Tranquility® Two-Stage Rooftop (TRT) Series

Submittal Data

Models TRT036-072, 60Hz - HFC-410A

LC1050

Rev.: November 5, 2024

CLIMATEMASTER®
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TRT Rooftop Series

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TRT TWO-STAGE ROOFTOP SERIES

The TRT line introduces the next stage of evolution in ClimateMaster® WSHP Rooftops. TRT's optimize energy efficiency with capacity control by utilizing two-stage compressors paired with variable frequency drive (VFD) fan motor controls allowing the unit to operate as low as 60% of its rated full load capacity. This pairing provides occupants with a constant leaving air temperature even with large shifts in demand. The system's capabilities are enhanced even further with intelligent iGate® 2 controls which reduce start-up, commissioning, and troubleshooting time. These technologies, along with other standard features and options, position the TRT as the leading Rooftop WSHP on the market!

Available in sizes 3 tons (10.6 kW) through 6 tons (70.3 kW) with various outdoor air options, the TRT Series offers a wide range of features and options for most any installation. The TRT has an extended range refrigerant circuit, capable of ground loop (geothermal) applications as well as water loop (boiler-tower) applications. Standard features include two-stage compressors, variable frequency drive (VFD) fan motor controls, intelligent communicating iGate® 2 controls, and insulated polyester powder painted cabinet.

ClimateMaster's patented ClimaDry® II Dehumidification option is an innovative means of providing modulating reheat without the complication of refrigeration controls. ClimaDry II is hot gas generated reheat, which utilizes one of the biggest advantages of a Water-Source Heat Pump (WSHP), the transfer of energy through the water piping system. ClimaDry II simply diverts condenser water through a water-to-air coil that is placed after the evaporator coil. ClimaDry II is the simplified leading reheat solution for commercial buildings.

The ability to handle outside air is one of the most attractive features of the TRT Series. Choices include manual fresh air damper, motorized fresh air damper, modulating economizer with enthalpy controls. Options such as DDC controls, factory-installed water solenoid valves, ClimaDry® II modulating reheat solution, internal water pump for single pipe applications, electrical disconnects, and several filter choices allow customized design solutions. TRT Series Water-Source Heat Pumps are designed to meet the challenges of today's HVAC demands with a high efficiency, high value solution.

UNIT FEATURES

- Available in sizes 036 (3 ton, 10.6 kW), 048 (4 ton, 14.1 kW), 060 (5 ton,17.6 kW), 072 (6 ton, 21.1 kW)
- Copeland scroll two-stage compressors
- Variable Frequency Drive (VFD) fan motor controls
- iGate® 2 Communicating Controls Powered by DXM2.5
  - Multiple communication pathways,
    - Cloud-based connectivity via iGate 2 Wi-Fi communicating color touch screen thermostat for remote monitoring, access, and diagnosis. Including the new functionality for contractors/ building engineers to monitor and make mass changes on multi-unit systems
    - Connect directly to the system with use of a handheld service tool
  - Provides real-time unit operating conditions
  - Reduces start-up, commissioning, and service time by removing the need for hard tooling to take temperature measurements
  - Captures operating conditions in the event of a safety shutdown
- Unique double isolation compressor mounting with vibration isolation for quiet operation
- Exceeds ASHRAE 90.1 efficiencies
- Galvanized steel construction with polyester powder coat paint
- Extended range refrigerant/water circuit insulation available
- Stainless steel drain pan standard
- Double wall construction for access doors with stainless steel hardware
- TXV metering device
- Extended range (20 to 110°F, [-6.7 to 43.3°C]) operation
- Up to 1.5” ESP capability
- Slide-out blower assembly with high efficiency motors
- Unit Performance Sentinel performance (UPS) monitoring system
- Eight safeties standard

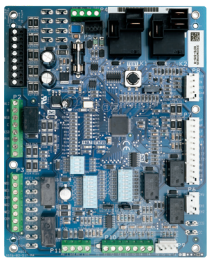
OPTIONS

- BACnet, Modbus and Johnson N2 compatibility options for DDC controls
- Internally mounted water pump for single pipe systems
- ClimaDry® II modulating reheat
- Ability to implement demand controlled ventilation (DCV) with optional enthalpy economizer and optional CO_2 sensor.

ACCESSORIES

- Wi-Fi communicating color touch screen thermostat
- Wide variety of thermostat options to meet your application needs
  - Roof curbs
- Various length braided hose kits with optional water valves, PT plugs, blowdown valve, flow limiting, and strainer options
- Externally mounted manual and motorized water valves
- 2” Merv 8 filter
- 4” Merv 8 or 13 filters
- Architecturally pleasing wall sensors for connection to DDC (MPC) controls

iGate® 2 Communication – Cloud connected, web-enabled information gateway to monitor, control, and diagnose your system



TRT Two-Stage Rooftop Series is equipped with industry-first, iGate® 2 communication information gateway that allows users to interact with their water-source system in easy to read clear language AND delivers improved reliability/efficiency by precisely controlling smart components.

Monitor/Configure – Installers can configure from the myUplink PRO website, mobile app, iGate 2 Communicating AWC Thermostat, or diagnostic tool, including: Airflow, unit family, size, accessory configuration, and demand reduction (optional, to limit unit operation during peak times). Users can look up the current system status: temperature sensor readings and operational status of the blower.

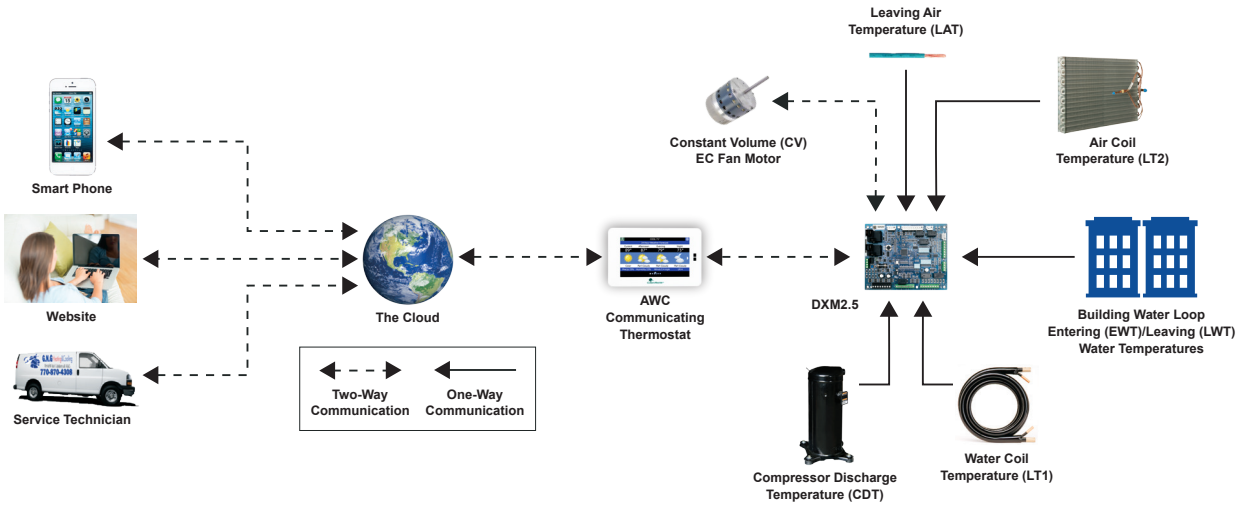
Precise Control – The new DXM2.5 board enables intelligent, 2-way communication between the DXM2.5 board and smart components like the communicating thermostat/diagnostic tool and constant volume (CV) EC fan motor. The advanced DXM2.5 board uses information received from the smart components and temperature sensors to precisely control operation of the variable speed CV EC fan motor to deliver higher efficiency, reliability and increased comfort.

Diagnostics – iGate 2 takes diagnosing water source heat pump units to a next level of simplicity, by providing a dashboard of system and fault information, in clear language, on the AWC Communicating Thermostat, handheld service tool and the web portal/mobile app on the internet.

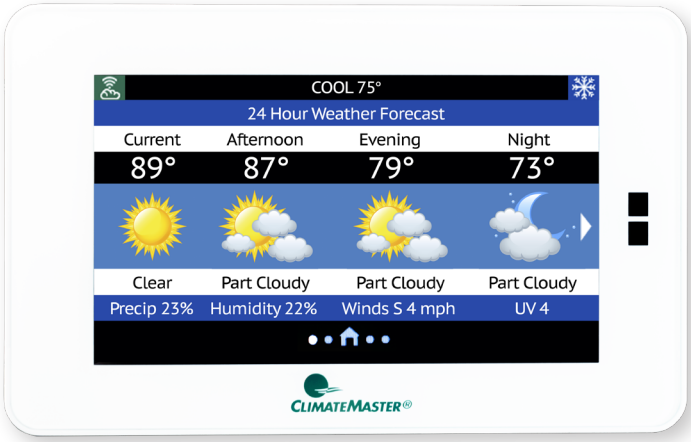
iGate 2 Thermostat Service Warnings notify the homeowner and contractor of a fault and displays fault descriptions by app notifications/email with possible causes. Additionally, the current system status can be viewed graphically on the web portal and mobile app.

In iGate 2 Service Mode, the service personnel can access fault description, possible causes and most importantly, the conditions (temp, flow, i/o conditions, configuration) at the time of the fault. Manual Operation mode allows the service personnel to manually command operation for any of the thermostat outputs, blower speed, to help troubleshoot specific components. This operation can either be conduct at the unit with a communicating thermostat/diagnostic tool or remotely with mobile app/website when the AWC Communicating Thermostat controls are used.

With an iGate 2 communicating system, users and contractors have a web-enabled gateway to system information never before available and exclusive to ClimateMaster products.



iGate® 2 Communication – Cloud connected, web-enabled information gateway to monitor, control, and diagnose your system



The iGate® 2 Communicating (AWC) Thermostat is innovating the future of comfort technology, one building at a time. The inspired design of the touch screen interface allows you to see real-time data for the efficiency and health of your system, with early warnings for potential system faults. The cloud based information gateway allows technicians to remotely diagnose system issues before occupants even know there is a problem. Control and monitor the system in your home or business from anywhere in the world with an easy to use app on your phone.

Features with Efficiency in Mind

Touch Screen Interface
A brilliantly customizable touch screen monitor for simple control.

Seamless Integration
Between your iGate® 2 Communicating (AWC) Thermostat and Tranquility comfort system.

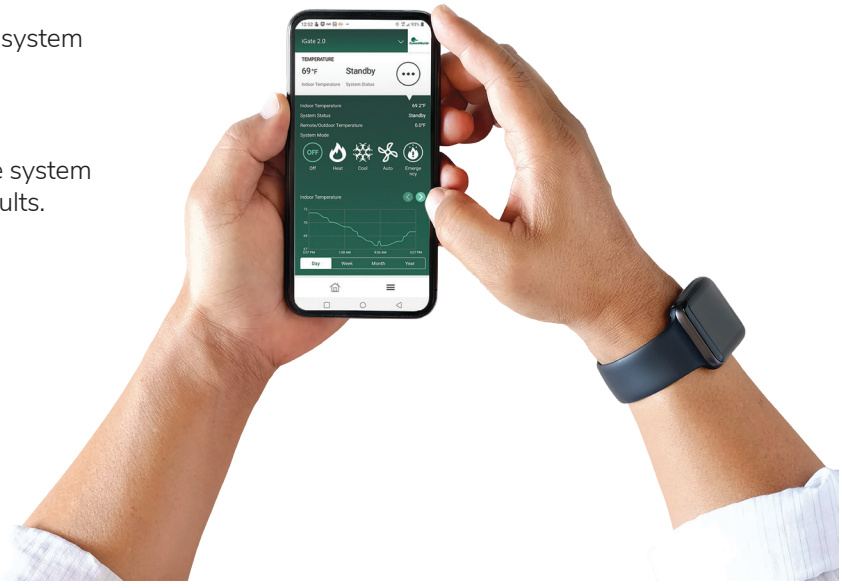
(Mobile) Remote System Control
Control temperature and schedule from anywhere in the world.

Early Fault Warnings
Alerts you and your contractor of potential system faults in the future.

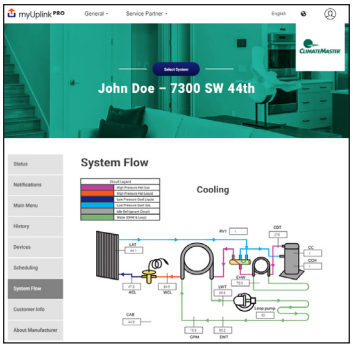
Remote Diagnostics
Enable the contractor to remotely diagnose system issues, adjust system settings, and reset faults.

Real-Time Operations Data & System Schematics
Access simply via the myUplink Pro Account and web portal to view system diagrams with current operating temperatures.

Revenue Stream
HVAC professionals can offer owners service contracts with remote monitoring and diagnosis capabilities without the large expense of a building management system.



HVAC Professional | User Experience



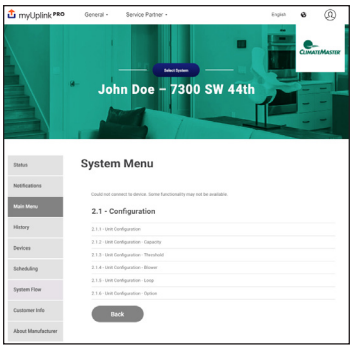
The iGate® 2 is more than just a smart thermostat for your residential or commercial customer, it's a business opportunity. Our new thermostat works with your customers' Tranquility comfort systems to provide the most efficient link between their system and your services. The customization of monitoring from the myUplink PRO web portal or phone app account allows for continuous system monitoring, analysis, repair recognition, and early warnings for potential system faults that are sent to you and your customer.

myUplink PRO

Benefits

- Remote login from anywhere, anytime from any internet connected device
- View system fault history with possible root causes
- Information is available for contractors to troubleshoot and diagnosis systems remotely
- Secure internet connection keeps homeowner information private
- Access thermostat(s) through Android and iPhone mobile apps

Homeowner | User Experience



The iGate® 2 combines a Wi-Fi thermostat and advanced unit controls to communicate the systems operation information to the cloud. From any internet connected device or smart phone, homeowners can control and monitor their systems from anywhere in the world. iGate 2 offers homeowners peace of mind their systems are operating at peak performance with advanced operational performance issue notifications. HVAC professionals get notifications when systems are operating out of range. They can log in remotely to check system faults, review current operating conditions, and diagnosis issues remotely. This gives the HVAC technician the upper hand when showing up to perform service, saving time which in turn saves money.

myUplink

Benefits

- Communicates personal settings and reminders through the iGate 2 communication system
- Easy-to-use, full-color, high-resolution interface
- Sleek, intuitive button control
- Secure internet connection keeps your information private
- Contains unit model, serial number and your HVAC professionals contact information
- System monitoring automatically contacts HVAC system providers when service is needed

Reference Calculations

HEATING

$$LWT = EWT - \frac{HE}{GPM \times Constant}$$

$$LAT = EAT + \frac{HC}{CFM \times 1.08}$$

COOLING

$$LWT = EWT + \frac{HR}{GPM \times Constant}$$

$$LC = TC - SC$$

$$LAT\ (DB) = EAT\ (DB) - \frac{SC}{CFM \times 1.08}$$

$$S/T = \frac{SC}{TC}$$

Constant = 500 for water, 485 for antifreeze

Conversion Table - to convert inch-pound (English) to S-I (Metric)

Airflow	Water Flow	Est 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

Legend and Glossary of Abbreviations

Abbreviations	Descriptions
Btuh	Btu (British Thermal Unit) per hour
CDT	Compressor discharge temperature
CFM	Airflow, cubic feet per minute
COP	Coefficient of performance = Btuh output/Btuh input
CT ECM	Electronic commutated constant torque fan motor
CV ECM	Electronic commutated constant volume fan motor
DB	Dry bulb temperature, °F
EAT	Entering air temperature
EER	Energy efficient ratio = Btuh output/Watt input
ESP	External static pressure, inches w.g.
EWT	Entering water temperature
FPT	Female pipe thread
GPM	Water flow in U.S., gallons per minute
HC	Air heating capacity, Btuh
HE	Total heat of extraction, Btuh
HR	Total heat of rejection, Btuh
HWC	Hot water generator (desuperheater) capacity, MBtuh

Abbreviations	Descriptions
kW	Total power unit input, kilowatts
LAT	Leaving air temperature, °F
LC	Latent cooling capacity, Btuh
LOC	Loss of charge
LWT	Leaving water temperature, °F
MBtuh	1,000 Btu per hour
MPT	Male pipe thread
MWV	Motorized water valve
PSC	Permanent split capacitor
RDS	Refrigerant Detection System
SC	Sensible cooling capacity, Btuh
S/T	Sensible to total cooling ratio
TC	Total cooling capacity, Btuh
TD or delta T	Temperature differential
VFD	Variable frequency drive
WB	Wet bulb temperature, °F
WPD	Waterside pressure drop, psi or feet of head
WSE	Waterside economizer

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.

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.....56,900 BTUH

Sensible Cooling.....49,400 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 12°F rise in temp.)...11 GPM

Air Flow.....2,120 CFM

Steps 3, 4 & 5 HP Selection:

After making our preliminary selection (TRT060), we enter the tables at design water flow and water temperature and read Total Cooling, Sens. Cooling and Heat of Rej. capacities:

Total Cooling.....57,000 BTUH

Sensible Cooling.....45,000 BTUH

Heat of Rejection.....73,200 BTUH

Steps 6 & 7 Entering Air and Airflow Corrections:

Next, we determine our correction factors.

