500	34.9	30.8	0.88	4.36	49.8	8.0						
	14.0	2.6	6.0	1280	34.9	29.5	0.85	4.18	49.1	8.3						
	14.0	2.6	6.0	1500	35.4	31.0	0.88	4.24	49.8	8.3						

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.
 ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
 Table does not reflect fan or pump power corrections for ARI/ISO conditions.
 All performance is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 40°F EWT is based upon a 15% antifreeze solution.
 Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
TT H/V/D 064 (Full Load)

1825 CFM Nominal (Rated) Airflow Cooling, 2050 CFM Nominal (Rated) Airflow Heating

Performance capacities shown in thousands of Btu/h

EWT °F	GPM	WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F						
		PSI	FT	Airflow CFM	TC	SC	Sens/Tot Ratio	kW	HR	EER	Airflow CFM	HC	kW	HE	LAT	COP
20	15.0	5.0	11.6	Operation not recommended						1750	41.0	3.87	28.3	91.7	3.10	
	15.0	5.0	11.6							2050	41.8	3.71	29.2	88.9	3.30	
30	7.5	0.6	1.5	1580	65.8	41.6	0.63	2.78	75.1	23.7	1750	44.6	3.96	31.5	93.6	3.29
	7.5	0.6	1.5	1825	67.3	45.6	0.68	2.9	77.2	23.2	2050	45.4	3.8	32.6	90.5	3.50
	11.3	2.3	5.3	1580	66.7	42.1	0.63	2.65	75.7	25.2	1750	46.4	4.01	33.1	94.6	3.39
	11.3	2.3	5.3	1825	68.3	46.2	0.68	2.77	77.8	24.7	2050	47.3	3.85	34.3	91.4	3.6
	15.0	4.8	11	1580	68.1	42.9	0.63	2.60	76.8	26.2	1750	47.4	4.04	34.0	95.1	3.44
	15.0	4.8	11	1825	69.7	47.1	0.68	2.71	78.9	25.7	2050	48.3	3.88	35.2	91.8	3.65
40	7.5	0.5	1.2	1580	67.5	43.1	0.64	3.00	77.6	22.5	1750	50.6	4.13	36.9	96.8	3.59
	7.5	0.5	1.2	1825	69.1	47.3	0.68	3.13	79.8	22.0	2050	51.5	3.96	38.1	93.3	3.82
	11.3	2.2	5.1	1580	68.4	43.4	0.63	2.85	78.0	24	1750	52.8	4.19	38.8	97.9	3.69
	11.3	2.2	5.1	1825	70.0	47.6	0.68	2.98	80.2	23.5	2050	53.8	4.02	40.2	94.3	3.92
	15.0	4.5	10.4	1580	68.7	43.5	0.63	2.78	78	24.7	1750	53.9	4.22	39.9	98.5	3.74
	15.0	4.5	10.4	1825	70.3	47.7	0.68	2.90	80.2	24.2	2050	55.0	4.05	41.3	94.8	3.98
50	7.5	0.4	1.0	1580	67.7	43.9	0.65	3.27	78.7	20.7	1750	56.7	4.30	42.4	100.0	3.86
	7.5	0.4	1.0	1825	69.3	48.1	0.69	3.41	80.9	20.3	2050	57.8	4.12	43.8	96.1	4.11
	11.3	2.1	4.9	1580	68.4	43.9	0.64	3.08	78.8	22.2	1750	59.3	4.37	44.7	101.4	3.97
	11.3	2.1	4.9	1825	70.1	48.1	0.69	3.21	81.0	21.8	2050	60.4	4.19	46.2	97.3	4.22
	15.0	4.3	9.9	1580	68.8	43.9	0.64	2.99	78.9	23.0	1750	60.7	4.41	45.9	102.1	4.03
	15.0	4.3	9.9	1825	70.4	48.2	0.68	3.13	81.1	22.5	2050	61.8	4.23	47.5	97.9	4.28
60	7.5	0.4	0.8	1580	65.8	43.4	0.66	3.56	77.9	18.5	1750	63.0	4.48	48.0	103.3	4.12
	7.5	0.4	0.8	1825	67.3	47.6	0.71	3.72	80.0	18.1	2050	64.2	4.30	49.6	99.0	4.38
	11.3	2.1	4.8	1580	67.2	43.8	0.65	3.35	78.6	20.1	1750	66.0	4.57	50.6	104.9	4.23
	11.3	2.1	4.8	1825	68.8	48.0	0.70	3.49	80.7	19.7	2050	67.3	4.38	52.4	100.4	4.50
	15.0	4.1	9.4	1580	67.8	43.9	0.65	3.25	78.8	20.9	1750	67.6	4.62	52.1	105.8	4.29
	15.0	4.1	9.4	1825	69.4	48.1	0.69	3.39	80.9	20.5	2050	68.9	4.43	53.9	101.1	4.57
70	7.5	0.3	0.7	1580	63.1	42.5	0.67	3.91	76.4	16.1	1750	69.4	4.67	53.7	106.7	4.36
	7.5	0.3	0.7	1825	64.6	46.7	0.72	4.08	78.5	15.8	2050	70.8	4.48	55.6	102.0	4.63
	11.3	2.0	4.6	1580	65.0	43.2	0.66	3.66	77.5	17.8	1750	72.9	4.78	56.8	108.6	4.48
	11.3	2.0	4.6	1825	66.6	47.3	0.71	3.82	79.6	17.4	2050	74.4	4.58	58.8	103.6	4.76
	15.0	3.9	8.9	1580	65.9	43.4	0.66	3.54	77.9	18.6	1750	74.9	4.83	58.6	109.6	4.54
	15.0	3.9	8.9	1825	67.5	47.6	0.71	3.70	80.1	18.2	2050	76.3	4.63	60.6	104.5	4.83
80	7.5	0.2	0.5	1580	59.8	41.4	0.69	4.31	74.5	13.9	1750	76.1	4.87	59.7	110.3	4.58
	7.5	0.2	0.5	1825	61.2	45.4	0.74	4.50	76.6	13.6	2050	77.6	4.67	61.7	105.1	4.87
	11.3	2.0	4.5	1580	62.1	42.2	0.68	4.03	75.8	15.4	1750	80.2	5.00	63.3	112.4	4.70
	11.3	2.0	4.5	1825	63.6	46.3	0.73	4.21	77.9	15.1	2050	81.8	4.79	65.4	106.9	5.00
	15.0	3.7	8.4	1580	63.2	42.6	0.67	3.90	76.4	16.2	1750	82.5	5.07	65.3	113.6	4.77
	15.0	3.7	8.4	1825	64.7	46.7	0.72	4.07	78.6	15.9	2050	84.1	4.86	67.5	108.0	5.07
85	7.5	0.2	0.5	1580	58.0	40.7	0.70	4.54	73.6	12.8	1750	79.6	4.98	62.8	112.1	4.69
	7.5	0.2	0.5	1825	59.4	44.7	0.75	4.74	75.6	12.5	2050	81.2	4.78	64.9	106.7	4.98
	11.3	1.9	4.4	1580	60.4	41.6	0.69	4.24	74.9	14.2	1750	84.0	5.12	66.6	114.5	4.81
	11.3	1.9	4.4	1825	61.8	45.6	0.74	4.43	76.9	14.0	2050	85.6	4.91	68.9	108.7	5.11
	15.0	3.6	8.2	1580	61.5	42.0	0.68	4.10	75.5	15.0	1750	86.5	5.20	68.8	115.8	4.88
	15.0	3.6	8.2	1825	63.0	46.1	0.73	4.28	77.6	14.7	2050	88.1	4.98	71.2	109.8	5.19
90	7.5	0.2	0.4	1580	56.2	40.1	0.71	4.78	72.6	11.8	1750	83.1	5.09	65.9	114.0	4.79
	7.5	0.2	0.4	1825	57.5	43.9	0.76	4.99	74.6	11.5	2050	84.7	4.88	68.1	108.3	5.09
	11.3	1.9	4.3	1580	58.7	41.0	0.70	4.46	73.9	13.2	1750	87.8	5.24	70.0	116.5	4.91
	11.3	1.9	4.3	1825	60.0	44.9	0.75	4.65	75.9	12.9	2050	89.5	5.02	72.4	110.4	5.22
	15.0	3.5	8.0	1580	59.9	41.4	0.69	4.31	74.6	13.9	1750	90.5	5.32	72.3	117.9	4.98
	15.0	3.5	8.0	1825	61.3	45.4	0.74	4.49	76.6	13.6	2050	92.2	5.10	74.8	111.7	5.30
100	7.5	0.1	0.3	1580	52.4	38.6	0.74	5.32	70.7	9.8	Operation not recommended					
	7.5	0.1	0.3	1825	53.6	42.3	0.79	5.55	72.6	9.7						
	11.3	1.8	4.2	1580	54.9	39.6	0.72	4.96	71.9	11.1						
	11.3	1.8	4.2	1825	56.2	43.4	0.77	5.18	73.9	10.9						
	15.0	3.3	7.6	1580	56.1	40.1	0.71	4.79	72.5	11.7						
	15.0	3.3	7.6	1825	57.5	43.9	0.76	5.00	74.6	11.5						
110	7.5	0.1	0.2	1580	48.6	37.1	0.76	5.95	69.0	8.2	Operation not recommended					
	7.5	0.1	0.2	1825	49.7	40.7	0.82	6.21	71.0	8.0						
	11.3	1.8	4.0	1580	51.0	38.1	0.75	5.54	70.0	9.2						
	11.3	1.8	4.0	1825	52.2	41.7	0.80	5.78	72.0	9.0						
	15.0	3.1	7.2	1580	52.2	38.6	0.74	5.34	70.6	9.8						
	15.0	3.1	7.2	1825	53.5	42.3	0.79	5.58	72.5	9.6						
120	7.5	0.1	0.1	1580	44.9	35.7	0.80	6.67	67.9	6.7	Operation not recommended					
	7.5	0.1	0.1	1825	46.0	39.2	0.85	6.97	69.8	6.6						
	11.3	1.7	3.9	1580	47.1	36.6	0.78	6.21	68.5	7.6						
	11.3	1.7	3.9	1825	48.3	40.1	0.83	6.48	70.5	7.4						
	15.0	2.9	6.8	1580	48.3	37.0	0.77	5.99	69.0	8.1						
	15.0	2.9	6.8	1825	49.5	40.6	0.82	6.25	70.9	7.9						

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.
 ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
 Table does not reflect fan or pump power corrections for ARI/ISO conditions.
 All performance is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 40°F EWT is based upon a 15% antifreeze solution.
 Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
TT H/V/D 072 (Part Load)

1500 CFM Nominal (Rated) Airflow Cooling, 1650 CFM Nominal (Rated) Airflow Heating

Performance capacities shown in thousands of Btu/h

Table with columns for EWT °F, GPM, WPD (PSI, FT), Cooling - EAT 80/67°F (Airflow CFM, TC, SC, Sens/Tot Ratio, kW, HR, EER), Heating - EAT 70°F (Airflow CFM, HC, kW, HE, LAT, COP). Includes rows for EWT from 20 to 120 and GPM from 1.5 to 15.0. Includes a shaded area for EWT 110 with the note 'Operation not recommended'.

Interpolation is permissible; extrapolation is not. All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating. ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating. Table does not reflect fan or pump power corrections for ARI/ISO conditions. All performance is based upon the lower voltage of dual voltage rated units. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated. Operation below 40°F EWT is based upon a 15% antifreeze solution. Operation below 60°F EWT requires optional insulated water/refrigerant circuit. See performance correction tables for operating conditions other than those listed above. See Performance Data Selection Notes for operation in the shaded areas.

CLIMATEMASTER WATER-SOURCE HEAT PUMPS

Tranquility 27™ Two-Stage (TT) Series

Rev.: 05/23/07D

Performance Data TT H/V/D 072 (Full Load)

