CLIMATEMASTER®

A NIBE GROUP MEMBER

COMMERCIAL

TRANQUILITY® 24 (SW) WATER-TO-WATER SERIES

INSTALLATION, OPERATION & MAINTENANCE MANUAL

Part#: 97B0164N01 | Revised: June 4, 2025

Models: SW 036-120

60Hz – R-454B

Models:
SW
036-120

Table of Contents

Model Nomenclature

Models:
SW
036-120

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
S	W	M	0	3	6	A	G	C	0	0	0	P	B	S

PRODUCT NAME
S = R-454B Refrigerant

MODEL TYPE
W = Water-to-Water Series

APPLICATION
M = Medium Temperature

SIZE
036
060
120

REVISION
A = Current

VOLTAGE
G = 208/230-1-60
H = 208/230-3-60
E = 265-1-60
F = 460-3-60
J = 208/230-1-60 Refrigerant Detection System
K = 208/230-3-60 Refrigerant Detection System
D = 265-1-60 Refrigerant Detection System
L = 460-3-60 Refrigerant Detection System

CONTROLS

Control	Standard	MPC
CXM2	C	N
DXM2.5	D	P
CXM2 with Disconnect	W	R
DXM2.5 with Disconnect	B	S

CABINET

Cabinet	UltraQuiet	Option
Commercial	No	0
	Yes	5

STANDARD
S = Standard

RESERVED FOR FUTURE
0 = None

EXTENDED OPTIONS
0 = Standard
G = Hot Water Generator (HWG)

LOAD SIDE OPTIONS

Description	Standard
None	0

SOURCE SIDE OPTIONS

Description	Standard
None	0
vFlow Modulating Valve	C

Use ClimateMaster's selection software at https://climatemastersolutions.com/eRep/ to build your Tranquility SW model.

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Attentions, Cautions, and Warnings

SAFETY

Warnings, cautions, and 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 a 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.

NOTICE: Notification of installation, operation, or maintenance information, which is important, but which is not hazard-related.

⚠ WARNING

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

⚠ WARNING

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.

⚠ WARNING

The installation of water-source heat pumps and all associated components, parts, and accessories which make up the installation shall be in accordance with the regulations of ALL authorities having jurisdiction and MUST conform to all applicable codes. It is the responsibility of the installing contractor to determine and comply with ALL applicable codes and regulations.

⚠ WARNING

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

⚠ WARNING

If unit connected via an air duct system to one or more rooms with R-454B is installed in a room with an area less than Amin or has an Effective Dispersal Volume less than minimum, that room shall be without continuously operating open flames or other POTENTIAL IGNITION SOURCES. A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest.

⚠ WARNING

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.

⚠ WARNING

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.

⚠ WARNING

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.

⚠ WARNING

Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work. Examples of such POTENTIAL IGNITION SOURCES are hot surfaces with a temperature exceeding 1,292°F (700°C)

⚠ WARNING

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).

⚠ WARNING

Only auxiliary electric heaters approved by ClimateMaster shall be installed in connecting ductwork. The installation of any other auxiliary devices is beyond ClimateMaster's responsibility.

⚠ WARNING

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.

⚠ WARNING

Children being supervised are NOT to play with the appliance.

⚠ WARNING

Do not pierce or burn.

⚠ WARNING

Be aware that refrigerants may not contain odor.

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⚠ 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.

⚠ NOTICE

Servicing shall be performed only as recommended by the manufacturer.

⚠ NOTICE

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

⚠ NOTICE

An unconditioned attic is not considered natural ventilation.

⚠ NOTICE

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

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General Information

INSPECTION

Upon receipt of the equipment, carefully check the shipment against the bill of lading. Make sure all units have been received. Inspect the packaging of each unit, and inspect each unit for damage. Ensure that the carrier makes proper notation of any shortages or damage on all copies of the freight bill and completes a common carrier inspection report. Concealed damage not discovered during unloading must be reported to the carrier within 15 days of receipt of shipment. If not filed within 15 days, the freight company can deny the claim without recourse.

NOTE: It is the responsibility of the purchaser to file all necessary claims with the carrier. Notify your equipment supplier of all damage within 15 days of shipment.

STORAGE

Equipment should be stored in its original packaging in a clean, dry area. Store units in an upright position at all times. You may stack vertical configurations a maximum of two units high and horizontal configurations a maximum of three units high.

UNIT PROTECTION

Cover units on the job site with either the original packaging or an equivalent protective covering. Cap the open ends of pipes stored on the job site. In areas where painting, plastering, and/or spraying has not been completed, all due precautions must be taken to avoid physical damage to the units and contamination by foreign material. Physical damage and contamination may prevent proper startup and may result in costly equipment cleanup.

Examine all pipes, fittings, and valves before installing any of the system components. Remove any dirt or debris found in or on these components.

PRE-INSTALLATION

Installation, Operation, and Maintenance instructions are provided with each unit. Horizontal equipment is designed for installation above false ceiling or in a ceiling plenum. Other unit configurations are typically installed in a mechanical room. The installation site chosen should include adequate service clearance around the unit. Before unit startup, read all manuals and become familiar with the unit and its operation. Thoroughly check the system before operation.

PREPARE UNITS FOR INSTALLATION AS FOLLOWS:

1. Compare the electrical data on the unit nameplate with ordering and shipping information to verify that the correct unit has been shipped.
2. Keep the cabinet covered with the original packaging until installation is complete and all plastering, painting, etc. is finished.
3. Verify refrigerant tubing is free of kinks or dents and that it does not touch other unit components.
4. Inspect all electrical connections. Connections must be clean and tight at the terminals.
5. Remove any blower support packaging (water-to-air units only).
6. Some airflow patterns are field convertible (horizontal units only). Locate the airflow conversion section of this IOM.
7. Locate and verify any hot water generator (HWG), hanger, or other accessory kit located in the compressor section or blower section.

CHECKS TO THE AREA

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the REFRIGERATING SYSTEM, these steps shall be completed prior to conducting work on the system.

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Work Procedure

Work shall be undertaken under a controlled procedure so as 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.

Checking 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_2 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 the 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

General Information

REPAIR TO INTRINSICALLY SAFE COMPONENTS

Intrinsically safe components must be replaced.

CABLING

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Refrigerant System Servicing

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REFRIGERANT SYSTEM

To maintain sealed circuit integrity, do not install service gauges unless unit operation appears abnormal. Reference the operating charts for pressures and temperatures. Verify that air and water flow rates are at proper levels before servicing the refrigerant circuit.

Removal 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
- Evacuate
- Purge the circuit with Inert gas
- Evacuate
- Continuously flush or purge with Inert gas when using flame to open circuit
- Open the circuit

The refrigerant charge shall be recovered into the correct recovery cylinders. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe. 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, refrigerant 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 (optional for FLAMMABLE REFRIGERANT). This process shall be repeated until no refrigerant is remains in the system (optional for FLAMMABLE REFRIGERANT). 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 REFRIGERATION 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 REFRIGERATION SYSTEM

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. 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.

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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 lower flammability limit 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 shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipework.

NOTE:
Examples of leak detection fluids are:

- Bubble method
- Fluorescent method agents

If a leak is suspected, all naked flames shall be removed/extinguished.

If a refrigerant leak that requires brazing is identified, all of the refrigerant shall be recovered from the system, or isolated (by means of shutoff valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to Removal and Evacuation section.

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
   - Recovery equipment and cylinders conform to the appropriate standards
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, ensure 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 - Upon decommissioning, equipment shall be labeled stating that is has been decommissioned and emptied of refrigerant. The label shall be dated and signed.

Refrigerant System Servicing

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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 shutoff 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.

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Physical Data

Tranquility (SW) Series

Unit Size	SW036	SW060	SW120
Compressor (qty)	1		2
Number of refrigerant circuits	1	1	2
Factory Charge R-454B - (oz.) (per circuit)	42	48	48
Refrigerant Leak Detection System	O	O	O
Water Connection Size			
Source/Load - FPT	1"		1-1/2"
HWG - FPT	1/2"		
Weight			
Weight - Operating (lbs) [kg]	187 [85]	239 [108]	496 [224]
Weight - Shipping (lbs) [kg]	212 [96]	264 [120]	520 [235]
Water Volume			
Gallons [Liters]	0.56 [2.12]	0.7 [2.65]	1.40 [5.30]

- O = Optional, R = Required

Dimensional Data

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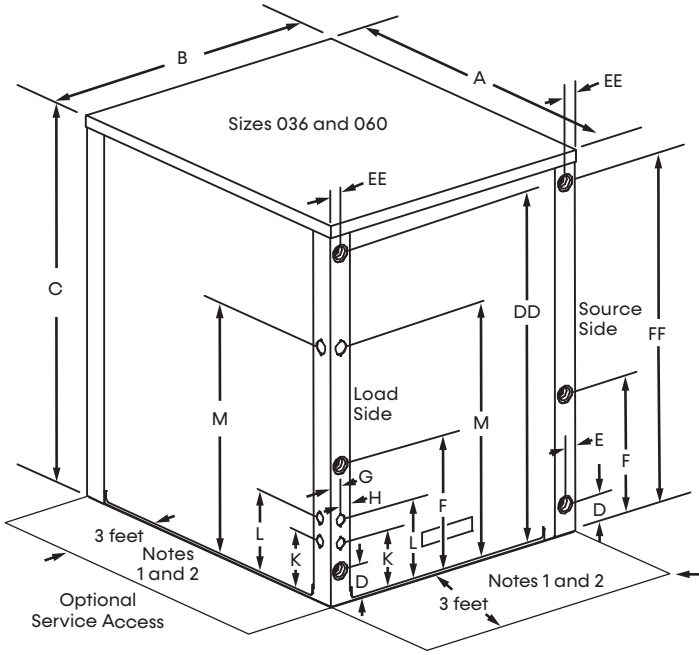
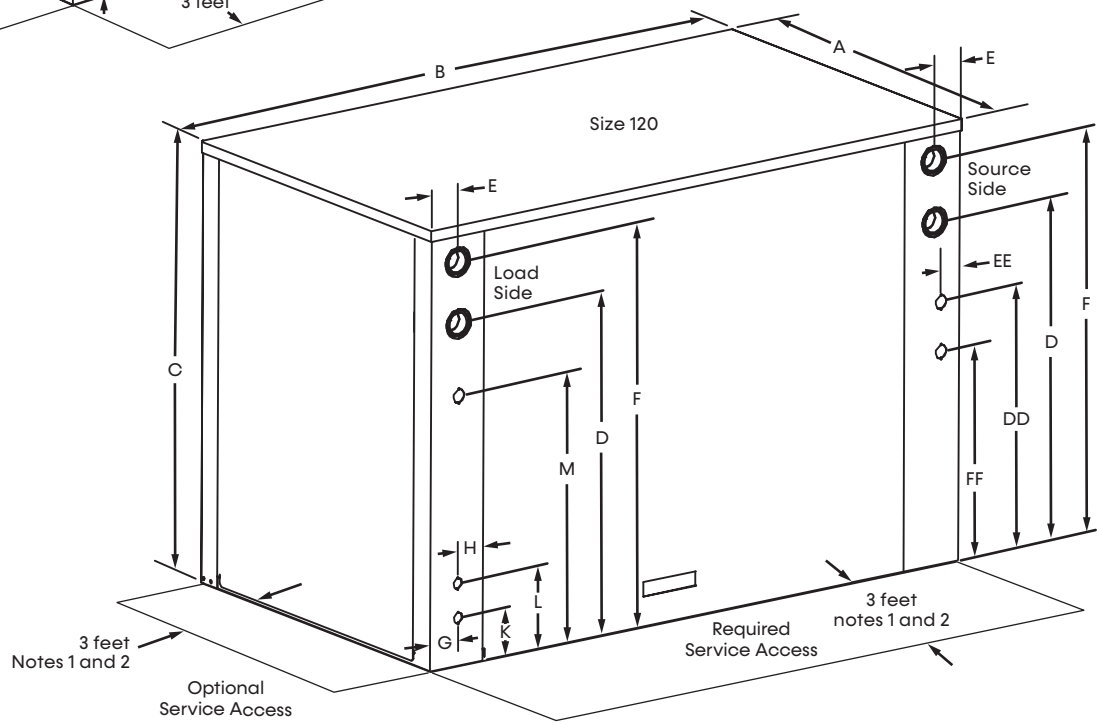


Notes:
1. Front and side access is preferred for service access. All components may be serviced from the front access panel if side access is not available.
2. While clear access to all removable panels is not required, installer should take care to comply with all building codes and allow adequate clearance for future field service.



Unit Size		Overall Cabinet			Water Connections														Electrical Knockouts				
		Depth/ Length	Width	Height	Water In (Source)		Water Out (Source)		Water In (Load)		Water Out (Load)		Water In/Out Φ	HWG In		HWG Out		HWG In/Out Φ	Low Voltage		High Voltage	G	H
		A	B	C	D	E	F	E	D	E	F	E		DD	EE	FF	EE		K	L	M		
																			KO 1/2"		KO 3/4"		
036-060	inch	27.5	25.4	27.0	4.0	2.2	10.6	2.2	4.0	2.2	10.6	2.2	1.0	25.4	2.2	25.4	2.2	0.5	6.0	7.6	20.6	2.1	1.1
	cm	69.9	64.5	68.6	10.1	5.5	26.9	5.5	26.9	5.5	10.1	5.5	2.5	64.5	5.6	64.5	5.6	1.3	15.3	19.4	52.2	5.3	2.9
120	inch	30.6	48.8	34.8	28.3	2.8	32.2	2.8	28.3	2.8	32.2	2.8	1.5	23.3	2.1	19.8	2.1	0.5	7.1	9.1	24.3	2.8	1.1
	cm	77.7	124.0	88.4	71.8	7.2	81.9	7.2	81.8	7.2	71.8	7.2	3.8	59.2	5.4	50.3	5.3	1.3	18.1	23.2	61.6	7.0	2.9

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Installation

LOCATION

These units are not designed for outdoor installation. Locate the unit in an INDOOR area that allows enough space for service personnel to perform typical maintenance or repairs.

