

**TRANQUILITY[®] 16
COMPACT (TC) SERIES
SUBMITTAL DATA**

**MODELS TCH/V 006 - 060
50HZ - HFC-410A**

ENGLISH LANGUAGE/S-I UNITS



Revised: 20 September, 2011



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: _____

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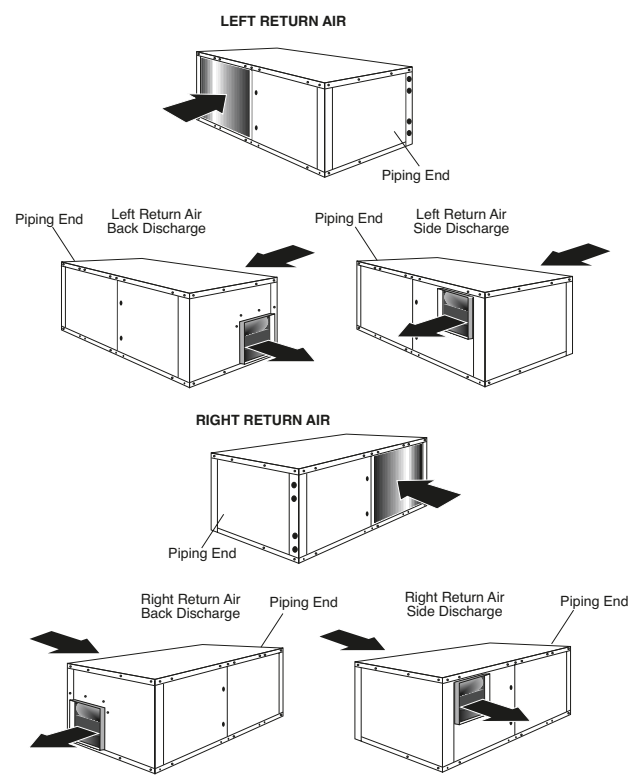
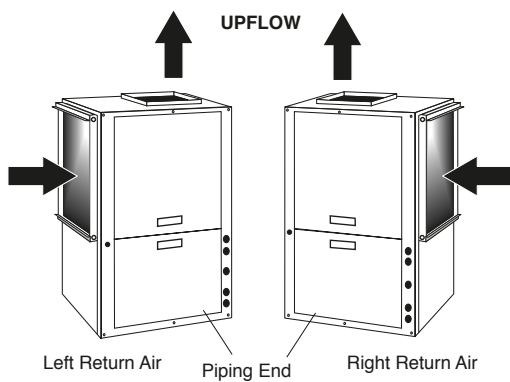
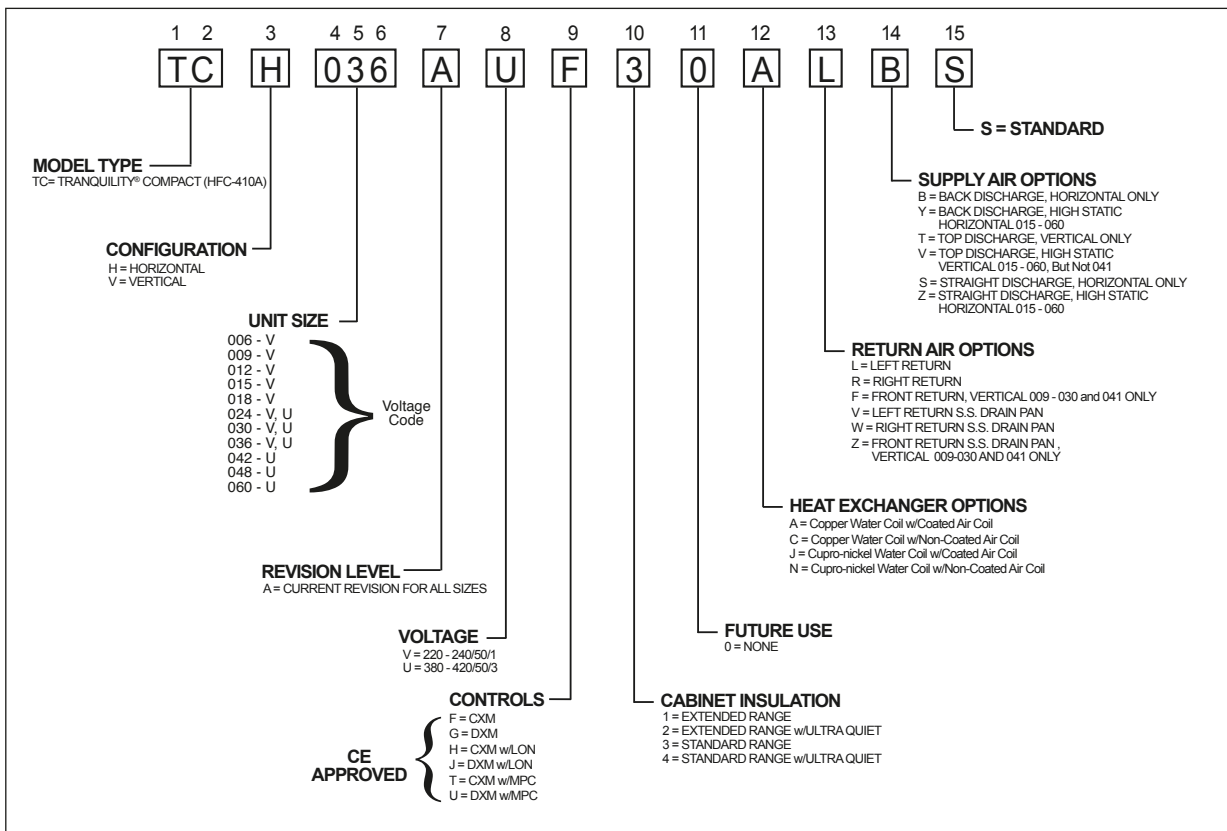
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ASHRAE/AHRI/ISO 13256-1. Metric (S-I) Units

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 30°C		Heating 20°C		Cooling 15°C		Heating 10°C		Cooling 25°C		Heating 0°C	
	Capacity kW	EER W/W	Capacity kW	COP W/W	Capacity kW	EER W/W	Capacity kW	COP W/W	Capacity kW	EER W/W	Capacity kW	COP W/W
TC-006	1.39	3.8	1.78	4.6	1.66	6.0	1.47	3.9	1.49	4.4	1.17	3.3
TC-009	2.11	3.8	2.75	4.1	2.43	6.0	2.33	3.8	2.23	4.5	1.87	3.3
TC-012	2.81	3.9	3.60	4.2	3.29	5.9	2.96	3.7	2.89	4.3	2.35	3.1
TC-015	3.48	4.4	4.11	4.9	4.04	7.0	3.42	4.3	3.60	4.9	2.63	3.5
TC-018	4.16	4.1	5.10	4.9	4.95	6.9	4.08	4.3	4.42	4.6	3.30	3.3
TC-024	5.97	4.1	6.93	5.0	6.73	6.4	5.84	4.3	6.27	4.7	4.50	3.5
TC-030	7.08	4.1	8.54	4.9	7.99	6.2	7.20	4.3	7.28	4.6	5.69	3.6
TC-036	8.69	4.2	10.99	4.7	9.75	6.4	9.12	4.2	8.89	4.6	7.20	3.5
TC-042	10.10	4.0	12.82	4.6	11.57	6.0	10.70	4.0	10.21	4.4	8.34	3.4
TC-048	12.02	4.1	13.59	5.0	13.68	6.3	11.31	4.3	12.35	4.5	8.85	3.6
TC-060	14.97	4.1	18.73	4.6	16.78	6.1	15.56	4.0	15.14	4.6	12.28	3.3

Cooling capacities based upon 27°C DB, 19°C WB entering air temperature.

Heating capacities based upon 20°C DB, 15°C WB entering air temperature.

Ground loop heat pump ratings based on 15% methanol antifreeze solution.

All ratings based upon operation at lower voltage of dual voltage rated models.



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 5°C when the JW3 jumper is not clipped (see example below). This is due to the potential of the refrigerant temperature being as low as 0°C with 5°C LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for standard range equipment or systems without antifreeze.

Example:

At 10°C EWT (Entering Water Temperature) and 0.28 l/s (minimum flow rate), a TS036 unit has a HE of 5.84 kW. To calculate LWT, rearrange the formula for HE as follows:

$HE = TD \times \text{Flow} \times 4.18$
 where HE = Heat of Extraction (kW); TD = temperature difference (EWT - LWT); and Flow = Water Flow Rate in l/s

$TD = HE / (\text{l/s} \times 4.18)$
 $TD = 5.84 / (0.28 \times 4.18)$
 $TD = 5^\circ\text{C}$
 $LWT = EWT - TD$
 $LWT = 10 - 5 = 5^\circ\text{C}$

In this example, as long as the EWT does not fall below 10°C, the system will operate as designed at 0.28 l/s. For EWTs below 10°C, higher flow rates will be required (open loop systems with EWT below 10°C, for example, require the middle flow rate).

W	HC kW	Power kW	HE kW	LAT °C	COP W/W
	5.46	1.75	3.70	29.6	3.11
6.68	6.07	1.78	4.30	30.7	3.42
6.97	6.31	1.79	4.52	31.1	3.53
7.16	6.43	1.79	4.64	31.3	3.59
6.72	6.80	1.81	5.00	31.9	3.77
6.89	7.08	1.82	5.26	32.4	3.89
7.12	7.23	1.82	5.40	32.7	3.96
8	7.73	1.88	5.84	33.6	4.10
	8.05	1.90	6.16	34.1	4.24
	8.23	1.91	6.33	34.4	4.29
	8.87	1.97	6.42	34.8	4.41

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Performance Data - TC H/V 006

79 l/s Nominal Airflow

Performance capacities shown in kW

WATER / BRINE			COOLING - EAT 27/19 °C					HEATING - EAT 20°C				
EWT °C	FLOW l/s	PD kPa	TC kW	SC kW	Power kW	HR kW	EER W/W	HC kW	Power kW	HE kW	LAT	COP W/W
-5	0.05		Operation not recommended									
	0.07											
	0.09	11.7										
0	0.05	3.4	1.85	1.22	0.25	2.10	7.4	1.19	0.37	0.82	32.4	3.2
	0.07	5.5	1.85	1.19	0.23	2.08	8.0	1.24	0.38	0.86	32.9	3.3
	0.09	9.0	1.84	1.17	0.22	2.06	8.2	1.27	0.38	0.89	33.2	3.4
5	0.05	2.8	1.81	1.23	0.28	2.08	6.5	1.34	0.38	0.96	34.0	3.5
	0.07	4.1	1.84	1.22	0.25	2.10	7.3	1.41	0.39	1.02	34.7	3.6
	0.09	6.9	1.85	1.21	0.24	2.10	7.6	1.44	0.39	1.05	35.1	3.7
10	0.05	2.1	1.73	1.22	0.30	2.04	5.7	1.50	0.40	1.11	35.7	3.8
	0.07	3.4	1.80	1.23	0.28	2.08	6.4	1.58	0.40	1.18	36.5	3.9
	0.09	6.2	1.82	1.23	0.27	2.09	6.8	1.63	0.41	1.22	37.0	4.0
15	0.05	2.1	1.64	1.20	0.34	1.98	4.9	1.67	0.41	1.26	37.4	4.1
	0.07	3.4	1.72	1.22	0.31	2.03	5.6	1.76	0.41	1.34	38.4	4.2
	0.09	5.5	1.75	1.23	0.30	2.05	5.9	1.80	0.42	1.39	38.8	4.3
20	0.05	1.4	1.53	1.16	0.37	1.90	4.1	1.83	0.42	1.41	39.1	4.4
	0.07	2.8	1.62	1.19	0.34	1.96	4.7	1.92	0.43	1.49	40.0	4.5
	0.09	4.8	1.66	1.20	0.33	1.99	5.1	1.96	0.43	1.53	40.5	4.6
25	0.05	1.4	1.41	1.11	0.40	1.82	3.5	1.97	0.43	1.54	40.6	4.6
	0.07	2.8	1.51	1.15	0.38	1.88	4.0	2.05	0.44	1.61	41.4	4.7
	0.09	4.1	1.55	1.17	0.36	1.91	4.3	2.09	0.44	1.65	41.8	4.7
30	0.05	1.4	1.29	1.06	0.44	1.73	2.9	2.09	0.44	1.65	41.8	4.7
	0.07	2.1	1.38	1.10	0.41	1.80	3.3	2.14	0.45	1.69	42.4	4.8
	0.09	4.1	1.43	1.12	0.40	1.83	3.6	2.16	0.45	1.71	42.6	4.8
35	0.05	1.4	1.17	1.00	0.48	1.65	2.4	Operation not recommended				
	0.07	2.1	1.25	1.04	0.45	1.71	2.8					
	0.09	4.1	1.30	1.06	0.44	1.74	3.0					
40	0.05	1.4	1.05	0.94	0.52	1.57	2.0					
	0.07	2.1	1.13	0.98	0.49	1.62	2.3					
	0.09	3.4	1.17	1.00	0.48	1.65	2.4					
45	0.05	1.4	0.94	0.89	0.56	1.50	1.7					
	0.07	2.1	1.01	0.92	0.54	1.54	1.9					
	0.09	3.4	1.04	0.94	0.52	1.57	2.0					

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.
 AHRI/ISO certified conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.
 Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
 All performance data is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 4°C EWT is based upon a 15% methanol antifreeze solution.
 Operation below 16°C EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 Gray shaded area refers to calculations required to determine if heating water flow is sufficient for non-antifreeze systems.