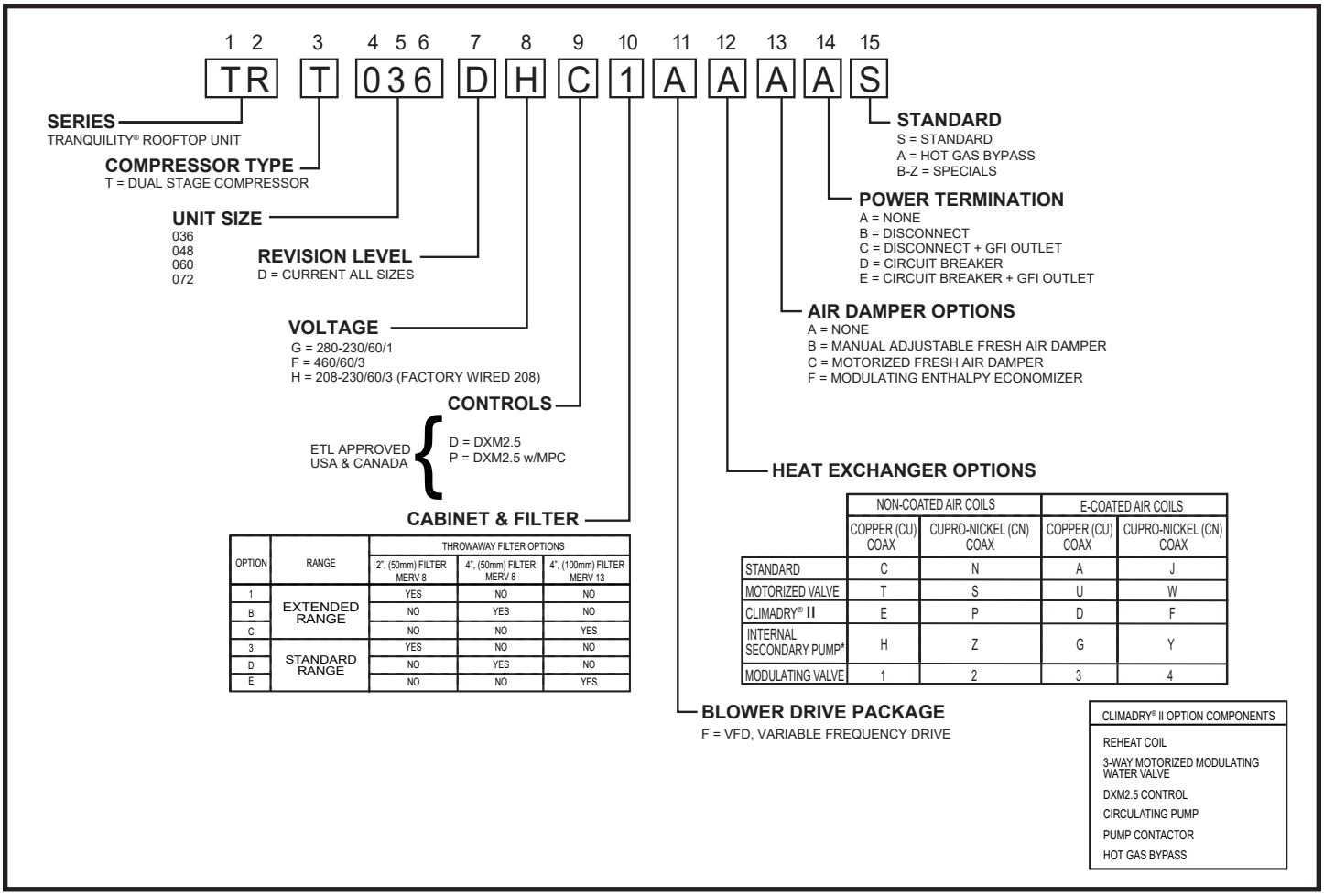
	Table	Ent Air	Air Flow	Corrected
Corrected Total Cooling =	57,000	x 0.969	x 1.004	= 55,454
Corrected Sens Cooling =	45,000	x 1.090	x 1.030	= 50,522
Corrected Heat of Rej =	73,200	x 0.975	x 1.006	= 71,798

Step 8 Water Temperature Rise Calculation and Assessment:

Actual Temperature Rise.....13.1°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 slightly undersized as recommended, when compared to the actual indicated load.

TRT Series Nomenclature

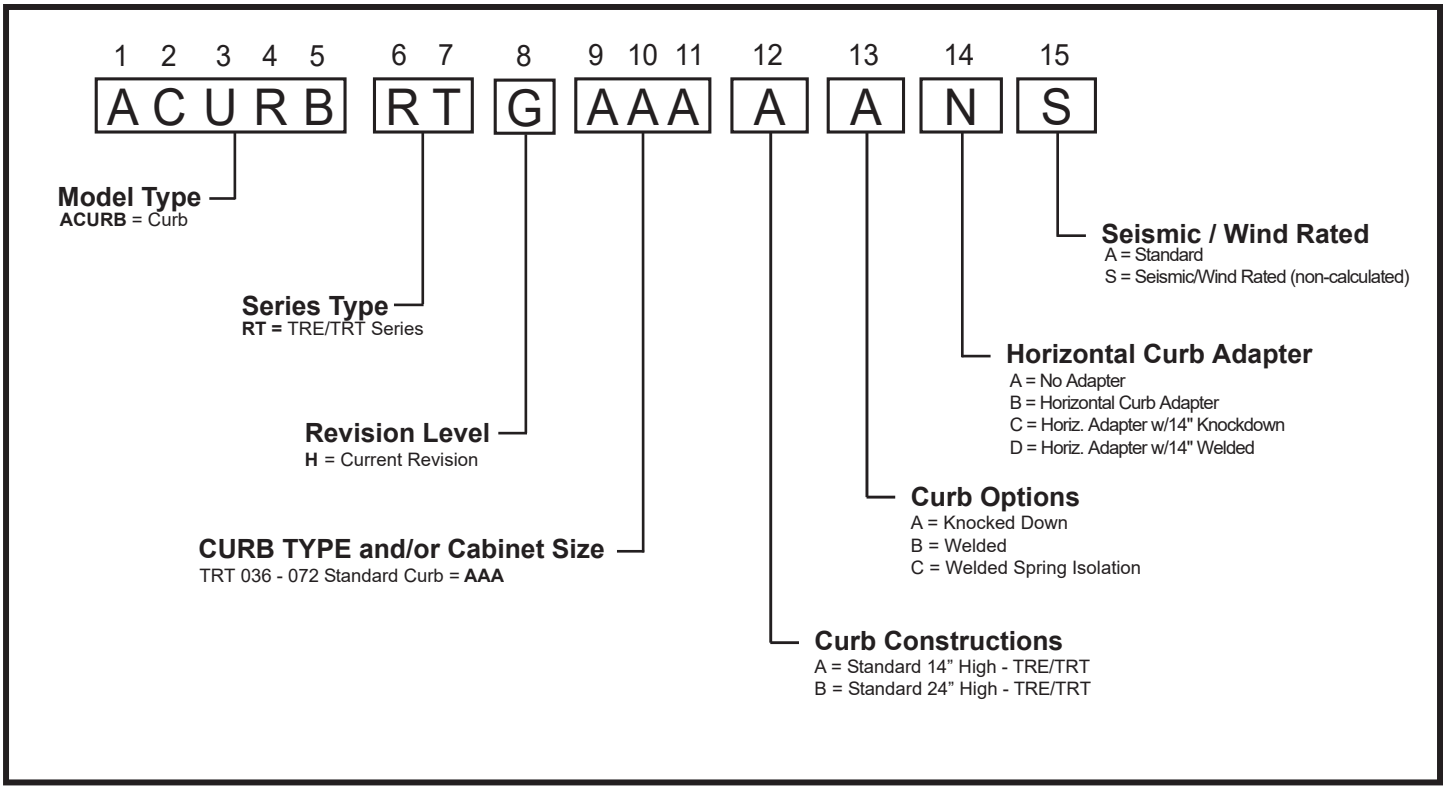


OPTION	RANGE	THROWAWAY FILTER OPTIONS		
		2", (50mm) FILTER MERV 8	4", (50mm) FILTER MERV 8	4", (100mm) FILTER MERV 13
1	EXTENDED RANGE	YES	NO	NO
B		NO	YES	NO
C		NO	NO	YES
3	STANDARD RANGE	YES	NO	NO
D		NO	YES	NO
E		NO	NO	YES

	NON-COATED AIR COILS		E-COATED AIR COILS	
	COPPER (CU) COAX	CUPRO-NICKEL (CN) COAX	COPPER (CU) COAX	CUPRO-NICKEL (CN) COAX
STANDARD	C	N	A	J
MOTORIZED VALVE	T	S	U	W
CLIMADRY® II	E	P	D	F
INTERNAL SECONDARY PUMP*	H	Z	G	Y
MODULATING VALVE	1	2	3	4

CLIMADRY® II OPTION COMPONENTS
REHEAT COIL
3-WAY MOTORIZED MODULATING WATER VALVE
DXM2.5 CONTROL
CIRCULATING PUMP
PUMP CONTACTOR
HOT GAS BYPASS

TRT Series Nomenclature



Performance Data – AHRI/ASHRAE/ISO 13256-1

AHRI/ASHRAE/ISO 13256-1. English (I-P) Unit
Full Load Ratings

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 86 ºF		Heating 68 ºF		Cooling 59 ºF		Heating 50 ºF		Cooling 77 ºF		Heating 32 ºF	
	Capacity BTUH	EER BTUH/W	Capacity BTUH	COP	Capacity BTUH	EER BTUH/W	Capacity BTUH	COP	Capacity BTUH	EER BTUH/W	Capacity BTUH	COP
TRT036	35,000	15.0	43,000	5.1	40,000	22.1	35,000	4.6	36,000	16.4	27,000	3.7
TRT048	46,500	14.0	59,200	4.7	53,000	20.3	48,500	4.1	48,200	15.5	37,700	3.4
TRT060	62,400	16.2	72,700	5.1	70,000	23.7	59,200	4.5	64,500	17.9	46,000	3.7
TRT072	68,000	14.5	88,000	5.0	76,000	21.3	72,000	4.4	69,000	15.8	55,000	3.6

Part Load Ratings

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 86 ºF		Heating 68 ºF		Cooling 59 ºF		Heating 50 ºF		Cooling 77 ºF		Heating 41 ºF	
	Capacity BTUH	EER BTUH/W	Capacity BTUH	COP	Capacity BTUH	EER BTUH/W	Capacity BTUH	COP	Capacity BTUH	EER BTUH/W	Capacity BTUH	COP
TRT036	25,000	16.4	30,500	5.5	29,000	28.0	24,000	4.6	27,500	22.6	21,000	3.9
TRT048	33,700	15.3	42,800	5.2	39,700	26.0	34,300	4.2	37,300	21.2	29,400	3.6
TRT060	45,100	17.7	53,100	5.5	51,300	30.0	42,500	4.5	48,900	24.2	36,700	3.9
TRT072	50,500	15.7	65,000	5.3	58,500	26.7	52,600	4.4	55,000	21.3	45,700	3.8

AHRI/ASHRAE/ISO 13256-1. Metric (S-I) Unit
Full Load Ratings

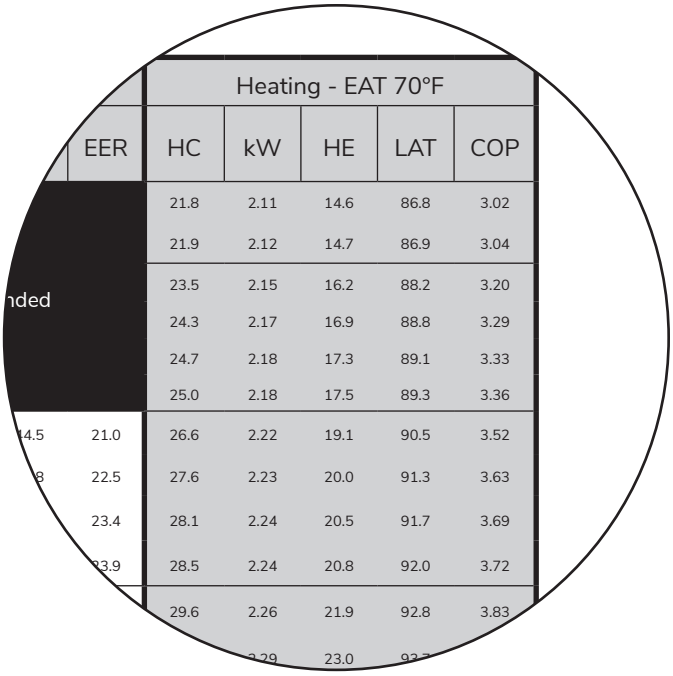
Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 30 ºC		Heating 20 ºC		Cooling 15 ºC		Heating 10 ºC		Cooling 25 ºC		Heating 0 ºC	
	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP
TRT036	10.26	4.4	12.60	5.1	11.72	6.5	10.26	4.6	10.55	4.8	7.91	3.7
TRT048	13.63	4.1	17.35	4.7	15.53	5.9	14.21	4.1	14.13	4.5	11.05	3.4
TRT060	18.29	4.7	21.31	5.1	20.52	6.9	17.35	4.5	18.90	5.2	13.48	3.7
TRT072	19.93	4.2	25.79	5.0	22.27	6.2	21.10	4.4	20.22	4.6	16.12	3.6

Part Load Ratings

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 30 ºC		Heating 20 ºC		Cooling 15 ºC		Heating 10 ºC		Cooling 20 ºC		Heating 5 ºC	
	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP
TRT036	7.33	4.8	8.94	5.5	8.50	8.2	7.03	4.6	8.06	6.6	6.15	3.9
TRT048	9.88	4.5	12.54	5.2	11.64	7.6	10.05	4.2	10.93	6.2	8.62	3.6
TRT060	13.22	5.2	15.56	5.5	15.04	8.8	12.46	4.5	14.33	7.1	10.76	3.9
TRT072	14.80	4.6	19.05	5.3	17.15	7.8	15.42	4.4	16.12	6.2	13.39	3.8

Note 1: Cooling capacities based upon 80.6°F DB, 66.2°F WB entering air temperature.
Note 2: Heating capacities based upon 68°F DB, 59°F WB entering air temperature.
Note 3: All ratings based upon operation at lower voltage of dual voltage rated models.
Note 4: All TRT's will have high static sheave set @ 1-turn open w/large motor & VFD.

For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 42°F [5.6°C] when the JW3 jumper is not clipped (see example below). Otherwise, appropriate levels of a proper antifreeze solution should be used in systems with leaving water temperatures of 42°F [5.6°C] or below and the JW3 jumper should be clipped. 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.



		Heating - EAT 70°F				
	EER	HC	kW	HE	LAT	COP
		21.8	2.11	14.6	86.8	3.02
		21.9	2.12	14.7	86.9	3.04
		23.5	2.15	16.2	88.2	3.20
nded		24.3	2.17	16.9	88.8	3.29
		24.7	2.18	17.3	89.1	3.33
		25.0	2.18	17.5	89.3	3.36
14.5	21.0	26.6	2.22	19.1	90.5	3.52
8	22.5	27.6	2.23	20.0	91.3	3.63
	23.4	28.1	2.24	20.5	91.7	3.69
	23.9	28.5	2.24	20.8	92.0	3.72
		29.6	2.26	21.9	92.8	3.83
			2.29	23.0	93.7	

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 x 500)

TD = 22,500 / (4.5 x 500)

TD = 10°F

LWT = EWT - TD

LWT = 50 - 10 = 40°F

In this example, a higher flow rate will be required for EWTs at or below 50°F without antifreeze. At 2 gpm/ton, the calculation above results in a TD of 7.5. LWT = 50 - 7.5 = 42.5°F, which is above 42°F EWT, and is acceptable for this application.

1,200 CFM Nominal Airflow Heating & Cooling

WATER / BRINE				COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
EWT °F	Flow gpm	PD psi	PD ft.	TC	SC	KW	HR	EER	HC	KW	HE	LAT	COP
20	9.00	6.3	14.6	Operation Not Recommended					23.62	2.16	16.27	86.2	3.2
30	4.50	1.2	2.8	42.48	29.22	1.67	48.19	25.4	26.17	2.21	18.63	88.1	3.5
	6.75	3.2	7.5	41.38	28.57	1.58	46.77	26.2	27.39	2.23	19.77	89.1	3.6
	9.00	5.7	13.2	40.53	28.09	1.54	45.78	26.4	28.07	2.25	20.41	89.6	3.7
40	4.50	1.0	2.2	42.81	29.52	1.81	49.00	23.6	30.45	2.29	22.62	91.4	3.9
	6.75	2.7	6.3	42.71	29.37	1.71	48.55	25.0	32.04	2.32	24.11	92.7	4.0
	9.00	4.9	11.3	42.41	29.18	1.66	48.09	25.5	32.92	2.34	24.93	93.3	4.1
50	4.50	0.7	1.6	42.07	29.30	1.96	48.77	21.4	34.94	2.38	26.81	94.9	4.3
	6.75	2.2	5.1	42.70	29.51	1.85	49.02	23.1	36.86	2.42	28.60	96.4	4.5
	9.00	4.0	9.3	42.83	29.52	1.80	48.97	23.8	37.92	2.44	29.59	97.2	4.6
60	4.50	0.4	0.9	40.57	28.73	2.14	47.87	19.0	39.46	2.47	31.03	98.4	4.7
	6.75	1.8	4.1	41.71	29.17	2.01	48.57	20.7	41.65	2.52	33.05	100.1	4.8
	9.00	3.5	8.1	42.16	29.34	1.95	48.82	21.6	42.83	2.54	34.15	101.0	4.9
70	4.50	0.3	0.8	38.58	27.93	2.33	46.55	16.5	43.87	2.57	35.11	101.8	5.0
	6.75	1.6	3.8	40.03	28.52	2.19	47.51	18.3	46.19	2.62	37.25	103.6	5.2
	9.00	3.3	7.6	40.69	28.78	2.12	47.94	19.1	47.41	2.65	38.36	104.5	5.2
80	4.50	0.3	0.6	36.28	26.97	2.56	45.03	14.2	47.99	2.67	38.89	104.9	5.3
	6.75	1.5	3.5	37.88	27.63	2.40	46.08	15.8	50.26	2.73	40.96	106.7	5.4
	9.00	3.2	7.3	38.66	27.96	2.33	46.60	16.6	51.39	2.76	41.97	107.6	5.5
90	4.50	0.2	0.5	33.86	25.96	2.83	43.52	12.0	51.61	2.77	42.17	107.7	5.5
	6.75	1.4	3.3	35.47	26.63	2.65	44.50	13.4	53.58	2.83	43.92	109.2	5.5
	9.00	3.0	7.0	36.29	26.97	2.56	45.03	14.2	54.46	2.87	44.68	109.9	5.6
100	4.50	0.2	0.4	31.49	24.98	3.14	42.21	10.0	Operation Not Recommended				
	6.75	1.3	3.1	32.99	25.59	2.94	43.01	11.2					
	9.00	2.9	6.6	33.78	25.92	2.84	43.47	11.9					
110	4.50	0.1	0.3	29.35	24.19	3.51	41.33	8.4					
	6.75	1.3	3.0	30.64	24.65	3.28	41.82	9.4					
	9.00	2.8	6.5	31.35	24.92	3.16	42.14	9.9					
120	4.50	0.1	0.3	27.66	23.76	3.95	41.15	7.0					
	6.75	1.2	2.8	28.62	23.96	3.68	41.16	7.8					
	9.00	2.7	6.3	29.19	24.13	3.55	41.29	8.2					

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.
All performance data is based upon the lower voltage of dual voltage rated units.
See performance correction tables for operating conditions other than those listed above.
See performance data selection notes for operation in shaded areas.