1950 CFM Nominal (Rated) Airflow Cooling, 2100 CFM Nominal (Rated) Airflow Heating

Performance capacities shown in thousands of Btu/h

EWT °F	GPM	WPD		Cooling - EAT 80/67°F							Heating - EAT 70°F					
		PSI	FT	Airflow CFM	TC	SC	Sens/Tot Ratio	kW	HR	EER	Airflow CFM	HC	kW	HE	LAT	COP
20	17.0	10.1	23.3	Operation not recommended							1850	44.6	4.82	28.8	92.3	2.7
	17.0	10.1	23.3	Operation not recommended							2100	45.3	4.67	29.6	90.0	2.8
30	8.5	2.2	5.1	1830	74.3	47.4	0.6	3.20	85.2	23.2	1850	49.0	4.89	32.8	94.5	2.9
	8.5	2.2	5.1	1950	74.9	49.2	0.7	3.26	86.0	23.0	2100	49.7	4.74	33.7	91.9	3.1
	12.75	5.0	11.6	1830	74.8	47.9	0.6	3.07	85.2	24.3	1850	51.1	4.94	34.8	95.6	3.0
	12.75	5.0	11.6	1950	75.4	49.6	0.7	3.13	86.1	24.1	2100	51.9	4.78	35.7	92.9	3.2
	17.0	8.9	20.6	1830	75.4	48.3	0.6	2.95	85.4	25.5	1850	52.3	4.96	35.8	96.2	3.1
	17.0	8.9	20.6	1950	76.0	50.0	0.7	3.01	86.3	25.3	2100	53.1	4.81	36.8	93.4	3.2
40	8.5	2.1	4.9	1830	78.6	49.6	0.6	3.40	90.1	23.1	1850	56.8	5.06	40.0	98.4	3.3
	8.5	2.1	4.9	1950	79.2	51.4	0.6	3.46	91.0	22.9	2100	57.7	4.90	41.1	95.4	3.4
	12.75	4.7	10.9	1830	79.1	50.0	0.6	3.29	90.2	24.0	1850	59.7	5.13	42.7	99.9	3.4
	12.75	4.7	10.9	1950	79.7	51.8	0.6	3.35	91.1	23.8	2100	60.6	4.97	43.8	96.7	3.6
	17.0	8.3	19.2	1830	79.6	50.3	0.6	3.17	90.3	25.1	1850	61.4	5.17	44.2	100.7	3.5
	17.0	8.3	19.2	1950	80.2	52.2	0.7	3.23	91.2	24.8	2100	62.3	5.01	45.3	97.5	3.6
50	8.5	1.9	4.4	1830	79.5	49.9	0.6	3.89	92.7	20.4	1850	65.5	5.27	47.9	102.8	3.6
	8.5	1.9	4.4	1950	80.1	51.7	0.6	3.96	93.7	20.2	2100	66.5	5.11	49.1	99.3	3.8
	12.75	4.3	9.9	1830	80.1	50.6	0.6	3.74	92.9	21.4	1850	69.3	5.37	51.3	104.7	3.8
	12.75	4.3	9.9	1950	80.8	52.5	0.6	3.81	93.8	21.2	2100	70.3	5.21	52.7	101.0	4.0
	17.0	7.7	17.8	1830	80.7	51.1	0.6	3.61	92.9	22.3	1850	71.4	5.43	53.2	105.7	3.9
	17.0	7.7	17.8	1950	81.3	53.0	0.7	3.68	93.9	22.1	2100	72.5	5.26	54.6	102.0	4.0
60	8.5	1.7	3.9	1830	77.4	49.0	0.6	4.43	92.5	17.5	1850	74.7	5.52	56.1	107.4	4.0
	8.5	1.7	3.9	1950	78.0	50.8	0.7	4.51	93.4	17.3	2100	75.8	5.35	57.6	103.4	4.2
	12.75	3.9	9.0	1830	78.2	49.6	0.6	4.24	92.7	18.5	1850	79.2	5.66	60.2	109.7	4.1
	12.75	3.9	9.0	1950	78.9	51.4	0.7	4.31	93.6	18.3	2100	80.5	5.49	61.8	105.5	4.3
	17.0	7.0	16.2	1830	79.1	50.0	0.6	4.17	93.2	19.0	1850	81.8	5.74	62.4	110.9	4.2
	17.0	7.0	16.2	1950	79.7	51.8	0.6	4.24	94.2	18.8	2100	83.0	5.56	64.1	106.6	4.4
70	8.5	1.7	3.9	1830	71.9	48.6	0.7	4.78	88.2	15.0	1850	84.0	5.81	64.4	112.0	4.2
	8.5	1.7	3.9	1950	72.5	50.3	0.7	4.86	89.1	14.9	2100	85.3	5.63	66.1	107.6	4.4
	12.75	3.9	9.0	1830	74.4	48.9	0.7	4.52	89.8	16.5	1850	89.2	5.99	68.9	114.6	4.4
	12.75	3.9	9.0	1950	75.0	50.7	0.7	4.60	90.8	16.3	2100	90.5	5.80	70.7	109.9	4.6
	17.0	6.9	15.9	1830	75.5	49.1	0.7	4.41	90.5	17.1	1850	92.0	6.09	71.3	116.0	4.4
	17.0	6.9	15.9	1950	76.1	50.8	0.7	4.49	91.4	16.9	2100	93.4	5.90	73.2	111.2	4.6
80	8.5	1.6	3.7	1830	67.5	48.0	0.7	5.21	85.4	13.0	1850	93.1	6.13	72.3	116.6	4.5
	8.5	1.6	3.7	1950	68.1	49.8	0.7	5.31	86.2	12.8	2100	94.5	5.94	74.3	111.7	4.7
	12.75	3.6	8.3	1830	70.6	48.4	0.7	4.91	87.4	14.4	1850	98.6	6.34	77.0	119.3	4.6
	12.75	3.6	8.3	1950	71.2	50.2	0.7	4.99	88.2	14.2	2100	100.1	6.15	79.1	114.1	4.8
	17.0	6.5	15.0	1830	72.0	48.6	0.7	4.77	88.3	15.1	1850	101.4	6.46	79.4	120.7	4.6
	17.0	6.5	15.0	1950	72.6	50.4	0.7	4.85	89.2	15.0	2100	102.9	6.26	81.5	115.4	4.8
85	8.5	1.6	3.7	1830	65.2	47.6	0.7	5.47	83.9	12.0	1850	97.4	6.30	76.0	118.7	4.5
	8.5	1.6	3.7	1950	65.7	49.3	0.7	5.57	84.8	11.9	2100	98.9	6.11	78.0	113.6	4.7
	12.75	3.6	8.3	1830	68.3	48.1	0.7	5.14	85.9	13.3	1850	102.7	6.53	80.5	121.4	4.6
	12.75	3.6	8.3	1950	68.8	49.8	0.7	5.24	86.7	13.2	2100	104.3	6.33	82.7	116.0	4.8
	17.0	6.5	15.0	1830	69.8	48.3	0.7	4.99	86.9	14.0	1850	105.4	6.67	82.8	122.8	4.6
	17.0	6.5	15.0	1950	70.4	50.1	0.7	5.08	87.7	13.9	2100	107.0	6.46	85.0	117.2	4.9
90	8.5	1.6	3.7	1830	62.9	47.1	0.7	5.72	82.5	11.0	1850	101.6	6.48	79.6	120.9	4.6
	8.5	1.6	3.7	1950	63.4	48.8	0.8	5.83	83.3	10.9	2100	103.2	6.27	81.8	115.5	4.8
	12.75	3.6	8.3	1830	66.0	47.8	0.7	5.38	84.4	12.3	1850	106.9	6.73	84.0	123.5	4.7
	12.75	3.6	8.3	1950	66.5	49.5	0.7	5.48	85.2	12.1	2100	108.5	6.52	86.3	117.9	4.9
	17.0	6.5	15.0	1830	67.6	48.0	0.7	5.21	85.4	13.0	1850	109.5	6.87	86.1	124.8	4.7
	17.0	6.5	15.0	1950	68.1	49.8	0.7	5.31	86.3	12.8	2100	111.1	6.65	88.4	119.0	4.9
100	8.5	1.5	3.5	1830	58.4	45.7	0.8	6.29	80.0	9.3	Operation not recommended					
	8.5	1.5	3.5	1950	58.8	47.3	0.8	6.41	80.8	9.2						
	12.75	3.4	7.9	1830	61.2	46.6	0.8	5.92	81.5	10.3						
	12.75	3.4	7.9	1950	61.7	48.3	0.8	6.03	82.3	10.2						
	17.0	6.1	14.1	1830	62.7	47.1	0.8	5.74	82.4	10.9						
	17.0	6.1	14.1	1950	63.2	48.8	0.8	5.85	83.2	10.8						
110	8.5	1.4	3.2	1830	54.7	43.8	0.8	6.93	78.5	7.9	Operation not recommended					
	8.5	1.4	3.2	1950	55.1	45.4	0.8	7.06	79.3	7.8						
	12.75	3.3	7.6	1830	56.8	45.0	0.8	6.53	79.3	8.7						
	12.75	3.3	7.6	1950	57.3	46.6	0.8	6.65	80.1	8.6						
	17.0	5.8	13.4	1830	58.1	45.6	0.8	6.33	79.9	9.2						
	17.0	5.8	13.4	1950	58.6	47.2	0.8	6.45	80.7	9.1						
120	8.5	1.4	3.2	1830	52.5	41.8	0.8	7.63	78.7	6.9	Operation not recommended					
	8.5	1.4	3.2	1950	52.9	43.3	0.8	7.77	79.5	6.8						
	12.75	3.1	7.2	1830	53.6	43.0	0.8	7.19	78.3	7.5						
	12.75	3.1	7.2	1950	54.0	44.6	0.8	7.32	79.1	7.4						
	17.0	5.6	12.9	1830	54.4	43.7	0.8	6.98	78.4	7.8						
	17.0	5.6	12.9	1950	54.9	45.2	0.8	7.11	79.2	7.7						

Interpolation is permissible; extrapolation is not.

All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.

ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Table does not reflect fan or pump power corrections for ARI/ISO conditions.

All performance is based upon the lower voltage of dual voltage rated units.

Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

Operation below 40°F EWT is based upon a 15% antifreeze solution.

Operation below 60°F EWT requires optional insulated water/refrigerant circuit.

See performance correction tables for operating conditions other than those listed above.

See Performance Data Selection Notes for operation in the shaded areas.

**Part Load Performance Data
Correction Tables**

Air Flow Correction Table

Airflow	Cooling				Heating		
	Total Capacity	Sensible Capacity	Power	Heat of Rejection	Heating Capacity	Power	Heat of Extraction
60%	0.925	0.788	0.913	0.922	0.946	1.153	0.896
69%	0.946	0.829	0.926	0.942	0.959	1.107	0.924
75%	0.960	0.861	0.937	0.955	0.969	1.078	0.942
81%	0.972	0.895	0.950	0.968	0.977	1.053	0.959
88%	0.983	0.930	0.965	0.979	0.985	1.032	0.974
94%	0.992	0.965	0.982	0.990	0.993	1.014	0.988
100%	1.000	1.000	1.000	1.000	1.000	1.000	1.000
106%	1.007	1.033	1.020	1.009	1.006	0.989	1.011
113%	1.012	1.064	1.042	1.018	1.012	0.982	1.019
119%	1.016	1.092	1.066	1.025	1.018	0.979	1.027
125%	1.018	1.116	1.091	1.032	1.022	0.977	1.033
130%	1.019	1.132	1.112	1.037	1.026	0.975	1.038

Entering Air Correction Table

Heating			
Entering Air DB°F	Heating Capacity	Power	Heat of Extraction
40	1.052	0.779	1.120
45	1.043	0.808	1.102
50	1.035	0.841	1.084
55	1.027	0.877	1.065
60	1.019	0.915	1.045
65	1.010	0.957	1.023
68	1.004	0.982	1.010
70	1.000	1.000	1.000
75	0.989	1.045	0.974
80	0.976	1.093	0.946

* = Sensible capacity equals total capacity
ARI/ISO/ASHRAE 13256-1 uses entering air conditions of Cooling - 80.6°F DB/66.2°F WB, 1 and Heating - 68°F DB/59°F WB entering air temperature

Cooling													
Entering Air WB°F	Total Capacity	Sensible Cooling Capacity Multiplier - Entering DB °F										Power	Heat of Rejection
		60	65	70	75	80	80.6	85	90	95	100		
45	0.832	1.346	1.461	1.603	*	*	*	*	*	*	*	0.946	0.853
50	0.850	1.004	1.174	1.357	*	*	*	*	*	*	*	0.953	0.870
55	0.880	0.694	0.902	1.115	1.331	*	*	*	*	*	*	0.964	0.896
60	0.922		0.646	0.875	1.103	1.329	1.356	*	*	*	*	0.977	0.932
65	0.975			0.639	0.869	1.096	1.123	1.320	*	*	*	0.993	0.979
66.2	0.990			0.582	0.812	1.039	1.066	1.262	1.482	*	*	0.997	0.991
67	1.000			0.545	0.774	1.000	1.027	1.223	1.444	*	*	1.000	1.000
70	1.040				0.630	0.853	0.880	1.075	1.297	1.517	*	1.011	1.035
75	1.117					0.601	0.627	0.821	1.046	1.275	1.510	1.033	1.101

**Full Load Performance Data
Correction Tables**

Air Flow Correction Table

Airflow	Cooling				Heating		
	Total Capacity	Sensible Capacity	Power	Heat of Rejection	Heating Capacity	Power	Heat of Extraction
60%	0.920	0.781	0.959	0.927	0.946	1.241	0.881
69%	0.942	0.832	0.964	0.946	0.960	1.163	0.915
75%	0.956	0.867	0.696	0.959	0.969	1.115	0.937
81%	0.969	0.901	0.975	0.970	0.978	1.076	0.956
88%	0.981	0.934	0.982	0.981	0.986	1.043	0.973
94%	0.991	0.967	0.990	0.991	0.993	1.018	0.988
100%	1.000	1.000	1.000	1.000	1.000	1.000	1.000
106%	1.007	1.033	1.011	1.008	1.006	0.990	1.010
113%	1.013	1.065	1.023	1.015	1.012	0.986	1.017
119%	1.018	1.098	1.036	1.021	1.017	0.983	1.024
125%	1.021	1.131	1.051	1.026	1.021	0.981	1.030
130%	1.023	1.159	1.063	1.030	1.024	0.979	1.034

Entering Air Correction Table

Heating			
Entering Air DB°F	Heating Capacity	Power	Heat of Extraction
40	1.084	0.732	1.161
45	1.073	0.764	1.140
50	1.060	0.802	1.117
55	1.046	0.846	1.090
60	1.031	0.893	1.061
65	1.016	0.945	1.031
68	1.006	0.978	1.013
70	1.000	1.000	1.000
75	0.984	1.058	0.968
80	0.968	1.117	0.936

* = Sensible capacity equals total capacity
ARI/ISO/ASHRAE 13256-1 uses entering air conditions of Cooling - 80.6°F DB/66.2°F WB, 1 and Heating - 68°F DB/59°F WB entering air temperature

Cooling													
Entering Air WB°F	Total Capacity	Sensible Cooling Capacity Multiplier - Entering DB °F										Power	Heat of Rejection
		60	65	70	75	80	80.6	85	90	95	100		
45	0.876	1.286	1.302	1.389	*	*	*	*	*	*	*	0.981	0.895
50	0.883	1.002	1.099	1.241	*	*	*	*	*	*	*	0.985	0.901
55	0.903	0.706	0.871	1.060	1.271	*	*	*	*	*	*	0.989	0.918
60	0.935		0.617	0.844	1.079	1.319	1.349	*	*	*	*	0.993	0.945
65	0.979			0.595	0.849	1.096	1.128	1.342	*	*	*	0.998	0.982
66.2	0.991			0.531	0.789	1.040	1.070	1.284	1.522	*	*	0.999	0.993
67	1.000			0.486	0.747	1.000	1.030	1.245	1.481	*	*	1.000	1.000
70	1.035				0.583	0.842	0.873	1.090	1.327	1.552	*	1.003	1.030
75	1.105					0.552	0.584	0.811	1.057	1.290	1.510	1.008	1.088

**Antifreeze & Motorized Water Valve
Correction Tables**

Antifreeze Correction Table

Antifreeze Type	Antifreeze %	Cooling			Heating		WPD Corr. Fct. EWT 30°F
		EWT 90°F			EWT 30°F		
		Total Cap	Sens Cap	Power	Htg Cap	Power	
Water	0	1.000	1.000	1.000	1.000	1.000	1.000
Propylene Glycol	5	0.995	0.995	1.003	0.989	0.997	1.070
	15	0.986	0.986	1.009	0.968	0.990	1.210
	25	0.978	0.978	1.014	0.947	0.983	1.360
Methanol	5	0.997	0.997	1.002	0.989	0.997	1.070
	15	0.990	0.990	1.007	0.968	0.990	1.160
	25	0.982	0.982	1.012	0.949	0.984	1.220
Ethanol	5	0.998	0.998	1.002	0.981	0.994	1.140
	15	0.994	0.994	1.005	0.944	0.983	1.300
	25	0.986	0.986	1.009	0.917	0.974	1.360
Ethylene Glycol	5	0.998	0.998	1.002	0.993	0.998	1.040
	15	0.994	0.994	1.004	0.980	0.994	1.120
	25	0.988	0.988	1.008	0.966	0.990	1.200

Motorized Water Valve Corrections

Model	Cv	MOPD	WPD Adders (Part Load)			WPD Adders (Full Load)		
			GPM	PSI	FT	GPM	PSI	FT
026	10.3	125	3.5	0.12	0.27	4.0	0.15	0.35
	10.3	125	5.8	0.31	0.72	6.0	0.34	0.78
	10.3	125	7.0	0.46	1.07	8.0	0.60	1.39
038	10.3	125	4.0	0.15	0.35	4.5	0.19	0.44
	10.3	125	6.0	0.34	0.78	6.8	0.43	0.99
	10.3	125	8.0	0.60	1.39	9.0	0.76	1.76
049	10.3	125	5.5	0.29	0.66	6.0	0.34	0.78
	10.3	125	8.3	0.64	1.48	9.0	0.76	1.76
	10.3	125	11.0	1.14	2.63	12.0	1.36	3.14
064	8.9	125	7.0	0.62	1.43	7.5	0.71	1.64
	8.9	125	10.5	1.39	3.22	11.3	1.60	3.69
	8.9	125	14.0	2.47	5.72	15.0	2.84	6.56
072	8.9	125	7.5	0.71	1.64	8.5	0.91	2.11
	8.9	125	11.3	1.61	3.72	12.8	2.07	4.78
	8.9	125	15.0	2.84	6.56	17.0	3.65	8.43

ECM Control

The ECM fan is controlled by an interface board that converts thermostat inputs and field selectable CFM settings to signals used by the ECM motor controller. Units manufactured before July 2005 have version I (P/N 69243707). Units manufactured after July 2005 have version II (P/N 17B0019N01). Fan speeds are selected with jumpers for version I or via a nine position DIP switch for version II. To take full advantage of the ECM motor features, a multi-stage thermostat should be used (2-stage heat/2-stage cool or 3-stage heat/2-stage cool).

Note: Power must be off to the unit for at least three seconds before the ECM motor will recognize a speed change. The motor will recognize a change in the CFM Adjust or dehumidification mode settings while the unit is powered.

There are four different airflow settings from lowest airflow rate (speed tap 1) to the highest airflow rate (speed tap 4). The charts below indicate settings for both versions of the ECM interface board, followed by detailed information for each setting.

Cooling settings: TT, TS, GS units*

Tap Setting	Version I 69243707	Version II 17B0019N01	
	HP CFM	DIP Switch	
	Jumper	SW1	SW2
1	1	ON	ON
2	2	ON	OFF
3	3	OFF	ON
4	4	OFF	OFF

*GS units use the same settings for both cooling (normal) CFM and heating CFM.

Heating settings: TT, TS units*

Tap Setting	Version I 69243707	Version II 17B0019N01	
	DELAY	DIP Switch	
	Jumper	SW3	SW4
1	1	ON	ON
2	2	ON	OFF
3	3	OFF	ON
4	4	OFF	OFF

*This table not used for GS units.