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Performance Data - TC H/V 009

121 l/s Nominal Airflow

Performance capacities shown in kW

WATER / BRINE			COOLING - EAT 27/19 °C					HEATING - EAT 20°C				
EWT °C	FLOW l/s	PD kPa	TC kW	SC kW	Power kW	HR kW	EER W/W	HC kW	Power kW	HE kW	LAT	COP W/W
-5	0.07	12.9	Operation not recommended									
	0.11	17.3										
	0.14	28.5										
0	0.07	8.2	2.53	1.74	0.34	2.88	7.4	1.82	0.55	1.27	32.5	3.3
	0.11	13.5	2.60	1.73	0.32	2.92	8.2	1.90	0.55	1.35	33.0	3.4
	0.14	23.4	2.63	1.73	0.30	2.93	8.6	1.94	0.56	1.39	33.3	3.5
5	0.07	5.8	2.45	1.73	0.38	2.83	6.4	2.04	0.56	1.47	34.0	3.6
	0.11	11.2	2.52	1.74	0.35	2.87	7.2	2.13	0.57	1.56	34.6	3.7
	0.14	20.2	2.55	1.74	0.34	2.89	7.6	2.17	0.57	1.60	34.9	3.8
10	0.07	4.4	2.35	1.72	0.42	2.78	5.6	2.25	0.58	1.67	35.4	3.9
	0.11	9.6	2.43	1.73	0.39	2.82	6.2	2.35	0.58	1.77	36.1	4.0
	0.14	18.0	2.46	1.73	0.38	2.84	6.6	2.41	0.59	1.82	36.5	4.1
15	0.07	3.5	2.25	1.70	0.47	2.72	4.8	2.46	0.59	1.87	36.9	4.1
	0.11	8.5	2.33	1.72	0.43	2.76	5.4	2.57	0.60	1.97	37.6	4.3
	0.14	16.3	2.37	1.72	0.42	2.79	5.7	2.63	0.61	2.02	38.0	4.3
20	0.07	2.9	2.14	1.67	0.52	2.66	4.1	2.67	0.61	2.06	38.3	4.4
	0.11	7.6	2.23	1.70	0.48	2.71	4.6	2.78	0.62	2.16	39.1	4.5
	0.14	15.0	2.27	1.70	0.46	2.73	4.9	2.84	0.63	2.22	39.5	4.5
25	0.07	2.4	2.03	1.63	0.57	2.60	3.6	2.87	0.63	2.24	39.7	4.6
	0.11	7.0	2.11	1.66	0.53	2.64	4.0	2.98	0.64	2.34	40.5	4.7
	0.14	13.9	2.15	1.68	0.51	2.67	4.2	3.04	0.65	2.40	40.9	4.7
30	0.07	2.1	1.90	1.58	0.63	2.53	3.0	3.05	0.65	2.40	40.9	4.7
	0.11	6.4	1.99	1.62	0.59	2.58	3.4	3.17	0.66	2.51	41.7	4.8
	0.14	13.0	2.03	1.64	0.57	2.60	3.6	3.22	0.67	2.56	42.1	4.8
35	0.07	1.8	1.76	1.52	0.68	2.45	2.6	Operation not recommended				
	0.11	6.0	1.86	1.57	0.64	2.50	2.9					
	0.14	12.3	1.90	1.59	0.62	2.53	3.1					
40	0.07	1.6	1.62	1.44	0.74	2.37	2.2	Operation not recommended				
	0.11	5.6	1.72	1.50	0.70	2.42	2.4					
	0.14	11.6	1.76	1.52	0.68	2.45	2.6					
45	0.07	1.4	1.47	1.35	0.81	2.28	1.8	Operation not recommended				
	0.11	5.2	1.57	1.41	0.77	2.33	2.0					
	0.14	11.1	1.62	1.44	0.75	2.36	2.2					

Interpolation is permissible; extrapolation is not.

All entering air conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

AHRI/ISO certified conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

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

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

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

Operation below 4°C EWT is based upon a 15% methanol antifreeze solution.

Operation below 16°C EWT requires optional insulated water/refrigerant circuit.

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

Gray shaded area refers to calculations required to determine if heating water flow is sufficient for non-antifreeze systems.

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Performance Data - TC H/V 012

160 l/s Nominal Airflow

Performance capacities shown in kW

WATER / BRINE			COOLING - EAT 27/19 °C					HEATING - EAT 20°C				
EWT °C	FLOW l/s	PD kPa	TC kW	SC kW	Power kW	HR kW	EER W/W	HC kW	Power kW	HE kW	LAT	COP W/W
-5	0.09		Operation not recommended									
	0.14											
	0.19	58.6										
0	0.09	29.6	3.54	2.37	0.49	4.03	7.2	2.38	0.73	1.65	32.3	3.2
	0.14	57.9	3.57	2.38	0.46	4.02	7.8	2.48	0.74	1.74	32.8	3.3
	0.19	46.2	3.57	2.38	0.44	4.01	8.1	2.54	0.75	1.79	33.1	3.4
5	0.09	9.7	3.47	2.33	0.54	4.01	6.5	2.68	0.76	1.92	33.8	3.5
	0.14	20.7	3.53	2.37	0.50	4.03	7.1	2.80	0.77	2.03	34.4	3.6
	0.19	39.3	3.55	2.38	0.48	4.03	7.4	2.87	0.77	2.09	34.8	3.7
10	0.09	7.6	3.37	2.27	0.59	3.96	5.7	2.98	0.78	2.20	35.4	3.8
	0.14	17.9	3.46	2.32	0.55	4.00	6.3	3.13	0.79	2.34	36.2	3.9
	0.19	34.5	3.49	2.34	0.53	4.02	6.7	3.21	0.80	2.41	36.6	4.0
15	0.09	6.2	3.24	2.20	0.64	3.88	5.0	3.30	0.81	2.49	37.0	4.0
	0.14	15.9	3.35	2.26	0.60	3.95	5.6	3.46	0.82	2.64	37.9	4.2
	0.19	31.0	3.40	2.29	0.58	3.97	5.9	3.55	0.83	2.72	38.3	4.2
20	0.09	5.5	3.08	2.13	0.70	3.79	4.4	3.61	0.83	2.77	38.6	4.3
	0.14	14.5	3.21	2.19	0.65	3.86	4.9	3.79	0.85	2.94	39.6	4.4
	0.19	28.3	3.27	2.22	0.63	3.90	5.2	3.88	0.86	3.03	40.1	4.5
25	0.09	4.8	2.91	2.04	0.76	3.67	3.8	3.91	0.86	3.05	40.2	4.5
	0.14	13.1	3.04	2.11	0.72	3.76	4.3	4.10	0.88	3.22	41.2	4.6
	0.19	26.2	3.11	2.14	0.69	3.80	4.5	4.20	0.89	3.31	41.7	4.7
30	0.09	4.1	2.71	1.96	0.83	3.54	3.3	4.20	0.89	3.31	41.7	4.7
	0.14	12.4	2.86	2.02	0.78	3.64	3.7	4.39	0.91	3.47	42.6	4.8
	0.19	25.5	2.93	2.06	0.76	3.69	3.9	4.48	0.92	3.56	43.1	4.8
35	0.09	4.1	2.50	1.88	0.90	3.40	2.8	Operation not recommended				
	0.14	12.4	2.65	1.94	0.85	3.50	3.1					
	0.19	24.8	2.73	1.97	0.82	3.55	3.3					
40	0.09	3.4	2.28	1.80	0.97	3.25	2.4					
	0.14	11.7	2.43	1.86	0.92	3.36	2.6					
	0.19	22.8	2.51	1.89	0.90	3.41	2.8					
45	0.09	3.4	2.06	1.71	1.05	3.10	2.0					
	0.14	11.0	2.21	1.77	1.00	3.20	2.2					
	0.19	22.1	2.28	1.80	0.97	3.25	2.4					

Interpolation is permissible; extrapolation is not.

All entering air conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

AHRI/ISO certified conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

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

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

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

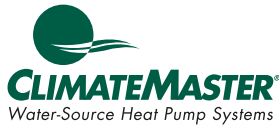
Operation below 4°C EWT is based upon a 15% methanol antifreeze solution.

Operation below 16°C EWT requires optional insulated water/refrigerant circuit.

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

Gray shaded area refers to calculations required to determine if heating water flow is sufficient for non-antifreeze systems.

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Performance Data - TC H/V 015

192 l/s Nominal Airflow

Performance capacities shown in kW

WATER / BRINE			COOLING - EAT 27/19 °C					HEATING - EAT 20°C				
EWT °C	FLOW l/s	PD kPa	TC kW	SC kW	Power kW	HR kW	EER W/W	HC kW	Power kW	HE kW	LAT	COP W/W
-5	0.12	8.8	Operation not recommended									
	0.18	15.0										
	0.24	26.3										
0	0.12	6.6	4.32	3.13	0.55	4.86	7.92	2.73	0.81	1.92	31.79	3.37
	0.18	12.2	4.36	3.14	0.50	4.87	8.68	2.86	0.82	2.04	32.32	3.48
	0.24	22.1	4.38	3.15	0.48	4.86	9.07	2.92	0.82	2.10	32.61	3.54
5	0.12	5.3	4.23	3.09	0.60	4.83	7.00	3.10	0.84	2.27	33.39	3.71
	0.18	10.5	4.30	3.12	0.56	4.86	7.71	3.25	0.84	2.40	34.00	3.84
	0.24	19.4	4.33	3.13	0.54	4.87	8.09	3.33	0.85	2.48	34.35	3.92
10	0.12	4.4	4.10	3.04	0.67	4.77	6.16	3.47	0.86	2.61	34.98	4.05
	0.18	9.3	4.20	3.08	0.62	4.82	6.81	3.64	0.87	2.77	35.68	4.19
	0.24	17.5	4.24	3.09	0.59	4.84	7.15	3.73	0.87	2.85	36.07	4.27
15	0.12	3.8	3.95	2.97	0.73	4.68	5.39	3.84	0.88	2.96	36.55	4.37
	0.18	8.5	4.07	3.02	0.68	4.75	5.97	4.02	0.89	3.13	37.34	4.52
	0.24	16.0	4.12	3.04	0.66	4.78	6.29	4.12	0.89	3.23	37.77	4.61
20	0.12	3.4	3.78	2.91	0.80	4.58	4.70	4.20	0.90	3.30	38.10	4.67
	0.18	7.8	3.91	2.96	0.75	4.66	5.21	4.40	0.91	3.49	38.97	4.84
	0.24	14.8	3.97	2.98	0.72	4.70	5.49	4.51	0.91	3.59	39.44	4.93
25	0.12	3.0	3.59	2.83	0.88	4.47	4.08	4.55	0.92	3.64	39.64	4.97
	0.18	7.2	3.73	2.89	0.82	4.55	4.53	4.77	0.93	3.84	40.57	5.15
	0.24	13.9	3.80	2.92	0.80	4.59	4.77	4.89	0.93	3.96	41.09	5.24
30	0.12	2.8	3.38	2.76	0.96	4.34	3.52	4.90	0.93	3.97	41.14	5.26
	0.18	6.8	3.53	2.81	0.90	4.43	3.91	5.13	0.94	4.19	42.14	5.44
	0.24	13.1	3.60	2.84	0.87	4.48	4.13	5.26	0.95	4.31	42.69	5.54
35	0.12	2.5	3.16	2.67	1.04	4.21	3.03	Operation not recommended				
	0.18	6.3	3.31	2.73	0.99	4.30	3.36					
	0.24	12.5	3.39	2.76	0.96	4.35	3.55					
40	0.12	2.3	2.94	2.58	1.13	4.07	2.59	Operation not recommended				
	0.18	6.0	3.09	2.64	1.07	4.16	2.88					
	0.24	11.9	3.17	2.67	1.04	4.21	3.04					
45	0.12	2.1	2.71	2.49	1.23	3.94	2.20	Operation not recommended				
	0.18	5.7	2.86	2.55	1.17	4.03	2.45					
	0.24	11.4	2.94	2.58	1.14	4.07	2.58					

Interpolation is permissible; extrapolation is not.

All entering air conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

AHR/ISO certified conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

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

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

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

Operation below 4°C EWT is based upon a 15% methanol antifreeze solution.

Operation below 16°C EWT requires optional insulated water/refrigerant circuit.

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

Gray shaded area refers to calculations required to determine if heating water flow is sufficient for non-antifreeze systems.

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Performance Data - TC H/V 018

230 l/s Nominal Airflow

Performance capacities shown in kW

WATER / BRINE			COOLING - EAT 27/19 °C					HEATING - EAT 20°C				
EWT °C	FLOW l/s	PD kPa	TC kW	SC kW	Power kW	HR kW	EER W/W	HC kW	Power kW	HE kW	LAT	COP W/W
-5	0.14	17.7	Operation not recommended									
	0.21	27.2										
	0.28	46.5										
0	0.14	13.8	5.48	4.13	0.65	6.12	8.48	3.19	0.96	2.24	31.51	3.34
	0.21	22.6	5.67	4.18	0.58	6.25	9.83	3.33	0.96	2.37	32.01	3.45
	0.28	39.4	5.78	4.20	0.54	6.32	10.67	3.41	0.97	2.44	32.28	3.51
5	0.14	11.4	5.25	4.04	0.73	5.97	7.22	3.62	0.98	2.64	33.06	3.68
	0.21	19.6	5.44	4.12	0.66	6.10	8.24	3.79	0.99	2.79	33.65	3.81
	0.28	34.8	5.53	4.15	0.63	6.16	8.85	3.88	1.00	2.88	33.98	3.88
10	0.14	9.9	5.02	3.93	0.81	5.83	6.20	4.06	1.01	3.05	34.63	4.01
	0.21	17.6	5.20	4.02	0.74	5.94	7.00	4.25	1.02	3.23	35.32	4.16
	0.28	31.5	5.30	4.06	0.71	6.01	7.47	4.35	1.03	3.33	35.70	4.24
15	0.14	8.7	4.78	3.80	0.90	5.68	5.34	4.50	1.03	3.46	36.21	4.35
	0.21	16.1	4.97	3.90	0.83	5.79	6.00	4.71	1.05	3.67	37.00	4.51
	0.28	28.9	5.06	3.95	0.79	5.85	6.37	4.84	1.05	3.78	37.43	4.60
20	0.14	7.8	4.54	3.66	0.99	5.52	4.60	4.94	1.06	3.88	37.80	4.67
	0.21	14.8	4.72	3.77	0.92	5.64	5.15	5.18	1.07	4.12	38.69	4.85
	0.28	26.9	4.82	3.82	0.88	5.70	5.46	5.32	1.07	4.25	39.18	4.95
25	0.14	7.1	4.28	3.51	1.08	5.36	3.95	5.38	1.08	4.30	39.39	5.00
	0.21	13.8	4.47	3.62	1.01	5.48	4.42	5.66	1.09	4.57	40.39	5.19
	0.28	25.3	4.57	3.68	0.97	5.54	4.68	5.81	1.10	4.71	40.93	5.30
30	0.14	6.5	4.00	3.35	1.19	5.19	3.37	5.82	1.10	4.73	41.00	5.31
	0.21	13.0	4.20	3.47	1.11	5.31	3.78	6.13	1.11	5.02	42.09	5.52
	0.28	24.0	4.30	3.52	1.07	5.38	4.00	6.29	1.12	5.17	42.69	5.63
35	0.14	6.1	3.70	3.18	1.30	5.00	2.84	Operation not recommended				
	0.21	12.3	3.91	3.30	1.22	5.13	3.20					
	0.28	22.8	4.02	3.36	1.18	5.20	3.40					
40	0.14	5.6	3.37	3.00	1.43	4.80	2.36	Operation not recommended				
	0.21	11.6	3.60	3.12	1.34	4.94	2.68					
	0.28	21.8	3.70	3.19	1.30	5.01	2.85					
45	0.14	5.3	3.02	2.79	1.56	4.58	1.93	Operation not recommended				
	0.21	11.1	3.25	2.93	1.48	4.72	2.20					
	0.28	20.9	3.36	2.99	1.43	4.80	2.35					

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.
 AHRI/ISO certified conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.
 Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
 All performance data is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 4°C EWT is based upon a 15% methanol antifreeze solution.
 Operation below 16°C EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 Gray shaded area refers to calculations required to determine if heating water flow is sufficient for non-antifreeze systems.