The installation of water-source heat pump units and all associated components, parts and accessories which make up the installation shall be in accordance with the regulations of ALL authorities having jurisdiction and MUST conform to all applicable codes. It is the responsibility of the installing contractor to determine and comply with ALL applicable codes and regulations.

Locate the unit in an indoor area that allows easy removal of access panels and has enough space for service personnel to perform maintenance or repair. Provide sufficient room to make water and electrical connections. Remove any access panel screws that would be difficult to remove after the unit is installed prior to setting the unit. These units are not approved for outdoor installation and must be installed inside the structure being conditioned. Do not locate in areas where ambient conditions are not maintained within 40-100°F (4-38°C).

PIPING INSTALLATION

Installation of Supply and Return Piping

Follow these piping guidelines:

1. Install a drain valve at the base of each supply and return riser to facilitate system flushing.
2. Install shutoff/balancing valves and unions at each unit to permit unit removal for servicing.
3. Place strainers at the inlet of each system circulating pump.
4. Select the proper hose length to allow slack between connection points. Hoses may vary in length by +2% to -4% under pressure.
5. Exceeding the minimum bend radius may cause the hose to collapse resulting in reduced water flow rate. Install an angle adapter to avoid sharp bends in the hose when the radius falls below the required minimum and causes a slight kink.

Insulation is not required on loop water piping except where the piping runs through unheated areas or outside the building or when the loop water temperature is below the minimum expected dew point of the pipe ambient temperature.

NOTE: Insulation is required if loop water temperature drops below the dew point.

Pipe-joint compound is not necessary when water-thread sealant tape is pre-applied to hose assemblies or when flared-end connections are used. If pipe-joint compound is preferred, use compound only in small amounts on the pipe threads of the fitting adapters. Prevent sealant from reaching the flared surfaces of the joint.

NOTE: When antifreeze is used in the loop, ensure that it is compatible with water-thread sealant tape or the pipe-joint compound that is used.

Maximum allowable torque for brass fittings is 30 ft-lbs (41 N-m). If a torque wrench is not available, tighten finger-tight plus one-quarter turn. Tighten steel fittings as necessary.

⚠ WARNING

Piping must comply with all applicable codes.

⚠ WARNING

Do not bend or kink supply lines

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Optional pressure-rated hose assemblies designed specifically for use with ClimateMaster units are available. You can purchase similar hoses from alternate suppliers. Supply and return hoses are fitted with swivel-joint fittings at one end to prevent kinking during installation.

Refer to Figure 1 for an illustration of a Supply/Return Hose Kit. Male adapters secure hose assemblies to the unit and risers. Install hose assemblies properly and check them regularly to avoid system failure and reduced service life.

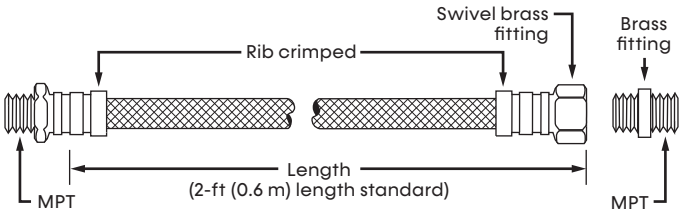
⚠ WARNING

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

Corrosive system water requires corrosion-resistant fittings and hoses and may require water treatment.

Figure 1: Supply/Return Hose Kit



LOAD PLUMBING INSTALLATION

SW Unit Load Plumbing

Many load plumbing applications are not described in this document. This document presents some basic guidelines. Many principles of water-loop applications are valid for the load plumbing discussion as well. All plumbing must conform to local codes with the following considerations:

Wide temperature variation applications such as heating/cooling coils:

- Employ piping materials that are rated for the maximum temperature and pressure combination. This excludes PVC for most heating applications.
- Ensure that load water flow in high temperature heating applications is at least 3 GPM per ton (3.9 l/m per kW) to improve performance and reduce nuisance high pressure faults.
- DO NOT employ plastic to metal threaded joints
- Utilize a pressure tank and air separator vent system to equalize pressure and remove air.

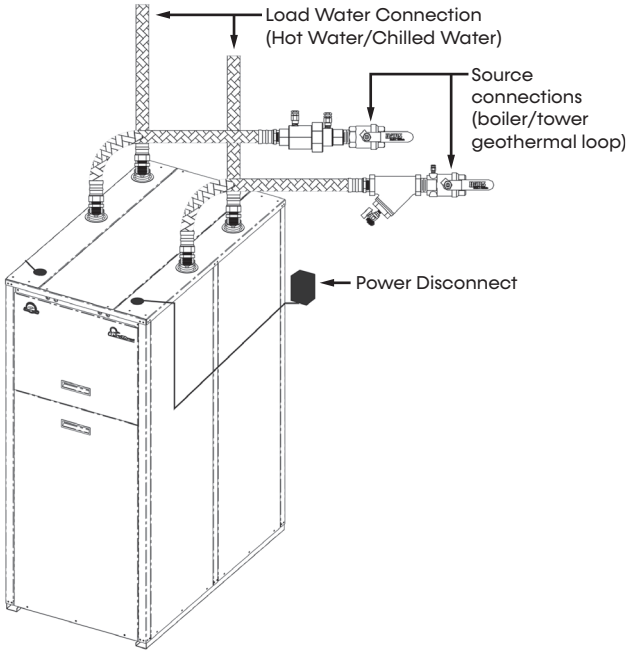
Swimming Pool Hot Tub Applications:

- Load brazed plate should be isolated with secondary heat exchanger constructed of anti-corrosion material in all chlorine/bromine fluid applications.

Potable Water Applications:

- Potable water systems require field-supplied external secondary heat exchanger.
- Ensure load water flow in high temperature heating applications is at least 3 GPM per ton to improve performance and reduce nuisance to high-pressure faults.

Figure 2: Typical Water-Loop Application



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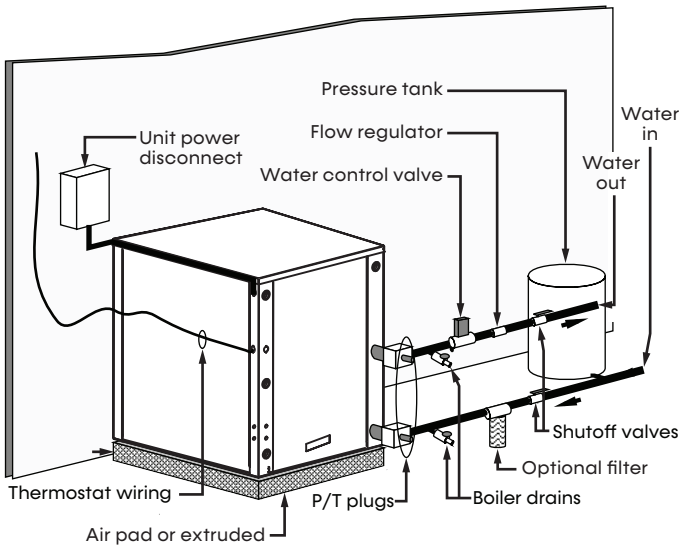
Water Loop Heat-Pump Applications

COMMERCIAL WATER-LOOP APPLICATIONS

Commercial systems typically include a number of units connected to a common piping system. Any unit plumbing maintenance work can introduce air into the piping system; therefore air elimination equipment is a major portion of the mechanical room plumbing. To avoid condensation, consider insulating the piping surfaces. The manufacturer recommends piping insulation any time the water temperature is below 60°F (15.6°C). Do not use metal to plastic threaded joints due to their tendency to leak over time.

Water thread-sealant tape or thread sealant is recommended to minimize internal fouling of the heat exchanger. Do not over tighten connections and route piping so as not to interfere with service or maintenance access. Hose kits are available from the manufacturer in different configurations for connection between the unit and the piping system. Depending on selection, hose kits may include shutoff valves, P/T plugs for performance measurement, high pressure stainless-steel braided hose, "Y" type strainer with blow down valve, and/or with blow down valve, auto-flow valve and swivel connections.

Figure 3: Typical Open-Loop/Well Applications



Flush the piping system to remove dirt, piping chips, and other foreign material prior to operation (see Piping System Cleaning and Flushing in this manual). The flow rate is usually set between 2.25 and 3.5 GPM per ton (2.9 and 4.5 l/m per kW) of cooling capacity. The manufacturer recommends 3 GPM per ton (3.9 l/m per kW) for most water-loop heat pump applications. To ensure proper maintenance and servicing, P/T ports are imperative for temperature, flow verification, and performance checks.

Water-loop heat pump (cooling tower/boiler) systems typically utilize a common loop maintained between 60 - 90°F (16 - 32°C). The use of a closed-circuit evaporative cooling tower with a secondary heat exchanger between the tower and the water loop is recommended. If an open type cooling tower is used continuously, chemical treatment and filtering is necessary.

⚠ WARNING

Never jumper terminal "A" from CXM2 or DXM2.5 #1 to CXM2 or DXM2.5 #2 on multi-compressor/multi-control board units. For more information, see the motorized water valve wiring examples in electrical section of this document.

⚠ CAUTION

Many units are installed with a factory or field-supplied manual or electric shutoff valve. DAMAGE WILL OCCUR if shutoff valve is closed during unit operation. A high-pressure switch must be installed on the heat-pump side of any field-provided shutoff valves and connected to the heat pump controls in series with the built-in refrigerant circuit high-pressure switch to disable compressor operation if water pressure exceeds pressure switch setting. The field-installed high-pressure switch shall have a cut-out pressure of 300 psig and a cut-in pressure of 250 psig. This pressure switch can be ordered from ClimateMaster with a ¼-inch internal-flare connection as part number 39B0005N02.

Ground Water Heat-Pump Applications

Models:
SW
036-120

Include shutoff valves for easy servicing. "Tee" boiler drains or other valves into the line to allow for acid flushing of the heat exchanger. Use pressure temperature plugs for easy flow and temperature measurement. Limit supply and return water piping materials to copper, PE, or similar material. Never use PVC or CPVC as they are incompatible with the POE oils used in R-454B products and piping-system failure and property damage may occur.

Ensure water quantity is plentiful and of good quality. See Water Quality Requirements for water quality guidelines. In conditions anticipating heavy scale formation or in brackish water, an intermediate heat exchanger is recommended.

In ground-water situations with heavy scaling or where biological growth such as iron bacteria is present, a closed-loop system is recommended. It is recommended to install an intermediate heat exchanger to isolate an open loop from the heat-pump loop on open-well systems. Over time heat exchangers may lose heat-exchange capabilities due to a build up of mineral deposits inside. Only qualified service mechanics can provide cleaning services as acid and special pumping equipment are required.

In areas with extremely hard water, inform the owner that the heat exchanger may require occasional acid flushing.

Expansion Tank and Pump

Use a closed, bladder-type expansion tank to minimize mineral formation due to air exposure. Size the expansion tank to handle at least one minute of pump runtime using its drawdown capacity rating to prevent premature pump failure. Discharge water from the unit is not contaminated in any manner and can be disposed of in various ways depending on local building codes; i.e. recharge well, storm sewer, drain field, adjacent stream or pond, etc. Most local codes forbid the use of sanitary sewer for disposal. Consult your local building and zoning department to assure compliance in your area.

⚠ 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.

Water-Control Valve

Note the placement of the water-control valve. Always maintain water pressure in the heat exchanger by placing water-control valves at the outlet of the unit to prevent mineral precipitation. Pilot-operated or slow-closing solenoid valves are recommended to reduce water hammer. If water hammer persists, mount a mini expansion tank on the piping to help absorb the excess hammer shock. Ensure that the unit transformer accommodates the total VA draw of the valve. For example, the slow-closing valve draws up to 35VA. This can overload smaller 40 or 50 VA transformers depending on the other controls employed. A typical pilot-operated solenoid valve draws approximately 15VA.

Flow Regulation

You can accomplish flow regulation using two methods.

- Most water-control valves have a built-in flow adjustment. Determine flow rate by measuring the pressure drop through the unit heat exchanger then compare to Table 6. Since the pressure is constantly varying, two pressure gauges may be needed. Adjust the water-control valve until reaching the desired flow of 1.5-2 gpm per ton (2.0 to 2.6 l/m per kW).
- Install and mount a flow-control device on the outlet of the water-control valve. The device is typically a brass fitting with an orifice of rubber or plastic material that is designed to allow a specified flow rate. Flow-control devices may produce a velocity noise, but you can reduce this noise by applying some back pressure from the ball valve located on the discharge line. Slightly close the valve to spread the pressure drop over both devices, decreasing the velocity noise.

⚠ WARNING

Never jumper terminal "A" from CXM2 or DXM2.5 #1 to CXM2 or DXM2.5 #2 on multi-compressor/multi-control board units. For more information, see the motorized water valve wiring examples in electrical section of this document.

⚠ CAUTION

Many units are installed with a factory or field-supplied manual or electric shutoff valve. DAMAGE WILL OCCUR if shutoff valve is closed during unit operation. A high-pressure switch must be installed on the heat-pump side of any field-provided shutoff valves and connected to the heat pump controls in series with the built-in refrigerant circuit high-pressure switch to disable compressor operation if water pressure exceeds pressure switch setting. The field-installed high-pressure switch shall have a cut-out pressure of 300 psig and a cut-in pressure of 250 psig. This pressure switch can be ordered from ClimateMaster with a ¼-inch internal-flare connection as part number 39B0005N02.

