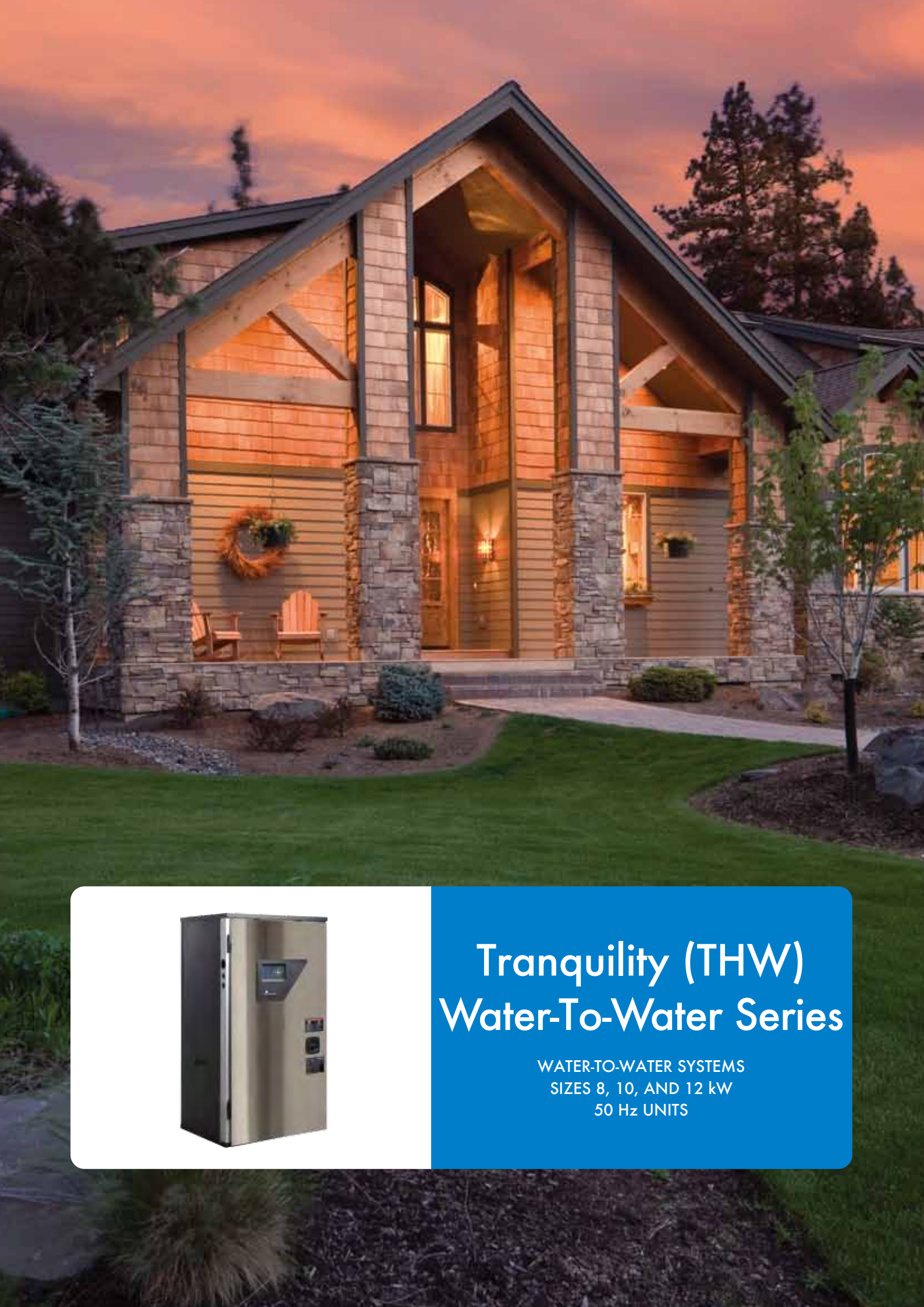


Tranquility (THW) Water-To-Water Series

WATER-TO-WATER SYSTEMS
SIZES 8, 10, AND 12 kW
50 Hz UNITS

Tranquility Water-To-Water (THW) Series Features

The Tranquility High Temperature (THW) Series Water-to-Water Heat Pump

The THW Series is unlike any other water-to-water heat pump on the market today. The large operating map of the scroll compressor allows high temperature operation, up to 63°C leaving load water temperature even at 0°C entering source water temperature. The combination of a coaxial (tube-in-tube) heat exchanger for the source (ground loop) side and a brazed plate heat exchanger for the load (heating/hot water) side provides very high efficiencies. Integral controls for hydronic heating and domestic water heating avoid the need for external microprocessor-based controls for outdoor temperature reset, warm weather shutdown, staging and other controls.

Available in sizes 8kW, 10kW and 12kW, the THW offers a heat pump for most any installation. The THW has an extended range refrigeration circuit, capable of ground loop (geothermal) applications as well as open loop (well water) applications. Standard features and factory-installed options are many. Unique application-specific controls make the THW Series ideal for hydronic heating and domestic hot water generation. The heating-only refrigeration circuit is optimized for high water temperatures, heating efficiencies, and capacities.

ClimateMaster's exclusive double isolation compressor mounting system, insulated compressor enclosure, and compressor discharge muffler make the THW Series one of the quietest water-to-water heat pumps available. The attractive "Euro-style" cabinet allows the unit to fit into any decor.

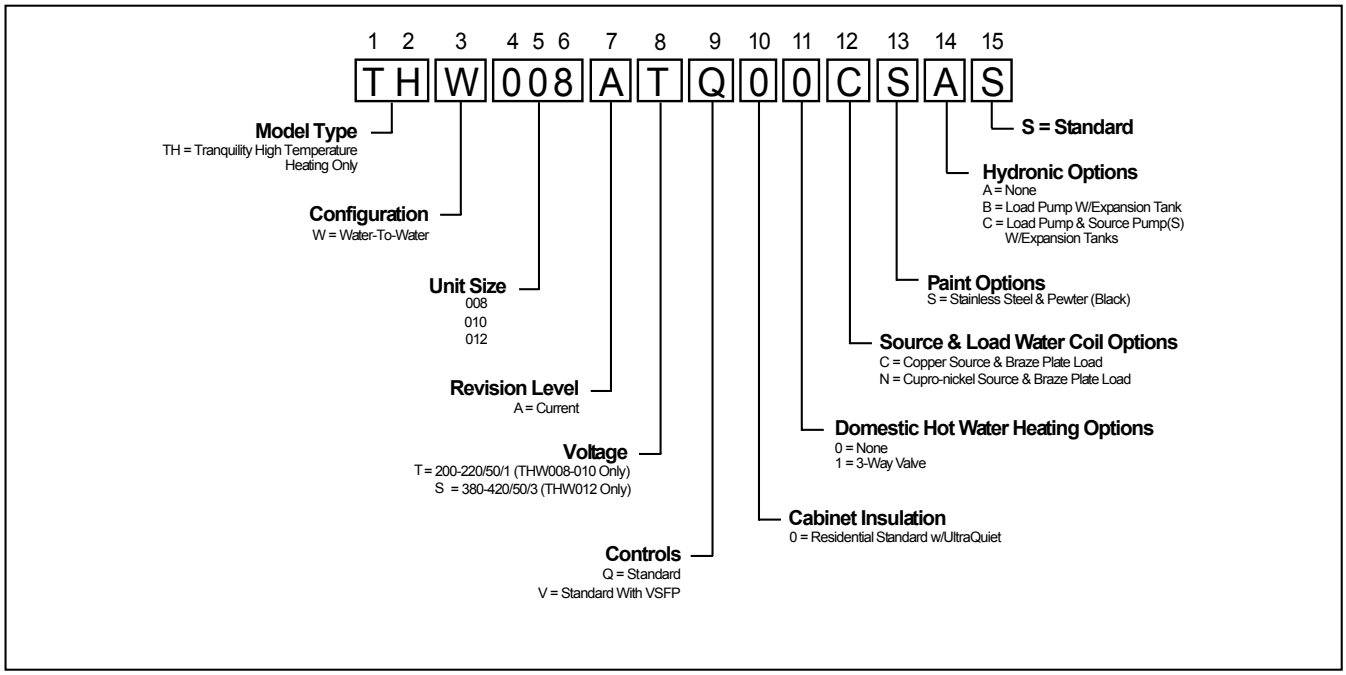
Unit Features

- Sizes 8kW, 10kW, and 12kW
- High temperature scroll compressor, up to 63°C leaving water temperature
- Ultra high efficiencies (4.2 COP at ground loop conditions; up to 5.5 COP at ground water conditions!)
- Built-in programmable controller with Outdoor Temperature Reset and Warm Weather Shutdown
- Large, back-lit digital user interface
- Rugged coaxial (tube-in-tube) "Source" heat exchanger (copper or cupro-nickel)
- Close approach temperature brazed plate stainless steel "Load" heat exchanger
- Galvanized steel construction with protective powder coat paint and stainless steel, hinged front access door
- Unique double compressor isolation, compressor enclosure, and discharge muffler for UltraQuiet operation
- "Euro-style" cabinet for attractive look
- Hinged front access door and 3 removable panels for ease of installation and service
- Insulated cabinet with foil backed insulation for ease of cleaning
- Flush-mount 1" FPT fittings, secured to the cabinet (no backup wrench required)
- TXV metering device
- 12-point low voltage terminal strip for ease of installation
- Disconnect and CE Mark controls
- Wide variety of options including 3-way valve for domestic hot water generation, factory-installed internal load and source pump(s) and factory-installed expansion tanks.

