Installation, Operation, and Maintenance

Water Source Heat Pump
Axiom™ Water-to-Water — EXW
5 to 20 Tons — 60 Hz

⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

June 2023

WSHP-SVX02F-EN

Introduction

Read this manual thoroughly before operating or servicing this unit.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

⚠WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
NOTICE	Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants.

Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury. All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

⚠WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- **Before installing/servicing this unit, technicians MUST put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). ALWAYS refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labeling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.**
- **If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠WARNING

Follow EHS Policies!

Failure to follow instructions below could result in death or serious injury.

- **All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.**
- **Non-Trane personnel should always follow local regulations.**

⚠WARNING

Contains Refrigerant!

Failure to follow instructions below could result in an explosion which could result in death or serious injury or equipment damage.

System contains refrigerant under high pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives.

Copyright

Trademarks

Table of Contents

General Information

⚠WARNING

Fiberglass Wool!

Exposition to glass wool fibers without all necessary PPE equipment could result in cancer, respiratory, skin or eye irritation, which could result in death or serious injury. Disturbing the insulation in this product during installation, maintenance or repair will expose you to airborne particles of glass wool fibers and ceramic fibers known to the state of California to cause cancer through inhalation.

You MUST wear all necessary Personal Protective Equipment (PPE) including gloves, eye protection, a NIOSH approved dust/mist respirator, long sleeves and pants when working with products containing fiberglass wool.

Precautionary Measures:

- **Avoid breathing fiberglass dust.**
- **Use a NIOSH approved dust/mist respirator.**
- **Avoid contact with the skin or eyes.Wear long-sleeved, loose-fitting clothing, gloves, and eye protection.**
- **Wash clothes separately from other clothing; rinse washer thoroughly.**
- **Operations such as sawing, blowing, tear-out, and spraying may generate fiber concentrations requiring additional respiratory protection. Use the appropriate NIOSH approved respirator.**

First Aid Measures:

- **Eye Contact - Flush eyes with water to remove dust. If symptoms persist, seek medical attention.**
- **Skin Contact -Wash affected areas gently with soap and warm water after handling.**

Jobsite Inspection

Always perform the following checks before accepting a unit:

- Verify that the nameplate data matches the data on the sales order and bill of lading (including electrical data).
- Verify that the power supply complies with the unit nameplate specifications.
- Visually inspect the exterior of the unit, for signs of shipping damage. Do not sign the bill of lading accepting the unit(s) until inspection has been completed. Check for damage promptly after the unit(s) are unloaded. Once the bill of lading is signed at the jobsite, the unit(s) are now the property of the SOLD TO party and future freight claims MAY NOT be accepted by the freight company.
- Verify that the refrigerant charge has been retained during shipment by use of gauges. Access fittings are located internal to the cabinet on the 5-ton through 20-ton equipment.
- After assuring that charge has been retained, reinstall the caps to assure that refrigerant leakage does not occur.

⚠CAUTION

Microbial Growth!

Failure to follow instructions below could result in odors and damage to the equipment and building materials.
The floor or foundation must be level and the condensate drain at the proper height for proper drainage and condensate flow. Standing water and wet surfaces inside the equipment can become an amplification site for microbial growth (mold). If there is evidence of microbial growth on the interior insulation, it should be removed and replaced prior to operating the system.

Jobsite Storage

This unit is intended for indoor use only. To protect the unit from damage due to the elements, and to prevent possible IAQ contaminant sources from growing, the unit should be stored indoors. If indoor storage is not possible, the following provisions for outdoor storage must be met:

- Place the unit(s) on a dry surface or raise above the ground to assure adequate air circulation beneath the unit.
- Cover the unit(s) with a waterproof tarp to protect them from the elements.
- Make provisions for continuous venting of the covered units to prevent moisture from standing on the unit(s) surfaces. Wet interior unit insulation can become an amplification site for microbial growth (mold) which has been determined to be a cause of odors and serious health related indoor air quality problems.
- Store units in the normal UP orientation to maintain oil in the compressor.
- Do not stack more than three units in total height for the EXW* 5 and 10-ton configurations, and no more than two units high for the EXW* configuration.

Unit Nameplate

The unit nameplate is located at the front of the unit. It includes the unit model number, serial number, electrical characteristics, refrigerant charge, and other pertinent unit data.

Compressor Nameplate

The nameplate for the compressors are located on the compressor shell.

Unit Description

Before shipment, each unit is leak tested, dehydrated, charged with refrigerant and run tested for proper control operation.

Water-to-Refrigerant Coils

The water-to-refrigerant heat exchangers are an inner copper tube or cupro-nickel (option available on the source-side only) and steel tube (tube-within-a-tube) design and are leak tested to assure there is no cross leakage between the water and refrigerant gas.

Water Connections

Water connections are located inside the unit and are accessible from the back of the unit. The fitting is an internal pipe threaded connection. The size of the connection is 1-inch for the 5 ton, 1½-inch for the 10 ton and 2-inch for the 20 ton unit.

Controls

The control system offered to control the unit is a deluxe 24 volt micro processing board.

All power wiring to the equipment is made at the power.

All low voltage wiring is made at the unit's low voltage terminal board.

Wiring Connections

Troubleshooting and connection diagrams for the equipment may be located in the back of this manual.

Deluxe 24V Controls

The Deluxe 24V control design will incorporate a microprocessor-based control board. The Trane microprocessor board is factory wired to a terminal strip to provide all necessary terminals for field connection. The deluxe board is equipped with a random start relay, anti-short cycle timer, brown out protection, compressor disable, unit safety control, diagnostics and a generic relay (which may be available for field use). Refer to the Control Power Transformer in Installation chapter for diagnostic information.

Access Fittings

Connections for the low and high side of the refrigeration system are located conveniently behind the refrigeration access panel.

Model Number Description

Digits 1, 2, 3 — Unit Configuration

EXW = Water to Water Heat Pump

Digit 4 — Development Sequence

E = R-410A

Digits 5, 6, 7 — Nominal Size (Tons)

060 = 5 Tons
120 = 10 Tons
240 = 20 Tons

Digit 8 — Voltage (Volts/Hz/Phase)

1 = 208/60/1
2 = 230/60/1
3 = 208/60/3
4 = 460/60/3
5 = 575/60/3
8 = 230/60/3

Digit 9 — Heat Exchanger (Source Side)

1 = Copper-Water Coil
2 = Cupro-Nickel Water Coil

Note: *Heat exchanger for the load side is copper-water coil only.*

7 = Insulated Copper Water Coil/Suction Line
8 = Insulated Cupro-Ni Water Coil/ Suction Line

Note: *Insulated heat exchanger is recommended when EWT<60°F.*

Digit 10 — Current Design Sequence

Digit 11 — Refrigeration Circuit

0 = Heat Pump

Digit 12 — Open Digit

Digit 13 — Freeze Protection (Source Side)

A = 20°F (For Glycol Loop)
B = 35°F (For Water Loop)

Note: *The load side will have a 35°F freeze protection.*

Digit 14 — Open Digit

Digit 15 — Open Digit

Digit 16 — Open Digit

Digit 17 — Control Type

D = Deluxe 24V Control

Digit 18 — Tstat Location

0 = Field Supplied

Note: *20°F Freezestat is typically used in a geothermal application. 35°F Freezestat is typically used in a boiler/tower application.*

Dimensions and Clearances

⚠WARNING

Improper Unit Lift!

Failure to properly lift unit in a LEVEL position could result in unit dropping and possibly crushing operator/ technician which could result in death or serious injury, and equipment or property-only damage.
Test lift unit approximately 24 inches (61 cm) to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level.

Table 1. Unit weights

Size	Approximate Shipping Weight with pallet (lb)	Approximate Weight without pallet (lb)
EXW*060	326	296
EXW*120	653	613
EXW*240	1222	1156

Unit Location and Clearances

Locate the unit in an indoor area. The ambient temperature surrounding the unit must not be less than 45°F. Do not locate the unit in areas subject to freezing. Attention should be given to service clearance and technician safety. The unit access panels may be easily removed. There must be enough space for service personnel to perform maintenance or repair. Provide sufficient room to make water, and electrical connection(s). Local and national codes should be followed in providing electrical power connections. Refer to the figure below for mechanical clearances.