Aux/Emerg Heat settings: TT, TS, GS units*

Tap Setting	Version I 69243707	Version II 17B0019N01	
	AUX CFM	DIP Switch	
	Jumper	SW5	SW6
1	1	ON	ON
2	2	ON	OFF
3	3	OFF	ON
4	4	OFF	OFF

*Residential units

CFM Adjust settings: TT, TS, GS units

Tap Setting	Version I 69243707	Version II 17B0019N01	
	CFM Adj	DIP Switch	
	Jumper	SW7	SW8
TEST	1	ON	ON
-	2	ON	OFF
+	3	OFF	ON
NORM	4	OFF	OFF

Dehum Mode settings: TT, TS, GS units

Tap Setting	Version I 69243707	Version II 17B0019N01	
	Dehumid	DIP Switch	
	Jumper	SW9	
NORM	pins 1,2	ON	
Dehumid	pins 2,3	OFF	

WARNING! When the disconnect switch is closed, high voltage is present in some areas of the electrical panel. Exercise caution when working with energized equipment.

Cooling settings: The cooling setting determines the cooling (normal) CFM for all units with ECM motor. Cooling (normal) setting is used when the unit is not in dehumidification mode. This setting also determines the heating CFM for Genesis (GS) units. Tap 1 is the lowest CFM setting, while tap 4 is the highest CFM setting. To avoid air coil freeze-up, tap 1 may not be used if the dehumidification mode is selected. Consult submittal data or specifications catalog for the specific unit series and model to correlate speed tap setting to airflow in CFM.

Heating settings: The heating setting determines the heating CFM for Tranquility 27™ (TT) and Tranquility 20™ (TS) units. This setting is not used for Genesis (GS) units. Tap 1 is the lowest CFM setting, while tap 4 is the highest CFM setting. Consult submittal data or specifications catalog for the specific unit series and model to correlate speed tap setting to airflow in CFM.

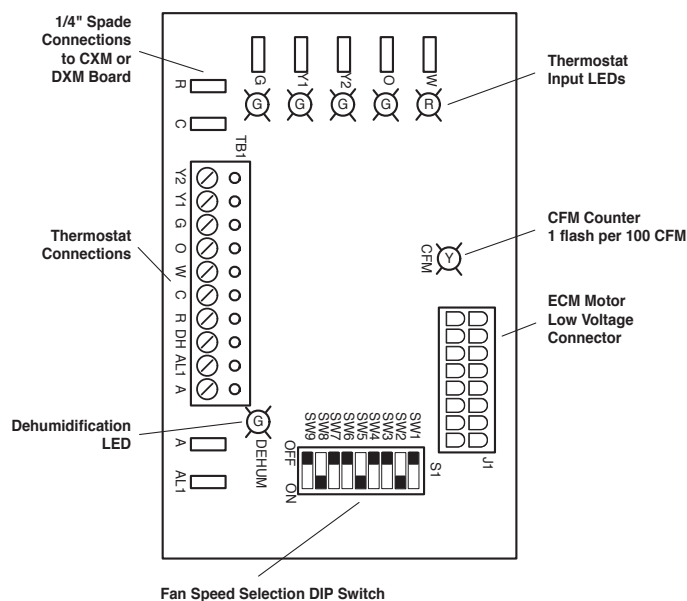
Auxiliary/Emergency Heat settings: The auxiliary/emergency heat setting determines the CFM when the unit is in auxiliary heat or emergency heat mode. This setting is used for residential units with internal electric heat. When auxiliary electric heat is energized (i.e. compressor and electric heat), the greater of the auxiliary/emergency or heating setting will be used. A “G” (fan) signal must be present from the thermostat for electric heat to operate. Consult the submittal data or specifications catalog for the specific unit series and model to correlate speed tap setting to airflow in CFM.

CFM Adjust settings: The CFM adjust setting allows four selections. The NORM setting is the factory default position. The + or – settings adjust the airflow by +/- 15%. The +/- settings are used to “fine tune” airflow adjustments. The TEST setting runs the ECM motor at 70% torque, which causes the motor to operate like a standard PSC motor, and disables the CFM counter.

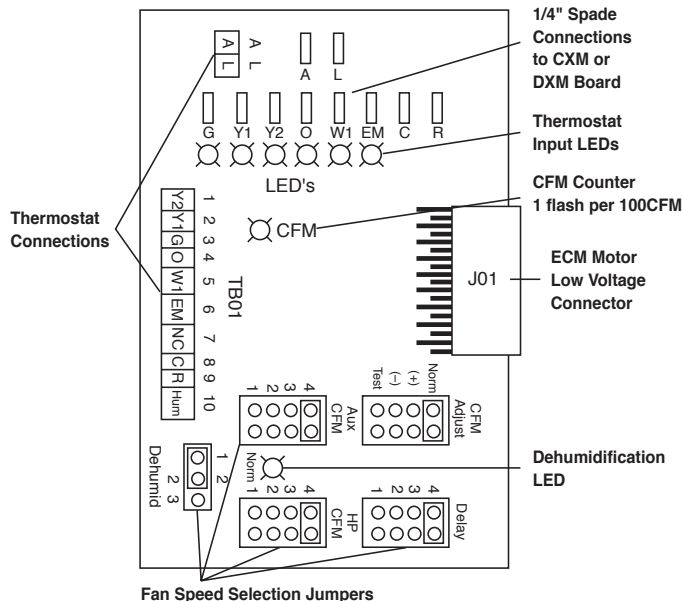
ECM Control

Dehumidification Mode settings: The dehumidification mode setting provides field selection of humidity control. When operating in the normal mode, the cooling airflow settings are determined by the cooling tap setting above. When dehumidification is enabled there is a reduction in airflow in cooling to increase the moisture removal of the heat pump. Consult submittal data or specifications catalog for the specific unit series and model to correlate speed tap to airflow in CFM. The dehumidification mode can be enabled in two ways.

1. **Constant Dehumidification Mode:** When the dehumidification mode is selected (via DIP switch or jumper setting), the ECM motor will operate with a multiplier applied to the cooling CFM settings (approx. 20-25% lower airflow). Any time the unit is running in the cooling mode, it will operate at the lower airflow to improve latent capacity. The “DEHUM” LED will be illuminated at all times. Heating airflow is not affected. NOTE: Do not select dehumidification mode if cooling setting is tap 1.
2. **Automatic (Humidistat-controlled) Dehumidification Mode:** When the dehumidification mode is selected (via DIP switch or jumper setting) AND a humidistat is connected to terminal DH (version II) or HUM (version I), the cooling airflow will only be reduced when the humidistat senses that additional dehumidification is required. The DH (or HUM) terminal is reverse logic. Therefore, a humidistat (not dehumidistat) is required. The “DEHUM” LED will be illuminated only when the humidistat is calling for dehumidification mode. Heating airflow is not affected. NOTE: Do not select dehumidification mode if cooling setting is tap 1.



ECM Interface Board version II
(P/N 17B0019N01)



ECM Interface Board version I
(P/N 69243707)

Blower Performance Data

Standard Unit - No Reheat

Airflow in CFM with wet coil and clean air filter

Model	Max ESP (in. wg)	Fan Motor (hp)	Tap Setting	Cooling Mode			Dehumid Mode			Heating Mode			Residential Units Only	
				Stg 1	Stg 2	Fan	Stg 1	Stg 2	Fan	Stg 1	Stg 2	Fan	AUX CFM	Aux/ Emerg Mode
TT H/V/D 026	0.50	1/2	4	810	950	475	630	740	475	920	1060	475	4	1060
	0.50	1/2	3	725	850	425	560	660	425	825	950	425	3	950
	0.50	1/2	2	620	730	370	490	570	370	710	820	370	2	820
	0.50	1/2	1	520	610	300				600	690	300	1	690
TT H/V/D 038	0.50	1/2	4	1120	1400	700	870	1090	700	1120	1400	700	4	1400
	0.50	1/2	3	1000	1250	630	780	980	630	1000	1250	630	3	1350
	0.50	1/2	2	860	1080	540	670	840	540	860	1080	540	2	1350
	0.50	1/2	1	730	900	450				730	900	450	1	1350
TT H/V/D 049	0.75	1	4	1460	1730	870	1140	1350	870	1560	1850	870	4	1850
	0.75	1	3	1300	1550	780	1020	1210	780	1400	1650	780	3	1660
	0.75	1	2	1120	1330	670	870	1040	670	1200	1430	670	2	1430
	0.75	1	1	940	1120	560				1010	1200	560	1	1350
TT H/V/D 064	0.75	1	4	1670	2050	1020	1300	1600	1020	1860	2280	1020	4	2280
	0.75	1	3	1500	1825	920	1160	1430	920	1650	2050	920	3	2040
	0.75	1	2	1280	1580	790	1000	1230	790	1430	1750	790	2	1750
	0.75	1	1	1080	1320	660				1200	1470	660	1	1470
TT H/V/D 072	0.75	1	4	1620	2190	1050	1270	1650	1050	1690	2230	1050	4	2230
	0.75	1	3	1500	1950	980	1170	1520	980	1600	2100	980	3	2100
	0.75	1	2	1400	1830	910	1100	1420	910	1400	1850	910	2	1870
	0.75	1	1	1320	1700	850				1240	1620	850	1	1670

Factory shipped on Tap Setting 2

During Auxiliary operation (residential units only) the CFM will run at the higher if the heating (delay jumper) or AUX settings

Airflow is controlled within +/- 5% up to Max ESP shown with wet coil and standard 1" fiberglass filter

Do not select Dehumidification mode if HP CFM is on setting 1

All units ARI/ISO/ASHRAE 13256-1 rated HP (Cooling) Delay (Heating) CFM Setting 3

Tranquility 27™ (TT) Series with ClimaDry Reheat Option

All Tranquility 27™ (TT) units have an ECM fan motor as a standard feature. The small additional pressure drop of the reheat coil causes the ECM motor to slightly increase RPM to overcome the added pressure drop, and maintain selected CFM up to the maximum ESP.

Physical Data

Model	026	038	049	064	072
Compressor (1 Each)	Two-Stage Scroll				
Factory Charge R410A (oz) [kg]	58 [1.64]	78 [2.21]	81 [2.30]	144 [4.08]	156 [4.42]
ECM Fan Motor & Blower					
Fan Motor (hp) [W]	1/2 [373]	1/2 [373]	1 [746]	1 [746]	1 [746]
Blower Wheel Size (dia x w) - (in) [mm]	9 x 7 [229 x 178]	11 x 10 [279 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]
Water Connection Size					
IPT (in)	3/4	3/4	1	1	1
HWG Connection Size					
IPT (in)	1/2	1/2	1/2	1/2	1/2
Coax Volume					
Volume (US Gallons) [liters]	0.76 [2.88]	0.92 [3.48]	1.24 [4.69]	1.56 [5.91]	1.56 [5.91]
Vertical Upflow/Downflow					
Air Coil Dimensions (h x w) - (in) [mm]	28 x 20 [711 x 508]	28 x 25 [711 x 635]	32 x 25 [813 x 635]	36 x 25 [914 x 635]	36 x 25 [914 x 635]
Standard Filter - 1" [25.4mm] Throwaway, qty (in) [mm]	28 x 24 [711 x 610]	28 x 30 [711 x 762]	2 - 16 x 30 [406 x 762]	1 - 16 x 30 [813 x 762] 1 - 20 x 30 [508 x 762]	1 - 16 x 30 [813 x 762] 1 - 20 x 30 [508 x 762]
Weight - Operating, (lbs) [kg]	266 [121]	327 [148]	416 [189]	443 [201]	443 [201]
Weight - Packaged, (lbs) [kg]	276 [125]	337 [153]	426 [193]	453 [205]	453 [205]
Horizontal					
Air Coil Dimensions (h x w) - (in) [mm]	18 x 31 [457 x 787]	20 x 25 [508 x 889]	20 x 40 [508 x 1016]	20 x 45 [508 x 1143]	20 x 45 [508 x 1143]
Standard Filter - 1" [25.4mm] Throwaway, qty (in) [mm]	2 - 18 x 18 [457 x 457]	1 - 12 x 20 [305 x 508] 1 - 20 x 24 [508 x 635]	1 - 18 x 20 [457 x 508] 1 - 20 x 24 [508 x 610]	2 - 20 x 24 [508 x 610]	2 - 20 x 24 [508 x 610]
Weight - Operating, (lbs) [kg]	266 [121]	327 [148]	416 [189]	443 [201]	443 [201]
Weight - Packaged, (lbs) [kg]	276 [125]	337 [153]	426 [193]	453 [205]	453 [205]

All units have spring compressor mountings, and 1/2" [12.2mm] & 3/4" [19.mm] electrical knockouts.

**TT - Horizontal
Dimensional Data**

Horizontal Model		Overall Cabinet		
		A Width	B Length	C Height
026	in	22.4	62.2	19.3
	cm	56.8	158.0	48.9
038	in	25.4	71.2	21.3
	cm	64.5	180.8	54.0
049	in	25.4	76.2	21.3
	cm	64.5	193.5	54.0
064 & 072	in	25.4	81.2	21.3
	cm	64.5	206.2	54.0

Horizontal Model		Water Connections							Water Connections - Units with ClimaDry	
		1	2	3	4	5	Water Loop IPT	HWG IPT	1	2
		Loop In D	Loop Out E	HWG In F	HWG Out G	H			Loop In D	Loop Out E
026	in	2.1	10.0	13.9	16.9	3.5	3/4"	1/2"	2.1	10.0
	cm	5.2	25.4	35.2	42.9	8.9				
038	in	3.4	10.8	15.6	18.9	3.4	3/4"	1/2"	5.96	13.13
	cm	8.6	27.5	39.7	47.9	8.6				
049	in	3.4	10.8	15.6	18.9	3.4	1"	1/2"	5.96	13.13
	cm	8.6	27.5	39.7	47.9	8.6				
064 & 072	in	3.4	10.8	15.6	18.9	3.4	1"	1/2"	5.96	13.13
	cm	8.6	27.5	39.7	47.9	8.6				

Horizontal Model		Electrical Knockouts		
		J 1/2"	K 1/2"	L 3/4"
		Low Voltage	External Pump	Power Supply
026	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9
038	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9
049	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9
064 & 072	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9

Notes:

