



# TRANQUILITY LARGE WATER-TO-WATER SERIES **INSTALLATION, OPERATION & MAINTENANCE MANUAL**

Part#: C97B0004N07 | Revised: March 9, 2026

SWT Models: 20–80 Tons  
60Hz – R-454B



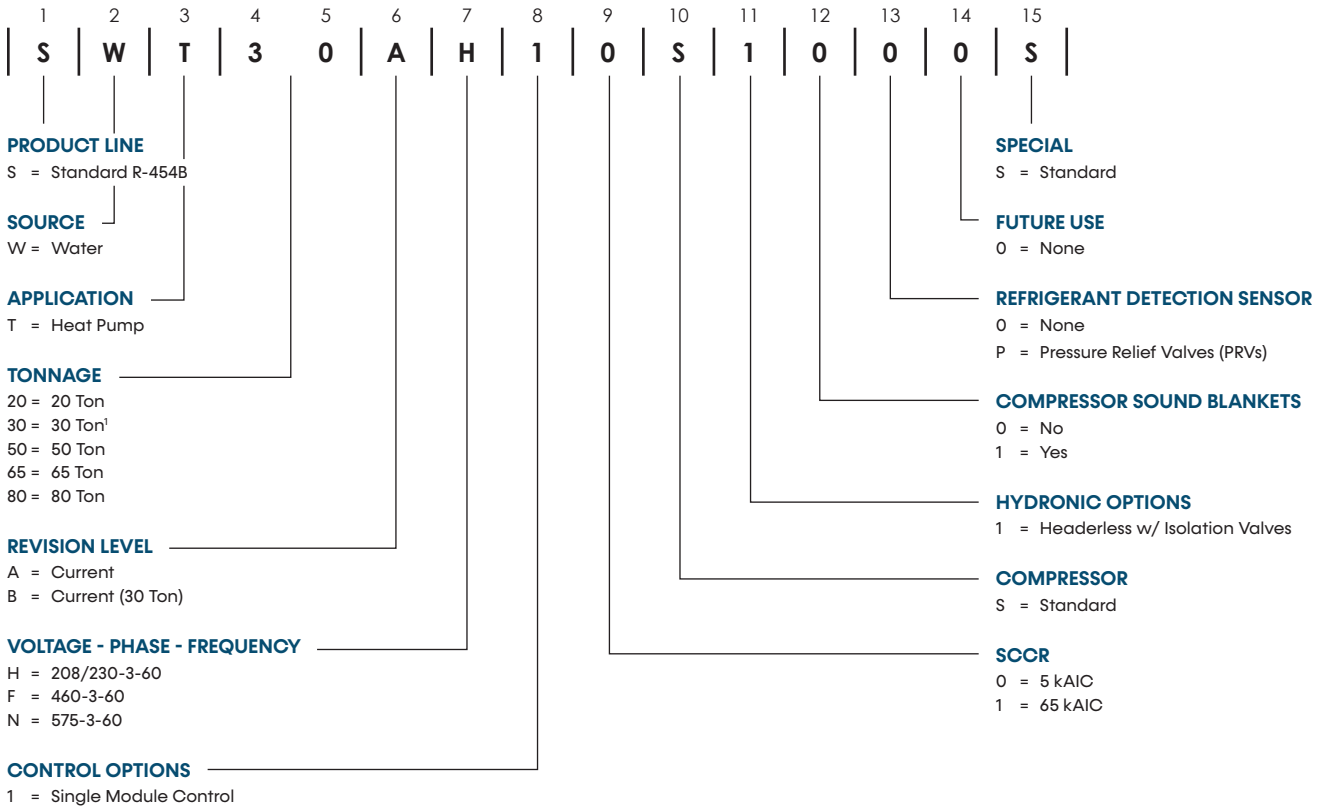
## Table of Contents

<b>3</b>	Model Nomenclature	<b>27</b>	Example Wiring Diagrams
<b>4</b>	Introduction	<b>29</b>	Controls
<b>6</b>	Physical Data	<b>30</b>	Controller Points List
<b>7</b>	Operating Limits	<b>34</b>	Pre-Startup
<b>10</b>	RDS Installation	<b>36</b>	Pre-Startup Checklist Form
<b>14</b>	Pre-Installation	<b>37</b>	Mechanical Startup
<b>15</b>	Rigging and Lifting Procedures	<b>38</b>	Startup and Warranty Registration
<b>16</b>	Recommended Service Clearances	<b>40</b>	Operation and Maintenance
<b>17</b>	Mounting Rails	<b>42</b>	Heat Exchangers
<b>19</b>	Unit Installation and Water Piping	<b>43</b>	Troubleshooting Guide
<b>20</b>	Filling the Water System	<b>46</b>	General Information - Servicing
<b>21</b>	Water Quality Requirements	<b>47</b>	Refrigerant Recovery, Evacuation, and Charging
<b>24</b>	Electrical Connections	<b>49</b>	Refrigeration Circuit Diagram
<b>25</b>	Communications Wiring	<b>50</b>	Warranty
<b>26</b>	Electrical Data	<b>52</b>	Revision History

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 800-299-9747 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.

# Model Nomenclature

Model  
SWT



1. 30 Ton configurations must select Revision B

## GENERAL DESCRIPTION

ClimateMaster’s Tranquility SW Large Water-to-Water models are available in 20-80 tons. These models are quiet, serviceable and extremely efficient systems that will provide years of reliable operation.

## SAFETY


Danger, Warning, Caution, and Attention notices appear throughout this manual. Read these items carefully before attempting any installation, service, or troubleshooting of the equipment.


**DANGER:** Indicates an immediate hazardous situation which, if not avoided, will result in death or serious injury. DANGER labels on unit access panels must be observed.

**WARNING:** Indicates potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION:** Indicates a potentially hazardous situation or an unsafe practice which, if not avoided, could result in minor or moderate injury or product or property damage.

**ATTENTION:** Notification of installed, operation or maintenance information which is important, but not hazard related.

<b>⚠ WARNING</b>	
	<ul style="list-style-type: none"> <li>Do not use means to accelerate the defrosting process to clean, other than those recommended by the manufacturer.</li> <li>Do not pierce or burn.</li> <li>Be aware that refrigerants may not contain an odor.</li> </ul>


<b>⚠ WARNING</b>	
<b>WATER AND REFRIGERANT SYSTEMS UNDER PRESSURE</b>	
	<ul style="list-style-type: none"> <li>Isolate/Lockout source and relieve pressure BEFORE servicing equipment.</li> <li>Failure to relieve pressure may result in property damage, serious bodily injury or death!</li> </ul>

<b>⚠ WARNING</b>	
An unventilated area where the appliance using FLAMMABLE REFRIGERANTS is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.	

<b>⚠ WARNING</b>	
An unventilated area where a water source heat pump is installed and surpasses a R-454B refrigerant charge of 62 oz (1.76 kg), shall be without continuously operating open flames (for example an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for example, an operating electric heater, hot surfaces).	

<b>⚠ WARNING</b>	
For mechanical ventilation, the lower edge of the air extraction opening where air is exhausted from the room shall not be more than 3.94 inches (100 mm) above the floor. The location where the mechanical ventilation air extracted from the space is discharged shall be separated by a sufficient distance, but not less than 9.84 feet (3 m), from mechanical ventilation air intake openings, to prevent recirculation to the space.	

<b>⚠ WARNING</b>	
<b>VERY HOT WATER!</b>	

<b>⚠ WARNING</b>	
	Disconnect power supply(ies) before servicing. Refer servicing to qualified service personnel. Electric shock hazard. May result in injury or death!

<b>⚠ WARNING</b>	
All refrigerant discharged from this unit must be recovered WITHOUT EXCEPTION. Technicians must follow industry accepted guidelines and all local, state, and federal statutes for the recovery and disposal of refrigerants. If a compressor is removed from this unit, refrigerant circuit oil will remain in the compressor. To avoid leakage of compressor oil, refrigerant lines of the compressor must be sealed after it is removed.	

<b>⚠ WARNING</b>	
Children being supervised are NOT to play with the appliance.	

<b>⚠ WARNING</b>	
This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.	

# Introduction

Model  
SWT

## CAUTION



Unit to be serviced by qualified personnel only. Refrigerant system under pressure. Relieve pressure before using torch. Recover refrigerant and store or dispose of properly.

## CAUTION

Single wall heat exchanger, not suitable for potable water connection.

## CAUTION

Excessive chlorine, undissolved solids and other improper water conditions **WILL DAMAGE** the internal heat exchanger and **WILL VOID YOUR WARRANTY!**

## CAUTION

Use only copper conductors for field installed wiring. Unit terminals are not designed to accept other types of conductors.

## CAUTION

### 3-PHASE SCROLL COMPRESSOR UNIT

If this unit uses a 3-Phase Scroll Compressor, the following instructions must be followed:

- Unit power supply must be wired in the proper sequence to avoid damage to the 3-Phase Scroll Compressor;
- Scroll Compressors with incorrect rotation show the following characteristics:
  - High sound level;
  - High suction pressure and low discharge pressure;
  - Low current draw.

If any of the three above characteristics exist, swap two of the three supply wires at the disconnect and recheck compressor for incorrect rotation.

## CAUTION

DO NOT store or install units in corrosive environments or in locations subject to temperature or humidity extremes (e.g., attics, garages, rooftops, etc.). Corrosive conditions and high temperature or humidity can significantly reduce performance, reliability, and service life. Always move and store units in an upright position. Tilting units on their sides will cause equipment damage.

## CAUTION

CUT HAZARD - Failure to follow this caution may result in personal injury. Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing heat pumps.

## CAUTION

To avoid equipment damage, DO NOT use these units as a source of heating or cooling during the construction process. The mechanical components and filters can quickly become clogged with construction dirt and debris, which may cause system damage and void product warranty.

## CAUTION

All three phase scroll compressors must have direction of rotation verified at startup. Verification is achieved by checking compressor Amp draw. Amp draw will be substantially lower compared to nameplate values. Additionally, reverse rotation results in an elevated sound level compared to correct rotation. Reverse rotation will result in compressor internal overload trip within several minutes. Verify compressor type before proceeding.

## ATTENTION

To avoid the release of refrigerant into the atmosphere, the refrigerant circuit of this unit must be serviced only by technicians who meet local, state and federal proficiency requirements.

All refrigerant discharged from this unit must be recovered WITHOUT EXCEPTION. Technicians must follow industry accepted guidelines and all local, state and federal statutes for the recovery and disposal of refrigerants.

If a compressor is removed from the unit, system refrigerant circuit oil will remain in the compressor. To avoid leakage of compressor oil, the refrigerant lines of the compressor must be sealed after it is removed.

## ATTENTION

This chiller is configured for brine duty with a minimum LWT of 20°F (6.7 C). It is the facility's responsibility to maintain the brine freeze-point adequately below the lowest water and ambient temperatures that the chiller will see.

## ATTENTION

Confirm all panels and electrical covers are properly installed/sealed, including the condenser fan motor cover.

## ATTENTION

Do not tamper with, modify, or defeat the functionality of the pressure relief valve in any way.

## ATTENTION

Installations where direct sun may cause the module and bank control panels to reach temperatures above 104°F require a sunshade.

## ATTENTION

Servicing shall be performed only as recommended by the manufacturer.

## ATTENTION

REFRIGERANT SENSORS for REFRIGERANT DETECTION SYSTEMS shall only be replaced with sensors specified by the appliance manufacturer.

## ATTENTION

An unconditioned attic is not considered natural ventilation.

## ATTENTION

This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

## ATTENTION

For Installation Only in Locations Not Accessible to the General Public.

## ATTENTION

Maximum external statics must be adhered to in order to maintain minimum CFM.

## ATTENTION

LEAK DETECTION SYSTEM installed. Unit must be powered except for service.

Model  
SWT

## Physical Data

### SWT Physical Data

Model SWT	Heat Pumps SWT				
	20	30	50	65	80
Refrigerant Circuits (quantity)	2	2	2	2	2
Compressor Type	Scroll	Scroll	Scroll	Scroll	Scroll
Compressor Quantity	2	2	2	2	2
Refrigerant Charge R-454B (lbs) [kgs]	6.0 [2.7]	10.5 [4.8]	15.5 [7.0]	19.5 [8.8]	24.0 [10.9]
Module Shipping Weight <sup>1</sup> (lbs) [kgs]	946 [429]	1,093 [496]	1,429 [648]	1,879 [852]	2,050 [930]
Module Operating Weight <sup>2</sup> (lbs) [kgs]	966 [438]	1,139 [517]	1,510 [685]	1,981 [898]	2,197 [997]
<b>Heat Exchangers</b>	<b>20</b>	<b>30</b>	<b>50</b>	<b>65</b>	<b>80</b>
Heat Exchanger (type) Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate
Independent Refrigerant Circuits (quantity)	2	2	2	2	2
Water Storage Volume headerless (gals) [L]	6.0 [22.7]	8.6 [32.6]	13.0 [49.2]	15.4 [58.3]	18.6 [70.4]
Minimum System Volume <sup>3</sup> (gal) [L]	120 [454]	180 [681]	300 [1,136]	390 [1,476]	480 [1,817]
Maximum Design Working Pressure - Water Side (psi) [kPa]	300 [2,068]	300 [2,068]	300 [2,068]	300 [2,068]	300 [2,068]

**NOTES:**

1. Module shipping weight includes refrigerant charge and packaging
2. Module operating weight includes water and refrigerant charge. Multiply times the number of modules for a total system operational weight.
3. Minimum system volume is required to provide stable operation. Storage/buffer tanks may be utilized in return piping to meet the minimum volume requirements.
4. Headerless water connections will be 2" Grooved VIC for 20/30 Tons and 2.5" Grooved VIC for 50/65/80 Tons.

## Operating Limits

Model  
SWT

### Flow and Water Temperature Data – SWT Series

Cooling Mode	Heat Pumps SWT
Minimum ambient temperature - °F	20
Maximum ambient temperature - °F	100
Minimum Leaving Chilled Water Temperature (No Glycol) - °F	40
Minimum Leaving Chilled Water Temperature (with Glycol) - °F	20
Maximum Leaving Chilled Water Temperature - °F	65
Minimum Chilled Water Differential Temperature - °F <sup>1</sup>	5
Maximum Chilled Water Differential Temperature - °F	23
Minimum Leaving Source Water Temperature - °F	65
Maximum Leaving Source Water Temperature - °F	130
Minimum Source Water Differential Temperature - °F <sup>1</sup>	10
Maximum Source Water Differential Temperature - °F	30
Heating Mode	
Minimum ambient temperature - °F	20
Maximum ambient temperature - °F	100
Minimum Leaving Hot Water Temperature - °F	65
Maximum Leaving Hot Water Temperature - °F	130
Minimum Chilled Water Differential Temperature - °F <sup>1</sup>	10
Maximum Chilled Water Differential Temperature - °F	30
Minimum Leaving Source Water Temperature - °F	40
Maximum Leaving Source Water Temperature - °F	65
Minimum Source Water Differential Temperature - °F <sup>1</sup>	5
Maximum Source Water Differential Temperature - °F	23

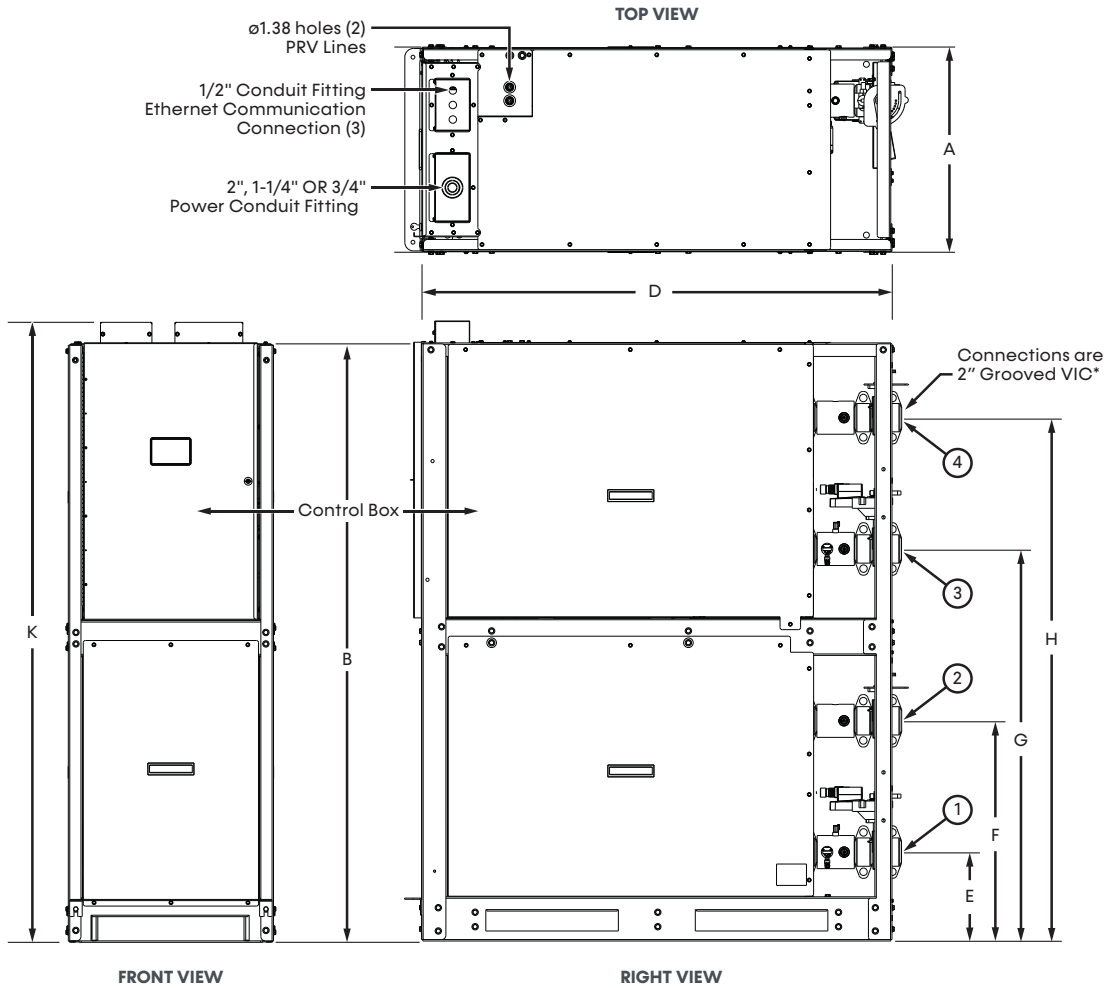
**NOTES:**

1. Minimum  $\Delta T$ 's are based on minimum  $\Delta P$ 's (0.5 PSI)
2. Water temperatures below 40°F (4.44°C) require a suitable antifreeze solution.