Figure 1. Unit location and clearances

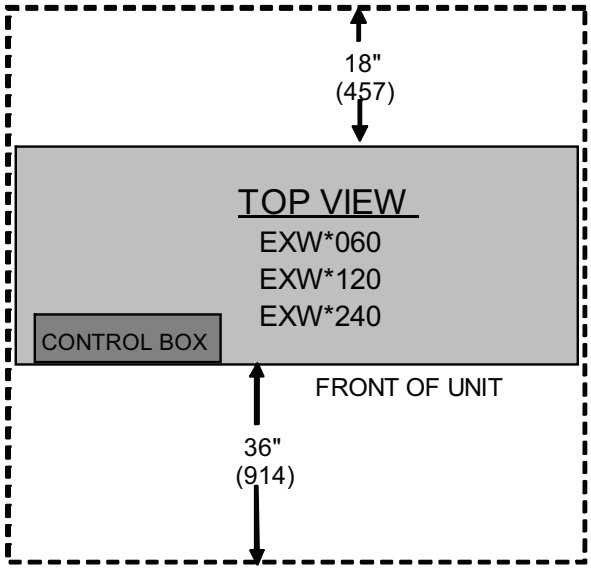
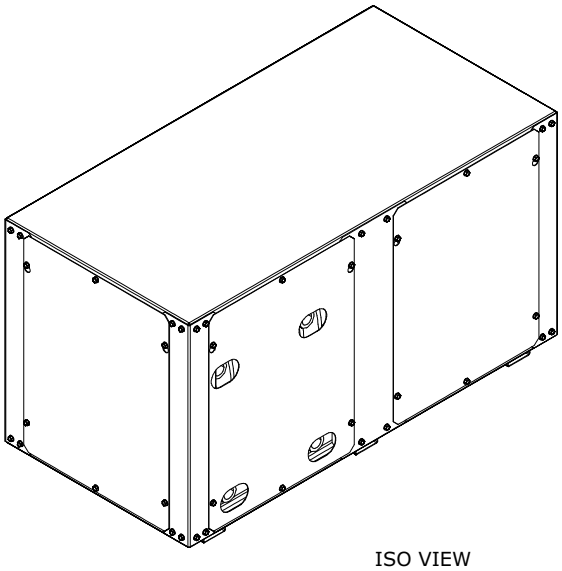
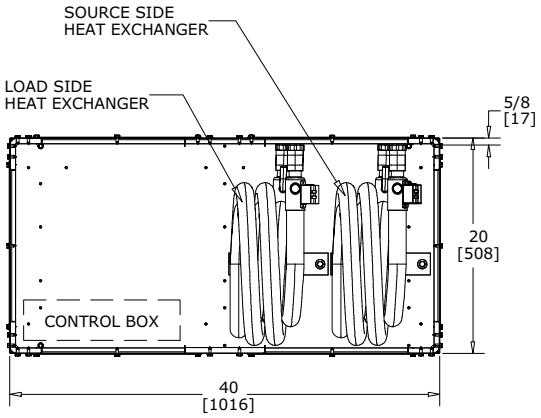