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Performance Data - TC H/V 024

274 l/s Nominal Airflow

Performance capacities shown in kW

WATER / BRINE			COOLING - EAT 27/19 °C					HEATING - EAT 20°C				
EWT °C	FLOW l/s	PD kPa	TC kW	SC kW	Power kW	HR kW	EER W/W	HC kW	Power kW	HE kW	LAT	COP W/W
-5	0.19	17.9	Operation not recommended									
	0.28	31.1										
	0.38	55.4										
0	0.19	14.9	7.23	5.48	0.95	8.18	7.57	4.54	1.47	3.07	33.71	3.09
	0.28	26.9	7.36	5.53	0.89	8.26	8.23	4.74	1.48	3.26	34.32	3.21
	0.38	48.5	7.43	5.54	0.87	8.29	8.56	4.85	1.48	3.37	34.65	3.27
5	0.19	13.0	7.03	5.41	1.04	8.07	6.76	5.16	1.50	3.66	35.58	3.44
	0.28	24.2	7.19	5.47	0.97	8.16	7.41	5.40	1.51	3.89	36.31	3.57
	0.38	44.0	7.26	5.50	0.94	8.20	7.74	5.53	1.52	4.01	36.72	3.64
10	0.19	11.6	6.81	5.31	1.14	7.95	5.97	5.78	1.53	4.25	37.48	3.78
	0.28	22.2	6.99	5.39	1.06	8.05	6.59	6.06	1.55	4.52	38.32	3.92
	0.38	40.6	7.07	5.42	1.02	8.09	6.91	6.22	1.56	4.66	38.79	4.00
15	0.19	10.6	6.57	5.20	1.26	7.82	5.22	6.40	1.57	4.84	39.35	4.09
	0.28	20.7	6.76	5.29	1.17	7.92	5.80	6.72	1.58	5.13	40.30	4.24
	0.38	38.0	6.85	5.33	1.12	7.97	6.10	6.88	1.59	5.29	40.80	4.32
20	0.19	9.8	6.30	5.08	1.39	7.69	4.53	7.01	1.60	5.41	41.18	4.38
	0.28	19.4	6.51	5.17	1.29	7.79	5.06	7.34	1.62	5.72	42.18	4.53
	0.38	35.9	6.61	5.22	1.24	7.84	5.34	7.52	1.63	5.88	42.71	4.61
25	0.19	9.2	6.02	4.95	1.55	7.56	3.89	7.58	1.64	5.95	42.92	4.64
	0.28	18.4	6.23	5.05	1.43	7.66	4.36	7.92	1.66	6.26	43.93	4.78
	0.38	34.1	6.34	5.09	1.37	7.71	4.62	8.09	1.67	6.42	44.45	4.85
30	0.19	8.6	5.71	4.82	1.72	7.43	3.31	8.11	1.67	6.44	44.52	4.86
	0.28	17.5	5.94	4.92	1.59	7.53	3.74	8.44	1.69	6.74	45.49	4.98
	0.38	32.7	6.05	4.96	1.53	7.58	3.96	8.60	1.70	6.89	45.97	5.04
35	0.19	8.1	5.39	4.69	1.92	7.31	2.80	Operation not recommended				
	0.28	16.8	5.63	4.79	1.78	7.40	3.17					
	0.38	31.3	5.74	4.83	1.70	7.45	3.37					
40	0.19	7.7	5.05	4.56	2.15	7.20	2.35	Operation not recommended				
	0.28	16.1	5.30	4.66	1.98	7.28	2.67					
	0.38	30.2	5.42	4.70	1.91	7.32	2.84					
45	0.19	7.4	4.70	4.43	2.41	7.10	1.95	Operation not recommended				
	0.28	15.6	4.95	4.53	2.22	7.17	2.23					
	0.38	29.3	5.08	4.57	2.13	7.21	2.38					

Interpolation is permissible; extrapolation is not.

All entering air conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

AHRI/ISO certified conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

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

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

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

Operation below 4°C EWT is based upon a 15% methanol antifreeze solution.

Operation below 16°C EWT requires optional insulated water/refrigerant circuit.

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

Gray shaded area refers to calculations required to determine if heating water flow is sufficient for non-antifreeze systems.

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Performance Data - TC H/V 030

343 l/s Nominal Airflow

Performance capacities shown in kW

WATER / BRINE			COOLING - EAT 27/19 °C					HEATING - EAT 20°C				
EWT °C	FLOW l/s	PD kPa	TC kW	SC kW	Power kW	HR kW	EER W/W	HC kW	Power kW	HE kW	LAT	COP W/W
-5	0.24	10.3	Operation not recommended									
	0.35	18.2										
	0.47	32.7										
0	0.24	8.3	8.69	6.19	1.18	9.87	7.36	5.68	1.80	3.87	33.71	3.15
	0.35	15.5	8.77	6.17	1.11	9.88	7.88	5.91	1.82	4.08	34.26	3.24
	0.47	28.2	8.79	6.14	1.08	9.87	8.13	6.03	1.83	4.20	34.56	3.29
5	0.24	7.0	8.52	6.16	1.28	9.80	6.68	6.39	1.86	4.53	35.42	3.44
	0.35	13.7	8.66	6.19	1.20	9.86	7.21	6.66	1.87	4.79	36.09	3.55
	0.47	25.3	8.71	6.19	1.17	9.88	7.47	6.81	1.88	4.93	36.45	3.62
10	0.24	6.1	8.29	6.07	1.38	9.67	5.99	7.11	1.90	5.21	37.18	3.74
	0.35	12.5	8.47	6.14	1.30	9.77	6.51	7.44	1.92	5.52	37.96	3.87
	0.47	23.2	8.55	6.16	1.26	9.81	6.78	7.61	1.93	5.68	38.39	3.94
15	0.24	5.4	8.00	5.93	1.51	9.51	5.32	7.85	1.94	5.91	38.96	4.04
	0.35	11.5	8.22	6.04	1.41	9.63	5.82	8.22	1.96	6.25	39.85	4.18
	0.47	21.6	8.32	6.08	1.37	9.69	6.08	8.42	1.98	6.44	40.33	4.26
20	0.24	5.0	7.67	5.77	1.64	9.32	4.67	8.59	1.99	6.60	40.74	4.32
	0.35	10.7	7.92	5.89	1.54	9.46	5.15	8.99	2.01	6.98	41.71	4.47
	0.47	20.3	8.04	5.95	1.49	9.53	5.40	9.21	2.02	7.18	42.23	4.55
25	0.24	4.5	7.31	5.58	1.80	9.11	4.06	9.31	2.03	7.28	42.48	4.59
	0.35	10.1	7.58	5.72	1.68	9.26	4.50	9.74	2.06	7.68	43.51	4.73
	0.47	19.2	7.71	5.78	1.63	9.34	4.73	9.96	2.08	7.89	44.06	4.80
30	0.24	4.3	6.92	5.38	1.98	8.89	3.50	10.00	2.08	7.92	44.16	4.81
	0.35	9.6	7.20	5.52	1.85	9.05	3.90	10.44	2.12	8.33	45.22	4.93
	0.47	18.3	7.34	5.60	1.79	9.12	4.11	10.67	2.14	8.53	45.78	4.99
35	0.24	4.0	6.51	5.18	2.18	8.68	2.99	Operation not recommended				
	0.35	9.1	6.79	5.32	2.03	8.83	3.34					
	0.47	17.5	6.94	5.39	1.97	8.90	3.53					
40	0.24	3.7	6.09	4.97	2.40	8.49	2.53	Operation not recommended				
	0.35	8.8	6.37	5.11	2.25	8.62	2.84					
	0.47	16.8	6.52	5.18	2.17	8.69	3.00					
45	0.24	3.5	5.66	4.77	2.66	8.32	2.13	Operation not recommended				
	0.35	8.4	5.95	4.90	2.48	8.43	2.39					
	0.47	16.2	6.09	4.97	2.40	8.49	2.54					

Interpolation is permissible; extrapolation is not.

All entering air conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

AHRI/ISO certified conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

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

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

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

Operation below 4°C EWT is based upon a 15% methanol antifreeze solution.

Operation below 16°C EWT requires optional insulated water/refrigerant circuit.

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

Gray shaded area refers to calculations required to determine if heating water flow is sufficient for non-antifreeze systems.

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Performance Data - TC H/V 036

412 l/s Nominal Airflow

Performance capacities shown in kW

WATER / BRINE			COOLING - EAT 27/19 °C					HEATING - EAT 20°C				
EWT °C	FLOW l/s	PD kPa	TC kW	SC kW	Power kW	HR kW	EER W/W	HC kW	Power kW	HE kW	LAT	COP W/W
-5	0.28	14.7	Operation not recommended									
	0.43	23.9										
	0.57	41.6										
0	0.28	12.3	10.43	7.39	1.42	11.85	7.34	6.76	2.14	4.63	33.60	3.16
	0.43	20.6	10.49	7.42	1.37	11.86	7.67	7.10	2.18	4.92	34.28	3.26
	0.57	36.2	10.49	7.42	1.35	11.85	7.76	7.29	2.20	5.08	34.65	3.31
5	0.28	10.7	10.24	7.32	1.52	11.76	6.73	7.80	2.26	5.53	35.68	3.44
	0.43	18.4	10.39	7.38	1.44	11.83	7.21	8.20	2.31	5.89	36.49	3.55
	0.57	32.6	10.45	7.40	1.41	11.85	7.42	8.42	2.34	6.08	36.93	3.60
10	0.28	9.6	9.95	7.21	1.66	11.61	6.01	8.82	2.38	6.44	37.74	3.70
	0.43	16.8	10.18	7.29	1.55	11.73	6.56	9.28	2.44	6.85	38.67	3.81
	0.57	30.0	10.27	7.33	1.50	11.78	6.83	9.54	2.46	7.07	39.18	3.87
15	0.28	8.7	9.58	7.07	1.82	11.40	5.26	9.83	2.50	7.34	39.77	3.94
	0.43	15.6	9.87	7.18	1.69	11.56	5.82	10.34	2.55	7.79	40.79	4.05
	0.57	28.0	9.99	7.22	1.64	11.63	6.11	10.61	2.58	8.03	41.34	4.11
20	0.28	8.1	9.15	6.91	2.02	11.17	4.54	10.81	2.60	8.21	41.73	4.16
	0.43	14.6	9.48	7.03	1.87	11.35	5.07	11.35	2.66	8.69	42.82	4.27
	0.57	26.4	9.63	7.09	1.80	11.43	5.35	11.63	2.68	8.95	43.39	4.33
25	0.28	7.5	8.68	6.73	2.24	10.92	3.88	11.73	2.69	9.04	43.59	4.36
	0.43	13.8	9.03	6.86	2.08	11.10	4.35	12.28	2.75	9.53	44.70	4.47
	0.57	25.0	9.20	6.93	2.00	11.20	4.61	12.57	2.77	9.79	45.27	4.53
30	0.28	7.0	8.18	6.53	2.48	10.66	3.29	12.59	2.78	9.81	45.32	4.53
	0.43	13.2	8.54	6.67	2.31	10.84	3.70	13.13	2.83	10.30	46.40	4.64
	0.57	23.9	8.72	6.74	2.22	10.94	3.93	13.39	2.85	10.54	46.94	4.70
35	0.28	6.7	7.66	6.32	2.75	10.41	2.78	Operation not recommended				
	0.43	12.5	8.02	6.47	2.56	10.58	3.13					
	0.57	22.9	8.20	6.54	2.47	10.67	3.32					
40	0.28	6.3	7.13	6.11	3.04	10.18	2.34					
	0.43	12.1	7.49	6.25	2.84	10.33	2.63					
	0.57	22.0	7.67	6.33	2.75	10.42	2.79					
45	0.28	6.1	6.63	5.89	3.36	9.98	1.97					
	0.43	11.6	6.96	6.03	3.15	10.11	2.21					
	0.57	21.3	7.14	6.11	3.04	10.18	2.35					

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.
 AHRI/ISO certified conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.
 Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
 All performance data is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 4°C EWT is based upon a 15% methanol antifreeze solution.
 Operation below 16°C EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 Gray shaded area refers to calculations required to determine if heating water flow is sufficient for non-antifreeze systems.

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Performance Data - TC H/V 042

480 l/s Nominal Airflow

Performance capacities shown in kW

WATER / BRINE			COOLING - EAT 27/19 °C					HEATING - EAT 20°C				
EWT °C	FLOW l/s	PD kPa	TC kW	SC kW	Power kW	HR kW	EER W/W	HC kW	Power kW	HE kW	LAT	COP W/W
-5	0.33	18.1	Operation not recommended									
	0.50	33.2										
	0.66	60.1										
0	0.33	15.2	12.34	9.31	1.60	13.93	7.73	8.30	2.63	5.68	34.33	3.16
	0.50	29.0	12.61	9.45	1.50	14.11	8.39	8.66	2.66	6.00	34.94	3.26
	0.66	53.1	12.74	9.53	1.46	14.20	8.73	8.85	2.68	6.18	35.28	3.31
5	0.33	13.4	11.99	9.12	1.73	13.72	6.92	9.35	2.72	6.63	36.15	3.44
	0.50	26.3	12.26	9.27	1.62	13.88	7.55	9.78	2.76	7.02	36.88	3.54
	0.66	48.3	12.40	9.34	1.57	13.97	7.88	10.02	2.78	7.24	37.29	3.60
10	0.33	12.1	11.63	8.92	1.89	13.52	6.14	10.43	2.82	7.61	38.01	3.70
	0.50	24.2	11.90	9.07	1.77	13.67	6.73	10.93	2.87	8.07	38.88	3.81
	0.66	44.8	12.04	9.15	1.71	13.75	7.04	11.21	2.89	8.32	39.35	3.88
15	0.33	11.2	11.24	8.73	2.08	13.33	5.40	11.53	2.92	8.60	39.90	3.95
	0.50	22.7	11.53	8.88	1.94	13.47	5.95	12.09	2.97	9.12	40.88	4.07
	0.66	42.1	11.68	8.95	1.87	13.55	6.24	12.40	3.00	9.40	41.41	4.13
20	0.33	10.3	10.84	8.55	2.30	13.14	4.72	12.62	3.02	9.59	41.78	4.17
	0.50	21.4	11.14	8.68	2.13	13.28	5.22	13.24	3.08	10.16	42.86	4.30
	0.66	39.9	11.29	8.76	2.06	13.35	5.49	13.58	3.11	10.47	43.44	4.36
25	0.33	9.7	10.41	8.37	2.54	12.95	4.10	13.69	3.12	10.57	43.64	4.38
	0.50	20.3	10.73	8.50	2.36	13.09	4.55	14.36	3.18	11.17	44.79	4.51
	0.66	38.0	10.88	8.57	2.27	13.16	4.79	14.71	3.22	11.50	45.40	4.57
30	0.33	9.2	9.95	8.20	2.81	12.76	3.54	14.73	3.22	11.51	45.43	4.58
	0.50	19.4	10.28	8.32	2.61	12.90	3.94	15.42	3.28	12.14	46.63	4.70
	0.66	36.5	10.45	8.39	2.51	12.96	4.16	15.79	3.32	12.47	47.25	4.76
35	0.33	8.8	9.45	8.03	3.12	12.56	3.03	Operation not recommended				
	0.50	18.7	9.81	8.15	2.89	12.70	3.39					
	0.66	35.1	9.98	8.21	2.79	12.77	3.58					
40	0.33	8.3	8.90	7.85	3.46	12.36	2.58					
	0.50	18.0	9.29	7.98	3.21	12.50	2.89					
	0.66	34.0	9.48	8.04	3.10	12.57	3.06					
45	0.33	8.0	8.32	7.66	3.83	12.15	2.17					
	0.50	17.4	8.73	7.80	3.57	12.30	2.45					
	0.66	32.9	8.93	7.86	3.44	12.37	2.60					

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.
 AHRI/ISO certified conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.
 Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
 All performance data is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 4°C EWT is based upon a 15% methanol antifreeze solution.
 Operation below 16°C EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 Gray shaded area refers to calculations required to determine if heating water flow is sufficient for non-antifreeze systems.