Model  
SWT

# Dimensional Data and Drawings

## 20-30 Ton



**NOTES**



\* Optional grooved-to-MPT adapter available for transitioning to a hose kit or other piping arrangements.

Model Size	A Chassis Width	B Chassis Height	D Chassis Depth	E Header Location	F Header Location	G Header Location	H Header Location	K Height with Electrical Connections	Connection Size (Grooved VIC)
020	24.00	70.00	55.00	10.35	25.71	45.80	61.16	72.51	2 in.
030	(60.96)	(177.8)	(139.7)	(26.29)	(65.30)	(116.33)	(155.35)	(184.18)	

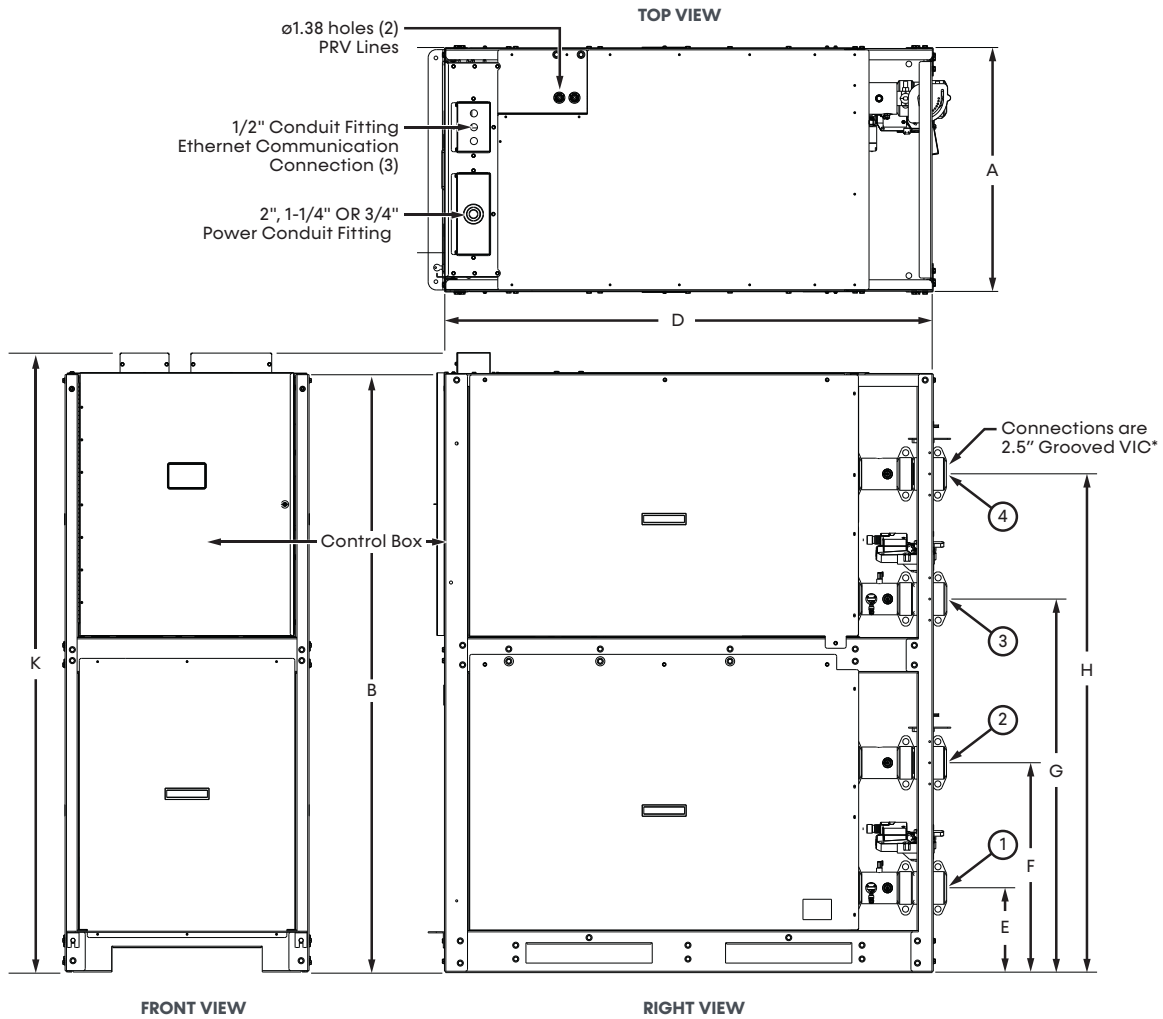
**NOTES:**

1. Dimensions shown in inches (centimeters).

Model	1	2	3	4
SWT	Load Water Outlet	Load Water Inlet	Source Water Outlet	Source Water Inlet

# Dimensional Data and Drawings 50-80 Ton

Model  
SWT



**NOTES**



\* Optional grooved-to-MPT adapter available for transitioning to a hose kit or other piping arrangements.

Model Size	A Chassis Width	B Chassis Height	D Chassis Depth	E Header Location	F Header Location	G Header Location	H Header Location	K Height with Electrical Connections	Connection Size (Grooved VIC)
050 065 080	30.00 (76.20)	73.54 (186.79)	60.00 (152.40)	10.39 (26.39)	25.75 (65.41)	45.85 (116.46)	61.20 (155.45)	76.10 (193.30)	2.5 in.

**NOTES:**

1. Dimensions shown in inches (centimeters).

Model	1	2	3	4
SWT	Load Water Outlet	Load Water Inlet	Source Water Outlet	Source Water Inlet

# RDS Installation

Each module has a Refrigerant Detection System (RDS) and alarm output from the module control. The RDS monitors the status of the refrigerant sensor in the unit. If refrigerant is detected above the maximum threshold, the unit control disables the compressors and enables a pilot relay (R15). A leak mitigation strategy must be determined at the module and bank level, meeting one of the following:

## UNVENTILATED ROOM

Each module is factory charged with a pre-determined amount of refrigerant as marked on the equipment dataplate and in the Physical Data section. The equipment must be installed in a room with a minimum room area ( $A_{min}$ ) equal to or larger than the value given in **Required Minimum Room Area** table for that specific module. If the specific unit size is marked with an N/A, the module contains refrigerant over a specified level, and a different mitigation method must be employed. When the altitude ( $H_{alt}$ ) of the installed location is above 1,969 feet (600 m), the  $A_{min}$  shall be corrected for the installation altitude by multiplying  $A_{min}$  by the applicable altitude adjustment factor (AF) as shown in **Required Minimum Airflow** table.

**Table 1: Required minimum floor area  $A_{min}$  per UL 60335-2-40 4th ed, GG.4DV<sup>1</sup>**

Minimum Installation Area			
Model	Charge oz (kg)	$A_{min}$ ft <sup>2</sup> (m <sup>2</sup> )	
SWT	20 Ton	96 (2.72)	743 (69)
	30 Ton	168 (4.76)	2,276 (211)
	50 Ton	248 (7.03)	4,961 (461)
	65 Ton	312 (8.85)	7,852 (729)
	80 Ton	384 (10.89)	11,894 (1105)

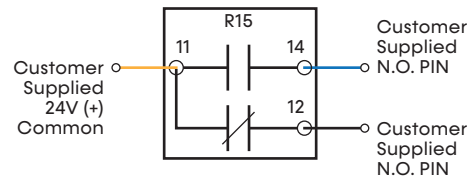
1. The above ventilation and room area are calculated based on equipment mounted to the floor. The minimum room area requirement reduces if the installation height exceeds 2 feet (0.6 m). If mounted higher, speak with a factory representative to determine new requirements.

## MACHINE ROOM

Modules may be installed in a machinery room that complies with applicable sections of ANSI/ASHRAE 15 (USA) or CSA B52 (Canada). Use the relay (R15) to open external dampers and/or activate external mechanical ventilation. The relay and Normally Open (NO) and Normally Closed (NC) contacts can control a signal with a maximum of 6A at 250VAC or 30VDC.

See the **RDS Mitigation Fan Relay** figure for required field wiring instructions.

**Figure 1: RDS Mitigation Fan Relay**



R15 Data Info:  
Input Voltage Rating: 24 VAC / 12 VDC, max 28 VAC / 14 VDC  
Contact Rating: 6A, 250 VAC / 30 VDC

**Table 2: Altitude Adjustment**

$H_{alt}$ ft (m)	AF
0 (0)	1.00
656 (200)	1.00
1,312 (400)	1.00
1,968 (600)	1.00
2,624 (800)	1.02
3,280 (1,000)	1.05
3,937 (1,200)	1.07
4,593 (1,400)	1.10
5,249 (1,600)	1.12
5,905 (1,800)	1.15
6,561 (2,000)	1.18

# RDS Installation

Model  
SWT

## MECHANICAL VENTILATION

Mechanical ventilation can be used for mitigation to the outdoors or another area or room. The equipment must be installed in a room with the minimum room area ( $A_r$ ), and the ventilation rate  $Q_{min}$  must be equal to or greater than the airflow in the **Required Minimum Airflow** table. The area requirement for the room where the ventilation is exhausted must be equal to or larger than the minimum room area ( $EA_{min}$ ) for the selected minimum room area  $A_r$ .

The requirements for openings in the mechanical ventilation system shall meet the following:

- The lower edge of openings extracting air from the room shall not exceed 4.0 inches (100 mm) above the floor.
- The openings supplying makeup air to the room shall be located such that the supplied makeup air mixes with the leaked refrigerant.
- Exhaust outlets shall be separated by a minimum of 9.9 feet (3 m) from the air intake for makeup air to prevent recirculation to the space.

**Table 3: Required floor area  $A_{min}$  and  $Q_{min}$  and secondary room area per UL 60335-2-40 4th ed, GG.3DV, GG.13DV, GG.14DV<sup>1</sup>**

Minimum Installation Area, Airflow, Exhaust Room Area						
Units	Charge oz (kg)	$A_r$ ft <sup>2</sup> (m <sup>2</sup> )	$m_{max}$ oz (kg)	$Q_{min}$ ft <sup>3</sup> /min (m <sup>3</sup> /h)	$EA_{min}$ ft <sup>2</sup> (m <sup>2</sup> )	
SWT	20 Ton	96 (2.72)	215 (20)	51.7 (1.46)	75 (127)	83 (8)
			323 (30)	63.3 (1.79)	55 (94)	61 (6)
			431 (40)	73.1 (2.07)	39 (66)	43 (4)
			538 (50)	81.7 (2.32)	24 (41)	27 (2)
			646 (60)	89.5 (2.54)	11 (19)	12 (1)
	30 Ton	168 (4.76)	323 (30)	63.3 (1.79)	177 (301)	196 (18)
			646 (60)	89.5 (2.54)	133 (226)	147 (14)
			969 (90)	109.6 (3.11)	99 (168)	109 (10)
			1,292 (120)	126.5 (3.59)	70 (119)	78 (7)
			1,561 (145)	139.1 (3.94)	49 (83)	54 (5)
	50 Ton	248 (7.03)	323 (30)	63.3 (1.79)	312 (531)	346 (32)
			1,163 (108)	120.1 (3.4)	216 (368)	240 (22)
			1,991 (185)	157.1 (4.45)	154 (261)	170 (16)
			2,831 (263)	187.3 (5.31)	103 (174)	114 (11)
			3,660 (340)	213 (6.04)	59 (101)	66 (6)
	65 Ton	312 (8.85)	323 (30)	63.3 (1.79)	421 (715)	466 (43)
			1,593 (148)	140.5 (3.98)	290 (493)	321 (30)
			2,852 (265)	188.1 (5.33)	210 (356)	232 (22)
			4,123 (383)	226.1 (6.41)	145 (247)	161 (15)
			5,382 (500)	258.3 (7.32)	91 (154)	101 (9)
80 Ton	384 (10.89)	323 (30)	63.3 (1.79)	542 (922)	601 (56)	
		2,400 (223)	172.5 (4.89)	358 (608)	396 (37)	
		4,467 (415)	235.3 (6.67)	251 (427)	279 (26)	
		6,544 (608)	284.8 (8.08)	168 (285)	186 (17)	
		8,611 (800)	326.7 (9.26)	97 (165)	107 (10)	

1. The above ventilation and room area are calculated based on equipment mounted to the floor. The minimum room area requirement reduces if the installation height exceeds 2 feet (0.6 m). If mounted higher, speak with a factory representative to determine new requirements.

**NATURAL VENTILATION TO THE INDOORS**

Natural ventilation can be achieved by ensuring that there is a connected space to the room housing the equipment. The total area of the space in which the equipment is installed and the adjacent space(s) connected by natural ventilation shall have an area greater than  $A_{min}$ , as shown in the **Required Minimum Room Area** table. The equipment must be installed in a room with a minimum room area (A) of no less than 20% of the minimum room area ( $A_{min}$ ).

There must be a permanent opening between the spaces, and the minimum opening size ( $Anv_{min}$ ) for the specified equipment room area (A) is found in the **Required Minimum Opening Size for Natural Ventilation to Indoor Space** table. Permanent openings, such as louvers, must utilize their free opening area. In addition, the following requirements must also be met:

- The area of any opening above 11.8 inches (300 mm) from the floor shall not be considered in determining compliance with  $Anv_{min}$ .
- At least 50% of the required opening area  $Anv_{min}$  shall be below 7.8 inches (200 mm) from the floor.
- The bottom of the lowest openings shall not be higher than the point of release when the unit is installed and not more than 3.9 inches (100 mm) from the floor.
- Openings are permanent openings that cannot be closed.
- For openings extending to the floor, the height shall not be less than 0.78 inches (20 mm) above the surface of the floor covering.
- A second higher opening shall be provided. The total size of the second opening shall not be less than 50% of the minimum opening area for  $Anv_{min}$  and shall be at least 3.4 feet (1.5 m) above the floor.

**Note: The requirement for the second opening can be met by drop ceilings, ventilation ducts, or similar arrangements that provide an airflow path between the connected rooms.**

**Table 4: Required floor area and minimum opening size for natural ventilation to an indoor room per UL 60335-2-40 4th ed, GG.7<sup>1</sup>**

Minimum Installation Area and Natural Ventilation to Indoor Space				
Units	Charge oz (kg)	A ft <sup>2</sup> (m <sup>2</sup> )	$Anv_{min}$ in <sup>2</sup> (m <sup>2</sup> )	
SWT	20 Ton	96 (2.72)	149 (14)	111 (0.07)
			297 (28)	88 (0.06)
			446 (41)	60 (0.04)
			595 (55)	30 (0.02)
	30 Ton	168 (4.76)	455 (42)	257 (0.17)
			911 (85)	204 (0.13)
			1,366 (127)	138 (0.09)
	50 Ton	248 (7.03)	1,821 (169)	70 (0.04)
			992 (92)	462 (0.3)
			1,984 (184)	365 (0.24)
			2,976 (277)	248 (0.16)
	65 Ton	312 (8.85)	3,969 (369)	125 (0.08)
			1,570 (146)	652 (0.42)
			3,141 (292)	515 (0.33)
	80 Ton	384 (10.89)	4,711 (438)	350 (0.23)
			6,281 (584)	176 (0.11)
2,379 (221)			890 (0.57)	
4,757 (442)			703 (0.45)	
			7,136 (663)	477 (0.31)
			9515 (884)	240 (0.16)

1. The above ventilation and room area are calculated based on equipment mounted to the floor. The minimum room area requirement reduces if the installation height exceeds 2 feet (0.6 m). If mounted higher, speak with a factory representative to determine new requirements.