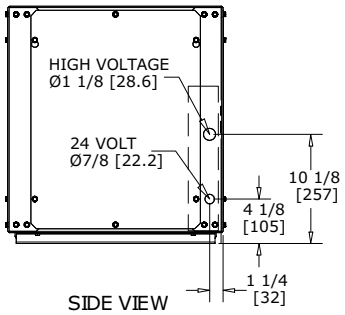
Figure 2. EXW*060



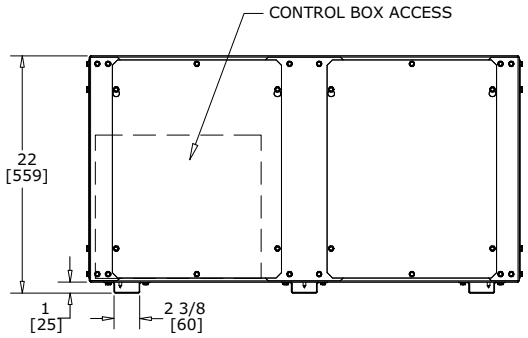
ISO VIEW



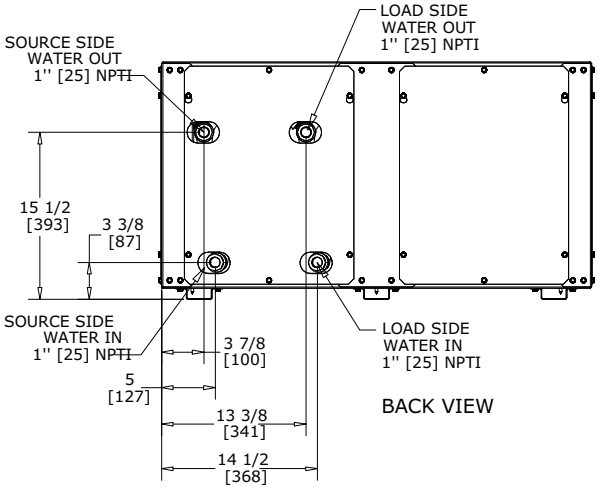
TOP VIEW



SIDE VIEW



FRONT VIEW



BACK VIEW

Figure 3. EXW*120

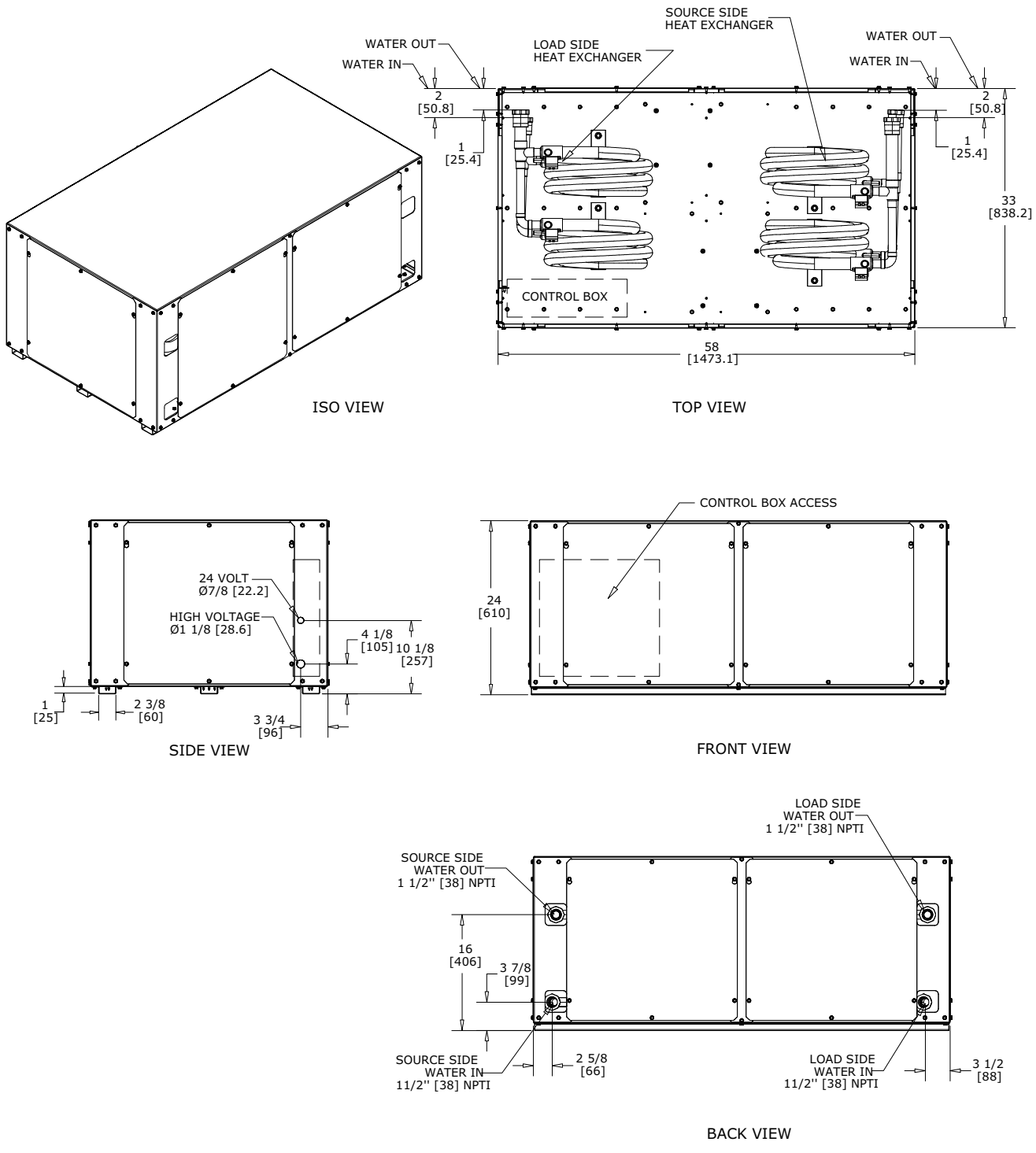
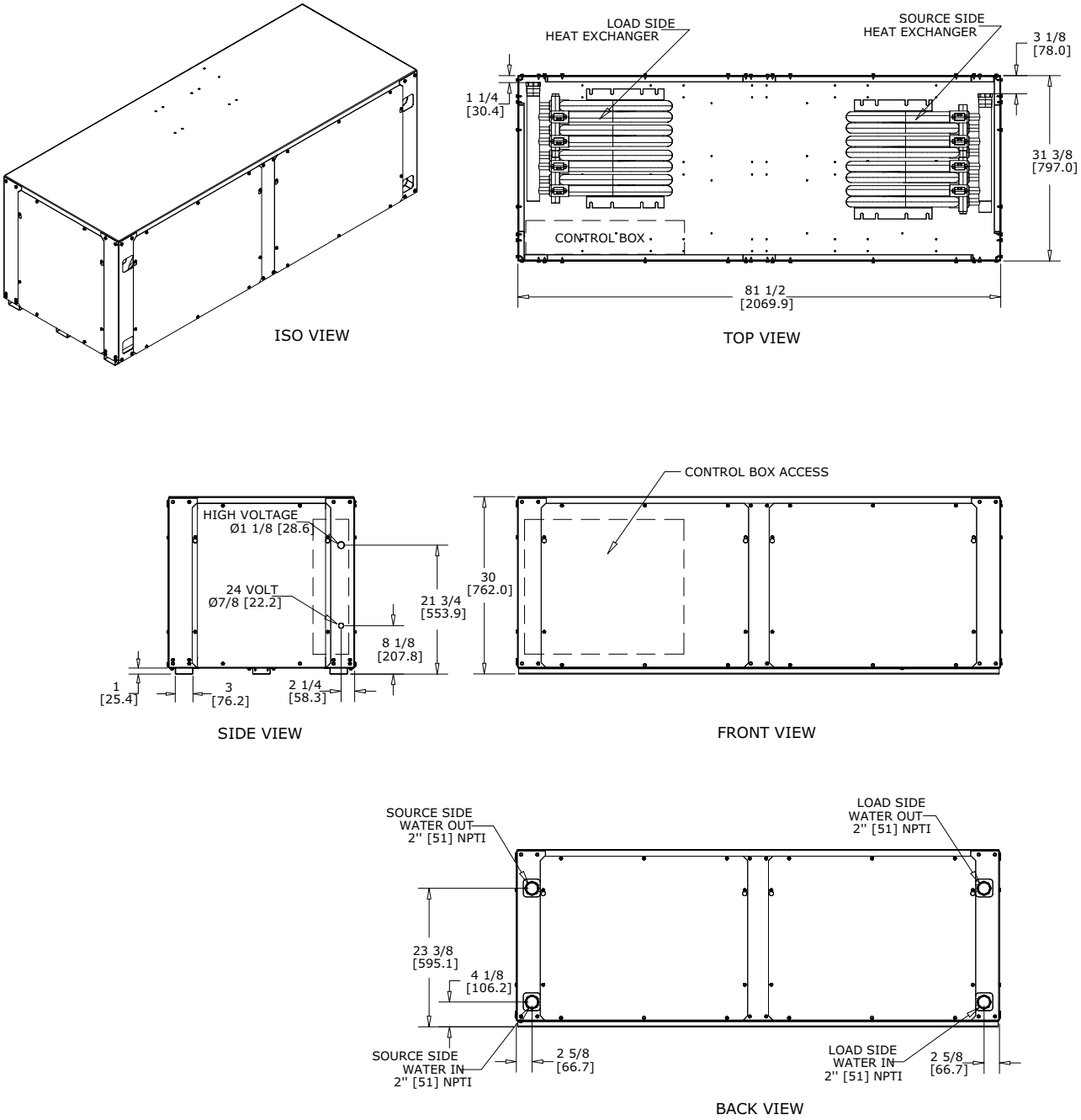


Figure 4. EXW*240



Installation

General Installation Checks

The checklist below is a summary of the steps required to successfully install a unit. This checklist is intended to acquaint the installing personnel with procedures required in the installation process. It does not replace the detailed instructions called out in the applicable sections of this manual.

1. Remove packaging and inspect the unit. Check the unit for shipping damage and material shortage; file a freight claim and notify appropriate sales representation.

Note: *The units have been tied to the skid by (4) angle brackets. Remove these brackets from the unit to slide unit from skid.*

2. Verify the correct model, options and voltage from the unit nameplate.
3. Verify the installation location of the unit will provide the required clearance for proper operation.
4. Remove refrigeration access panel and inspect the unit. Be certain the refrigerant tubing has clearance from adjacent parts.

⚠WARNING

Hazardous Voltage!

Failure to disconnect power before servicing could result in death or serious injury.
Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

Main Electrical

5. Verify the power supply complies with the unit nameplate specifications.
6. Inspect all control panel components; tighten any loose connections.
7. Connect properly sized and protected power supply wiring to a field-supplied/installed disconnect switch and to the main power terminal block (1TB1) in the unit control box.
8. Install proper grounding wires to an earth ground.

Note: *All field-installed wiring must comply with NEC and applicable local codes.*

Low Voltage Wiring Requirements

9. Connect properly sized control wiring to the proper termination points between the field supplied thermostat and the terminal strip located in the equipment control box.

⚠WARNING

Improper Unit Lift!

Failure to properly lift unit in a LEVEL position could result in unit dropping and possibly crushing operator/technician which could result in death or serious injury, and equipment or property-only damage.
Test lift unit approximately 24 inches (61 cm) to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level.

Unit Placement

Units may be placed into a field supplied mechanical rack or placed on a finished floor. Loosen compressor bolts to release tension of the rubber grommets to help reduce vibration during operation. Sound proofing material (field supplied) is recommended to help attenuate noise generated by compressor vibration.

It is important to leave appropriate clearances around the unit to achieve maintenance and serviceability to the equipment. Refer to Dimensions and Clearances chapter for service clearance dimensions.

Water Connection

Connect the source-side and load-side water-in/water-out from the water-to-water heat pump to the source system and the load system.

Note: *The source for a water-to-water heat pump is typically a boiler/cooling tower or geothermal loop. The load for a water-to-water heat pump is typically fresh-air unit(s), fan coil(s), hydronic coil(s), radiant heat, wall fin, or potable water.*

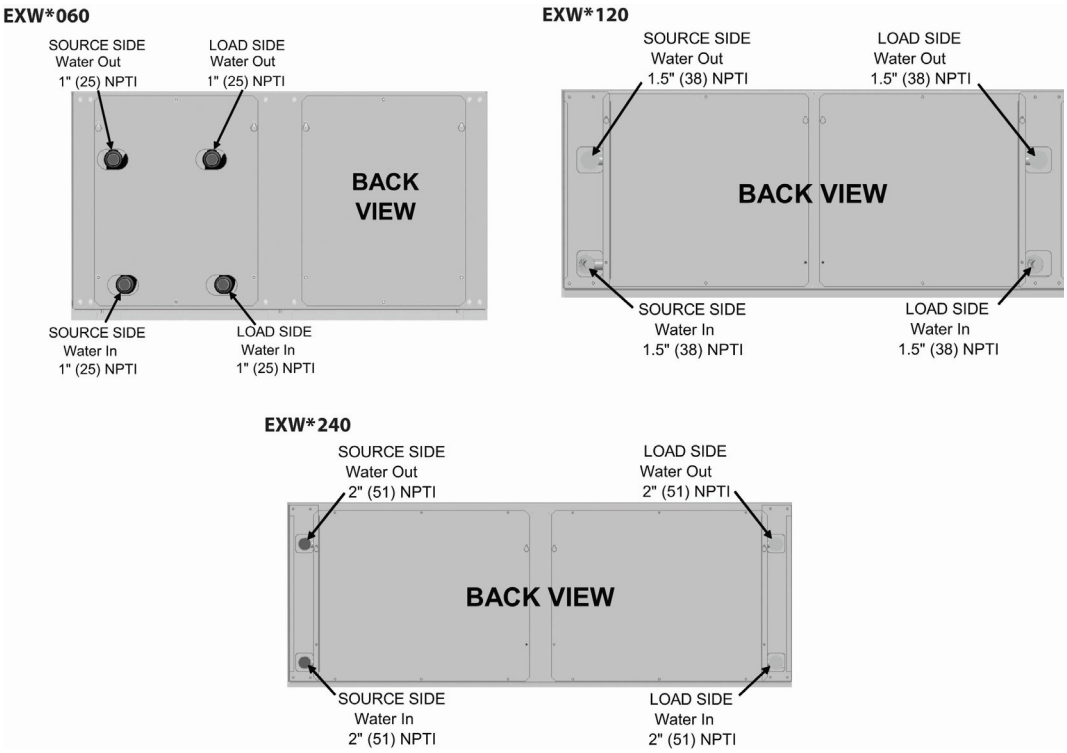
The source-side connection and the load-side connections are at the rear of the unit.