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Performance Data - TC H/V 048

549 l/s Nominal Airflow

Performance capacities shown in kW

WATER / BRINE			COOLING - EAT 27/19 °C					HEATING - EAT 20°C				
EWT °C	FLOW l/s	PD kPa	TC kW	SC kW	Power kW	HR kW	EER W/W	HC kW	Power kW	HE kW	LAT	COP W/W
-5	0.38	13.4	Operation not recommended									
	0.57	24.9										
	0.76	45.1										
0	0.38	11.9	14.70	10.49	1.92	16.62	7.65	8.72	2.73	5.99	33.16	3.19
	0.57	22.9	14.98	10.54	1.80	16.78	8.31	9.05	2.76	6.30	33.67	3.29
	0.76	41.9	15.11	10.55	1.75	16.85	8.64	9.24	2.77	6.47	33.95	3.34
5	0.38	10.9	14.31	10.36	2.09	16.40	6.85	9.81	2.80	7.01	34.81	3.50
	0.57	21.5	14.63	10.47	1.95	16.58	7.50	10.23	2.83	7.41	35.45	3.62
	0.76	39.6	14.78	10.51	1.89	16.67	7.83	10.47	2.84	7.63	35.80	3.68
10	0.38	10.1	13.86	10.18	2.28	16.14	6.07	10.97	2.87	8.10	36.57	3.82
	0.57	20.4	14.22	10.33	2.12	16.35	6.69	11.49	2.90	8.58	37.34	3.96
	0.76	37.9	14.40	10.39	2.05	16.45	7.02	11.77	2.92	8.85	37.76	4.03
15	0.38	9.6	13.35	9.95	2.51	15.86	5.32	12.18	2.94	9.24	38.39	4.14
	0.57	19.6	13.76	10.13	2.33	16.08	5.91	12.77	2.98	9.79	39.28	4.29
	0.76	36.5	13.95	10.21	2.24	16.19	6.22	13.10	3.00	10.10	39.78	4.37
20	0.38	9.1	12.80	9.69	2.77	15.56	4.62	13.40	3.02	10.38	40.23	4.44
	0.57	18.9	13.23	9.89	2.56	15.80	5.16	14.07	3.06	11.01	41.25	4.60
	0.76	35.3	13.44	9.99	2.47	15.91	5.45	14.44	3.09	11.35	41.80	4.68
25	0.38	8.7	12.19	9.40	3.07	15.25	3.98	14.62	3.10	11.53	42.08	4.72
	0.57	18.3	12.66	9.62	2.84	15.49	4.46	15.35	3.15	12.21	43.18	4.88
	0.76	34.4	12.88	9.73	2.73	15.61	4.72	15.74	3.18	12.57	43.77	4.96
30	0.38	8.4	11.53	9.10	3.40	14.94	3.39	15.82	3.18	12.64	43.88	4.97
	0.57	17.8	12.03	9.33	3.15	15.17	3.82	16.58	3.24	13.35	45.04	5.12
	0.76	33.5	12.27	9.44	3.03	15.29	4.06	16.99	3.27	13.72	45.64	5.19
35	0.38	8.1	10.83	8.78	3.79	14.62	2.86	Operation not recommended				
	0.57	17.4	11.35	9.01	3.50	14.85	3.24					
	0.76	32.7	11.60	9.13	3.37	14.97	3.45					
40	0.38	7.9	10.08	8.44	4.22	14.30	2.39	Operation not recommended				
	0.57	16.9	10.62	8.69	3.90	14.53	2.72					
	0.76	32.1	10.89	8.81	3.75	14.64	2.90					
45	0.38	7.6	9.29	8.09	4.70	13.99	1.98	Operation not recommended				
	0.57	16.6	9.85	8.34	4.35	14.21	2.26					
	0.76	31.5	10.13	8.47	4.19	14.32	2.42					

Interpolation is permissible; extrapolation is not.

All entering air conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

AHRI/ISO certified conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

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

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

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

Operation below 4°C EWT is based upon a 15% methanol antifreeze solution.

Operation below 16°C EWT requires optional insulated water/refrigerant circuit.

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

Gray shaded area refers to calculations required to determine if heating water flow is sufficient for non-antifreeze systems.

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Performance Data - TC H/V 060

686 l/s Nominal Airflow

Performance capacities shown in kW

WATER / BRINE			COOLING - EAT 27/19 °C					HEATING - EAT 20°C				
EWT °C	FLOW l/s	PD kPa	TC kW	SC kW	Power kW	HR kW	EER W/W	HC kW	Power kW	HE kW	LAT	COP W/W
-5	0.47	26.3	Operation not recommended									
	0.71	50.6										
	0.95	92.9										
0	0.47	23.0	17.79	12.67	2.54	20.33	6.99	11.96	3.86	8.10	34.45	3.10
	0.71	46.2	18.03	12.69	2.44	20.46	7.40	12.48	3.90	8.58	35.08	3.20
	0.95	85.6	18.11	12.65	2.39	20.50	7.58	12.77	3.93	8.85	35.43	3.25
5	0.47	20.8	17.39	12.53	2.71	20.10	6.42	13.53	3.99	9.54	36.35	3.39
	0.71	43.1	17.72	12.66	2.57	20.29	6.88	14.19	4.05	10.15	37.15	3.51
	0.95	80.6	17.85	12.69	2.52	20.37	7.10	14.57	4.08	10.49	37.60	3.57
10	0.47	19.2	16.88	12.28	2.91	19.79	5.81	15.20	4.13	11.06	38.36	3.68
	0.71	40.8	17.29	12.48	2.75	20.03	6.29	15.99	4.20	11.79	39.32	3.80
	0.95	76.8	17.47	12.56	2.67	20.14	6.53	16.43	4.24	12.19	39.86	3.87
15	0.47	18.0	16.29	11.96	3.14	19.43	5.19	16.90	4.29	12.61	40.42	3.94
	0.71	39.0	16.76	12.21	2.96	19.71	5.67	17.81	4.37	13.44	41.51	4.08
	0.95	73.7	16.97	12.32	2.87	19.84	5.91	18.30	4.41	13.89	42.11	4.15
20	0.47	17.0	15.63	11.60	3.41	19.05	4.58	18.59	4.44	14.15	42.46	4.19
	0.71	37.5	16.14	11.87	3.20	19.34	5.04	19.57	4.53	15.03	43.64	4.32
	0.95	71.1	16.39	12.01	3.10	19.49	5.28	20.09	4.58	15.51	44.27	4.39
25	0.47	16.2	14.91	11.23	3.73	18.64	4.00	20.20	4.59	15.61	44.41	4.40
	0.71	36.2	15.45	11.50	3.49	18.94	4.43	21.20	4.68	16.52	45.62	4.53
	0.95	69.0	15.72	11.64	3.38	19.10	4.65	21.71	4.73	16.98	46.23	4.59
30	0.47	15.5	14.14	10.87	4.09	18.23	3.45	21.69	4.73	16.96	46.21	4.59
	0.71	35.1	14.70	11.13	3.82	18.53	3.84	22.64	4.82	17.82	47.35	4.70
	0.95	67.1	14.98	11.27	3.70	18.68	4.05	23.09	4.86	18.23	47.90	4.75
35	0.47	14.9	13.33	10.54	4.50	17.83	2.96	Operation not recommended				
	0.71	34.2	13.91	10.77	4.20	18.11	3.31					
	0.95	65.5	14.20	10.90	4.06	18.26	3.50					
40	0.47	14.3	12.50	10.26	4.97	17.47	2.52	Operation not recommended				
	0.71	33.3	13.08	10.45	4.64	17.72	2.82					
	0.95	64.1	13.38	10.56	4.48	17.86	2.99					
45	0.47	13.9	11.66	10.03	5.49	17.14	2.13	Operation not recommended				
	0.71	32.5	12.24	10.18	5.12	17.36	2.39					
	0.95	62.8	12.53	10.27	4.95	17.48	2.53					

Interpolation is permissible; extrapolation is not.

All entering air conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

AHR/ISO certified conditions are 27°C DB and 19°C WB in cooling and 20°C DB in heating.

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

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

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

Operation below 4°C EWT is based upon a 15% methanol antifreeze solution.

Operation below 16°C EWT requires optional insulated water/refrigerant circuit.

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

Gray shaded area refers to calculations required to determine if heating water flow is sufficient for non-antifreeze systems.



Entering Air Correction Tables

Cooling Corrections										
Ent Air WB °C	Total Clg Cap	Sens Clg Cap Multipliers - Entering DB °C							Power	Heat of Rej.
		20	21	24	27	29	32	35		
10	0.7800	0.9778	*	*	*	*	*	*	0.9972	0.8243
13	0.8327	0.8966	1.0556	*	*	*	*	*	0.9980	0.8667
16	0.8954	0.7505	0.9184	1.1056	*	*	*	*	0.9988	0.9169
18	0.9681		0.6778	0.8992	1.1213	1.3439	*	*	0.9997	0.9747
19	1.0000		0.5507	0.7782	1.0000	1.2161	1.4266	*	1.0000	1.0000
21	1.0508			0.6408	0.8856	1.1082	1.3087	1.4870	1.0005	1.0403
24	1.1435				0.6085	0.8566	1.0663	1.2376	1.0014	1.1135

* Sensible capacity equals total capacity.
 AHRI/ISO/ASHRAE 13256-1 uses entering air conditions of Cooling - 27.0°C DB/ 19.0°C WB, and Heating - 20.0°C DB/ 15.0°C WB entering air temperature.

Heating Corrections			
Ent Air DB °C	Htg Cap	Power	Heat of Ext
7	1.0507	0.7802	1.1314
10	1.0327	0.8227	1.0953
13	1.0195	0.8683	1.0646
16	1.0102	0.9168	1.0380
18	1.0033	0.9680	1.0139
20	1.0000	1.0000	1.0000
21	0.9979	1.0218	0.9908
24	0.9928	1.0781	0.9673
27	0.9866	1.1367	0.9419

Air Flow Correction Table

Airflow % of Rated	Heating			Cooling				
	Htg Cap	Power	Heat of Ext	Total Cap	Sens Cap	S/T	Power	Heat of Rej
75	0.9764	1.1134	0.9368	0.9605	0.8837	0.9200	0.9606	0.9605
81	0.9829	1.0789	0.9551	0.9730	0.9130	0.9384	0.9691	0.9722
88	0.9889	1.0484	0.9717	0.9837	0.9393	0.9548	0.9784	0.9826
94	0.9947	1.0222	0.9867	0.9927	0.9668	0.9739	0.9887	0.9919
100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
106	1.0050	0.9820	1.0116	1.0055	1.0434	1.0377	1.0122	1.0069
113	1.0096	0.9681	1.0216	1.0093	1.1016	1.0915	1.0253	1.0126
119	1.0138	0.9583	1.0299	1.0113	1.1790	1.1658	1.0394	1.0171
125	1.0177	0.9527	1.0365	1.0116	1.2798	1.2652	1.0544	1.0204

ClimateMaster works continually to improve its products. As a result, the design and specifications of each product at the time of order may be changed without notice and may not be as described herein. Please contact ClimateMaster's Customer Service Department at 1-405-745-6000 for specific information on the current design and specifications. Statements and other information contained herein are not express warranties and do not form the basis of any bargain between the parties, but are merely ClimateMaster's opinion or commendation of its products. The latest version of this document is available at climatemaster.com.



Antifreeze Correction Table

Antifreeze Type	Antifreeze %	Cooling			Heating		WPD Corr. Fct. EWT -1°C
		EWT 32°C			EWT -1°C		
		Total Cap	Sens Cap	Power	Htg Cap	Power	
Water	0	1.000	1.000	1.000	1.000	1.000	1.000
Propylene Glycol	5	0.995	0.995	1.003	0.989	0.997	1.070
	15	0.986	0.986	1.009	0.968	0.990	1.210
	25	0.978	0.978	1.014	0.947	0.983	1.360
Methanol	5	0.997	0.997	1.002	0.989	0.997	1.070
	15	0.990	0.990	1.007	0.968	0.990	1.160
	25	0.982	0.982	1.012	0.949	0.984	1.220
Ethanol	5	0.998	0.998	1.002	0.981	0.994	1.140
	15	0.994	0.994	1.005	0.944	0.983	1.300
	25	0.986	0.986	1.009	0.917	0.974	1.360
Ethylene Glycol	5	0.998	0.998	1.002	0.993	0.998	1.040
	15	0.994	0.994	1.004	0.980	0.994	1.120
	25	0.988	0.988	1.008	0.966	0.990	1.200

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Airflow in l/s with wet coil and clean air filter

Model	Fan Speed	Rated Airflow (l/s)	Min Airflow (l/s)	Airflow (l/s) at External Static Pressure (Pa.)															
				0	25	50	75	100	125	150	175	200	225	250					
TCH/V 006	HI	79	54		112	105	98	83	65										
	MED				94	87	76	68											
	LOW				76	68	58												
TCH/V 009	HI	121	85		145	134	124	113	99										
	MED				138	127	113	102	92										
	LOW				120	114	106	92											
TCH/V 012	HI	144	108		170	162	155	144	137	116									
	MED				151	144	137	130	123										
	LOW				130	126	116	112											
TCH/V 015	HI	192	140		269	255	248	230	195	163									
	MED				248	241	234	223	212	184									
	LOW				219	212	205	198	184	163									
TCH/V 018	HI	230	167		269	255	248	230	195										
	MED				248	241	234	223	212	184									
	LOW				219	212	205	198	184										
TCH/V 024	HI	274	241					343	319	298	264								
	MED				346	340	329	316	302	285	264								
	LOW				281	274	268	261	250										
TCH/V 030	HI	343	285					398	377	353	326	288							
	MED				429	412	394	374	357	333	305								
	LOW				384	367	353	336	319	298									
TCH/V 036	HI	412	350		532	518	501	480	462	424	389								
	MED				424	399	396	392	385	364									
	LOW				354	350													
TCH/V 042	HI	480	406		563	542	521	497	470	443	408								
	MED				511	494	477	460	436	408	384								
	LOW																		
TCH/V 048	HI	549	484				679	655	617	576	511								
	MED				665	652	638	607	587	549	484								
	LOW				607	593	580	566	539	497									
TCH/V 060	HI	686	603		793	789	778	750	729	711	694	665	633						
	MED				725	722	704	686	669	648	630	605							
	LOW				655	651	640	630	612										

Black areas denote ESP where operation is not recommended.
 Units factory shipped on medium speed. Other speeds require field selection.
 All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 220V for 220-240V units.
 Performance stated is at the rated power supply, performance may vary as the power supply varies from the rated.