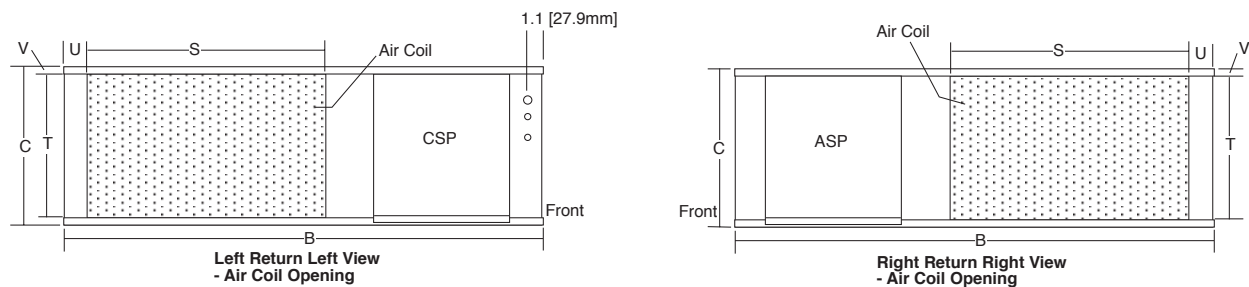
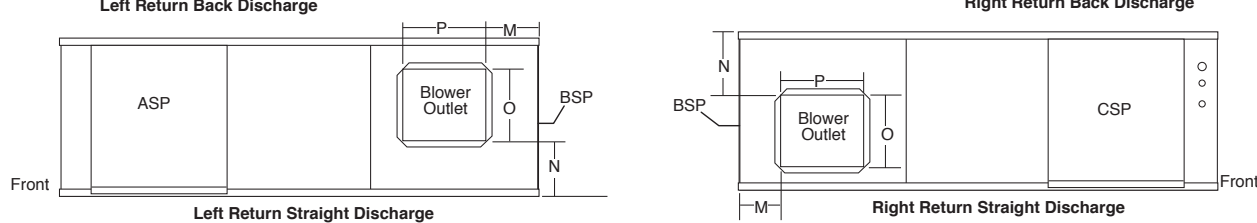
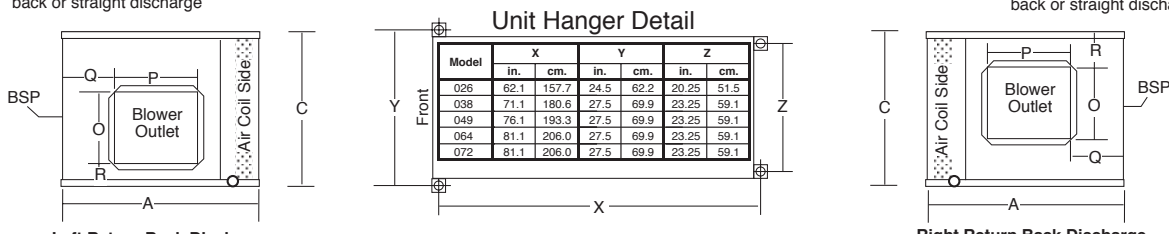
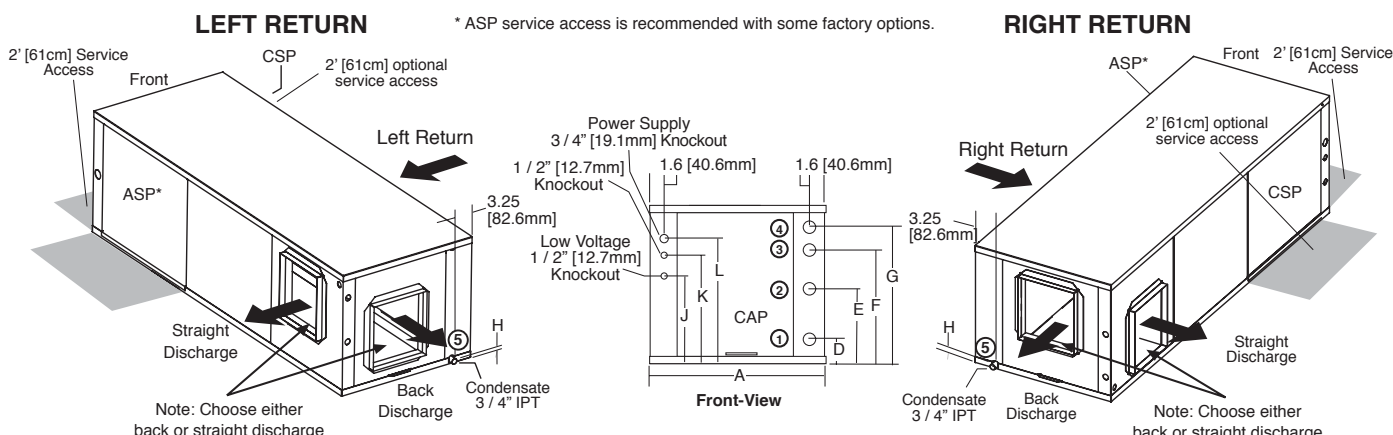
1. While clear access to all removable panels is not required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
2. Horizontal units shipped with filter bracket only. This bracket should be removed for return duct connection
3. Discharge flange and hanger brackets are factory installed.
4. Condensate is 3/4" IPT.
5. Blower service panel requires 2' service access.
6. Blower service access is through back panel on straight discharge units or through panel opposite air coil on back discharge units.

Legend:

- CAP = Control Access Panel
- BSP = Blower Service Panel
- CSP = Compressor Access Panel
- ASP = Alternative Service Panel

**TT - Horizontal
Dimensional Data**

Horizontal Model		Discharge Connection Duct Flange Installed (+/- 0.10 in, +/- 2.5mm)						Return Connection Using Return Air Opening			
		M	N	O Supply Height	P Supply Width	Q	R	S Return Width	T Return Height	U	V
026	in	3.6	2.0	12.5	15.5	3.6	2.0	33.8	16.2	2.3	1.5
	cm	9.3	5.1	31.8	39.4	9.2	5.2	85.8	41.0	5.8	3.9
038	in	3.1	1.2	19.0	17.5	3.1	1.0	34.8	18.2	3.1	1.5
	cm	8.0	3.1	48.3	44.5	8.0	2.6	88.3	46.1	7.8	3.9
049	in	3.1	1.2	19.0	17.5	3.1	1.0	39.8	18.2	3.1	1.5
	cm	8.0	3.1	48.3	44.5	8.0	2.6	101.0	46.1	7.8	3.9
064 & 072	in	3.1	1.2	19.0	17.5	3.1	1.0	44.8	18.2	3.1	1.5
	cm	8.0	3.1	48.3	44.5	8.0	2.6	113.7	46.1	7.8	3.9



**TT - Vertical Upflow
Dimensional Data**

Vertical Upflow Model		Overall Cabinet		
		A Width	B Depth	C Height
026	in	22.4	25.6	48.5
	cm	56.8	65.1	123.2
038	in	25.4	30.6	50.5
	cm	64.5	77.8	128.3
049	in	25.4	30.6	54.5
	cm	64.5	77.8	138.4
064 & 072	in	25.4	30.6	58.5
	cm	64.5	77.8	148.6

Vertical Upflow Model		Water Connections							Water Connections - Units with ClimaDry	
		1	2	3	4	5	Water Loop IPT	HWG IPT	1	2
		Loop In D	Loop Out E	HWG In F	HWG Out G	H			Loop In D	Loop Out E
026	in	2.1	10.0	13.9	16.9	7.8	3/4"	1/2"	2.1	10.0
	cm	5.2	25.4	35.2	42.9	19.8			5.2	25.4
038	in	3.4	10.8	15.6	18.9	7.8	3/4"	1/2"	5.96	13.13
	cm	8.6	27.5	39.7	47.9	19.8			15.14	33.35
049	in	3.4	10.8	15.6	18.9	7.8	1"	1/2"	5.96	13.13
	cm	8.6	27.5	39.7	47.9	19.8			15.14	33.35
064 & 072	in	3.4	10.8	15.6	18.9	7.8	1"	1/2"	5.96	13.13
	cm	8.6	27.5	39.7	47.9	19.8			15.14	33.35

Vertical Upflow Model		Electrical Knockouts		
		J 1/2"	K 1/2"	L 3/4"
		Low Voltage	External Pump	Power Supply
026	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9
038	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9
049	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9
064 & 072	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9

Notes:

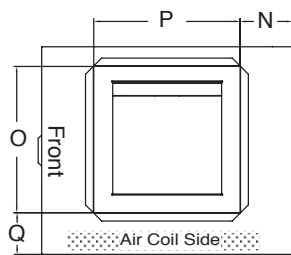
1. While clear access to all removable panels is not required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
2. Front & Side access is preferred for service access. However, all components may be serviced from the front access panel if side access is not available.
3. Discharge flange is field installed.
4. Condensate is 3/4" IPT PVC and is switchable from front to side.

Legend:

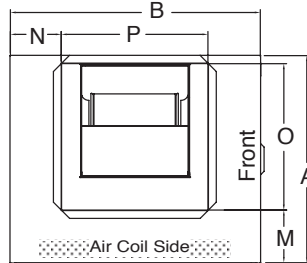
- CAP = Control Access Panel
- BSP = Blower Service Panel
- CSP = Compressor Access Panel
- ASP = Alternative Service Panel

**TT - Vertical Upflow
Dimensional Data**

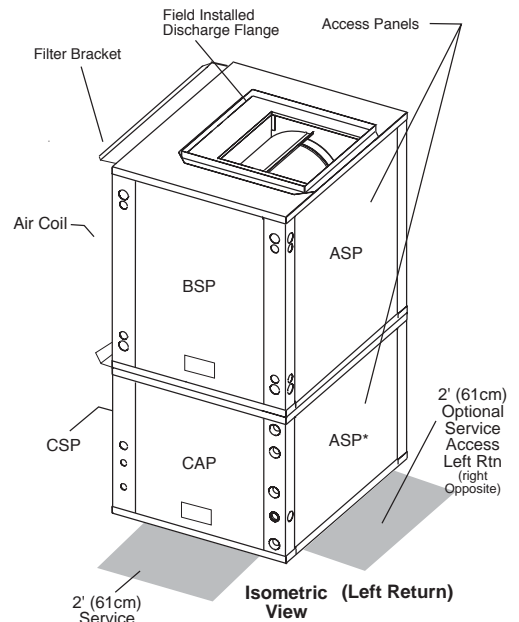
Vertical Upflow Model		Discharge Connection Duct Flange Installed (+/- 0.10 in, +/- 2.5mm)					Return Connection Using Return Air Opening			
		M	N	O Supply Width	P Supply Depth	Q	R	S Return Depth	T Return Height	U
026	in	7.2	5.8	14.0	14.0	4.9	2.2	21.1	27.2	1.0
	cm	18.3	14.8	35.6	35.6	12.4	5.6	53.6	69.1	2.5
038	in	6.4	6.3	18.0	18.0	5.3	2.2	26.1	27.2	1.0
	cm	16.1	16.0	45.7	45.7	13.5	5.6	66.3	69.1	2.5
049	in	6.4	6.3	18.0	18.0	5.3	2.2	26.1	31.2	1.0
	cm	16.1	16.0	45.7	45.7	13.5	5.6	66.3	79.2	2.5
064 & 072	in	6.4	6.3	18.0	18.0	5.3	2.2	26.1	35.2	1.0
	cm	16.1	16.0	45.7	45.7	13.5	5.6	66.3	89.4	2.5



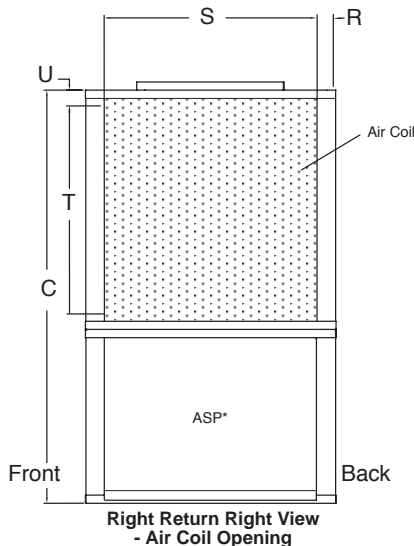
Top View-Right Return



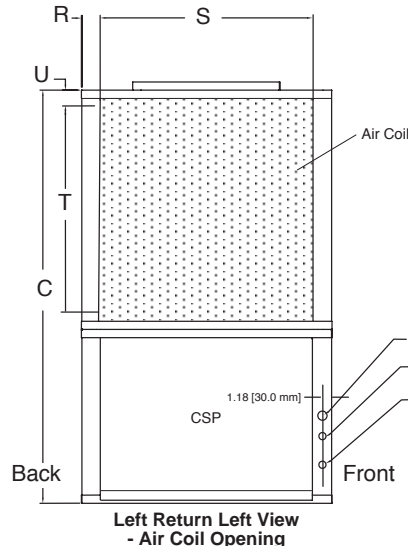
Top View-Left Return



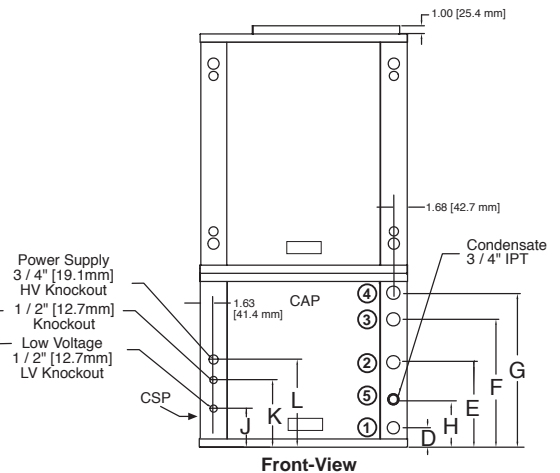
Isometric (Left Return) View



Right Return Right View - Air Coil Opening



Left Return Left View - Air Coil Opening



Front-View

* ASP service access is recommended with some factory options.

**TT - Vertical Downflow
Dimensional Data**

Vertical Downflow Model		Overall Cabinet		
		A Width	B Depth	C Height
026	in	22.4	25.6	52.5
	cm	56.8	65.1	133.4
038	in	25.4	30.6	54.5
	cm	64.5	77.8	138.4
049	in	25.4	30.6	58.5
	cm	64.5	77.8	148.6
064 & 072	in	25.4	30.6	62.5
	cm	64.5	77.8	158.8

Vertical Downflow Model		Water Connections							Water Connections - Units with ClimaDry	
		1	2	3	4	5	Water Loop IPT	HWG IPT	1	2
		Loop In D	Loop Out E	HWG In F	HWG Out G	H			Loop In D	Loop Out E
026	in	2.1	10.0	13.9	16.9	3.6	3/4"	1/2"	2.1	10.0
	cm	5.2	25.4	35.2	42.9	9.2				
038	in	3.4	10.8	15.6	18.9	3.6	3/4"	1/2"	5.96	13.13
	cm	8.6	27.5	39.7	47.9	9.2				
049	in	3.4	10.8	15.6	18.9	3.6	1"	1/2"	5.96	13.13
	cm	8.6	27.5	39.7	47.9	9.2				
064 & 072	in	3.4	10.8	15.6	18.9	3.6	1"	1/2"	5.96	13.13
	cm	8.6	27.5	39.7	47.9	9.2				

Vertical Downflow Model		Electrical Knockouts		
		J 1/2"	K 1/2"	L 3/4"
		Low Voltage	External Pump	Power Supply
026	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9
038	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9
049	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9
064 & 072	in	3.6	6.1	8.6
	cm	9.2	15.6	21.9

Notes:

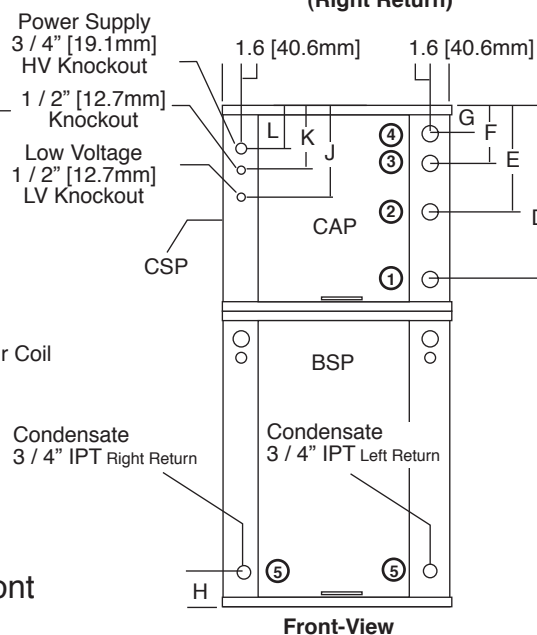
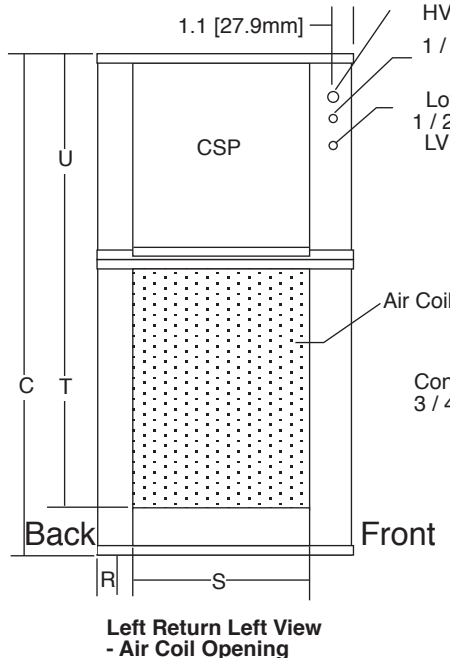
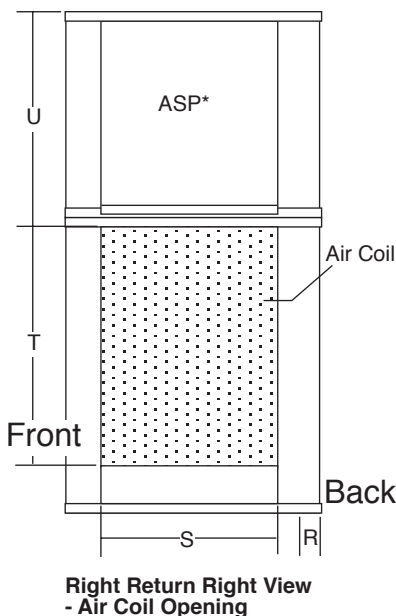
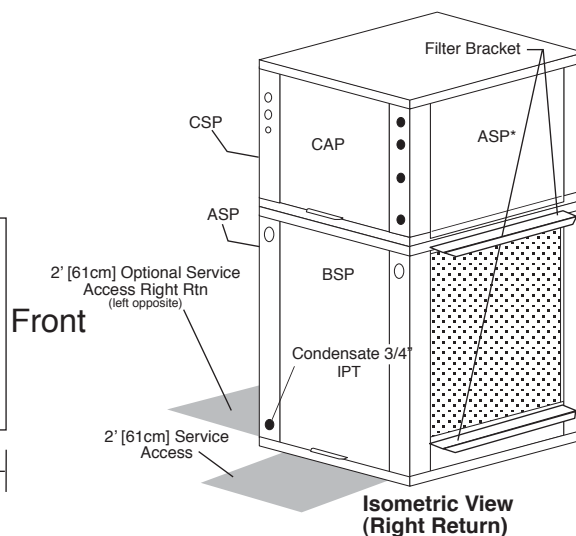
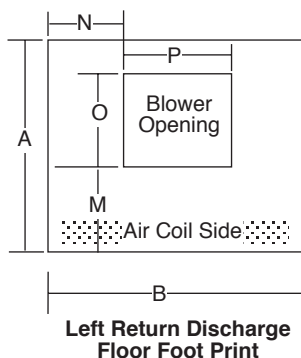
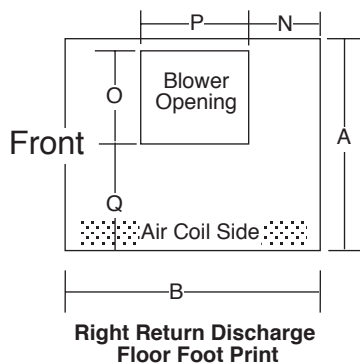
1. While clear access to all removable panels is not required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
2. Front & Side access is preferred for service access. However, all components may be serviced from the front access panel if side access is not available.
3. Condensate is 3/4" IPT PVC and is switchable from front to side.