Tranquility Water-To-Water (THW) Series Features

1. Euro-Style Cabinet For Attractive Look
2. High Temperature Scroll Compressor
3. Rugged Coaxial "Source" Heat Exchanger
4. Close Approach Temperature Brazed Plate Stainless Steel "Load" Heat Exchanger
5. Optional Full Condensing Hot Water Generation With 3-Way Valve
6. Optional Factory Installed "Load" and "Source" Pumps
7. Optional Factory Installed Expansion Tanks
8. Fully Insulated Water and Refrigerant Lines
9. Fully Insulated Compressor Section
10. Powder Coated Galvanized Steel Cabinet and Stainless Steel Front Access Panel For Long Life
11. Large Backlight User Interface
12. Built-In Programmable Controller With Outdoor Temperature Reset and Warm Weather Shutdown
13. Exclusive Double Compressor Isolation, Compressor Enclosure, and Compressor Discharge Muffler For UltraQuiet Operation
14. Hinged Front Access Door and Three Removable Panels For Ease of Installation and Service
15. 12-Point Terminal Strip For Ease of Low Voltage Wiring (Thermistor Wiring and CE Mark Controls)
16. Service Disconnect

Model Key


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
T H W 0 0 8 A T Q 0 0 C S A S
Model Type
TH = Tranquility High Temperature Heating Only
Configuration
W = Water-To-Water
Unit Size
008
010
012
Revision Level
A = Current
Voltage
T = 200-220/50/1 (THW008-010 Only)
S = 380-420/50/3 (THW012 Only)
Controls
Q = Standard
V = Standard With VSFP
Cabinet Insulation
0 = Residential Standard w/UltraQuiet
Domestic Hot Water Heating Options
0 = None
1 = 3-Way Valve
Source & Load Water Coil Options
C = Copper Source & Braze Plate Load
N = Cupro-nickel Source & Braze Plate Load
Paint Options
S = Stainless Steel & Pewter (Black)
Hydronic Options
A = None
B = Load Pump W/Expansion Tank
C = Load Pump & Source Pump(S) W/Expansion Tanks
S = Standard

Rated Equipment Performance & Efficiencies

50Hz Units	Ground Loop Heat Pump				Ground Water Heat Pump			
Model	Heating				Heating			
	Indoor 30/35°C, Outdoor 0/-3°C*		Indoor 40/45°C, Outdoor 0/-3°C*		Indoor 30/35°C, Outdoor 10/7°C*		Indoor 40/45°C, Outdoor 10/7°C*	
	Capacity	COP	Capacity	COP	Capacity	COP	Capacity	COP
	kW	W/W	kW	W/W	kW	W/W	kW	W/W
THW008	7.81	4.2	7.20	3.2	10.68	5.5	9.85	4.2
THW010	9.84	4.2	9.29	3.2	12.85	5.2	12.02	4.1
THW012	13.15	4.2	12.44	3.3	15.74	4.8	15.69	4.1

*Indoor temperature is also called “Load;” outdoor temperature is also called “Source.” Numbers shown with “/” indicate entering/leaving water temperatures. Bold outline indicates typical radiant floor application temperatures. All ratings are based upon standard EN 14511-2.

Performance Data (50Hz) - THW008

50Hz - S-I Units

Source				Load													
EWT °C	Flow		WPD kPa	EWT °C	0.265 l/s [15.9 l/m]						0.353 l/s [21.2 l/m]					
	l/s	l/m			HC kW	Power kW	HE kW	LWT °C	COP W/W	WPD kPa	HC kW	Power kW	HE kW	LWT °C	COP W/W	WPD kPa
-1	0.404	24.3	4.03	21	8.0	1.44	6.6	28.5	5.6	2.34	8.1	1.39	6.7	26.6	5.8	4.41
				32	7.4	1.98	5.4	39.0	3.7	1.79	7.5	1.93	5.5	37.3	3.9	3.72
				43	6.8	2.45	4.3	49.7	2.8	1.24	6.8	2.40	4.5	48.0	2.9	2.96
				54	6.2	3.03	3.1	60.1	2.0	0.97	6.2	2.99	3.2	58.7	2.1	2.48
10	0.404	24.3	3.28	21	10.8	1.48	9.3	31.2	7.3	2.34	10.9	1.40	9.5	28.4	7.8	4.41
				32	10.0	2.07	8.0	41.5	4.9	1.79	10.1	1.98	8.1	39.1	5.1	3.72
				43	9.2	2.57	6.7	52.0	3.6	1.24	9.3	2.49	6.8	49.7	3.7	2.96
				54	8.4	3.19	5.2	62.3	2.6	0.97	8.5	3.12	5.4	60.4	2.7	2.48
21	0.404	24.3	2.41	21	13.6	1.52	12.0	33.9	8.9	2.34	13.7	1.41	12.3	30.2	9.7	4.41
				32	12.7	2.15	10.5	44.1	5.9	1.79	12.8	2.04	10.8	40.8	6.3	3.72
				43	11.7	2.69	9.0	54.3	4.3	1.24	11.8	2.58	9.2	51.4	4.6	2.96
				54	10.7	3.36	7.3	64.4	3.2	0.97	10.8	3.24	7.6	62.0	3.3	2.48

THW operating parameters are as follows: Min Source EWT = -6°C; Max Load LWT = 63°C (see application section for design guidelines).
Interpolation is permissible; extrapolation is not.
Operation below 4°C EWT (source) is based upon 15% antifreeze solution.
All performance data is based upon the lower voltage of dual voltage units.
Antifreeze for source water is required for operation in the shaded area and all source EWTs below 4°C.

Performance Data (50Hz) - THW010

50Hz - S-I Units

Source				Load													
EWT °C	Flow		WPD kPa	EWT °C	0.341 l/s [20.5 l/m]						0.461 l/s [27.7 l/m]					
	l/s	l/m			HC kW	Power kW	HE kW	LWT °C	COP W/W	WPD kPa	HC kW	Power kW	HE kW	LWT °C	COP W/W	WPD kPa
-1	0.524	31.5	5.68	21	10.4	1.86	8.6	28.8	5.6	4.20	10.5	1.79	8.7	26.8	5.9	7.79
				32	9.6	2.56	7.1	39.3	3.8	3.45	9.7	2.50	7.2	37.6	3.9	6.68
				43	8.8	3.15	5.7	50.0	2.8	2.69	8.9	3.01	5.8	48.3	2.9	5.65
				54	8.0	3.91	4.1	60.5	2.1	2.21	8.1	3.85	4.2	59.1	2.1	4.82
10	0.524	31.5	4.90	21	14.0	1.91	12.1	31.5	7.3	4.20	14.2	1.81	12.4	28.6	7.8	7.79
				32	13.0	2.67	10.4	41.8	4.9	3.45	13.2	2.56	10.6	39.3	5.1	6.68
				43	12.0	3.31	8.7	52.3	3.6	2.69	12.1	3.21	8.9	50.1	3.8	5.65
				54	11.0	4.12	6.8	62.7	2.7	2.21	11.1	4.02	7.1	60.8	2.8	4.82
21	0.524	31.5	4.03	21	17.6	1.97	15.7	34.2	9.0	4.20	17.8	1.82	16.0	30.5	9.8	7.79
				32	16.5	2.77	13.7	44.4	5.9	3.45	16.6	2.63	14.0	41.1	6.3	6.68
				43	15.2	3.48	11.7	54.6	4.4	2.69	15.4	3.33	12.0	51.8	4.6	5.65
				54	13.9	4.33	9.6	64.8	3.2	2.21	14.0	4.19	9.9	62.4	3.4	4.82

THW operating parameters are as follows: Min Source EWT = -6°C; Max Load LWT = 63°C (see application section for design guidelines).
Interpolation is permissible; extrapolation is not.
Operation below 4°C EWT (source) is based upon 15% antifreeze solution.
All performance data is based upon the lower voltage of dual voltage units.
Antifreeze for source water is required for operation in the shaded area and all source EWTs below 4°C.

Performance Data (50Hz) - THW012

50Hz - S-I Units

Source				Load													
EWT °C	Flow		WPD kPa	EWT °C	0..423 l/s [25.4 l/m]						0.562 l/s [33.7 l/m]					
	l/s	l/m			HC kW	Power kW	HE kW	LWT °C	COP W/W	WPD kPa	HC kW	Power kW	HE kW	LWT °C	COP W/W	WPD kPa
-1	0.644	38.7	6.09	21	12.9	2.36	10.6	29.0	5.5	6.48	13.0	2.27	10.8	27.0	5.7	10.61
				32	11.9	3.25	8.7	39.6	3.7	5.51	12.0	3.17	8.9	37.9	3.8	9.51
				43	10.9	4.01	6.9	50.4	2.7	4.55	11.0	3.93	7.1	48.7	2.8	8.41
				54	9.9	4.97	5.0	60.9	2.0	3.93	10.0	4.89	5.2	59.5	2.1	7.51
10	0.644	38.7	5.02	21	17.4	2.43	15.0	31.7	7.2	6.48	17.6	2.29	15.3	28.9	7.7	10.61
				32	16.2	3.39	12.8	42.1	4.8	5.51	16.3	3.25	13.1	39.6	5.0	9.51
				43	14.9	4.21	10.7	52.7	3.5	4.55	15.0	4.08	11.0	50.4	3.7	8.41
				54	13.6	5.23	8.4	63.1	2.6	3.93	13.7	5.10	8.6	61.2	2.7	7.51
21	0.644	38.7	4.29	21	21.9	2.50	19.4	34.4	8.8	6.48	22.1	2.31	19.8	30.7	9.6	10.61
				32	20.4	3.52	16.9	44.7	5.8	5.51	20.6	3.33	17.3	41.4	6.2	9.51
				43	18.9	4.41	14.4	55.0	4.3	4.55	19.0	4.23	14.8	52.1	4.5	8.41
				54	17.2	5.50	11.7	65.2	3.1	3.93	17.4	5.32	12.1	62.8	3.3	7.51