825 CFM Nominal Airflow Heating & Cooling

WATER / BRINE				COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
EWT °F	Flow gpm	PD psi	PD ft.	TC	SC	KW	HR	EER	HC	KW	HE	LAT	COP
20	7.00	4.5	10.4	Operation Not Recommended					14.24	1.57	8.89	83.9	2.7
30	3.50	0.8	1.8	31.17	20.56	0.88	34.18	35.3	16.80	1.61	11.32	86.8	3.1
	5.25	1.9	4.4	30.65	20.56	0.85	33.54	36.1	17.60	1.62	12.08	87.7	3.2
	7.00	4.1	9.4	30.21	20.51	0.84	33.07	36.0	18.05	1.62	12.51	88.2	3.3
40	3.50	0.6	1.4	31.14	20.35	0.97	34.44	32.2	20.31	1.65	14.68	90.7	3.6
	5.25	1.6	3.7	31.26	20.51	0.91	34.36	34.5	21.37	1.66	15.70	91.9	3.8
	7.00	3.5	8.1	31.18	20.55	0.88	34.19	35.3	21.96	1.67	16.26	92.6	3.9
50	3.50	0.5	1.2	30.36	20.01	1.09	34.06	28.0	23.86	1.69	18.09	94.7	4.1
	5.25	1.2	2.9	30.94	20.25	1.00	34.37	30.8	25.16	1.71	19.34	96.2	4.3
	7.00	2.8	6.5	31.13	20.35	0.97	34.44	32.2	25.88	1.71	20.04	97.0	4.4
60	3.50	0.3	0.6	29.05	19.56	1.24	33.27	23.5	27.37	1.73	21.48	98.7	4.6
	5.25	0.9	2.0	29.94	19.86	1.14	33.82	26.4	28.88	1.74	22.93	100.3	4.9
	7.00	2.3	5.4	30.33	20.00	1.09	34.04	27.8	29.70	1.75	23.72	101.3	5.0
70	3.50	0.2	0.6	27.41	19.02	1.41	32.24	19.4	30.78	1.76	24.77	102.5	5.1
	5.25	0.7	1.6	28.47	19.37	1.30	32.90	21.9	32.42	1.78	26.35	104.3	5.3
	7.00	2.1	4.9	28.98	19.53	1.24	33.22	23.3	33.30	1.79	27.20	105.3	5.5
80	3.50	0.2	0.4	25.59	18.42	1.62	31.13	15.8	34.00	1.79	27.88	106.1	5.6
	5.25	0.6	1.4	26.71	18.79	1.49	31.80	17.9	35.70	1.81	29.51	108.0	5.8
	7.00	2.0	4.5	27.27	18.97	1.43	32.15	19.1	36.58	1.82	30.36	109.0	5.9
90	3.50	0.2	0.3	23.73	17.77	1.86	30.07	12.8	36.95	1.83	30.71	109.4	5.9
	5.25	0.5	1.2	24.81	18.15	1.72	30.67	14.4	38.59	1.85	32.28	111.2	6.1
	7.00	1.8	4.2	25.37	18.34	1.65	31.00	15.4	39.40	1.86	33.05	112.1	6.2
100	3.50	0.1	0.3	21.97	17.16	2.13	29.23	10.3	Operation Not Recommended				
	5.25	0.4	0.9	22.94	17.50	1.97	29.67	11.6					
	7.00	1.7	3.9	23.46	17.68	1.90	29.93	12.4					
110	3.50	0.1	0.2	20.48	16.68	2.43	28.77	8.4					
	5.25	0.4	0.8	21.26	16.92	2.26	28.97	9.4					
	7.00	1.7	3.8	21.70	17.07	2.18	29.12	10.0					
120	3.50	0.1	0.2	19.46	16.49	2.77	28.91	7.0					

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.
All performance data is based upon the lower voltage of dual voltage rated units.
See performance correction tables for operating conditions other than those listed above.
See performance data selection notes for operation in shaded areas.

1,600 CFM Nominal Airflow Heating & Cooling

WATER / BRINE				COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
EWT °F	Flow gpm	PD psi	PD ft.	TC	SC	KW	HR	EER	HC	KW	HE	LAT	COP
20	12.00	12.6	29.1	Operation Not Recommended					32.64	3.18	21.78	86.8	3.0
30	6.00	3.3	7.6	55.11	36.52	2.36	63.17	23.3	36.19	3.28	25.01	88.9	3.2
	9.00	7.1	16.4	52.98	34.79	2.26	60.70	23.4	37.89	3.32	26.57	89.9	3.3
	12.00	11.4	26.4	51.48	33.67	2.22	59.06	23.1	38.84	3.34	27.44	90.4	3.4
40	6.00	2.7	6.2	56.13	37.78	2.54	64.80	22.1	42.05	3.42	30.39	92.3	3.6
	9.00	5.9	13.6	55.64	37.02	2.41	63.86	23.1	44.20	3.46	32.39	93.5	3.7
	12.00	9.7	22.4	55.00	36.42	2.35	63.03	23.4	45.40	3.49	33.49	94.2	3.8
50	6.00	2.1	4.8	55.36	37.96	2.76	64.78	20.1	48.07	3.55	35.97	95.8	4.0
	9.00	4.7	10.8	56.06	37.92	2.60	64.93	21.6	50.65	3.60	38.36	97.2	4.1
	12.00	8.0	18.4	56.12	37.72	2.53	64.74	22.2	52.07	3.63	39.67	98.1	4.2
60	6.00	1.5	3.5	53.41	37.42	3.01	63.68	17.7	54.10	3.67	41.56	99.2	4.3
	9.00	3.9	9.0	54.91	37.86	2.83	64.56	19.4	57.01	3.74	44.26	100.9	4.5
	12.00	7.0	16.1	55.48	37.97	2.74	64.83	20.2	58.58	3.77	45.72	101.8	4.6
70	6.00	1.4	3.2	50.69	36.42	3.29	61.92	15.4	59.95	3.80	46.99	102.6	4.6
	9.00	3.7	8.5	52.67	37.16	3.09	63.21	17.0	63.04	3.87	49.85	104.4	4.8
	12.00	6.6	15.3	53.56	37.47	2.99	63.77	17.9	64.67	3.90	51.35	105.3	4.9
80	6.00	1.3	3.0	47.55	35.15	3.60	59.84	13.2	65.44	3.92	52.05	105.8	4.9
	9.00	3.5	8.1	49.72	36.03	3.39	61.28	14.7	68.52	4.00	54.87	107.6	5.0
	12.00	6.4	14.7	50.79	36.45	3.28	61.99	15.5	70.07	4.04	56.28	108.5	5.1
90	6.00	1.2	2.8	44.26	33.81	3.95	57.74	11.2	70.35	4.05	56.54	108.6	5.1
	9.00	3.4	7.8	46.42	34.69	3.72	59.11	12.5	73.14	4.13	59.03	110.2	5.2
	12.00	6.2	14.2	47.54	35.15	3.61	59.84	13.2	74.43	4.18	60.17	111.0	5.2
100	6.00	1.2	2.7	41.13	32.61	4.33	55.90	9.5	Operation Not Recommended				
	9.00	3.2	7.5	43.08	33.34	4.08	57.02	10.5					
	12.00	6.0	13.8	44.14	33.76	3.96	57.66	11.1					
110	6.00	1.1	2.5	38.45	31.80	4.75	54.66	8.1					
	9.00	3.1	7.3	40.02	32.23	4.49	55.34	8.9					
	12.00	5.8	13.4	40.92	32.53	4.36	55.79	9.4					
120	6.00	1.0	2.4	36.61	31.76	5.22	54.42	7.0					
	9.00	3.0	7.0	37.60	31.67	4.93	54.42	7.6					
	12.00	5.7	13.1	38.24	31.76	4.79	54.60	8.0					

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.
All performance data is based upon the lower voltage of dual voltage rated units.
See performance correction tables for operating conditions other than those listed above.
See performance data selection notes for operation in shaded areas.

1,250 CFM Nominal Airflow Heating & Cooling

WATER / BRINE				COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
EWT °F	Flow gpm	PD psi	PD ft.	TC	SC	KW	HR	EER	HC	KW	HE	LAT	COP
20	9.00	7.9	18.1	Operation Not Recommended					21.43	2.34	13.45	83.8	2.7
30	4.50	2.3	5.3	42.34	28.91	1.35	46.95	31.4	24.37	2.37	16.30	86.0	3.0
	6.75	4.2	9.8	41.47	28.00	1.28	45.84	32.4	25.49	2.38	17.38	86.8	3.1
	9.00	7.1	16.4	40.74	27.34	1.26	45.02	32.4	26.11	2.38	17.99	87.3	3.2
40	4.50	1.9	4.4	42.37	29.33	1.49	47.45	28.5	28.80	2.40	20.60	89.3	3.5
	6.75	3.5	8.1	42.49	29.14	1.39	47.23	30.6	30.28	2.41	22.05	90.4	3.7
	9.00	5.9	13.6	42.31	28.87	1.35	46.90	31.4	31.12	2.42	22.85	91.0	3.8
50	4.50	1.5	3.5	41.32	29.01	1.66	46.99	24.8	33.38	2.44	25.07	92.7	4.0
	6.75	2.7	6.3	42.15	29.29	1.54	47.40	27.4	35.23	2.45	26.87	94.0	4.2
	9.00	4.7	10.8	42.40	29.33	1.48	47.45	28.6	36.25	2.46	27.87	94.8	4.3
60	4.50	1.3	2.9	39.53	28.28	1.87	45.91	21.1	38.01	2.47	29.59	96.1	4.5
	6.75	2.1	4.9	40.83	28.82	1.72	46.71	23.7	40.16	2.48	31.69	97.7	4.7
	9.00	3.9	9.0	41.39	29.04	1.65	47.03	25.0	41.34	2.49	32.85	98.6	4.9
70	4.50	1.1	2.6	37.25	27.34	2.11	44.45	17.7	42.56	2.50	34.04	99.5	5.0
	6.75	1.9	4.5	38.83	27.98	1.95	45.46	20.0	44.93	2.51	36.37	101.2	5.2
	9.00	3.7	8.5	39.57	28.30	1.87	45.94	21.2	46.21	2.52	37.62	102.2	5.4
80	4.50	1.0	2.3	34.71	26.38	2.38	42.82	14.6	46.91	2.52	38.30	102.7	5.5
	6.75	1.9	4.3	36.38	27.00	2.20	43.89	16.5	49.38	2.54	40.73	104.5	5.7
	9.00	3.5	8.1	37.22	27.33	2.11	44.43	17.6	50.67	2.54	42.00	105.5	5.8
90	4.50	0.9	2.1	32.09	25.55	2.68	41.23	12.0	50.93	2.54	42.25	105.6	5.9
	6.75	1.8	4.1	33.73	26.05	2.49	42.21	13.6	53.33	2.56	44.60	107.4	6.1
	9.00	3.4	7.8	34.58	26.34	2.39	42.74	14.4	54.52	2.57	45.76	108.3	6.2
100	4.50	0.8	1.9	29.59	24.99	3.01	39.86	9.8	Operation Not Recommended				
	6.75	1.7	3.9	31.07	25.28	2.81	40.65	11.1					
	9.00	3.2	7.5	31.86	25.49	2.71	41.10	11.8					
110	4.50	0.8	1.8	27.41	24.93	3.38	38.95	8.1					
	6.75	1.6	3.7	28.63	24.89	3.16	39.41	9.1					
	9.00	3.1	7.3	29.31	24.96	3.05	39.73	9.6					
120	4.50	0.7	1.5	25.82	25.68	3.79	38.76	6.8					
	6.75	1.5	3.5	26.65	25.12	3.55	38.76	7.5					
	9.00	3.0	7.0	27.16	24.97	3.43	38.87	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.
All performance data is based upon the lower voltage of dual voltage rated units.
See performance correction tables for operating conditions other than those listed above.
See performance data selection notes for operation in shaded areas.

2,000 CFM Nominal Airflow Heating & Cooling

WATER / BRINE				COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
EWT °F	Flow gpm	PD psi	PD ft.	TC	SC	KW	HR	EER	HC	KW	HE	LAT	COP
20	16.00	5.8	13.4	Operation Not Recommended					40.45	3.78	27.54	86.7	3.1
30	8.00	0.9	2.0	76.08	50.61	2.84	85.78	26.8	44.46	3.86	31.28	88.5	3.4
	12.00	2.8	6.6	75.23	50.05	2.74	84.59	27.4	46.21	3.90	32.92	89.3	3.5
	16.00	5.3	12.3	74.43	49.57	2.70	83.65	27.5	47.18	3.91	33.83	89.8	3.5
40	8.00	0.8	1.8	75.77	50.65	3.02	86.08	25.1	51.05	3.98	37.48	91.6	3.8
	12.00	2.5	5.8	76.16	50.70	2.89	86.01	26.4	53.34	4.02	39.63	92.6	3.9
	16.00	4.7	10.9	76.04	50.58	2.83	85.70	26.9	54.60	4.04	40.83	93.2	4.0
50	8.00	0.7	1.6	74.10	50.03	3.25	85.19	22.8	58.10	4.10	44.13	94.8	4.2
	12.00	2.2	5.0	75.41	50.53	3.08	85.93	24.5	60.95	4.14	46.81	96.2	4.3
	16.00	4.1	9.6	75.85	50.67	3.01	86.10	25.2	62.53	4.17	48.30	96.9	4.4
60	8.00	0.6	1.3	71.46	48.94	3.52	83.49	20.3	65.48	4.22	51.07	98.2	4.5
	12.00	2.0	4.5	73.41	49.75	3.32	84.76	22.1	68.89	4.28	54.27	99.8	4.7
	16.00	3.8	8.8	74.25	50.09	3.23	85.27	23.0	70.77	4.32	56.03	100.7	4.8
70	8.00	0.5	1.2	68.16	47.54	3.85	81.30	17.7	73.05	4.36	58.16	101.7	4.9
	12.00	1.9	4.3	70.50	48.54	3.62	82.85	19.5	77.00	4.45	61.82	103.6	5.1
	16.00	3.7	8.5	71.60	49.00	3.51	83.58	20.4	79.17	4.50	63.82	104.6	5.2
80	8.00	0.5	1.1	64.46	45.95	4.23	78.89	15.2	80.72	4.53	65.25	105.3	5.2
	12.00	1.8	4.2	66.97	47.03	3.97	80.52	16.9	85.14	4.65	69.29	107.3	5.4
	16.00	3.6	8.2	68.22	47.57	3.84	81.34	17.7	87.55	4.71	71.48	108.4	5.4
90	8.00	0.4	1.0	60.59	44.30	4.67	76.53	13.0	88.36	4.74	72.21	108.8	5.5
	12.00	1.8	4.1	63.11	45.38	4.38	78.05	14.4	93.17	4.89	76.50	111.0	5.6
	16.00	3.5	8.0	64.40	45.93	4.24	78.86	15.2	95.76	4.98	78.78	112.2	5.6
100	8.00	0.4	0.9	56.82	42.74	5.18	74.48	11.0	Operation Not Recommended				
	12.00	1.8	4.1	59.18	43.71	4.85	75.72	12.2					
	16.00	3.5	8.0	60.42	44.23	4.69	76.43	12.9					
110	8.00	0.4	0.8	53.38	41.44	5.76	73.04	9.3					
	12.00	1.7	3.9	55.44	42.20	5.39	73.84	10.3					
	16.00	3.4	7.8	56.56	42.64	5.22	74.36	10.8					
120	8.00	0.3	0.8	50.58	40.65	6.43	72.53	7.9					
	12.00	1.6	3.8	52.18	41.05	6.01	72.71	8.7					
	16.00	3.3	7.6	53.10	41.35	5.82	72.95	9.1					

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.
All performance data is based upon the lower voltage of dual voltage rated units.
See performance correction tables for operating conditions other than those listed above.
See performance data selection notes for operation in shaded areas.

1,550 CFM Nominal Airflow Heating & Cooling

WATER / BRINE				COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
EWT °F	Flow gpm	PD psi	PD ft.	TC	SC	KW	HR	EER	HC	KW	HE	LAT	COP
20	12.00	3.12	7.2	Operation Not Recommended					27.02	2.87	17.23	84.1	2.8
30	6.00	0.64	1.5	56.17	38.46	1.57	61.52	35.8	30.23	2.89	20.36	86.0	3.1
	9.00	1.37	3.2	55.83	38.08	1.50	60.93	37.3	31.37	2.90	21.48	86.7	3.2
	12.00	2.85	6.6	55.42	37.77	1.47	60.44	37.6	32.01	2.90	22.11	87.1	3.2
40	6.00	0.54	1.3	55.68	38.50	1.73	61.57	32.3	35.24	2.93	25.25	89.0	3.5
	9.00	1.22	2.8	56.14	38.53	1.61	61.63	34.8	36.83	2.94	26.80	90.0	3.7
	12.00	2.51	5.8	56.17	38.45	1.56	61.51	35.9	37.72	2.95	27.66	90.5	3.8
50	6.00	0.45	1.0	54.25	38.06	1.94	60.86	28.0	40.71	2.97	30.57	92.3	4.0
	9.00	1.06	2.5	55.32	38.41	1.79	61.42	30.9	42.77	2.99	32.58	93.5	4.2
	12.00	2.18	5.0	55.71	38.51	1.72	61.58	32.4	43.91	2.99	33.70	94.2	4.3
60	6.00	0.29	0.7	52.11	37.25	2.20	59.62	23.7	46.46	3.01	36.18	95.7	4.5
	9.00	0.91	2.1	53.62	37.83	2.02	60.51	26.6	48.99	3.03	38.65	97.2	4.7
	12.00	1.96	4.5	54.28	38.07	1.93	60.88	28.1	50.40	3.04	40.03	98.0	4.9
70	6.00	0.22	0.5	49.46	36.15	2.51	58.01	19.7	52.38	3.05	41.96	99.2	5.0
	9.00	0.85	2.0	51.25	36.90	2.30	59.10	22.3	55.34	3.07	44.87	101.0	5.3
	12.00	1.87	4.3	52.10	37.24	2.20	59.61	23.7	56.98	3.08	46.48	102.0	5.4
80	6.00	0.15	0.3	46.47	34.84	2.85	56.21	16.3	58.31	3.08	47.79	102.8	5.5
	9.00	0.80	1.9	48.41	35.70	2.63	57.37	18.4	61.64	3.09	51.08	104.7	5.8
	12.00	1.81	4.2	49.36	36.11	2.52	57.95	19.6	63.46	3.10	52.89	105.8	6.0
90	6.00	0.13	0.3	43.29	33.41	3.24	54.35	13.3	64.14	3.10	53.56	106.2	6.1
	9.00	0.79	1.8	45.26	34.31	3.00	55.50	15.1	67.73	3.10	57.15	108.4	6.4
	12.00	1.77	4.1	46.27	34.75	2.88	56.09	16.1	69.65	3.10	59.08	109.5	6.6
100	6.00	0.11	0.2	40.07	31.92	3.67	52.60	10.9	Operation Not Recommended				
	9.00	0.81	1.9	41.98	32.81	3.41	53.62	12.3					
	12.00	1.76	4.1	42.97	33.26	3.28	54.18	13.1					
110	6.00	0.09	0.2	36.96	30.48	4.14	51.09	8.9					
	9.00	0.77	1.8	38.73	31.30	3.87	51.92	10.0					
	12.00	1.71	3.9	39.67	31.73	3.73	52.39	10.6					
120	6.00	0.08	0.2	34.14	29.22	4.65	49.99	7.3					
	9.00	0.74	1.7	35.68	29.90	4.36	50.55	8.2					
	12.00	1.65	3.8	36.51	30.27	4.21	50.89	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.
All performance data is based upon the lower voltage of dual voltage rated units.
See performance correction tables for operating conditions other than those listed above.
See performance data selection notes for operation in shaded areas.