Legend:

- CAP = Control Access Panel
- BSP = Blower Service Panel
- CSP = Compressor Access Panel
- ASP = Alternative Service Panel

**TT - Vertical Downflow
Dimensional Data**

Vertical Downflow Model		Discharge Connection Duct Flange Installed (+/- 0.10 in, +/- 2.5mm)					Return Connection Using Return Air Opening			
		M	N	O Supply Width	P Supply Depth	Q	R	S Return Depth	T Return Height	U
026	in	6.7	8.4	10.1	9.1	10.8	2.2	21.1	27.2	1.0
	cm	17.1	21.4	25.7	23.0	27.4	5.6	53.6	69.1	2.5
038	in	7.2	9.0	13.4	12.9	10.4	2.2	26.1	27.2	1.0
	cm	18.3	22.9	34.0	32.7	26.5	5.6	66.3	69.1	2.5
049	in	7.2	9.0	13.4	12.9	10.4	2.2	26.1	31.2	1.0
	cm	18.3	22.9	34.0	32.7	26.5	5.6	66.3	79.2	2.5
064 & 072	in	7.2	9.0	13.4	12.9	10.4	2.2	26.1	35.2	1.0
	cm	18.3	22.9	34.0	32.7	26.5	5.6	66.3	89.4	2.5



* ASP service access is recommended with some factory options.

Corner Weights**Corner Weights for TT Series Horizontal Units**

Model		Total	Left-Front*	Right-Front*	Left-Back*	Right-Back*
026	Lbs	266	78.8	67.2	69.9	50.2
	kg	121	35.7	30.5	31.7	22.7
038	Lbs	327	104.4	74.9	83.7	64.0
	kg	148	47.4	34.0	38.0	29.0
049	Lbs	416	145.0	92.6	98.1	80.3
	kg	189	65.8	42.0	44.5	36.4
064	Lbs	441	182.3	72.5	78.4	107.8
	kg	200	82.7	32.9	35.6	48.9
072	Lbs	441	182.3	72.5	78.4	107.8
	kg	200	82.7	32.9	35.6	48.9

*Front is control box end.

Electrical Data

Standard Units

All TT Units								Standard TT Units		
Model	Voltage Code	Voltage	Min/Max Voltage	Compressor			Fan Motor FLA	Total Unit FLA	Min Circuit Amp	Max Fuse/HACR
				QTY	RLA	LRA				
TTH/V/D 026	G	208-230/60/1	197/254	1	10.3	52.0	4.3	14.6	17.2	25
TTH/V/D 038	G	208-230/60/1	197/254	1	16.7	82.0	4.3	21.0	25.2	40
	H	208-230/60/3	197/254	1	11.2	58.0	4.3	15.5	18.3	25
	F*	460/60/3	414/506	1	4.5	29.0	4.1	8.6	9.7	15
TTH/V/D 049	G	208-230/60/1	197/254	1	21.2	96.0	7.0	28.2	33.5	50
	H	208-230/60/3	197/254	1	13.5	88.0	7.0	20.5	23.9	35
	F*	460/60/3	414/506	1	6.4	41.0	6.9	13.3	14.9	20
TTH/V/D 064	G	208-230/60/1	197/254	1	25.6	118.0	7.0	32.6	39.0	60
	H	208-230/60/3	197/254	1	17.6	123.0	7.0	24.6	29.0	45
	F*	460/60/3	414/506	1	9.0	62.0	6.9	15.9	18.2	25
TTH/V/D 072	G	208-230/60/1	197/254	1	27.2	150.0	7.0	34.2	41.0	60

*460V with ECM motor requires a neutral wire.
 ECM motor are rated 265V and are wired between one hot leg and neutral
 HACR circuit breaker in USA only
 Wire length based on one way measurement with 2% voltage drop
 Wire size based on 60°C copper conductor
 All fuses Class RK-5

Units with Secondary Pump or ClimaDry Reheat

All TT Units				TT Units with ClimaDry				TT Units with Secondary Pump			
Model	Voltage Code	Voltage	Min/Max Voltage	Reheat Pump FLA	Total Unit FLA	Min Circuit Amp	Max Fuse/HACR	Pump FLA	Total Unit FLA	Min Circuit Amp	Max Fuse/HACR
TTH/V/D 026	G	208-230/60/1	197/254	0.8	15.4	18.0	25	0.43	15.0	17.6	25
TTH/V/D 038	G	208-230/60/1	197/254	0.8	21.8	26.0	40	0.8	21.8	26.0	40
	H	208-230/60/3	197/254	0.8	16.3	19.1	30	0.8	16.3	19.1	30
	F*	460/60/3	414/506	0.7	9.3	10.4	15	0.7	9.3	10.4	15
TTH/V/D 049	G	208-230/60/1	197/254	1.07	29.3	34.6	50	0.8	29.0	34.3	50
	H	208-230/60/3	197/254	1.07	21.6	24.9	35	0.8	21.3	24.7	35
	F*	460/60/3	414/506	1.07	14.4	16.0	20	0.7	14.0	15.6	20
TTH/V/D 064	G	208-230/60/1	197/254	1.07	33.7	40.1	60	1.07	33.7	40.1	60
	H	208-230/60/3	197/254	1.07	25.7	30.1	45	1.07	25.7	30.1	45
	F*	460/60/3	414/506	1.07	17.7	19.2	25	1.07	17.0	19.2	25
TTH/V/D 072	G	208-230/60/1	197/254	1.07	35.3	42.1	60	1.07	35.3	42.1	60

*460V with ECM motor requires a neutral wire. 460V with secondary/ClimaDry pump requires a neutral wire.
 Pump and ECM motor are rated 265V and are wired between one hot leg and neutral
 HACR circuit breaker in USA only
 Wire length based on one way measurement with 2% voltage drop
 Wire size based on 60°C copper conductor
 All fuses Class RK-5

TT Series Wiring Diagram Matrix

Only CXM and DXM diagrams, with a representative diagram of LON and MPC Options are presented in this submittal. Other diagrams can be located online at www.climatemaster.com using the part numbers presented below.

Model	Refrigerant	Wiring Diagram Part Number	Electrical	Control	DDC	Fan Motor
TT Series Single Phase	EarthPure® HFC410A	96B0006N18	208-230/60/1, 265/60/1	CXM	-	ECM
		96B0006N16			LON	
		96B0006N14			MPC	
		DXM		96B0006N19	-	ECM
				96B0006N17	LON	
				96B0006N15	MPC	
				96B0038N66	ClimaDry®	
TT Series Three Phase (230 Style)	EarthPure® HFC410A	96B0007N18	208-230/60/3	CXM	-	ECM
		96B0007N16			LON	
		96B0007N14			MPC	
		DXM		96B0007N19	-	ECM
				96B0007N17	LON	
				96B0007N15	MPC	
				96B0007N29	ClimaDry®	
TT Series Three Phase (460 Style)	EarthPure® HFC410A	96B0008N18	460/60/3	CXM	-	ECM
		96B0008N16			LON	
		96B0008N14			MPC	
		DXM		96B0008N19	-	ECM
				96B0008N17	LON	
				96B0008N15	MPC	

All wiring diagrams available at www.climatemaster.com.

Typical Wiring Diagram
Single Phase TT Units
With CXM Controller

TITLE: H/V/D W/ICM 208-230/60/1, 265/60/1 & 220-240/50/1 COMMERCIAL DATE: 9/17/04 REV: 96B0006N18 DRAWING NO: 96B0006N18	NOTES: 1. COMPRESSOR AND BLOWER MOTOR THERMALLY PROTECTED INTERNALLY. 2. ALL WIRING TO THE UNIT MUST COMPLY WITH NEC AND LOCAL CODES. 3. FOR 230V OPERATION, DISCONNECT RED LEAD AT L1 AND ATTACH ORANGE LEAD TO L1. 4. FOR 220V OPERATION, DISCONNECT RED LEAD AT L1 AND ATTACH GREEN LEAD TO L1. 5. ENERGY SAVING MODE MAY HAVE CIRCUIT BREAKER. 6. FPI THERMISTOR PROVIDES FREEZE PROTECTION FOR WATER. WHEN USING REFER TO THERMOSTAT INSTALLATION INSTRUCTIONS FOR WIRING TO THE UNIT. 7. CHECK INSTALLATION WIRING INFORMATION FOR SPECIFIC THERMOSTAT HOODUP. 8. 24V ALARM SIGNAL SHOWN FOR DRY-ALARM CONTACT. CUT JWI JUMPER AND LEAD TO THE UNIT SUPPLY VOLTAGE. 9. TRANSFORMER SECONDARY GROUNDS VIA CXM BOARD STANDOFFS & SCREWS TO CONTROL BOX. (GROUND AVAILABLE FROM TOP TWO STANDOFFS AS SHOWN.) 10. LED TO THE PUMP. AWA START IS PLACED FOR VOLTAGE UP TO 277V. 11. PLACE JUMPFERS ON 2 & 3. ICM BOARD. WHEN DEHUMIDIFICATION MODE IS USED.	CXM CONTROLLER FAULT CODES <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>DESCRIPTION OF OPERATION</th> <th>LED</th> <th>ALARM RELAY</th> </tr> <tr> <td>NORMAL MODE</td> <td>ON</td> <td>OPEN</td> </tr> <tr> <td>NORMAL MODE W/ UPS WARNING</td> <td>ON</td> <td>CYCLE (CLOSED & SEC. OPEN 25 SEC.)</td> </tr> <tr> <td>CXMI IS NON-FUNCTIONAL</td> <td>OFF</td> <td>OPEN</td> </tr> <tr> <td>FAULT RETRY</td> <td>SLOW FLASH</td> <td>OPEN</td> </tr> <tr> <td>LOCKOUT</td> <td>SLOW FLASH</td> <td>CLOSED</td> </tr> <tr> <td>OVER/UNDER VOLTAGE SHUTDOWN</td> <td>SLOW FLASH</td> <td>OPEN (CLOSED AFTER 15 MIN.)</td> </tr> <tr> <td>TEST MODE-UP FAULT IN MEMORY</td> <td>FLASHING CODE 1</td> <td>CYCLING CODE 1</td> </tr> <tr> <td>TEST MODE-UP FAULT IN MEMORY</td> <td>FLASHING CODE 2</td> <td>CYCLING CODE 2</td> </tr> <tr> <td>TEST MODE-UP FAULT IN MEMORY</td> <td>FLASHING CODE 3</td> <td>CYCLING CODE 3</td> </tr> <tr> <td>TEST MODE-UP FAULT IN MEMORY</td> <td>FLASHING CODE 4</td> <td>CYCLING CODE 4</td> </tr> <tr> <td>TEST MODE-UP FAULT IN MEMORY</td> <td>FLASHING CODE 5</td> <td>CYCLING CODE 5</td> </tr> <tr> <td>TEST MODE-UP FAULT IN MEMORY</td> <td>FLASHING CODE 6</td> <td>CYCLING CODE 6</td> </tr> <tr> <td>TEST MODE-UP FAULT IN MEMORY</td> <td>FLASHING CODE 7</td> <td>CYCLING CODE 7</td> </tr> <tr> <td>TEST MODE-UP FAULT IN MEMORY</td> <td>FLASHING CODE 8</td> <td>CYCLING CODE 8</td> </tr> <tr> <td>TEST MODE-UP FAULT IN MEMORY</td> <td>FLASHING CODE 9</td> <td>CYCLING CODE 9</td> </tr> <tr> <td>SWAPPED F1/F2/F3 LOCKOUT</td> <td>FLASHING CODE 9</td> <td>CYCLING CODE 9</td> </tr> </table>	DESCRIPTION OF OPERATION	LED	ALARM RELAY	NORMAL MODE	ON	OPEN	NORMAL MODE W/ UPS WARNING	ON	CYCLE (CLOSED & SEC. OPEN 25 SEC.)	CXMI IS NON-FUNCTIONAL	OFF	OPEN	FAULT RETRY	SLOW FLASH	OPEN	LOCKOUT	SLOW FLASH	CLOSED	OVER/UNDER VOLTAGE SHUTDOWN	SLOW FLASH	OPEN (CLOSED AFTER 15 MIN.)	TEST MODE-UP FAULT IN MEMORY	FLASHING CODE 1	CYCLING CODE 1	TEST MODE-UP FAULT IN MEMORY	FLASHING CODE 2	CYCLING CODE 2	TEST MODE-UP FAULT IN MEMORY	FLASHING CODE 3	CYCLING CODE 3	TEST MODE-UP FAULT IN MEMORY	FLASHING CODE 4	CYCLING CODE 4	TEST MODE-UP FAULT IN MEMORY	FLASHING CODE 5	CYCLING CODE 5	TEST MODE-UP FAULT IN MEMORY	FLASHING CODE 6	CYCLING CODE 6	TEST MODE-UP FAULT IN MEMORY	FLASHING CODE 7	CYCLING CODE 7	TEST MODE-UP FAULT IN MEMORY	FLASHING CODE 8	CYCLING CODE 8	TEST MODE-UP FAULT IN MEMORY	FLASHING CODE 9	CYCLING CODE 9	SWAPPED F1/F2/F3 LOCKOUT	FLASHING CODE 9	CYCLING CODE 9
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LEGEND: ○ SOLENOID COIL ○ RELAY CONTACTS - N.C. ○ RELAY CONTACTS - N.O. ○ CAPACITOR ○ THERMISTOR ○ WIRE NUT ○ CIRCUIT BREAKER ○ GROUND ○ OPTIONAL	COMPONENTS: ASTAT BMC CAP CB CC DTS FPI HP JWI LAT LOC NUT PI RVS TRANSFORMER TRANSFORMER SOLENOID TRANSFORMER SOLENOID TRANSFORMER SOLENOID TRANSFORMER SOLENOID	TRANSFORMER PRIMARY VOLTAGE LEAD COLOR 208 RED 230 RED 240 ORG 240 BRN 265 BRN																																																			