Blower Performance Data - High Static

Model	Fan Speed	Rated Airflow (l/s)	Min Airflow (l/s)	Airflow (l/s) at External Static Pressure (Pa.)														
				0	25	50	75	100	125	150	175	200	225	250				
TCH/V 015	HI	192	140			276	269	258	244	230	188							
	MED				265	255	248	237	234	223	212	173						
	LOW				237	226	219	212	205	202	188							
TCH/V 018	HI	230	167			276	269	258	244	230	188							
	MED				285	255	248	237	234	223	212	173						
	LOW				237	226	219	212	205	202	188							
TCH/V 024	HI	274	241							353	326	288						
	MED								357	333	305	257						
	LOW					353	336	319	298	271	244							
TCH/V 030	HI	343	285							398	357	316						
	MED								388	353	319							
	LOW				360	353	340	329	312	288								
TCH/V 036	HI	412	350						536	515	490	452	410					
	MED				476	469	462	455	441	431	403	375						
	LOW				361	354	350											
TCH/V 042	HI	480	406				532	521	504	497	473	425						
	MED				477	470	463	453	446	429	405	370						
	LOW																	
TCH/V 048	HI	549	484						707	689	672	645	614	569	518			
	MED				703	700	683	665	648	628	611	587	556	511				
	LOW				635	631	621	611	593	573	549	518						
TCH/V 060	HI	686	603		849	846	839	828	814	793	778	754	729	701	669			
	MED				764	761	757	736	722	715	701	683	665	627	619			
	LOW				683	679	676	669	665	655	648	637	619					

Black areas denote ESP where operation is not recommended.
 Units factory shipped on medium speed. Other speeds require field selection.
 All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 220V for 220-240V units.
 Performance stated is at the rated power supply, performance may vary as the power supply varies from the rated.



TC Series	006	009	012	015	018	024	030	036	042	048	060
Compressor (1 Each)	Rotary					Scroll					
Factory Charge HFC-410A - kg	0.48	0.52	.65	0.91	1.22	1.22	1.36	1.42	1.98	2.10	2.32
PSC Fan Motor & Blower											
Fan Motor Type/Speeds	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3
Fan Motor (Watts)	30	75	75	124	124	187	560	373	560	560	746
Blower Wheel Size (Dia x w) mm	127 x 127	127 x 127	152 x 127	203 x 178		229 x 178		229 x 203		254 x 254	279 x 254
Water Connection Size											
FPT	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"	3/4"	3/4"	3/4"	1"	1"
Coax Volume (liters)	.47	.54	.63	1.08	1.70	1.08	1.22	1.22	3.37	2.79	3.55
Vertical											
Air Coil Dimensions (H x W) mm	254 x 381	254x381	254 x 381	508 x 438	508 x 438	508 x 438	508 x 438	610 x 552	610 x 552	610 x 718	610 x 718
Filter Standard - 25.4mm Throwaway mm	254 x 457	254x457	254 x 457	508 x 508	508 x 508	508 x 508	508 x 508	610 x 610	610 x 610	1-356 x 610, 1- 457 x 610	1-356 x 610, 1- 457 x 610
Weight - Operating kg	47	48	52	69	72	86	89	92	99	119	126
Weight - Packaged kg	51	52	56	72	74	88	92	95	102	123	129
Horizontal											
Air Coil Dimensions (H x W) mm	254 x 381	254 x 381	254 x 381	406 x 559	406 x 559	406 x 559	406 x 559	508 x 635	508 x 635	508 x 889	508 x 889
Filter Standard - 25.4mm Throwaway mm	254 x 457	254 x 457	254 x 457	406 x 635	406 x 635	457 x 635	457 x 635	508 x 711 or (2) 508 x 356	508 x 711 or (2) 508 x 356	1-508 x 610, 1-508 x 356	1-508 x 610, 1-508 x 356
Weight - Operating kg	47	47	52	69	72	86	89	92	99	119	138
Weight - Packaged kg	51	52	56	72	74	88	92	95	102	123	141

Notes:

All units have dual isolation compressor mounts for quiet operation, thermal expansion valves for refrigerant metering, and 22.2mm & 28.6mm electrical knockouts to accommodate field wiring.

FPT - Female Pipe Thread

Condensate Drain Connection is 3/4" FPT

Unit Maximum Water Working Pressure	
Options	Max Pressure kPa
Base Unit	2,068

Use the lowest maximum pressure rating when multiple options are combined.



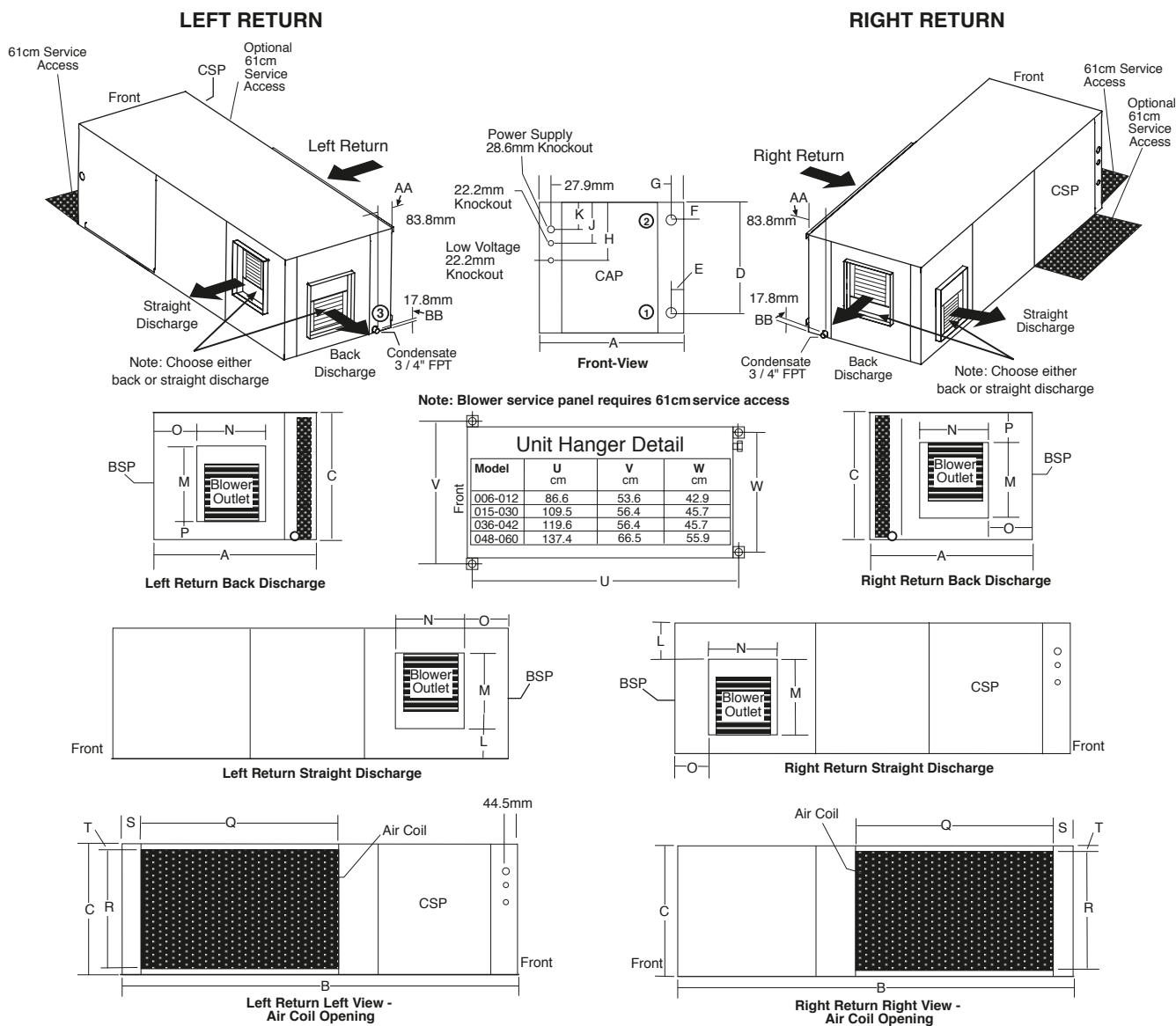
Horizontal Model		Overall Cabinet		
		A Width	B Length	C Height
006 - 012	cm	48.5	86.6	27.9
015 - 018	cm	51.1	109.5	43.2
024 - 030	cm	51.1	109.5	46.5
036 - 042	cm	51.1	119.6	53.3
048 - 060	cm	61.2	137.4	53.3

Horizontal Model		Electrical Knockouts		
		H 22.2mm	J 22.2mm	K 28.6mm
		Low Voltage	Low Voltage	Power Supply
006 - 012	cm	20.6	13.0	5.4
015 - 030	cm	30.8	23.2	15.6
036 - 060	cm	41.0	33.3	25.7

Horizontal Model		Water Connections						
		①		②		③		Loop In/Out FPT
		Loop In D	Loop In E	Loop Out F	Loop Out G	Cond. 3/4" FPT		
						AA	BB	
006 - 012	cm	24.3	2.7	3.8	2.7	8.4	1.8	1/2"
015	cm	38.4	3.4	8.1	3.5	8.4	1.8	1/2"
018	cm	38.4	3.4	10.4	3.5	8.4	1.8	1/2"
024	cm	41.7	3.4	11.3	3.5	8.4	1.8	3/4"
030	cm	41.7	3.4	7.8	3.5	8.4	1.8	3/4"
036	cm	48.5	3.4	13.4	3.5	8.4	1.8	3/4"
042	cm	48.5	3.4	11.3	3.5	8.4	1.8	3/4"
048	cm	48.5	3.4	11.1	3.5	8.4	1.8	1"
060	cm	48.5	3.4	9.7	3.5	8.4	1.8	1"

Horizontal Model		Discharge Connection Duct Flange Installed (+/- 2.5mm)					Return Connection Using Return Air Opening			
		L	M Supply Height	N Supply Width	O	P	Q Return Width	R Return Height	S	T
006 - 012	cm	1.9	22.7	17.0	13.3	3.3	41.0	25.0	2.7	1.5
015 - 018	cm	6.6	33.8	25.1	10.5	3.3	58.4	38.1	2.8	2.5
024 - 030	cm	6.6	33.8	25.1	10.5	3.3	58.4	41.4	2.8	2.5
036 - 042	cm	6.3	40.9	27.9	7.7	6.4	65.8	48.3	2.8	2.5
048	cm	9.5	41.0	34.8	10.3	3.2	91.2	48.3	2.8	2.5
060	cm	4.4	46.0	34.8	10.3	3.2	91.2	48.3	2.8	2.5

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Notes:

1. While clear access to all removable panels is not required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
2. Units are shipped with an air filter supported by a set of filter rails. These rails are not suitable for supporting duct work. If a return air duct is to be connected to the unit, these rails should be removed and replaced with the ClimateMaster AFF Series accessory filter frame or some other air filter support system.
3. Discharge flange and hanger brackets are factory installed.
4. Condensate is 3/4" FPT.
5. Blower service panel requires 61cm service access.
6. Blower service access is through back panel on straight discharge units or through panel opposite air coil on back discharge units

Legend:

- CAP = Control Access Panel
- BSP = Blower Service Panel
- CSP = Compressor Access Panel
- FPT = Female Pipe Thread



Vertical Upflow Model		Overall Cabinet		
		A Width	B Depth	C Height
006 - 012	cm	48.5	48.5	55.9
015 - 018	cm	54.6	54.6	99.1
024 - 030	cm	54.6	54.6	101.6
036 - 042	cm	54.6	66.0	114.3
048 - 060	cm	61.0	82.6	116.8

Vertical Upflow Model		Water Connections - Standard Units						
		①		②		③		Loop In/Out FPT
		Loop In D	Loop In E	Loop Out F	Loop Out G	Cond. 3/4" FPT		
H	I							
006 - 012	cm	3.6	4.1	24.1	4.3	15.6	4.1	1/2"
015	cm	4.8	3.6	35.1	3.6	20.6	3.6	1/2"
018	cm	4.8	3.6	32.8	3.6	20.6	3.6	1/2"
024	cm	4.8	3.6	35.1	3.6	20.6	3.6	3/4"
030	cm	4.8	3.6	38.6	3.6	20.6	3.6	3/4"
036	cm	4.8	3.6	39.9	3.6	20.6	3.6	3/4"
042	cm	4.8	3.6	42.0	3.6	20.6	3.6	3/4"
048	cm	4.8	3.6	42.2	3.6	20.6	3.6	1"
060	cm	4.8	3.6	43.7	3.6	20.6	3.6	1"

Vertical Model		Electrical Knockouts		
		J 22.2mm	K 22.2mm	L 28.6mm
		Low Voltage	Low Voltage	Power Supply
006 - 012	cm	7.3	14.9	22.5
015 - 060	cm	10.5	18.1	5.7

Notes:

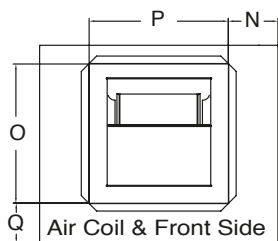
1. While clear access to all removable panels is not required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
2. Front & Side access is preferred for service access. However, all components may be serviced from the front access panel if side access is not available. (Except on TCV 015-030 with front return)
3. Discharge flange is field installed.
4. Condensate is 3/4" FPT.
5. Units are shipped with an air filter supported by a set of filter rails. These rails are not suitable for supporting duct work. If a return air duct is to be connected to the unit, these rails should be removed and replaced with the ClimateMaster AFF Series accessory filter frame or some other air filter support system.