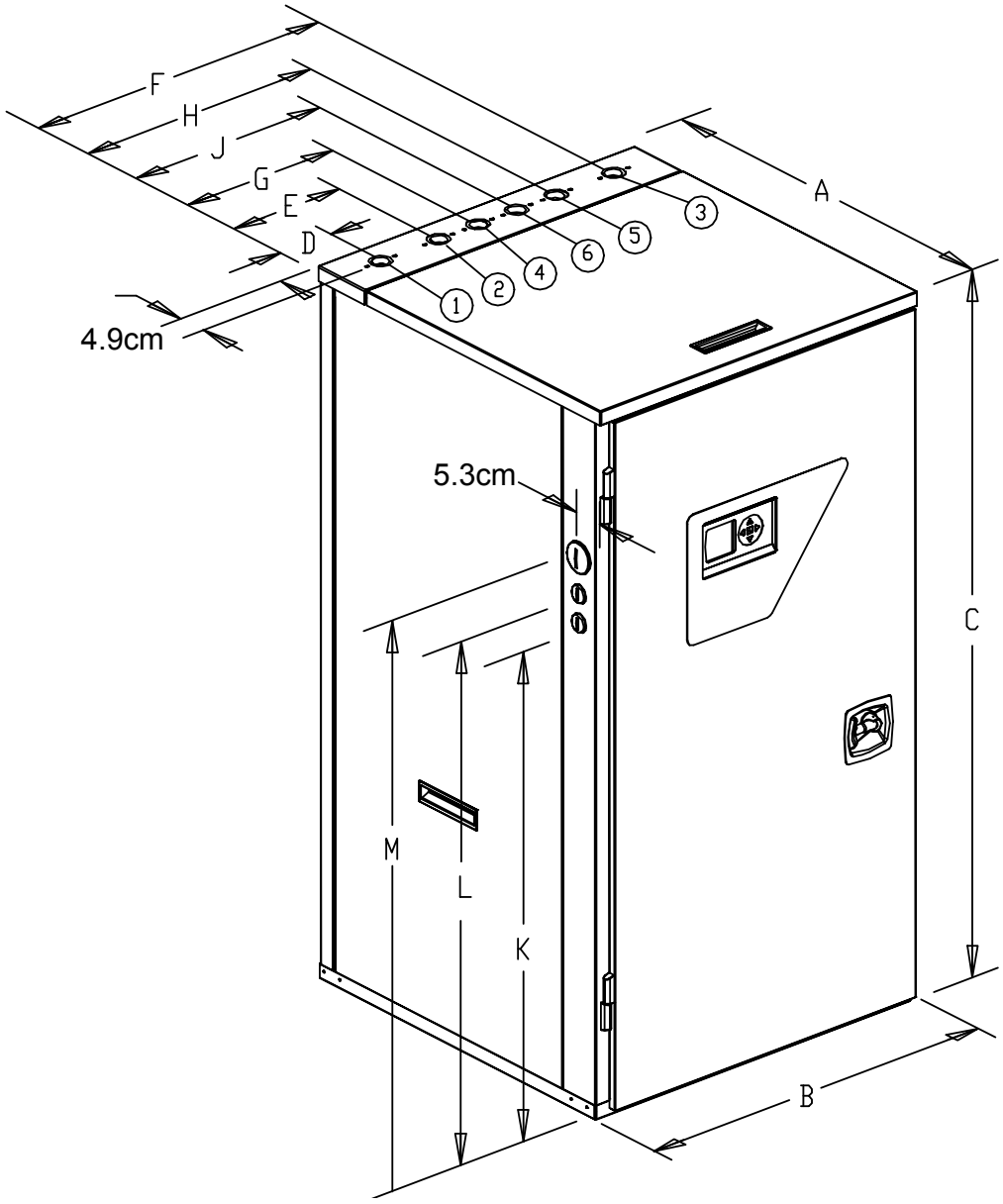
THW operating parameters are as follows: Min Source EWT = -6°C; Max Load LWT = 63°C (see application section for design guidelines).
Interpolation is permissible; extrapolation is not.
Operation below 4°C EWT (source) is based upon 15% antifreeze solution.
All performance data is based upon the lower voltage of dual voltage units.
Antifreeze for source water is required for operation in the shaded area and all source EWTs below 4°C.

Physical Data

Model	008	010	012
Compressor (qty)	Scroll (1)		
Factory Charge HFC-410A [kg]	2.51	2.50	2.84
Indoor/Load Water Connection Size			
FPT	1	1	1
Outdoor/Source Water Connection Size			
FPT	1	1	1
Domestic Hot Water Connection Size			
FPT	1	1	1
Weight - Operating, [kg]	207	207	234
Weight - Packaged, [kg]	214	214	241

Dual isolation compressor mounting
Balanced Port Expansion Valve (TXV)
Insulated Source and Load Water Coils
FPT - Female Pipe Thread

THW Dimensions



Model		Overall Cabinet			Water Connections						Electric Access Plugs		
					1	2	3	4	5	6			
		A Depth	B Width	C Height	D Source (Outdoor) Water In	E Source (Outdoor) Water Out	F Load (Indoor) Water In	G Load (Indoor) Water Out	H DHW Return In	J DHW Water Out	K Low Voltage	L Low Voltage	M Power Supply
008	cm.	68.1	65.1	124.2	8.6	20.6	56.6	28.7	45.0	36.6	85.3	90.4	96.5
010	cm.	68.1	65.1	124.2	8.6	20.6	56.6	28.7	45.0	36.6	85.3	90.4	96.5
012	cm.	68.1	65.1	124.2	8.6	20.6	56.6	28.7	45.0	36.6	85.3	90.4	96.5

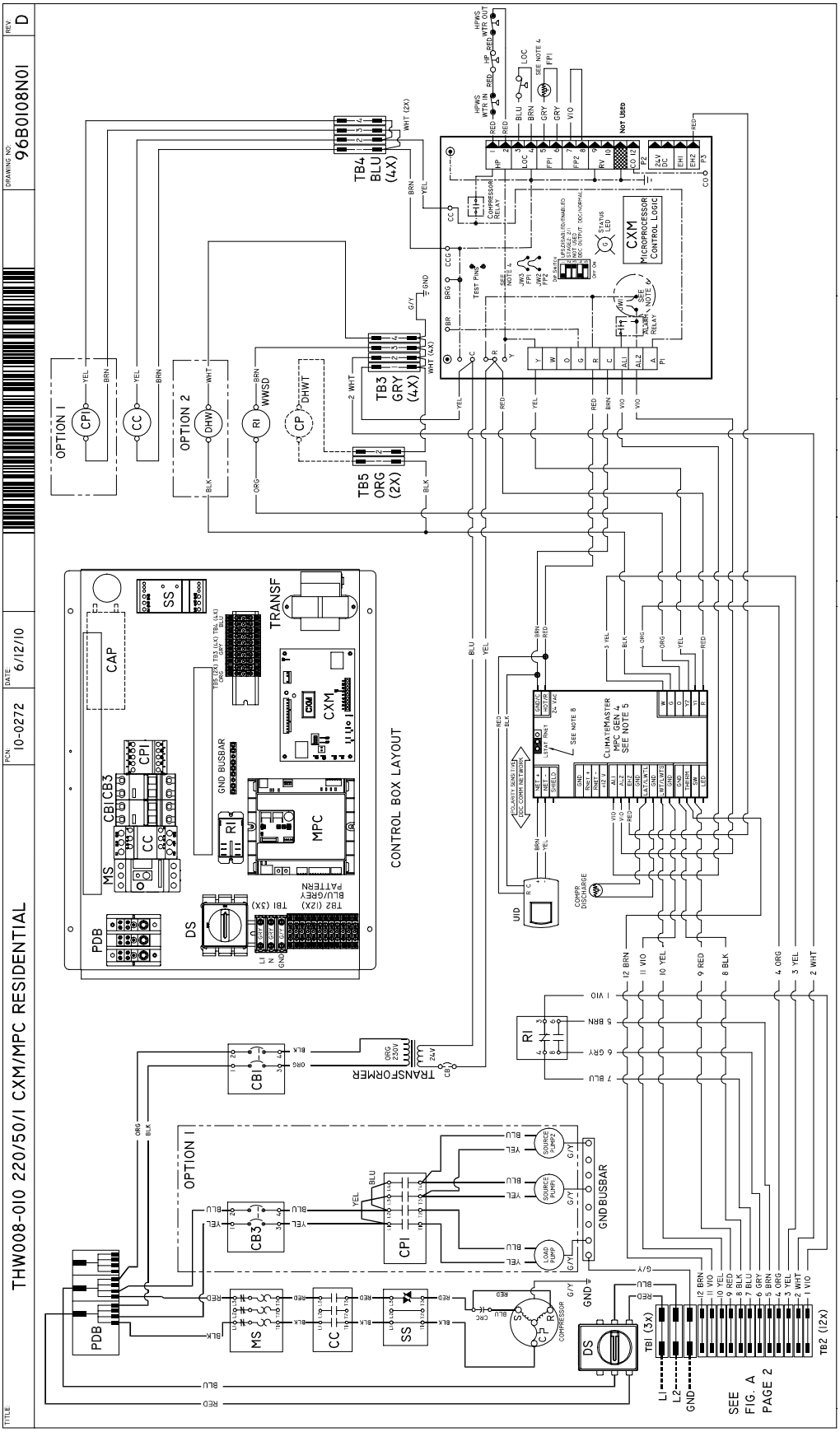
Electrical Data

Model	Voltage Code	Voltage	Min/Max Voltage	Compressor			Load Pump FLA	Source Pump (1) FLA	Source Pump (2) FLA	Total Unit FLA	Min Circuit Amps	Max Fuse
				Qty	RLA	LRA						
THW008	T	200-220/50/1	190/242	1	18.9	94	-	-	-	18.9	23.6	40
							0.8	-	-	19.7	24.4	40
							0.8	0.8	-	20.5	25.2	40
	S	380-420/50/3	361/462	1	6.6	39	-	-	-	6.6	8.3	15
							0.8	-	-	7.4	9.1	15
							0.8	0.8	-	8.2	9.9	15
THW010	T	200-220/50/1	190/242	1	24.7	121	-	-	-	24.7	30.9	50
							0.8	-	-	25.5	31.7	50
							0.8	0.8	0.8	27.1	33.3	50
	S	380-420/50/3	361/462	1	7.9	41	-	-	-	7.9	9.9	15
							0.8	-	-	8.7	10.7	15
							0.8	0.8	0.8	10.3	12.3	20
THW012	S	380-420/50/3	361/462	1	9.8	70	-	-	-	9.8	12.3	20
							1.07	-	-	10.9	13.3	20
							1.07	1.07	1.07	13	15.5	25