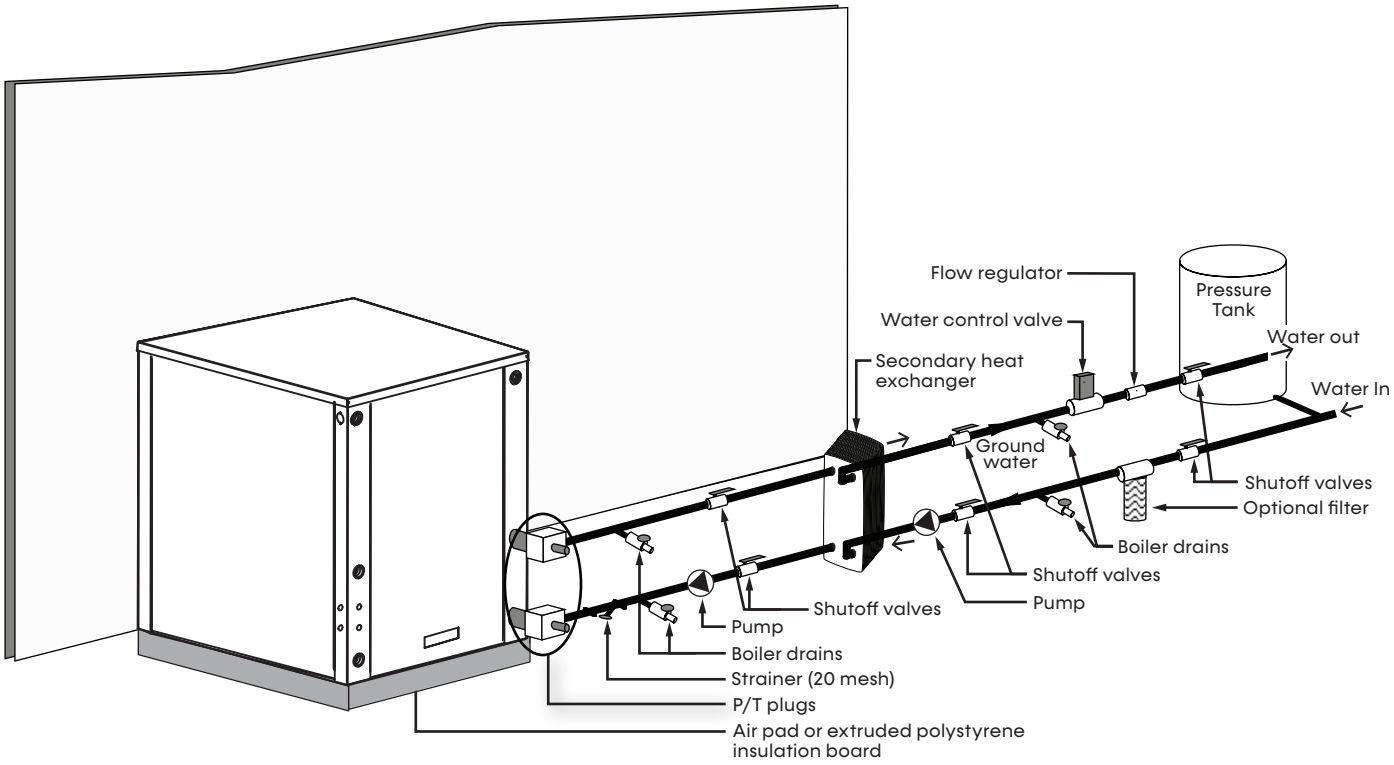
⚠ CAUTION

Low temperature limit systems do not allow leaving load water temperature (cooling mode) or leaving source water temperature (heating mode) to be below 42°F (5.6°C).

Models:
SW
036-120

Ground Water Heat-Pump Applications

Example Ground Water Heat-Pump Configuration



Ground Loop Heat-Pump Applications

Models:
SW
036-120

⚠ CAUTION

The following instructions represent industry accepted installation practices for closed-loop earth-coupled heat pump systems. They are provided to assist the contractor in installing trouble-free ground loops. These instructions are recommendations only. State and Local Codes MUST be followed and installation MUST conform to ALL applicable Codes. It is the responsibility of the Installing contractor to determine and comply with ALL applicable Codes and Regulations.

PRE-INSTALLATION

Prior to installation, locate and mark all existing underground utilities, piping, etc. Install loops for new construction before sidewalks, patios, driveways, and other construction has begun. During construction, accurately mark all ground loop piping on the plot plan as an aid in avoiding potential future damage to the installation.

PIPING INSTALLATION

Limit all earth-loop piping materials only polyethylene fusion for inground sections of the loop. Do not use galvanized or steel fittings at any time due to their tendency to corrode. Avoid all plastic-to-metal threaded fittings due to their potential to leak in earth-coupled applications (use a flanged fitting instead). Use P/T plugs to enable flow measurement using the pressure drop of the unit heat exchanger in lieu of other flow measurement means. Earth loop temperatures range between 25–110°F (-4–43°C), and 2.25–3 GPM of flow per ton (2.9–3.9 l/m per kW) of cooling capacity is recommended in these applications. Upon completion of the ground loop piping, pressure test the loop to ensure a leak free system. For horizontal systems, test individual loops as installed. Test the entire system when all loops are assembled. Test Vertical U-Bends and Pond Loop Systems: Test Vertical U-bends and pond loop assemblies prior to installation with a test pressure of at least 100 psi (689 kPa).

FLUSHING THE EARTH LOOP

Upon completion of system installation and testing, flush the system to remove all foreign objects and purge to remove all air. Flush the loop first with the unit isolated to avoid flushing debris from the loop into the unit heat exchanger.

ANTIFREEZE

In areas where minimum entering loop temperatures drop below 40°F (5°C) or where piping is routed through areas subject to freezing, anti-freeze is required. Alcohols and glycols are commonly used as antifreezes. Consult your local sales manager to determine the antifreeze best suited to your area. Maintain low temperature protection to 15°F (9°C) below the lowest expected entering loop temperature. For example, if 30°F (-1°C) is the minimum expected entering loop temperature, the leaving loop temperature would be 25 to 22°F (-4 to -6°C) and low temperature protection should be at 15°F (-10°C) e.g. 30°F - 15°F = 15°F (-1°C - 9°C = -10°C). To prevent fuming, premix and pump all alcohols from a reservoir outside of the building when possible, or introduce alcohols under the water level. Initially calculate the total volume of fluid in the piping system. Then use the percentage by volume shown in Table 2 for the amount of antifreeze. Verify antifreeze concentration using a well-mixed sample and a hydrometer to measure specific gravity.

Table 2: Antifreeze Percentages by Volume

Type	Minimum Antifreeze Concentration % for Low Temperature Protection			
	10°F [-12.2°C]	15°F [-9.4°C]	20°F [-6.7°C]	25°F [-3.9°C]
Methanol	21%	17%	13%	9%
100% USP food grade Propylene Glycol	29%	24%	19%	12%
Ethanol[1]	28%	24%	18%	12%

1. Must not be denatured with any petroleum based product

Models:
SW
036-120

Ground-Loop Heat-Pump Applications

Note the placement of the water control valve. Always maintain water pressure in the heat exchanger by installing water control valves at the source out of the unit to prevent mineral precipitation. Position water high pressure switch between the unit and valve. Pilot-operated or slow-closing valves are recommended to reduce water hammer. If water hammer persists, mount a mini expansion tank on the piping to help absorb the excess hammer shock. Ensure that the unit's transformer can accommodate the total 'VA' draw of the valve. For instance, some slow-closing valves can draw up to 35VA. This can overload smaller transformers depending on the other controls employed. A typical pilot-operated solenoid valve draws approximately 15VA.

⚠ WARNING

Never jumper terminal "A" from CXM2 or DXM2.5 #1 to CXM2 or DXM2.5 #2 on multi-compressor/multi-control board units. For more information, see the motorized water valve wiring examples in electrical section of this document.

⚠ CAUTION

Many units are installed with a factory or field-supplied manual or electric shutoff valve. DAMAGE WILL OCCUR if shutoff valve is closed during unit operation. A high-pressure switch must be installed on the heat-pump side of any field-provided shutoff valves and connected to the heat pump controls in series with the built-in refrigerant circuit high-pressure switch to disable compressor operation if water pressure exceeds pressure switch setting. The field-installed high-pressure switch shall have a cut-out pressure of 300 psig and a cut-in pressure of 250 psig. This pressure switch can be ordered from ClimateMaster with a ¼-inch internal-flare connection as part number 39B0005N02.

FLOW REGULATION

Install on source in of unit. Accomplish flow regulation by two methods.

1. Most water control valves have a built-in flow adjustment. Determine flow rate by measuring the pressure drop through the unit heat exchanger then compare to Table 6. Since the pressure is constantly varying, two pressure gauges might be needed. Adjust the water control valve until the desired flow of 2.5 to 3 GPM per ton (2.0 to 2.6 l/m per kW) is achieved.
2. Install a flow-control device. Flow-control devices are typically an orifice of plastic material that is designed to allow a specified flow rate. These are mounted on the outlet of the water control valve. Flow-control devices may produce a velocity noise, but you can reduce this noise by applying back pressure. Apply back pressure by slightly closing the leaving isolation valve of the well water system.

Water Quality Requirements

Models:
SW
036-120

Table 3: 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	($HCO3^-$)	ppm - $CaC0_3$ 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	($CaCO_3$)	ppm - $CaC0_3$ 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 - $CaC0_3$ equivalent	<1000	<1000	<1000	<1000
	Sulfate	(SO_4^{2-})	ppm	<200	<200	<200	<200
	Nitrate	(NO_3^-)	ppm	<100	<100	<100	<100
	Chlorine (free)	(Cl)	ppm	<0.5	<0.5	<0.5	<0.5
	Chloride (water < 80°F)	(Cl^-)	ppm	<20	<20	<150	<150
	Chloride (water > 120°F)	(Cl^-)	ppm	<20	<20	<125	<125
	Hydrogen Sulfide[α]	(H_2S)	ppb	<0.5	<0.5	<0.5	<0.5
	Carbon Dioxide	(CO_2)	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_3)	ppm	<0.05	<0.1	<0.1	<0.1
	Chloramine	(NH_2CL)	ppm	0	0	0	0
Fouling & Biological	Iron bacteria		cells/mL	0	0	0	0
	Slime-forming bacteria		cells/mL	0	0	0	0
	Sulfate-reducing bacteria		cells/mL	0	0	0	0
	Suspended Solids[β]	(TSS)	ppm	<10	<10	<10	<10
Electrolysis All HX types	Earth Ground Resistance[χ]		Ohms	Consult NEC and local electrical codes for grounding requirements			
	Electrolysis Voltage[δ]		mV	Measure voltage and internal water loop to HP ground			
	Leakage Current[δ]		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						

Models:
SW
036-120

Water Quality Requirements

1. The Water Quality 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 de-ionized 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.

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

α Hydrogen sulfide has an odor of rotten eggs. If one detects this smell, a test for H_2S must be performed. If H_2S 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.

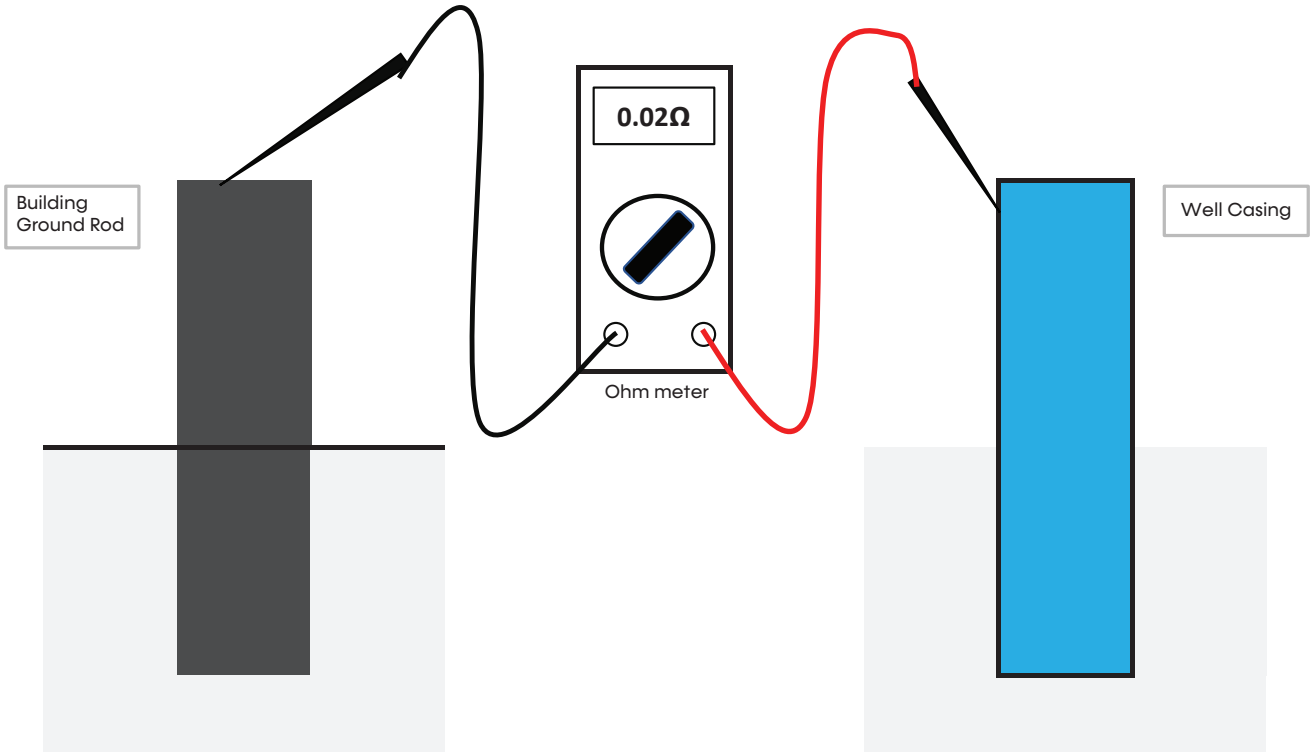
χ The WSHP piping system or other plumbing pipes must not be used as the building ground. An electrical grounding system using a dedicated ground rod meeting NEC and local electrical codes must be installed.

δ Refer to the Antifreeze Percentages by Volume table for instructions on measuring resistance and leakage currents within water loops.