For vibration isolation, it is recommended that flexible steel braided hoses be installed instead of hard piping the equipment to the main loop system or mechanical device.

Additional accessories, such as a strainer are recommended for use to eliminate contaminants from entering the co-axial water-to-refrigerant heat exchangers.

Note: *Provide insulation on water and refrigerant piping on geothermal applications.*

Figure 5. Water connection



Cleaning and Flushing the Water Loop

After the piping system is complete, the flexible hose connectors should be doubled back to complete the water circuit external to the unit (avoiding trash settle-out in the water coils). Refer to the figure below. An extra pipe may be necessary to connect the hose kits. Refer to table Antifreeze requirements based on volume for antifreeze/water mixture by volume.

1. Water circulation system should be filled with clean water using the water make up connections.

Note: *Air vents should be opened during filling.*

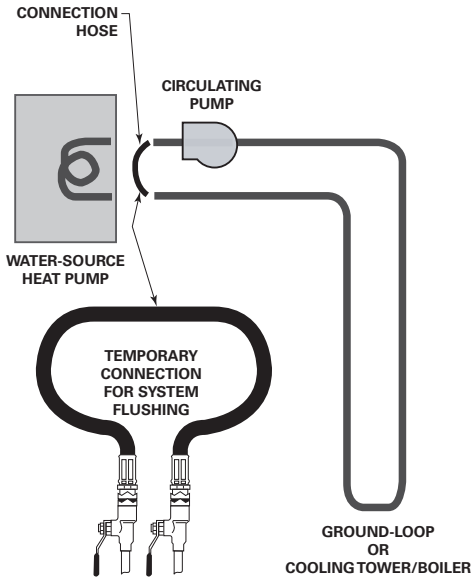
2. With the air vents closed, start the circulating pump and then crack the air vents to bleed off the trapped air, assuring circulation through all components of the system.

Note: *Make up water must be available to the system to replace the volume formerly occupied by the air that is bled off.*

3. With the air vented and the water circulating, the entire system should be checked for leaks with repairs made as required.
4. Operate the supplementary heat system making checks per manufacturer's instructions. During this operation, visual checks should be made for leaks that may have occurred due to increased heat. Repair as required.
5. Open the system at the lowest point for the initial blow down (making sure the make up water is equal to the water being dumped). Continue blow down until the water leaving the drain runs clear, but not less than 2 hours.
6. Shut down pumps and supplementary heat system. Reconnect the hoses placing the water-to-refrigerant heat exchanger in the water circulating system.

Note: *Vents should be open when the pumps and supplementary heat system are shut down.*

Figure 6. Flushing water loop



Using Antifreeze

In areas of the country where entering water temperatures drop below 45°F or where piping is being run through areas subject to freezing, the loop must be freeze protected by using an approved antifreeze solution to prevent the earth loop water from freezing inside the heat exchanger. Methanol and glycols are the most commonly used antifreeze solutions. Consult your geothermal unit supplier for locally approved solutions in your area.

Propylene glycol is not recommended in installations where the water temperature are expected to fall below 30°F. At extreme temperatures, the viscosity increases to the point where normal loop circulating pumps may not maintain proper flow.

If propylene glycol is the only locally approved solution for anti-freeze, good engineering practices should be used to achieve the desired flow.

Calculate the approximate volume of water in the system by using the requirements detailed in table Water volume in Operating Data chapter. Add three gallons to this total to allow for the water contained in the hose kit and geothermal unit.

Table 2. Antifreeze requirements based on volume

Type of Antifreeze	Minimum Temperature for Freeze Protection				
	10°F	15°F	20°F	25°F	30°F
Methanol	25%	21%	16%	10%	3%
Propylene Glycol	—	—	—	—	6%

Cleaning and Flushing the Water Loop

All installations must be thoroughly flushed to remove air and dirt from the earth loop before running the system.

The loop must be flushed with a high volume of water at a minimum velocity of (2 feet per second) in both directions. Refer to the below table for flow rates required to flush earth loops.

Table 3. System flushing flow rates

Pipe	Gallons per 100 Ft.	Minimum Flush GPM
¾" PE	3.02	3.8
1" PE	4.73	6.0
1¼" PE	7.55	9.5
1½ PE	9.93	13.0
2" PE	15.36	21.0

Field Installed Power Wiring

⚠WARNING

Hazardous Voltage!

Failure to disconnect power before servicing could result in death or serious injury.
Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

⚠WARNING

Live Electrical Components!

Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.
When it is necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.

NOTICE

Use Copper Conductors Only!

Failure to use copper conductors could result in equipment damage as the equipment was not designed or qualified to accept other types of conductors.

Verify that the power supply available is compatible with the unit's nameplate. Use only copper conductors to connect the power supply to the unit.

Main Unit Power Wiring

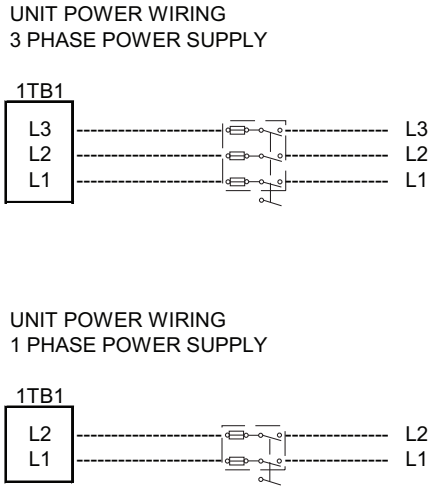
A field supplied disconnect switch must be installed at or near the unit in accordance with the National Electric Code (NEC latest edition).

Location of the applicable electric service entrance for HIGH (line voltage) may be found on the unit submittal at the front of this manual.

The high voltage connection is made at the 1TB1 terminal block. The terminal block is located inside the unit control box. Refer to the customer connection diagram that is shipped with the unit for specific termination points.

Provide proper grounding for the unit in accordance with the local and national codes.

Figure 7. Unit power wiring



Control Power Transformer

Transformers are equipped with internal circuit breakers. If a circuit breaker trips, turn OFF all power to the unit before attempting to reset it. The transformer is located in the control box.

Figure 8. Field connections - low voltage terminal board - EXW*060

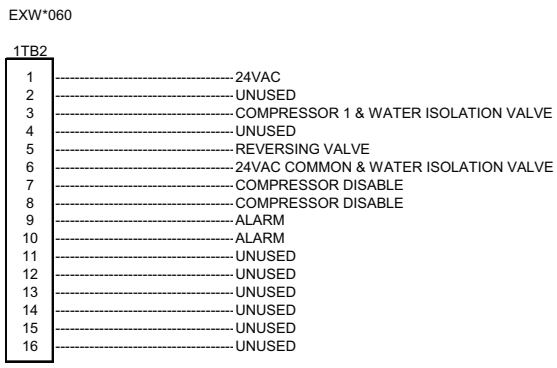
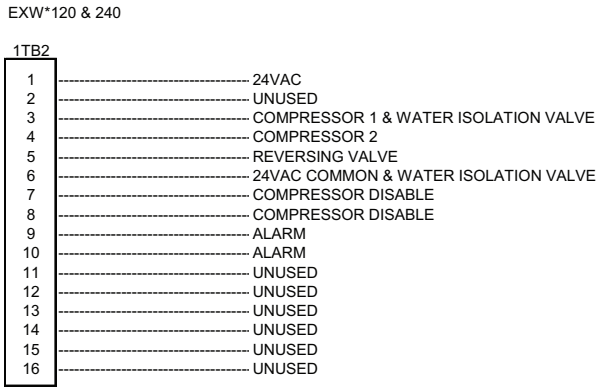


Figure 9. Field connections - low voltage terminal board - EXW*120 and EXW*240



Controls Using 24 Vac

Before installing any wire, refer to the electrical access locations on the unit dimensions on Dimensions and Clearances chapter.