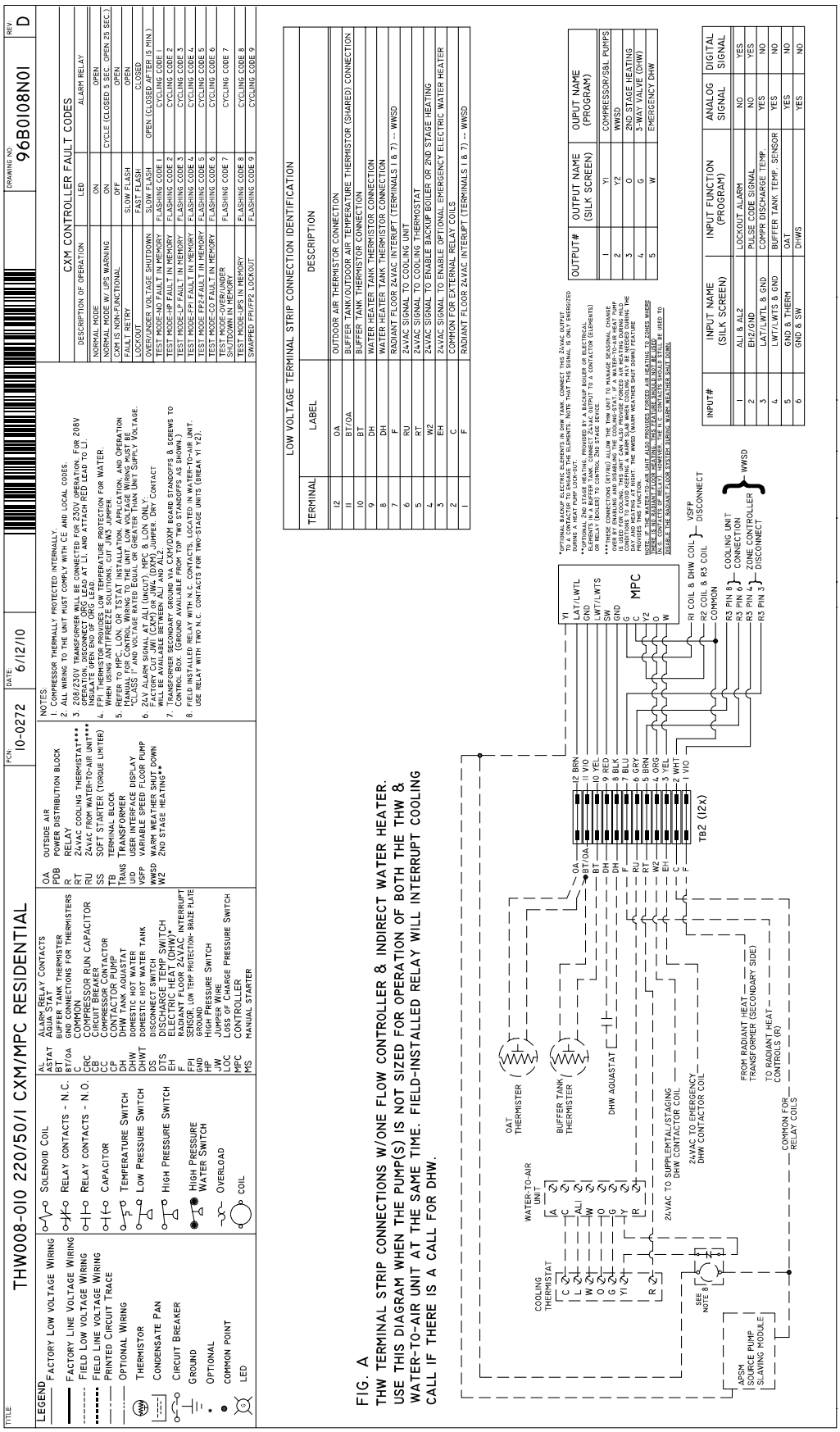
Wiring Diagram Matrix

Model	Diagram Number	Voltage	Option
THW008	96B0108N01	220/50/1	-
THW008	96B0108N02	220/50/1	VSFP
THW012	97B0108N03	380-420/50/3	-
THW012	97B0108N04	380-420/50/3	VSFP

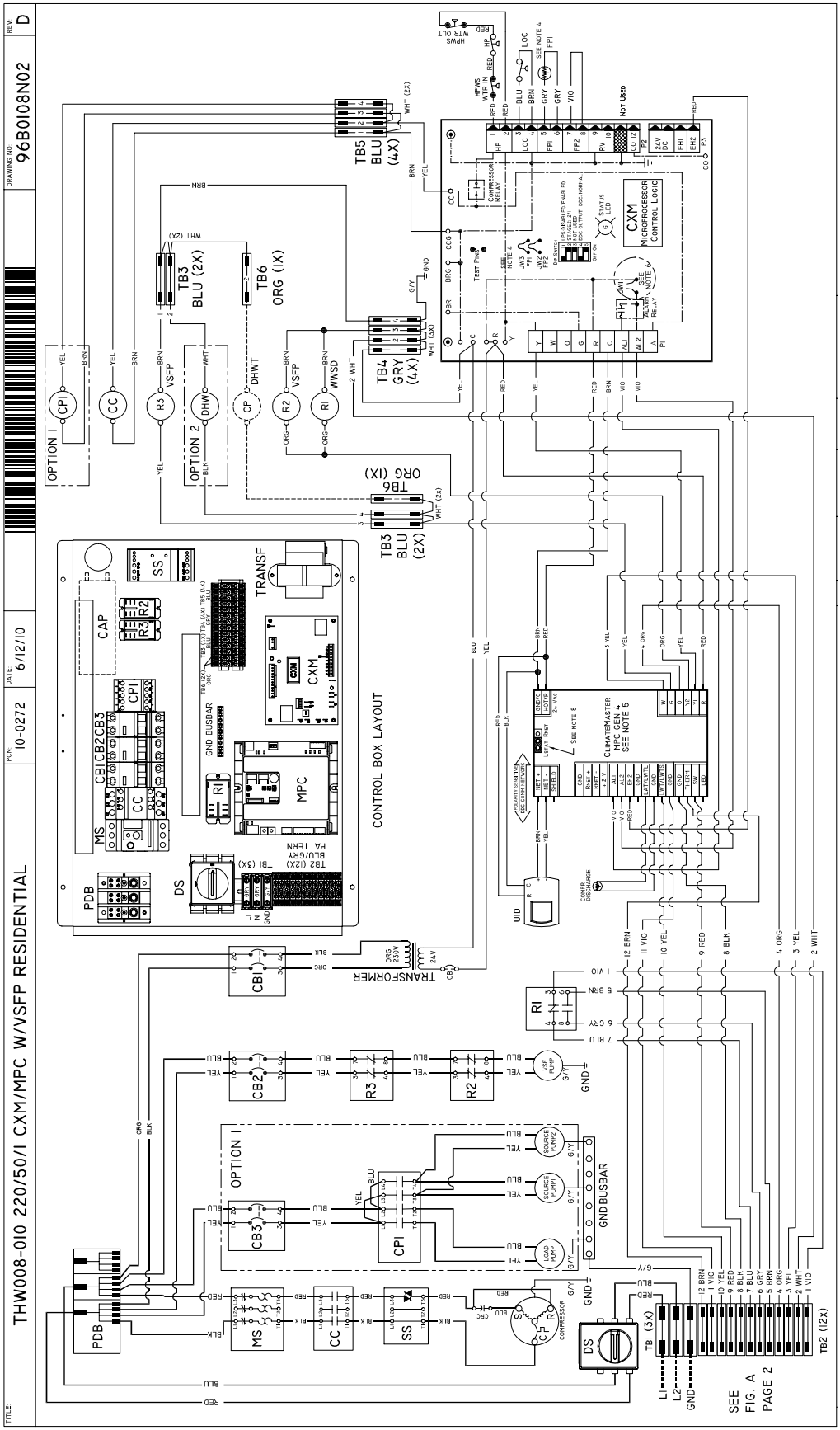
THW008 - 012 Electrical Wiring Diagram - 220/50/1
96B0108N01