Water Quality Requirements

Models:
SW
036-120

Measuring Earth Ground Resistance for Ground-Water Applications



Measure the earth ground bond using an Ohm meter between the building's ground rod and the steel well casing.

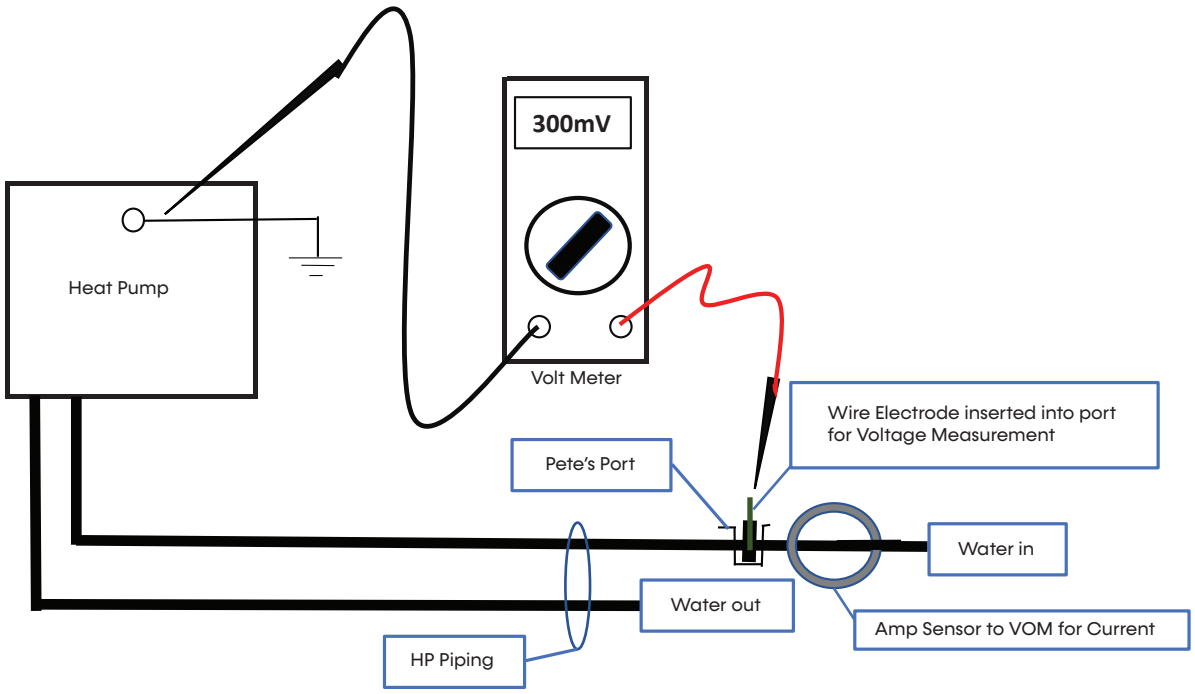
The resistance measured should be zero Ohms. The NEC allows a resistance to ground up to 20 Ohms. Any resistance above zero indicates a poor earth ground, which may be the result of a hot neutral line or that conductive water is present. Both of these may lead to electrolysis and corrosion of the heat pump piping. A check for both should be performed and resolved.

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

Models:
SW
036-120

Water Quality Requirements

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 will occur and corresion will result.

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.

Hot Water Generator

Models:
SW
036-120

The Hot Water Generator (HWG) or desuperheater option provides considerable operating-cost savings by utilizing heat energy from the compressor discharge line to help satisfy domestic hot water requirements. The HWG is active throughout the year, providing virtually free hot water when the heat pump operates in the cooling mode or hot water at the COP of the heat pump during operation in the heating mode. Actual HWG water-heating capacities are provided in the appropriate heat pump performance data.

Heat pumps equipped with the HWG option include a built-in water-to-refrigerant heat exchanger that eliminates the need to tie into the heat pump's refrigerant circuit in the field. The control circuit and pump are also built in for residential equipment. The Typical HWG Installation figure shows an example of HWG water piping connections on a unit with built-in circulating pump. This piping layout prevents the HWG pump from pulling sludge/debris from the bottom of the tank.

The temperature setpoint of the HWG is field selectable to 125°F or 150°F. The 150°F setpoint allows more heat storage from the HWG. For example, consider the amount of heat that can be stored by the HWG when using the 125°F setpoint, versus the amount of heat that can be generated by the HWG when using the 150°F setpoint.

In a typical 50-gallon two-element electric water heater, turn down the lower element to 100°F, or the lowest setting, to get the most from the HWG. The tank eventually stratifies so that the lower 80% of the tank, or 40 gallons, becomes 100°F (controlled by the lower element). The upper 20% of the tank, or 10 gallons, is maintained at 125°F (controlled by the upper element).

⚠ WARNING

A 150°F setpoint may lead to scalding or burns. The 150°F setpoint must only be used on systems that employ an approved anti-scald valve.

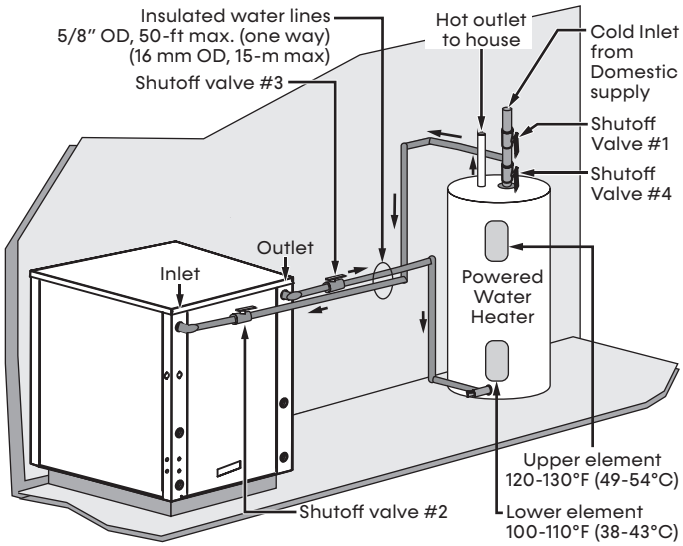
Using a 125°F setpoint, the HWG can heat the lower 40 gallons of water from 100°F to 125°F, providing up to 8,330 Btu's of heat. Using the 150°F setpoint, the HWG can heat the same 40 gallons of water from 100°F to 150°F and the remaining 10 gallons of water from 125°F to 150°F, providing a total of up to 18,743 Btu's of heat, or more than twice as much heat as when using the 125°F setpoint.

Electric water heaters are recommended. If a gas, propane, or oil water heater is used, install a second preheat tank. See the Two-tank HWG Installation figure. If the electric water heater has only a single center element, the dual-tank system is recommended to ensure a usable entering water temperature for the HWG.

Typically a single tank of at least 50 gallons (189 liters) is used to limit installation costs and space. For maximum storage and temperate source water to the HWG, use a dual tank system as shown in the Two-tank HWG Installation figure.

It is always advisable to use water-softening equipment on domestic-water systems to reduce the scaling potential and lengthen equipment life. In extreme water conditions, it may be necessary to avoid the use of the HWG option since the potential cost of frequent maintenance may offset or exceed any savings. Consult the HWG Water Piping Sizes and Length table for scaling potential tests.

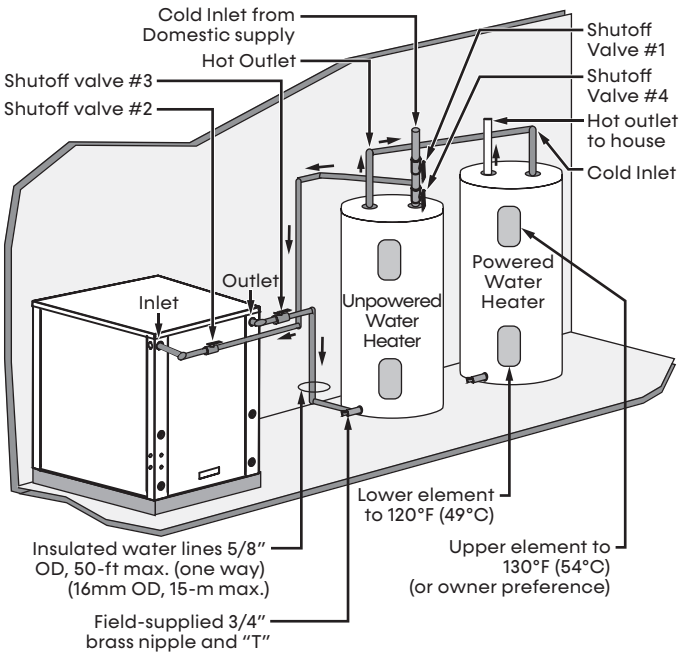
Figure 4: Typical HWG Installation



Models:
SW
036-120

Hot Water Generator

Figure 5: Two-tank HWG Installation



⚠ WARNING

Under no circumstances should the sensors be disconnected or removed. Full load conditions can drive hot water tank temperatures far above safe temperature levels if sensors are disconnected or removed.

INSTALLATION

The HWG is controlled by two sensors and the CXM2/DXM2.5. One sensor is located on the compressor discharge line to sense the discharge refrigerant temperature. The other sensor is located on the HWG heat exchanger's "Water In" line to sense the potable water temperature.

The CXM2/DXM2.5 monitors the refrigerant and water temperatures to determine when to operate the HWG. The HWG operates any time the refrigerant temperature is sufficiently above the water temperature. After the HWG satisfies the water-heating demand during a heat pump run cycle, the controller cycles the pump at regular intervals to determine if an additional HWG cycle can be utilized.

When the control is powered and the HWG pump output is active for water temperature sampling or HWG operation, the CXM2/DXM2.5 status LED slowly flashes (On 1 second, Off 1 second).

If the control detects a HWG fault, the CXM2/DXM2.5 status LED flashes a numeric fault code as follows:

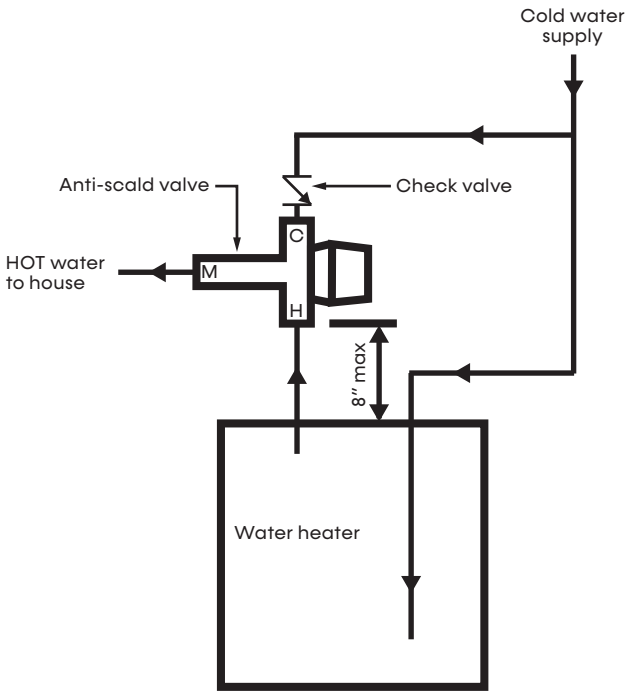
- High Water Temperature (> 160°F) (five flashes)
- Hot Water Sensor Fault (six flashes)
- Compressor Discharge Sensor Fault (six flashes)

Fault code flashes have a duration of 0.3 seconds with a 10-second pause between fault codes. For example, a Compressor Discharge Sensor Fault is six flashes 0.3 seconds long, then a 10 second pause, then six flashes again, etc.

⚠ WARNING

Using 150°F setpoint on the HWG results in water temperatures sufficient to cause severe physical injury in the form of scalding or burns, even when the hot water tank temperature setting is visibly set below 150°F. The 150°F HWG setpoint must only be used on systems that employ an approved anti-scald valve (part number (AVAS4) at the hot water storage tank with such valve properly set to control water temperatures distributed to all hot water outlets at a temperature level that prevents scalding or burns.

Figure 6: Anti-scald Valve-Piping Connection



Hot Water Generator

Models:
SW
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- Hot Water Generator settings are determined by DIP switches 3-2, 3-3, and 3-4.
- DIP 3-2 controls the HWG Test Mode and provides for forced operation of the HWG output, activating the HWG pump for up to five minutes.

  NOTE: The HWG pump is field provided on commercial units and is a factory-installed option on residential units.

  – ON = HWG test mode, OFF = normal HWG operation

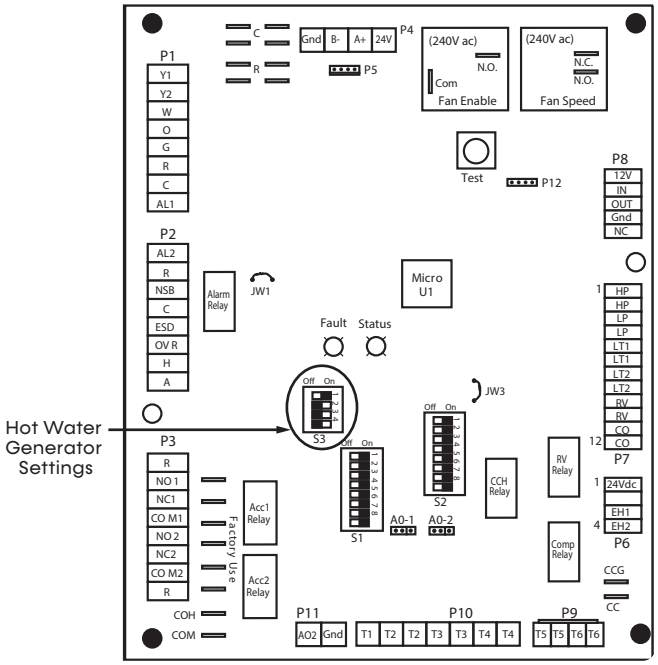
  – The control reverts to standard operation after five minutes regardless of switch position.
- DIP 3-3 determines HWG setpoint temperature and provides for selection of the HWG operating setpoint.