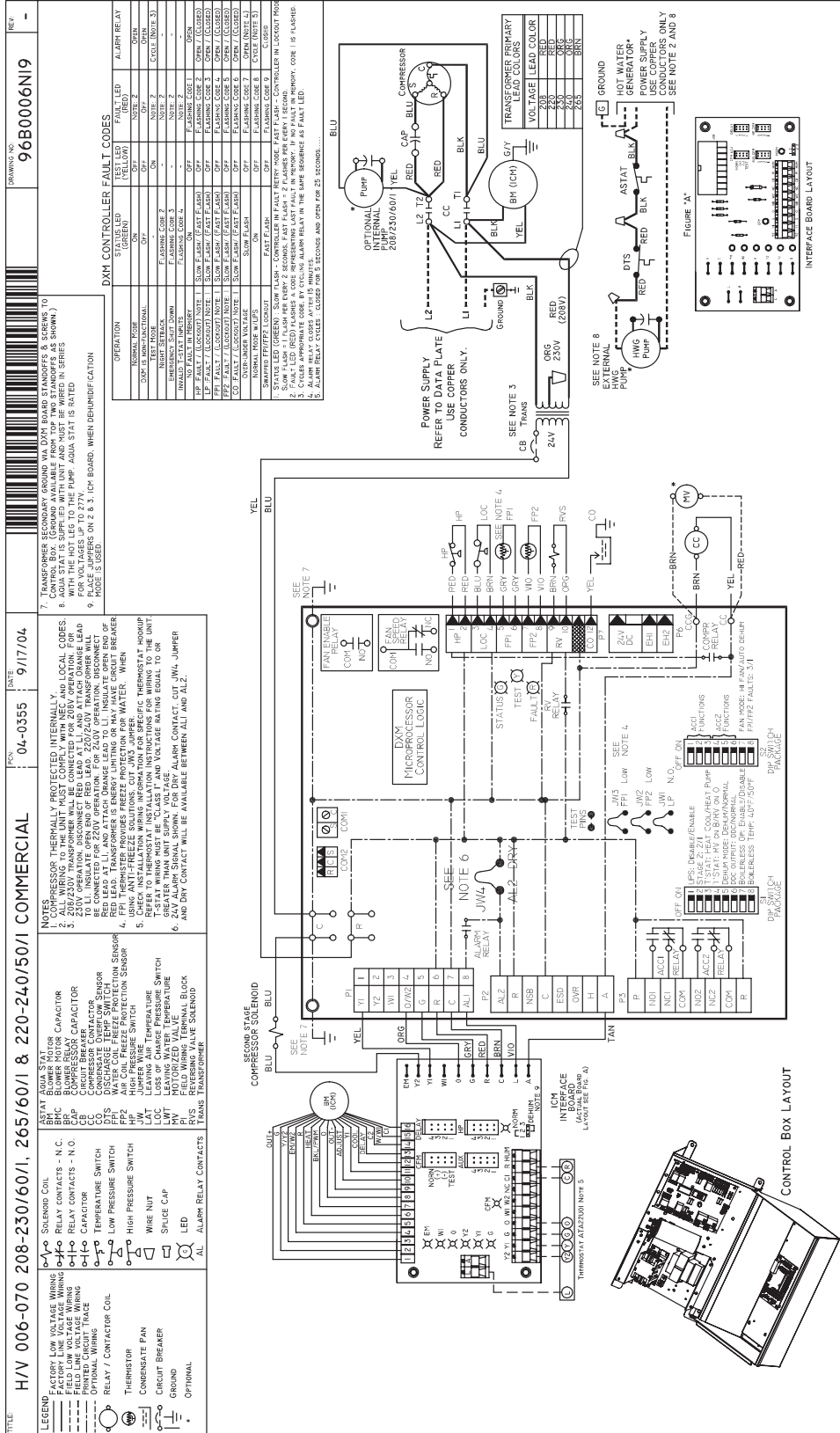
CONTROL BOX LAYOUT

INTERFACE BOARD LAYOUT

FIGURE 'A'
INTERFACE BOARD LAYOUT

Tranquility 27™ Two-Stage (TT) Series
Rev.: 05/23/07D

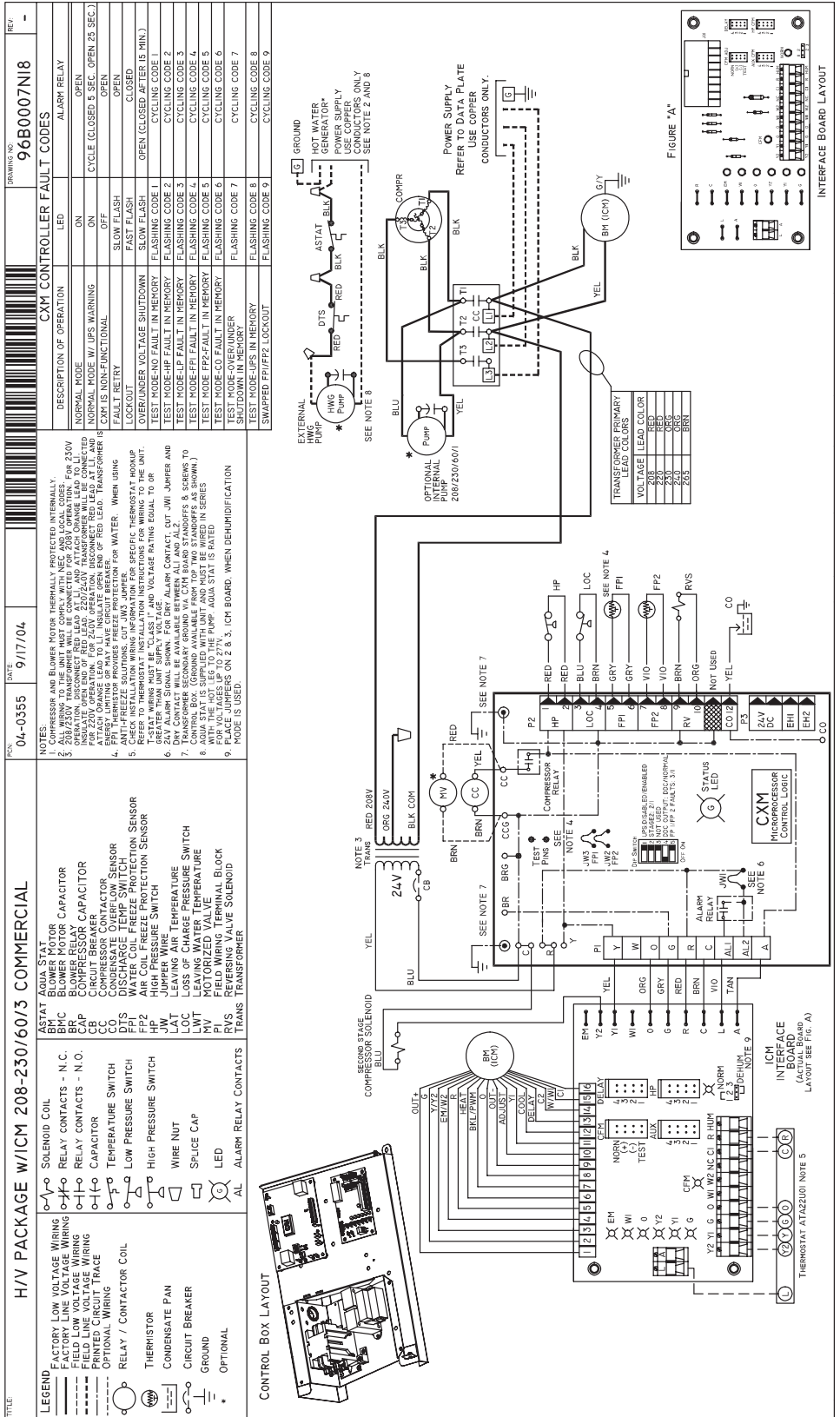
Typical Wiring Diagram
Single Phase TT Units
With DXM Controller



Tranquility 27™ Two-Stage (TT) Series

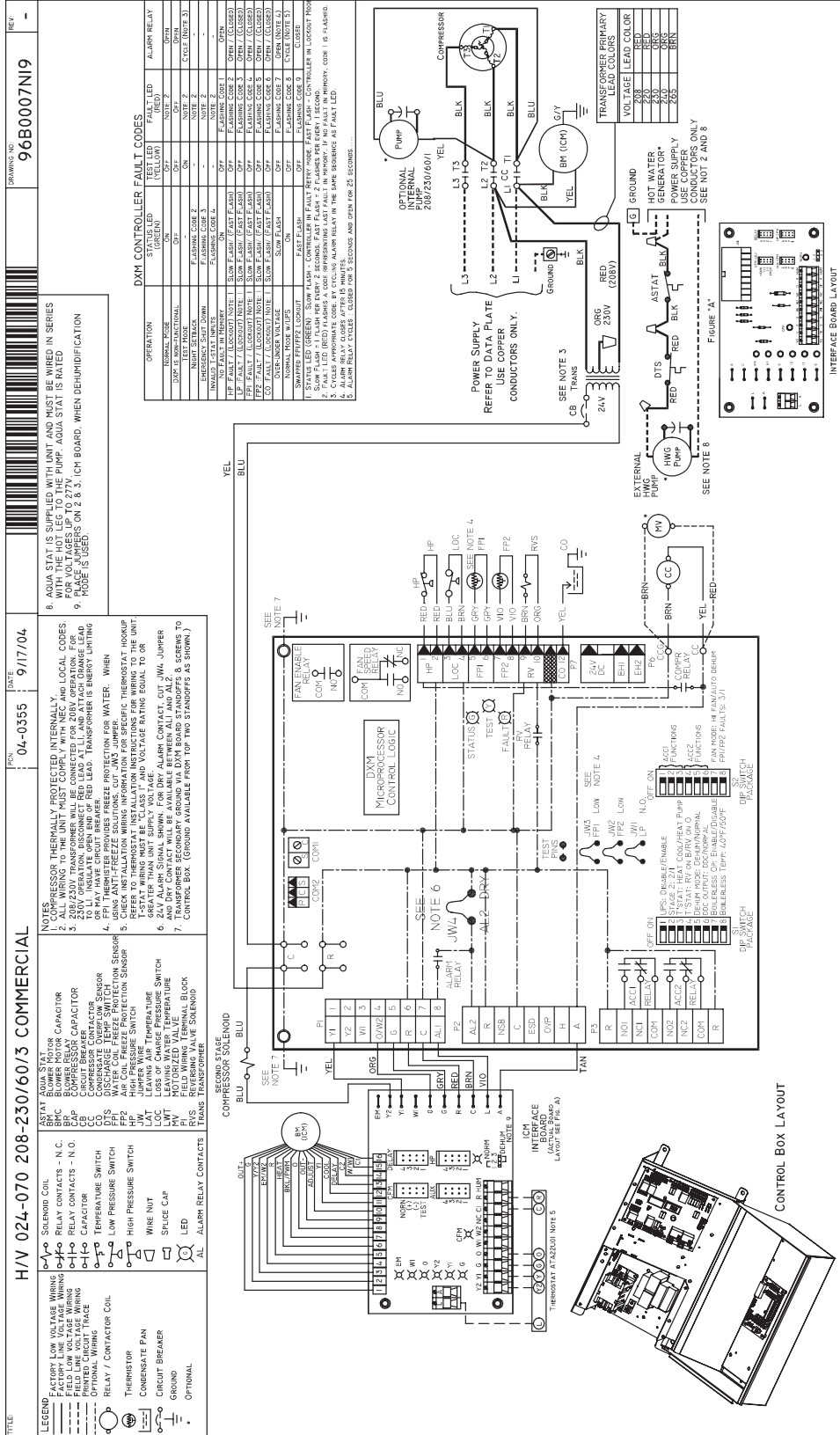
Rev.: 05/22/07D

Typical Wiring Diagram
Three Phase 208/230V TT Units
With CXM Controller



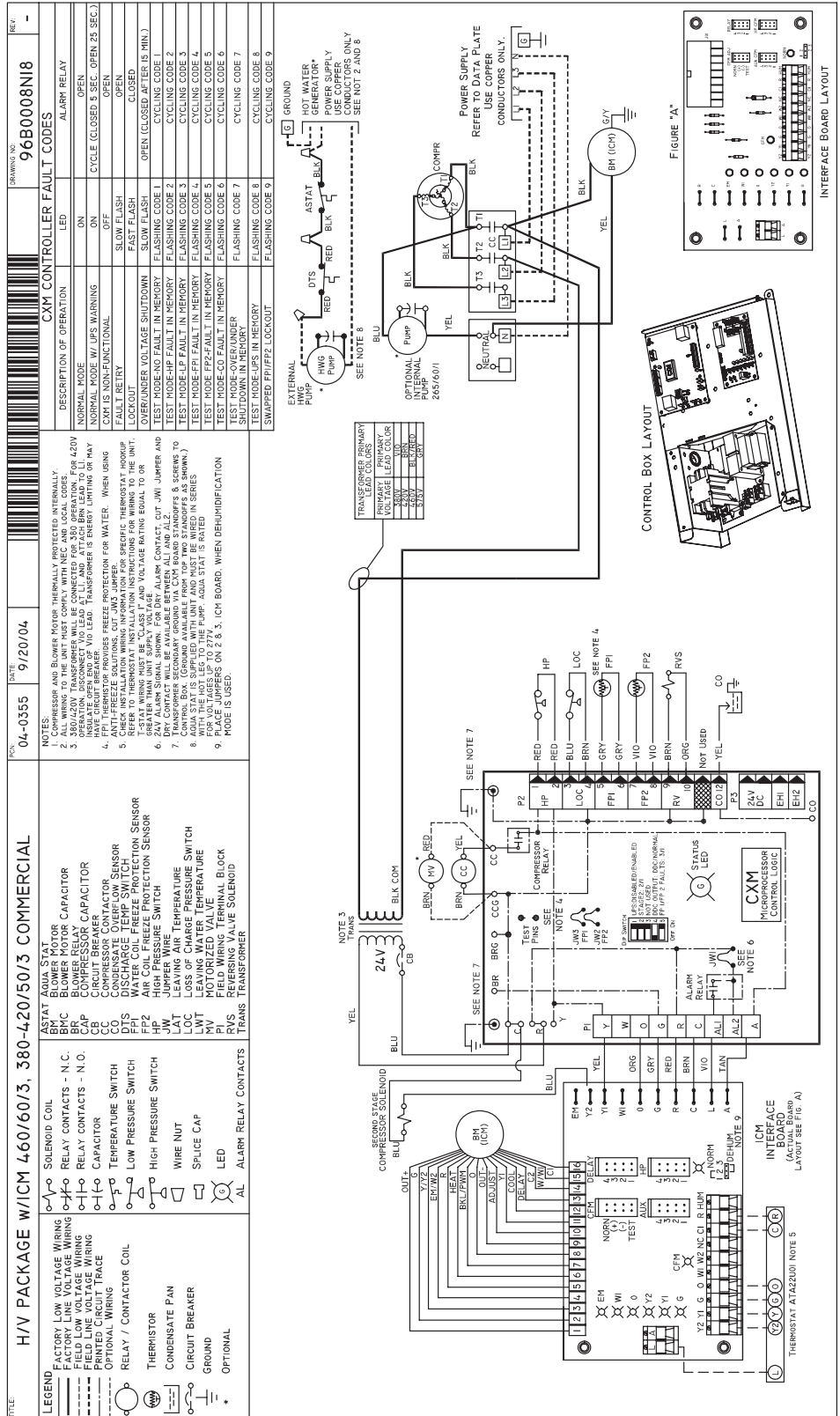
Tranquility 27™ Two-Stage (TT) Series
Rev.: 05/23/07D

Typical Wiring Diagram
Three Phase 208/230V TT Units
With DXM Controller



Typical Wiring Diagram
Three Phase 460V TT Units
With CXM Controller

Note: 460V Units With
ECM Motor Require
A Neutral Wire.