# RDS Installation

Model  
SWT

## NATURAL VENTILATION TO OUTDOORS

Natural ventilation can be achieved by ensuring that there is a space connected to the outdoors from the room housing the equipment. If natural ventilation is applied, then all of the following must be met:

- Natural ventilation to the outdoors is not allowed when the room housing the equipment is below ground level.
- Natural ventilation must not be from an occupied space.
- As shown in the **Required Minimum Opening Size for Natural Ventilation to Outdoor Space** table, permanent openings such as louvers must meet the following requirements and have a free area greater than  $Anv_{min}$ .
- The room housing the equipment must maintain ambient temperatures above the listed requirements in the table, **Ambient Temperature Operational Limits**.

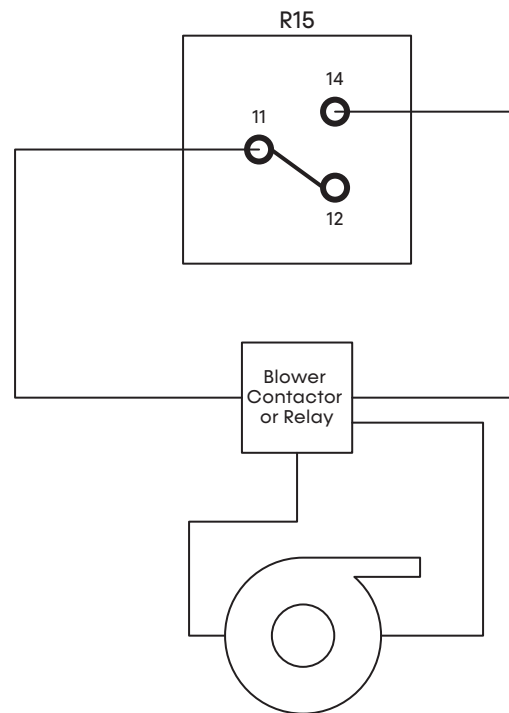
**Table 5: Required minimum opening for natural ventilation to an outdoor space per UL 60335-2-40 4th ed, GG.12DV**

Natural Ventilation to Outdoor Space			
Units	Charge oz (kg)	$Anv_{min}$ in <sup>2</sup> (m <sup>2</sup> )	
SWT	20 Ton	96 (2.72)	132 (0.08)
	30 Ton	168 (4.76)	174 (0.11)
	50 Ton	248 (7.03)	212 (0.14)
	65 Ton	312 (8.85)	237 (0.15)
	80 Ton	384 (10.89)	263 (0.17)

## SAMPLE MITIGATION WIRING

Utilize the relay (R15) provided on each module to open external dampers and/or activate external mechanical ventilation. The relay and Normally Open (NO) and Normally Closed (NC) contacts can control a signal with a maximum of 6A at 250VAC or 30VDC. The relay will enable when the individual module enters mitigation mode due to refrigerant being detected by the onboard RDS or if enabled from the CoolLogic Touch controller. An example of wiring can be seen in the **Example RDS Mitigation Wiring** figure below:

**Figure 2: Example RDS Mitigation Wiring**



- 11. COM Relay Input
- 12. N.C. Relay Output
- 14. N.O. Relay Output

## Pre-Installation

### INSPECTION

Upon receipt of equipment, carefully check the shipment against the bill of lading and inspect each unit for any damage incurred during shipment. Verify all components and loose parts immediately upon receipt. Note any damage on the bill of lading immediately and in the presence of the freight carrier’s delivering agent. Report the damage to the freight carrier and file appropriate claim documents in accordance with International Chamber of Commerce (ICC) regulations. It is the responsibility of the recipient to contact ClimateMaster.

Thoroughly check for any visible damage of control panels, electrical and/or refrigeration components or broken copper lines. Be sure the nameplate voltage agrees with the site voltage. The carrier must make proper notation of any damages or shortages on all copies of the bill of lading and complete a common carrier inspection report prior to your final acceptance of the shipment.

**NOTE: It is the responsibility of the purchaser to file all necessary claims with the carrier.** In addition, please notify the ClimateMaster Customer Service Department of all damage immediately at 1-800-299-9747, Option 1, or CLMCustomerService@climatemaster.com.

### STORAGE

A suitable antifreeze solution will be required to store water-source heat pumps in locations with ambient temperatures below 36°F (2.22°C).

Fill the heat pump with at least 2 (two) gallons (7.6 L) of inhibited propylene glycol or other suitable inhibited antifreeze solution to prevent any residual water in the unit from freezing.

### HANDLING OF MODULES

Carefully remove the module’s packaging. The unit’s steel base cutouts provide maneuverability by forklift or pallet jack into its final position. Verify that all header grooved couplings and mounting hardware kits are on site prior to connecting the modules.

### RIGGING AND LIFTING

Each module should be lifted by using a fork lift. If it is necessary to utilize a crane for rigging or lifting, each module shall be lifted by using lifting straps and spreader bars using rigging points. Refer to Rigging and Lifting Procedures on next page.

### WARRANTY

To ensure proper equipment longevity, design, performance, and reliability, all ClimateMaster units must be installed, operated, and maintained per product IOMs. Water quality is of the utmost importance for the proper care and maintenance of your heat pump system, and regular water treatment will increase your system’s longevity. If an open loop is used, there must be a secondary heat exchanger installed between the open loop and the chiller loop. Failure to provide adequate filtration or treatment of evaporator water will void the ClimateMaster module’s warranty.

A factory-authorized technician is required to start up your ClimateMaster heat pump. Please contact the ClimateMaster Technical Service Department to schedule startup at 1-800-299-9747, Option 3, or CLMTechServices@climatemaster.com. A minimum of two weeks’ notice is required to schedule your factory startup.

#### **WARNING**

Equipment not accessible to General public.

#### **ATTENTION**

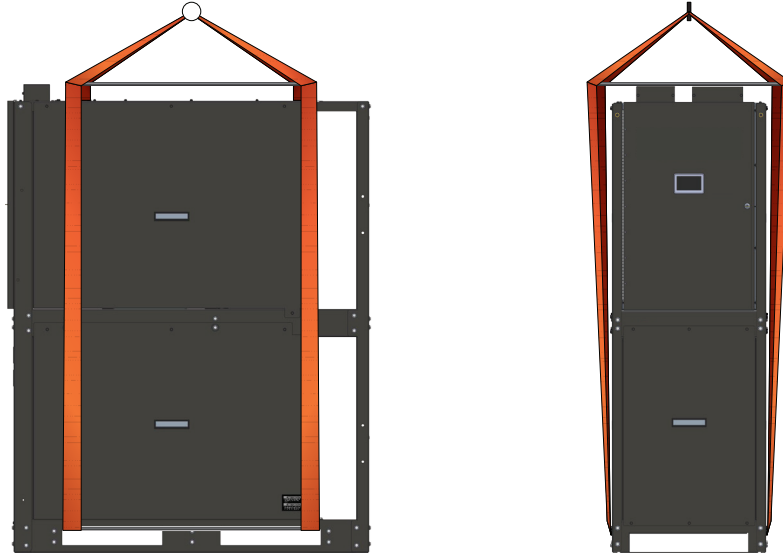
This unit is configured for brine duty with a minimum LWT of 20°F (6.7 C). It is the facility’s responsibility to maintain the brine freeze-point adequately below the lowest water and ambient temperatures that the unit will see.

## Rigging and Lifting Procedures

Model  
SWT

### RIGGING

Each module should be lifted by using lift straps threaded through the steel base cutouts and the use of a spreader bar. **NOTE: If no spreader bar is used, damage to the unit may occur.**



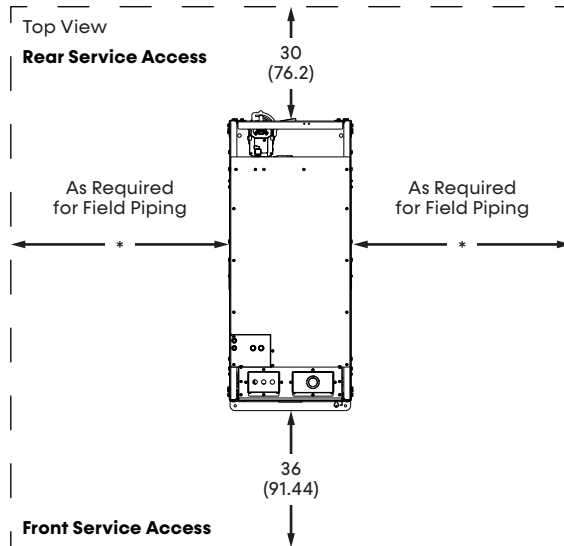
### LIFTING AND TRANSPORTING MODULES

Pallet jacks or forklifts are required for lifting and transporting the module. Each module has base cutouts provided for ease of maneuverability. 60-inch forks are recommended to prevent damage to chiller base.



## Recommended Service Clearances

**Figure 3: Recommended Service Clearance**



**NOTES**

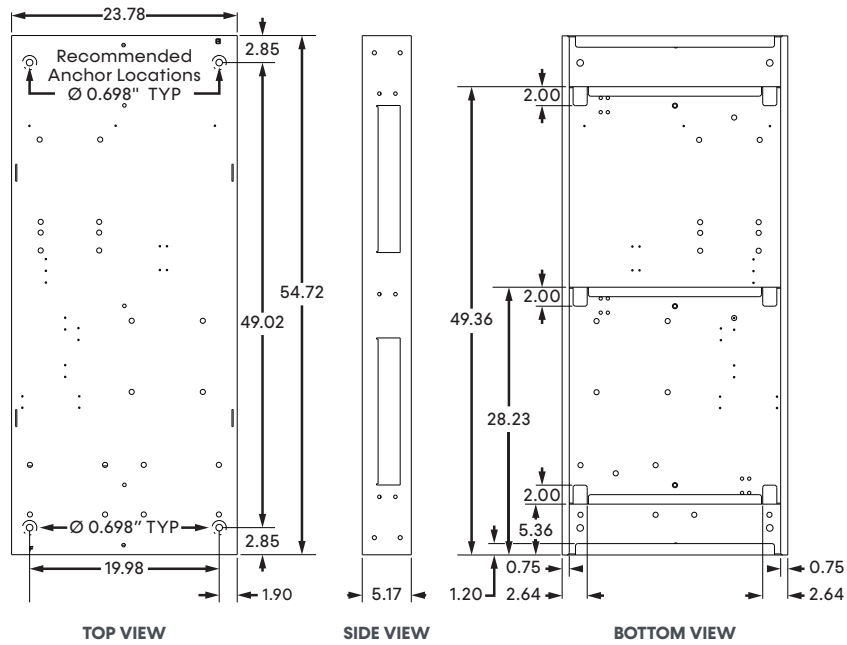
- Allow 36-inch (91.44 cm) clearance for electrical panels and 30-inch (76.2 cm) clearance for rear service access to modules.
- Allow a minimum of 18-inch (45.72 cm) height clearance for service for all modules.
- Minimum service clearances adhere to high-voltage code requirements. Local building or electrical codes may require additional clearance. Consult applicable codes.
- Measurements are shown in Inches and (centimeters).

# Mounting Rails

Model  
SWT

ClimateMaster recommends bolting the heat pump to a concrete base or two (2) 4-inch (10.16 cm) base mounting rails using the four (4) bolt holes in each base pan. Due to the modules' low vibration, ClimateMaster does not require the application of spring isolators or pads. Should isolators or pads be desired, install them in accordance with the following figure.

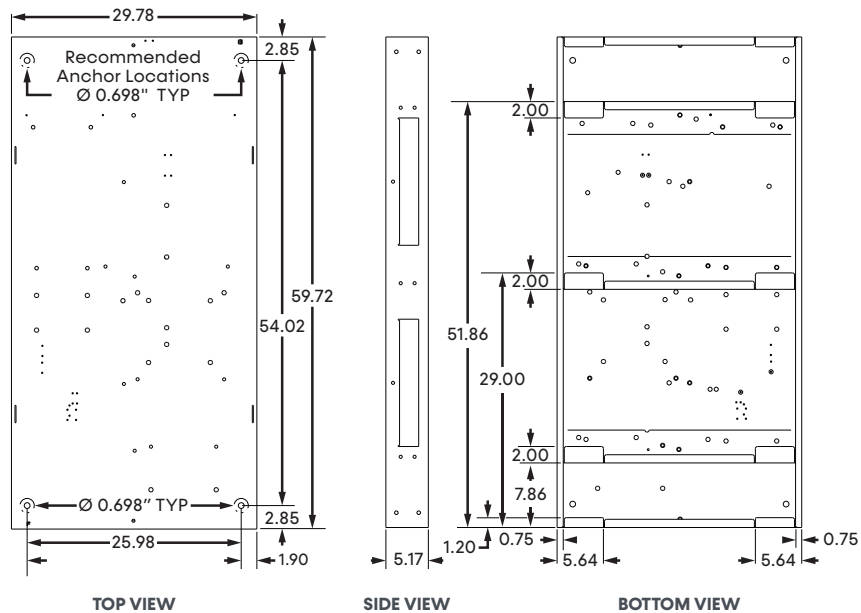
**Figure 4: Anchor Locations SWT 20, 30**



**NOTES**

Recommend Bolt 1/2"-13 x 6.5"L

**Figure 5: Anchor Locations SWT 50, 65, 80**

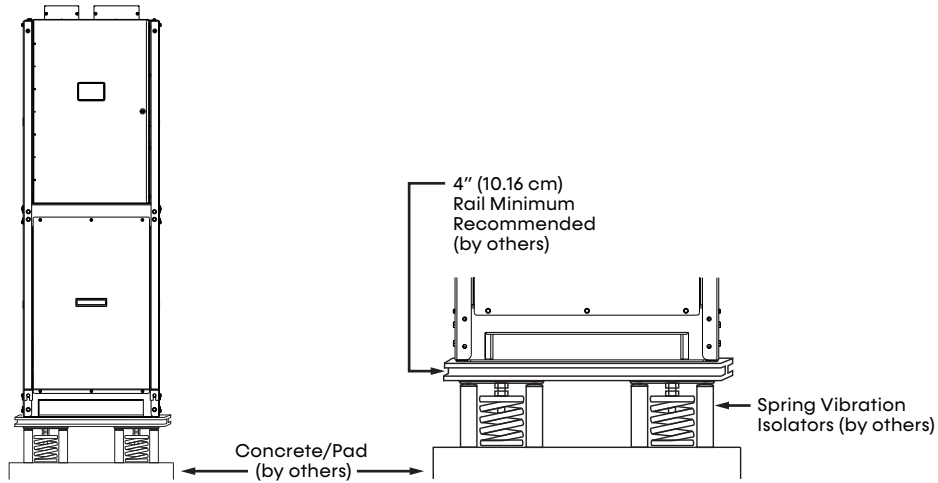


**NOTES**

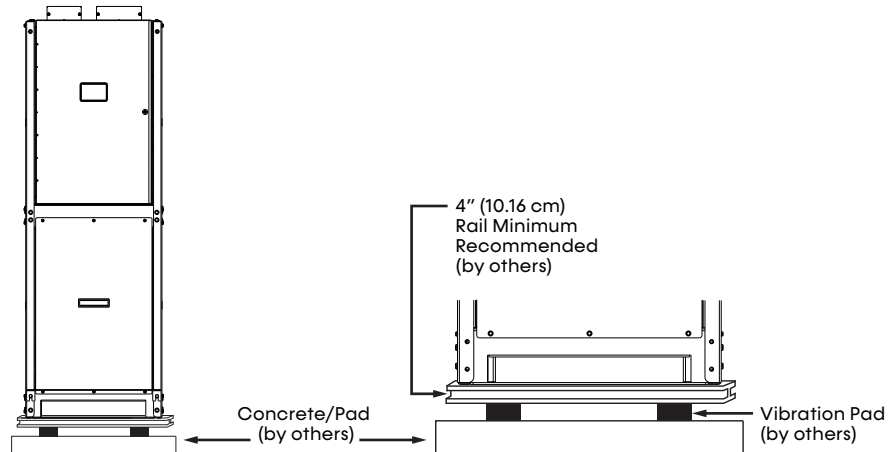
Recommend Bolt 1/2"-13 x 6.5"L

# Vibration Isolation

**Figure 6: Spring Vibration Isolators Option**



**Figure 7: Vibration Isolation Pads Option**



**NOTES**

Size and weight distribution is to be determined by a qualified structural engineer per individual job requirements.