  – ON = 150°F (66°C), OFF = 125°F (52°C)
- DIP 3-4 is for the HWG status and provides HWG operation control

  – ON = HWG mode enabled, OFF = HWG mode disabled

  – Units are shipped from the factory with this switch in the OFF position.

Figure 7: Hot Water Generator Settings



⚠ WARNING

The HWG pump is fully wired from the factory. Use extreme caution when working around the microprocessor control as it contains line voltage connections that presents a shock hazard that can cause severe injury or death.

The heat pump, water piping, pump, and hot water tank should be located where the ambient temperature does not fall below 50°F (10°C). Keep water piping lengths at a minimum. DO NOT use a one way length greater than 50 feet (one way) (15 m). See Table 4 for recommended piping sizes and maximum lengths.

All installations must be in accordance with local codes. The installer is responsible for knowing the local requirements, and for performing the installation accordingly. DO NOT activate the HWG (turn DIP 3-4 to the ON position) until Initial Startup section, below is completed. To avoid damaging the pump, do not power it before all installation steps are complete.

WATER TANK PREPARATION

1. Turn off power or fuel supply to the hot water tank.
2. Connect a hose to the drain valve on the water tank.
3. Shut off the cold water supply to the water tank.
4. Open the drain valve and open the pressure relief valve or a hot water faucet to drain tank.
5. When using an existing tank, it should be flushed with cold water after it is drained until the water leaving the drain hose is clear and free of sediment.
6. Close all valves and remove the drain hose.
7. Install HWG water piping and pump.

Models:
SW
036-120

Hot Water Generator

HWG WATER PIPING

1. Using at least ½-inch (12.7-mm) I.D. copper, route and install the water piping and valves. Install an approved anti-scald valve if the 150°F HWG setpoint is or will be selected. An appropriate method must be employed to purge air from the HWG piping. This may be accomplished by flushing water through the HWG or by installing an air vent at the high point of the HWG piping system.
2. Insulate all HWG water piping with no less than ⅜-inch (10-mm) wall closed-cell insulation.
3. Open both shutoff valves and make sure the tank drain valve is closed.

WATER TANK REFILL

1. Close valve #4. Ensure that the HWG valves (valves #2 and #3) are open. Open the cold water supply (valve #1) to fill the tank through the HWG piping. This forces water flow through the HWG and purge air from the HWG piping.
2. Open a hot-water faucet to vent air from the system until water flows from faucet; turn off faucet. Open valve #4.
3. Depress the hot water tank pressure relief valve handle to ensure that there is no air remaining in the tank.
4. Inspect all work for leaks.
5. Before restoring power or fuel supply to the water heater, adjust the temperature setting on the tank thermostat(s) to ensure maximum utilization of the heat available from the refrigeration system and conserve the most energy. On tanks with both upper and lower elements and thermostats, turn down the lower element to 100°F (38°C) or the lowest setting; adjust the upper element to 120-130°F (49-54°C). Depending upon the specific needs of the customer, you may want to adjust the upper element differently. On tanks with a single thermostat, use a preheat tank (Figure 5).
6. Replace access cover(s) and restore power or fuel supply.

INITIAL STARTUP

7. Make sure all valves in the HWG water circuit are fully open.
8. Turn on the heat pump and allow it to run for 10-15 minutes.
9. Set S3-4 to the "ON" position (enabled) to engage the HWG. See Figure 6.
10. The HWG pump should not run if the compressor is not running.
11. The temperature difference between the water entering and leaving the HWG coil should be approximately 5-10°F (3-6°C).
12. Allow the unit to operate for 20 to 30 minutes to insure that it is functioning properly.

Table 4: HWG Water Piping Sizes and Length

Unit Nominal Tonnage	Nominal HWG Flow (gpm)	1/2" Copper (max length[1])	3/4" Copper (max length[1])
2.0	0.8	50	-
2.5	1.0	50	-
3.0	1.2	50	-
3.5	1.4	50	-
4.0	1.6	45	50
5.0	2.0	25	50
6.0	2.4	10	50

1. The maximum length is equivalent length (in feet) one way of type L copper.

⚠ WARNING

Use only copper piping for HWG piping due to the potential of high water temperatures for water that has been in the HWG heat exchanger during periods of no-flow conditions (HWG pump not energized). Piping other than copper may rupture due to high water temperature and potable water pressure. CPVC, PEX, or other plastic pipe should not be used HWG piping

Electrical Data

Models:
SW
036-120

Standard Unit

Unit Size	Rated Voltage	Voltage Code	Voltage Min/Max	Compressor A			No Pump		
				RLA	LRA	Qty	Total Unit FLA	Min Circuit Amp	Fuse HACR
SW036	208/230-1-60	G.J.	187/252	14.6	76.0	1	14.6	18.3	30
	265/60/1	E.D	249/291	10.2	55.0	1	10.2	12.7	20
	208/230-3-60	H.K.	187/252	8.6	70.0	1	8.6	10.8	15
	460-3-60	F.L.	432/504	4.5	39.0	1	4.5	5.6	15
SW060	208/230-1-60	G.J.	187/252	22.3	149.0	1	22.3	27.9	50
	208/230-3-60	H.K.	187/252	14.0	150.0	1	14.0	17.5	30
	460-3-60	F.L.	432/504	6.3	58.0	1	6.3	7.9	15
SW120	208/230-1-60	G.J.	187/252	23.7	157.0	2	47.4	53.4	70
	208/230-3-60	H.K.	187/252	16.0	156.4	2	32.1	36.1	50
	460-3-60	F.L.	432/504	7.1	69.0	2	14.1	15.9	20

Models:
SW
036-120

Electrical: Power Wiring

⚠ WARNING

To avoid possible injury or death due to electrical shock, open the power supply disconnect switch and secure it in an open position during installation.

⚠ WARNING

Disconnect electrical power source to prevent injury or death from electrical shock.

⚠ CAUTION

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

ELECTRICAL

Line Voltage - All field installed wiring, including electrical ground, must comply with NFPA 70: National Electrical Code (NEC), CSA C22.1: Canadian Electrical Code (CE Code), as well as applicable local codes. Refer to the unit electrical data for fuse sizes. Consult wiring diagram for field connections that must be made by the installing (or electrical) contractor. All final electrical connections must be made with a length of flexible conduit to minimize vibration and sound transmission to the building.

Disconnects - Units with a factory-installed disconnect switch will provide full separation of **all poles** and disconnection from main line voltage. For units where factory disconnect is not selected as an option, the installer must incorporate the means to fully disconnect the line voltage in the fixed wiring in accordance with wiring rules and local electrical codes.

POWER CONNECTION

Line voltage connection is made by connecting the incoming line voltage wires to the "L" side of the contactor. Consult electrical data tables for maximum fuse size.

GENERAL LINE VOLTAGE WIRING

Ensure the available power is the same voltage and phase shown on the unit serial plate. Line and low voltage wiring must be done in accordance with local codes or the National Electric Code, whichever is applicable.

Figure 8: Single Phase Line Voltage Field Wiring

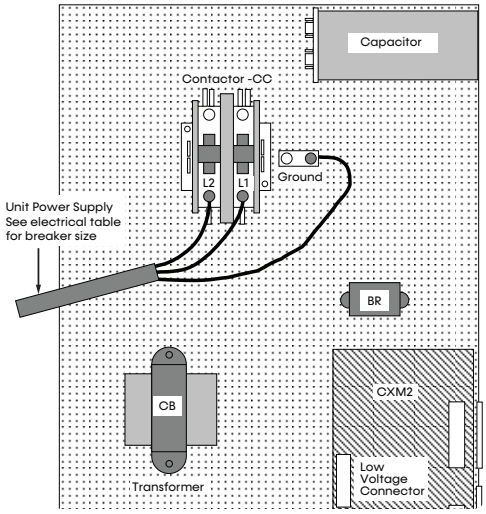
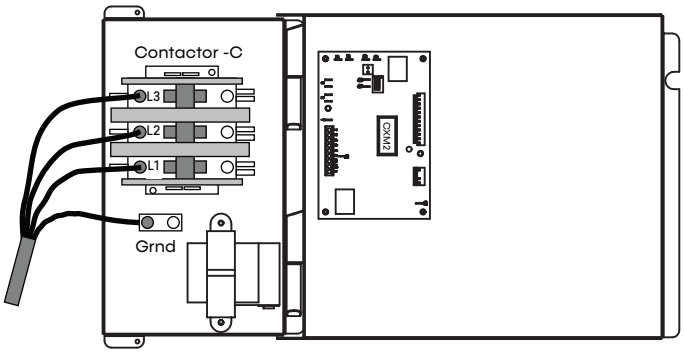


Figure 10: 036-060 Line Voltage Field Wiring Commercial Class (3-phase)



TRANSFORMER

All 208/230V units are factory wired for 208V. If supply voltage is 230V, installer must rewire transformer. See wire diagram for connections.

Electrical: Power Wiring

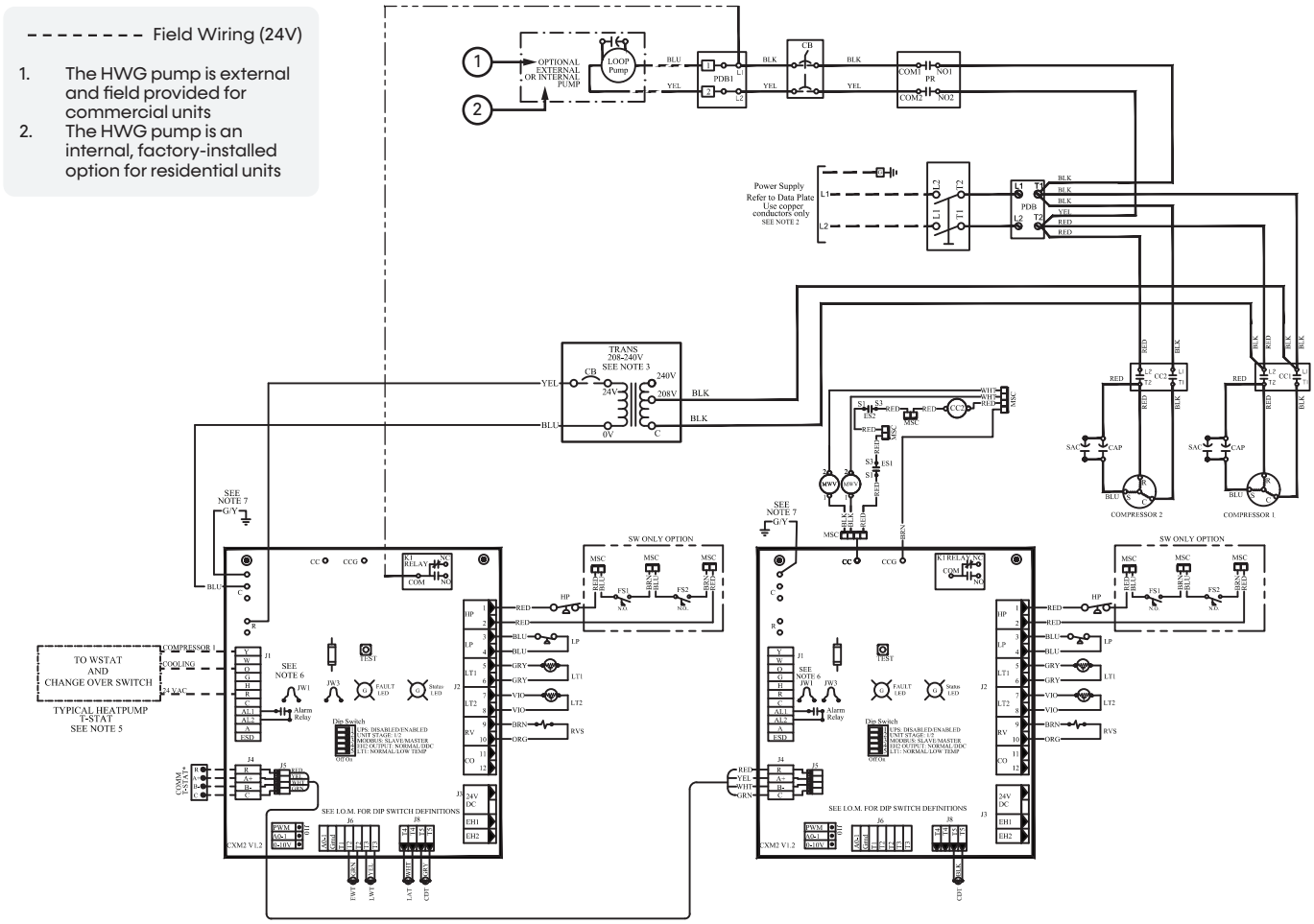
Models:
SW
036-120

⚠ WARNING

Never jumper terminal "A" from CXM2 or DXM2.5 #1 to CXM2 or DXM2.5 #2 on multi-compressor/multi-control board units. For more information, see the motorized water valve wiring examples in electrical section of this document.

NOTE: See the CXM2 AOM (part #97B0003N12), DXM2.5 AOM (part #97B0003N13), or MPC Controller AOM (part #97B0031N01).