- Ensure that the AC control wiring between the controls and the unit's termination point does not exceed three (3) ohms/conductor for the length of the run.

Note: *Resistance in excess of 3-ohms per conductor may cause component failure due to insufficient AC voltage supply.*

- Check all loads and conductors for grounds, shorts, and mis-wiring.
- Use copper conductors unless otherwise specified.
- Do not run the AC low voltage wiring in the same conduit with the high voltage power wiring.

Table 4. 24V AC conductors

Distance from unit to control	Recommended wire size
000-460 feet	18 gauge
461-732 feet	16 gauge
733-1000 feet	14 gauge

Table 5. Deluxe controller diagnostic LEDs

Color: Green	Color: Red		
LED1	**LED2**	**LED3**	**Controller Mode**
OFF	OFF	OFF	Control OFF
ON	OFF	OFF	Normal/Compressor OFF
ON	OFF	FLASH	Anti-short Cycle
ON	OFF	ON	Normal/Compressor ON
FLASH	ON	OFF	Brownout Condition
ON	FLASH	FLASH	Soft Lockout (low pressure)
ON	FLASH	FLASH	Soft Lockout (high pressure)
ON	ON	ON	Manual Lockout (low pressure)
ON	ON	FLASH	Manual Lockout (high pressure)
ON	FLASH	OFF	Manual Lockout (condensate overflow)
ON	ON	OFF	Compressor Disable

Electrical

Table 6. Electrical performance EXW* units

Model No.	VOLTS-AC/ HZ/PH	Minimum Utilization Voltage	Maximum Utilization Voltage	Total Unit FLA	Comp RLA (ea)	Comp LRA (ea)	No. of Compres.	Minimum Circuit Ampacity	Maximum Overcurrent Protective Device
EXW*060	208/60/1	197	229	26.3	26.3	134.0	1	32.88	50
	230/60/1	207	254	26.3	26.3	134.0	1	32.88	50
	208/60/3	187	229	15.6	15.6	110.0	1	19.50	35
	230/60/3	207	254	15.6	15.6	110.0	1	19.50	35
	460/60/3	414	506	7.8	7.8	52.0	1	9.75	15
	575/60/3	518	633	5.8	5.8	38.9	1	7.25	15
EXW*120	208/60/1	197	229	52.6	26.3	134.0	2	59.18	80
	230/60/1	207	254	52.6	26.3	134.0	2	59.18	80
	208/60/3	187	229	31.2	15.6	110.0	2	35.10	50
	230/60/3	207	254	31.2	15.6	110.0	2	35.10	50
	460/60/3	414	506	15.6	7.8	52.0	2	17.55	25
	575/60/3	518	633	11.6	5.8	38.9	2	13.05	15
EXW*240	208/60/3	187	229	60.2	30.1	225.0	2	67.70	90
	230/60/3	207	254	60.2	30.1	225.0	2	67.70	90
	460/60/3	414	506	33.4	16.7	114.0	2	37.60	50
	575/60/3	518	633	27.2	13.6	80.0	2	30.60	40

Pre-Start

Pre-Start-up Checklist

Before energizing the unit, the following system devices must be checked:

- Is the high voltage power supply correct and in accordance with the nameplate ratings?
- Is the field wiring and circuit protection the correct size?
- Is the low voltage control circuit wiring correct per the unit wiring diagram?
- Is the piping system clean/complete and correct? (A recommendation of all system flushing of debris from the water-to-refrigerant heat exchanger, along with air purging from the water-to-refrigerant heat exchanger be done in accordance with the Closed-Loop/Ground Source Heat Pump Systems Installation Guide).
- Is vibration isolation provided? (i.e. unit isolation pad, hose kits)
- Is unit serviceable? (Refer to clearance specifications on Dimensions and Clearances chapter).
- Are the low/high-side pressure temperature caps secure and in place?
- Are all the unit access panels secure and in place?
- Is the water flow established and circulating through all the units?
- Has all work been done in accordance with applicable local and national codes?
- Has heat transfer fluid been added in the proper mix to prevent freezing in closed system app.

Unit Start-up

Start-up with the system controls is included below:

1. Set the system control to the cooling mode of operation.
2. Turn on the circulation pumps. The compressor should NOT run.
3. Reduce the temperature control setting until the compressor, reversing valve and solenoid valve are energized. Verify system flow rate is the same as what was selected on the unit. Refer to Operating Data chapter for the water temperature change for the load and source side. Compressor amps should be within data plate ratings, and the suction line should be cool with no frost observed in the refrigerant circuit.
4. Check the cooling refrigerant pressures against values in Operating Data chapter.
5. Turn the system control switch to the OFF position. Unit should stop running and the reversing valve should de-energize.
6. Leave unit off for approximately FIVE minutes to allow for pressure equalization.
7. Set system control to the heating mode of operation.
8. Adjust the temperature setting upward until the unit is energized. Refer to Operating Pressures on Operating Data chapter. for the water temperature change for the load and source side. The compressor operation should be smooth with no frost observed in the refrigeration circuit.
9. Check the heating refrigerant pressures against values in Operating Data chapter.
10. Set the system control to maintain the desired space temperature.
11. Instruct the owner on system operation.

Operating Data

Table 7. Operating data for cooling EXW*060

	Source				Load				Compressor	
Unit Model	EWT °F	Flow GPM	WPD FT	Water Temp Rise °F	EWT °F	Flow GPM	WPD FT	Water Temp Drop °F	Suction Pressure PSIG	Discharge Pressure PSIG
EXW*060	50	10	4.7	12 - 16	60	10	5.7	11 - 14	84 - 97	179 - 228
		15	9.8	8 - 11		10	5.7	11 - 14	84 - 96	170 - 216
		10	4.7	13 - 17		15	11.6	8 - 10	91 - 105	182 - 231
		15	9.8	9 - 11		15	11.6	8 - 10	91 - 104	172 - 219
		10	4.7	14 - 18	70	10	5.5	13 - 16	100 - 115	184 - 234
		15	9.8	10 - 12		10	5.5	13 - 17	100 - 115	175 - 222
		10	4.7	15 - 19		15	11.3	9 - 12	108 - 125	187 - 238
		15	9.8	10 - 13		15	11.3	9 - 12	108 - 124	177 - 225
		10	4.7	16 - 21	80	10	5.4	15 - 19	119 - 137	189 - 241
		15	9.8	11 - 14		10	5.4	15 - 19	118 - 136	180 - 229
		10	4.7	17 - 22		15	11.0	11 - 13	128 - 148	192 - 245
		15	9.8	12 - 15		15	11.0	11 - 14	128 - 147	182 - 232
	70	10	4.1	12 - 16	60	10	5.7	10 - 13	89 - 102	236 - 300
		15	8.6	8 - 10		10	5.7	11 - 13	88 - 101	224 - 285
		10	4.1	13 - 16		15	11.6	7 - 9	96 - 110	239 - 304
		15	8.6	9 - 11		15	11.6	7 - 10	95 - 110	227 - 288
		10	4.1	14 - 18	70	10	5.5	12 - 15	105 - 121	242 - 309
		15	8.6	9 - 12		10	5.5	12 - 16	105 - 121	230 - 293
		10	4.1	15 - 19		15	11.3	9 - 11	114 - 131	246 - 313
		15	8.6	10 - 13		15	11.3	9 - 11	113 - 130	233 - 297
		10	4.1	16 - 20	80	10	5.4	14 - 18	125 - 144	249 - 317
		15	8.6	11 - 14		10	5.4	14 - 18	124 - 143	236 - 301
		10	4.1	17 - 21		15	11.0	10 - 13	135 - 155	253 - 322
		15	8.6	11 - 14		15	11.0	10 - 13	134 - 154	240 - 305
	90	10	3.9	12 - 15	60	10	5.7	9 - 12	93 - 107	309 - 394
		15	7.9	8 - 10		10	5.7	10 - 12	93 - 107	293 - 373
		10	3.9	13 - 16		15	11.6	7 - 9	101 - 116	313 - 399
		15	7.9	8 - 11		15	11.6	7 - 9	100 - 116	297 - 379
		10	3.9	14 - 17	70	10	5.5	11 - 14	111 - 128	318 - 405
		15	7.9	9 - 12		10	5.5	11 - 14	110 - 127	302 - 384
		10	3.9	14 - 18		15	11.3	8 - 10	120 - 138	322 - 410
		15	7.9	10 - 12		15	11.3	8 - 10	119 - 137	306 - 389
		10	3.9	15 - 19	80	10	5.4	13 - 16	131 - 151	327 - 416
		15	7.9	10 - 13		10	5.4	13 - 17	131 - 150	310 - 395
		10	3.9	16 - 21		15	11.0	9 - 12	142 - 163	331 - 422
		15	7.9	11 - 14		15	11.0	9 - 12	141 - 162	314 - 400
	110	10	3.6	11 - 15	60	10	5.7	8 - 11	98 - 113	405 - 515
		15	7.4	8 - 10		10	5.7	8 - 11	98 - 112	384 - 489
		10	3.6	12 - 15		15	11.6	6 - 8	106 - 122	410 - 522
		15	7.4	8 - 10		15	11.6	6 - 8	106 - 122	389 - 495
		10	3.6	13 - 16	70	10	5.5	10 - 12	117 - 134	416 - 529
		15	7.4	9 - 11		10	5.5	10 - 13	116 - 133	395 - 502
		10	3.6	14 - 17		15	11.3	7 - 9	126 - 145	421 - 536
		15	7.4	9 - 12		15	11.3	7 - 9	125 - 144	400 - 509
		10	3.6	15 - 19	80	10	5.4	11 - 14	138 - 159	427 - 544
		15	7.4	10 - 12		10	5.4	12 - 15	137 - 158	406 - 516
		10	3.6	15 - 20		15	11.0	8 - 10	149 - 171	433 - 551
		15	7.4	10 - 13		15	11.0	8 - 10	148 - 170	411 - 523