## Unit Installation and Water Piping

### FOUNDATION FOR UNIT PLACEMENT

The minimum foundation requirement for the ClimateMaster water-source heat pump is a level surface capable of bearing the combined operating weight of the modules.

### DRAINING

When performing standard maintenance procedures such as flushing a heat exchanger, it is necessary to close off any relevant module sections. Each ClimateMaster water-source heat pump includes standard motorized water isolation valves for this purpose.

### INSTALLING MODULES

ClimateMaster recommends bolting the unit to a concrete base or two (2) 4-inch (10.16 cm) base mounting rails using the bolt holes in the unit base. Although the compressors are installed on anti-vibration mountings, vibration-eliminating springs or pads under the base rails on which the unit will rest can further isolate the unit from the structure. One end of the modules should be chosen as the reference module and carefully located.

Field-installed mounting accessories are provided to install each module. The **Mounting hardware kit** contains necessary bolts, spacers, nuts and washers.

### PIPING INSTALLATION

1. Inspect the pipe ends to ensure they are free from indentations, projections, roll marks, or other harmful surface defects such as loose paint, scale, dirt, chips, grease, and rust.
2. Ensure building piping and unit piping are properly aligned. If using hose kits, ensure that hose length is correct and that piping will come together without issue.
3. Inspect the grooved coupling gasket for defects.
4. Install gaskets on the pipe ends **Be sure the gasket is completely on the pipe so damage will not occur in the next step.**

5. Place the coupling halves over the gasket and ensure that the coupling keys (the part that goes into the groove) are engaged in the grooves.
6. Insert the bolts and install nuts to hand tight. Ensure that the oval neck of the bolt engages into the bolt hole of the housing. **Tighten nuts alternately and equally until the bolt pads meet and make metal-to-metal contact.**
7. Tighten nuts by another ¼ to ½ turn to ensure the nuts and bolts are snug and secure; using a torque wrench is usually not required. **Uneven tightening of bolts may cause the gasket to be pinched resulting in immediate or delayed leaks.**

### HEADER INSULATION

Chilled water piping is pre-insulated on each module at the factory with ¾-inch (1.91 cm) closed-cell insulation. **After leak testing, the installing contractor will need to insulate the entire coupling connection.**

#### WARNING

Equipment not accessible to General public.

### STRAINERS – MINIMUM 20 MESH SCREEN REQUIRED

ClimateMaster Large Water-to-Water Heat Pumps utilize brazed plate heat exchangers which are extremely sensitive to debris. **Therefore, it is mandatory that all chilled or water systems include a strainer with a minimum of 20 mesh screen for proper filtration.** The strainer must be installed as shown in the Water Piping Configurations and be in place at all times when the unit is operating.

**ClimateMaster's warranty does not cover and does not apply to products which have defects or damages due to freezing of the water supply, an inadequate or interrupted water supply, corrosives or abrasives in the water supply, or improper or inadequate filtration or treatment of the water supply.**

## Filling the Water System

It is imperative that the water systems are free from debris prior to initial operation. See *Water Quality Parameters* for a comprehensive list of precautions.

### FILLING, PURGING AND LEAK TESTING THE SYSTEM

After the water systems have been properly installed, visually inspect all joints for tightness. If the chiller is to be installed in an existing system, the cleanliness of the existing system can be judged from the operating conditions of the present machines. It is good practice to flush and, ideally, to acid wash the existing system **before** connecting a new chiller.

The following method is recommended to fill and leak check the water system for modules **WITH** Water Isolation Valves:

1. Close all water isolation valves inside each module which isolate the individual heat exchangers.
2. Ensure that all drain valves are closed and that all water main isolation valves are opened.
3. The system should be filled with clean water sent through the strainers and the system checked for leaks.
4. Once the main water lines and the chiller headers are filled with clean water, purge and repeat the filling process at least three times.
5. Open the water isolation valves inside each modular chiller and repeat the filling process, this time also checking for leaks inside each module.
6. Following the final filling and leak checking procedure, air should be purged from the system.

### CLEANING THE SYSTEM

The following method is recommended to properly clean the water systems:

1. Before cleaning the system, install a temporary bypass line between the main supply and return water headers of both chilled and condenser water systems when possible. Open the main header bypass lines to divert the initial water flow around the module heat exchangers until you are confident the circulating water is mostly pure.

2. Provided main header bypass lines are installed, close all water isolation valves inside all modular chillers equipped with manual or automatic water isolation valves. If the modules are **NOT** equipped with water isolation valves, we recommend installing 3-way main header bypass valves so the initial water flow bypasses all module heat exchangers.
3. It is mandatory to run the pumps with the strainers in place (see Starting the Pumps section below for proper pump startup). All external hydronic branches should be open to all devices in the system.
4. Pressure drop across the strainer must be observed and as pressure change reaches 50% of the initial read, strainers must be isolated and cleaned.
5. Open all water isolation valves inside each module equipped with manual or automatic water isolation valves (see step 6 for modules **NOT** equipped with water valves). If bypass lines are not installed (described in step 1) it is recommended to drain out the initial fill of water to help flush out debris. Close off the main header bypass lines referred to in step 1 and open the flow to the main water headers. Repeat steps 3 and 4 until there is no more debris being collected by the strainers.
6. If bypass lines are not installed (described in step 1) and the modules are **NOT** equipped with water isolation valves, it is recommended to drain out the initial fill of water to help flush out debris. Remove and clean the strainers before refilling and purging the system again. Repeat steps 3 and 4 until there is no more debris being collected by the strainers.

### STARTING THE PUMPS

Follow the manufacturer's recommendations when starting the pumps for the first time. The system should be checked for leaks and air purged with the pumps in operation. The pressure drop across the heat exchangers will give a good indication of flow through the system (see project selection print-out or contact local representative). This should be immediately checked against the expected pressure drop for the flow rate required. **If the pressure drop begins to fall and the flow rate is falling, this could indicate the need to clean the strainers.**

# Water Quality Requirements

Model  
SWT

**Table 6: Water Quality Requirements**

Clean water is essential to the performance and life span of water-source heat pumps. Contaminants, chemicals, and minerals all have the potential to cause damage to the water heat exchanger if not treated properly. All closed-loop water systems should undergo water quality testing and be maintained to the water quality standards listed in this table. All open-loop water systems shall be tested upon installation and periodically to ensure water quality standard in the table below are met.

Water Quality Requirements For Closed-Loop and Open-Loop Systems							
	Description	Symbol	Units	Heat Exchanger Type			
				Closed Loop Recirculating		Open Loop, Tower, Ground Source Well	
				All Heat Exchanger Types	Coaxial HX Copper Tube in Tube	Coaxial HX Cupronickel	Brazed- Plate HX 316 SS
Scaling Potential	pH - Chilled Water <85°F			7.0 to 9.0	7.0 to 9.0	7.0 to 9.0	7.0 to 9.0
	pH - Chilled Water >85°F			8.0 to 10.0	8.0 to 10.0	8.0 to 10.0	8.0 to 10.0
	Alkalinity	(HCO <sub>3</sub> <sup>-</sup> )	ppm - CaCO <sub>3</sub> equivalent	50 to 500	50 to 500	50 to 500	50 to 500
	Calcium	(Ca)	ppm	<100	<100	<100	<100
	Magnesium	(Mg)	ppm	<100	<100	<100	<100
	Total Hardness	(CaCO <sub>3</sub> )	ppm - CaCO <sub>3</sub> equivalent	30 to 150	150 to 450	150 to 450	150 to 450
	Langelier Saturation Index	LSI		-0.5 to +0.5	-0.5 to +0.5	-0.5 to +0.5	-0.5 to +0.5
	Ryznar Stability Index	RSI		6.5 to 8.0	6.5 to 8.0	6.5 to 8.0	6.5 to 8.0
Corrosion Prevention	Total Dissolved Solids	(TDS)	ppm - CaCO <sub>3</sub> equivalent	<1000	<1000	<1000	<1000
	Sulfate	(SO <sub>4</sub> <sup>2-</sup> )	ppm	<200	<200	<200	<200
	Nitrate	(NO <sub>3</sub> <sup>-</sup> )	ppm	<100	<100	<100	<100
	Chlorine (free)	(Cl)	ppm	<0.5	<0.5	<0.5	<0.5
	Chloride (water < 80°F)	(Cl <sup>-</sup> )	ppm	<20	<20	<150	<150
	Chloride (water > 120°F)	(Cl <sup>-</sup> )	ppm	<20	<20	<125	<125
	Hydrogen Sulfide <sup>a</sup>	(H <sub>2</sub> S)	ppb	<0.5	<0.5	<0.5	<0.5
	Carbon Dioxide	(CO <sub>2</sub> )	ppm	0	<50	10 to 50	10 to 50
	Iron Oxide	(Fe)	ppm	<1.0	<1.0	<1.0	<0.2
	Manganese	(Mn)	ppm	<0.4	<0.4	<0.4	<0.4
	Ammonia	(NH <sub>3</sub> )	ppm	<0.05	<0.1	<0.1	<0.1
	Chloramine	(NH <sub>2</sub> CL)	ppm	0	0	0	0
	Fouling & Biological	Iron bacteria		cells/mL	0	0	0
Slime-forming bacteria			cells/mL	0	0	0	0
Sulfate-reducing bacteria			cells/mL	0	0	0	0
Suspended Solids <sup>b</sup>		(TSS)	ppm	<10	<10	<10	<10
Electrolysis All HX types	Earth Ground Resistance <sup>x</sup>		Ohms	Consult NEC and local electrical codes for grounding requirements			
	Electrolysis Voltage <sup>d</sup>		mV	Measure voltage and internal water loop to HP ground			
	Leakage Current <sup>d</sup>		mA	Measure current in water loop pipe			
	Building Primary Electrical Ground to unit, must meet local diameter and penetration length requirements. Do not connect heat pump to steel pipe unless dissimilar materials are separated by using Di-electric unions. Galvanic corrosion of heat pump water pipe will occur						

## Water Quality Requirements

1. The **Water Quality Requirements** table provides water quality requirements for coaxial and brazed-plate heat exchangers.
2. The water must be evaluated by an independent testing facility comparing site samples against this table. When water properties are outside of these parameters, the water must either be treated by a professional water treatment specialist to bring the water quality within the boundaries of this specification, or an external secondary heat exchanger must be used to isolate the heat pump water system from the unsuitable water. Failure to do so will void the warranty of the heat pump system and will limit liability for damage caused by leaks or system failure.
3. Regular sampling, testing and treatment of the water is necessary to assure that the water quality remains within acceptable levels thereby allowing the heat pump to operate at optimum levels.
4. If closed-loop systems are turned off for extended periods, water samples must be tested prior to operating the system.
5. For optimal performance, it is recommended that the closed-loop piping systems are initially filled with deionized water.
6. Well water with chemistry outside of these boundaries, and salt water or brackish water requires an external secondary heat exchanger. Surface/Pond water should not be used.
7. If water temperature is expected to fall below 40°F (4.4°C), antifreeze is required. Refer to the heat pump IOM for the correct solution ratios to prevent freezing.
  - α Hydrogen sulfide has an odor of rotten eggs. If one detects this smell, a test for H<sub>2</sub>S must be performed. If H<sub>2</sub>S is detected above the limit indicated, remediation is necessary. Consult with your water testing/treatment professional. If a secondary heat exchanger is required, use appropriate materials as recommended by the heat exchanger supplier.
  - β Suspended solids and particulates must be filtered to prevent fouling and failure of heat exchangers. Strainers or particulate filters must be installed to provide a maximum particle size of 600 micron (0.60 mm, 0.023 inch) using a 20 to 30 mesh screen size. When a loop is installed in areas with fine material such as sand or clay, further filtration is required to a maximum of 100 micron. Refer to the Strainer / Filter Sizing Chart to capture the particle sizes encountered on the site.
  - χ The hydronic piping system or other plumbing pipes must not be used as the building ground. An electrical grounding system using a dedicated ground rod meeting NEC and local electrical codes must be installed.
  - δ Refer to the **Antifreeze Percentages by Volume** table for instructions on measuring resistance and leakage currents within water loops.

**Strainer / Filter Sizing**

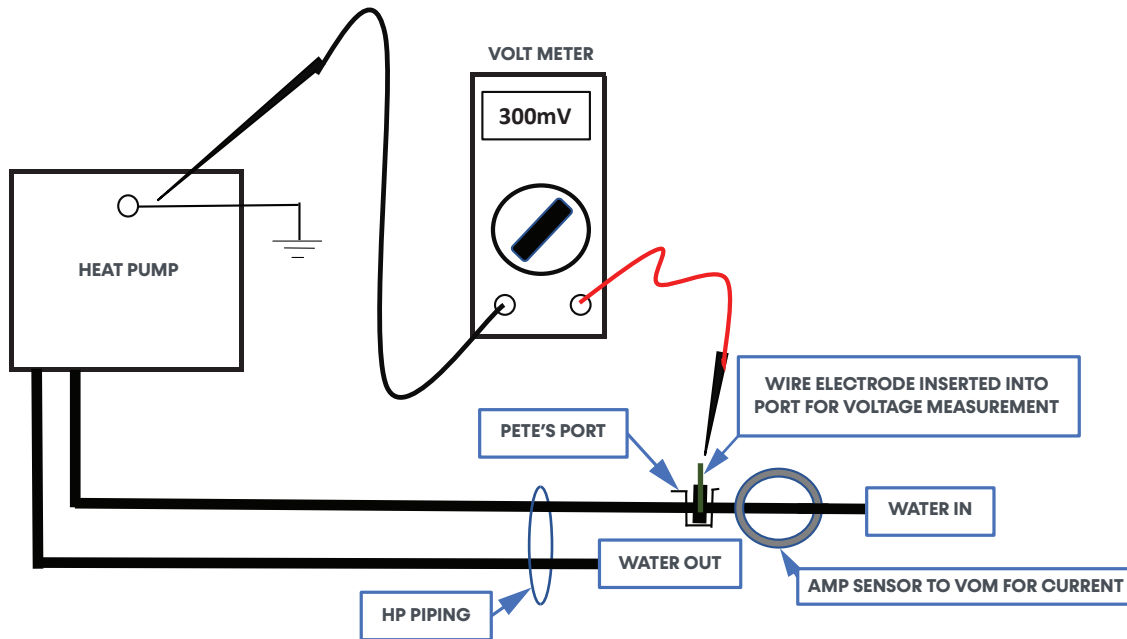
Mesh Size	Particle Size		
	Microns	Millimeter	Inch
20	840	0.840	0.0340
30	533	0.533	0.0210
60	250	0.250	0.0100
100	149	0.149	0.0060
150	100	0.100	0.0040
200	74	0.074	0.0029

- ppm = parts per million
- ppb = parts per billion

# Water Quality Requirements

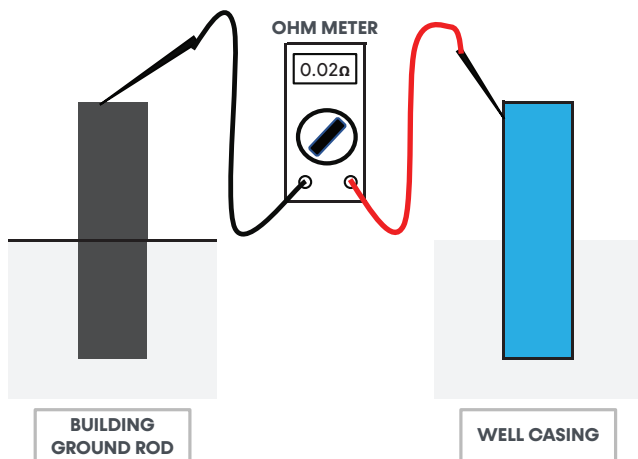
Model  
SWT

## Measuring Electrolysis, Voltage, and Current for Ground-Water Applications



- Measure the electrolysis voltage using a volt meter between the heat pump ground and a #14 AWG solid copper wire electrode inserted into the water using a Pete's style access port.
- The heat pump must be operating and the water stream flowing.
- The voltage measured should be less than 300mV (0.300V). If the voltage is higher than 500mV, electrolysis occurs resulting in corrosion.
- If voltage is measured, the cause is a high-resistance earth ground or current on the neutral conductor. Remedial measures should be performed.
- Measure the current flowing through the piping system by using an amp clamp probe on the water-in line. The heat pump must be operating and the water stream flowing.
- There should be zero amps measured. If current is present, there is leakage current to the plumbing system and it must be rectified to prevent pipe corrosion.