Legend:

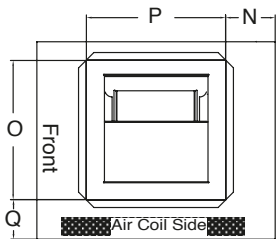
- CAP = Control Access Panel
- BSP = Blower Service Panel
- CSP = Compressor Access Panel
- ASP = Alternative Service Panel
- FPT = Female Pipe Thread



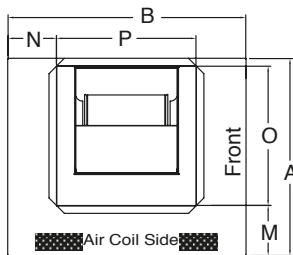
Vertical Model		Discharge Connection Duct Flange Installed (+/- 2.5mm)					Return Connection Using Return Air Opening			
		M	N	O Supply Width	P Supply Depth	Q	R	S Return Depth	T Return Height	U
006 - 012	cm	22.7	12.9	22.9	22.9	14.0	5.3	41.1	25.1	1.9
015 - 030	cm	16.1	9.5	35.6	35.6	13.6	5.8	46.5	53.1	1.9
036 - 042	cm	16.1	9.5	35.6	35.6	13.1	5.8	57.9	60.7	1.9
048 - 060	cm	17.4	18.4	40.6	45.7	13.1	5.8	74.4	57.0	1.9



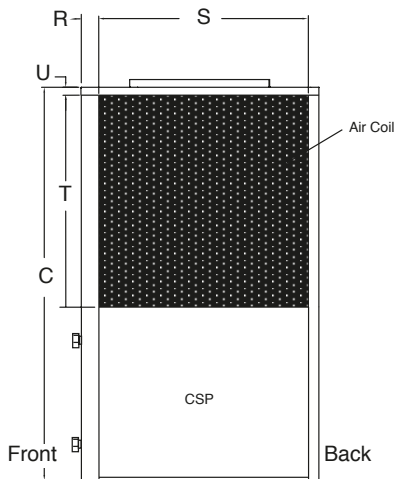
Top View-Front Return



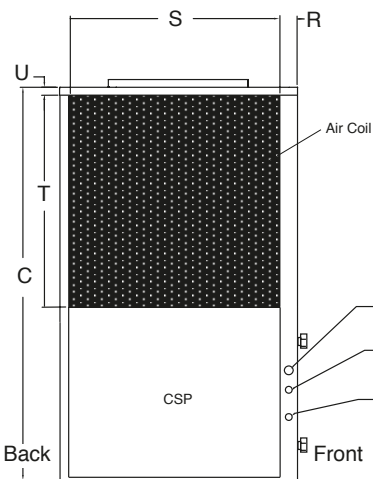
Top View-Right Return



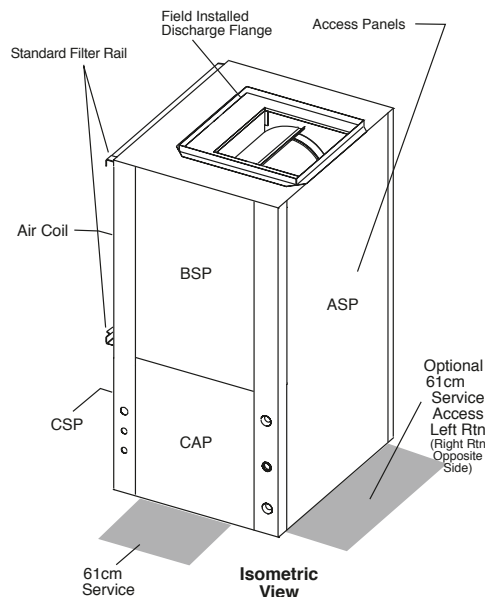
Top View-Left Return



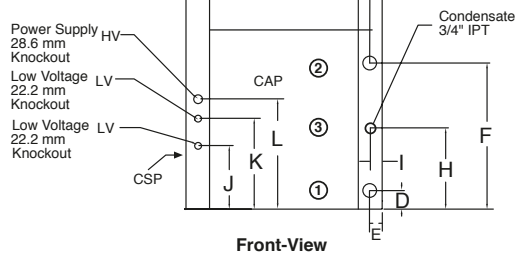
Right Return Right View - Air Coil Opening



Left Return Left View - Air Coil Opening



Isometric View



Front-View

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Corner Weights for TCH Series Units

Model		Total	Left-Front*	Right-Front*	Left-Back*	Right-Back*
TCH006	kg	47	17	11	11	9
TCH009	kg	48	17	11	10	9
TCH012	kg	52	19	12	12	10
TCH015	kg	69	24	16	15	14
TCH018	kg	72	25	17	16	14
TCH024	kg	79	28	18	18	15
TCH030	kg	83	30	19	18	15
TCH036	kg	92	34	21	20	17
TCH042	kg	99	37	23	22	18
TCH048	kg	119	44	27	26	21
TCH060	kg	126	47	29	28	23

*Front is control box end.

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Electrical Data - Standard Unit

TC Model	Voltage Code	Rated Voltage	Voltage Min/Max	Compressor			Fan Motor FLA	Total Unit FLA	Min Circuit Amp	Max Fuse
				QTY	RLA	LRA				
006	V	220/240-50-1	209/252	1	2.8	15	0.4	3.2	3.9	15
009	V	220/240-50-1	209/252	1	3.1	18.8	0.7	3.8	4.6	15
012	V	220/240-50-1	209/252	1	4.0	21.0	0.7	4.7	5.7	15
015	V	220/240-50-1	209/252	1	4.7	23.0	0.9	5.6	6.7	15
018	V	220/240-50-1	209/252	1	5.9	24.0	0.9	6.8	8.2	15
024	V	220/240-50-1	209/252	1	9	52.0	1.3	10.3	12.6	20
	U	380/415-50-3	361/436	1	3.4	27.0	0.8	4.2	5.0	15
030	V	220/240-50-1	209/252	1	11.2	60.0	2.7	13.9	16.7	25
	U	380/415-50-3	361/436	1	3.9	28.0	1.7	5.6	6.6	15
036	V	220/240-50-1	209/252	1	13.5	67.0	2.0	15.5	18.9	30
	U	380/415-50-3	361/436	1	5.4	38.0	1.2	6.6	8.0	15
042	U	380/415-50-3	361/436	1	6	46.0	1.7	7.7	9.2	15
048	U	380/415-50-3	361/436	1	6.1	43.0	1.8	7.9	9.4	15
060	U	380/415-50-3	361/436	1	7.8	51.5	2.5	10.3	12.3	20

All fuses Class RK-5

TC SERIES 50HZ - HFC410A SUBMITTAL DATA ENG/S-I



Electrical Data - High Static Blower

TC Model	Voltage Code	Rated Voltage	Voltage Min/Max	Compressor			Fan Motor FLA	Total Unit FLA	Min Circuit Amp	Max Fuse
				QTY	RLA	LRA				
015	V	220/240-50-1	209/252	1	4.7	23.0	0.9	5.6	6.7	15
018	V	220/240-50-1	209/252	1	5.9	24.0	1.3	7.2	8.7	15
024	V	220/240-50-1	209/252	1	9	52.0	2.7	11.7	14.0	20
	U	380/415-50-3	361/436	1	3.4	27.0	1.7	5.1	6.0	15
030	V	220/240-50-1	209/252	1	11.2	60.0	2.7	13.9	16.7	25
	U	380/415-50-3	361/436	1	3.9	28.0	1.7	5.6	6.6	15
036	V	220/240-50-1	209/252	1	13.5	67.0	2.7	16.2	19.6	30
	U	380/415-50-3	361/436	1	5.4	38.0	1.7	7.1	8.5	15
042	U	380/415-50-3	361/436	1	6	46.0	1.7	7.7	9.2	15
048	U	380/415-50-3	361/436	1	6.1	43.0	2.5	8.6	10.1	15
060	U	380/415-50-3	361/436	1	7.8	51.5	2.6	10.4	12.4	20

All fuses Class RK-5



Only representative diagrams are presented in this submittal.

Other diagrams can be located online at climatemaster.com using the part numbers presented below.

Model	Refrigerant	Wiring Diagram Part Number	Sizes	Electrical	Control	DDC	Fan Motor
TC Series Single Phase	EarthPure® HFC-410A	96B0006N65	009 - 036	220/50/1	CXM	-	PSC
		96B0006N67				LON	
		96B0006N69				MPC	
		96B0006N66			DXM	-	
		96B0006N68				LON	
		96B0006N70				MPC	
TC Series Three Phase	EarthPure® HFC-410A	96B0008N57	030 - 060	380/50/3	CXM	-	PSC
		96B0008N59				LON	
		96B0008N61				MPC	
		96B0008N58			DXM	-	
		96B0008N60				LON	
		96B0008N62				MPC	

All wiring diagrams available at climatemaster.com.

Typical Wiring Diagram - Single Phase with CXM Controller

DRAWING NO: **96B0006N65**

REV: **D**

TITLE: **H/V 220/240/50/1 CXM CE**

DATE: **7/2/10**

REV: **10-0290**

ALARM RELAY CONTACTS

- AL BLOWER MOTOR
- BR BLOWER MOTOR
- BN COMPRESSOR CAPACITOR
- CC COMPRESSOR CAPACITOR
- CB CIRCUIT BREAKER
- CO CONDENSATE OVERFLOW
- HP HIGH PRESSURE SWITCH
- HPW HIGH PRESSURE WATER SWITCH
- LOC LOSS OF CHARGE PRESSURE SWITCH
- JWI CLIP LABEL FIELD SELECTION JUMPER
- MVS MOTORIZED VALVE END SWITCH
- PDB POWER DISTRIBUTION BLOCK
- RVS REVERSING VALVE SOLENOID
- TRANS TRANSFORMER

NOTES:

1. COMPRESSOR & BLOWER MOTOR THERMALLY PROTECTED INTERNALLY.
2. ALL WIRING TO THE UNIT MUST COMPLY WITH NEC AND LOCAL CODES.
3. TRANSFORMER IS WIRED TO 240V (ORG) LEAD FOR 240/50V/1. SWITCH RED & ORG LEADS TO PDB(I) & INSULATE ORG LEAD FOR 220/50V/1.
4. FPI THERMISTOR PROVIDES LOW TEMPERATURE PROTECTION FOR WATER. WHEN USING ANTI-FREEZE SOLUTIONS, CUT JW3 JUMPER.
5. CHECK INSTALLATION. WIRING INFORMATION FOR SPECIFIC THERMOSTAT HOOK UP REFER TO THERMOSTAT INSTALLATION INSTRUCTIONS FOR WIRING TO THE UNIT.
6. 24V ALARM SIGNAL SHOWN FOR DRY ALARM CONTACT. CUT JW1 JUMPER. WIRE "Y" FROM T-STAT TO "Y" CXM WHEN A MOTORIZED VALVE IS NOT USED. OR GREATER THAN UNIT SUPPLY VOLTAGE.
7. DRY CONTACT WILL BE AVAILABLE BETWEEN AL1 AND AL2.
8. BLOWER MOTOR IS FACTORY WIRED FOR MEDIUM SPEED. FROM "C" TERMINAL TO CONTROL BOX. FOR HIGH OR LOW SPEED REMOVE BLUE WIRE FROM FAN MOTOR SPEED TAP "M" AND CONNECT TO "H" FOR HIGH OR "L" FOR LOW.

DESCRIPTION OF OPERATION

LED	ALARM RELAY
NORMAL MODE	ON
NORMAL MODE W/UPS WARNING	ON
CXMI IS NON-FUNCTIONAL	OFF
FAULT-RETRY	OPEN
LOCKOUT	OPEN
OVERCURRENT VOLTAGE SHUTDOWN	CLOSED
TEST MODE-NO FAULT IN MEMORY	OPEN (CLOSED AFTER 15 MIN.)
TEST MODE-HP FAULT IN MEMORY	FLASHING CODE 1
TEST MODE-LP FAULT IN MEMORY	FLASHING CODE 2
TEST MODE-FP FAULT IN MEMORY	FLASHING CODE 3
TEST MODE-PP2 FAULT IN MEMORY	FLASHING CODE 4
TEST MODE-LO FAULT IN MEMORY	FLASHING CODE 5
TEST MODE-OVERCURRENT	FLASHING CODE 6
SHUTDOWN IN MEMORY	FLASHING CODE 7
TEST MODE-UPS IN MEMORY	FLASHING CODE 8
SWAPPED FPI/FP2 LOCKOUT	FLASHING CODE 9