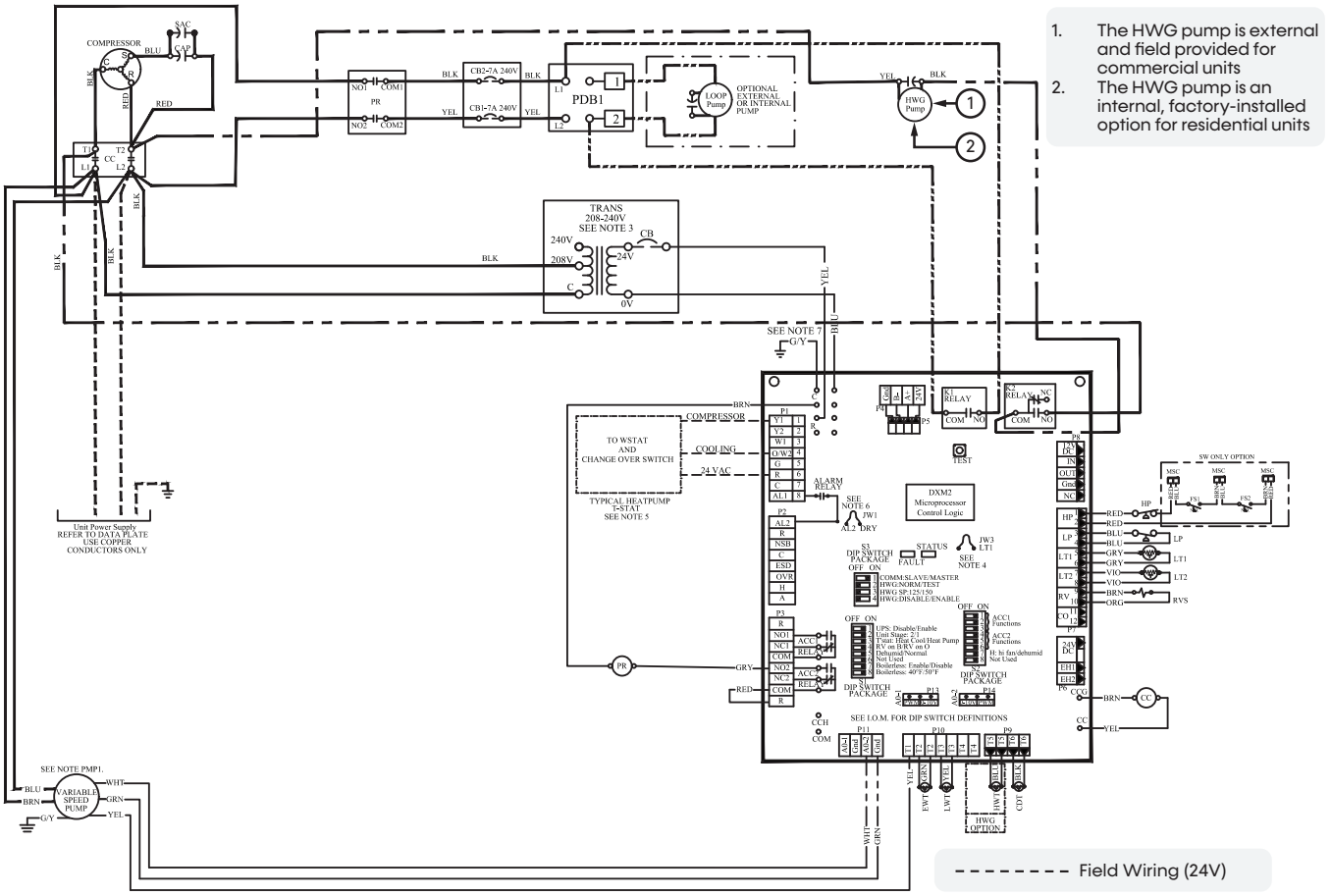
Figure 11: Field Wiring of 24V Motorized Valve for SW120 (CXM2)



Models:
SW
036-120

Electrical: Power Wiring

Figure 12: Field Wiring of 24V Motorized Valve for SW036-060 (DXM2.5)



Electrical: Low-Voltage Wiring

Models:
SW
036-120

THERMOSTAT CONNECTIONS

Wire the thermostat directly to the CXM2 or DXM2.5. See Electrical: Thermostat Wiring for specific terminal connections. Review the appropriate AOM (Application, Operation and Maintenance) manual for units with DDC controls.

LOW WATER TEMPERATURE CUTOUT SELECTION

The CXM2/DXM2.5 allows the field selection of low water (or water-antifreeze solution) temperature limit by clipping jumper JW3 (see the figure below), which changes the sensing temperature associated with thermistor LT1. Note that the LT1 thermistor is located on the refrigerant line between the brazed-plate heat exchanger and expansion device (TXV). LT1 is senses refrigerant temperature, not water temperature, which is a better indication of how water flow rate/ temperature is affecting the refrigeration circuit. The factory setting for LT1 is for systems using water (30°F [-1.1°C] refrigerant temperature). In low water temperature (extended range) applications with antifreeze (most ground loops), clip jumper JW3 as shown in the figure below to change the setting to 10°F (-12.2°C) refrigerant temperature, which is a more suitable temperature when using an antifreeze solution. All ClimateMaster units operating with entering water temperatures below 60°F (15.6°C) require the optional water/refrigerant circuit insulation package to prevent internal condensation.

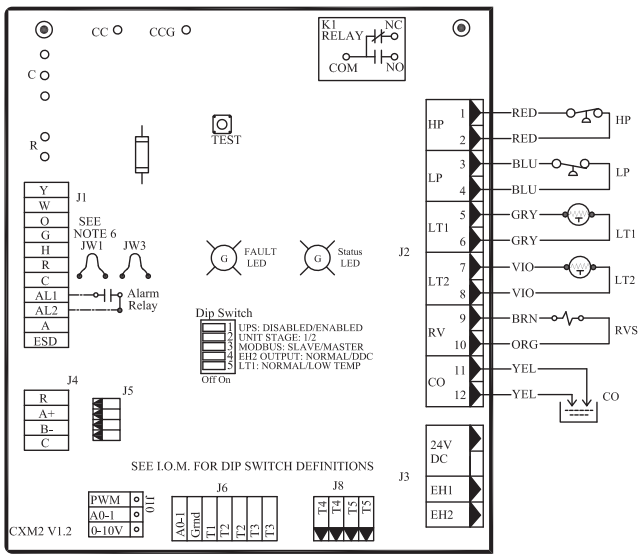
vFlow FREEZE PROTECTION

vFlow freeze protection logic is designed to safeguard the brazed-plate heat exchanger (BPHE) from freeze-related damage. The system monitors the source loop leaving water temperature (LWT) and initiates a lockout if it approaches a threshold where freezing could begin.

Due to localized conditions such as sensor tolerances, stratification, or reduced flow, portions of the heat exchanger can experience temperatures lower than the average LWT. These situations can lead to ice formation inside the BPHE, which can cause immediate and irreparable damage due to expansion forces.

To mitigate this risk, the control logic includes a freeze protection setpoint that triggers a lockout condition when necessary. While antifreeze is strongly recommended in low-temperature loop designs, the lockout feature acts as a critical backup to prevent slush or freezing water from entering the heat exchanger under fault or marginal conditions.

Figure 13: LT1 Limit Setting



Models:
SW
036-120

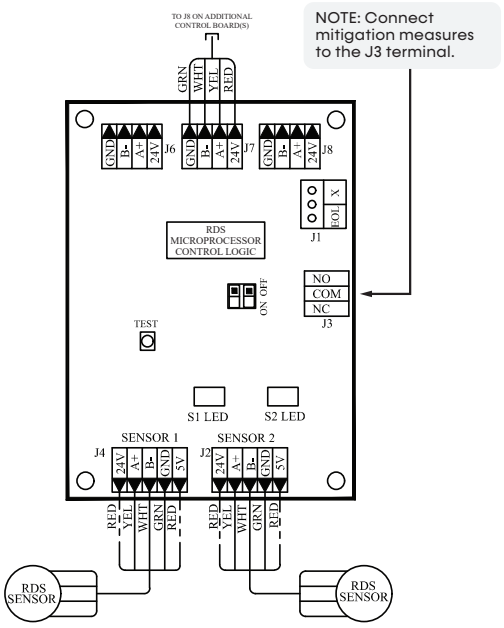
Electrical: Low-Voltage Wiring

REFRIGERANT DETECTION SYSTEM (RDS)

The function, operation, and required servicing measures for the Refrigerant Detection System (RDS) include the following:

- The RDS monitors the status of the refrigerant sensor(s) in the unit. If refrigerant is detected above the maximum threshold, the control disables the compressor(s) and enables the pilot relay on the RDS control board. You can use this relay to open external zoning dampers and/or activate external mechanical ventilation. The relay is normally closed (NC) and can control a signal with a maximum of 28VA @ 24VAC.
- A fault is enabled if the RDS control board loses communication with a refrigerant sensor or if the main control board loses communication with the RDS board. See Functional Troubleshooting for steps to troubleshoot the RDS.

Figure 15: RDS Board



FIELD-INSTALLED RDS SYSTEM

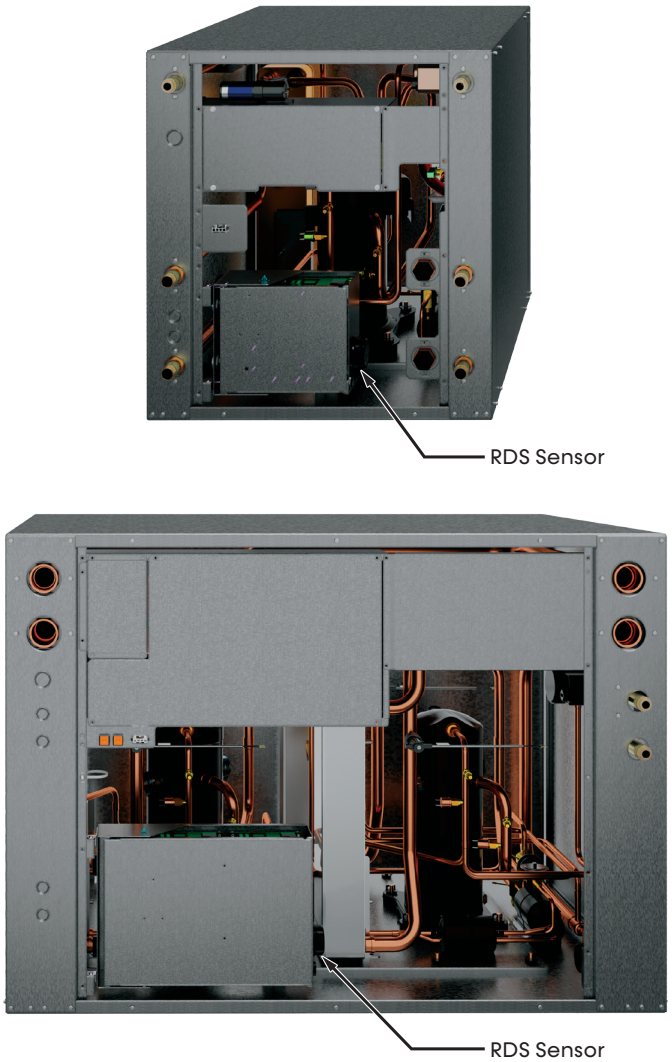
If the RDS was specified as a factory-installed option, but forgotten and not ordered, use the following guidelines to install a refrigerant detection sensor:

1. The sensor must be installed inside the cabinet
2. The ideal location for the sensor is on the exterior side panel of the controls enclosure as shown in Figure 14
3. Because the RDS is optional, an area within the controls enclosure can house the RDS control board

⚠ NOTICE

The sensor cannot be installed in a way that exposes it to water and must be installed using the orientation displayed in the figure below.

Figure 14: RDS Installation



Electrical: Low-Voltage Wiring

Models:
SW
036-120

ACCESSORY CONNECTIONS

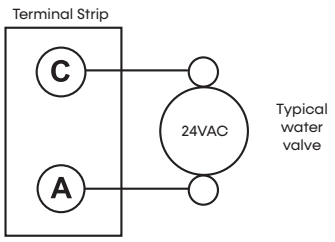
A terminal paralleling the compressor contactor coil is provided on the CXM2/DXM2.5. Terminal "A" is designed to control accessory devices, such as water valves. **NOTE: This terminal should be used only with 24V signals and not line voltage.** Terminal "A" is energized with the compressor contactor. See the Accessory Wiring figure or the specific unit wiring diagram for details.

Table 5: Low Voltage VA Ratings

Component	VA
Typical Blower Relay	6 - 7
Typical Reversing Valve Solenoid	4 - 6
30 A Compressor Contactor	6 - 9
Subtotal	16 - 22
+ CXM2 (5 - 9VA)[1]	21 - 31
Remaining VA for Accessories	19 - 29
+ DXM2.5 (8 - 12VA)[2]	24 - 34
Remaining VA for Accessories	41 - 51

1. Standard transformer for CXM2 is 50VA.
2. Optional DXM2.5 and/or DDC controls include a 75VA transformer.

Figure 16: Accessory Wiring



WATER SOLENOID VALVES

Use an external solenoid valve(s) on ground water installations to shut off flow to the unit when the compressor is not operating. A slow closing valve may be required to help reduce water hammer. The Accessory Wiring figure shows typical wiring for a 24VAC external solenoid valve. The Accessory Motorized Water Valve – Typical Wiring Example #1 and #2 figures illustrate a slow-closing water control valve wiring for two styles of typical accessory water valves. Slow-closing valves take approximately 60 seconds to open (very little water flows before 45 seconds). Once fully open, an end switch allows the compressor to be energized. Only use relay or triac-based electronic thermostats with slow-closing valves. When wired as shown, the slow-closing valve will operate properly with the following notations:

1. The valve will remain open during a unit lockout.
2. The valve will draw approximately 25-35VA through the "Y" signal of the thermostat.

NOTE: This valve can overheat the anticipator of an electromechanical thermostat. Therefore, only relay or triac based thermostats should be used.