2,400 CFM Nominal Airflow Heating & Cooling

WATER / BRINE				COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
EWT °F	Flow gpm	PD psi	PD ft.	TC	SC	KW	HR	EER	HC	KW	HE	LAT	COP
20	18.00	6.4	14.7	Operation Not Recommended					47.15	4.56	31.60	86.1	3.0
30	9.00	1.1	2.5	80.38	55.01	3.37	91.89	23.8	52.17	4.68	36.20	88.1	3.3
	13.50	3.2	7.4	77.81	53.17	3.24	88.86	24.0	54.45	4.73	38.30	89.0	3.4
	18.00	5.8	13.5	75.87	51.83	3.18	86.74	23.8	55.71	4.76	39.46	89.4	3.4
40	9.00	0.8	1.8	81.20	55.82	3.62	93.55	22.4	60.40	4.87	43.80	91.2	3.6
	13.50	2.5	5.8	80.98	55.48	3.45	92.73	23.5	63.35	4.93	46.53	92.4	3.8
	18.00	4.8	11.1	80.33	54.97	3.37	91.82	23.8	64.98	4.96	48.04	93.0	3.8
50	9.00	0.5	1.1	79.50	55.03	3.92	92.87	20.3	69.05	5.05	51.82	94.6	4.0
	13.50	1.8	4.2	80.89	55.72	3.71	93.54	21.8	72.65	5.12	55.17	96.0	4.2
	18.00	3.7	8.7	81.22	55.82	3.61	93.54	22.5	74.64	5.17	57.02	96.7	4.2
60	9.00	0.3	0.7	76.20	53.25	4.27	90.75	17.9	77.89	5.23	60.04	98.0	4.4
	13.50	1.5	3.4	78.59	54.55	4.02	92.32	19.5	82.10	5.32	63.94	99.6	4.5
	18.00	3.4	7.8	79.58	55.08	3.91	92.92	20.4	84.41	5.37	66.08	100.5	4.6
70	9.00	0.3	0.6	71.95	50.90	4.67	87.87	15.4	86.75	5.42	68.25	101.4	4.7
	13.50	1.3	3.1	74.85	52.51	4.39	89.84	17.0	91.44	5.53	72.59	103.2	4.9
	18.00	3.2	7.4	76.23	53.27	4.26	90.77	17.9	93.98	5.58	74.93	104.2	4.9
80	9.00	0.2	0.6	67.29	48.33	5.13	84.81	13.1	95.41	5.62	76.25	104.7	5.0
	13.50	1.3	2.9	70.30	49.99	4.83	86.77	14.6	100.42	5.74	80.84	106.7	5.1
	18.00	3.1	7.1	71.83	50.83	4.68	87.80	15.4	103.08	5.81	83.26	107.7	5.2
90	9.00	0.2	0.5	62.75	45.90	5.67	82.09	11.1	103.68	5.82	83.80	107.9	5.2
	13.50	1.2	2.7	65.53	47.37	5.33	83.70	12.3	108.76	5.97	88.40	109.9	5.3
	18.00	2.9	6.8	67.01	48.18	5.16	84.63	13.0	111.37	6.05	90.73	110.9	5.4
100	9.00	0.2	0.4	58.85	44.01	6.29	80.30	9.4	Operation Not Recommended				
	13.50	1.2	2.7	61.08	45.06	5.90	81.23	10.3					
	18.00	2.8	6.6	62.36	45.70	5.72	81.88	10.9					
110	9.00	0.1	0.3	56.25	43.21	7.01	80.17	8.0					
	13.50	1.1	2.6	57.59	43.52	6.57	80.00	8.8					
	18.00	2.8	6.4	58.49	43.86	6.36	80.19	9.2					
120	9.00	0.1	0.3	55.86	44.32	7.87	82.73	7.1					
	13.50	1.1	2.6	55.76	43.36	7.34	80.80	7.6					
	18.00	2.7	6.2	56.08	43.22	7.10	80.30	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.
All performance data is based upon the lower voltage of dual voltage rated units.
See performance correction tables for operating conditions other than those listed above.
See performance data selection notes for operation in shaded areas.

1,750 CFM Nominal Airflow Heating & Cooling

WATER / BRINE				COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
EWT °F	Flow gpm	PD psi	PD ft.	TC	SC	KW	HR	EER	HC	KW	HE	LAT	COP
20	13.00	3.15	7.3	Operation Not Recommended					32.21	3.53	20.15	85.0	2.7
30	6.50	0.76	1.8	62.53	42.65	1.96	69.22	31.9	36.31	3.60	24.04	87.2	3.0
	9.75	1.35	3.1	61.68	41.97	1.85	67.99	33.3	37.93	3.62	25.58	88.0	3.1
	13.00	2.85	6.6	60.82	41.35	1.81	67.01	33.5	38.83	3.63	26.44	88.5	3.1
40	6.50	0.54	1.2	62.04	42.54	2.19	69.51	28.4	42.63	3.69	30.04	90.5	3.4
	9.75	1.09	2.5	62.57	42.73	2.02	69.46	31.0	44.78	3.72	32.08	91.6	3.5
	13.00	2.20	5.1	62.50	42.62	1.95	69.15	32.1	45.98	3.74	33.22	92.3	3.6
50	6.50	0.36	0.8	60.13	41.53	2.48	68.59	24.2	49.23	3.79	36.31	94.0	3.8
	9.75	0.72	1.7	61.61	42.32	2.27	69.34	27.2	51.91	3.83	38.85	95.4	4.0
	13.00	1.60	3.7	62.13	42.58	2.17	69.53	28.6	53.40	3.85	40.27	96.2	4.1
60	6.50	0.21	0.5	57.28	39.97	2.83	66.93	20.2	55.96	3.88	42.70	97.5	4.2
	9.75	0.52	1.2	59.35	41.11	2.58	68.15	23.0	59.11	3.93	45.70	99.2	4.4
	13.00	1.25	2.9	60.26	41.61	2.46	68.67	24.5	60.84	3.96	47.34	100.1	4.5
70	6.50	0.18	0.4	53.86	38.10	3.23	64.88	16.7	62.65	3.98	49.06	101.1	4.6
	9.75	0.48	1.1	56.23	39.39	2.95	66.30	19.0	66.17	4.03	52.41	102.9	4.8
	13.00	1.14	2.6	57.37	40.02	2.82	66.99	20.4	68.08	4.06	54.22	103.9	4.9
80	6.50	0.14	0.3	50.22	36.13	3.67	62.75	13.7	69.14	4.08	55.22	104.5	5.0
	9.75	0.41	0.9	52.63	37.42	3.37	64.14	15.6	72.88	4.13	58.78	106.5	5.2
	13.00	1.07	2.5	53.86	38.09	3.23	64.87	16.7	74.86	4.16	60.66	107.5	5.3
90	6.50	0.11	0.2	46.66	34.30	4.16	60.84	11.2	75.25	4.17	61.03	107.7	5.3
	9.75	0.38	0.9	48.90	35.44	3.84	62.01	12.7	79.00	4.22	64.60	109.7	5.5
	13.00	1.04	2.4	50.09	36.06	3.69	62.67	13.6	80.91	4.25	66.41	110.7	5.6
100	6.50	0.08	0.2	43.51	32.84	4.69	59.50	9.3	Operation Not Recommended				
	9.75	0.33	0.8	45.38	33.68	4.35	60.24	10.4					
	13.00	0.95	2.2	46.43	34.19	4.19	60.73	11.1					
110	6.50	0.06	0.1	41.16	32.09	5.26	59.10	7.8					
	9.75	0.30	0.7	42.47	32.44	4.91	59.20	8.7					
	13.00	0.90	2.1	43.27	32.74	4.73	59.42	9.1					
120	6.50	0.04	0.1	40.13	32.53	5.88	60.19	6.8					
	9.75	0.28	0.6	40.57	32.08	5.50	59.32	7.4					
	13.00	0.86	2.0	41.01	32.07	5.31	59.13	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.
All performance data is based upon the lower voltage of dual voltage rated units.
See performance correction tables for operating conditions other than those listed above.
See performance data selection notes for operation in shaded areas.

Antifreeze Correction Table

EWT	Antifreeze Type	Antifreeze %	Cooling			Heating		WPD
			Total Cap	Sensible Cap	Watts	Total Cap	Watts	
90	Water	0%	1.000	1.000	1.000	1.000	1.000	1.000
	Ethanol	5%	0.998	0.998	1.002	0.996	0.999	1.025
		10%	0.996	0.996	1.003	0.991	0.997	1.048
		15%	0.994	0.994	1.005	0.987	0.996	1.098
		20%	0.991	0.991	1.006	0.982	0.994	1.142
		25%	0.986	0.986	1.009	0.972	0.991	1.207
		30%	0.981	0.981	1.012	0.962	0.988	1.265
		35%	0.977	0.977	1.015	0.953	0.985	1.312
		40%	0.972	0.972	1.018	0.943	0.982	1.370
		45%	0.966	0.966	1.023	0.931	0.978	1.431
		50%	0.959	0.959	1.027	0.918	0.974	1.494
	Ethylene Glycol	5%	0.998	0.998	1.002	0.996	0.999	1.021
		10%	0.996	0.996	1.003	0.991	0.997	1.040
		15%	0.994	0.994	1.004	0.987	0.996	1.079
		20%	0.991	0.991	1.005	0.982	0.995	1.114
		25%	0.988	0.988	1.008	0.976	0.993	1.146
		30%	0.985	0.985	1.010	0.969	0.990	1.175
		35%	0.982	0.982	1.012	0.963	0.988	1.208
		40%	0.979	0.979	1.014	0.956	0.986	1.243
		45%	0.976	0.976	1.016	0.950	0.984	1.278
		50%	0.972	0.972	1.018	0.943	0.982	1.314
	Methanol	5%	0.997	0.997	1.002	0.993	0.998	1.039
		10%	0.993	0.993	1.004	0.986	0.996	1.075
		15%	0.990	0.990	1.007	0.979	0.994	1.116
		20%	0.986	0.986	1.009	0.972	0.991	1.154
		25%	0.982	0.982	1.012	0.964	0.989	1.189
		30%	0.978	0.978	1.014	0.955	0.986	1.221
		35%	0.974	0.974	1.017	0.947	0.984	1.267
		40%	0.970	0.970	1.020	0.939	0.981	1.310
		45%	0.966	0.966	1.023	0.930	0.978	1.353
		50%	0.961	0.961	1.026	0.920	0.975	1.398
	Propylene Glycol	5%	0.995	0.995	1.003	0.990	0.997	1.065
		10%	0.990	0.990	1.006	0.980	0.994	1.119
		15%	0.986	0.986	1.009	0.971	0.991	1.152
		20%	0.981	0.981	1.012	0.962	0.988	1.182
		25%	0.978	0.978	1.014	0.956	0.986	1.227
		30%	0.975	0.975	1.016	0.950	0.984	1.267
		35%	0.972	0.972	1.018	0.944	0.982	1.312
		40%	0.969	0.969	1.020	0.938	0.980	1.356
		45%	0.965	0.965	1.023	0.929	0.977	1.402
		50%	0.960	0.960	1.026	0.919	0.974	1.450

Table Continued on Next Page

Antifreeze Correction Table

Table Continued from Previous Page

EWT	Antifreeze Type	Antifreeze %	Cooling			Heating		WPD
			Total Cap	Sensible Cap	Watts	Total Cap	Watts	
30	Water	0%	1.000	1.000	1.000	1.000	1.000	1.000
	Ethanol	5%	0.991	0.991	1.006	0.981	0.994	1.140
		10%	0.981	0.981	1.012	0.961	0.988	1.242
		15%	0.973	0.973	1.018	0.944	0.983	1.295
		20%	0.964	0.964	1.024	0.927	0.977	1.343
		25%	0.959	0.959	1.028	0.917	0.974	1.363
		30%	0.954	0.954	1.031	0.907	0.970	1.383
		35%	0.949	0.949	1.035	0.897	0.967	1.468
		40%	0.944	0.944	1.038	0.887	0.964	1.523
		45%	0.940	0.940	1.041	0.880	0.962	1.580
		50%	0.936	0.936	1.043	0.872	0.959	1.639
	Ethylene Glycol	5%	0.997	0.997	1.002	0.993	0.998	1.040
		10%	0.993	0.993	1.004	0.986	0.996	1.075
		15%	0.990	0.990	1.006	0.980	0.994	1.122
		20%	0.987	0.987	1.008	0.973	0.992	1.163
		25%	0.983	0.983	1.011	0.966	0.990	1.195
		30%	0.979	0.979	1.013	0.958	0.987	1.225
		35%	0.976	0.976	1.016	0.951	0.985	1.279
		40%	0.972	0.972	1.018	0.943	0.982	1.324
		45%	0.969	0.969	1.021	0.937	0.980	1.371
		50%	0.966	0.966	1.023	0.930	0.978	1.419
	Methanol	5%	0.995	0.995	1.004	0.989	0.997	1.069
		10%	0.989	0.989	1.007	0.978	0.993	1.127
		15%	0.984	0.984	1.011	0.968	0.990	1.164
		20%	0.979	0.979	1.014	0.957	0.986	1.197
		25%	0.975	0.975	1.017	0.949	0.984	1.216
		30%	0.971	0.971	1.019	0.941	0.981	1.235
		35%	0.967	0.967	1.022	0.933	0.979	1.286
		40%	0.963	0.963	1.025	0.924	0.976	1.323
		45%	0.959	0.959	1.028	0.917	0.974	1.360
		50%	0.955	0.955	1.030	0.910	0.971	1.399
	Propylene Glycol	5%	0.995	0.995	1.004	0.989	0.997	1.071
		10%	0.989	0.989	1.007	0.978	0.993	1.130
		15%	0.985	0.985	1.010	0.968	0.990	1.206
		20%	0.980	0.980	1.013	0.958	0.987	1.270
		25%	0.974	0.974	1.017	0.947	0.983	1.359
		30%	0.968	0.968	1.021	0.935	0.979	1.433
		35%	0.963	0.963	1.025	0.924	0.976	1.522
		40%	0.957	0.957	1.029	0.913	0.972	1.614
		45%	0.949	0.949	1.034	0.898	0.967	1.712
		50%	0.941	0.941	1.039	0.882	0.962	1.816

Blower Performance Data – TRT036

All Data is Wet Coil – ESP Table

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
900	BHP	0.10	0.13	0.16	0.17	0.19	0.22	0.24	0.26	0.28	0.30	0.33	0.35	0.37	0.40	0.44	0.47
	Torque Setting	B	B	B	A	A	A	A	A	A	A	C	C	C	C	C	C
	RPM	552	615	665	715	765	820	875	925	965	1010	1055	1100	1140	1180	1220	1260
1000	BHP	0.16	0.17	0.19	0.21	0.23	0.25	0.28	0.30	0.33	0.36	0.40	0.43	0.46	0.49	0.52	0.55
	Torque Setting	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C	C
	RPM	615	655	695	740	790	845	900	940	985	1030	1070	1115	1150	1190	1230	1265
1100	BHP	0.22	0.23	0.25	0.29	0.32	0.34	0.35	0.36	0.38	0.41	0.44	0.48	0.50	0.53	0.56	0.59
	Torque Setting	B	A	A	A	A	A	A	A	A	C	C	C	C	C	C	C
	RPM	685	725	765	810	855	895	940	985	1025	1065	1105	1145	1180	1215	1250	1285
1200	BHP	0.26	0.27	0.30	0.33	0.36	0.39	0.42	0.44	0.48	0.51	0.54	0.57	0.60	0.62	0.65	
	Torque Setting	A	A	A	A	A	A	A	A	C	C	C	C	C	C	C	
	RPM	710	740	785	830	880	920	965	1005	1045	1085	1125	1160	1195	1230	1265	
1300	BHP	0.30	0.33	0.36	0.40	0.42	0.44	0.46	0.50	0.55	0.61	0.65	0.68	0.71	0.74		
	Torque Setting	A	A	A	A	A	A	A	A	C	C	C	C	C	C		
	RPM	750	790	830	870	910	950	990	1030	1065	1105	1140	1175	1210	1245		
1400	BHP	0.40	0.42	0.44	0.47	0.50	0.53	0.56	0.60	0.64	0.67	0.70	0.72	0.75			
	Torque Setting	A	A	A	A	A	A	A	C	C	C	C	C	C			
	RPM	820	850	875	915	950	990	1025	1065	1100	1135	1170	1205	1235			
1500	BHP	0.45	0.47	0.50	0.52	0.55	0.59	0.64	0.69	0.74	0.77	0.80	0.83	0.86			
	Torque Setting	A	A	A	A	A	A	C	C	C	C	C	C	C			
	RPM	860	885	920	955	985	1020	1055	1090	1125	1160	1190	1225	1255			

Blower Performance Data – TRT048

All Data is Wet Coil – ESP Table

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
1200	BHP	0.27	0.31	0.34	0.37	0.40	0.42	0.45	0.48	0.52	0.55	0.58	0.60	0.63	0.66	0.70	0.73
	Drive Setting	B	B	A	A	A	A	A	A	A	A	A	C	C	C	C	C
	RPM	750	800	845	890	935	975	1015	1055	1095	1135	1170	1205	1240	1275	1310	1345
1300	BHP	0.35	0.38	0.41	0.43	0.45	0.47	0.53	0.59	0.64	0.67	0.70	0.72	0.75	0.78	0.80	0.83
	Drive Setting	B	A	A	A	A	A	A	A	A	A	C	C	C	C	C	C
	RPM	810	850	890	930	970	1010	1050	1090	1125	1160	1195	1230	1265	1300	1330	1365
1400	BHP	0.43	0.46	0.49	0.52	0.55	0.58	0.62	0.66	0.68	0.71	0.74	0.77	0.82	0.86	0.91	0.96
	Drive Setting	A	A	A	A	A	A	A	A	A	C	C	C	C	C	C	C
	RPM	865	900	935	970	1010	1045	1085	1120	1155	1190	1220	1255	1290	1320	1355	1390
1500	BHP	0.49	0.52	0.54	0.57	0.62	0.68	0.73	0.76	0.79	0.82	0.85	0.89	0.92	0.96	1.00	
	Drive Setting	A	A	A	A	A	A	A	A	C	C	C	C	C	C	C	
	RPM	910	945	975	1010	1045	1080	1115	1150	1180	1215	1250	1280	1310	1345	1375	
1600	BHP	0.62	0.65	0.67	0.70	0.72	0.75	0.78	0.82	0.86	0.89	0.94	1.00	1.04	1.08		
	Drive Setting	A	A	A	A	A	A	A	C	C	C	C	C	C	C		
	RPM	960	985	1015	1050	1080	1115	1145	1175	1210	1240	1275	1305	1335	1365		
1700	BHP	0.74	0.77	0.80	0.83	0.85	0.88	0.90	0.93	0.95	1.00	1.06	1.11	1.17	1.22		
	Drive Setting	A	A	A	A	A	A	C	C	C	C	C	C	C	C		
	RPM	1000	1030	1060	1090	1115	1150	1180	1210	1240	1270	1300	1330	1360	1390		
1800	BHP	0.83	0.87	0.90	0.94	0.98	1.02	1.06	1.09	1.14	1.18	1.23	1.28	1.32			
	Drive Setting	A	A	A	A	A	C	C	C	C	C	C	C	C			
	RPM	1050	1075	1100	1125	1155	1185	1215	1245	1275	1300	1330	1360	1385			
1900	BHP	0.97	1.00	1.03	1.08	1.12	1.16	1.20	1.25	1.29	1.34	1.38	1.42				
	Drive Setting	A	A	A	C	C	C	C	C	C	C	C	C				
	RPM	1100	1120	1145	1175	1200	1225	1250	1280	1305	1335	1360	1385				
2000	BHP	1.13	1.17	1.20	1.24	1.28	1.32	1.36	1.40	1.44							
	Drive Setting	A	A	C	C	C	C	C	C	C							
	RPM	1145	1170	1190	1215	1235	1260	1290	1315	1340							