Table 8. Operating data for heating EWX*060

	Source				Load				Compressor	
Unit Model	EWT °F	Flow GPM	WPD FT	Water Temp Drop °F	EWT °F	Flow GPM	WPD FT	Water Temp Rise °F	Suction Pressure PSIG	Discharge Pressure PSIG
EXW*060	35	10	5.6	7 - 9	70	10	5.5	9 - 12	58 - 67	149 - 190
		15	11.3	5 - 7		15	11.3	6 - 8	62 - 71	143 - 183
		10	5.6	7 - 9		10	5.5	9 - 12	58 - 67	149 - 190
		15	11.3	5 - 7		15	11.3	6 - 8	62 - 71	143 - 183
		10	5.6	6 - 8	90	10	5.2	9 - 11	60 - 69	158 - 201
		15	11.3	5 - 6		15	10.7	6 - 8	64 - 74	152 - 193
		10	5.6	6 - 8		10	5.2	9 - 11	60 - 69	158 - 201
		15	11.3	5 - 6		15	10.7	6 - 8	64 - 74	152 - 193
		10	5.6	5 - 7	110	10	5.0	9 - 11	62 - 71	168 - 213
		15	11.3	4 - 5		15	10.2	6 - 8	66 - 76	161 - 205
		10	5.6	5 - 7		10	5.0	9 - 11	62 - 71	168 - 213
		15	11.3	4 - 5		15	10.2	6 - 8	66 - 76	161 - 205
	55	10	4.5	10 - 13	70	10	5.5	12 - 15	82 - 95	197 - 251
		15	9.4	7 - 9		15	11.3	8 - 11	88 - 101	190 - 241
		10	4.5	10 - 13		10	5.5	12 - 15	82 - 95	197 - 251
		15	9.4	7 - 9		15	11.3	8 - 11	88 - 101	190 - 241
		10	4.5	9 - 11	90	10	5.2	11 - 14	85 - 98	209 - 266
		15	9.4	6 - 8		15	10.7	8 - 10	90 - 104	201 - 255
		10	4.5	9 - 11		10	5.2	11 - 14	85 - 98	209 - 266
		15	9.4	6 - 8		15	10.7	8 - 10	90 - 104	201 - 255
		10	4.5	8 - 10	110	10	5.0	11 - 14	87 - 101	221 - 281
		15	9.4	5 - 7		15	10.2	8 - 10	93 - 107	212 - 270
		10	4.5	8 - 10		10	5.0	11 - 14	87 - 101	221 - 281
		15	9.4	5 - 7		15	10.2	8 - 10	93 - 107	212 - 270
	75	10	4.0	13 - 17	70	10	5.5	15 - 19	115 - 132	260 - 330
		15	8.4	9 - 12		15	11.3	11 - 13	122 - 141	250 - 318
		10	4.0	13 - 17		10	5.5	15 - 19	115 - 132	260 - 330
		15	8.4	9 - 12		15	11.3	11 - 13	122 - 141	250 - 318
		10	4.0	12 - 15	90	10	5.2	14 - 18	118 - 136	274 - 349
		15	8.4	8 - 11		15	10.7	10 - 13	126 - 145	264 - 336
		10	4.0	12 - 15		10	5.2	14 - 18	118 - 136	274 - 349
		15	8.4	8 - 11		15	10.7	10 - 13	126 - 145	264 - 336
		10	4.0	10 - 13	110	10	5.0	14 - 17	122 - 140	290 - 369
		15	8.4	7 - 9		15	10.2	10 - 12	129 - 149	279 - 355
		10	4.0	10 - 13		10	5.0	14 - 17	122 - 140	290 - 369
		15	8.4	7 - 9		15	10.2	10 - 12	129 - 149	279 - 355
	85	10	3.9	15 - 19	70	10	5.5	17 - 22	135 - 156	297 - 378
		15	8.1	11 - 13		15	11.3	12 - 15	144 - 165	286 - 364
		10	3.9	15 - 19		10	5.5	17 - 22	135 - 156	297 - 378
		15	8.1	11 - 13		15	11.3	12 - 15	144 - 165	286 - 364
		10	3.9	14 - 17	90	10	5.2	16 - 21	139 - 160	314 - 400
		15	8.1	10 - 12		15	10.7	11 - 14	148 - 170	302 - 384
		10	3.9	14 - 17		10	5.2	16 - 21	139 - 160	314 - 400
		15	8.1	10 - 12		15	10.7	11 - 14	148 - 170	302 - 384
		10	3.9	12 - 15	110	10	5.0	15 - 19	143 - 165	332 - 422
		15	8.1	9 - 11		15	10.2	11 - 14	152 - 175	319 - 406
		10	3.9	12 - 15		10	5.0	15 - 19	143 - 165	332 - 422
		15	8.1	9 - 11		15	10.2	11 - 14	152 - 175	319 - 406