Typical Wiring Diagram
Single Phase TT Units
With CXM And MPC Controller

FILE: H/V/D 208-230,265/60/1 & 220-240/50/1 CXM W/MPC, ICM COMMERCIAL

REV: -

DRAWING NO: 96B0006N1/4

DATE: 8/27/04

ICM: 04-0330

CXM CONTROLLER FAULT CODES

DESCRIPTION OF OPERATION	LED	ALARM RELAY
NORMAL MODE	ON	OPEN
NORMAL MODE W/ UPS WARNING	ON	CYCLE (CLOSED 5 SEC, OPEN 25 SEC.)
CXM IS NON-FUNCTIONAL	OFF	OPEN
FAULT RETRY	SLOW FLASH	OPEN
OVER/UNDER VOLTAGE SHUTDOWN	FAST FLASH	CLOSED
TEST MODE-NO FAULT IN MEMORY	SLOW FLASH	OPEN (CLOSED AFTER IS MIN.)
TEST MODE-HP FAULT IN MEMORY	FLASHING CODE 1	CYCLING CODE 1
TEST MODE-LP FAULT IN MEMORY	FLASHING CODE 2	CYCLING CODE 2
TEST MODE-FPI FAULT IN MEMORY	FLASHING CODE 3	CYCLING CODE 3
TEST MODE-CC FAULT IN MEMORY	FLASHING CODE 4	CYCLING CODE 4
TEST MODE-CC FAULT IN MEMORY	FLASHING CODE 5	CYCLING CODE 5
TEST MODE-CC FAULT IN MEMORY	FLASHING CODE 6	CYCLING CODE 6
TEST MODE-CC FAULT IN MEMORY	FLASHING CODE 7	CYCLING CODE 7
TEST MODE-UPS IN MEMORY	FLASHING CODE 8	CYCLING CODE 8
TEST MODE-UPS IN MEMORY	FLASHING CODE 9	CYCLING CODE 9
SWAPPED P1/PF2 LOCKOUT	FLASHING CODE 9	CYCLING CODE 9

NOTE: 1. COMPRESSOR AND BLOWER MOTOR THERMALLY PROTECTED INTERNALLY.
 2. ALL WIRING TO THE UNIT MUST COMPLY WITH NEC AND LOCAL CODES.
 3. OPERATION DISCONNECT RED LEAD AT LI, L1, AND ATTACH ORANGE LEAD TO LI, L2, AND ATTACH BLUE LEAD TO L3.
 4. OPERATION DISCONNECT RED LEAD AT LI, L1, AND ATTACH ORANGE LEAD TO L2, AND ATTACH BLUE LEAD TO L3.
 5. REFER TO MPC, LON, OR STAT INSTALLATION, APPLICATION, AND OPERATION MANUALS FOR CONTROL WIRING TO THE UNIT. LOW VOLTAGE WIRING MUST BE PERFORMED BY A LICENSED ELECTRICIAN.
 6. FACTORY CUT JUMPS (CJM) OR JUMPS (JCM) MUST BE REMOVED IN SERIES WITH THE HOT LEG TO THE PUMP. AQUA STAT WILL BE SUPPLIED WITH LAMP.
 7. TRANSFORMER SECONDARY GRADING VIA CXM/ICM BOARD STANDOFFS & SCREWS TO THE HOT LEG TO THE PUMP. AQUA STAT IS RATED.
 8. WITH THE HOT LEG TO THE PUMP, AQUA STAT IS RATED.
 9. ASH SENSORS ARE NOT REQUIRED ON WATERWATER APPLICATION. ASW06-ASW08 (WATER-AIR ONLY) HOPE JUMPER TO ASSTAT. ASW09-ASW11 HOPE JUMPER TO RINET. MODE IS USED.
 10. MODE IS USED.

LEGEND

- FACTORY LOW VOLTAGE WIRING
- FIELD LOW VOLTAGE WIRING
- FIELD LINE VOLTAGE TRACE
- OPTIONAL WIRING
- RELAY / CONTACTOR COIL
- THERMISTOR
- CONDENSATE PAN
- CIRCUIT BREAKER
- GROUND
- OPTIONAL

STAT SOLENOID COIL
BMC RELAY CONTACTS - N.C.
BRP RELAY CONTACTS - N.O.
CC CAPACITOR
CC TEMPERATURE SWITCH
CC LOW PRESSURE SWITCH
FF2 HIGH PRESSURE SWITCH
LAT WIRE NUT
LWT SPLICE CAP
PV LED
RVS ALARM RELAY CONTACTS
TRANS TRANSFORMER

CONTROL BOX LAYOUT

TRANSFORMER PRIMARY LEAD COLORS

VOLTAGE	LEAD COLOR
208	RED
230	RED
240	RED
250	RED
260	RED
270	RED
280	RED

CONTROL BOX LAYOUT

INTERFACE BOARD LAYOUT

Tranquility 27™ (TT) Series 60Hz Engineering Specifications Rev.: 04/02/07

General:

Furnish and install ClimateMaster "Tranquility 27™" Water Source Heat Pumps, as indicated on the plans. Equipment shall be completely assembled, piped and internally wired. Capacities and characteristics as listed in the schedule and the specifications that follow.

Horizontal / Vertical Water Source Heat Pumps:

Units shall be supplied completely factory built for an entering water temperature range from 20° to 120°F (-6.7° to 43.3°C) as standard. Equivalent units from other manufacturers can be proposed provided approval to bid is given 10 days prior to bid closing. All equipment listed in this section must be rated and certified in accordance with American Refrigeration Institute / International Standards Organization (ARI / ISO) and Environmental Testing Laboratories for United States and Canada (ETL-US-C). The units shall have ARI / ISO and ETL-US-C labels. All units shall be fully quality tested by factory run testing under normal operating conditions and water flow rates as described herein. Quality control system shall automatically perform via computer: triple leak check, pressure tests, evacuate and accurately charge system, perform detailed heating and cooling mode tests, and quality cross check all operational and test conditions to pass/fail data base. Detailed report card will ship with each unit displaying all test performance data. Note: If unit fails on any cross check, system shall not be allowed unit to ship. Serial numbers will be recorded by factory and furnished to contractor on report card for ease of unit warranty status. **Units tested without water flow are not acceptable.**

Basic Construction:

Horizontal Units shall have one of the following air flow arrangements: Left Inlet/Straight (Right) Discharge; Right Inlet/Straight (Left) Discharge; Left Inlet/Back Discharge; or Right Inlet/Back Discharge as shown on the plans. Units must have the ability to be field convertible from straight to back or back to straight discharge with no additional parts or unit structure modification. Horizontal units will have factory installed hanger brackets with rubber isolation grommets packaged separately.

Vertical Units shall have one of the following air flow arrangements: Left Return/Top Discharge, Right Return/Top Discharge, Left Return/Bottom Discharge, Right Return/Bottom Discharge as shown on the plans.

If units with these arrangements are not used, the contractor is responsible for any extra costs incurred by other trades. All units (horizontal and vertical) must have a minimum of three access panels for serviceability of compressor compartment. **Units having only one access panel to compressor/heat exchangers/expansion device/refrigerant piping shall not be acceptable.**

Compressor section interior surfaces shall be lined with 1/2 inch (12.7mm) thick, dual density, 1-3/4 lb/ft³ (28 kg/m³) acoustic type glass fiber insulation. Air handling section interior surfaces shall be lined with 1/2 in (12.7mm) thick, single density, 1-3/4 lb/ft³ (28 kg/m³) foil backed fiber insulation for ease of cleaning. Insulation placement shall be designed in a manner that will eliminate any exposed edges to prevent the introduction of glass fibers into the air stream. **Units without foil backed insulation in the air handling section will not be accepted.**

The heat pumps shall be fabricated from heavy gauge galvanized steel with powder coat paint finish. Both sides of the steel shall be painted for added protection.

Standard cabinet panel insulation must meet NFPA 90A requirements, air erosion and mold growth limits of UL-181, stringent fungal resistance test per ASTM-C1071 and ASTM G21, and shall meet zero level bacteria growth per ASTM G22. **Unit insulation must meet these stringent requirements or unit(s) will not be accepted.**

All horizontal units to have factory installed 1" (25.4mm) discharge air duct collars, 1" (25.4mm) filter rails with 1" (25.4mm) filters factory installed, and factory installed unit-mounting brackets. Vertical units to have field installed discharge air duct collar, shipped loose and 1" (25.4mm) filter rails with 1" (25.4mm) filters factory installed. **If units with these factory installed provisions are not used, the contractor is responsible for any extra costs to field install these provisions, and/or the extra costs for his sub-contractor to install these provisions.**

All units must have an insulated panel separating the fan compartment from the compressor compartment. Units with the compressor in the air stream are not acceptable. Units shall have a factory installed 1 inch (25.4mm) wide filter bracket for filter removal from either side. Units shall have a 1 inch (25.4mm) thick throwaway type glass fiber filter. The contractor shall purchase one spare set of filters and replace factory shipped filters on completion of start-up. Filters shall be standard sizes. If units utilize non-standard filter sizes then the contractor shall provide 12 spare filters for each unit.

Cabinets 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.

Supply and return water connections shall be copper IPT fittings, and shall be securely mounted flush to the cabinet corner post allowing for connection to a flexible hose without the use of a back-up wrench. **Water connections that protrude through the cabinet or require the use of a backup wrench shall not be allowed.** All water connections and electrical knockouts must be in the compressor compartment corner post as to not interfere with the serviceability of unit. **Contractor shall be responsible for any extra costs involved in the installation of units that do not have this feature.** Contractor must ensure that units can be easily removed for servicing and coordinate locations of electrical conduit and lights with the electrical contractor.

Option: Contractor shall install 2-inch (50.8mm) filter racks with removable access door and 2 inch (50.8mm) MERV11 pleated throwaway filters on all units.

Option: UltraQuiet package shall consist of high technology sound attenuating material that is strategically applied to the compressor and air handling compartment casings and fan scroll in addition to the standard ClimaQuiet system design, to further dampen and attenuate sound transmissions.

Option: The unit will be supplied with cupro nickel coaxial water to refrigerant heat exchanger.

Option: The unit will be supplied with internally factory mounted two-way water valve for variable speed pumping requirements. A factory-mounted or field-installed high pressure switch shall be installed in the water piping to disable compressor operation in the event water pressures build due to water freezing in the piping system.

Option: The unit will be supplied with internally factory mounted automatic water flow regulators.

Option: The unit will be supplied with internally mounted secondary pump for primary/secondary applications, specifically one-pipe systems.

Option: The unit shall be supplied with extended range Insulation option, which adds closed cell insulation to internal water lines, and provides insulation on suction side refrigeration tubing including refrigerant to water heat exchanger.

Option: The unit shall be supplied with a hot water generator (desuperheater).

Option: The refrigerant to air heat exchanger shall be "electro-coated" with a low cure cathodic epoxy material a minimum of 0.4 mils thick (0.4 – 1.5 mils range) on all surfaces. The black colored coating shall provide a minimum of 1000 hours salt spray protection per ASTM B117-97 on all galvanized end plates and copper tubing, and a minimum of 2000 hours of salt spray on all aluminum fins. The material shall be formulated without the inclusion of any heavy metals and shall exhibit a pencil hardness of 2H (ASTM D3363-92A), crosshatch adhesion of 4B-5B (ASTM D3359-95), and impact resistance of 160 in-lbs (184 kg-cm) direct (ASTM D2794-93).

Option: Unit shall include ClimaDry reheat option. Only modulating reheat that will adjust capacity based upon supply air temperature to provide "neutral" (72°F, 22.2°C) constant air temperature will be accepted. "Neutral" supply air temperature shall be provided regardless of entering loop water temperatures (above 55°F, 12.8°C) or refrigerant condensing pressures. Control of reheat must be accomplished via a humidistat or dehumidistat contact closure. Refrigerant circuit must be ARI certified. Approved equal manufacturers may provide pre-engineered integrated modulating hot gas reheat within the unit cabinet, or the installing contractor in conjunction with the "approved equal" unit manufacturer can provide for approval (during the submittal phase) an engineered system consisting of: a duct mounted hot water coil, small circulating pump, modulating control valve, and associated piping using the discharge condenser water off of the unit as the heating medium. All design costs and costs of field installed items including additional power wiring to pump, and control wiring to and from pump and control valve to unit shall be borne by mechanical contractor. **Refrigerant circuits that are not ARI certified when the reheat option is applied will not be accepted.**

Fan and Motor Assembly:

Blower shall have inlet rings to allow removal of wheel and motor from one side without removing housing. Units shall have a direct-drive centrifugal fan. The fan motor shall be an ECM2 variable speed ball bearing type motor. The ECM2 fan motor shall provide soft starting, maintain constant CFM over its static operating range and provide airflow adjustment on its control board. The fan motor shall be isolated from the housing by rubber grommets. The motor shall be permanently lubricated and have thermal overload protection. A special dehumidification mode shall be provided to allow lower airflows in cooling for better dehumidification. The dehumidification mode shall be selectable via a jumper on the control board or may be controlled externally from a humidistat. Airflow / Static pressure rating of the unit shall be based on a wet coil and a clean filter in place. **Ratings based on a dry coil and / or no filter, or on an ESP less than 0.50 in w.g. (12.7 mm w.g.) shall NOT be acceptable.**

Tranquility 27™ Two-Stage (TT) Series

Rev.: 05/23/07D

Refrigerant Circuit:

All units shall contain an EarthPure® (HFC 410A) sealed refrigerant circuit including a high efficiency Copeland UltraTech™ two-stage compressor designed for heat pump operation, a thermostatic expansion valve for refrigerant metering, an enhanced corrugated aluminum lanced fin and rifled copper tube refrigerant to air heat exchanger, reversing valve, coaxial (tube in tube) refrigerant to water heat exchanger, and safety controls including a high pressure switch, low pressure switch (loss of charge), water coil low temperature sensor, and air coil low temperature sensor. Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service. Activation of any safety device shall prevent compressor operation via a microprocessor lockout circuit. The lockout circuit shall be reset at the thermostat or at the contractor supplied disconnect switch.

Units that cannot be reset at the thermostat shall not be acceptable.

Hermetic compressors shall be internally sprung. The compressor shall have a dual level vibration isolation system. The compressor will be mounted on computer selected vibration isolation springs to a large heavy gauge compressor mounting tray plate, which is then isolated from the cabinet base with rubber grommets for maximized vibration attenuation. All units (except units with rotary compressors) shall include a discharge muffler to further enhance sound attenuation. Compressor shall have thermal overload protection. Compressor shall be located in an insulated compartment away from air stream to minimize sound transmission.

Refrigerant to air heat exchangers shall utilize enhanced corrugated lanced aluminum fins and rifled copper tube construction rated to withstand 625 PSIG (3101 kPa) refrigerant working pressure. Refrigerant to water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design, rated to withstand 625 PSIG (3101 kPa) working refrigerant pressure and 500 PSIG (3101 kPa) working water pressure. The refrigerant to water heat exchanger shall be "electro-coated" with a low cure cathodic epoxy material a minimum of 0.4 mils thick (0.4 – 1.5 mils range) on all surfaces. The black colored coating shall provide a minimum of 1000 hours salt spray protection per ASTM B117-97 on all external steel and copper tubing. The material shall be formulated without the inclusion of any heavy metals and shall exhibit a pencil hardness of 2H (ASTM D3363-92A), crosshatch adhesion of 4B-5B (ASTM D3359-95), and impact resistance of 160 in-lbs (184 kg-cm) direct (ASTM D2794-93).

Refrigerant metering shall be accomplished by thermostatic expansion valve only. Expansion valves shall be dual port balanced types with external equalizer for optimum refrigerant metering. Units shall be designed and tested for operating ranges of entering water temperatures from 20° to 120°F (-6.7° to 43.3°C). Reversing valve shall be four-way solenoid activated refrigerant valve, which shall default to heating mode should the solenoid fail to function. If the reversing valve solenoid defaults to cooling mode, an additional low temperature thermostat must be provided to prevent over-cooling an already cold room.

Drain Pan:

The drain pan shall be constructed of 304 Stainless Steel to inhibit corrosion. This corrosion protection system shall meet the stringent 1000 hour salt spray test per ASTM B117. If plastic type material is used, it must be HDPE (High Density Polyethylene) to avoid thermal cycling shock stress failure over the lifetime of the unit. Drain pan shall be fully insulated. Drain outlet shall be located at pan as to allow complete and unobstructed drainage of condensate. Drain outlet for horizontal units shall be connected from pan directly to IPT fitting. **No hidden internal tubing extensions from pan outlet extending to unit casing (that can create drainage problems) will be accepted.** The unit as standard will be supplied with solid-state electronic condensate overflow protection. **Mechanical float switches will NOT be accepted.**

Vertical units shall be furnished with a PVC slip condensate drain connection and an internal factory installed condensate trap. **If units without an internal trap are used, the contractor is responsible for any extra costs to field install these provisions, and/or the extra costs for his sub-contractor to install these provisions.**

Electrical:

A control box shall be located within the unit compressor compartment and shall contain a 50VA transformer, 24 volt activated, 2 or 3 pole compressor contactor, terminal block for thermostat wiring and solid-state controller for complete unit operation. Reversing valve and fan motor wiring shall be routed through this electronic controller. 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.