Blower Performance Data – TRT060

All Data is Wet Coil – ESP Table

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
1500	BHP	0.17	0.22	0.26	0.29	0.31	0.34	0.37	0.40	0.44	0.47	0.50	0.53	0.56	0.60	0.63	0.65
	Drive Setting	B	B	B	B	A	A	A	A	A	A	A	A	A	C	C	C
	RPM	516	573	625	670	710	755	785	820	850	880	900	925	945	970	990	1010
1600	BHP	0.20	0.24	0.28	0.32	0.35	0.38	0.41	0.45	0.48	0.52	0.55	0.58	0.62	0.65	0.68	0.70
	Drive Setting	B	B	B	A	A	A	A	A	A	A	A	A	C	C	C	C
	RPM	526	583	635	680	725	765	795	830	860	890	915	940	965	990	1010	1030
1700	BHP	0.23	0.26	0.30	0.34	0.38	0.42	0.45	0.49	0.53	0.56	0.60	0.64	0.67	0.71	0.73	0.75
	Drive Setting	B	B	B	A	A	A	A	A	A	A	A	A	C	C	C	C
	RPM	536	589	640	685	730	770	805	840	875	900	930	955	980	1005	1025	1045
1800	BHP	0.25	0.29	0.33	0.37	0.41	0.46	0.50	0.54	0.58	0.62	0.65	0.68	0.72	0.76	0.78	0.81
	Drive Setting	B	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C
	RPM	547	599	650	695	740	780	815	855	885	915	940	965	995	1020	1040	1060
1900	BHP	0.29	0.32	0.37	0.41	0.46	0.50	0.55	0.59	0.62	0.66	0.70	0.73	0.77	0.81	0.85	0.88
	Drive Setting	B	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C
	RPM	568	620	665	710	755	790	830	865	895	925	955	985	1015	1035	1060	1080
2000	BHP	0.33	0.36	0.42	0.47	0.52	0.57	0.61	0.66	0.69	0.73	0.77	0.81	0.85	0.89	0.92	0.96
	Drive Setting	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C	C
	RPM	589	635	680	725	765	805	845	880	910	940	975	1005	1030	1055	1075	1100
2100	BHP	0.41	0.45	0.49	0.52	0.57	0.63	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	1.00	
	Drive Setting	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C	
	RPM	615	660	700	740	780	820	860	895	925	960	990	1020	1045	1070	1095	
2200	BHP	0.44	0.49	0.54	0.58	0.64	0.69	0.74	0.78	0.83	0.87	0.91	0.96	1.00	1.04	1.08	
	Drive Setting	B	A	A	A	A	A	A	A	A	C	C	C	C	C	C	
	RPM	640	680	720	760	800	840	880	910	945	975	1005	1035	1060	1085	1115	
2300	BHP	0.52	0.56	0.60	0.65	0.70	0.75	0.80	0.85	0.89	0.94	1.00	1.05	1.11	1.16		
	Drive Setting	B	A	A	A	A	A	A	A	A	C	C	C	C	C		
	RPM	665	705	745	785	825	860	895	930	960	995	1025	1050	1080	1105		
2400	BHP	0.57	0.62	0.67	0.73	0.79	0.84	0.89	1.00	1.00	1.03	1.08	1.14	1.20			
	Drive Setting	A	A	A	A	A	A	A	A	A	C	C	C	C			
	RPM	695	735	775	810	850	885	920	950	980	1015	1040	1070	1100			
2500	BHP	0.64	0.69	0.75	0.81	0.87	0.92	1.00	1.01	1.05	1.11	1.17	1.23				
	Drive Setting	A	A	A	A	A	A	A	A	C	C	C	C				
	RPM	725	765	800	835	870	905	940	970	1000	1030	1060	1090				

Blower Performance Data – TRT072

All Data is Wet Coil – ESP Table

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
1800	BHP	0.27	0.31	0.35	0.39	0.43	0.47	0.51	0.55	0.59	0.62	0.66	0.70	0.74	0.76	0.79	0.83
	Drive Setting	B	B	B	B	A	A	A	A	A	A	A	A	A	C	C	C
	RPM	568	620	665	710	755	790	830	865	895	920	950	975	1005	1025	1045	1070
1900	BHP	0.29	0.33	0.37	0.42	0.46	0.50	0.55	0.59	0.63	0.67	0.70	0.74	0.77	0.81	0.85	0.89
	Drive Setting	B	B	B	B	A	A	A	A	A	A	A	A	C	C	C	C
	RPM	573	625	670	715	755	795	830	870	900	930	960	990	1015	1040	1060	1085
2000	BHP	0.32	0.36	0.41	0.46	0.51	0.56	0.60	0.65	0.69	0.72	0.76	0.80	0.84	0.88	0.92	0.96
	Drive Setting	B	B	B	B	A	A	A	A	A	A	A	A	C	C	C	C
	RPM	583	630	675	720	760	800	835	875	905	935	970	1000	1025	1050	1075	1100
2100	BHP	0.39	0.44	0.47	0.51	0.56	0.61	0.66	0.71	0.75	0.79	0.83	0.87	0.91	0.95	0.99	1.03
	Drive Setting	B	B	B	B	A	A	A	A	A	A	A	C	C	C	C	C
	RPM	599	645	685	725	770	805	845	885	915	950	980	1010	1035	1060	1085	1110
2200	BHP	0.42	0.47	0.52	0.56	0.62	0.67	0.72	0.77	0.81	0.85	0.89	0.93	0.98	1.02	1.06	1.11
	Drive Setting	B	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C
	RPM	620	665	705	745	785	825	865	900	930	960	995	1020	1050	1075	1100	1130
2300	BHP	0.49	0.54	0.58	0.62	0.67	0.72	0.78	0.82	0.87	0.91	0.97	1.02	1.08	1.13	1.19	1.23
	Drive Setting	B	B	B	A	A	A	A	A	A	A	C	C	C	C	C	C
	RPM	640	685	725	765	800	840	880	910	945	975	1010	1035	1065	1090	1120	1145
2400	BHP	0.54	0.58	0.62	0.68	0.74	0.79	0.85	0.90	0.94	0.99	1.04	1.10	1.15	1.21	1.27	1.31
	Drive Setting	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C	C
	RPM	660	700	740	780	820	855	890	925	955	990	1020	1050	1075	1105	1135	1155
2500	BHP	0.59	0.64	0.69	0.75	0.81	0.87	0.92	0.96	1.01	1.05	1.11	1.17	1.23	1.29	1.34	1.39
	Drive Setting	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C	C
	RPM	680	725	765	800	835	870	905	935	970	1000	1030	1060	1090	1120	1145	1170
2600	BHP	0.64	0.69	0.75	0.80	0.86	0.92	0.97	1.02	1.08	1.13	1.19	1.25	1.30	1.36	1.41	
	Drive Setting	B	A	A	A	A	A	A	A	A	C	C	C	C	C	C	
	RPM	700	740	780	815	850	885	920	950	985	1015	1045	1075	1100	1130	1155	
2700	BHP	0.70	0.75	0.80	0.86	0.91	0.97	1.02	1.08	1.14	1.20	1.26	1.32	1.38	1.50	1.52	
	Drive Setting	B	A	A	A	A	A	A	A	C	C	C	C	C	C	C	
	RPM	725	760	795	830	865	900	930	960	995	1025	1055	1085	1115	1140	1165	
2800	BHP	0.76	0.82	0.88	0.93	0.98	1.05	1.10	1.16	1.22	1.30	1.37	1.44	1.50	1.56		
	Drive Setting	A	A	A	A	A	A	A	A	C	C	C	C	C	C		
	RPM	745	780	815	850	880	915	945	980	1010	1040	1070	1100	1125	1150		
2900	BHP	0.82	0.88	0.93	0.98	1.05	1.11	1.17	1.23	1.30	1.37	1.44	1.51	1.59	1.65		
	Drive Setting	A	A	A	A	A	A	A	C	C	C	C	C	C	C		
	RPM	765	800	830	865	900	930	960	990	1020	1050	1080	1110	1140	1165		
3000	BHP	0.91	0.96	1.02	1.07	1.13	1.20	1.26	1.32	1.38	1.46	1.53	1.60	1.66			
	Drive Setting	A	A	A	A	A	A	A	C	C	C	C	C	C			
	RPM	785	820	855	885	915	950	980	1010	1035	1065	1095	1125	1150			

Airflow Correction Table

Percent of Rated Airflow	Total Capacity	Sensible	Power	Heat of Rejection	Heating Capacity	Power	Heat of Extraction
75%	0.94	0.85	0.95	0.94	0.93	1.04	0.94
81%	0.96	0.88	0.96	0.96	0.95	1.02	0.95
88%	0.97	0.92	0.98	0.97	0.96	1.01	0.97
94%	0.98	0.96	0.99	0.98	0.98	1.00	0.98
100%	1.00	1.00	1.00	1.00	1.00	1.00	1.00
106%	1.01	1.03	1.01	1.01	1.00	0.99	0.99
113%	1.02	1.06	1.03	1.02	1.00	0.98	0.99
119%	1.02	1.08	1.04	1.03	1.00	0.98	0.99
125%	1.03	1.11	1.06	1.04	1.01	0.98	1.00

Wet Coil to Dry Coil Conversion Table

Air Coil Face Velocity	Required BHP Multiplier	Required RPM Multiplier
200	0.96	1.00
250	0.97	1.00
300	0.98	1.00
350	0.98	1.00
400	0.99	1.00
450	0.99	1.00
500	1.07	0.99

Entering Air Correction Table – Cooling

Entering Air WB ºF	Total Capacity	Sensible Cooling Capacity Multiplier - Entering Air DB ºF									Power	Heat of Rejection
		60	65	70	75	80	80.6	85	90	95		
50	0.73	0.88									0.98	0.78
55	0.80	0.69	0.89	0.84							0.98	0.84
60	0.88		0.69	0.89	1.09						0.99	0.90
65	0.98			0.68	0.88	1.08	1.11	1.28			1.00	0.97
66.2	0.97			0.64	0.83	1.03	1.06	1.24			1.00	0.97
67	1.00			0.60	0.80	1.00	1.02	1.20	0.15		1.00	1.00
70	1.04				0.68	0.88	0.90	1.08	1.28	0.16	1.01	1.04
75	1.14					0.68	0.68	0.87	1.07	1.27	1.01	1.12

Entering Air Correction Table – Heating

Entering Air DB ºF	Heating Capacity	Power	Heat of Extraction
50	1.03	0.83	1.08
55	1.02	0.87	1.06
60	1.01	0.90	1.04
65	1.00	0.95	1.02
68	0.99	0.98	1.00
70	1.00	1.00	1.00
75	0.98	1.04	0.96
80	0.96	1.10	0.93

ClimaDry® II – ESP Loss

Coil Face Velocity FPM	TRT with ClimaDry II - ESP Loss	
	TRT036 & 048 In. of Water	TRT060 & 072 In. of Water
175	-	-
200	0.17	0.17
225	0.18	0.18
250	0.20	0.20
275	0.21	0.21
300	0.22	0.23
325	0.23	0.24
350	0.25	0.26
375	0.26	0.27
400	0.27	0.29
425	-	0.30
450	-	0.31

Physical Data

MODEL	036	048	060	072
Compressor	**Scroll**			
Number of Circuits (Compressors)	1			
Factory Charge R410a - (oz) [kg] per circuit	64 [1.81]	84 [2.38]	120 [3.40]	132 [3.74]
Blower Motor	Belt Drive, Nema Premium, Inverter Duty			
Blower Motor Quantity	1			
Standard Motor (hp) [kw]	1 [.75]	1-1/2 [1.12]	1-1/2 [1.12]	2 [1.49]
VFD	Variable Frequency Drive			
VFD Quantity	1			
VFD (hp) [kw]	1 [0.746]	1-1/2 [1.12]	1-1/2 [1.12]	2 [1.49]
Blower	Forward Curve			
No. of Blowers	1			
Water Connections	Standard FPT			
FPT (in0 [mm]	3/4" [19.05]		1" [25.4]	1-1/4" [31.75]
Coax Volume				
Volume (US Gallons) [liters]	0.61 [2.29]	0.77 [2.90]	1.11 [4.21]	1.30 [4.93]
Condensate Connection Size	1" [25.4]			
FPT (in) [mm]				
Air Coil Data	Tube & Fin			
ISP/ClimaDry Pump	Direct Drive Impeller			
No. of Pumps	1			
Standard Motor (hp) [kw]	1/6 [.124]			
Connection Size (in) [cm]	3/4" [1.91]		1" [2.54]	
Hydronic Reheat Coil Data	Tube & Fin			
Miscellaneous Data				
Filter Standard - 2" [50.8mm] MERV8 (qty) (in) [cm]	(QTY.4) 16 x 20 [406 X 508]			
Standard Weight - Operating (lbs) [kg]	735 [333]	785 [356]	835 [379]	880 [399]
Standard Weight - Packaged (lbs) [kg]	750 [340]	800 [363]	850 [386]	900 [408]
ClimaDry Weight - Operating (lbs) [kg]	802 [364]	852 [386]	920 [417]	965 [438]
ClimaDry Weight - Packaged (lbs) [kg]	817 [371]	867 [393]	935 [324]	985 [447]

TRT Series Nomenclature – ClimaDry® II Option

1 2 3	4 5 6	7	8	9	10	11	12	13	14	15
TRT	036	D	H	C	1	A	E	A	A	S

HEAT EXCHANGER OPTIONS ③ ⑥ ⑦ ⑧

	NON-COATED AIR COILS		COATED AIR COILS	
	COPPER (CU) COAX	CUPRO-NICKEL (CN) COAX	COPPER (CU) COAX	CUPRO-NICKEL (CN) COAX
STANDARD	C	N	A	J
MOTORIZED VALVE	T	S	U	W
CLIMADRY® II	E	P	D	F
INTERNAL SECONDARY PUMP	H	Z	G	Y

CLIMADRY® II OPTION COMPONENTS
REHEAT COIL
3-WAY MOTORIZED MODULATING WATER VALVE
DXM2.5 CONTROL
CIRCULATING PUMP
PUMP CONTACTOR
HOT GAS BYPASS

Notes:

1. ClimaDry® II reheat option (Digit 12 - D, E, F or P) must be ordered with original equipment (cannot be field added). Unit must have DXM2.5 control. 460 volts require 4 wire power supply with neutral. Not available for units with internal water valve, flow regulator options, or 575 Volt. Check unit submittal for limitations and specific requirements.
2. All TRT rooftops with the ClimaDry® II reheat option require antifreeze to protect the reheat coil in low ambient conditions. ASHRAE minimums for the region shall be considered during the calculation of the antifreeze solution.
3. ClimaDry II is not recommended for applications with poor water quality (see water quality guidelines in unit IOM). The copper heat exchanger (Digit 12 - D or E) with cast iron pump are designed for closed loop systems.
4. **Max working water pressure for the ClimaDry II option is 145 psig.**
5. Thermostat must be either:
   A. Thermostat with dehumidification mode iGate® 2 Communicating (AWC)Thermostat
   B. Thermostat and separate humidistat or dehumidistat controller
   (see DXM2.5 IOM for details).
6. ClimaDry II units must have minimum entering air temperature of 65°F DB / 55°F WB while in the cooling, continuous fan, or dehumidification modes. Minimum entering air temperature while operating in the heating mode (not continuous fan) is the minimum entering air temperature for the standard model (without the ClimaDry II option) in the heating mode. Operating below these minimum entering air temperatures may result in nuisance faults.
7. ClimaDry II shall not be applied with the VFD set to leaving air temperature mode.

ClimaDry® II Modulating Reheat Option

ClimateMaster's patented ClimaDry® II Dehumidification option is an innovative means of providing modulating reheat without the complication of refrigeration controls. ClimaDry II is hot gas generated reheat, which utilizes one of the biggest advantages of a Water-Source Heat Pump (WSHP), the transfer of energy through the water piping system. ClimaDry II simply diverts condenser water through a water-to-air coil that is placed after the evaporator coil. If condenser water is not warm enough, the internal "run-around" loop increases the water temperature with each pass through the condenser coil (see figure 1, below).

ClimaDry® II Benefits

ClimaDry II is like no other reheat option on the market. Proportional reheat is controlled to the desired leaving air temperature set point (factory set point of 69°F, 20.5°C), no matter what the water loop temperature is. Since dehumidification operation will occur under less than full load cooling conditions a good percentage of the time, it is important to have a reheat function that provides 100% reheat in the spring and fall when the water loop is cool. Supply air temperature is field adjustable to +/- 3°F [+/- 1.7°C] for even greater flexibility with the optional potentiometer. It is recommended that the ClimaDry II supply air temperature be set to match the space cooling setpoint so that ClimaDry II does not impact room temperature. Competitors without ClimaDry II typically use an on/off (non-modulating) refrigeration based reheat circuit, typically referred to as "Hot gas reheat" (HGR). HGR needs higher condensing temperatures to work well, typically 85°F [29°C] entering water temperature (EWT). With HGR, cooler water temperatures produce cooler supply air temperatures, which could overcool the space, requiring additional space heating from another source or a special auto-change-over relay to allow the unit to switch back and forth between reheat and heating. Rarely does HGR provide 100% reheat, like ClimaDry II. ClimaDry II has a simple and easy to troubleshoot refrigerant circuit. No switching valves or hard to diagnose leaky check valves are utilized. No unusual refrigerant pressures occur during the reheat mode. The ClimaDry II refrigerant circuit is like every other ClimateMaster unit (without reheat), so everything the technician already knows applies to troubleshooting the ClimaDry II refrigeration circuit. Plus, the water loop portion of the ClimaDry II option is easy to understand and diagnose.