Table 9. Operating data for cooling EWX*120

	Source				Load				Compressor	
Unit Model	EWT °F	Flow GPM	WPD FT	Water Temp Rise oF	EWT °F	Flow GPM	WPD FT	Water Temp Drop °F	Suction Pressure PSIG	Discharge Pressure PSIG
EXW*120	50	20	7.7	13 - 16	60	20	5.7	11 - 15	89 - 103	182 - 231
		30	15.3	9 - 11		20	5.7	12 - 15	89 - 102	171 - 217
		20	7.7	14 - 17		30	11.6	8 - 10	97 - 112	184 - 234
		30	15.3	9 - 12		30	11.6	8 - 11	97 - 111	173 - 220
		20	7.7	15 - 19	70	20	5.6	13 - 17	106 - 122	187 - 238
		30	15.3	10 - 13		20	5.6	14 - 17	106 - 122	176 - 223
		20	7.7	16 - 20		30	11.3	9 - 12	115 - 132	189 - 241
		30	15.3	11 - 13		30	11.3	10 - 12	115 - 132	178 - 226
		20	7.7	17 - 21	80	20	5.4	15 - 19	126 - 145	192 - 245
		30	15.3	11 - 14		20	5.4	16 - 20	125 - 144	181 - 230
		20	7.7	18 - 23		30	11.0	11 - 14	136 - 157	194 - 247
		30	15.3	12 - 15		30	11.0	11 - 14	135 - 156	183 - 232
	70	20	6.4	12 - 16	60	20	5.7	11 - 13	92 - 106	238 - 303
		30	12.9	8 - 11		20	5.7	11 - 14	92 - 106	224 - 285
		20	6.4	13 - 17		30	11.6	8 - 10	100 - 115	240 - 306
		30	12.9	9 - 11		30	11.6	8 - 10	100 - 115	226 - 288
		20	6.4	14 - 18	70	20	5.6	12 - 16	110 - 126	245 - 311
		30	12.9	10 - 12		20	5.6	13 - 16	109 - 126	230 - 293
		20	6.4	15 - 19		30	11.3	9 - 11	119 - 137	247 - 315
		30	12.9	10 - 13		30	11.3	9 - 11	118 - 136	232 - 296
		20	6.4	16 - 21	80	20	5.4	14 - 18	130 - 149	252 - 320
		30	12.9	11 - 14		20	5.4	15 - 18	129 - 149	237 - 301
		20	6.4	17 - 22		30	11.0	10 - 13	141 - 162	254 - 324
		30	12.9	12 - 15		30	11.0	10 - 13	140 - 161	239 - 304
	90	20	5.9	12 - 15	60	20	5.7	10 - 12	96 - 110	310 - 395
		30	12.0	8 - 10		20	5.7	10 - 12	95 - 110	292 - 372
		20	5.9	13 - 16		30	11.6	7 - 9	104 - 119	314 - 399
		30	12.0	9 - 11		30	11.6	7 - 9	103 - 119	295 - 376
		20	5.9	14 - 17	70	20	5.6	11 - 14	113 - 131	319 - 406
		30	12.0	9 - 12		20	5.6	11 - 14	113 - 130	300 - 382
		20	5.9	14 - 18		30	11.3	8 - 10	123 - 141	322 - 410
		30	12.0	10 - 12		30	11.3	8 - 10	122 - 141	303 - 386
		20	5.9	15 - 20	80	20	5.4	13 - 16	134 - 154	328 - 417
		30	12.0	10 - 13		20	5.4	13 - 17	134 - 154	309 - 393
		20	5.9	16 - 21		30	11.0	9 - 12	145 - 167	331 - 422
		30	12.0	11 - 14		30	11.0	9 - 12	145 - 166	312 - 397
	110	20	5.6	11 - 15	60	20	5.7	8 - 11	99 - 114	404 - 514
		30	11.6	8 - 10		20	5.7	8 - 11	98 - 113	380 - 484
		20	5.6	12 - 15		30	11.6	6 - 8	107 - 123	408 - 519
		30	11.6	8 - 10		30	11.6	6 - 8	107 - 123	384 - 489
		20	5.6	13 - 16	70	20	5.6	10 - 12	117 - 135	415 - 528
		30	11.6	9 - 11		20	5.6	10 - 13	117 - 134	390 - 497
		20	5.6	14 - 17		30	11.3	7 - 9	127 - 146	419 - 534
		30	11.6	9 - 12		30	11.3	7 - 9	126 - 146	395 - 502
		20	5.6	15 - 19	80	20	5.4	11 - 14	139 - 160	426 - 543
		30	11.6	10 - 12		20	5.4	12 - 15	138 - 159	401 - 511
		20	5.6	15 - 20		30	11.0	8 - 10	150 - 173	431 - 548
		30	11.6	10 - 13		30	11.0	8 - 10	149 - 172	406 - 516

Table 10. Operating data for heating EXW*120

Unit Model	Source				Load				Compressor	
	EWT °F	Flow GPM	WPD FT	Water Temp Drop °F	EWT °F	Flow GPM	WPD FT	Water Temp Rise °F	Suction Pressure PSIG	Discharge Pressure PSIG
EXW*120	35	20	10.3	7 - 9	70	20	5.6	9 - 12	57 - 65	256 - 326
		30	19.8	5 - 7		30	11.3	6 - 8	61 - 70	230 - 293
		20	10.3	7 - 9		20	5.6	9 - 12	57 - 65	243 - 309
		30	19.8	5 - 7		30	11.3	6 - 8	61 - 70	230 - 293
		20	10.3	6 - 8	90	20	5.2	9 - 11	59 - 67	328 - 417
		30	19.8	4 - 6		30	10.7	6 - 8	63 - 72	315 - 401
		20	10.3	6 - 8		20	5.2	9 - 11	59 - 67	328 - 417
		30	19.8	4 - 6		30	10.7	6 - 8	63 - 72	315 - 401
		20	10.3	5 - 7	110	20	5.0	8 - 11	60 - 69	412 - 525
		30	19.8	4 - 5		30	10.2	6 - 7	65 - 74	399 - 508
		20	10.3	5 - 7		20	5.0	8 - 11	60 - 69	412 - 525
		30	19.8	4 - 5		30	10.2	6 - 7	65 - 74	399 - 508
	55	20	7.2	9 - 12	70	20	5.6	11 - 15	81 - 93	252 - 320
		30	14.5	7 - 8		30	11.3	8 - 10	86 - 99	239 - 304
		20	7.2	9 - 12		20	5.6	11 - 15	81 - 93	252 - 320
		30	14.5	7 - 8		30	11.3	8 - 10	86 - 99	239 - 304
		20	7.2	8 - 11	90	20	5.2	11 - 14	83 - 96	336 - 428
		30	14.5	6 - 8		30	10.7	8 - 10	89 - 102	323 - 412
		20	7.2	8 - 11		20	5.2	11 - 14	83 - 96	336 - 428
		30	14.5	6 - 8		30	10.7	8 - 10	89 - 102	323 - 412
		20	7.2	7 - 9	110	20	5.0	10 - 13	86 - 98	421 - 536
		30	14.5	5 - 6		30	10.2	7 - 9	91 - 105	408 - 519
		20	7.2	7 - 9		20	5.0	10 - 13	86 - 98	421 - 536
		30	14.5	5 - 6		30	10.2	7 - 9	91 - 105	408 - 519
	75	20	6.2	12 - 16	70	20	5.6	14 - 18	113 - 130	260 - 331
		30	12.6	9 - 11		30	11.3	10 - 13	121 - 139	247 - 315
		20	6.2	12 - 16		20	5.6	14 - 18	113 - 130	260 - 331
		30	12.6	9 - 11		30	11.3	10 - 13	121 - 139	247 - 315
		20	6.2	11 - 14	90	20	5.2	13 - 17	116 - 134	345 - 439
		30	12.6	8 - 10		30	10.7	9 - 12	124 - 142	332 - 422
		20	6.2	11 - 14		20	5.2	13 - 17	116 - 134	345 - 439
		30	12.6	8 - 10		30	10.7	9 - 12	124 - 142	332 - 422
		20	6.2	9 - 12	110	20	5.0	13 - 16	119 - 137	430 - 547
		30	12.6	7 - 8		30	10.2	9 - 11	127 - 146	417 - 530
		20	6.2	9 - 12		20	5.0	13 - 16	119 - 137	430 - 547
		30	12.6	7 - 8		30	10.2	9 - 11	127 - 146	417 - 530
	85	20	6.0	14 - 18	70	20	5.6	16 - 20	133 - 153	265 - 337
		30	12.1	10 - 13		30	11.3	11 - 14	142 - 163	252 - 320
		20	6.0	14 - 18		20	5.6	16 - 20	133 - 153	265 - 337
		30	12.1	10 - 13		30	11.3	11 - 14	142 - 163	252 - 320
		20	6.0	13 - 16	90	20	5.2	15 - 19	137 - 157	349 - 445
		30	12.1	9 - 11		30	10.7	11 - 14	145 - 167	336 - 428
		20	6.0	13 - 16		20	5.2	15 - 19	137 - 157	349 - 445
		30	12.1	9 - 11		30	10.7	11 - 14	145 - 167	336 - 428
		20	6.0	11 - 14	110	20	5.0	14 - 18	140 - 161	434 - 552
		30	12.1	8 - 10		30	10.2	10 - 13	149 - 172	421 - 536
		20	6.0	11 - 14		20	5.0	14 - 18	140 - 161	434 - 552
		30	12.1	8 - 10		30	10.2	10 - 13	149 - 172	421 - 536