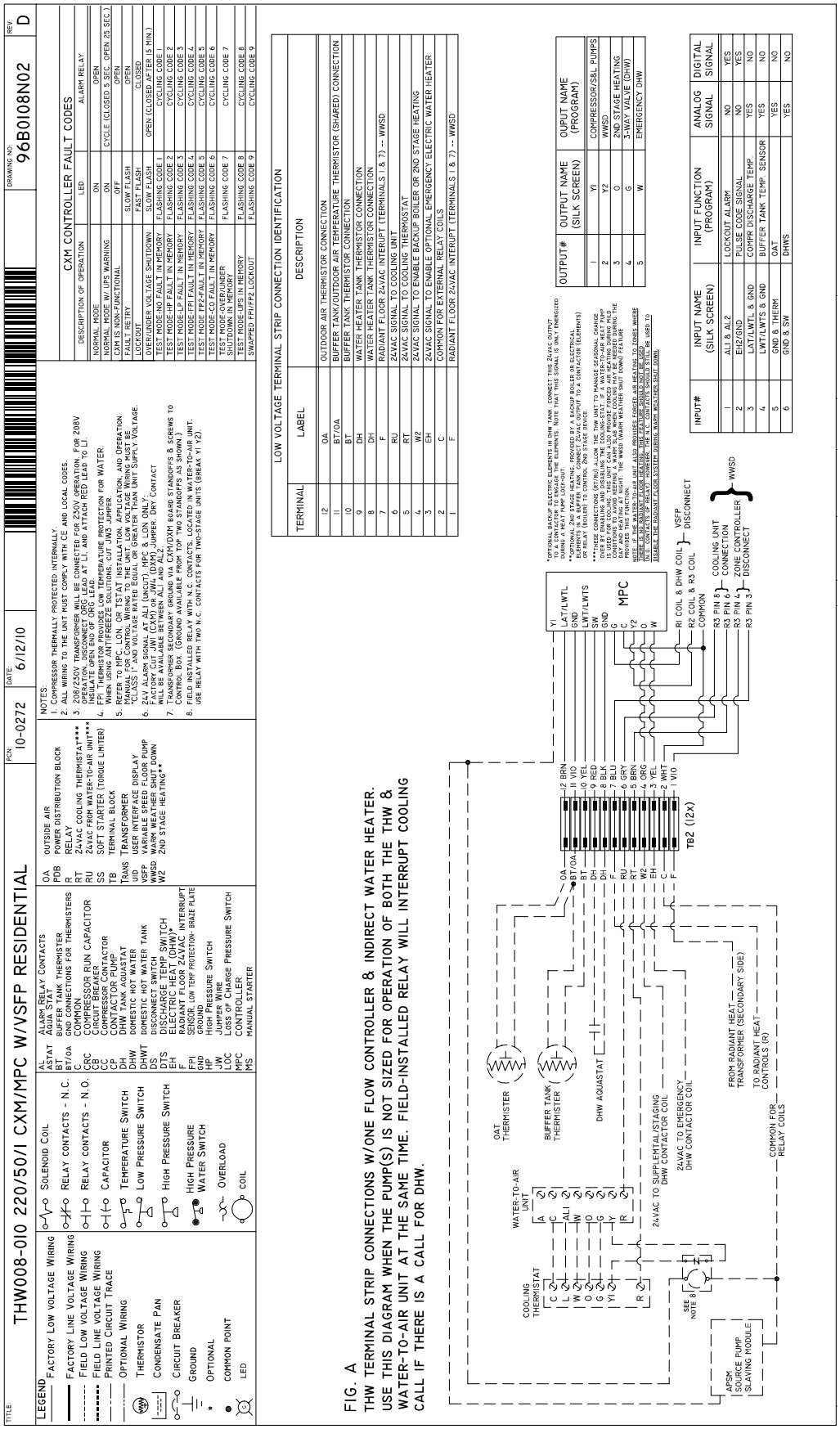
THW008 - 012 Electrical Wiring Diagram - 220/50/1
96B0108N01



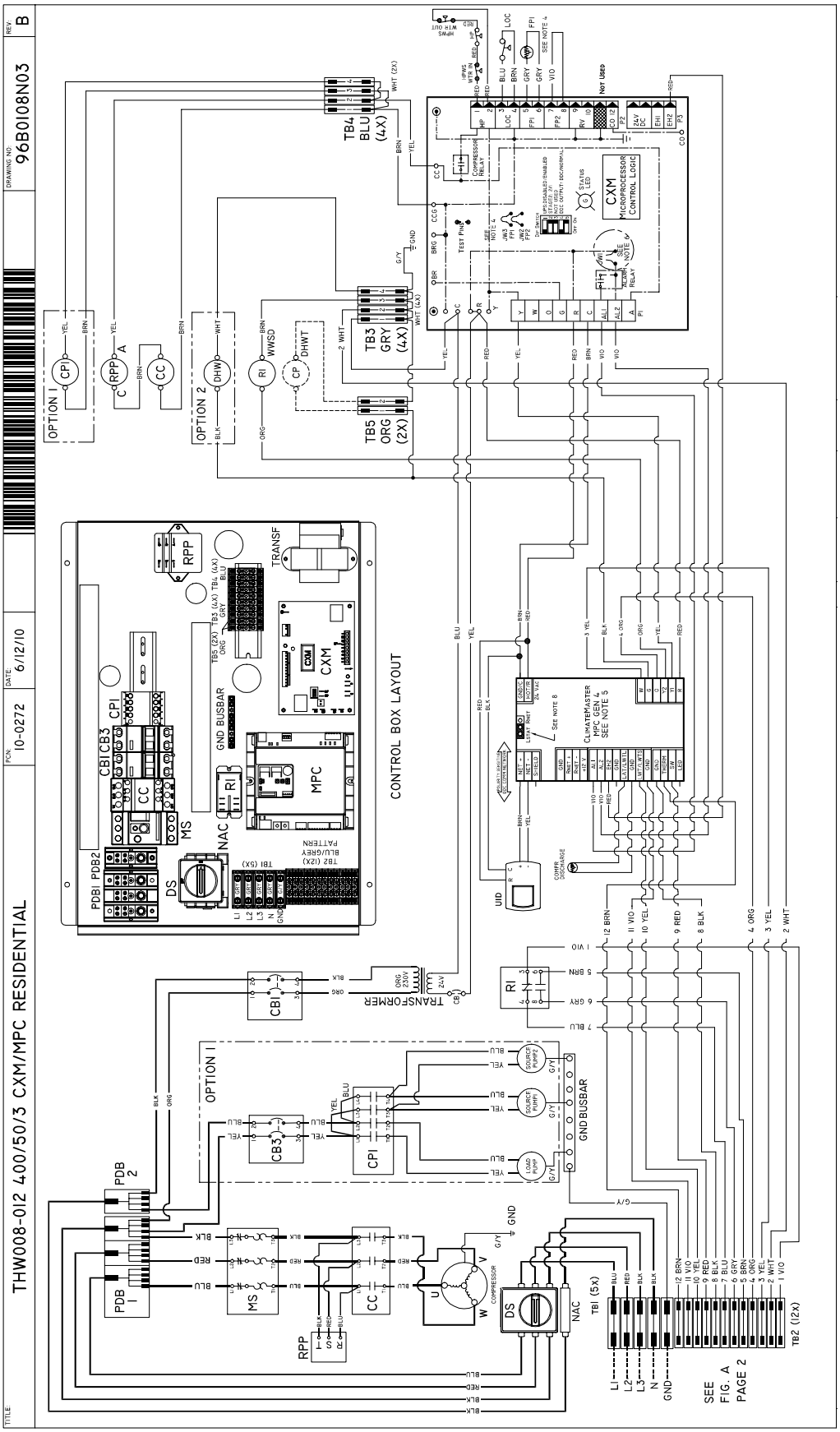
THW008 - 012 Electrical Wiring Diagram - 220/50/1
VSFP - 96B0108N02



THW008 - 012 Electrical Wiring Diagram - 220/50/1
VSFP - 96B0108N02



THW008 - 012 Electrical Wiring Diagram - 420/50/3
96B0108N03



THW008 - 012 Electrical Wiring Diagram - 420/50/3
96B0108N03

TITLE: THW008-012 400/50/3 CXM/MPC RESIDENTIAL

PCN: 10-0272 | DATE: 6/12/10 | DRAWING NO: 96B0108N03 | REV: B

LEGEND

- Factory Low voltage Wiring
- Factory Line Voltage Wiring
- Field Low voltage Wiring
- Field Line voltage Wiring
- Printed Circuit Trace
- Optional Wiring
- Thermistor
- Condensate Pan
- Circuit Breaker
- Ground
- * Optional
- Common point
- LED
- Solenoid Coil
- Relay contacts - N.C.
- Relay contacts - N.O.
- Capacitor
- Temperature Switch
- Low Pressure Switch
- High Pressure Switch
- High Pressure Water Switch
- Overload
- Coil

AL	Alarm Relay Contacts
ASTAT	Aqua Stat
BT	Buffer tank thermister
BT/OA	GND connections for thermisters
C	Common
CRC	Compressor Run Capacitor
CB	Circuit Breaker
CC	Compressor Contactor
CP	Contactor Pump
DH	DHW tank aquastat
DHW	Domestic hot water
DHWT	Domestic hot water tank
DS	Disconnect switch
DTS	Discharge Temp Switch
EH	Electric Heat (DHW)*
F	Radiant Floor 24VAC Interrupt
FPI	Sensor, low temp protection- braze plate
GND	Ground
HP	High Pressure Switch
JW	Jumper Wire
LOC	Loss of Charge Pressure Switch
MPC	Controller
MS	Manual Starter
NAC	Nuetral auxiliary contact
OA	Outside air
RDB	Power distribution block
	Relay
RPP	Reverse phase protector
RT	24VAC cooling thermistat***
RU	24VAC from water-to-air unit***
SS	Soft Starter (torque limiter)
TB	Terminal block
TRANS	Transformer
UID	User interface display
VSFP	Variable speed floor pump
WWSD	Warm weather shut down
W2	2nd stage heating**

NOTES:

1. Compressor thermally protected internally.
2. All wiring to the unit must comply with CE and local codes.
3. 208/230V transformer will be connected for 230V operation. For 208V operation, disconnect ORG lead at L1, and attach RED lead to L1. Insulate open end of ORG lead.
4. FP1 thermistor provides low temperature protection for water. When using antifreeze solutions, cut JW3 jumper.
5. Refer to MPC, LON, or TSTAT installation, application, and operation manual for control wiring to the unit. Low voltage wiring must be "Class 1" and voltage rated equal or greater than unit supply voltage.
6. 24V alarm signal at AL1 (uncut), MPC & LON only: Factory cut JW1 (CXM) or JW4 (DXM) jumper. Dry contact will be available between AL1 and AL2.
7. Transformer secondary ground via CXM/DXM board standoffs & screws to control box. (Ground available from top two standoffs as shown.)
8. Field installed relay with N.C. contacts, located in water-to-air unit. Use relay with two N.C. contacts for two-stage units (break Y1 Y2).