## Measuring Earth Ground Resistance



- Measure the earth ground bond using an Ohm meter between the building's ground rod and the steel well casing.
- The resistance measured should be zero Ohms. The NEC allows a resistance to ground up to 20 Ohms. Any resistance above zero indicates a poor earth ground, which may be the result of a hot neutral line or that conductive water is present. Both of these may lead to electrolysis and corrosion of the heat pump piping. A check for both should be performed and resolved.

**NOTE: If the well casing is plastic, create a conductive path by inserting a #6 AWG bare copper wire into the well water. Remove the temporary conductor when finished.**

Model  
SWT

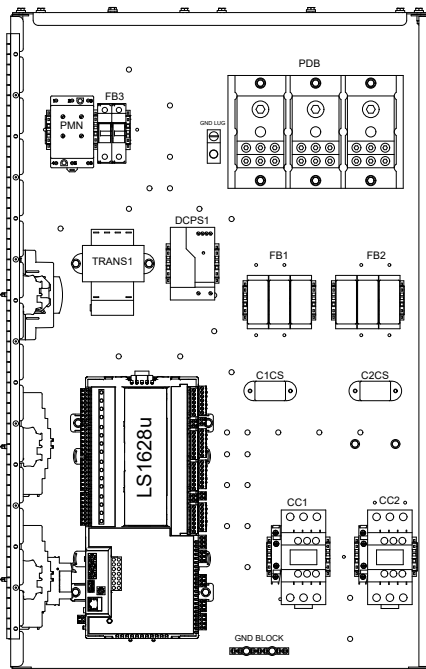
# Electrical Connections

The power for all modules is taken from a suitable circuit breaker/fused disconnect power supply within the main panel. Proper grounding of the module is mandatory. **Before carrying out any electrical work, confirm that the main supply is isolated.** Knockout drawings are provided. **Do not drill into cabinet;** shavings can damage electronic components. The power for all individual modules shall be in compliance with all local and national codes.

## MODULE CONTROLLER

The module controller LS1628 directly senses the control parameters that govern the specific module's operation, such as evaporator and condenser leaving temperatures, suction and discharge temperatures and pressures.

Figure 8: Module Control Panel



**CAUTION**

Unit to be serviced by qualified personnel only. Refrigerant system under pressure. Relieve pressure before using torch. Recover refrigerant and store or dispose of properly.

## ELECTRICAL PHASE SEQUENCING

Proper clockwise rotation for scroll compressor motors is important to prevent damage to the compressors. ClimateMaster recommends the use of a phase sequence indicating instrument following the manufacturers directions. An alternative is to “bump test” the compressors one at a time with pressure gauges attached to the high and low gauge ports of the compressors to check for proper rotation. Energize the compressor for a few seconds to ensure the discharge pressure gauge increases significantly. If the discharge pressure does not increase, proper rotation is reversed. Compressor rotation can be reversed by opening the main electrical disconnect and switching any two of the main power supply leads feeding that compressor's contactor.

## PROPER VOLTAGE BALANCE

Occasionally, in three phase circuits, a voltage imbalance occurs between phases. It is not recommended to operate equipment when an imbalance greater than 4% occurs. This causes motors to run at high temperatures and may affect their longevity. The following example describes how to calculate the average voltage of the three phases to see if the imbalance is greater than 4%.

Example: Line 1 = 226V, Line 2 = 230V, Line 3 = 228V  
 The average is:  $(226+230+228)/3 = 228V$   
 Next,  $[100(228-226)]/228 = 0.9\%$

The voltage imbalance of the three phase circuit is 0.9%. This is well under the 4% range.

**CAUTION**

**3-PHASE SCROLL COMPRESSOR UNIT**

If this unit uses a 3-Phase Scroll Compressor, the following instructions must be followed:

- Unit power supply must be wired in the proper sequence to avoid damage to the 3-Phase Scroll Compressor;
- Scroll Compressors with incorrect rotation show the following characteristics:
  - High sound level;
  - High suction pressure and low discharge pressure;
  - Low current draw.

If any of the three above characteristics exist, swap two of the three supply wires at the disconnect and recheck compressor for incorrect rotation.

# Communications Wiring

Model  
SWT

## AVOIDING NOISE

Avoid running communication wires or sensor input wires next to AC power wires or the controller’s relay output wires. These can be sources of noise that can affect signal quality. Common sources of noise are:

- Spark igniters
- Radio transmitters
- Variable speed drives
- Electric motors (> 1hp)
- Transformers
- Large contactors, (i.e., motor starters)
- Relays
- Video display devices
- Lamp dimmers
- Fluorescent lights
- Induction heaters
- Generators
- Parallel runs with power lines
- Other electronic modules

## STP CAT 6 ETHERNET CABLE

Shielded, twisted pair category 6 (STP Cat 6) Ethernet cable is a twisted-pair cable comprised of eight copper wires twisted into four pairs. Each pair is then shielded with aluminum foil or braided wire strands before being jacketed. The cable standard provides performance of up to 250 MHz and runs at 1 Gbps up to 328 ft. (100 m) in length. If the length of the cable is 121 ft. (37 m) or less, then the speed increases to 10 Gbps.

This cable is commonly connected using punch-down blocks and modular connectors. Cable shielding reduces interference (both electromagnetic and radio frequency) and improves signal quality.

Category 6 is currently defined in ISO/IEC 11801, IEC 61156, and EN 50173. These documents specify performance characteristics and test requirements for frequencies up to 250 MHz.

The cable is available in both stranded- and solid-conductor forms. The stranded form is more flexible and withstands more bending without breaking. In situations where a cable is repeatedly flexed or connected and disconnected, choose a stranded cable. For horizontal cable runs not subject to repeated movement, or for outdoor applications, use STP Cat 6 CMP solid-copper conductor cable with individual shielding applied to each of the four wired pairs. The category and type of cable can be identified by the printing on the jacket.

The Category 6 specification requires conductors to be pure copper.

## CHARACTERISTICS OF STP CAT 6

The use of balanced lines helps preserve a high signal-to-noise ratio despite interference from both external sources and crosstalk from other pairs.

**Table 7: Electrical Characteristics for a Commercially Available Cat 6 UTP Cable Product**

Property	Nominal	Tolerance	Unit
Characteristic Impedance, 1-250 MHz	100	± 15	Ω
Characteristic Impedance @ 250 MHz	100	± 5	Ω
DC Loop Resistance	≤ 0.05		Ω/m
Propagation Speed Relative to the Speed of Light	0.69		1
Propagation Delay	4.60		ns/m
Delay Skew < 100 MHz	< 0.45		ns/m
Capacitance @ 100 Hz	56		pF/m
Max Tensile Load, During Installation	110		N
Wire Diameter (24 AWG; 0.205 mm <sup>2</sup> )	0.51		mm
Operating Temperature	-20 to +70		°C
Maximum DC Operating Voltage (PoE uses max 57 V)	90		V

Model  
SWT

## Electrical Data

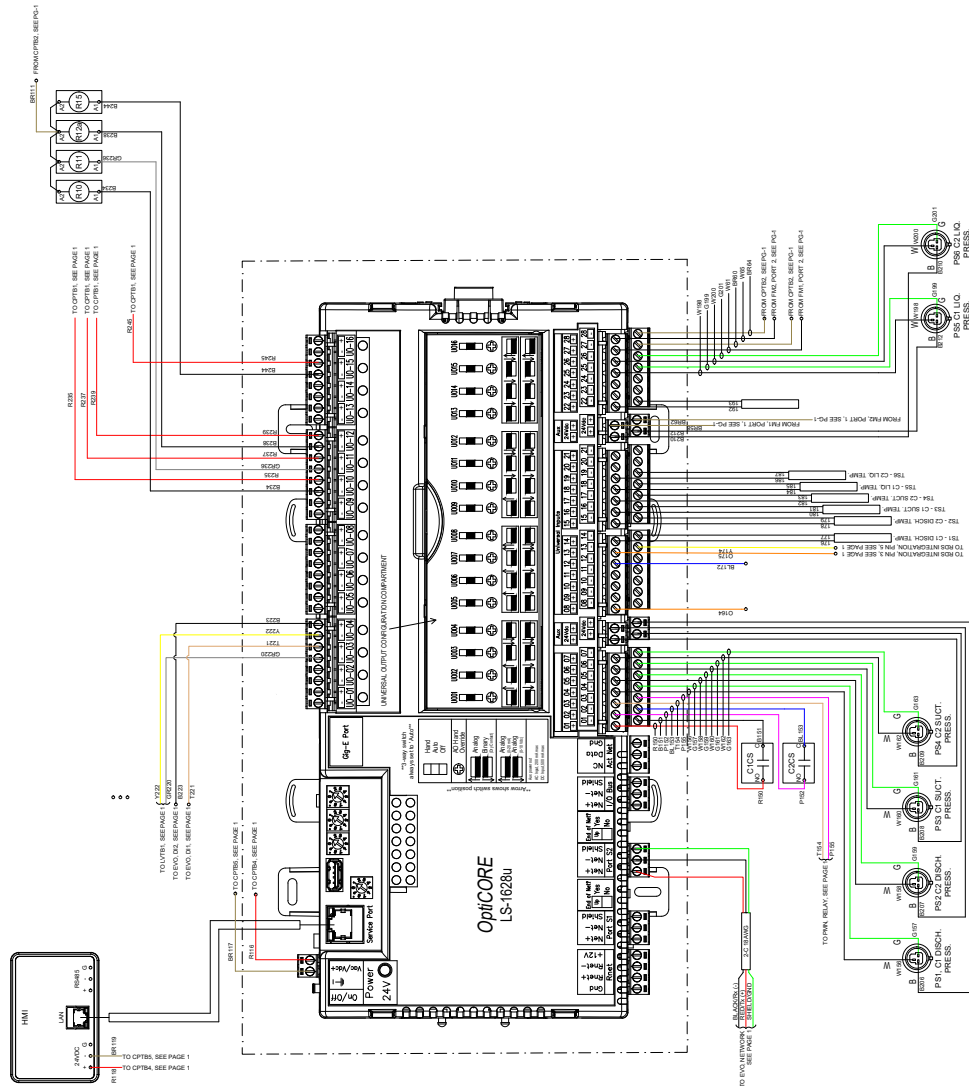
### Standard Compressor

Base Model	Voltage Code	Rated Voltage	Voltage Min/Max	Compressor			Total Unit FLA	Min Circuit Ampacity (MCA)	Max Overcurrent Protection (MOP)
				QTY	RLA	LRA			
SWT20	H	208/230V-3PH-60Hz	187/252	2.0	33.3	255.0	66.6	74.9	100
	F	460V-3PH-60HZ	432/504	2.0	15.4	140.0	30.8	34.7	50
	N	575V-3PH-60Hz	540/630	2.0	12.9	107.6	25.8	29.0	40
SWT30	H	208/230V-3PH-60Hz	187/252	2.0	49.0	386.3	98.0	110.3	150
	F	460V-3PH-60HZ	432/504	2.0	24.0	182.0	48.0	54.0	70
	N	575V-3PH-60Hz	540/630	2.0	19.2	131.0	38.4	43.2	60
SWT50	H	208/230V-3PH-60Hz	187/252	2.0	74.4	578.1	148.8	167.4	225
	F	460V-3PH-60HZ	432/504	2.0	38.8	280.7	77.6	87.3	125
	N	575V-3PH-60Hz	540/630	2.0	28.4	250.0	56.8	63.9	90
SWT65	H	208/230V-3PH-60Hz	187/252	2.0	102.8	599.0	205.6	231.3	300
	F	460V-3PH-60HZ	432/504	2.0	48.0	310.0	96.0	108.0	150
	N	575V-3PH-60Hz	540/630	2.0	43.1	239.0	86.2	97.0	125
SWT80	F	460V-3PH-60HZ	432/504	2.0	67.5	442.0	135.0	151.9	200
	N	575V-3PH-60Hz	540/630	2.0	45.2	375.0	90.4	101.7	125



Model  
SWT

# Example Wiring Diagrams



# Controls

Model  
SWT

All ClimateMaster SWT Large Water-to-Water units are equipped with a digital control system that supports stand-alone operation and building management system integration. The following are steps and guides to initial configuration and setup.

2. The Gig-E Port is the only port that speaks BACnet over IP. Connect the CAT 5e cable to the Gig-E Port:

**Figure 10: Gig-E Port**



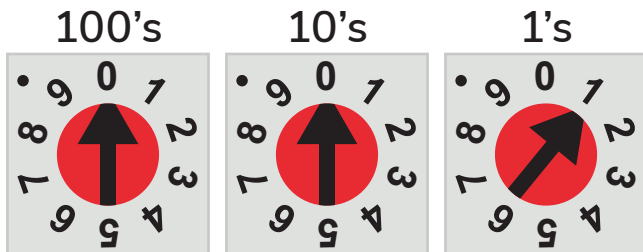
## CONFIGURE THE CONTROLLER

Complete these steps before powering the unit.

1. Using the rotary switches, set the unit controller's address. Set the Hundreds (100's) switch to the hundreds digit of the address, set the Tens (10s) switch to the tens digit of the address, and the Ones (1s) switch to the ones digit.

**If the controller's address is 001, point the arrow on the Hundreds (100's) switch to 0, Tens (10's) switch to 0, and the Ones (1's) to 1.**

**Figure 9: Rotary Switches**



3. Set the Comm Selector Rotary switch to 1 for MS/TP:

**Figure 11: Comm Selector Rotary**



## Controller Points List

Name	Object ID	Object Name	Description
C1 Cooling Liquid Line Temperature	AV:2143	c1_cl_ll_temp_1	Circuit 1's Cooling Liquid Line Temperature
C1 Cool Mode SubCool	AV:2087	c1_cool_mode_subcool_1	Circuit 1's Subcool Temperature in Cool Mode
C1 Discharge Temperature	AV:2139	c1_disc_temp_1	Circuit 1's Discharge Temperature
C1 Disch Pressure	AV:2135	c1_disc_pres_1	Circuit 1's Discharge Pressure
C1 Heating Liquid Line Temperature	AV:2145	c1_ht_ll_temp_1	Circuit 1's Heating Liquid Line Temperature
C1 Heat Mode SubCool	AV:2088	c1_heat_mode_subcool_1	Circuit 1's Subcool Temperature in Heat Mode
C1 Liquid Line Pressure	AV:2163	c1_ll_pressure_1	Circuit 1's Liquid Line Pressure in Cool Mode
C1 Liquid Line Pressure Heat Stat	AV:2116	c1_ll_press_heat_1	Circuit 1's Liquid Line Pressure in Heat Mode
C1 Suction Pressure	AV:2137	c1_suct_pres_1	Circuit 1's Suction Pressure
C1 Suction Temperature	AV:2141	c1_suct_temp_1	Circuit 1's Suction Temperature
C2 Cooling Liquid Line Temperature	AV:2144	c2_cl_ll_temp_1	Circuit 2's Cooling Liquid Line Temperature
C2 Cool Mode SubCool	AV:2086	c2_cool_mode_subcool_1	Circuit 2's Subcool Temperature in Cool Mode
C2 Discharge Temperature	AV:2140	c2_disc_temp_1	Circuit 2's Discharge Temperature
C2 Disch Pressure	AV:2136	c2_disc_pres_1	Circuit 2's Discharge Pressure
C2 Heating Liquid Line Temperature	AV:2146	c2_ht_ll_temp_1	Circuit 2's Heating Liquid Line Temperature
C2 Heat Mode SubCool	AV:2089	c2_heat_mode_subcool_1	Circuit 2's Subcool Temperature in Heat Mode
C2 Liquid Line Pressure	AV:2164	c2_ll_pressure_1	Circuit 2's Liquid Line Pressure in Cool Mode
C2 Liquid Line PressureHeat Stat	AV:2117	c2_ll_press_heat_1	Circuit 2's Liquid Line Pressure in Heat Mode
C2 Suction Pressure	AV:2138	c2_suct_pres_1	Circuit 2's Suction Pressure
C2 Suction Temperature	AV:2142	c2_suct_temp_1	Circuit 2's Suction Temperature
Calc C1 Suc Superheat	AV:2035	c1_suc_superheat_1	Circuit 1's Suction Superheat Temperature
Calc C2 Suc Superheat	AV:2036	c2_suc_superheat_1	Circuit 2's Suction Superheat Temperature
Chilled Water Design Delta	AV:2160	chilled_design_delta_1	Chilled Water Design Delta
Chiller Module Type	AV:2077	chiller_config_1	Circuit 1's Module Type
Comp 1 Runtime	AV:2037	c1_runtime_1	Compressor 1 Runtime
Comp 2 Runtime	AV:2039	c2_runtime_1	Compressor 2 Runtime
Cooling Type	AV:2161	cooling_type_1	Sets the Pressure Control Setpoints
COOL LVG TRG	AV:2156	cool_temp_stp_1	Bank's Chilled Water Target Setpoint
EEV1 Manual Percentage	AV:2004	exv1_man_percent_1	Circuit 1's EEV A Manual Percentage ONLY IN MANUAL Mode
EEV2 Manual Percentage	AV:2006	exv2_man_percent_1	Circuit 1's EEV A Manual Percentage ONLY IN MANUAL Mode
EEV B C1 Manual Percentage	AV:2240	exvb1_man_percent_1	Circuit 1's EEV B Manual Percentage ONLY IN MANUAL Mode
EEV B C2 Manual Percentage	AV:2241	exvb2_man_percent_1	Circuit 1's EEV B Manual Percentage ONLY IN MANUAL Mode
EXVA C1 Valve position	AV:2371	exv_a_c1_val_pos_1	Circuit 1's EEV A Valve Position
EXVA C2 Valve position	AV:2372	exv_a_c2_val_pos_1	Circuit 2's EEV A Valve Position
EXV A C1 Superheat	AV:2242	exva_c1_sh_1	Circuit 1's EEV A Superheat
EXV A C2 Superheat	AV:2243	exva_c2_sh_1	Circuit 2's EEV A Superheat
EXVB C1 Valve position	AV:2373	exv_b_c1_val_pos_1	Circuit 1's EEV B Valve Position
EXVB C2 Valve position	AV:2374	exv_b_c2_val_pos_1	Circuit 2's EEV B Valve Position
EXV B C1 Superheat	AV:2244	exvb_c1_sh_1	Circuit 1's EEV B Superheat

Table continued on next page.