Solid State Control System (CXM):

Units shall have a solid-state control system. **Units utilizing electro-mechanical control shall not be acceptable.** The control system microprocessor board shall be specifically designed to protect against building electrical system noise contamination, EMI, and RFI interference. The control system shall interface with a heat pump type thermostat. The control system shall have the following features:

- a. Anti-short cycle time delay on compressor operation.
- b. Random start on power up mode.
- c. Low voltage protection.
- d. High voltage protection.
- e. Unit shutdown on high or low refrigerant pressures.

- f. Unit shutdown on low water temperature.
- g. Condensate overflow electronic protection.
- h. Option to reset unit at thermostat or disconnect.
- i. Automatic intelligent reset. Unit shall automatically reset the unit 5 minutes after trip if the fault has cleared. If a fault occurs 3 times sequentially without thermostat meeting temperature, then lockout requiring manual reset will occur.
- j. Ability to defeat time delays for servicing.
- k. Light emitting diode (LED) on circuit board to indicate high pressure, low pressure, low voltage, high voltage, low water/air temperature cut-out, condensate overflow, and control voltage status.
- l. The low-pressure switch shall not be monitored for the first 120 seconds after a compressor start command to prevent nuisance safety trips.
- m. 24V output to cycle a motorized water valve or other device with compressor contactor.
- n. Unit Performance Sentinel (UPS). The UPS warns when the heat pump is running inefficiently.
- o. Water coil low temperature sensing (selectable for water or anti-freeze).
- p. Air coil low temperature sensing.

NOTE: Units not providing the 8 safety protections of anti-short cycle, low voltage, high voltage, high refrigerant pressure, low pressure (loss of charge), air coil low temperature cut-out, water coil low temperature cut-out, and condensate overflow protections will not be accepted.

Solid State ECM2 Fan Control Board:

Airflow selection shall be accomplished via 3 jumper switches on the ECM2 control board. Actual airflow shall be indicated by the CFM LED with each 100 CFM being represented by one flash of the LED. Airflow shall be automatically maintained ($\pm 5\%$) by the ECM2 motor regardless of external static pressure up to its maximum output capacity. A jumper shall allow selection of a special dehumidification mode, which reduces airflow in cooling by 25% to increase the latent capacity of the unit. A terminal shall be provided on the control board to allow an external humidistat to activate dehumidification mode.

Note: To achieve full benefit of the two-stage compressor and ECM2 fan, a 2 Heat / 2 Cool thermostat (or a 3 Heat / 2 Cool thermostat when electric backup heat is required) should be employed.

Option: Enhanced solid state control system (DXM)

This control system features two stage control of cooling and two stage control of heating modes for exacting temperature and dehumidification purposes.

This control system coupled with a multi-stage thermostat will better dehumidify room air by automatically running the heat pump's fan at lower speed on the first stage of cooling thereby implementing low sensible heat ratio cooling. On the need for higher cooling performance the system will activate the second stage of cooling and automatically switch the fan to the higher fan speed setting. This system may be further enhanced with a humidistat. **Units not having automatic low sensible heat ratio cooling will not be accepted;** as an alternate a hot gas reheat coil may be provided with control system for automatic activation.

Control shall have all of the above mentioned features of the CXM control system along with the following expanded features:

- a. Removable thermostat connector.
- b. Night setback control.
- c. Random start on return from night setback.
- d. Minimized reversing valve operation (Unit control logic shall only switch the reversing valve when cooling is demanded for the first time. The reversing valve shall be held in this position until the first call for heating, ensuring quiet operation and increased valve life.).
- e. Override temperature control with 2-hour (adjustable) timer for room occupant to override setback temperature at the thermostat.
- f. Dry contact night setback output for digital night setback thermostats.
- g. Ability to work with heat pump or heat/cool (Y, W) type thermostats.
- h. Ability to work with heat pump thermostats using O or B reversing valve control.
- i. Emergency shutdown contacts.
- j. Boilerless system heat control at low loop water temperature.
- k. Ability to allow up to 3 units to be controlled by one thermostat.
- l. Relay to operate an external damper.
- m. Ability to automatically change fan speed from multistage thermostat.
- n. Relay to start system pump.
- o. 75 VA control transformer. Control transformer shall have load side short circuit and overload protection via a built in circuit breaker.

Remote Service Sentinel (CXM/DXM):

Solid state control system shall communicate with thermostat to display (at the thermostat) the unit status, fault status, and specific fault condition, as well as retrieve previously stored fault that caused unit shutdown. The Remote Service Sentinel allows building maintenance personnel or service personnel to diagnose unit from the wall thermostat. The control board shall provide a signal to the thermostat fault light, indicating a lockout. Upon cycling the G (fan) input 3 times within a 60 second time period, the fault light shall display the specific code as indicated by a sequence of flashes. A detailed flashing code shall be provided at the thermostat LED to display unit status and specific fault status such as over/under voltage fault, high pressure fault, low pressure fault, low water temperature fault, condensate overflow fault, etc. **Units that do not provide this remote service sentinel shall not be acceptable.**

Option: Lonworks interface system

Units shall have all the features listed above (either CXM or DXM) and the control board will be supplied with a LONWORKS interface board, which is LONMark certified. This will permit all units to be daisy chained via a 2-wire twisted pair shielded cable. The following points must be available at a central or remote computer location:

- a. space temperature
- b. leaving water temperature
- c. discharge air temperature
- d. command of space temperature setpoint
- e. cooling status
- f. heating status
- g. low temperature sensor alarm
- h. low pressure sensor alarm
- i. high pressure switch alarm
- j. condensate sensor alarm
- k. hi/low voltage alarm
- l. fan "ON/AUTO" position of space thermostat as specified above
- m. unoccupied / occupied command
- n. cooling command
- o. heating command
- p. fan "ON / AUTO" command
- q. fault reset command
- r. itemized fault code revealing reason for specific shutdown fault (any one of 7)

This option also provides the upgraded 75VA control transformer with load side short circuit and overload protection via a built in circuit breaker.

Option: MPC (Multiple Protocol Control) interface system

Units shall have all the features listed above (either CXM or DXM) and the control board will be supplied with a Multiple Protocol interface board. Available protocols are BACnet MS/TP, Modbus, or Johnson Controls N2. The choice of protocol shall be field selectable/changeable via the use of a simple selector switch. Protocol selection shall not require any additional programming or special external hardware or software tools. This will permit all units to be daisy chain connected by a 2-wire twisted pair shielded cable. The following points must be available at a central or remote computer location:

- a. space temperature
- b. leaving water temperature
- c. discharge air temperature
- d. command of space temperature setpoint
- e. cooling status
- f. heating status
- g. low temperature sensor alarm
- h. low pressure sensor alarm
- i. high pressure switch alarm
- j. condensate overflow alarm
- k. hi/low voltage alarm
- l. fan "ON/AUTO" position of space thermostat as specified above
- m. unoccupied / occupied command
- n. cooling command
- o. heating command
- p. fan "ON / AUTO" command
- q. fault reset command
- r. itemized fault code revealing reason for specific shutdown fault (any one of 7)

This option also provides the upgraded 75VA control transformer with load side short circuit and overload protection via a built in circuit breaker.

Warranty:

Climate Master shall warranty equipment for a period of 12 months from start up or 18 months from shipping (which ever occurs first).

Option: Extended 4-year compressor warranty covers compressor for a total of 5 years.

Option: Extended 4-year refrigeration circuit warranty covers coils, reversing valve, expansion valve and compressor for a total of 5 years.

Option: Extended 4-year control board warranty covers the CXM/DXM control board for a total of 5 years.

FIELD INSTALLED OPTIONS

Hose Kits:

All units 120000 BTUH (35 kW) and below shall be connected with hoses. The hoses shall be 2 feet (61 cm) long, braided stainless steel; fire rated hoses complete with adapters. Only fire rated hoses will be accepted.

Valves:

The following valves are available and will be shipped loose:

- a. Ball valve; bronze material, standard port full flow design, IPT connections.
- b. Ball valve with memory stop and PT Port; standard port full flow design, IPT connections.
- c. "Y" strainer with cap; bronze material, IPT connections.
- d. "Y" strainer with blowdown valve; bronze material, IPT connections.
- e. Motorized water valve; slow acting, 24v, IPT connections.

Hose Kit Assemblies:

The following assemblies ship with the valves already assembled to the hose described:

- a. Supply and return hoses having ball valve with PT port.
- b. Supply hose having ball valve with PT port; return hose having automatic flow regulator valve (Measureflo) with PT ports, and ball valve.
- c. Supply hose having "Y" strainer with blowdown valve, and ball valve with PT port; return hose having automatic flow regulator (Measureflo) with PT ports, and ball valve.

Thermostats:

The thermostat shall be a ClimateMaster mechanical or electronic type thermostat as selected below with the described features:

- a. Single Stage Standard Manual Changeover (ATM11C01)
Thermostat shall be a single-stage, vertical mount, manual changeover with HEAT-OFF-COOL system switch and fan ON-AUTO switch. Thermostat shall have a mechanical temperature indicator and set point indication. Thermostat shall only require 4 wires for connection. Mercury bulb thermostats are not acceptable.
- b. Single Stage Digital Manual Changeover with Two-Speed Fan Control (ATM11C03) – DXM and PSC Fan required
Thermostat shall be a single-stage, digital, manual changeover with HEAT-OFF-COOL system switch, fan ON-AUTO switch, and fan LO-HI switch. Thermostat shall have an LCD display with temperature and set-point(s) in °F or °C. The Thermostat shall provide permanent memory of set-point(s) without batteries. A fault LED shall be provided to display specific fault condition. Thermostat shall come standard with remote temperature sensor, but may be operated with internal sensor if desired via installation of a jumper.
- c. Single Stage Digital Auto or Manual Changeover (ATA11U01)
Thermostat shall be a single-stage, digital, auto or manual changeover with HEAT-OFF-COOL-AUTO system switch and fan ON-AUTO switch. Thermostat shall have an LCD display with temperature and set-point(s) in °F or °C. The Thermostat shall provide permanent memory of set-point(s) without batteries. A fault LED shall be provided to display specific fault condition. Thermostat shall provide temperature display offset for custom applications.
- d. Single Stage Digital Automatic Changeover with Two-Speed Fan Control (ATA11C04) – DXM and PSC Fan required
Thermostat shall be a single-stage, digital, auto or manual changeover with HEAT-OFF-COOL-AUTO system switch, fan ON-AUTO switch, and fan LO-HI switch. Thermostat shall have an LCD display with temperature and set-point(s) in °F or °C. The Thermostat shall provide permanent memory of set-point(s) without batteries. A fault LED shall be provided to display specific fault condition. Thermostat shall come standard with remote temperature sensor, but may be operated with internal sensor if desired via installation of a jumper.
- e. Multistage Digital Automatic Changeover (ATA22U01)
Thermostat shall be multi-stage (2H/2C), manual or automatic changeover with HEAT-OFF-COOL-AUTO system settings and fan ON-AUTO settings. Thermostat shall have an LCD display with temperature, set-point(s), mode, and status indication. The temperature indication shall be selectable for °F or °C. The thermostat shall provide permanent memory of set-point(s)

without batteries. A fault LED shall be provided to indicate specific fault condition(s). Thermostat shall provide temperature display offset for custom applications. Thermostat shall allow unit to provide better dehumidification with optional DXM controller by automatically using lower fan speed on stage 1 cooling (higher latent cooling) as main cooling mode, and automatically shifting to high speed fan on stage 2 cooling.

- f. Single Stage Manual Changeover Programmable 5/2 Day (ATP11N01)
Thermostat shall be 5 day/2 day programmable (with up to 4 set points per day), single stage (1H/1C), manual changeover with HEAT-OFF-COOL system settings and fan ON-AUTO settings. Thermostat shall have an LCD display with temperature, set-point(s), mode, and status indication. The temperature indication shall be selectable for °F or °C. The thermostat shall provide permanent memory of set-point(s) without batteries. Thermostat shall provide convenient override feature to temporarily change set point.
- g. Multistage Automatic or Manual Changeover Programmable 5/2 Day (ATP21U01)
Thermostat shall be 5 day/2 day programmable (with up to 4 set points per day), multi-stage (2H/1C), automatic or manual changeover with HEAT-OFF-COOL-AUTO system settings and fan ON-AUTO settings. Thermostat shall have an LCD display with temperature, set-point(s), mode, and status indication. The temperature indication shall be selectable for °F or °C. The thermostat shall provide permanent memory of set-point(s) without batteries. Thermostat shall provide convenient override feature to temporarily change set point.
- h. Multistage Automatic or Manual Changeover Programmable 7 Day (ATP32U01)
Thermostat shall be 7 day programmable (with up to 4 set points per day), multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO system settings and fan ON-AUTO settings. Thermostat shall have a blue backlit dot matrix LCD display with temperature, set-points, mode, and status indication. The temperature indication shall be selectable for °F or °C. Time display shall be selectable for 12 or 24 hour clock. Fault identification shall be provided (when used with ClimateMaster CXM or DXM controls) to simplify troubleshooting by providing specific unit fault at the thermostat with red backlit LCD during unit lockout. The thermostat shall provide permanent memory of set-points without batteries. Thermostat shall provide heating set-point range limit, cooling set-point range limit, temperature display offset, keypad lockout, dead-band range setting, and inter-stage differential settings. Thermostat shall provide progressive recovery to anticipate time required to bring space temperature to the next programmed event. Thermostat shall provide an installer setup for configuring options and for setup of servicing contractor name and contact information. Thermostat shall allow the use of an accessory remote and/or outdoor temperature sensor (AST008). Thermostat navigation shall be accomplished via five buttons (up/down/right/left/select) with menu-driven selections for ease of use and programming.
- i. Multistage Automatic or Manual Changeover Programmable 7 Day with Humidity Control (ATP32U02)
Thermostat shall be 7 day programmable (with up to 4 set points per day), multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO system settings and fan ON-AUTO settings. Separate dehumidification and humidification set points shall be configurable for discreet outputs to a dehumidification option and/or an external humidifier. Installer configuration mode shall allow thermostat dehumidification mode to operate with ClimaDry reheat or with ECM fan dehumidification mode via settings changes. Thermostat shall have a blue backlit dot matrix LCD display with temperature, relative humidity, set-points, mode, and status indication. The temperature indication shall be selectable for °F or °C. Time display shall be selectable for 12 or 24 hour clock. Fault identification shall be provided (when used with ClimateMaster CXM or DXM controls) to simplify troubleshooting by providing specific unit fault at the thermostat with red backlit LCD during unit lockout. The thermostat shall provide permanent memory of set-points without batteries. Thermostat shall provide heating set-point range limit, cooling set-point range limit, temperature display offset, keypad lockout, dead-band range setting, and inter-stage differential settings. Thermostat shall provide progressive recovery to anticipate time required to bring space temperature to the next programmed event. Thermostat shall provide an installer setup for configuring options and for setup of servicing contractor name and contact information. Thermostat shall allow the use of an accessory remote and/or outdoor temperature sensor (AST008). Thermostat navigation shall be accomplished via five buttons (up/down/right/left/select) with menu-driven selections for ease of use and programming.

DDC Sensors:

ClimateMaster wall mounted DDC sensor to monitor room temperature and interfaces with optional interface system described above. Several types as described below:

- a. Sensor only with no display (LON and MPC).
- b. Sensor with override (LON only).
- c. Sensor with setpoint and adjustment override (MPC only).
- d. Sensor with setpoint and adjustment override, LCD display, status/fault indication (LON and MPC).

Section Change Log

Date:	Item:	Action:
05/23/07	All	Updated with model 072
01/01/07	Dimensional Data	Updated Dimensional Data
01/01/07	Specifications	Updated thermostat offering
01/01/07	Wiring Diagrams	Added pressure switch for motorized valve option
01/01/07	Electrical Data	Added secondary pump data, corrected reheat data
01/01/07	Performance Data	Added low temperature selection notes
01/01/07	Motorized Valves	Added Cv, MOPD, and WPD data
01/01/06	First Published	

Tranquility 27™ Two-Stage (TT) Series
Rev.: 05/23/07D