CXM CONTROLLER FAULT CODES

DESCRIPTION OF OPERATION	LED	ALARM RELAY
NORMAL MODE	ON	OPEN
NORMAL MODE W/ UPS WARNING	ON	CYCLE (CLOSED 5 SEC. OPEN 25 SEC.)
CXM IS NON-FUNCTIONAL	OFF	OPEN
FAULT RETRY	SLOW FLASH	OPEN
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-FP1 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-OVER/UNDER SHUTDOWN IN MEMORY	FLASHING CODE 7	CYCLING CODE 7
TEST MODE-UPS IN MEMORY	FLASHING CODE 8	CYCLING CODE 8
SWAPPED FP1/FP2 LOCKOUT	FLASHING CODE 9	CYCLING CODE 9

LOW VOLTAGE TERMINAL STRIP CONNECTION IDENTIFICATION

TERMINAL	LABEL	DESCRIPTION
12	OA	OUTDOOR AIR THERMISTOR CONNECTION
11	BT/OA	BUFFER TANK/OUTDOOR AIR TEMPERATURE THERMISTOR (SHARED) CONNECTION
10	BT	BUFFER TANK THERMISTOR CONNECTION
9	DH	WATER HEATER TANK THERMISTOR CONNECTION
8	DH	WATER HEATER TANK THERMISTOR CONNECTION
7	F	RADIANT FLOOR 24VAC INTERUPT (TERMINALS 1 & 7) -- WWSD
6	RU	24VAC SIGNAL TO COOLING UNIT
5	RT	24VAC SIGNAL TO COOLING THERMOSTAT
4	W2	24VAC SIGNAL TO ENABLE BACKUP BOILER OR 2ND STAGE HEATING
3	EH	24VAC SIGNAL TO ENABLE OPTIONAL EMERGENCY ELECTRIC WATER HEATER
2	C	COMMON FOR EXTERNAL RELAY COILS
1	F	RADIANT FLOOR 24VAC INTERUPT (TERMINALS 1 & 7) -- WWSD

OUTPUT#	OUTPUT NAME (SILK SCREEN)	OUPUT NAME (PROGRAM)
1	Y1	COMPRESSOR/S&L PUMPS
2	Y2	WWSD
3	O	2ND STAGE HEATING
4	G	3-WAY VALVE (DHW)
5	W	EMERGENCY DHW

INPUT#	INPUT NAME (SILK SCREEN)	INPUT FUNCTION (PROGRAM)	ANALOG SIGNAL	DIGITAL SIGNAL
1	AL1 & AL2	LOCKOUT ALARM	NO	YES
2	EH2/GND	PULSE CODE SIGNAL	NO	YES
3	LAT/LWTL & GND	COMPR DISCHARGE TEMP.	YES	NO
4	LWT/LWTS & GND	BUFFER TANK TEMP. SENSOR	YES	NO
5	GND & THERM	OAT	YES	NO
6	GND & SW	DHWS	YES	NO

*OPTIONAL BACKUP ELECTRIC ELEMENTS IN DHW TANK. CONNECT THIS 24VAC OUTPUT TO A CONTACTOR TO ENGAGE THE ELEMENTS. NOTE THAT THIS SIGNAL IS ONLY ENERGIZED DURING A HEAT PUMP LOCK-OUT.

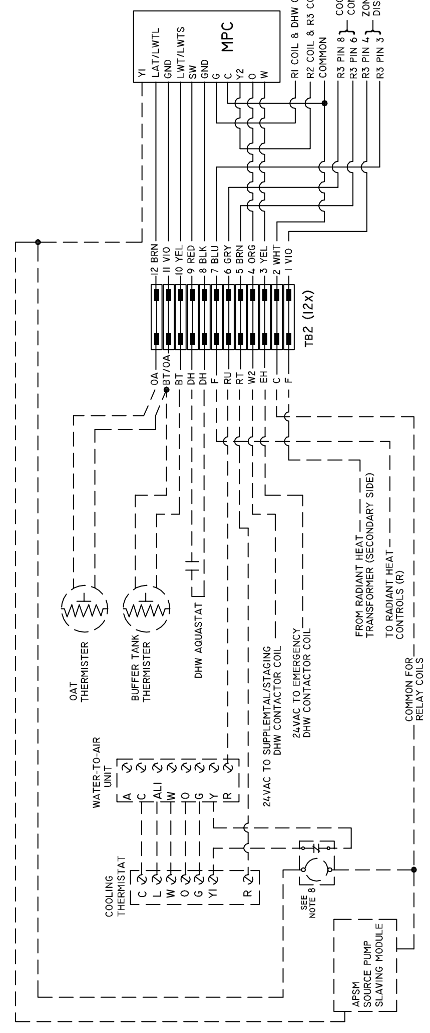
**OPTIONAL 2ND STAGE HEATING, PROVIDED BY A BACKUP BOILER OR ELECTRICAL ELEMENTS IN A BUFFER TANK. CONNECT 24VAC OUTPUT TO A CONTACTOR (ELEMENTS) OR RELAY (BOILER) TO CONTROL 2ND STAGE DEVICE.

***THESE CONNECTIONS (RT/RU) ALLOW THE THW UNIT TO MANAGE SEASONAL CHANGE OVER BY ENABLING AND DISABLING THE COOLING-STAT. IF A WATER-TO-AIR HEAT PUMP IS USED FOR COOLING, THIS UNIT CAN ALSO PROVIDE FORCED AIR HEATING DURING MILD CONDITIONS TO AVOID KEEPING A WARM SLAB WHEN COOLING MAY BE NEEDED DURING THE DAY AND HEATING AT NIGHT. THE WWSD (WARM WEATHER SHUT DOWN) FEATURE PROVIDES THIS FUNCTION.

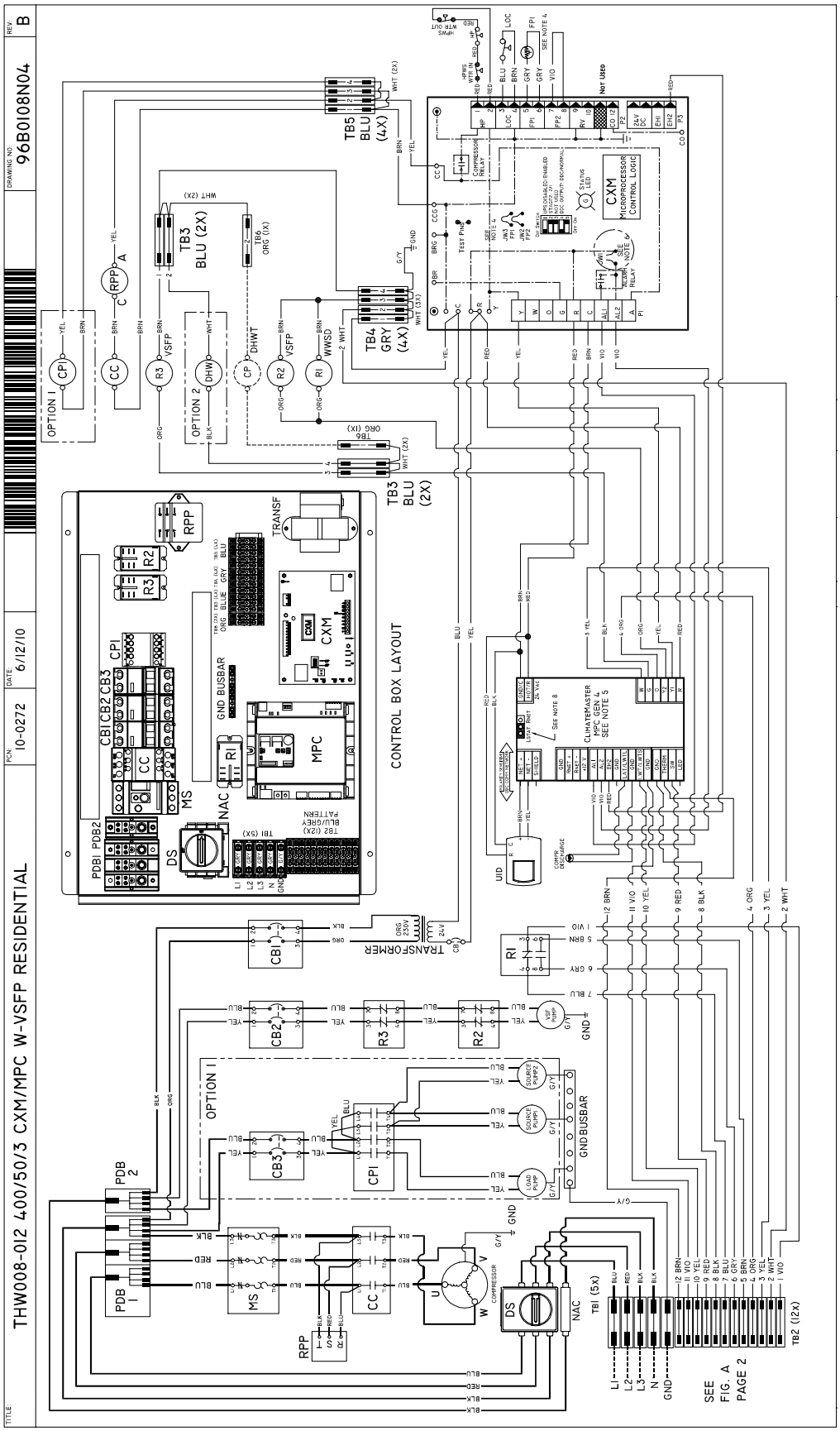
NOTE: IF THE WATER-TO-AIR UNIT ALSO PROVIDES FORCED AIR HEATING TO ZONES WHERE THERE IS NO RADIANT FLOOR HEATING, THIS FEATURE SHOULD NOT BE USED (N.O. CONTACTS OF RELAY). HOWEVER, THE N.C. CONTACTS SHOULD STILL BE USED TO DISABLE THE RADIANT FLOOR SYSTEM DURING WARM WEATHER SHUT DOWN.