LEGEND

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

COMPONENT LOCATION

POWER SUPPLY DATA PLATE CONDUCTORS ONLY

POWER SUPPLY WIRING: EARTH (GND), N (NEUTRAL), L1, L2, L3, T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12

ORG 240V L1, L2, L3

24V TRANS

24V DC

24V EHI

24V EFL

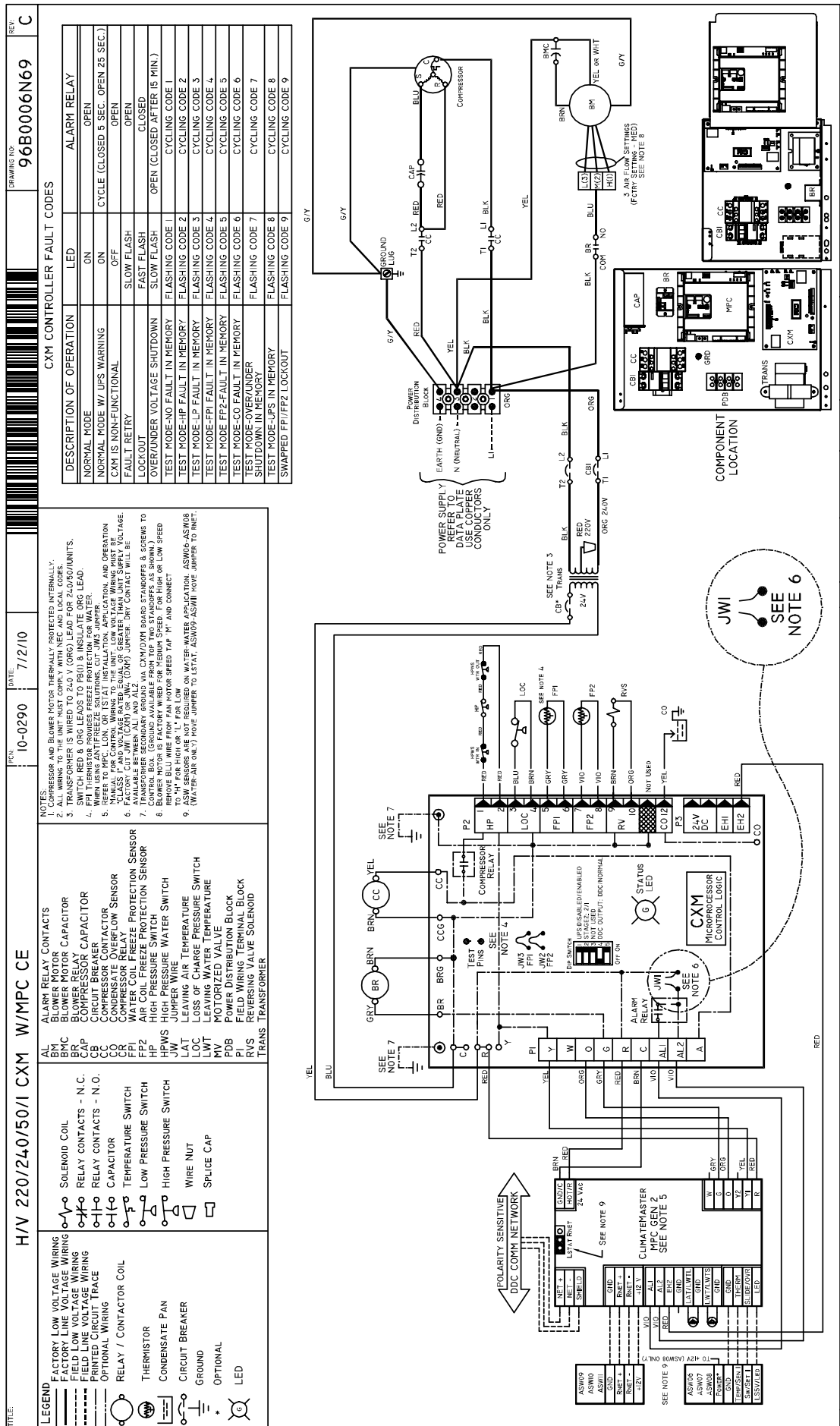
24V EFR

CO P3

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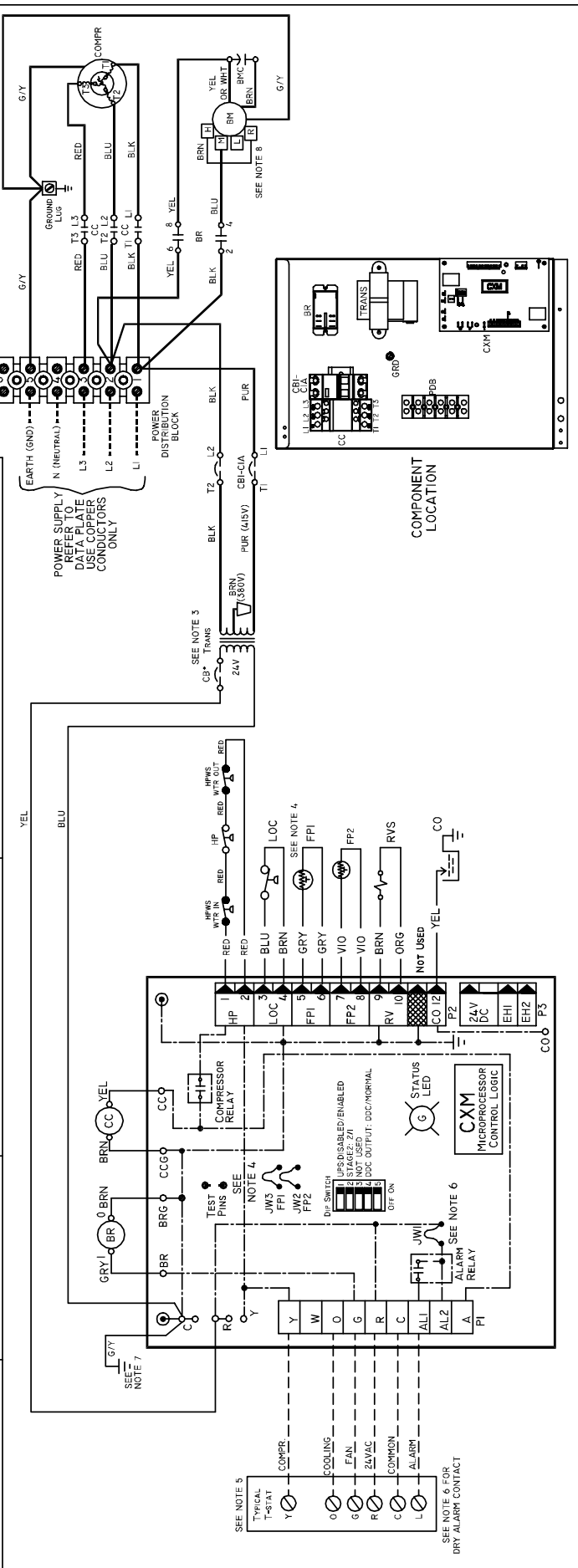
Typical Wiring Diagram - Single Phase with CXM & MPC Controllers



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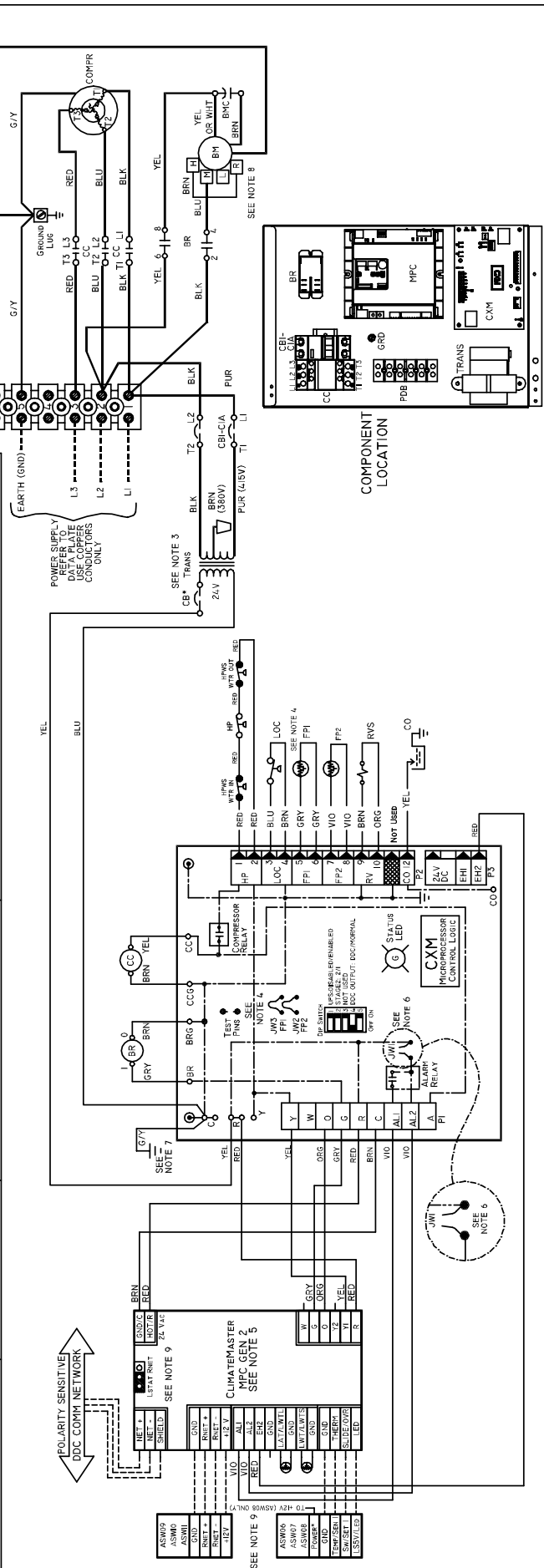
REV: C	DRAWING NO: 96B0008N57
DATE: 7/16/10	REV: C
PKG: 10-0290	REV: C
H/V 380/415/50/3 CXM CE	
<p>LEGEND</p> <p>FACTORY LINE VOLTAGE WIRING</p> <p>FIELD LINE VOLTAGE WIRING</p> <p>FIELD LOW VOLTAGE WIRING</p> <p>PRINTED CIRCUIT TRACE</p> <p>OPTIONAL WIRING</p> <p>RELAY / CONTACTOR COIL</p> <p>THERMISTOR</p> <p>CONDENSATE PAN</p> <p>CIRCUIT BREAKER</p> <p>LED</p> <p>GROUND</p> <p>WIRE NUT</p>	<p>ALARM RELAY CONTACTS</p> <p>AL SOLENOID COIL</p> <p>BR BLOWER MOTOR</p> <p>BMC BLOWER MOTOR CAPACITOR</p> <p>CAP COMPRESSOR CAPACITOR</p> <p>CB CIRCUIT BREAKER</p> <p>CC COMPRESSOR CONTACTOR</p> <p>CO SENSOR, CONDENSATE OVERFLOW</p> <p>FPI SENSOR, LOW TEMP PROTECTION, WATER COIL</p> <p>FP2 SENSOR, LOW TEMP PROTECTION, AIR COIL</p> <p>HP HIGH PRESSURE SWITCH</p> <p>HPMS HIGH PRESSURE WATER SWITCH</p> <p>JWI CLIPFELD FIELD SELECTION JUMPER</p> <p>LOC LOSS OF CHARGE PRESSURE SWITCH</p> <p>MV MOTORIZED VALVE</p> <p>MVES MOTORIZED VALVE END SWITCH</p> <p>PDB POWER DISTRIBUTION BLOCK</p> <p>RVS REVERSING VALVE SOLENOID</p> <p>TRANS TRANSFORMER</p>
<p>NOTES</p> <p>1. COMPRESSOR & BLOWER MOTOR THERMALLY PROTECTED INTERNALLY.</p> <p>2. ALL WIRING TO THE UNIT MUST COMPLY WITH NEC AND LOCAL CODES.</p> <p>3. TRANSFORMER IS WIRED TO 420V (PUR) LEAD FOR 420/50/3 UNITS.</p> <p>4. SWITCH PUR & BRN LEADS TO PDB AND INSULATE PUR LEAD.</p> <p>5. FPI THERMISTOR PROVIDES LOW TEMPERATURE PROTECTION FOR WATER.</p> <p>6. FPI WHEN USING ANTI-FREEZE SOLUTIONS, CUT JWI JUMPER.</p> <p>7. REFER TO MFC, LON, OR TEST INSTALLATION, APPLICATION, AND OPERATION MANUAL FOR CONTROL WIRING TO THE UNIT.</p> <p>8. WIRE "Y" FROM T-STAT TO "Y" CXM WHEN A MOTORIZED VALVE IS NOT USED. T-STAT WIRING MUST BE "CLASS 1" AND VOLTAGE RATING EQUAL TO OR GREATER THAN UNIT SUPPLY VOLTAGE.</p> <p>9. 24V ALARM SIGNAL SHOWN. FOR DRY ALARM CONTACT, CUT JWI JUMPER. DRY CONTACT WILL BE AVAILABLE BETWEEN YEL AND AL2.</p> <p>10. TRANSFORMER SECONDARY GROUND VIA GREEN WIRE WITH YELLOW STRIPE FROM TERMINAL TO CONTROL BOX.</p> <p>11. BLOWER MOTOR THERMALLY PROTECTED INTERNALLY.</p> <p>12. REMOVE BLU WIRE FROM MEDIUM TAP AND CONNECT TO LOW SPEED TAP. FOR HIGH SPEED REMOVE BLU WIRE FROM EXISTING SPEED TAP AND REMOVE BRN JUMPER WIRE FROM HIGH SPEED TAP. CONNECT BLUE WIRE TO HIGH SPEED TAP. TAP OFF UNCONNECTED END OF BRN JUMPER.</p>	<p>DESCRIPTION OF OPERATION</p> <p>LED ON ALARM RELAY OPEN</p> <p>NORMAL MODE ON</p> <p>NORMAL MODE W/ UPS WARNING ON</p> <p>CXM IS NON-FUNCTIONAL OFF</p> <p>FAULT RETRY SLOW FLASH</p> <p>OVERUNDER VOLTAGE SHUTDOWN SLOW FLASH</p> <p>LOCKOUT FAST FLASH</p> <p>TEST MODE-ND FAULT IN MEMORY FLASHING CODE 1</p> <p>TEST MODE-HP FAULT IN MEMORY FLASHING CODE 2</p> <p>TEST MODE-LP FAULT IN MEMORY FLASHING CODE 3</p> <p>TEST MODE-FPI FAULT IN MEMORY FLASHING CODE 4</p> <p>TEST MODE-CC FAULT IN MEMORY FLASHING CODE 5</p> <p>TEST MODE-CO FAULT IN MEMORY FLASHING CODE 6</p> <p>SHUTDOWN IN MEMORY FLASHING CODE 7</p> <p>TEST MODE-UFS IN MEMORY FLASHING CODE 8</p> <p>TEST MODE-SWAPPED FPI/FP2 LOCKOUT FLASHING CODE 9</p>