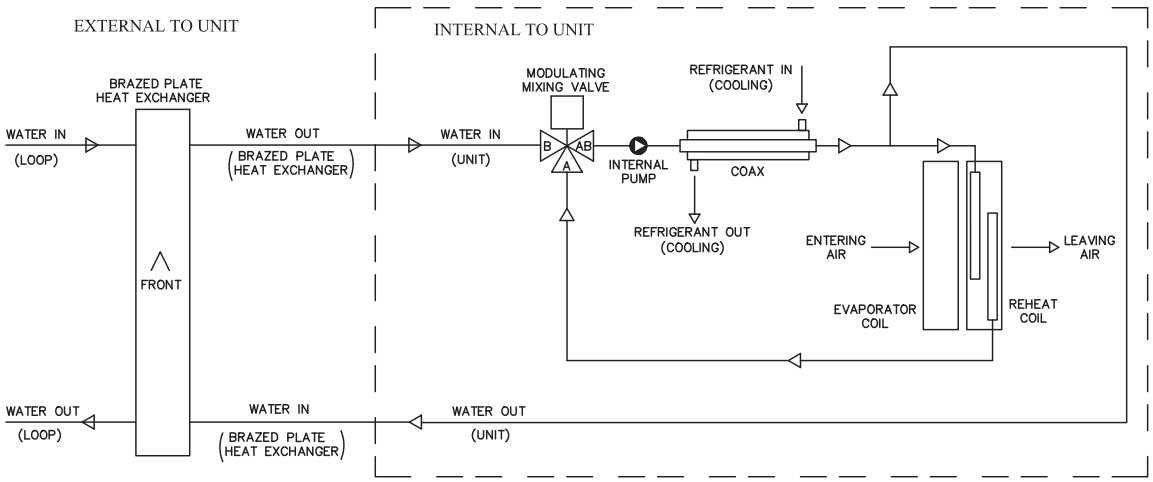
ClimaDry® II Applications

ClimaDry II can be applied to a number of common applications, such as:

- Classrooms
- Condominiums
- Apartments
- Computer rooms
- Spaces with high latent loads like auditoriums, theaters, convention centers, etc.
- Most applications where humidity is a problem

(Note: ClimaDry II is not for use in high fraction outdoor air applications or in applications with corrosive atmospheres, such as pool rooms.)

Figure 1: ClimaDry® II Schematic



NOTE:
Brazed plate heat exchanger is used when connecting to a loop with no antifreeze.

With the ClimaDry II option, return air from the space is cooled by the air-to-refrigerant (evaporator) coil, and then reheated by the water-to-air (reheat) coil to dehumidify the air, but maintain the constant space temperature (thus operating as a dehumidifier).

The moisture removal capability of the heat pump is determined by the unit's latent capacity rating. Latent capacity equals Total capacity minus Sensible capacity. Using unit performance data from submittals (http://www.climatemaster.com/) select the correct model, use your maximum entering water temperature (EWT) and flow rate to select TC and SC. For example, at 80°F [26.7°C] EWT and 15 GPM, the moisture removal capability (latent capacity) of a ClimateMaster TRE120 is 36.4 Mbtuh as shown in figure 2.

Dividing the latent capacity by 1,069 BTU/LB of water vapor at 80°F DB and 67°F WB [26.7°C DB and 19.4°C WB] moist air enthalpy, converts the amount of moisture removal to pounds per hour (multiply pounds per hour by 0.4536 to obtain kg/hr). Calculations are shown in figure 2.

Most ClimateMaster heat pumps have a sensible-to-total heat ratio (SHR) of 0.72 to 0.82. Therefore, approximately, 25% of the cooling capacity is dedicated to latent cooling capacity (moisture removal). When selecting a unit with ClimaDry II, the space sensible and latent loads should be calculated. If the unit will be used for space cooling, a unit with at least enough capacity to satisfy the building sensible load should be selected. If the latent cooling load is not satisfied by the selection, a larger unit with enough latent capacity will be required. If the unit will be used for dehumidification purposes only, the latent capacity is the only consideration necessary. In this case, sensible load is immaterial.

Figure 2: Example TRE120 Performance

4000 CFM Nominal (Rated) Airflow

LC = TC - SC = 121.2 - 84.8 = 36.4 Mbtuh

36,400 Btuh ÷ 1,069 = 34.1 lbs/hr (15.4 kg/hr)

Water/Brine				Cooling - EAT 80/67°F					Heating - EAT 70°F				
EWT °F	Flow GPM	PD PSI	PD FT	TC	SC	kW	HR	EER	HC	kW	HE	LAT	COP
80	15.0	0.2	0.5	121.2	84.8	9.93	155.1	12.2	162.8	10.86	125.7	105.6	4.4
	22.5	0.4	1.0	126.2	87.0	9.28	157.9	13.6	171.5	11.08	133.7	107.6	4.5
	30.0	1.5	3.6	128.7	88.1	8.97	159.3	14.3	176.2	11.20	138.0	108.7	4.6
85	15.0	0.2	0.5	117.6	83.2	10.43	153.2	11.3	170.0	11.04	132.3	107.3	4.5
	22.5	0.4	0.9	122.6	85.4	9.75	155.9	12.6	179.2	11.27	140.7	109.4	4.7
	30.0	1.5	3.5	125.2	86.6	9.41	157.3	13.3	184.1	11.40	145.2	110.5	4.7
90	15.0	0.1	0.3	114.0	81.7	10.92	151.3	10.4	177.3	11.22	139.0	108.9	4.6
	22.5	0.4	0.9	119.1	83.9	10.21	153.9	11.7	186.8	11.47	147.7	111.1	4.8
	30.0	1.5	3.4	121.7	85.0	9.87	155.3	12.3	192.0	11.60	152.5	112.4	4.9
100	15.0	0.1	0.2	107.0	79.1	12.02	148.0	8.9	Operation not recommended				
	22.5	0.3	0.8	111.8	80.9	11.25	150.2	9.9					
	30.0	1.4	3.3	114.4	81.9	10.87	151.5	10.5					
110	15.0	0.1	0.2	100.5	77.2	13.24	145.6	7.6					
	22.5	0.3	0.7	104.8	78.4	12.40	147.1	8.5					
	30.0	1.4	3.2	107.2	79.1	12.00	148.1	8.9					
120	15.0	0.1	0.1	94.8	76.6	14.59	144.6	6.5					
	22.5	0.3	0.7	98.5	76.9	13.67	145.1	7.2					
	30.0	1.3	3.0	100.5	77.2	13.23	145.6	7.6					

Dividing the latent capacity by 1,069 BTU/LB of water vapor at 80°F DB and 67°F WB [26.7°C DB and 19.4°C WB] moist air enthalpy, converts the amount of moisture removal to pounds per hour (multiply pounds per hour by 0.4536 to obtain kg/hr). Calculations are shown in figure 2.

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

ClimaDry® II Sequence of Operation

A heat pump equipped with ClimaDry® II can operate in three modes; cooling, cooling with reheat (dehumidification), and heating. The cooling/heating modes are like any other ClimateMaster WSHP. The reversing valve ("O" signal) is energized in cooling, along with the compressor contactor(s) and blower relay. In the heating mode the reversing valve is de-energized. Almost any thermostat will activate the heat pump in heating or cooling modes. The DXM2.5 microprocessor board, which is required with the ClimaDry II option, will accept either heat pump (Y,O) thermostats or non-heat pump (Y,W) thermostats. The reheat mode requires either a separate humidistat/dehumidistat or a thermostat that has an integrated dehumidification function for activation. The DXM2.5 board is configured to work with either a humidistat or dehumidistat input to terminal "H" (DIP switch settings for the DXM2.5 board are shown below in table 2). Upon receiving an "H" input, the DXM2.5 board will activate the cooling mode and engage reheat. Tables 1 and 2 show the relationship between thermostat input signals and unit operation. There are four operational inputs for single stage units and six operational inputs for dual stage units:

-Fan Only
-1st Stage Cooling
-2nd Stage Cooling
-1st Stage Heating
-2nd Stage Heating
-Reheat Mode

- **Fan Only:** A (G) call from the thermostat to the (G) terminal of the DXM2.5 control board will bring the unit on in fan only mode.
- **1st Stage Cooling:** A simultaneous call from (G), (Y1), and (O) to the (G), (Y1), (O/W2) terminals of the DXM2.5 control board will bring the unit on in 1st Stage Cooling.
- **2nd Stage Cooling:** A simultaneous call from (G), (Y1), (Y2), and (O) to the (G), (Y1), (Y2), and (O/W2) terminals of the DXM2.5 control board will bring the unit on in 2nd Stage Cooling. When the call is satisfied at the thermostat the unit will continue to run in 1st Stage Cooling until the 1st Stage Cooling call is removed or satisfied, shutting down the unit.

Table 1: Humidistat/Dehumidistat Logic and DXM2.5 (2.1, 2.2., 2.3) DIP settings

Sensor	2.1	2.2	2.3	Logic	Reheat (ON)–H	Reheat (OFF)–H
Humidistat	OFF	OFF	OFF	Reverse	0 VAC	24 VAC
Dehumidistat	OFF	ON	OFF	Standard	24 VAC	0 VAC

Table 2: ClimaDry® II Operating Modes

Mode	Input					Output				
	O	G	Y1	Y2[3]	H	O	G	Y1	Y2[3]	Reheat
No Demand	ON/OFF	OFF	OFF	OFF	OFF	ON/OFF	OFF	OFF	OFF	OFF
Fan Only	ON/OFF	ON	OFF	OFF	OFF	ON/OFF	ON	OFF	OFF	OFF
Cooling 1st Stage	ON	ON	ON	OFF	OFF	ON	ON	ON	OFF	OFF
Cooling 2nd Stage	ON	ON	ON	ON	OFF	ON	ON	ON	ON	OFF
Cooling & Dehumidistat[1]	ON	ON	ON	ON/OFF	ON	ON	ON	ON	ON/OFF	OFF
Dehumidistat Only	ON/OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
Heating 1st Stage	OFF	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF
Heating 2nd Stage	OFF	ON	ON	ON	OFF	OFF	ON	ON	ON	OFF
Heating & Dehumidistat[2]	OFF	ON	ON	ON/OFF	ON	OFF	ON	ON	ON/OFF	OFF

[1]Cooling input takes priority over dehumidify input.
[2]DXM2.5 is programmed to ignore the H demand when the unit is in heating mode.
[3]N/A for single stage units; Full load operation for dual capacity units.
[4]ON/OFF = Either ON or OFF.

- **1st Stage Heating:** A simultaneous call from (G) and (Y1) to the (G) and (Y1) terminals of the DXM2.5 control board will bring the unit on in 1st Stage Heating.

- **2nd Stage Heating:** A simultaneous call from (G), (Y1), and (Y2) to the (G), (Y1), and (Y2) terminals of the DXM2.5 control board will bring the unit on in 2nd Stage Heating. When the call is satisfied at the thermostat the unit will continue to run in 1st Stage Heating until the call is removed or satisfied, shutting down the unit.

- **Reheat Mode:** A call from the Humidistat/Dehumidistat to the (H) terminal of the DXM2.5 control board will bring the unit on in Reheat Mode if there is no call for cooling at the thermostat. When the Humidistat/ Dehumidification call is removed or satisfied the unit will shut down. NOTE: Cooling always overrides Reheat Mode. In the Cooling mode, the unit cools and dehumidifies. If the cooling thermostat is satisfied but there is still a call for dehumidification, the unit will continue to operate in Reheat Mode.

NOTE: Care must be taken when using a humidistat to operate ClimaDry II. When the DIP switch on the DXM2.5 controller is set for 'humidistat' it reverses the control logic so that an "open" control circuit initiates a ClimaDry II run cycle. If a humidistat is not connected, or if a manual switch on the humidistat is set to "off", ClimaDry II will see the open circuit and call for dehumidification.

ClimaDry® II Component Functions

The ClimaDry II option consists of the following components:

- Intelligent DXM2.5 Controller
- Motorized Modulating Water Valve
- Supply Air Sensor
- Loop Pump
- Hydronic Coil
- Low Pressure Switch

The DXM2.5 Controller operates on 24 VAC power supply and automatically adjusts the water valve based upon the Supply Air Sensor. The Supply Air Sensor senses supply air temperature at the blower inlet providing the input signal necessary for the DXM2.5 control to drive the motorized modulating water valve during the reheat mode of operation.

The Motorized Modulating Water Valve is a proportional actuator/three-way valve combination used to divert the condenser water from the coax to the hydronic reheat coil during the reheat mode of operation. The proportional controller signals the valve based on the supply air temperature sensor.

The Loop Pump circulates condenser water through the hydronic reheat coil during the reheat mode of operation. In this application, the loop pump is only energized during the reheat mode of operation. The Hydronic Coil is utilized during the reheat mode of operation to reheat the air to the setpoint of the DXM2.5 controller. Condenser water is diverted by the motorized modulating water valve and pumped through the hydronic coil by the loop pump in proportion to the control setpoint. The amount of reheating is dependent on the setpoint and how far from setpoint the supply air temperature is. The factory setpoint is 69°F [20.5°C], generally considered "neutral" air.

ClimaDry® II Application Considerations

The reheat coil adds a small amount of resistance to the air stream. In some cases the high static option may be required for applications with higher static ductwork. Consult the submittal data or the Installation/Operation/ Maintenance (IOM) manual for the specific heat pump to review blower tables.

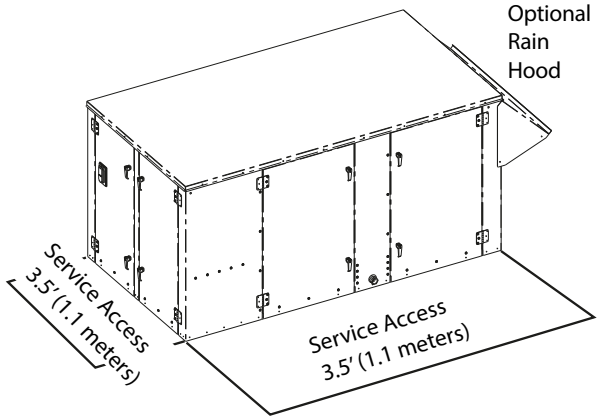
Unlike most hot gas reheat options, the ClimaDry II option will operate over a wide range of EWTs. Special flow regulation (water regulating valve) is not required for low EWT conditions.

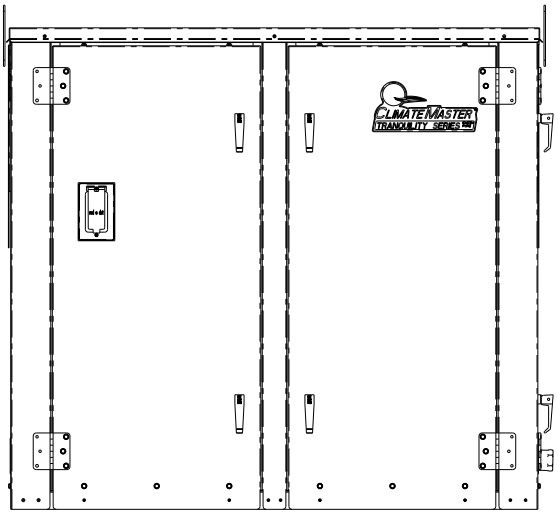
Units with the ClimaDry II option shall have an antifreeze solution to protect the coil in low ambient conditions. ASHRAE minimums for the region shall be considered during the calculation of the antifreeze solution.

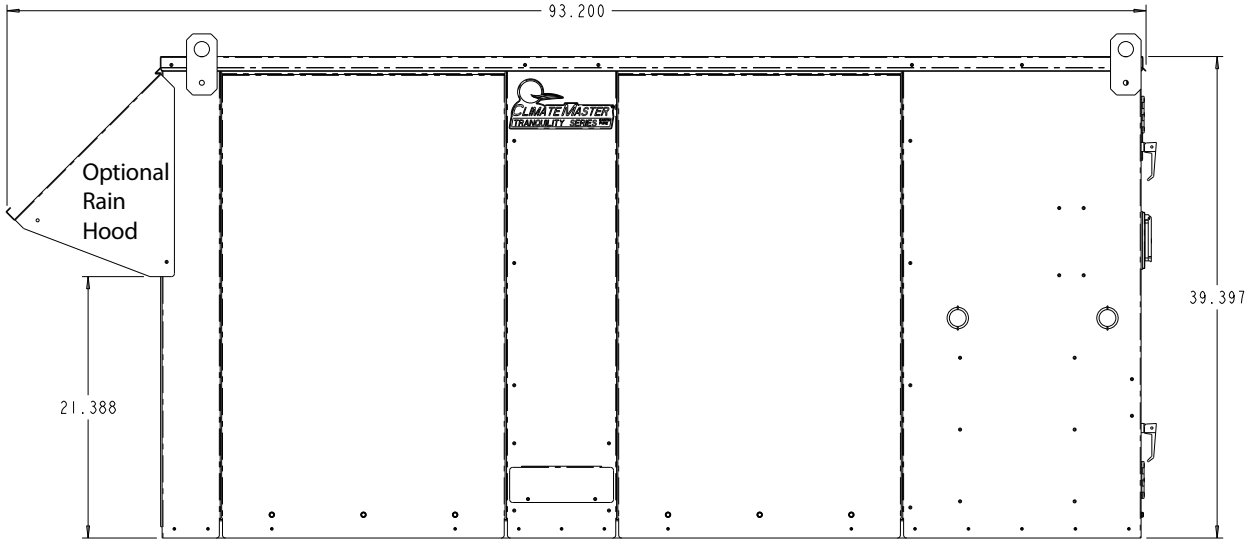
In applications where antifreeze is not specified, a secondary heat exchanger can be used to isolate the unit from the water loop, thus requiring less antifreeze to be used with the a Secondary brazed plate heat exchanger. Figure 1 on page 70 shows the heat exchanger connections.

Water-source heat pumps with ClimaDry II should not be used as make-up air units. These applications should use equipment specifically designed for make-up air.