FIG. A

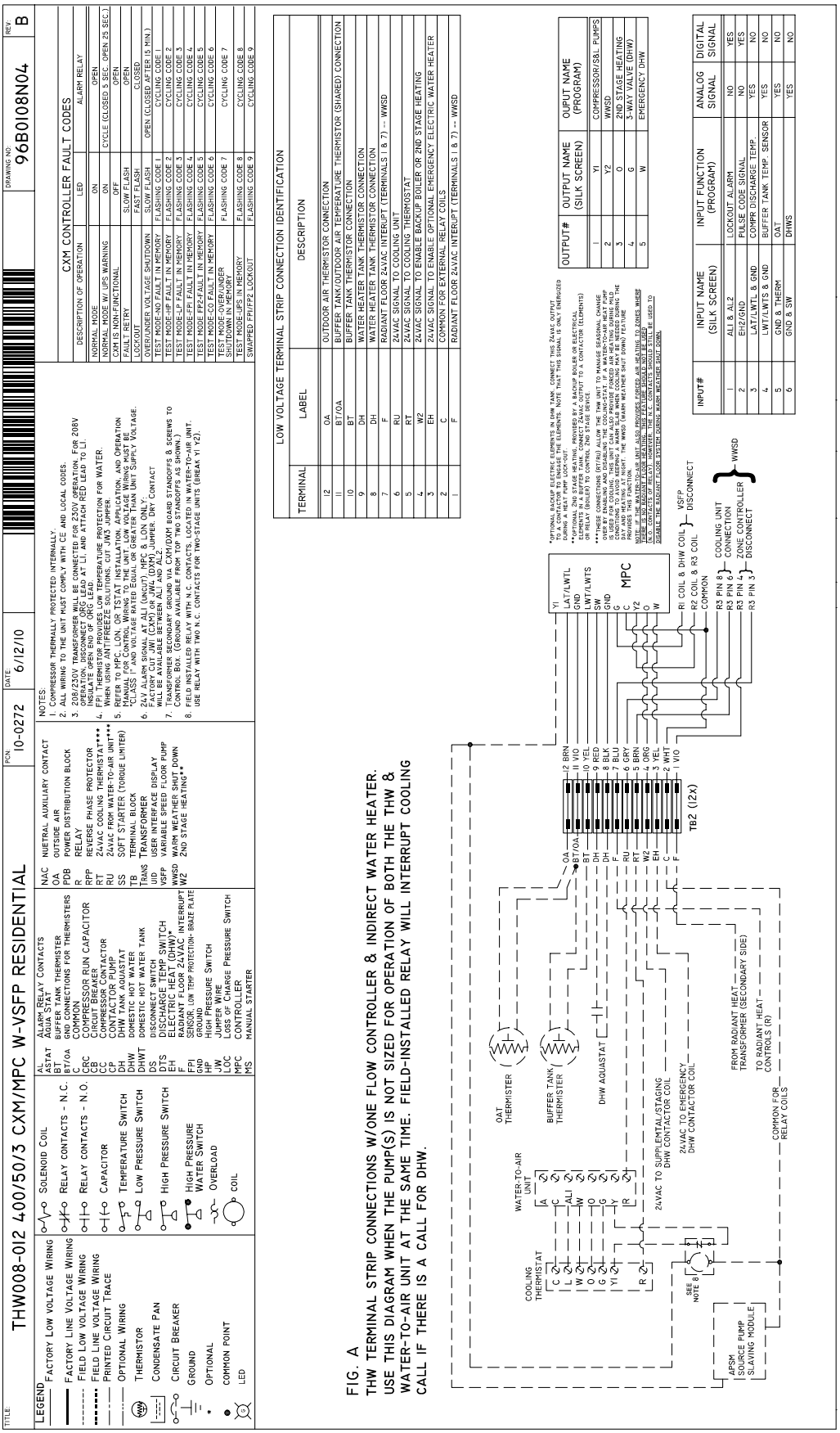
THW TERMINAL STRIP CONNECTIONS W/ONE FLOW CONTROLLER & INDIRECT WATER HEATER. USE THIS DIAGRAM WHEN THE PUMP(S) IS NOT SIZED FOR OPERATION OF BOTH THE THW & WATER-TO-AIR UNIT AT THE SAME TIME. FIELD-INSTALLED RELAY WILL INTERRUPT COOLING CALL IF THERE IS A CALL FOR DHW.



THW008 - 012 Electrical Wiring Diagram - 420/50/3
VSFP - 96B0108N04



THW008 - 012 Electrical Wiring Diagram - 420/50/3
VSFP - 96B0108N04



Engineering Guide Specifications

General
The water-source heating units shall be high temperature water-to-water heat pumps. Units shall be performance rated in accordance with EN 14511-2 or AHRI/ISO/ASHRAE 13256-2. Units shall include CE mark. Each unit shall be water run-tested at the factory. The quality control system shall automatically perform via computer: triple leak check, pressure tests, evacuate and accurately charge system, perform detailed heating mode tests, and quality cross check all operational and test conditions to pass/fail data base. Each unit shall be pallet mounted and shipped with appropriate protective packaging to help avoid damage in transportation.

The units shall be warranted by the manufacturer against defects in materials and workmanship for a period of twelve (12) months from the date of unit start-up or eighteen (18) months from the date of shipment (from CM's factory), whichever comes first. Optional extended warranties are available. The water source units shall be designed to operate with entering Source temperature between -7 and 32°C, and entering Load temperature between 10 and 54°C with a maximum leaving load temperature of 63°C.

Casing & Cabinet
The cabinet shall be fabricated from heavy-gauge galvanized steel and painted with a polyester powder coating. Access door shall be stainless steel and hinged for easy access. The interior shall be insulated with 13mm thick, multi-density, foil-backed coated glass fiber. Four access panels shall be provided and shall be removable with piping in place. The internal component layout shall provide for major service with the unit in place for restricted access installations. The units shall have an insulated compressor section to minimize the transmission of compressor noise.

Refrigerant Circuit
All units shall contain EarthPure® (HFC-410A) sealed refrigerant circuit employing a hermetic motor-compressor, thermal expansion valve, coaxial tube water-to-refrigerant Source heat exchanger, brazed plate Load heat exchanger, compressor discharge muffler, 100% molecular sieve filter drier with XH-11 desiccant, and service ports. An optional 3-way Domestic Hot Water valve shall be available. Compressors shall be scroll type designed for heat pump duty and shall be double isolated from the cabinet with two sets of compressor mounting hardware. Compressor motors shall be single-phase PSC or three-phase with internal over load protection.

The coaxial water-to-refrigerant heat exchangers shall be designed for close approach temperatures and be constructed of a convoluted copper (optional cupro-nickel) inner tube and steel outer tube. The brazed plate heat exchanger shall be designed for close approach temperatures and shall be constructed with stainless steel plates. The thermal expansion valve shall provide proper superheat over the entire fluid temperature range with minimal "hunting". The coaxial heat exchangers and refrigerant suction lines shall be insulated to prevent condensation at low liquid temperatures.

Electrical
CXM Control – A microprocessor-based compressor controller shall be provided to monitor and control unit operation. The control shall provide compressor enable, high and low pressure monitoring, field selectable water coil low temperature sensing, and over/under voltage monitoring. The control shall also provide for water valve connection, a test mode, short cycle protection, random start-up, as well as fault LED, fault memory, and intelligent fault retry. The control shall employ quick attach harness assemblies for low voltage connections to the control board to aid in troubleshooting or replacement. An integral terminal block with screw terminals shall be provided on the control for connection to other low voltage controls. The control system microprocessor board shall be specifically designed to protect against building electrical system noise contamination, EMI, and RFI interference.

MPC Control – A programmable controller shall be provided to monitor buffer tank temperature, Domestic Hot Water (DHW) tank temperature, outdoor air temperature, and other inputs to determine when to operate the compressor, pump(s) and hot water valve. The MPC shall be factory-wired to the CXM compressor control module and user interface. MPC programming shall include outdoor temperature reset, warm weather shutdown, cooling enable, heat pump staging, emergency DHW output, pump control, vacation mode, DHW time schedule, advanced diagnostics, user interface communication, and sensor monitoring.