# Controller Points List

Model  
SWT

Table continued from previous page.

Name	Object ID	Object Name	Description
EXV B C2 Superheat	AV:2245	exvb_c2_sh_1	Circuit 2's EEV B Superheat
HEAT LVG TRG	AV:2155	heat_temp_stp_1	Hot Water Target Setpoint
Hot Water Design Delta	AV:2159	heating_design_delta_1	Hot Water Design Delta
Local Loop 2 Manual Percentage	AV:2114	loop2_man_percentage_1	Loop 2 Valve Manual Percentage ONLY IN MANUAL Mode
Loop1 Entering Water Temp	AV:2064	loop1_entering_temp_1	Loop1 Entering Water Temp
Loop1 Leaving Water Temp	AV:2147	loop1_leaving_temp_1	Loop1 Leaving Water Temp
Loop1 Manual Percentage	AV:2112	loop1_man_percentage_1	Loop 1 Valve Manual Percentage ONLY IN MANUAL Mode
Loop 1 Flow Status	AV:2091	flow1_stat_1	Loop 1 Flow Status
Loop 1 Motorized Water Valve Output	AV:2020	loop1_mwv_out_1	Loop 1 Valve Position Control
Loop 1 MWV Status	AV:2084	loop1_mwv1_stat_1	Loop 1 Valve Position Status
Loop 2 Flow Status	AV:2093	flow2_stat_1	Loop 2 Flow Status
Loop 2 Leaving Water Temp	AV:2126	loop2_leaving_temp_1	Loop 2 Leaving Water Temperature
Loop 2 Motorized Water Valve Output	AV:2021	loop2_mwv_out_1	Loop 2 Valve Position Control
Loop 2 MWV 2 Status	AV:2085	loop2_mwv1_stat_1	Loop 2 Valve Position Status
Manual Mode Remaining Time	AV:2175	man_mode_remain_time_1	Manual Mode Expiry Timer
Manual Module Mode	AV:2239	manual_sysmode_1	Manual Mode Status
Module Active Alarms	AV:2167	mod_act_mod_alarms_1	Module Active Alarms
Module Active Compressor Alarms	AV:2166	mod_act_comp_alarms_1	Module Active Compressor Alarms
Module Active OOR Alarms	AV:2165	mod_act_oor_alarms_1	Module Active OOR Alarms
Module Active Retries	AV:2070	mod_unload_stat_1	Module Active Retries
Module Comm Read Status	AV:2151	mod_comm_rx_stat_1	Module Comm Read Status
Module Lead Lag Order	AV:2157	mod_lead_lag_order_1	Module Lead Lag Order
Module Mode	AV:2158	sysmode_1	Module Mode
Alarm_Output	BV:2024	alarm_out_1	Alarm_Output
Antifreeze	BV:2154	brine_used_1	Antifreeze
C1 A EEV Enable Output	BV:2019	c1_exv_a_en_out_1	Circuit 1's EEV A Enable Status
C1 Disable	BV:2239	c1_disable_1	Circuit 1's Disable Status
C1 Enable Output	BV:2022	c1_en_out_1	Circuit 1's EEV B Enable Status
C1 Manual	BV:2071	c1_manual_1	C1 Manual Enable
C1 Minimum Run Time	BV:2171	c1_min_runtime_1	Compressor 1 Minimum Required Runtime
C1 Compressor Off Delay	BV:2174	c2_minimum_off_1	Compressor 2 Off Delay Elapsed
C1 Ref Isolation Solenoid	BV:2031	c1_ref_iso_solenoid_1	Circuit 1's Refrigerant Isolation Solenoid Enable
C1 Retry	BV:2067	c1_unload_1	Compressor 1 in Retry
C1 RV Out	BV:2169	c1_rv_out_1	Circuit 1's Reversing Valve Enable
C1 Shutdown Status	BV:2190	c1_shutdown_1	Circuit 1's Shutdown Status
C2 Disable	BV:2240	c2_disable_1	Compressor 2 Disabled
C2 EEV A Enable Output	BV:2148	c2_exv_a_en_out_1	Circuit 2's EEV A Enable Status
C2 Enable Output	BV:2023	c2_en_out_1	Circuit 2's EEV B Enable Status
C2 Heat EEV	BV:2029	c2_exv_b_en_out_1	Circuit 2's Heat EEV

Table continued on next page.

## Controller Points List

Table continued from previous page.

Name	Object ID	Object Name	Description
C2 Manual	BV:2072	c2_manual_1	C2 Manual Enable
C2 Minimum Run Time	BV:2172	c2_min_runtime_1	Compressor 2 Minimum Required Runtime
C2 Ref Isolation Solenoid Stat	BV:2032	c2_ref_iso_solenoid_1	Circuit 2's Refrigerant Isolation Solenoid Enable
C2 Runtime Reset	BV:2041	reset_c2_runtime_1	Compressor 2 Runtime Reset
C2 RV Out	BV:2170	c2_rv_out_1	Circuit 2's Reversing Valve Enable
C2 Shutdown Status	BV:2191	c2_shutdown_1	Circuit 2's Shutdown Status
Chiller Run	BV:2076	chiller_run_1	Module enable from Bank
Clear Fault History	BV:2168	clear_fault_history_1	Module Fault History Clear
Comp 1 Fail	BV:2123	comp1_fail_1	Compressor 1 Fail
Comp 1 Go Command	BV:2054	comp_1_go_1	Compressor 1 Bank Command
Comp 1 Status	BV:2056	c1_stat_1	Compressor 1 Status
Comp 2 Go Command	BV:2055	comp_2_go_1	Compressor 2 Bank Command
Comp 2 Status	BV:2057	c2_stat_1	Compressor 2 Status
Compressor 2 Fail	BV:2040	comp2_fail_1	Compressor 2 Fail
Compressor Off Delay	BV:2173	c1_minimum_off_1	Compressor Required Minimum Off Time
EEV1 Manual Control	BV:2005	exv1_manual_1	Circuit 1's EEV A Manual Control
EEV2 Manual Control	BV:2007	exv2_manual_1	Circuit 2's EEV A Manual Control
EEV B C1 Manual Control	BV:2242	exvb1_manual_1	Circuit 1's EEV B Manual Control
EEV B C2 Manual Control	BV:2243	exvb2_manual_1	Circuit 2's EEV B Manual Control
EEV C1 Manual EN	BV:2000	bbvp_eev_c1_man_en_1	EEV A Fully Open Manual
EEV C2 Manual EN	BV:2001	bbvp_eev_c2_man_en_1	EEV B Fully Open Manual
Enable Fixed Head Pressure Control	BV:2162	fixed_disc_press_en_1	Fixed Head Pressure Control
Fail to Run Enable	BV:2177	enable_ftr_1	StandAlone Mode
Lock Loop 1 Open	BV:2209	lock_loop1_open_1	Lock Loop 1 Open
Loop1 Manual Control	BV:2113	loop1_manual_1	Loop1 Manual Control
Loop1 Valve Bypass Module	BV:2111	loop1_bypass_mod_1	Loop1 Valve Bypass Module
Loop 1 Valve Status	BV:2108	loop1_valve_status_1	Loop 1 Valve Status
Loop 2 Manual Valve Control	BV:2115	loop2_manual_1	Loop 2 Manual Valve Control
Loop 2 Valve Status	BV:2109	loop2_valve_status_1	Loop 2 Valve Status
Manual C1 Hot Gas Solenoid	BV:2180	c1_man_hgs_1	Manual C1 Hot Gas Solenoid
Manual C1 Hot Gas Solenoid	BV:2002	c1_man_li_1	Manual C1 Hot Gas Solenoid
Manual C1 Liquid Injection	BV:2003	c2_man_li_1	Manual C1 Liquid Injection
Manual C1 Refrigeration Isolation Solenoid	BV:2184	c1_man_ref_iso_1	Manual C1 Refrigeration Isolation Solenoid
Manual C1 Reversing Valve	BV:2182	c1_man_rev_valve_1	Manual C1 Reversing Valve
Manual C2 Hot Gas Solenoid	BV:2181	c2_man_hgs_1	Manual C2 Hot Gas Solenoid
Manual C2 Refrigeration Isolation Solenoid	BV:2185	c2_man_ref_iso_1	Manual C2 Refrigeration Isolation Solenoid
Manual C2 Reversing Valve	BV:2183	c2_man_rev_valve_1	Manual C2 Reversing Valve
Manual Mode	BV:2210	manual_mode_1	Operating Mode in Manual Mode
Module Communication Transmit Status	BV:2152	mod_comm_tx_stat_1	Bank Module Communication Watchdog Timer
Module Failure Mot Valve	BV:2110	mot_wtr_vlv_fail_1	Motorized Valve Failure in Module

Table continued on next page.

## Controller Points List

Model  
SWT

Table continued from previous page.

Name	Object ID	Object Name	Description
Module Flow 1 Status	BV:2090	modflow1_1	Flow Detection on Loop 1
Module Flow Status 2	BV:2246	modflow2_1	Flow Detection on Loop 2
Module Ok	BV:2074	module_ok_1	Module Condition
Module Run	BV:2073	module_run_1	Module Run Status
Phase OK Status	BV:2134	phase_stat_1	Module Phase Status
RDS Alarm	BV:2178	rds_alarm_1	Module RDS Alarm
Reset All Module Alarms	BV:2069	reset_alarms_1	Reset All Module Alarms
C1 Discharge Pressure OOR	BV:2049	c1_discharge_pressure_oor_1	Circuit 1 Discharge Pressure OOR
C1 Discharge Temperature OOR	BV:2605	c1_discharge_temperature_oor_1	Circuit 1 Discharge Temperature OOR
C1 Liquid Line pressure OOR	BV:2062	c1_liquid_pressure_oor_1	Circuit 1 Liquid Line pressure OOR
C1 Liquid Line Temp OOR	BV:2060	c1_liquid_line_temp_oor_1	Circuit 1 Liquid Line Temp OOR
C1 Suction Pressure Out of Range	BV:2130	c1p2_oor_1	Circuit 1 Suction Pressure Out of Range
C1 Suction Temperature OOR	BV:2052	c1_suction_temperature_oor_1	Circuit 1 Suction Temperature OOR
C2 Discharge Pressure OOR	BV:2050	c2_discharge_pressure_oor_1	Circuit 2 Discharge Pressure OOR
C2 Discharge Temperature OOR	BV:2051	c2_discharge_temperature_oor_1	Circuit 2 Discharge Temperature OOR
C2 Liquid Line Press Out of Range	BV:2063	c2lp_oor_1	Circuit 2 Liquid Line Press Out of Range
C2 Liquid Line Temperature OOR	BV:2061	c2_liquid_line_temperature_oor_1	Circuit 2 Liquid Line Temperature OOR
C2 Suction Pressure Out of Range	BV:2131	c2p2_oor_1	Circuit 2 Suction Pressure Out of Range
C2 Suction Temperature OOR	BV:2053	c2_suction_temperature_oor_1	Circuit 2 Suction Temperature OOR
Communications Alarm	BV:2068	comm_lost_1	No communication with Bank alarm
Compressor 1 EEV Comm Loss Alarm	BV:2132	c1_eev_comm_loss_alarm_1	Circuit 1 EEV Comm Loss Alarm
Compressor 1 High Discharge Temp	BV:2045	c1_hi_disch_tmp_1	Circuit 1 High Discharge Temperature Alarm
Compressor 1 High Pressure Alarm	BV:2048	c1_hi_pres_alm_1	Circuit 1 High Discharge Pressure Alarm
Compressor 1 Low Suction Pressure Alarm	BV:2046	c1_low_suc_pres_alm_1	Circuit 1 Low Suction Pressure Alarm
Compressor 1 NO-Run Alarm	BV:2042	c1_no_run_1	Compressor 1 NO-Run Alarm
Compressor 2 EEV Comm Loss Alarm	BV:2133	c2_eev_comm_loss_alarm_1	Circuit 2 EEV Comm Loss Alarm
Compressor 2 High Discharge Temp	BV:2044	c2_hi_disch_tmp_1	Circuit 2 High Discharge Temperature Alarm
Compressor 2 High Pressure Alarm	BV:2047	c2_hi_pres_alm_1	Circuit 2 High Discharge Pressure Alarm
Compressor 2 Low Suction Pressure Alarm	BV:2118	c2_low_suc_pres_alm_1	Circuit 2 Low Suction Pressure Alarm
Compressor 2 NO-Run Alarm	BV:2043	c2_no_run_1	Compressor 2 NO-Run Alarm
Loop 1 Motorized Valve Alarm	BV:2106	loop1_valve_alarm_1	Loop 1 Motorized Valve Alarm
Loop 2 Motorized Valve Alarm	BV:2107	loop2_valve_alarm_1	Loop 2 Motorized Valve Alarm
Module Flow 1 Alarm	BV:2094	module_flow1_alarm_1	Module Flow 1 Alarm
Module Flow 2 Alarm	BV:2247	module_flow2_alarm_1	Module Flow 2 Alarm
Module Lockout	BV:2075	manager_lockout_alm_1	Module Locked Out
Phase Loss Alarm	BV:2120	phase_loss_alarm_1	Phase Loss Alarm
RDS Shutdown Alarm	BV:2179	rds_shutdown_alarm_1	RDS Shutdown Alarm
VFD 1 General Alarm	BV:2186	vfd1_genfault_alm_1	VFD 1 General Alarm
VFD 1 STO Alarm	BV:2188	vfd1_sto_alm_1	VFD 1 STO Alarm
VFD 2 General Alarm	BV:2187	vfd2_genfault_alm_1	VFD 2 General Alarm
VFD 2 STO Alarm	BV:2189	vfd2_sto_alm_1	VFD 2 STO Alarm

## Pre-Startup

**All startups must be performed by ClimateMaster factory-trained personnel.** Prior to unit startup, there are certain essential checks which must be completed. Failure to carry out these checks could result in damage to the unit voiding the modules warranty.

### ELECTRICAL

It is imperative to turn off the main electrical power supply and follow proper lock-out/tag-out procedures prior to servicing any of the unit's electrical components. The following procedures can be performed only after the electrical power is confirmed to be off:

1. The installation must be inspected and approved by the respective agent and be in compliance with all local and national electrical codes.
2. Check and tighten as required all electrical terminal connections on each module. Utilize any lock-out/tag-out procedures required for your project location when performing this operation. If no procedure exists take all precautions necessary to prevent the power from being turned on. A systematic tightening of all terminals inside the electrical control panel on each module should be carried out. This will include the compressor motor terminals, which would require removal of the compressor terminal cover. Check connections at each safety and every termination in the panel.
3. All field connections should be checked for tightness.
4. Check all fuses for proper sizing as indicated on the unit data plate and/or the electrical diagram on the inside door of the electrical panel.
5. **Confirm all panels and electrical covers are properly installed/sealed.**
6. **Check that all cabling (inside and outside of electrical panel) is not subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. These effects should also consider continual vibration from such sources as the compressors.**

### REFRIGERATION

Refrigerant piping and components should be inspected for damage.