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TITLE: H/V 380/415/50/3 CXM W/MPC CE P.C.N.: 10-0290 DATE: 7/16/10 REV: A DRAWING NO.: 96B0008N61		
LEGEND FACTORY LINE VOLTAGE WIRING FACTORY LOW VOLTAGE WIRING FIELD LINE VOLTAGE WIRING FIELD LOW VOLTAGE WIRING PRINTED CIRCUIT TRACE OPTIONAL WIRING RELAY / CONTACTOR COIL THERMISTOR CONDENSATE PAN CIRCUIT BREAKER LED OPTIONAL	ALARM RELAY CONTACTS BLOWER MOTOR BLOWER MOTOR CAPACITOR COMPRESSOR CAPACITOR CIRCUIT BREAKER COMPRESSOR CONTACTOR CO COIL FFI SENSOR, CONDENSATE OVERFLOW FP2 SENSOR, LOW TEMP PROTECTION, WATER COIL HP HIGH PRESSURE WATER SWITCH HPMS HIGH PRESSURE WATER SWITCH JWI CLIP LABEL FIELD SELECTION JUMPER LLOC LOSS OF CHARGE PRESSURE SWITCH MVM MOTORIZED VALVE MVES MOTORIZED VALVE END SWITCH PDB POWER DISTRIBUTION BLOCK RVS REVERSING VALVE SOLENOID TRANSFORMER	NOTES 1. COMPRESSOR & BLOWER MOTOR THERMALLY PROTECTED INTERNALLY. 2. ALL WIRING TO THE UNIT MUST COMPLY WITH NEC AND LOCAL CODES. 3. TRANSFORMER IS WIRED TO 220V (RVS) LEAD FOR L20/50/3 UNITS. 4. WHEN USING ANTI-FREEZE SOLUTIONS, CUT JWI3 JUMPER. 5. REFER TO MPC, LON, OR TSTAT INSTALLATION, APPLICATION, AND OPERATION MANUAL FOR CONTROL WIRING TO THE UNIT. 6. WIRE "Y" FROM MPC TO "Y" DXM WHEN A MOTORIZED VALVE IS NOT USED. 7. T-STAT WIRING MUST BE "CLASS 1" AND VOLTAGE RATING EQUAL TO OR GREATER THAN UNIT SUPPLY VOLTAGE. 8. FACTORY CUT JWI1 JUMPER. DRY CONTACT WILL BE AVAILABLE BETWEEN ALL AND AL2. 9. TRANSFORMER SECONDARY GROUND VIA GREEN WIRE WITH YELLOW STRIPE FROM "C" TERMINAL TO CONTROL BOX. 10. BLOWER MOTOR FACTORY WIRED TO MEDIUM SPEED. FOR LOW SPEED REMOVE BLU WIRE FROM MEDIUM TAP AND CONNECT TO LOW SPEED TAP. FOR HIGH SPEED REMOVE BLU WIRE FROM EXISTING SNEED TAP AND REMOVE BRN JUMPER WIRE FROM HIGH SPEED TAP. CONNECT BLUE WIRE TO HIGH SPEED TAP. TAPE OFF UNCONNECTED END OF BRN JUMPER. 11. ASW SENSORS ARE NOT REQUIRED ON WATER-WATER APPLICATION. ASW06-ASW08 (WATER-AIR ONLY) MOVE JUMPER TO LSTAT. ASW09-ASW11 MOVE JUMPER TO RNET.
CMX CONTROLLER FAULT CODES		
DESCRIPTION OF OPERATION	LED	ALARM RELAY
NORMAL MODE	ON	OPEN
NORMAL MODE W/ DFS WARNING	ON	CYCLE (CLOSED 5 SEC. OPEN 25 SEC.)
CXM IS NON-FUNCTIONAL	OFF	OPEN
FAULT RETRY	SLOW FLASH	OPEN
LOCKOUT	FAST FLASH	CLOSED
OVER/UNDER VOLTAGE SHUTDOWN	SLOW FLASH	OPEN (CLOSED AFTER 15 MIN.)
TEST MODE-NO FAULT IN MEMORY	FLASHING CODE 1	CYCLING CODE 1
TEST MODE-HP FAULT IN MEMORY	FLASHING CODE 2	CYCLING CODE 2
TEST MODE-LP FAULT IN MEMORY	FLASHING CODE 3	CYCLING CODE 3
TEST MODE-FPI FAULT IN MEMORY	FLASHING CODE 4	CYCLING CODE 4
TEST MODE-FP2 FAULT IN MEMORY	FLASHING CODE 5	CYCLING CODE 5
TEST MODE-CO FAULT IN MEMORY	FLASHING CODE 6	CYCLING CODE 6
TEST MODE-CC FAULT IN MEMORY	FLASHING CODE 7	CYCLING CODE 7
TEST MODE-JWS IN MEMORY	FLASHING CODE 8	CYCLING CODE 8
TEST MODE-FPI/FP2 LOCKOUT	FLASHING CODE 9	CYCLING CODE 9



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**General:**

Furnish and install ClimateMaster "Tranquility® 16" (Tranquility® Compact) Water Source Heat Pumps, as indicated on the plans. Equipment shall be completely assembled, piped and internally wired. Capacities and characteristics as listed in the schedule and the specifications that follow.

Horizontal/Vertical Water Source Heat Pumps:

Units shall be supplied completely factory built for an entering water temperature range from -6.7° to 48.9°C as standard. Equivalent units from other manufacturers can be proposed provided approval to bid is given 10 days prior to bid closing. All equipment listed in this section must be rated in accordance with Air-Conditioning, Heating and Refrigeration Institute/International Standards Organization (AHRI/ISO) and shall have CE Mark. All units shall be fully quality tested by factory run testing under normal operating conditions and water flow rates as described herein. Quality control system shall automatically perform via computer: triple leak check, pressure tests, evacuate and accurately charge system, perform detailed heating and cooling mode tests, and quality cross check all operational and test conditions to pass/fail data base. Detailed report card will ship with each unit displaying all test performance data. **Note: If unit fails on any cross check, system shall not be allowed unit to ship.** Serial numbers will be recorded by factory and furnished to contractor on report card for ease of unit warranty status. **Units tested without water flow are not acceptable.**

Basic Construction:

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

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

If units with these arrangements are not used, the contractor is responsible for any extra costs incurred by other trades. All units (horizontal and vertical) must have a minimum of three access panels for serviceability of compressor compartment.

Units having only one access panel to compressor/heat exchangers/expansion device/refrigerant piping shall not be acceptable.

All interior surfaces shall be lined with 12.7mm thick, 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.

The heat pumps shall be fabricated from heavy gauge galvanized steel with powder coat paint finish on the front access panels.

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

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

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

Cabinets shall have separate holes and knockouts for entrance of line voltage and low voltage control wiring. All factory-installed wiring passing through factory knockouts and openings shall be protected from sheet metal edges at openings by plastic ferrules. Supply and return water connections shall be copper FPT fittings. All water connections and electrical knockouts must be in the compressor compartment corner post as to not interfere with the serviceability of unit. **Contractor shall be responsible for any extra costs involved in the installation of units that do not have this feature.** Contractor must ensure that units can be easily removed for servicing and coordinate locations of electrical conduit and lights with the electrical contractor.

Option: Contractor shall install 50.8mm filter frame with removable access door and 50.8mm Glass Fiber throwaway filters on all units.



Option: UltraQuiet package shall consist of dual density acoustical, 12.7mm fiberglass insulation; spring isolation under compressor; discharge muffler (except rotary compressors); and sound attenuating material applied to the fan housing.

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

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

Fan and Motor Assembly:

Blower shall have inlet rings to allow removal of wheel and motor from one side without removing housing. Units shall have a direct-drive centrifugal fan. The fan motor shall be 3-speed, permanently lubricated, PSC type, with internal thermal overload protection. Units supplied without permanently lubricated motors must provide external oilers for easy service. The fan motor on small and medium size units (009-042) shall be isolated from the fan housing by a torsionally flexible motor mounting system with rubber type grommets to inhibit vibration induced high noise levels associated with "hard wire belly band" motor mounting. The fan motor on larger units (048 & 060) shall be isolated with flexible rubber type isolation grommets only. The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule. Airflow/Static pressure rating of the unit shall be based on a dry coil and a clean filter in place.

Option: High static motors

Refrigerant Circuit:

All units shall contain an EarthPure® (HFC-410A) sealed refrigerant circuit including a high efficiency scroll or rotary compressor designed for heat pump operation, a thermostatic expansion valve for refrigerant metering, an enhanced corrugated aluminum lanced fin and rifled copper tube refrigerant to air heat exchanger, reversing valve, coaxial (tube in tube) refrigerant to water heat exchanger, and safety controls including a high pressure switch, low pressure (loss of charge) switch, water coil low temperature sensor, and air coil low temperature sensor. Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service. Activation of any safety device shall prevent compressor operation via a microprocessor lockout circuit. The lockout circuit shall be reset at the thermostat or at the contractor supplied disconnect switch. **Units that cannot be reset at the thermostat shall not be acceptable.**

Hermetic compressors shall be internally sprung. The compressor shall have a dual level vibration isolation system. The compressor will be mounted on vibration isolation grommets or springs to a large heavy gauge compressor mounting plate, which is then isolated from the cabinet base with rubber grommets for maximized vibration attenuation. Compressor shall have thermal overload protection. Compressor shall be located in an insulated compartment away from air stream to minimize sound transmission.

Refrigerant to air heat exchangers shall utilize enhanced corrugated lanced aluminum fins and rifled copper tube construction rated to withstand 4309 kPa refrigerant working pressure. Refrigerant to water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design, rated to withstand 4309 kPa working refrigerant pressure. The refrigerant to water heat exchanger shall be "electro-coated" with a low cure cathodic epoxy material a minimum of 0.4 mils thick (0.4 – 1.5 mils range) on all surfaces. The black colored coating shall provide a minimum of 1000 hours salt spray protection per ASTM B117-97 on all external steel and copper tubing. The material shall be formulated without the inclusion of any heavy metals and shall exhibit a pencil hardness of 2H (ASTM D3363-92A), crosshatch adhesion of 4B-5B (ASTM D3359-95), and impact resistance of 184 kg-cm direct (ASTM D2794-93).

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

Drain Pan:

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



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

Electrical:

A control box shall be located within the unit compressor compartment and shall contain a 50VA transformer, 24 volt activated, 2 or 3 pole compressor contactor, terminal block for thermostat wiring and solid-state controller for complete unit operation. Reversing valve and fan motor wiring shall be routed through this electronic controller. Units shall be name-plated for use with time delay fuses or HACR circuit breakers. Unit controls shall be 24 Volt and provide heating or cooling as required by the remote thermostat/sensor.

Solid State Control System (CXM):

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

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

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

Option: Enhanced solid state control system (DXM)

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

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

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

- a. Removable thermostat connector.
- b. Night setback control.
- c. Random start on return from night setback.
- d. Minimized reversing valve operation (Unit control logic shall only switch the reversing valve when cooling is demanded for the first time. The reversing valve shall be held in this position until the first call for heating, ensuring quiet operation and increased valve life.)
- e. Override temperature control with 2-hour timer for room occupant to override setback temperature at the thermostat.
- f. Dry contact night setback output for digital night setback thermostats.
- g. Ability to work with heat pump or heat/cool (Y, W) type thermostats.
- h. Ability to work with heat pump thermostats using O or B reversing valve control.
- i. Emergency shutdown contacts.



- j. Boilerless system heat control at low loop water temperature.
- k. Ability to allow up to 3 units to be controlled by one thermostat.
- l. Relay to operate an external damper.
- m. Ability to automatically change fan speed from multistage thermostat.
- n. Relay to start system pump.
- o. 75 VA control transformer. Control transformer shall have load side short circuit and overload protection via a built in circuit breaker.

Remote Service Sentinel (CXM/DXM):

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

Option: Lonworks interface system

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

- a. Space temperature
- b. Leaving water temperature
- c. Discharge air temperature
- d. Command of space temperature setpoint
- e. Cooling status
- f. Heating status
- g. Low temperature sensor alarm
- h. Low pressure sensor alarm
- i. High pressure switch alarm
- j. Condensate sensor alarm
- k. Hi/low voltage alarm
- l. Fan "ON/AUTO" position of space thermostat as specified above
- m. Unoccupied/occupied command
- n. Cooling command
- o. Heating command
- p. Fan "ON/AUTO" command
- q. Fault reset command
- r. Itemized fault code revealing reason for specific shutdown fault (any one of 7)

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

Option: MPC (Multiple Protocol Control) interface system

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

- a. Space temperature
- b. Leaving water temperature
- c. Discharge air temperature
- d. Command of space temperature setpoint
- e. Cooling status
- f. Heating status
- g. Low temperature sensor alarm
- h. Low pressure sensor alarm
- i. High pressure switch alarm
- j. Condensate overflow alarm
- k. Hi/low voltage alarm
- l. Fan "ON/AUTO" position of space thermostat as specified above
- m. Unoccupied/occupied command
- n. Cooling command
- o. Heating command



- p. Fan "ON/AUTO" command
- q. Fault reset command
- r. Itemized fault code revealing reason for specific shutdown fault (any one of 7)

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

Warranty:

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

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

Option: Two-Year Extended Warranty provides coverage for a period of 30 months from date of shipment or 24 months from the date of start-up (whichever occurs first).

FIELD INSTALLED OPTIONS

Hose Kits:

All units shall be connected with hoses. The hoses shall be 2 feet 61cm long, braided stainless steel; fire rated hoses complete with adapters. Only fire rated hoses will be accepted.

Valves:

The following valves are available and will be shipped loose:

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

Hose Kit Assemblies:

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

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

Thermostats:

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

- a. Single Stage Standard Manual Changeover (ATM11C11)
Thermostat shall be a single-stage, horizontal mount, manual changeover with HEAT-OFF-COOL system switch and fan ON-AUTO switch. Thermostat shall have a mechanical temperature setpoint indicator. Thermostat shall only require 4 wires for connection. Mercury bulb thermostats are not acceptable.
- 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. Single Stage Digital Automatic or Manual Changeover with Two-Speed Fan Control (ATA11C04) – DXM and PSC Fan required
Thermostat shall be a single-stage, digital, auto or manual changeover with HEAT-OFF-COOL-AUTO system switch, fan ON-AUTO switch, and fan LO-HI switch. Thermostat shall have an LCD display with temperature and setpoint(s) in °F or °C. A fault LED shall be provided to display specific fault condition. Thermostat shall allow use of an accessory remote temperature sensor (AST009), but may be operated with internal sensor via orientation of a jumper.
- d. Single Stage Digital Automatic Changeover (ATA11C06)
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. A fault LED shall be provided to display specific fault condition. Thermostat shall allow use of an accessory remote temperature sensor (AST009), but may be operated with internal sensor via orientation of a jumper.



e. Multistage Digital Automatic Changeover (ATA22U01)

Thermostat shall be multi-stage (2H/2C), manual or automatic changeover with HEAT-OFF-COOL-AUTO-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. A fault LED shall be provided to indicate specific fault condition(s). Thermostat shall provide temperature display offset for custom applications. Thermostat shall allow unit to provide better dehumidification with optional DXM controller by automatically using lower fan speed on stage 1 cooling (higher latent cooling) as main cooling mode, and automatically shifting to high speed fan on stage 2 cooling.

f. Multistage Manual Changeover Programmable 5/2 Day (ATP21U01)

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.

g. Multistage Automatic or Manual Changeover Programmable 7 Day (ATP32U03)

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 CXM or DXM controls) to simplify troubleshooting by providing specific unit fault at the thermostat with red backlit LCD during unit lockout. The thermostat shall provide permanent memory of 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.

h. Multistage Automatic or Manual Changeover Programmable 7 Day with Humidity Control (ATP32U04)

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® 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 °F or °C. Time display shall be selectable for 12 or 24 hour clock. Fault identification shall be provided (when used with ClimateMaster CXM or DXM controls) to simplify troubleshooting by providing specific unit fault at the thermostat with red backlit LCD during unit lockout. The thermostat shall provide permanent memory of 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.

DDC Sensors:

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

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



Notes:



Date:	Item:	Action:
09/20/11	Size 024	Added "U" Voltage
08/09/11	Unit Maximum Working Water Pressure	Updated to Reflect New Safeties
09/28/10	Physical Data Table	Added Coax Volume Information
08/23/10	Size 006 and 012	Added
08/09/10	Entire Document	Removed I-P Units Miscellaneous Edits to Engineering Specifications
11/04/09	TC 009 Information	Added
05/05/09	Dimensional Data Tables	Condensate Column Added to Water Connections Table, Rows Consolidated in Cabinet, Knockout and Discharge Tables
10/16/08	Created	