Models:
SW
036-120

Electrical: Low-Voltage Wiring

Figure 17: Accessory Motorized Water Valve – Typical Wiring Example #1

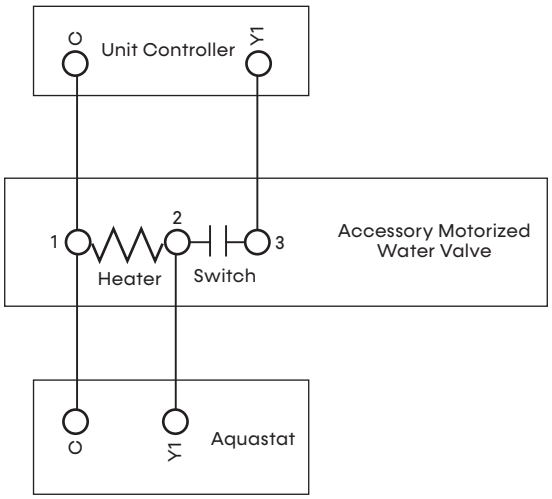


Figure 18: Accessory Motorized Water Valve - Typical Wiring Example #2

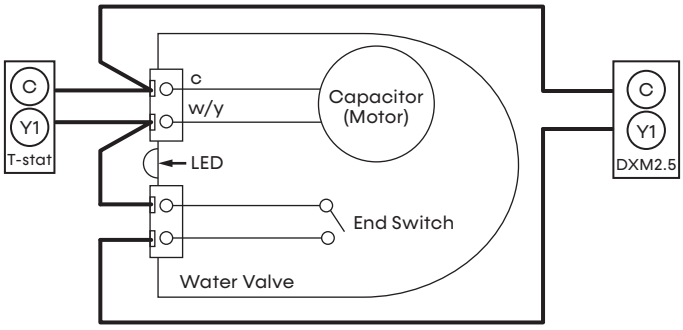
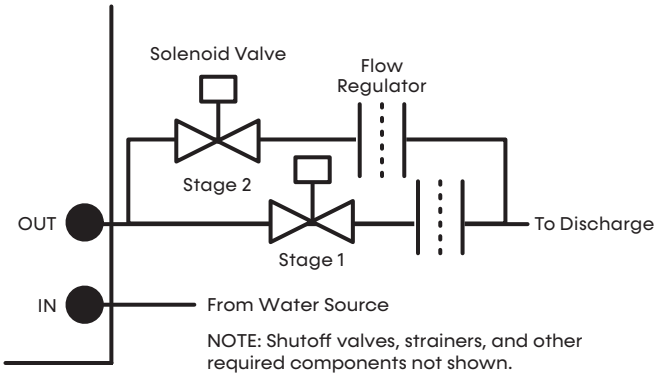


Figure 19: Two-Stage Piping



NOTE: Shutoff valves, strainers, and other required components not shown.

Controls: CXM2 and DXM2.5

Models:
SW
036-120

CXM2 Communicating Controls

For detailed controller information, see the CXM2 Application, Operation, and Maintenance (AOM) manual (part # 97B0137N01). To confirm the controller type of your particular unit, refer to digit 9 on the unit model number and the unit nomenclature diagram found on page 3 of this manual.

DXM2.5 Advanced Communicating Controls

For detailed controller information, see the DXM2.5 Application, Operation, and Maintenance (AOM) manual (part # 97B0142N01). To confirm the controller type of your particular unit, refer to digit 9 on the unit model number and the unit nomenclature diagram found on page 3 of this manual.

Models:
SW
036-120

Piping System Cleaning and Flushing

Cleaning and flushing the WLHP piping system is the single most important step to ensure proper startup and continued efficient operation of the system.

Follow the instructions below to properly clean and flush the system:

1. Verify electrical power to the unit is disconnected.
2. Install the system with the supply hose connected directly to the return riser valve. Use a single length of flexible hose.
3. Open all air vents. Fill the system with the water. DO NOT allow system to overflow. Bleed all air from the system. Pressurize and check the system for leaks and repair appropriately.
4. Verify all strainers are in place. Start the pumps, and systematically check each vent to ensure all air is bled from the system.
5. Verify make-up water is available. Adjust make-up water appropriately to replace the air which was bled from the system. Check and adjust the water/air level in the expansion tank.
6. Set the boiler to raise the loop temperature to approximately 85°F (29°C). Open the a drain at the lowest point in the system. Adjust the make-up water replacement rate to equal the rate of bleed.

⚠ CAUTION

DO NOT use 'stop leak' or any similar chemical agent in this system. Addition of these chemicals to the loop water will foul the system and inhibit unit operation.

⚠ CAUTION

To avoid possible damage to a plastic (PVC) piping system, do not allow temperatures to exceed 110°F (43°C).

7. Refill the system and add trisodium phosphate in a proportion of approximately one pound per 150 gallons (½ kg per 750 L) of water (or other equivalent approved cleaning agent). Reset the boiler to raise the loop temperature to about 100°F (38°C). Circulate the solution for a minimum of 8 to 24 hours. At the end of this period, shut off the circulating pump and drain the solution. Repeat system cleaning if desired.
8. When the cleaning process is complete, remove the short-circuited hoses. Reconnect the hoses to the proper supply, and return connections to each of the units. Refill the system and bleed off all air.
9. Test the system pH with litmus paper. The system water should be slightly alkaline (pH 7.5-8.5). Add chemicals, as appropriate, to maintain acidity levels.
10. When the system is successfully cleaned, flushed, refilled and bled, check the main system panels, safety cutouts and alarms. Set the controls to properly maintain loop temperatures.

Unit and System Checkout

Models:
SW
036-120

⚠ WARNING

Verify ALL water controls are open and allow water flow prior to engaging the compressor. Freezing of the brazed plate or water lines can permanently damage the heat pump.

⚠ WARNING

To avoid equipment damage, DO NOT leave system filled in a building without heat during the winter unless antifreeze is added to system water. Condenser coils never fully drain by themselves and will freeze unless winterized with antifreeze.

NOTE: The manufacturer strongly recommends all piping connections, both internal and external to the unit, be pressure tested by an appropriate method prior to any finishing of the interior space or before access to all connections is limited. Test pressure may not exceed the maximum allowable pressure for the unit and all components within the water system. The manufacturer will not be responsible or liable for damages from water leaks due to inadequate or lack of a pressurized leak test, or damages caused by exceeding the maximum pressure rating during installation.

BEFORE POWERING THE SYSTEM,
please check the following:

UNIT CHECKOUT

- ☐ **Balancing/Shutoff Valves:** Ensure all isolation valves are open, water control valves wired and open or brazed plate may freeze and burst.
- ☐ **Line Voltage and Wiring:** Ensure Voltage is within an acceptable range for the unit and wiring and fuses/breakers are properly sized. Low voltage wiring is complete.
- ☐ **Unit Control Transformer:** Ensure transformer has properly selected control voltage tap. 208-230V units are factory wired for 208V operation unless specified otherwise.
- ☐ **Entering Water:** Ensure entering water temperatures are within the operating limits of Table 7.
- ☐ **Low Water Temperature Cutout:** Verify low water temperature cut-out on CXM2/DXM2.5 is properly set.
- ☐ **Water Flow Balancing:** Verify inlet and outlet water temperatures on both Load and source are recorded for each heat pump upon startup. This check can eliminate nuisance trip outs and high velocity water flows that can erode heat exchangers.
- ☐ **Unit Controls:** Verify CXM2 or DXM2.5 field-selection options are proper and complete.

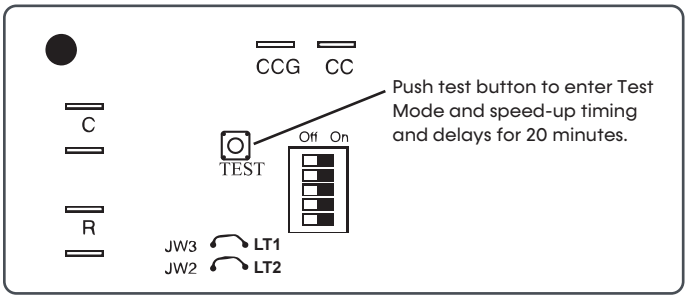
⚠ WARNING

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.

SYSTEM CHECKOUT

- ☐ **System Water Temperature:** Check load and source water temperature for proper range and also verify heating and cooling setpoints for proper operation.
- ☐ **System pH:** System water pH is 6 - 8.5. Proper pH promotes longevity of hoses and fittings.
- ☐ **System Flushing:** Verify all hoses are connected end to end when flushing to ensure debris bypasses unit heat exchanger and water valves etc. Water used in the system must be potable quality initially and clean of dirt, piping slag, and strong chemical cleaning agents. Verify all air is purged from the system. Air in the system can cause poor operation or system corrosion.
- ☐ **Cooling Tower/Boiler:** Check equipment for proper setpoints and operation.
- ☐ **Standby Pumps:** Verify the standby pump is properly installed and in operating condition.
- ☐ **System Controls:** Verify system controls function and operate in the proper sequence.
- ☐ **Low Water Temperature Cutout:** Verify low water temperature cut-out controls are provided for the outdoor portion of the loop or operating problems occur.
- ☐ **System Control Center:** Verify control center and alarm panel for proper setpoints and operation.
- ☐ **Strainers:** Verify 20 mesh (841 micron) [0.84mm] strainers are installed in load and source water piping. Confirm maintenance schedule for strainers.
- ☐ **Miscellaneous:** Note any questionable aspects of the installation.

Figure 23: Test Mode Button



Models:
SW
036-120

Unit Startup Procedure

⚠ WARNING

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

⚠ WARNING

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

1. Adjust all valves to their full open position. Turn on the line power to all heat pump units.
2. Operate each unit in the cooling cycle. Loop water temperature entering the heat pumps should be between 70°F (21°C) and 110°F (43°C).
3. Operate each heat pump in the heating cycle immediately after checking cooling cycle operation. A time delay will prevent the compressor from re-starting for approximately five (5) minutes.
4. Establish a permanent operating record by logging the unit operating conditions at initial startup for each unit.
5. If a unit fails to operate, conduct the following checks:

a. Check the voltage and current. They should comply with the electrical specifications described on the unit nameplate.

b. Look for wiring errors. Check for loose terminal screws where wire connections have been made on both the line and low-voltage terminal boards.

c. Check the supply and return piping. They must be properly connected to the inlet and outlet connections on the unit.

d. If the checks described above fail to reveal the problem and the unit still will not operate, contact a trained service technician to ensure proper diagnosis and repair of the equipment.

NOTE: Units have a 5-minute time delay in the control circuit that can be bypassed on the CXM2 as shown in Figure 23. See controls description for detailed features of the control.

Table 6: Brazed-Plate Water Pressure Drop

Model	GPM	Pressure Drop PSI			
		30°F	50°F	70°F	90°F
Source/Outdoor Brazed Plate					
SW036	4.5	1.7	1.3	1.0	0.8
	6.8	4.1	3.4	2.8	2.4
	9.0	7.1	6.0	5.1	4.5
SW060	7.5	1.5	1.3	1.1	0.9
	11.3	4.0	3.4	3.0	2.7
	15.0	6.9	6.2	5.5	5.0
SW120	15.0	1.7	1.4	1.2	0.9
	22.5	4.4	3.8	3.3	2.7
	30.0	7.6	6.8	6.1	5.0
Load/Outdoor Brazed Plate					
SW036	4.5		0.6	0.5	0.3
	6.8		1.4	1.3	1.1
	9.0		2.6	2.4	2.2
SW060	7.5		1.4	1.3	1.2
	11.3		3.5	3.2	3.0
	15.0		6.2	5.8	5.5
SW120	15.0		1.6	1.4	1.3
	22.5		3.8	3.5	3.3
	30.0		6.8	6.4	6.0

- Antifreeze is required for operation in the light grey area
- Operation in the dark grey area is not recommended

Unit Startup Procedure

Models:
SW
036-120

Table 7: Operating Limits

Operating Limits	Cooling	Heating
Air Limits		
Min. ambient air, DB	10°F [-12°C][1]	10°F [-12°C][1]
Max. ambient air, DB	130°F [54.4°C]	130°F [54.4°C]
Min. entering air, DB/WB	65/45°F [18/7°C]	50°F [10°C]
Max. entering air, DB/WB	90/72°F [32/22°C]	80°F [27°C]
Water Limits		
Min. entering water	20°F [-6.7°C][2]	20°F [-6.7°C]
Max. entering water	120°F [49°C]	90°F [32°C]
Water Flow Range	1.5 to 3.0 gpm/ton [1.6 to 3.2 l/m per kW][3]	

Notes:
1. To prevent unit damage, the water loop should contain antifreeze to prevent freezing when not in operation.
2. With unit flow-control automation.
3. Unless specified different on performance table for any model size

Table 8: Commissioning Conditions

Commissioning Conditions	Cooling	Heating
Air Limits		
Min. ambient air, DB	10°F [-12°C][1]	10°F [-12°C][1]
Max. ambient air, DB	130°F [54.4°C]	130°F [54.4°C]
Min. entering air, DB/WB	65/45°F [18/7°C]	40°F [4.4°C][5]
Max. entering air, DB/WB	100/75°F [38/24°C][4]	80°F [27°C]
Water Limits		
Min. entering water	20°F [-6.7°C][2]	20°F [-6.7°C]
Max. entering water	120°F [49°C]	90°F [32°C]
Water Flow Range	1.5 to 3.0 gpm/ton [1.6 to 3.2 l/m per kW]	

Notes:
1. To prevent unit damage, the water loop should contain antifreeze to prevent freezing when not in operation.
2. With unit flow-control automation.
3. Unless specified different on performance table for any model size
4. Commission units for cooling at entering air temperatures of 100/75°F (38/24°C) only at rated water flow or 3 gpm/ton.
5. Commission units for heating at entering air temperature of 40°F (4.4°C) only at rated water flow or 3 gpm/ton.