### WATER SYSTEM

1. Confirm installation of the mandatory field installed chilled water strainer with minimum of 40-mesh screen.
2. Confirm that leak testing has been carried out.
3. Confirm that the system is clean.
4. Confirm that necessary water treatment systems are in place with the heat exchanger water systems.
5. Confirm the chilled water circulating pumps are operational and water is flowing through the exchanger.
6. Shut the entering water valve and blow out some water from the lower flush port to check for particles or coloration from suspended particles. Record the pressure differential across the unit heat exchanger measured at the pete's ports at each module.
7. Confirm correct water flow rates through the heat exchanger. Acquire the design parameters for the unit bank from the ClimateMaster Selection Program data (available from your local representative). Compare the measured differential pressures from step 5 above with the predicted flow rates to ensure proper correlation to the flow results.

**⚠ WARNING**

Disconnect power supply(ies) before servicing. Refer servicing to qualified service personnel. Electric shock hazard. May result in injury or death!

**⚠ WARNING**

Polyolester Oil, commonly known as POE oil, is a synthetic oil used in many refrigeration systems including those with R-454B refrigerant. POE oil, if it ever comes in contact with PVC or CPVC piping, may cause failure of the PVC/CPVC. PVC/CPVC piping should never be used as supply or return water piping with water source heat pump products containing R-454B as system failures and property damage may result.

**⚠ CAUTION**

Unit to be serviced by qualified personnel only. Refrigerant system under pressure. Relieve pressure before using torch. Recover refrigerant and store or dispose of properly.

**⚠ CAUTION****3-PHASE SCROLL COMPRESSOR UNIT**

If this unit uses a 3-Phase Scroll Compressor, the following instructions must be followed:

- Unit power supply must be wired in the proper sequence to avoid damage to the 3-Phase Scroll Compressor;
- Scroll Compressors with incorrect rotation show the following characteristics:
  - High sound level;
  - High suction pressure and low discharge pressure;
  - Low current draw.

If any of the three above characteristics exist, swap two of the three supply wires at the disconnect and recheck compressor for incorrect rotation.



# Pre-Startup Checklist

## Water-Source Heat Pumps

Model: SW

E-mail: [CLMTechServices@climatemaster.com](mailto:CLMTechServices@climatemaster.com) • Phone: 800.299.9747, Option 2, then Option 3

<b>Project Name:</b> _____	<b>Date:</b> _____
<b>Address/Phone:</b> _____	

	YES	NO
1. Are modules connected properly per Codes and Installation Manual? (Installation, Operation & Maintenance (IOM) Manual is available at <a href="http://www.climatemaster.com">www.climatemaster.com</a> .)	<input type="checkbox"/>	<input type="checkbox"/>
2. Is there a minimum of 40-mesh strainer on the inlet water of each loop? (Fill the heat pump with water, passing through—at minimum—40-mesh strainers.)	<input type="checkbox"/>	<input type="checkbox"/>
3. Is condenser water system filled and flushed? See “Filling the Water System” in IOM.	<input type="checkbox"/>	<input type="checkbox"/>
4. Is chilled water system filled, flushed and all air purged from system? (Air must be purged from system prior to startup. See “Filling the Water System” in IOM.)	<input type="checkbox"/>	<input type="checkbox"/>
5. Are all pumps tested and operational?	<input type="checkbox"/>	<input type="checkbox"/>
6. Is required GPM/Pressure Differential supplied to the chilled water side? See project specifications or selection and performance sheets available from ClimateMaster Sales Rep.	<input type="checkbox"/>	<input type="checkbox"/>
7. Have all heat pump coupling connections been leak tested?	<input type="checkbox"/>	<input type="checkbox"/>
8. Is water presently circulating through heat pump?	<input type="checkbox"/>	<input type="checkbox"/>
9. Does the power supply match the heat pump nameplate?	<input type="checkbox"/>	<input type="checkbox"/>
10. Are power and communication wiring complete?	<input type="checkbox"/>	<input type="checkbox"/>
11. Do wiring and devices match the approved electrical submittal drawings?	<input type="checkbox"/>	<input type="checkbox"/>
12. Is required load available to run multiple compressors at startup?	<input type="checkbox"/>	<input type="checkbox"/>
13. Glycol Added? If Yes, Glycol % _____	<input type="checkbox"/>	<input type="checkbox"/>

If you checked “No” to any question above, provide the line reference number and the date of scheduled completion below. Please note **all conditions must be complete prior to the start-up date:**

\* This form must be completed and submitted to ClimateMaster **three (3) weeks** prior to final scheduling of any Startup.  
**NOTE:** If any of the above items are not complete at time of startup, back charges will be assessed for additional costs.

<b>Contractor Name:</b> _____	
<b>Address:</b> _____	
<b>Phone:</b> _____	<b>(Authorized Signature)</b> _____
<b>Date:</b> _____	

## Mechanical Startup

Model  
SWT

**All startups must be performed by ClimateMaster factory trained personnel.**

### STARTUP DOCUMENTATION

All startup paperwork and documentation must be submitted to ClimateMaster. Future warranty claims cannot be processed without a completed Startup and Warranty Registration form on file.

### MECHANICAL STARTUP

1. Review all items are complete from the Pre-Startup Checklist.
2. Cross reference model number with submittal sheet to verify that the units are the correct model type and voltage requirements.
3. Confirm all panels and electrical covers are properly installed/sealed.
4. Inspect all refrigerant piping for oil leaks which may have occurred during shipment which might indicate a refrigerant leak.
5. Before attempting a bump-test, or any compressor operation, check for proper line- or high-voltage values at unit-input power block, and the 24VAC low-voltage values for correctness ( $\pm 10\%$  of nominal values).
6. Confirm the jumper locations for all control systems and unit controllers as shown on the wiring diagrams provided on the inside electrical door panels.
7. Verify that evaporator header inlets (hot-water side if simultaneous application) include strainer assemblies equipped with 40-mesh screens.

# Startup and Warranty Registration

## Water-Source Heat Pumps



Model: SW

Sign date and E-mail to: [CLMTechServices@climatemaster.com](mailto:CLMTechServices@climatemaster.com) • For any questions, call 800.299.9747, Option 2, then Option 3

**NOTE: Please fill out this form and include the required screenshots for each module in the bank.**

Project Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City/State/Zip: \_\_\_\_\_  
 Startup Date: \_\_\_\_\_

Ambient Temp: \_\_\_\_\_  
 Contractor Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City/State/Zip: \_\_\_\_\_  
 Phone No.: \_\_\_\_\_

**Module**

Model No.: \_\_\_\_\_  
 Serial No.: \_\_\_\_\_  
 Chiller No.: \_\_\_\_\_

**Compressor**

Model No.: \_\_\_\_\_  
 Serial No. 1: \_\_\_\_\_  
 Serial No. 2: \_\_\_\_\_

**Water Samples Taken: (Mark "X")**

Cooling Loop:  Yes  
 Heating Loop:  Yes     N/A  
 Source Loop:  Yes     N/A  
 Glycol Added:  Yes     No    If Yes: Glycol %: \_\_\_\_\_

**Water Pressure Entering/Leaving**

Cooling: \_\_\_\_\_ / \_\_\_\_\_ Δ P  
 Heating: \_\_\_\_\_ / \_\_\_\_\_ Δ P  
 Source: \_\_\_\_\_ / \_\_\_\_\_ Δ P

**NOTE: Failure to collect and send water samples from each loop will void any promise of warranty. For initial MANDATORY water samples, bottles are provided. Follow instructions on label and mail the same day sample is taken.**

- ▶ All wiring terminations in module panel, safeties, and compressors tightened:  Yes
- ▶ Rotation of scroll compressor is correct:  Yes

**Voltage/Ground**

Phase-Phase: L1-L2: \_\_\_\_\_ L2-L3: \_\_\_\_\_ L1-L3: \_\_\_\_\_ Transformer: L1-L2: \_\_\_\_\_ 24V: \_\_\_\_\_

**Compressor Circuit #1**

Amperage: L1: \_\_\_\_\_ L2: \_\_\_\_\_ L3: \_\_\_\_\_

**Compressor Circuit #2**

Amperage: L1: \_\_\_\_\_ L2: \_\_\_\_\_ L3: \_\_\_\_\_

**Insert a USB drive into the USB port on the back of the touchscreen. Go to the screens noted on this page and press the camera icon to take screenshots of each screen. Submit the screenshots with your startup form.**

**System Screenshots<sup>1</sup>**

Home:  Chiller Configuration:   
 I/O Status:  Diagnostics:   
 Status:  PID Settings:

**NOTES:** 1. All System Screenshots are required.

Rep Signature: \_\_\_\_\_ Print Name: \_\_\_\_\_  
 E-Signature:  Check Box (Authorized Signature)



Model  
SWT

# Operation and Maintenance

## PRESSURE AND TEMPERATURE LOG

A log of temperatures and pressures should be taken regularly. Periodically conduct a visual inspection of the unit to identify problems before they reach the point of failure. As with any mechanical system, it is necessary to conduct a series of checks to the ClimateMaster heat pump to confirm correct operation.

### MAINTAINING A DAILY LOG

Date							
Chilled No.							
Technician							
	Sun.	Mon.	Tue.	Wed.	Thur.	Fri.	Sat.
Chilled Water Entering Temperature							
Chilled Water Leaving Temperature							
Chilled Water Pressure Drop							
Faults: Note by Module Number							

### DAILY

- A daily operational log should be kept.
- Perform visual inspection.
- Record entering and leaving chilled water temperatures and pressures.
- Note any problems that may exist and immediately plan for further investigation. If repair is necessary, schedule for earliest possible date.
- Properly document all data taken.

## WEEKLY

- Review daily log from previous week.
- Perform visual inspection.
- Properly document all data taken.
- Note any problems that may exist. Immediately plan for further investigation. If repair is necessary, schedule for earliest possible date.

## QUARTERLY


Check controller operating parameters and setpoints.

- Check temperature drop/rise on heat exchanger.\*
- Check water flow rates and pressure drops across heat exchanger.
- Check all electrical connections for tightness.
- Properly document all data taken.

\* The temperature drop/rise on a fully loaded (both compressors) heat exchanger is generally 10°F (-12.22°C). If only one compressor is running the temperature drop/rise will be approximately 5°F (-15°C). Some projects are designed to have a higher or lower temperature drop on the evaporator depending on application. Consult the bank performance sheet for your specific project for these values. If the temperature drop/rise is greater than the design, your heat exchanger may need to be back flushed or the strainer may need to be cleaned.

**⚠ WARNING**

**WATER AND REFRIGERANT SYSTEMS UNDER PRESSURE**



- Isolate/Lockout source and relieve pressure BEFORE servicing equipment.
- Failure to relieve pressure may result in property damage, serious bodily injury or death!

**⚠ WARNING**

**VERY HOT WATER!**

## Operation and Maintenance

Model  
SWT

### WINTER SHUTDOWN: AT THE END OF THE COOLING SEASON (IF UNIT IS UTILIZED FOR COOLING ONLY)

Drain the fluid from the cooler, hydronic package (if installed) and internal piping.

Fill the cooler and hydronic package with a sufficient amount of antifreeze solution to prevent any residual water in the cooler and hydronic package/piping from freezing. It is the facility's responsibility to maintain the working-fluid freeze-point adequately below the lowest water temperatures for freeze protection during off-state.

At the beginning of the next cooling season, refill the cooler and add the recommended inhibitor.

### ANNUAL

- Back flush all heat exchangers. If fouling is suspected, use only ClimateMaster recommended de-scalers (see *Chemical Clean In Place Washing* section).
- Remove and clean all waterside strainers.
- Manually operate all waterside isolation valves, if provided, on each module.
- Check all electrical connections for tightness.
- Perform leak check on all refrigerant circuits.
- Check all header piping couplings for tightness.
- Check and test all refrigerant safeties for proper operation.
- Check all peripheral systems for proper operation.
- Verify setpoints, sensors, and general control configuration.
- Properly document all data taken.

# Heat Exchangers

## DRAINING

When performing standard maintenance procedures such as flushing a heat exchanger, it will be necessary to close off a section of a module. This can easily be done if factory mounted water isolation valves are provided. Access to a floor drain is helpful when performing standard maintenance procedures.

## BACK FLUSHING

It may become evident from the recorded weekly log data that the performance of the chiller is gradually degrading. This could be due to a buildup of debris or sludge obstructing the free passage of flow through the heat exchangers. This debris can be removed by a back washing process which involves the introduction of a forced violent backwards flow through the heat exchanger using a carefully formulated flushing solution. To be effective, this back flow should be slightly higher than the normal flow, and in the opposite direction. The difficulties and practicality of this method depends on the back wash pumping system itself.

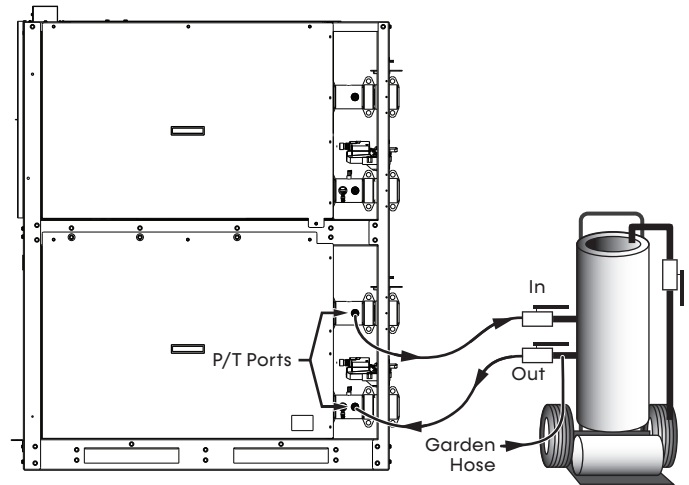
**WARNING**

**WATER VALVES MUST BE REOPENED AFTER FLUSHING IS COMPLETE**

## CHEMICAL CLEAN IN PLACE WASHING WITH WATER ISOLATION VALVES

Chemical Clean-in-place washing will typically provide the best debris removal, even from severely clogged heat exchangers. It is only necessary to mechanically and electrically isolate one heat pump module at a time. The rest of the heat pump modules can continue to operate to satisfy the cooling load required. The cleaning tank, pump, and pump strainer should be arranged as shown in the figure, **Chemical Cleaning the Unit Heat Exchangers**.

**Figure 14: Chemical Cleaning the Unit Heat Exchangers**



Connection points are provided using the 3/4-inch (1.91 cm) service ports at each heat exchanger. The cleaning solution should flow through the bottom on the heat exchanger to the top to ensure the area to be cleaned was flooded, allowing ScaleBreak-MP to come in contact with all the deposits. A minimum of a 20 mesh strainer or filter bag must be used to capture any debris removed from the heat exchanger.

Goodway® Technologies ScaleBreak-MP, is the recommended descaler which will quickly and effectively dissolve calcium, lime, rust and other water formed deposits from water cooled/ heated equipment. The solutions should only be allowed to circulate within the heat exchanger for 10 to 15 minutes or as recommended by the solution instructions.

Once the washing is complete, the solution should be flushed out completely by pumping clean, fresh water through the heat pump. To achieve a reasonable level of dilution, it may be required to change the water several times. After cleaning, the water quality and water treatment should be confirmed.

# Troubleshooting Guide

## ⚠️ WARNING

The troubleshooting guidelines recommended in this section could result in exposure to electrical safety hazards. Please refer to the safety warnings provided in this manual. Failure to follow all of the recommended safety warnings provided could result in death or serious injury. When possible, disconnect all electrical power including remote disconnects before servicing. Follow proper lockout/tagout procedures. Only a qualified, licensed electrician or persons trained to handle live electrical components should be allowed to work with energized electrical components.

## ⚠️ WARNING



Disconnect power supply(ies) before servicing. Refer servicing to qualified service personnel. Electric shock hazard. May result in injury or death!

## ⚠️ CAUTION



Unit to be serviced by qualified personnel only. Refrigerant system under pressure. Relieve pressure before using torch. Recover refrigerant and store or dispose of properly.