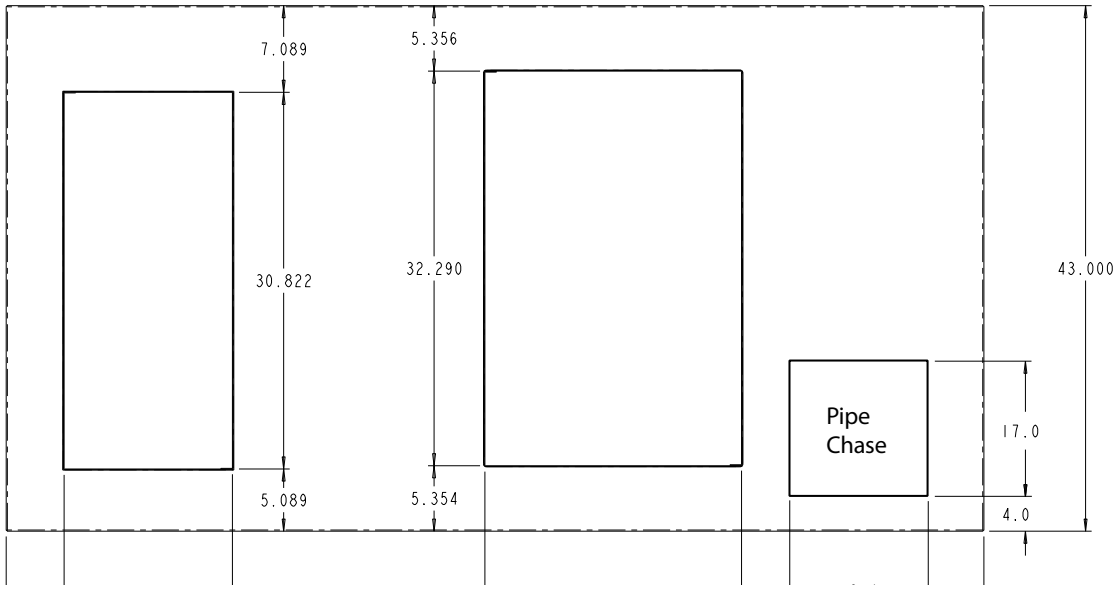
TRT036-72 Dimensional Data







Top View
of Base



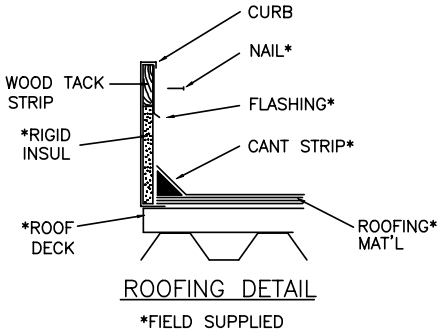
Standard Roof Curb

Model	A	B	C	D	E	F*
TRT036/48/60/72	72.25”	18”	35.25”	72.25”	35.25”	14” or 24”

* “F” dimension can be 14” or 24”

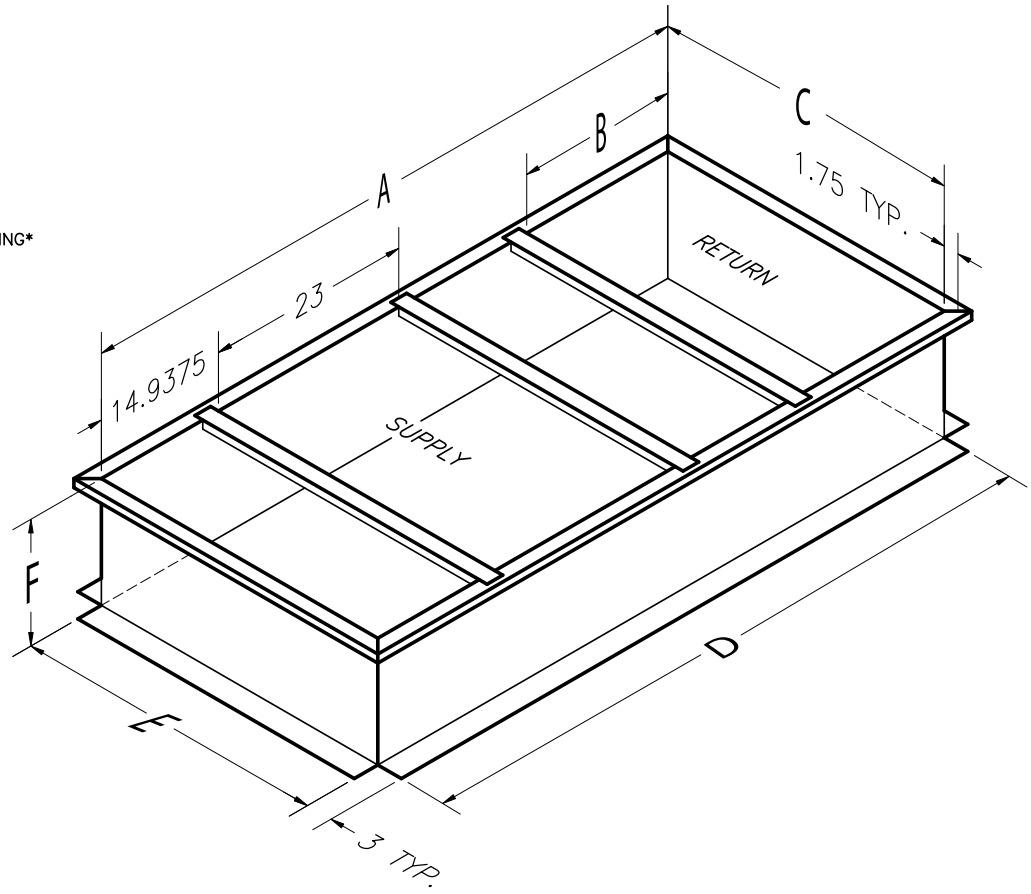
Features

1 — Roof curb is heavy GA. galvanized steel.
2 — Full perimeter wood nailer provided.
3 — Gasket material & assembly hardware provided.
4 — Top corners are mitred.
5 — Curbs are shipped knocked down.
6 — Other available options, by special request, include: single pitch, compound pitch and construction for standing seam roofs.



ROOFING DETAIL

*FIELD SUPPLIED



Standard 60 Hz Construction – Belt Drive Blower Motor + VFD

Model	Mode	Ducted Discharge Octave Band Frequency, Hz.							Free Air Inlet Combined With Casing (Cabinet) Radiated Octave Band Frequency, Hz.						
		125	250	500	1000	2000	4000	8000	125	250	500	1000	2000	4000	8000
TRT036	Fan Only	55	50	37	33	34	36	34	64	51	48	48	41	47	40
	Cooling: Full Load	61	52	47	47	45	42	38	75	64	58	54	54	54	45
	Heating: Full Load	61	52	47	47	45	40	37	75	63	58	55	52	50	47
	Cooling: Part Load	53	49	34	34	37	38	36	69	65	55	58	57	54	43
	Heating: Part Load	53	46	36	32	30	33	35	69	65	56	53	48	46	44
TRT048	Fan Only	49	41	35	31	28	33	36	61	52	49	45	42	48	42
	Cooling: Full Load	59	54	50	47	48	47	42	72	65	62	59	55	56	49
	Heating: Full Load	59	53	49	47	46	44	40	72	63	60	56	53	55	48
	Cooling: Part Load	52	43	37	33	31	33	35	67	64	57	54	50	49	43
	Heating: Part Load	54	44	37	32	28	32	36	67	59	54	46	43	48	41
TRT060	Fan Only	51	40	33	32	31	34	35	60	53	50	53	46	46	40
	Cooling: Full Load	60	52	46	40	40	43	38	69	62	58	57	54	54	46
	Heating: Full Load	60	51	44	41	40	42	37	69	63	62	57	54	52	45
	Cooling: Part Load	52	43	34	33	33	35	35	63	59	53	52	46	47	42
	Heating: Part Load	53	44	32	31	30	33	35	63	61	55	52	45	46	42
TRT072	Fan Only	52	40	36	31	30	34	36	62	54	51	50	44	48	42
	Cooling: Full Load	64	54	52	46	47	49	49	72	65	68	60	58	61	53
	Heating: Full Load	64	54	50	46	46	48	41	72	64	64	60	57	60	51
	Cooling: Part Load	53	42	37	31	31	35	35	65	60	56	56	49	53	50
	Heating: Part Load	53	40	37	31	30	34	36	65	64	55	56	49	52	49

Tested in accordance with ARI 260
TRT comes standard w/mute construction
TRT Series Octave Band Sound Power Level (dB re 1PW)

Electrical Data – Standard

Model #	Voltage Code	Voltage	Min/Max Voltage	Blower Option	Compressor			Blower Motor VFD			Rated Current *	Min Circuit Amp	SCCR kA rms Symetrical	SCCR Volts Maximum	Max Fuse/ HACR
					QTY	RLA	LRA	QTY	FLA	HP					
TRT036	G	208-1-60	197/254	VFD Only	1	15.6	83.0	1	11.4	1.0	27.0	30.9	5	600	45
	H	208-3-60	197/254	VFD Only	1	11.6	73.0	1	8.4	1.0	20.0	22.9	5	600	30
	F	460-3-60	414/506	VFD Only	1	5.7	38.0	1	4.1	1.0	9.8	11.2	5	600	15
TRT048	G	208-1-60	197/254	VFD Only	1	21.2	104.0	1	16.1	1.5	37.3	42.6	5	600	60
	H	208-3-60	197/254	VFD Only	1	14.0	83.1	1	13.0	1.5	27.0	30.5	5	600	40
	F	460-3-60	414/506	VFD Only	1	6.4	41.0	1	6.0	1.5	12.4	14.0	5	600	20
TRT060	G	208-1-60	197/254	VFD Only	1	26.9	139.9	1	16.1	1.5	43.0	49.7	5	600	70
	H	208-3-60	197/254	VFD Only	1	16.5	110.0	1	13.0	1.5	29.5	33.6	5	600	50
	F	460-3-60	414/506	VFD Only	1	7.2	52.0	1	6.0	1.5	13.2	15.0	5	600	20
TRT072	G	208-1-60	197/254	VFD Only	1	29.7	179.2	1	16.8	2.0	46.5	53.9	5	600	80
	H	208-3-60	197/254	VFD Only	1	17.6	136.0	1	13.2	2.0	30.8	35.2	5	600	50
	F	460-3-60	414/506	VFD Only	1	8.5	66.1	1	6.9	2.0	15.4	17.5	5	600	25

* Verbiage change from Total FLA to Rated Current

Electrical Data – ClimaDry® II Reheat or Internal Secondary Pump

Model #	Voltage Code	Voltage	Min/Max Voltage	Blower Option	Compressor			Blower Motor VFD			Pump		Rated Current *	Min Circuit Amp	SCCR kA rms Symetrical	SCCR Volts Maximum	Max Fuse/ HACR
					QTY	RLA	LRA	QTY	FLA	HP	QTY	FLA					
TRT036	G	208-3-60	197/254	VFD Only	1	15.6	83.0	1	11.4	1.0	1	1.07	28.1	32.0	5	600	45
	H	208-3-60	197/254	VFD Only	1	11.6	73.0	1	8.4	1.0	1	1.07	21.1	24.0	5	600	35
	F	460-3-60	414/506	VFD Only	1	5.7	38.0	1	4.1	1.0	1	1.07	10.9	12.3	5	600	15
TRT048	G	208-3-60	197/254	VFD Only	1	21.2	104.0	1	16.1	1.5	1	1.07	38.4	43.7	5	600	60
	H	208-3-60	197/254	VFD Only	1	14.0	83.1	1	13.0	1.5	1	1.07	28.1	31.6	5	600	45
	F	460-3-60	414/506	VFD Only	1	6.4	41.0	1	6.0	1.5	1	1.07	13.5	15.1	5	600	20
TRT060	G	208-3-60	197/254	VFD Only	1	26.9	139.9	1	16.1	1.5	1	1.07	44.1	50.8	5	600	70
	H	208-3-60	197/254	VFD Only	1	16.5	110.0	1	13.0	1.5	1	1.07	30.6	34.7	5	600	50
	F	460-3-60	414/506	VFD Only	1	7.2	52.0	1	6.0	1.5	1	1.07	14.3	16.1	5	600	20
TRT072	G	208-3-60	197/254	VFD Only	1	29.7	179.2	1	16.8	2.0	1	1.07	47.6	55.0	5	600	80
	H	208-3-60	197/254	VFD Only	1	17.6	136.0	1	13.2	2.0	1	1.07	31.9	36.3	5	600	50
	F	460-3-60	414/506	VFD Only	1	8.5	66.1	1	6.9	2.0	1	1.07	16.5	18.6	5	600	25

* Verbiage change from Total FLA to Rated Current

Blower Motor Variable Frequency Drive (VFD) Controls

VFD Blower Description

Variable Frequency Drives are controllers that vary electrical frequency and voltage to the fan motor. Electrical frequency is directly related to a fan motors speed (RPM's). The faster the frequency, the faster the motor will go and vice versa. VFD's allow the fan motor to ramp speed (CFM) up or down to match the load of the space they are satisfying. This allows the TRT product to deliver variable capacity, optimizing system efficiency and saving owners money.

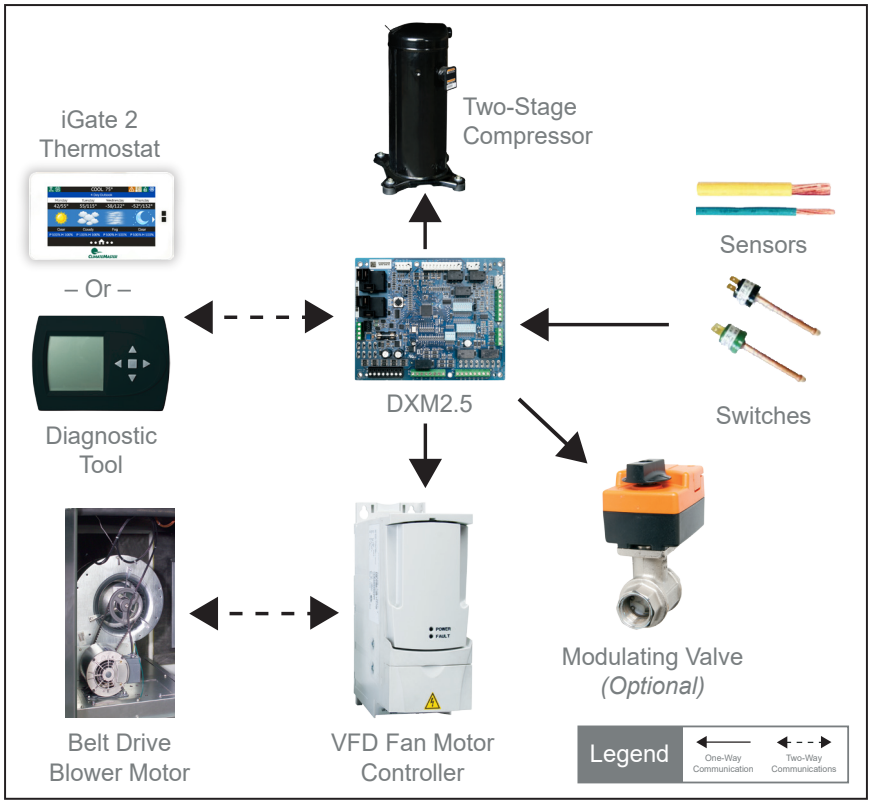
VFD controllers come factory installed and tested to provide supply fan motor speed modulation. VFDs on the supply fan, are quieter, more efficient, and are eligible for utility rebates. These products are commonly used in single zone variable air volume (VAV) applications. When applied to single zone VAV applications the system modulates the indoor fan and stages the compressor as space temperature changes, for increased part-load efficiency and more precise temperature control with fan speed varying down to 60% of maximum air flow. The VFD controls are paired with our intelligent DXM2.5 controls to provide superior service and functionality.

VFD Blower Sequence of Operation

The VFD blower option comes factory programmed with DXM2.5 controls. The DXM2.5 controls the VFD blower controller using a 0–10 VDC control signal, and comes factory programed for Leaving Air Temperature (LAT) control mode. When the VFD is off, the output should be set to 0 VDC. For each unit size, there will be a maximum and minimum operating speed that the VFD can be operated at for any mode, defined in VFD Operational Table 1.1.

The VFD blower may be operated in LAT or discrete speed control modes.

NOTE: VFD output is 50% of last value during heating or cooling blower off delay times.



Blower Motor Variable Frequency Drive (VFD) Controls, Cont'd.

LAT Control VFD Operation

The DXM2.5 will come factory configured for LAT control operation. The VFD speed will be controlled by the DXM2.5 to maintain the factory default LAT set point, 55 for cooling and 105 for heating. LAT can be adjusted in the field. See VFD Operational Table 1.1 for full details.

When a compressor demand is recognized, the VFD output will be set to the most recent operating speed of the VFD in the current operating mode (heating or cooling). If there is no value stored from a previous heating or cooling cycle, the VFD speed will initially set at 75% or 8.0 VDC. After the VFD speed is initially set, the VFD control signal will not be adjusted until after 90 seconds of compressor operation, and then will be periodically checked and adjusted every 10 seconds if needed to maintain the LAT.

If the control switches from the heating mode to cooling, or cooling to heating without de-activating the compressor, the VFD control voltage will immediately switch to the last stored control voltage for the new operating mode, and then will not be adjusted for the first 90 seconds of operation in the new operating mode.

The VFD control voltage is increased or decreased incrementally based on the magnitude of the differential between the current LAT and the target LAT defined in VFD Operational Table1.2.

Discrete Speed VFD Operation

When the DXM2.5 is configured for discrete speed VFD operation, the VFD speed will be set to the selected operating speed (A, B or C) for full load heating or cooling. Full load operation is defined as second stage or higher heating or cooling.

When the DXM2.5 is configured for discrete speed VFD operation, the VFD operating speed may be increased or decreased by 10%, if the appropriate speed adjustment flag is set in the VFD configuration flags. If the increase and decrease flags are both set, there will be no adjustment from the normal value.

When operating in first stage heating or cooling, the VFD speed will be set to the percentage of the selected full load operating speed (A, B or C, plus or minus adjustment) listed for each unit size as defined in VFD Operational Table 1.3.

VFD Operational Table 1.1

HP Family	Unit Size	Minimum Heat LAT	Maximum Heat LAT	Default Heat LAT	Minimum Cool LAT	Maximum Cool LAT	Default Cool LAT
TRT	36	85°	125°	105°	45°	65°	55°
	48	85°	125°	105°	45°	65°	55°
	60	85°	125°	105°	45°	65°	55°
	72	85°	125°	105°	45°	65°	55°

VFD Operational Table 1.2

LAT differential |Actual – Target|	VFD adjust (VDC)
ΔT ≤ 1.0°F	0.0
1.0 < ΔT ≤ 2.0°F	0.1
2.0 < ΔT ≤ 3.0°F	0.2
3.0 < ΔT ≤ 5.0°F	0.3
ΔT > 5.0°F	0.4

VFD Operational Table 1.3

HP Family	Unit Size	Minimum VFD Speed	Maximum VFD Speed	VFD Fixed Speed A	VFD Fixed Speed B	VFD Fixed Speed C	Part Load Multiplier	Default Fan Speed
TRT	36	3.6	9.9	6.9	5.8	8.9	75%	4.8
	48	4.5	9.5	7.5	7	8.5	75%	6
	60	4.3	9.8	7.3	6.7	8.8	75%	5.7
	72	3.9	9.9	7.2	6.2	8.9	75%	5.2

NOTE: All speed values are voltages from 0-10VDC

TRT Series Wiring Diagram Matrix

All current diagrams can be located online at climatemaster.com. Click 'Commercial Professional'.

1. Click 'Products' in the main navigation
2. Select 'Rooftop: Water Cooled'
3. Select the TRT product series
4. Click the Wire Diagrams tab in the middle of the page
5. Select your voltage and controls

Unit Controller	Reheat	Sizes
		036-072
DXM2.5	None	96B0281N07
	Yes	96B0281N08
Auxiliary WD for MPC Controls	N/A	96B0149N10

General:

Furnish and install ClimateMaster Tranquility® "TRT" Rooftop 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.

Units shall be supplied completely factory built capable of operating over an entering water temperature range from 20° to 120°F (-6.7° to 48.9°C) as standard. All equipment listed in this section must be rated and certified in accordance with Air-Conditioning, Heating and Refrigeration Institute/International Standards Organization (AHRI/ISO 13256-1). All equipment must be tested, investigated, and determined to comply with the requirements of the standards for Heating and Cooling Equipment UL-1995 for the United States and CAN/CSA-C22.2 NO.236 for Canada, by Intertek Testing Laboratories (ETL). The units shall have AHRI/ISO and ETL-US-C labels.

All units shall pass a factory acceptance test. The quality control system shall automatically perform factory acceptance test via computer. A detailed report from the factory acceptance test shall ship with each unit. **(Note: If unit fails the factory acceptance test, it shall not be allowed to ship. Unit serial number shall be recorded by factory acceptance test and furnished on report card for ease of unit warranty status.)**

Basic Construction:

Units shall be designed for outdoor installation and usage and shall be ETL or UL tested to withstand UL rain test standards.