Unit Maximum Water Working Pressure and Flow

Unit Maximum Water Working Pressure PSIG (kPa)	
Unit	145 (100)
Maximum Water Flow Through Unit GPM (l/min)	
036	25 (94.6)
060, 120	35 (132.5)

Models:
SW
036-120

Operating Pressures

Operating Pressure/Temperature tables include the following notes:

- Airflow is at nominal (rated) conditions
- Entering air is based upon 70°F (21°C) DB in heating and 80/67°F (27/19°C) in cooling
- Subcooling is based upon head pressure at compressor service port
- Cooling air and water values can vary greatly with changes in humidity level

Table 9: SW Series Typical Unit Operating Pressures and Temperatures

SW036-120 (SW120 Per Circuit)								
		Cooling						
Source EWT F	Source Water Flow GPM/ton	Load EWT F @ 1.5-3.0 GPM/Ton	Suction Pressure PSIG	Discharge Pressure PSIG	Super-heat	Sub-cooling	Water Temp Rise F Source	Water Temp Drop F Load
50	1.5	50	80-100	180-200	14-18	18-28	15-30	7-15
		60	90-110	190-210	14-18	18-28		8-17
		70	100-120	200-220	17-21	18-28		8-19
		80	120-140	210-230	18-22	18-28		9-20
	2.25	50	80-100	170-190	15-19	14-22	10-20	7-15
		60	90-110	175-195	15-19	14-22		8-17
		70	100-120	180-200	16-20	14-22		9-19
		80	120-140	200-220	17-21	14-22		9-20
	3.0	50	75-95	165-185	15-19	12-20	5-15	8-16
		60	90-110	170-190	15-19	12-20		8-17
		70	95-115	175-195	16-20	12-20		9-19
		80	120-140	190-210	20-24	12-20		9-20
80	1.5	50	90-110	300-320	11-15	18-25	15-30	7-14
		60	100-120	310-330	11-15	18-25		7-16
		70	110-130	330-350	11-15	18-25		8-18
		80	130-150	350-370	12-16	18-25		9-20
	2.25	50	95-115	295-315	10-14	14-21	12-18	7-14
		60	105-125	305-325	10-14	14-21		8-16
		70	115-135	320-340	11-15	14-21		8-18
		80	130-150	340-360	14-18	14-21		9-20
	3.0	50	100-120	285-305	10-14	12-18	10-15	7-15
		60	110-130	300-320	10-14	12-18		8-16
		70	120-140	310-330	12-16	12-18		9-18
		80	140-160	330-350	13-17	12-18		9-20
110	1.5	50	95-115	475-495	9-13	17-23	14-25	5-11
		60	110-130	490-510	9-13	17-23		6-13
		70	120-140	510-530	10-14	17-23		7-15
	2.25	50	90-110	460-480	9-13	15-20	14-17	5-11
		60	115-135	465-485	9-13	15-20		6-13
		70	120-140	475-495	10-14	15-20		7-15
	3.0	50	90-110	440-460	9-13	12-17	7-13	5-12
		60	110-130	450-470	9-13	12-17		6-14
		70	120-140	470-490	10-14	12-17		7-15
		80	140-160	480-500	11-15	12-17		8-17

Operating Pressures

Models:
SW
036-120

SW036-120 (SW120 Per Circuit)								
Source EWT F	Source Water Flow GPM/ton	Heating						
		Load EWT F @ 1.5-3.0 GPM/Ton	Suction Pressure PSIG	Discharge Pressure PSIG	Super-heat	Sub-cooling	Water Temp Drop F Source	Water Temp Rise F Load
20	3.0	60	50-60	180-200	10-14	6-15	2-6	5-14
		80	50-60	280-300	10-14	6-15		5-14
		90	55-65	290-310	11-15	6-15		4-14
		100	55-65	360-385	11-15	6-15		4-14
		120	55-65	425-435	13-16	6-15		4-13
50	1.5	60	70-80	200-220	11-15	12-18	9-16	6-17
		80	75-85	310-330	11-15	12-18		6-17
		90	80-90	320-340	11-15	12-18		6-17
		100	85-95	380-400	11-15	12-18		5-17
		120	90-100	450-470	11-15	12-18		4-16
	2.25	60	75-85	195-215	10-14	10-14	6-13	7-18
		80	80-90	305-325	10-14	10-14		6-18
		90	85-95	310-330	10-14	10-14		6-18
		100	90-100	360-380	10-14	10-14		6-17
		120	95-105	445-465	10-14	10-14		5-17
	3.0	60	80-90	190-210	9-13	7-15	5-10	7-19
		80	85-95	300-320	9-13	7-15		7-19
		90	90-100	305-325	9-13	7-15		6-19
		100	95-105	360-380	9-13	7-15		6-18
		120	100-110	440-460	9-13	7-15		5-17
80	1.5	60	110-120	220-240	13-17	16-20	15-21	8-18
		80	120-130	310-330	13-17	16-20		8-19
		90	125-135	320-340	13-17	16-20		7-19
		100	130-140	400-420	13-17	16-20		7-19
		120	135-145	480-500	13-17	16-20		6-20
	2.25	60	100-110	215-235	12-16	14-19	9-16	8-20
		80	120-130	290-300	12-16	14-19		8-20
		90	130-140	330-350	12-16	14-19		8-20
		100	140-150	400-420	12-16	14-19		7-20
		120	150-160	475-495	12-16	14-19		6-20
	3.0	60	110-120	220-240	11-15	6-18	7-12	9-21
		80	135-150	280-300	11-15	6-18		8-21
		90	130-140	340-360	11-15	6-18		8-21
		100	140-150	405-425	11-15	6-18		8-21
		120	150-160	490-510	11-15	6-18		6-21

Models:
SW
036-120

Preventative Maintenance

HEAT EXCHANGER MAINTENANCE (DIRECT GROUND WATER APPLICATIONS ONLY)

If the installation is performed in an area with a known high mineral content (125 ppm or greater) in the water, it is best to establish with the owner a periodic maintenance schedule so the coil can be checked regularly. Consult the well water applications section of this manual for a more detailed water coil material selection. Should periodic coil cleaning be necessary, use standard coil cleaning procedures which are compatible with either the heat exchanger material or copper water lines. Generally, the more water flowing through the unit the less chance for scaling therefore 2.5 GPM per ton (2.0 l/m per kW) is recommended as a minimum flow.

HEAT EXCHANGER MAINTENANCE (ALL OTHER WATER LOOP APPLICATIONS)

Generally water coil maintenance is not needed however, if the installation is located in a system with a known high dirt or debris content, it is best to establish with the owner a periodic maintenance schedule so the coil can be checked regularly. These dirty installations are a result of the deterioration of iron or galvanized piping or components in the system or open cooling towers requiring heavy chemical treatment and mineral buildup through water use. Should periodic coil cleaning be necessary, use standard coil cleaning procedures which are compatible with both the heat exchanger material and copper water lines. Generally, the more water flowing through the unit, the less chance for scaling, however flow rates over 3 GPM per ton (3.9 l/m per kW) can produce water (or debris) velocities that can erode the heat exchanger wall and ultimately produce leaks.

Clean or replace 20 mesh (841 micron) [0.84mm] strainer/filters on a timely schedule.

COMPRESSORS

Conduct annual amperage checks to ensure amp draw is no more than 10% greater than that indicated by serial plate data.

CABINET

Do not allow water to stay in contact with the cabinet for long periods of time to prevent corrosion of the cabinet sheet metal. Generally smaller cabinets are set up from the floor a few inches for prevention. The cabinet can be cleaned using a mild detergent.

REFRIGERANT SYSTEM

To maintain sealed circuit integrity, do not install service gauges unless unit operation appears abnormal. Reference the operating chart for pressure and temperatures. Verify that air and water flow rates are at proper levels before servicing the refrigerant circuit.

If the refrigerant circuit is opened for any reason, a new liquid line filter-drier must be installed.

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 basis 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 OF THE GOODS 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 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.

Limitation: 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, malfunction or other failure and the remedy fails of its essential purpose, CM shall refund the purchase price paid to CM in exchange for the return of the sold good(s). Said refund shall be the maximum liability of CM. **THIS REMEDY IS 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

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

A NIBE GROUP MEMBER

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GRANT OF LIMITED EXPRESS WARRANTY

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

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

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

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

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

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

LIMITATION OF REMEDIES

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

LIMITATION OF LIABILITY

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

OBTAINING WARRANTY PERFORMANCE

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

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

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

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

Created: 10/09

LC079

Startup Log Sheet

Models:
SW
036-120

Installer: Complete *Unit and System Checkout* and follow *Unit Startup Procedures* in the IOM. Use this form to record unit information, temperatures, and pressures during startup. Keep this form for reference.

Job Name:

Street Address:

Model Number: **Serial Number:**

Unit Location in Building:

Date: **Sales Order Number:**

In order to minimize troubleshooting and costly system failures, complete the following checks and data entries before the system is put into full operation.

Temperatures (check one): ☐ °F ☐ °C Antifreeze: _____ %

Pressures (check one): ☐ PSIG ☐ kPa Type: _____

	Cooling Mode		Heating Mode	
Source				
Entering Fluid Temperature				
Leaving Fluid Temperature				
Temperature Differential		DB		DB
Pressure	In	Out	In	Out
Pressure Differential				
Load				
Entering Fluid Temperature				
Leaving Fluid Temperature				
Temperature Differential		DB		DB
Pressure In	In	Out	In	Out
Pressure Differential				
Compressor				
Amps				
Volts				
Discharge Line Temperature				

NOTES:
1. Allow unit to run 15 minutes in each mode before taking data.
2. Never connect refrigerant gauges during startup procedures.
3. Conduct water-side analysis using P/T ports to determine water flow and temperature difference.
4. If water-side analysis shows poor performance, refrigerant troubleshooting may be required.
5. Connect refrigerant gauges as a last resort.

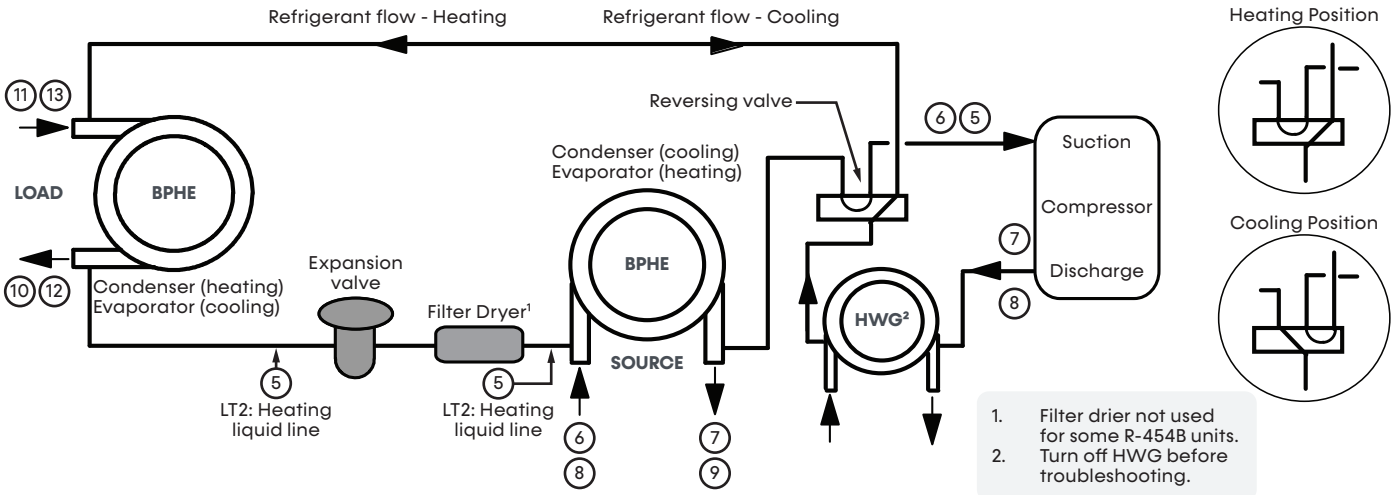
Models:
SW
036-120

Refrigeration Troubleshooting Form

Customer: **Loop Type:** **Startup Date:**

Model #: **Serial #:** **Antifreeze Type:** **%**

Complaint:



	Description	Heating	Cooling	Notes
	Water Side Analysis			
1	Water In Temp.			
2	Water Out Temp.			ΔT =
3	Water In Pressure			
4	Water Out Pressure			
4a	Pressure Drop			
4b	GPM			

Heat of Extraction (Absorption) or Heat of Rejection:

HE (Btuh) = _____ or HR (Btuh) = _____

_____ Flow Rate (GPM) x _____ ΔT (°F) x _____ Fluid Factor

Fluid Factor:
500 (Water) 485 (Antifreeze)

	Refrigerant Analysis			
5	Suction Temp.			
6	Suction Pressure			
6a	Saturation Temp.			
6b	Superheat			
7	Discharge Temp.			
8	Discharge Pressure			
8a	Saturation Temp.			
8b	Subcooling			
9	Liquid Line Temp			
10	Load Water In Temp.			
11	Load Water Out Temp.			ΔT =
12	Load Water In Pressure			
13	Load Water Out Pressure			
13a	Pressure Drop			
13b	Flow Rate GPM [l/s]			

Notes

Models:
SW
036-120

Models:
SW
036-120

Notes

Notes

Models:
SW
036-120

Models:
SW
036-120

Revision History

Date	Section	Description
06/04/25	Ground Water Heat-Pump Applications	Added example configuration graphic
	Electrical Data	Added 265V option
	Electrical: Low-Voltage Wiring	Added vFlow Freeze-Protection Logic content
04/18/25	Model Nomenclature	Updated options and removed unavailable offerings
	Minimum Installation Area	Removed section
	Physical Data	Updated water connection sizes
		Updated weights
	Dimensional Data	Updated water connection values
		Switched Load and Source sides per updated design
	Electrical Data	Updated data, added data for units with High Head variable pump
	Electrical: Power Wiring	Updated to include Disconnect requirements
	Electrical: Low-Voltage Wiring	Updated example wiring diagrams
	Unit Operating Conditions	Updated data
11/19/24	Model Nomenclature	Updated model nomenclature terminology
	Dimensional Data	Updated dimensional depth, length, and width values
09/10/24	Minimum Installation Area	Updated charge. Corrected variable terminology
08/30/24	Cover	Updated cover image
	Attentions, Cautions, and Warnings;	Added a notice that addresses powering off the unit while the RDS is active
	Physical Data	Updated refrigerant charge
	Minimum Installation Area	Updated Minimum Installation Area data
	Dimensional Data	Updated dimensional data
08/16/24	All	Updated brazed-plate content
05/14/24	All	Created

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