Issue	Possible Cause
Compressor high discharge temperature alarm	Discharge Temp > 250 psi and compressor output is ON
Local flow alarm	Both valves fully open, module flow is OFF and a compressor has been requested
Load high leaving water temperature alarm	In heat mode if leaving temp > 90°F, otherwise if temp > 144°F
High suction pressure software shutdown	Suction pressure > 185 psi, Motorized Water Valve is > minimum position, and compressor output is ON
Low discharge pressure software shutdown	Discharge pressure < 200 psi and compressor output is ON
Compressor no-run alarm	Compressor input status is OFF and compressor output status is ON

## Issue

Compressor Low Suction Pressure Alarm: Suction Pressure < 89 psi

Possible Cause	Solution
Main chilled water valve closed or restricted	Open valve to full open position.
Module chilled water isolation valves, if provided, closed or restricted	Open valves to full open position.
Low refrigerant volume	Check for leaks – add refrigerant.
No load on water chiller	Check water pump operation.
Restriction in liquid line	Plugged liquid line drier – replace liquid line drier.
Inoperable EEV	Repair the expansion valve.
Low water flow through the cooler	Check water flow through the cooler.
Chilled water temperature too cold	Raise water temperature setpoint.
Fouled brazed plate heat exchanger	Clean-in-place heat exchanger as described in IOM.
Faulty suction pressure transducer	Verify transducer calibration using a calibrated manifold gauge and replace if defective.
Wrong suction pressure cutout setpoint	Verify suction pressure cutout setpoint to be set equal to the corresponding leaving chilled solution freeze temperature equivalent pressure on a PT chart. (i.e. If the solution freeze point is 32°F, the equivalent pressure setpoint will be 101 psig).
Improper chilled water circulation	Use an ample sized cleanable strainer in the chilled water circuit; make certain the strainer is clean to ensure full flow of chilled water (strainer screen must be 40-mesh minimum).
Faulty suction pressure transducer	Verify transducer calibration using a calibrated manifold gauge and replace if defective.
Wrong suction pressure cutout setpoint	Verify suction pressure cutout setpoint to be set equal to the corresponding leaving chilled solution freeze temperature equivalent pressure on a PT chart. (i.e. If the solution freeze point is 32°F, the equivalent pressure setpoint will be 101 psig.).
Low discharge pressure	Raise and control discharge pressure within design limits.

Table continued on next page.

# Troubleshooting Guide

Table continued from previous page.

<b>Issue</b>	
Compressor High Discharge Pressure Alarm: Discharge pressure > 575 psi	
<b>Possible Cause</b>	<b>Solution</b>
Improper condenser water circulation	Use an ample sized cleanable strainer in the condenser water circuit; make certain the strainer is clean to ensure full flow of condenser water (strainer must be 40 mesh minimum). It may sometimes be necessary to treat water to prevent formation of deposits.
Insufficient water flow through the condenser	Check water flow through condenser against design requirements.
Fouled brazed plate heat exchanger	Clean-in-place heat exchanger as described in IOM.
Main condenser water valve closed or restricted	Open valves to full open position.
Module condenser water isolation valves closed or restricted	Open valves to full open position.
Water regulating valve incorrectly set or defective	Reset or replace valve.
Defective high pressure switch	Replace high pressure switch.
Compressor discharge valve partially closed	Open valve to full open position.
Non-condensable gases in hydronic system	Recover non-condensable gases from bleed valve on condenser or at bleed valve of the building condenser water system.
Condenser water temperature high	Check water supply temperature against requirements; if cooling tower is used, check spray nozzles on cooling tower.
Overcharge of refrigeration	Recover refrigerant from system while in operation until the first sign of bubbles are shown in the sight glass. Add back refrigerant just until bubbles clear.
<b>Issue</b>	
Module Lockout: Unlock code does not match factory lock code	
<b>Possible Cause</b>	<b>Solution</b>
Incorrect unlock code	Contact factory to verify unlock code
<b>Issue</b>	
Phase Loss Alarm: Chiller Requested and Phase Status is OFF	
<b>Possible Cause</b>	<b>Solution</b>
No signal from phase loss monitor	Check power wiring and fuses.
Phase loss monitor not operational	Replace Phase loss monitor.
<b>Issue</b>	
EEV Communication Loss Alarm: EEV Communication Status is OFF	
<b>Possible Cause</b>	<b>Solution</b>
No power to the controller	Verify power and power wiring to the controller.
Incorrect wiring	Verify ethernet connection between the S2 port on the module and network on the Controller.
Incorrect network configuration	Verify and update network address
<b>Issue</b>	
Invalid OAT Out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
<b>Possible Cause</b>	<b>Solution</b>
Bad OAT Sensor	Replace sensor.
Incorrect wiring to OAT sensor	Verify sensor wiring.
<b>Issue</b>	
Invalid Compressor Discharge Temperature Out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
<b>Possible Cause</b>	<b>Solution</b>
Bad discharge temp sensor	Replace sensor.
Incorrect wiring to discharge temp sensor	Verify sensor wiring.

Table continued on next page.

# Troubleshooting Guide

 Model  
SWT

Table continued from previous page.

Issue	
Invalid Compressor Suction Temperature Out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	Solution
Bad suction temp sensor	Replace sensor.
Incorrect wiring to the suction temp sensor	Verify sensor wiring.
Issue	
Invalid Air Coil Line Temperature out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	Solution
Bad air coil line temp sensor	Replace sensor.
Incorrect wiring to the air coil line temp sensor	Verify sensor wiring.
Issue	
Invalid Liquid Line Temperature out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	Solution
Bad air coil line temp sensor	Replace sensor.
Incorrect wiring to the air coil line temp sensor	Verify sensor wiring.
Issue	
Invalid Loop Entering Water Temperature out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	Solution
Bad loop entering water temp sensor	Replace Sensor
Incorrect wiring to the loop entering water temp sensor	Verify sensor wiring
Issue	
Invalid Compressor Suction Pressure out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	Solution
Bad suction pressure sensor	Replace sensor.
Incorrect wiring to suction pressure sensor	Verify sensor wiring.
Issue	
Invalid Loop Leaving Water Temperature out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	Solution
Bad loop leaving water temp sensor	Replace sensor.
Incorrect wiring to the loop leaving water temp sensor	Verify sensor wiring.
Issue	
Invalid Compressor Discharge Pressure out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	Solution
Bad discharge pressure sensor	Replace sensor.
Incorrect wiring to discharge pressure sensor	Verify sensor wiring.
Issue	
Invalid Compressor Liquid Pressure out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	Solution
Bad liquid pressure sensor	Replace sensor.
Incorrect wiring to liquid pressure sensor	Verify sensor wiring.
Issue	
Refrigerant Detection System	
Possible Cause	Solution
Refrigerant Leak	Check refrigerant charge. If the charge is low, identify and repair the leak.
Faulty RDS Sensor	Check refrigerant charge. If the charge is not low, replace the RDS sensor.

## General Information - Servicing

### WORK PROCEDURE

Work shall be undertaken under a controlled procedure to minimize the risk of a flammable gas or vapor being present while the work is being performed.

### GENERAL WORK AREA

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

**Check for presence of refrigerant** - The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

**Presence of fire extinguisher** - If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO<sub>2</sub> fire extinguisher adjacent to the charging area.

**No ignition sources** - No person carrying out work in relation to a REFRIGERATION SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing, and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

**Ventilated area** - Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

### CHECKS TO REFRIGERATION EQUIPMENT

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant-containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- Refrigerant piping or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

### CHECKS TO ELECTRICAL DEVICES

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- Capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- That no live electrical components and wiring are exposed while charging, recovering, or purging the system;
- That there is continuity of earth bonding.

# Refrigerant Recovery, Evacuation, and Charging

## RECOVERY AND EVACUATION

When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations;
- Recover;
- Purge the circuit with Nitrogen;
- Evacuate;
- Continuously flush or purge with inert gas when using flame to open circuit; and
- Open the circuit.

The refrigerant charge shall be recovered into the proper recovery cylinders. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

## CHARGING PROCEDURES

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.

- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.

Prior to recharging the system, it shall be pressure-tested with Nitrogen to 300 psi. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

## LEAK DETECTION

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine may react with the refrigerant and corrode the copper pipe-work. **NOTE: Examples of leak detection fluids are: bubble method or fluorescent method agents.**

If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut-off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to the section, "Recovery and Evacuation" above.

# Refrigerant Recovery, Evacuation, and Charging

## DECOMMISSIONING

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

1. Become familiar with the equipment and its operation.
2. Isolate system electrically.
3. Before attempting the procedure, ensure that:
  - Mechanical handling equipment is available, if required, for handling refrigerant cylinders;
  - All personal protective equipment is available and being used correctly;
  - The recovery process is supervised at all times by a competent person;
4. Pump down refrigerant system, if possible.
5. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
6. Make sure that cylinder is situated on the scales before recovery takes place.
7. Start the recovery machine and operate in accordance with instructions.
8. Do not overfill cylinders (no more than 80% volume liquid charge).
9. Do not exceed the maximum working pressure of the cylinder, even temporarily.
10. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
11. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

## Labeling

Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating that the equipment contains FLAMMABLE REFRIGERANTS.

## RECOVERY

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

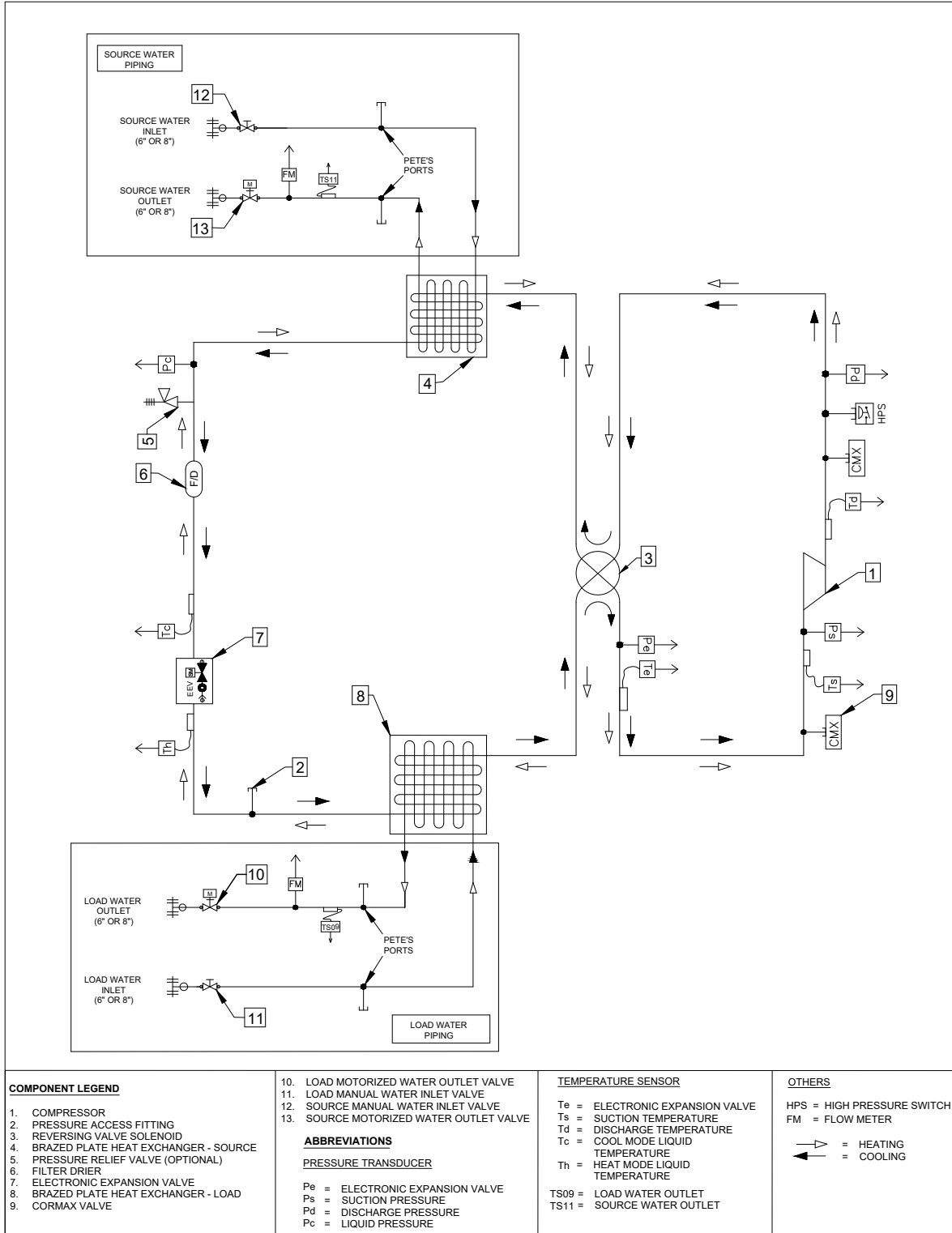
When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

# Refrigeration Circuit Diagram



Model  
SWT

# Warranty U.S. and Canada

## CLIMATE MASTER, INC.



### LIMITED EXPRESS WARRANTY/ LIMITATION OF REMEDIES AND LIABILITY

It is expressly understood that unless a statement is specifically identified as a warranty, statements made by Climate Master, Inc., a Delaware corporation, ("CM") or its representatives, relating to CM's products, whether oral, written or contained in any sales literature, catalog or any other agreement, are not express warranties and do not form a part of the bargain, but are merely CM's opinion or commendation of CM's products.

**EXCEPT AS SPECIFICALLY SET FORTH HEREIN, THERE IS NO EXPRESS WARRANTY AS TO ANY OF CM'S PRODUCTS. CM MAKES NO WARRANTY AGAINST LATENT DEFECTS. CM MAKES NO WARRANTY OF MERCHANTABILITY OF THE GOODS OR OF THE FITNESS FOR ANY PARTICULAR PURPOSE.**

#### GRANT OF LIMITED EXPRESS WARRANTY

CM warrants CM products purchased and retained in the United States of America and Canada to be free from defects in material and workmanship under normal use and maintenance as follows: (1) All complete air conditioning, heating and/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 factory), whichever comes first; (2) Repair and replacement parts, which are not supplied under warranty, for ninety (90) days from date of shipment (from factory). All parts must be returned to CM's factory in Oklahoma City, Oklahoma, freight prepaid, no later than sixty (60) days after the date of the failure of the part; if CM determines the part to be defective and within CM's Limited Express Warranty, CM shall, when such part has been either replaced or repaired, return such a to a factory recognized dealer, contractor or service organization, F.O.B. CM's factory, Oklahoma City, Oklahoma, freight prepaid. The warranty on any parts 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 to CM is or has been in default; (6) Products which have defects or damage which result from improper installation, wiring, electrical imbalance characteristics or maintenance; or are caused by accident, misuse or abuse; fire, flood, 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 unauthorized opening of refrigerant circuit; (8) Mold, fungus or bacteria damages; (9) Products subjected to corrosion or abrasion; (10) Products 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; or (13) Products which have defects, damage or insufficient performance as a result of insufficient or incorrect system design or the improper application of CM's products.

CM is not responsible for: (1) The costs of any fluids, refrigerant or other system components, or 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 costs of labor, refrigerant, materials or service incurred in removal of the defective part, or in obtaining and replacing the new or repaired part; or, (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.

**Limitations:** This Limited Express Warranty is given in lieu of all other warranties. If, notwithstanding the disclaimers contained herein, it is determined that other warranties exist, any such warranties, including without limitation any express warranties or any implied warranties of fitness for particular purpose and merchantability, shall be limited to the duration of the Limited Express Warranty.

#### LIMITATION OF REMEDIES

In the event of a breach of the Limited Express Warranty, CM will only be obligated at CM's option to 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 of each defect, malfunction or other failure and a reasonable number of attempts by CM to correct the defect, failure or other problem, the defect, failure or other problem persists, CM shall either reimburse the purchaser for the cost of the return of the goods to the purchaser or shall reimburse the purchaser for the cost of the return of the goods to the manufacturer. **THE SOLE AND EXCLUSIVE REMEDY OF THE BUYER OR THEIR PURCHASER 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, shortages of transportation, fuel, material, or labor, acts of God or any other reason beyond the sole control of CM. **CM EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGE IN CONTRACT, FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, OR IN TORT, WHETHER FOR CM'S NEGLIGENCE OR AS STRICT LIABILITY.**

#### 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 dealer, contractor or service organization. If assistance is required in obtaining warranty performance, write or call:

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

**NOTE:** Some states or Canadian provinces 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 from Canadian province to Canadian province.

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

Rev.: 11/09



LC083

**Notes**

Model  
SWT

Model  
SWT

## Revision History

Date	Section	Description
03/09/26	All	First Published



A **NIBE** GROUP MEMBER

7300 SW 44<sup>th</sup> St | Oklahoma City, OK 73179  
Phone: 800-299-9747  
[www.climatemaster.com](http://www.climatemaster.com)



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 800-299-9747 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 [www.climatemaster.com](http://www.climatemaster.com).

Engineered and assembled in the USA.

© ClimateMaster, Inc. All Rights Reserved 2025