All exterior and other painted surfaces shall be constructed of galvanized steel finished with both sides having powder paint coated surfaces. This corrosion protection system shall meet the stringent 1,000-hour salt spray test per ASTM B117.

Roof shall be constructed of single piece of steel as described above (except on largest of unit sizes in which case shall be a maximum of two pieces joined by a standing seam construction). All roof edges shall overlap sides of unit and have a 45° lip extending away from unit sides so that rainwater drippage shall not fall on top of access doors.

Access to filters, indoor blower, electrical controls, compressor compartment, and damper section shall be provided by double wall construction for access doors and noncorrosive hardware.

The compressor and electrical control compartment shall be isolated from the system air streams.

Bottom base pan of entire unit shall have no penetrations by bolts or screws. All base pan edges and any openings shall contain 1 inch upturns at all edges and shall be sealed with silicone caulking to prevent water from dripping through base pan.

All interior surfaces shall be lined with 1 inch (25.4 mm) thick, 1-1/2 lb/ft3 (24 kg/m3) acoustic type glass fiber insulation. 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. All air handling compartments shall utilize foil-faced insulation for ease of cleaning.

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.**

Entire unit base shall be insulated on the underneath side to provide condensation protection and noise attenuation. The unit shall be furnished with 2 inch (50 mm) filter rails and one set 2 inch (50 mm) throwaway filters. Filter rails shall be field convertible without the need for additional parts to accept 4 inch filters.

Option: Unit shall be furnished with factory-installed 2 inch (50 mm) pleated filters.

Option: Unit shall be furnished with factory-configured 4 inch (100 mm) filter rails and 4 inch (100 mm) pleated filters.

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

Fan and Motor Assembly:

The assembly shall include a fan, housing and solid steel fan shaft encased in ball bearings. Unit shall have a belt drive fan assembly, fan pulley and adjustable motor sheave with V-belt drive. Fan shall be forward curved, low speed centrifugal that has been statically and dynamically balanced, and tested in accordance with current A.M.C.A. standards bulletin 210. Fan bearings shall be permanently lubricated type and be self-aligning. The motor shall be a single or three-phase, high efficiency, ball bearing, open type with internal thermal overload protection. The motor shall be mounted on an adjustable base for proper belt tension. The fan and motor assembly must be capable of overcoming the external static pressures up to and including as shown in the unit submittal. Airflow/Static pressure rating of the unit shall be based on a wet coil and a clean filter in place. Fan and motor assembly will be mounted on an easily removable slide out assembly with safety stop for easy access and maintenance; motor shall be factory wired with wire of sufficient length to allow fan/motor assembly to be removed from unit and be placed on roof of unit for servicing.

Variable Frequency Drives (VFD). VFD controls shall be factory mounted, installed, and programmed. VFD have the capability to reduce airflow down to 60% of maximum airflow. Products not containing factory mounted VFD controls shall not be acceptable.

Refrigerant Circuit:

Units shall use EarthPure® (HFC-410A) refrigerant only. Units shall have a sealed refrigerant circuit including a high efficiency two-stage scroll compressor designed for heat pump operation, a dual port balanced thermostatic expansion valve for refrigerant metering, a filter dryer, an enhanced corrugated finned tube refrigerant to air heat exchanger, a reversing valve, a 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. Both high and low pressure switches shall be installed on Schrader fittings for service or replacement without having to evacuate and recharge refrigerant. Access fittings shall also be factory installed on high and low-pressure refrigerant lines to facilitate field service. Suction line shall be insulated to prevent condensation. Activation of any safety device shall prevent compressor operation via a microprocessor board lockout circuit. The lockout circuit shall be reset at the thermostat or at the disconnect switch. **Units that cannot be reset at the thermostat shall not be acceptable.**

The 2-stage scroll compressor(s) will be mounted on external grommets specifically selected for maximized vibration attenuation. Compressor shall be mounted on a double isolation compressor deck, so as to further reduce vibration transmission to unit base. Compressor shall have thermal overload protection and 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 650 PSIG (4481 kPa) refrigerant working pressure. Refrigerant to water heat exchangers shall be of copper inner water tube that is deeply fluted, and steel refrigerant outer tube co-axial design, rated to withstand 650 PSIG (4481 kPa) working refrigerant pressure and 650 PSIG (4481 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 1,000 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 type 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 48.9°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.

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 with end switch 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: Unit shall include ClimaDry® II 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 or refrigerant condensing pressures. Control of reheat must be accomplished via a humidistat or dehumidistat contact closure. Refrigerant circuit must be AHRI certified. Approved equal manufacturers may provide pre-engineered integrated modulating hot gas reheat within the unit cabinet. Any design costs and costs of field installed items shall be borne by mechanical contractor. Refrigerant circuits that are not AHRI certified when the reheat option is applied will not be accepted. (See ClimaDry II submittal for application details and unit availability.)

Option: vFLow® — The unit will be supplied with internally factory mounted modulating water valve with ΩT control. The factory built-in valve shall modulate water flow through unit based on a field adjustable water temperature difference between the entering and leaving water. The valve shall automatically adjust for operating mode, source water temperature and variations in external head pressure. The valve will also act as a shut-off valve to prevent water flow through the unit when the unit is not activated and will have a minimum position capability.

Drain Pan:

The drain pan shall be constructed of 304 stainless steel. This corrosion protection system shall meet the stringent 1,000-hour salt spray test per ASTM B117. Drain pan shall be fully insulated. Drain outlet shall be located at pan as to allow complete and unobstructed drainage of condensate. Drain pan outlet side field selectable/convertible. Drain outlet shall be connected from pan directly to FPT fitting. **No hidden internal tubing extensions from pan outlet extending to unit casing (that can create drainage problems) will be accepted.**

Electrical:

A control box shall be located within the unit compressor compartment and shall contain a 75 VA transformer with load side circuit breaker protection, 24 volt activated, 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. Two compressor units shall have a solid-state time delay relay and random start to prevent both compressors from starting simultaneously.

Option: **Disconnect Switch, Non-Fused**

Option: **Disconnect Switch, Non-Fused and unpowered 115 VAC GFI convenience outlet (separate 115 VAC circuit required by others).**

Option: **Circuit Breaker**

Option: **Circuit Breaker and unpowered 115 VAC GFI convenience outlet (separate 115 VAC circuit required by others).**

Outdoor Air:

The unit shall be supplied as standard with no outdoor air provisions (100% return air).

Option: **Manual outside air damper with rain hood and bird screen sized for a maximum capacity of 20% of the total unit air volume for outside air volume.**

Option: **Two-position motorized outside air damper (opens outside air damper upon compressor contactor activation).**

Option: **Fully modulating enthalpy controlled economizer, supplied with large diameter ABS gear driven outdoor air and return air dampers. Solid-state economizer logic module shall be Honeywell W7220 series with Honeywell M7215 actuator. The economizer package shall also be supplied with gravity relief damper.**

Option: **Optional demand control ventilation when optional CO_2 sensor is added to economizer.**

Enhanced Solid State Control System (DXM2.5):

This control system is a communicating controller; also features two stage control of cooling and two stage control of heating modes for exacting temperature and dehumidification purposes.

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:

Control 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. Option to reset unit at thermostat or disconnect.
h. 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.
i. Ability to defeat time delays for servicing.

j. The low-pressure switch shall not be monitored for the first 120 seconds after a compressor start command to prevent nuisance safety trips.
k. 24V output to cycle a motorized water valve or other device with compressor contactor.
l. Unit Performance Sentinel (UPS). The UPS warns when the heat pump is running inefficiently.
m. Water coil low temperature sensing (selectable for water or anti-freeze).
n. Air coil low temperature sensing.
o. 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).
p. Emergency shutdown contacts.
q. Entering and leaving water temperature sensing.
r. Leaving air temperature sensing.
s. Compressor discharge temperature sensing.
t. Removable thermostat connector.
u. Night setback control.
v. Random start on return from night setback.
w. Override temperature control with 2-hour timer for room occupant to override setback temperature at the thermostat.
x. Dry contact night setback output for digital night setback thermostats.
y. Ability to work with heat pump or heat/cool (Y, W) type thermostats.
z. Ability to work with heat pump thermostats using O or B reversing valve control.
aa. Boilerless system heat control at low loop water temperature.
bb. Ability to allow up to 2 units to be controlled by one thermostat.
cc. Relay to operate an external damper.
dd. Relay to start system pump.
ee. 75 VA control transformer. Control transformer shall have load side short circuit and overload protection via a built-in circuit breaker.

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

When DXM2.5 is connected to AWC99U01 communicating thermostat or handheld service tool, the installer/service technician can; check and set CFM; and check DIP switch S1, S2, and S3 settings; run operation modes manually; check all physical inputs from thermostat and refrigerant pressure switches status, (Y1, Y2, W, O, G, H, ESD, NSB, OR, HP switch, and LOC switch); current or at time of fault the following temperatures - water coil (LT1), air coil (LT2), compressor discharge, leaving air, leaving water, entering water and control voltage; record last five faults, list possible reasons, and clear faults. When the AWC99U01 communicating thermostat is used this same functionality can be viewed and adjusted remotely with the only portal or mobile app. **Systems not providing remote access, diagnosis, and adjustment functionality will not be accepted.**

Digital Night Setback with Pump Restart (DXM2.5 w/ ATP32U03C/04C, AWC99U01):

The unit will be provided with a Digital Night Setback feature using an accessory relay on the DXM2.5 controller with an ATP32U03C/04C or AWC99U01 thermostat and an external, field-provided time clock. The external time clock will initiate and terminate the night setback period. The thermostat will have a night setback override feature with a programmable override time period. An additional accessory relay on the unit DXM2.5 controller will energize the building loop pump control for the duration of the override period. **(Note: This feature requires additional low voltage wiring. Consult Application Drawings for details.)**

Remote Service Sentinel (DXM2.5):

Solid-state control system shall communicate with thermostat to display (at a compatible 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, etc. **Units that do not provide this remote service sentinel shall not be acceptable.**

Option: MPC (Multiple Protocol Control) Interface System

Units shall have all the features listed above 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. Hi/low voltage alarm
k. Fan “ON/AUTO” position of space thermostat as specified above
l. Unoccupied/occupied command
m. Cooling command
n. Heating command
o. Fan “ON/AUTO” command
p. Fault reset command
q. Itemized fault code revealing reason for specific shutdown fault (any one of 7)

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

Warranty:

ClimateMaster 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 CXM2/DXM2.5 control board for a total of 5 years.

FIELD INSTALLED OPTIONS

Thermostats:

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

a. Thermostat (Communicating) (AWC99U01)

An electronic communicating web-enabled touchscreen thermostat shall be provided. The thermostat shall offer three stages of heating and two stages of cooling with precise temperature control and have a four-wire connection to the unit. The thermostat shall be capable of manual or automatic change-over operation and shall operate in standard or programmable mode. An integrated humidity control feature shall be included to control a humidifier and/or a dehumidifier. The thermostat shall include a utility demand reduction feature to be initiated by an independent time program or an external input.

The thermostat shall provide access to via the web portal or mobile application to include temperature adjustment, schedule adjustment including occupied/unoccupied, entering water temperature, leaving water temperature, water coil temperature, air coil temperature, leaving air temperature, and compressor discharge temperature. A graphical system layout to be provided with real-time operating mode information of the temperature sensors for easy diagnostics.

The thermostat shall display system faults with probable cause and troubleshooting guidance. The system shall provide in clear language last five faults, time of faults, operating temps at time of fault, and possible reasons for the fault. The thermostat shall provide access for immediate manual control of all outputs via the web portal/mobile application for rapid troubleshooting.

b. 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 setpoint(s) in °F or °C. The Thermostat shall provide permanent memory of setpoint(s) without batteries. A fault LED shall be provided to display specific fault condition. Thermostat shall provide temperature display offset for custom applications.

c. Multi-stage Manual Changeover Programmable 5/2 Day (ATP21W02)

Thermostat shall be 5 day/2 day programmable (with up to 4 setpoints per day), multi-stage (2H/1C), manual changeover with HEAT-OFF-COOL-EM HEAT system settings and fan ON-AUTO settings. Thermostat shall have an LCD display with temperature, setpoint(s), mode, and status indication. The temperature indication shall be selectable for °F or °C. The thermostat shall provide permanent memory of setpoint(s) without batteries. Thermostat shall provide convenient override feature to temporarily change setpoint.

d. Multi-stage Automatic or Manual Changeover Programmable 7 Day (ATP32U03C)

Thermostat shall be 7 day programmable (with up to 4 setpoints per day), multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO-EM HEAT system settings and fan ON-AUTO settings. Thermostat shall have a blue backlit dot matrix LCD display with temperature, setpoints, 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 CXM2 or DXM2.5 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 setpoints without batteries. Thermostat shall provide heating setpoint range limit, cooling setpoint 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.

e. Multistage Automatic or Manual Changeover Programmable 7 Day with Humidity Control (ATP32U04C)
Thermostat shall be 7 day programmable (with up to 4 setpoints per day), multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO-EM HEAT system settings and fan ON-AUTO settings. Separate dehumidification and humidification setpoints 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® II reheat or with ECM fan dehumidification mode via settings changes. Thermostat shall have a blue backlit dot matrix LCD display with temperature, relative humidity, setpoints, mode, and status indication. The temperature indication shall be selectable for ºF or ºC. Time display shall be selectable for 12 or 24 hour clock. Fault identification shall be provided (when used with ClimateMaster CXM2 or DXM2.5 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 setpoints without batteries. Thermostat shall provide heating setpoint range limit, cooling setpoint 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.

f. CM100 - Multi-stage Automatic or Manual Changeover digital thermostat (ATA32V01)
Multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO-EM HEAT system settings and fan ON-AUTO settings. Thermostat shall have a green backlit LED display with temperature, setpoints, mode, and status indication via a green (cooling) or red(heating) LED. The temperature indication shall be selectable for ºF or ºC. Time display shall be selectable for 12 or 24 hour clock. The thermostat shall provide permanent memory of setpoints without batteries. Thermostat shall provide heating setpoint range limit, cooling setpoint 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. Thermostat navigation shall be accomplished via four buttons (Mode/fan/down/up) with menu-driven selections for ease of use and programming.

g. CM300 – Multi-stage, Automatic or Manual Changeover, 7-day Programmable with Wi-Fi and Humidity Control (AVB32V02C)
Residential version shall be 7 day programmable with up to 4 setpoints per day. Commercial version shall be 7 day programmable with 4 occupied/unoccupied periods per day with up to 4-hour override. Multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO-EM HEAT system settings and fan ON-AUTO settings, Wi-Fi, pre-occupancy purge fan option, night time control of display backlight, bi-color LED indicates a heating or cooling demand, keypad lock, title 24 compliant, openADR2.0b certified with Skyport web portal.

h. CM500 – Color Touchscreen Display, Multi-stage, Automatic or Manual Changeover, 7-day Programmable with Wi-Fi and Humidity Control (AVB32V03C)
Thermostat shall have color resistive touchscreen display with space temperature, relative humidity, setpoints, mode, status indication and local weather (if connected to Wi-Fi). Residential version shall be 7 day programmable with up to 4 setpoints per day. Commercial version shall be 7 day programmable with 4 occupied/unoccupied periods per day with up to 4-hour override. Multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO-EM HEAT system settings and fan ON-AUTO settings, Wi-Fi, pre-occupancy purge fan option, customizable screen saver and background displays, indicator on display indicates a heating or cooling demand, set-point lock, title 24 compliant, openADR2.0b certified with Skyport web portal.

Capable of being monitored by 3rd party software. Compatible with AST014 Wi-Fi remote sensor. Configurator mobile app or web portal for easy setup. Separate dehumidification and humidification setpoints shall be configurable for discreet outputs to a dehumidification option and/or an external humidifier. The temperature indication shall be selectable for °F or °C. Time display shall be selectable for 12- or 24-hour clock. The thermostat shall provide permanent memory of setpoints without batteries. Thermostat shall provide heating setpoint range limit, cooling setpoint range limit, temperature display offset, 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 access to a web portal and mobile app for installer setup for configuring options. Thermostat shall have 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 (MPC).
b. Sensor with setpoint adjustment and override (MPC only).
c. Sensor with setpoint adjustment and override, LCD display, status/fault indication (MPC).

Roof Curbs:

A 14 inch (356 mm) high knockdown roof curb for flat roofs is available as standard in down discharge configuration. Other curbs are available by special request.

NOTICE! This product specification document is furnished as a means to copy and paste ClimateMaster product information into project specification. It is not intended to be a complete list of product requirements. This document is an excerpt from the product submittal and must not be used without consulting the complete product submittal. For complete product installation and application requirements, please consult the complete product submittal. ClimateMaster is not responsible for misuse of this document or a failure to adequately review specific requirements in the product submittal.

Performance Sheet

SUBMITTAL DATA - S-I UNITS

Unit Designation: _____

Job Name: _____

Architect: _____

Engineer: _____

Contractor: _____

PERFORMANCE DATA

Cooling Capacity: _____ kW

EER: _____

Heating Capacity: _____ kW

COP: _____

Ambient Air Temp: _____ °C

Entering Water Temp (Clg): _____ °C

Entering Air Temp (Clg): _____ °C

Entering Water Temp (Htg): _____ °C

Entering Air Temp (Htg): _____ °C

Airflow: _____ l/s

Fan Speed or Motor/RPM/Turns: _____

Operating Weight: _____ (kg)

ELECTRICAL DATA

Power Supply: _____ Volts

_____ Phase _____ Hz

Minimum Circuit Ampacity: _____

Maximum Overcurrent Protection: _____

SUBMITTAL DATA - I-P UNITS

Unit Designation: _____

Job Name: _____

Architect: _____

Engineer: _____

Contractor: _____

PERFORMANCE DATA

Cooling Capacity: _____ Btuh

EER: _____

Heating Capacity: _____ Btuh

COP: _____

Ambient Air Temp: _____ °F

Entering Water Temp (Clg): _____ °F

Entering Air Temp (Clg): _____ °F

Entering Water Temp (Htg): _____ °F

Entering Air Temp (Htg): _____ °F

Airflow: _____ CFM

Fan Speed or Motor/RPM/Turns: _____

Operating Weight: _____ (lb)

ELECTRICAL DATA

Power Supply: _____ Volts

_____ Phase _____ Hz

Minimum Circuit Ampacity: _____

Maximum Overcurrent Protection: _____

Notes:

Revision History

Date:	Item:	Action:
11/05/24	Removed Condensate Overflow verbiage	Removed Condensate Overflow verbiage throughout the document
	Electrical Data	Updated ClimaDry/Secondary Pump and Standard Electrical Data
10/27/22	All	Transitioned from DXM2 to DXM2.5 unit controls. Introduced new communicating WiFi color touch screen iGate thermostat
11/11/21	Removed LON controls	All pages
09/24/21	Decoders	Updated Curb decoder pg 9
08/4/21	Decoders	Updated decoder pg 9
10/12/20	Edits to specification verbiage	Updated pages 49, 50, and 51
10/21/19	First Published	

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