Digital User Interface – A panel-mounted backlit digital user interface shall be factory installed and wired for customization of the MPC programming. Four arrow keys and a select key will be used to control a large dot-matrix style 5 x 5 cm backlit display. The main screen shall display current outdoor and water temperatures, and allow the user to change settings by selecting from one of the menus at the bottom of the screen. A special installer set up mode will allow the technician to change some of the default MPC parameters. The user interface shall include a time schedule for DHW operation, Fahrenheit/Celsius selection, vacation mode for DHW, and other user preference options.

12-point terminal block – A low voltage terminal block with a blue/gray pattern for ease of identification shall be provided to connect thermistors and external wiring. The MPC, user interface, CXM board and other relays/components shall be factory-wired to the terminal block.

Line voltage lugs shall be provided for unit wiring. A circuit breaker protected 75VA transformer shall be employed. Units shall have knockouts for entrance of low and line voltage wiring.

Piping
Source/Load supply and return water connections, as well as Domestic Hot Water supply and return connections shall be 1" FPT (Female Pipe Thread) copper fittings and shall be securely mounted flush to the cabinet allowing for connection to an EPT (External Pipe Thread) fitting without the use of a back-up wrench. All Source water piping shall be insulated to prevent condensation at low liquid temperatures.

CLIMATEMASTER
Geothermal Heat Pump Systems

CLIMATE MASTER, INC.
LIMITED EXPRESS WARRANTY /LIMITATION OF REMEDIES AND LIABILITY
(FOR INTERNATIONAL CLASS PRODUCTS)

Disclaimer: It is expressly understood that unless a statement is specifically identified as a warranty, statements made by Climate Master, Inc., a Delaware corporation, U. S. A. ("CM") or its representatives, relating to CM's products, whether oral, written or contained in any sales literature, catalog, this or any other agreement or other materials, are not express warranties and do not form a part of the basis of the bargain, but are merely CM's opinion or commendation of CM's products. **EXCEPT AS SPECIFICALLY SET FORTH HEREIN AND TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, CM MAKES NO WARRANTY AS TO ANY OF CM'S PRODUCTS, AND CM MAKES NO WARRANTY AGAINST LATENT DEFECTS OR ANY WARRANTY OF MERCHANTABILITY OF THE GOODS OR OF THE FITNESS OF THE GOODS FOR ANY PARTICULAR PURPOSE.**

GRANT OF LIMITED EXPRESS WARRANTY
CM warrants CM products purchased and installed outside the United States of America ("U.S.A.") and Canada to be free from material defects in materials and workmanship under normal use and maintenance as follows: (1) All complete air conditioning, heating or heat pump units built or sold by CM for twelve (12) months from date of unit start-up or eighteen (18) months from date of shipment (from CM's factory), whichever comes first; and, (2) Repair and replacement parts, which are not supplied under warranty, for ninety (90) days from date of shipment (from factory).

Warranty parts shall be furnished by CM if ordered through an authorized sales representative of CM ("Representative") within sixty (60) days after the failure of the part. If CM determines that a parts order qualifies for replacement under CM's warranty, such parts shall be shipped freight prepaid to the Representative or the ultimate user, as requested by Representative. All duties, taxes and other fees shall be paid by the ultimate user through the Representative.

If requested by CM, all defective parts shall be returned to CM's factory in Oklahoma City, Oklahoma, U.S.A, freight and duty prepaid, not later than sixty (60) days after the date of the request. If the defective part is not timely returned or if CM determines the part to not be defective or otherwise not to qualify under CM's Limited Express Warranty, CM shall invoice Customer the costs for the parts furnished, including freight. The warranty on any part repaired or replaced under warranty expires at the end of the original warranty period.

This warranty does not cover and does not apply to: (1) Air filters, fuses, refrigerant, fluids, oil; (2) Products relocated after initial installation; (3) Any portion or component of any system that is not supplied by CM, regardless of the cause of the failure of such portion or component; (4) Products on which the unit identification tags or labels have been removed or defaced; (5) Products on which payment by Customer to CM or its distributors or Representatives, or the Customer's seller is in default; (6) Products which have defects or damage which result from improper installation, wiring, electrical imbalance characteristics or maintenance; or from parts or components manufactured by others; or are caused by accident, misuse, negligence, abuse, fire, flood, lightning, alteration or misapplication of the product; (7) Products which have defects or damage which result from a contaminated or corrosive air or liquid supply, operation at abnormal temperatures or flow rates, or unauthorized opening of the refrigerant circuit; (8) Mold, fungus or bacteria damages; (9) Products subjected to corrosion or abrasion; (10) Products, parts or components manufactured or supplied by others; (11) Products which have been subjected to misuse, negligence or accidents; (12) Products which have been operated in a manner contrary to CM's printed instructions; (13) Products which have defects, damage or insufficient performance as a result of insufficient or incorrect system design or the improper application, installation, or use of CM's products; or (14) Electricity or fuel costs, or any increases or unrealized savings in same, for any reason.

CM is not responsible for: (1) The cost of any fluids, refrigerant or other system components, or the associated labor to repair or replace the same, which is incurred as a result of a defective part covered by CM's Limited Express Warranty; (2) The cost of labor, refrigerant, materials or service incurred in diagnosis and removal of the defective part, or in obtaining and replacing the new or repaired part; (3) Transportation costs of the defective part from the installation site to CM or of the return of any part not covered by CM's Limited Express Warranty; or (4) The costs of normal maintenance.

Limitation: This Limited Express Warranty is given in lieu of all other warranties. If, notwithstanding the disclaimers contained herein, it is determined by a court or other qualified judicial body that other warranties exist, any such warranty, including without limitation any express warranty or any implied warranty of fitness for particular purpose and merchantability, shall be limited to the duration of the Limited Express Warranty. This Limited Express Warranty does not exclude any warranty that is mandatory and that may not be excluded under applicable imperative law.

LIMITATION OF REMEDIES
In the event of a breach of this Limited Express Warranty or any warranty that is mandatory under applicable imperative law, CM will only be obligated at CM's option to either repair the failed part or unit or to furnish a new or rebuilt part or unit in exchange for the part or unit which has failed. If after written notice to CM's factory in Oklahoma City, Oklahoma, U.S.A. of each defect, malfunction or other failure and a reasonable number of attempts by CM to correct the defect, malfunction or other failure and the remedy fails of its essential purpose, CM shall refund the purchase price paid to CM in exchange for the return of the sold good(s). Said refund shall be the maximum liability of CM. **TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, THIS REMEDY IS THE SOLE AND EXCLUSIVE REMEDY OF THE CUSTOMER AGAINST CM FOR BREACH OF CONTRACT, FOR THE BREACH OF ANY WARRANTY OR FOR CM'S NEGLIGENCE OR IN STRICT LIABILITY.**

LIMITATION OF LIABILITY
CM shall have no liability for any damages if CM's performance is delayed for any reason or is prevented to any extent by any event such as, but not limited to: any war, civil unrest, government restrictions or restraints, strikes, or work stoppages, fire, flood, accident, allocation, shortages of transportation, fuel, materials, or labor, acts of God or any other reason beyond the sole control of CM. **TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW AND SUBJECT TO THE NEXT SENTENCE, CM EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR LOSS OF PROFITS, LOSS OF BUSINESS OR GOODWILL, CONSEQUENTIAL, INCIDENTAL, SPECIAL, LIQUIDATED, OR PUNITIVE DAMAGE IN CONTRACT, FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, OR IN TORT, WHETHER FOR CM's NEGLIGENCE OR AS STRICT LIABILITY.** Nothing in this Agreement is intended to exclude CM's liability for death, personal injury or fraud.

OBTAINING WARRANTY PERFORMANCE
Normally, the contractor or service organization who installed the products will provide warranty performance for the owner. Should the installer be unavailable, contact any CM recognized Representative. If assistance is required in obtaining warranty performance, write or call:

Climate Master, Inc. • Customer Service • 7300 S.W. 44th Street • Oklahoma City, Oklahoma, U.S.A. 73179 • (405) 745-6000 • FAX (405) 745-6068

NOTE: Some countries do not allow limitations on how long an implied warranty lasts, or the limitation or exclusions of consequential or incidental damages, so the foregoing exclusions and limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state and country to country.

Please refer to the CM Installation, Operation and Maintenance Manual for operating and maintenance instructions.

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Accessories & Warranty

Hot Water Valve
An optional factory-installed 3-way valve wired to the unit controls to provide Domestic Hot Water to an indirect water heater or to a secondary heat exchanger/direct water heater combination. This option provides an additional set of load water connections for ease of installation. Connections are designated for Heating (buffer tank) and Domestic Hot Water (indirect water heater tank).

Internal Source and Load Pumps / Internal Expansion Tanks
Optional Source pump(s), Load pump, and expansion tank(s) shall be factory installed and wired to help lower installation costs and labor. When installed at the factory, pumps are controlled by the MPC.

Variable Speed Floor Pump Connection
An optional relay and line voltage lugs shall be provided for a variable speed radiant floor system pump. Some radiant floor systems utilize a variable speed pump on the floor system, which changes flow based upon the number of zones open or closed. Since the pump has built-in controls, only a power supply is needed.

Cupro-Nickel Heat Exchanger
An optional corrosion resistant CuNi coaxial heat exchanger shall be factory installed in lieu of standard copper construction (Source heat exchanger only).

Standard Warranty:
ClimateMaster THW Series are warranted for twelve (12) months from the date of unit start-up or eighteen (18) months from date of shipment (from CM's factory), whichever comes first. Optional extended warranties are available.

CLIMATE MASTER, INC.
LIMITED EXPRESS WARRANTY /LIMITATION OF REMEDIES AND LIABILITY
(FOR INTERNATIONAL CLASS PRODUCTS)

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