Table 11. Operating data for cooling EXW*240

Unit Model	Source				Load				Compressor	
	EWT °F	Flow GPM	WPD FT	Water Temp Rise °F	EWT °F	Flow GPM	WPD FT	Water Temp Drop°F	Suction Pressure PSIG	Discharge Pressure PSIG
EXW*240	50	40	5.6	12 - 15	60	40	5.7	11 - 13	87 - 100	180 - 229
		60	10.8	8 - 10		40	5.7	11 - 14	86 - 100	169 - 215
		40	5.6	13 - 16		60	11.6	7 - 10	93 - 107	181 - 231
		60	10.8	9 - 11		60	11.6	8 - 10	93 - 107	170 - 217
		40	5.6	14 - 17	70	40	5.5	12 - 16	103 - 119	185 - 235
		60	10.8	9 - 12		40	5.5	12 - 16	103 - 118	174 - 221
		40	5.6	15 - 18		60	11.3	9 - 11	111 - 127	186 - 237
		60	10.8	10 - 12		60	11.3	9 - 11	110 - 127	175 - 223
		40	5.6	16 - 20	80	40	5.4	14 - 18	123 - 141	190 - 242
		60	10.8	11 - 13		40	5.4	14 - 18	122 - 141	179 - 228
		40	5.6	17 - 21		60	11.0	10 - 13	131 - 151	192 - 244
		60	10.8	11 - 14		60	11.0	10 - 13	131 - 150	180 - 229
	70	40	4.8	12 - 15	60	40	5.7	10 - 12	90 - 103	237 - 301
		60	9.4	8 - 10		40	5.7	10 - 13	89 - 103	223 - 284
		40	4.8	12 - 16		60	11.6	7 - 9	96 - 111	239 - 304
		60	9.4	8 - 11		60	11.6	7 - 9	96 - 110	224 - 286
		40	4.8	13 - 17	70	40	5.5	11 - 14	107 - 123	243 - 310
		60	9.4	9 - 11		40	5.5	12 - 15	106 - 122	229 - 292
		40	4.8	14 - 18		60	11.3	8 - 10	114 - 131	245 - 312
		60	9.4	9 - 12		60	11.3	8 - 10	114 - 131	231 - 294
		40	4.8	15 - 19	80	40	5.4	13 - 17	126 - 145	250 - 318
		60	9.4	10 - 13		40	5.4	13 - 17	126 - 145	235 - 300
		40	4.8	16 - 20		60	11.0	9 - 12	135 - 156	252 - 321
		60	9.4	11 - 14		60	11.0	10 - 12	135 - 155	237 - 302
	90	40	4.4	11 - 14	60	40	5.7	9 - 11	93 - 106	310 - 395
		60	8.7	8 - 10		40	5.7	9 - 12	92 - 106	292 - 372
		40	4.4	12 - 15		60	11.6	6 - 8	99 - 114	313 - 398
		60	8.7	8 - 10		60	11.6	6 - 8	99 - 114	294 - 375
		40	4.4	13 - 16	70	40	5.5	10 - 13	110 - 127	319 - 406
		60	8.7	9 - 11		40	5.5	11 - 14	110 - 126	300 - 382
		40	4.4	13 - 17		60	11.3	7 - 9	118 - 136	321 - 409
		60	8.7	9 - 12		60	11.3	8 - 10	117 - 135	303 - 385
		40	4.4	14 - 18	80	40	5.4	12 - 15	130 - 150	328 - 417
		60	8.7	10 - 12		40	5.4	12 - 16	130 - 150	309 - 393
		40	4.4	15 - 19		60	11.0	9 - 11	139 - 160	330 - 420
		60	8.7	10 - 13		60	11.0	9 - 11	139 - 160	311 - 396
	110	40	4.2	11 - 14	60	40	5.7	8 - 10	96 - 110	406 - 517
		60	8.3	7 - 9		40	5.7	8 - 10	95 - 110	382 - 487
		40	4.2	11 - 14		60	11.6	6 - 7	102 - 118	409 - 520
		60	8.3	8 - 10		60	11.6	6 - 7	102 - 117	385 - 490
		40	4.2	12 - 15	70	40	5.5	9 - 12	114 - 131	417 - 531
		60	8.3	8 - 10		40	5.5	9 - 12	113 - 130	393 - 500
		40	4.2	13 - 16		60	11.3	7 - 8	122 - 140	420 - 534
		60	8.3	9 - 11		60	11.3	7 - 9	121 - 139	396 - 504
		40	4.2	14 - 17	80	40	5.4	11 - 14	134 - 155	428 - 545
		60	8.3	9 - 12		40	5.4	11 - 14	134 - 154	404 - 514
		40	4.2	14 - 18		60	11.0	8 - 10	144 - 165	431 - 549
		60	8.3	10 - 12		60	11.0	8 - 10	143 - 165	407 - 517

Table 12. Operating data for heating EWX*240

Unit Model	Source				Load				Compressor	
	EWT °F	Flow GPM	WPD FT	Water Temp Drop °F	EWT °F	Flow GPM	WPD FT	Water Temp Rise °F	Suction Pressure PSIG	Discharge Pressure PSIG
EXW*240	35	40	7.0	6 - 8	70	40	5.5	8 - 10	54 - 62	233 - 297
		60	13.1	5 - 6		60	11.3	6 - 7	57 - 66	226 - 288
		40	7.0	6 - 8		40	5.5	8 - 10	54 - 62	233 - 297
		60	13.1	5 - 6		60	11.3	6 - 7	57 - 66	226 - 288
		40	7.0	6 - 7	90	40	5.2	8 - 10	56 - 64	305 - 389
		60	13.1	4 - 5		60	10.7	6 - 7	59 - 68	296 - 377
		40	7.0	6 - 7		40	5.2	8 - 10	56 - 64	305 - 389
		60	13.1	4 - 5		60	10.7	6 - 7	59 - 68	296 - 377
		40	7.0	5 - 6	110	40	5.0	8 - 10	57 - 66	398 - 507
		60	13.1	3 - 4		60	10.2	5 - 7	61 - 70	387 - 492
		40	7.0	5 - 6		40	5.0	8 - 10	57 - 66	398 - 507
		60	13.1	3 - 4		60	10.2	5 - 7	61 - 70	387 - 492
	55	40	5.3	9 - 11	70	40	5.5	11 - 14	80 - 92	243 - 310
		60	10.3	6 - 8		60	11.3	7 - 9	84 - 97	236 - 300
		40	5.3	9 - 11		40	5.5	11 - 14	80 - 92	243 - 310
		60	10.3	6 - 8		60	11.3	7 - 9	84 - 97	236 - 300
		40	5.3	8 - 10	90	40	5.2	10 - 13	82 - 94	318 - 405
		60	10.3	6 - 7		60	10.7	7 - 9	87 - 100	309 - 393
		40	5.3	8 - 10		40	5.2	10 - 13	82 - 94	318 - 405
		60	10.3	6 - 7		60	10.7	7 - 9	87 - 100	309 - 393
		40	5.3	7 - 9	110	40	5.0	10 - 13	85 - 97	415 - 528
		60	10.3	5 - 6		60	10.2	7 - 9	90 - 103	403 - 513
		40	5.3	7 - 9		40	5.0	10 - 13	85 - 97	415 - 528
		60	10.3	5 - 6		60	10.2	7 - 9	90 - 103	403 - 513
	75	40	4.6	12 - 15	70	40	5.5	14 - 17	115 - 132	254 - 323
		60	9.1	8 - 11		60	11.3	10 - 12	122 - 140	246 - 313
		40	4.6	12 - 15		40	5.5	14 - 17	115 - 132	254 - 323
		60	9.1	8 - 11		60	11.3	10 - 12	122 - 140	246 - 313
		40	4.6	11 - 14	90	40	5.2	13 - 17	119 - 136	332 - 422
		60	9.1	7 - 10		60	10.7	9 - 12	125 - 144	322 - 410
		40	4.6	11 - 14		40	5.2	13 - 17	119 - 136	332 - 422
		60	9.1	7 - 10		60	10.7	9 - 12	125 - 144	322 - 410
		40	4.6	9 - 12	110	40	5.0	12 - 16	122 - 140	432 - 550
		60	9.1	7 - 8		60	10.2	9 - 11	129 - 148	420 - 534
		40	4.6	9 - 12		40	5.0	12 - 16	122 - 140	432 - 550
		60	9.1	7 - 8		60	10.2	9 - 11	129 - 148	420 - 534
	85	40	4.5	14 - 17	70	40	5.5	16 - 20	138 - 158	259 - 330
		60	8.8	10 - 12		60	11.3	11 - 14	145 - 167	251 - 320
		40	4.5	14 - 17		40	5.5	16 - 20	138 - 158	259 - 330
		60	8.8	10 - 12		60	11.3	11 - 14	145 - 167	251 - 320
		40	4.5	12 - 16	90	40	5.2	15 - 19	142 - 163	339 - 431
		60	8.8	9 - 11		60	10.7	10 - 13	150 - 172	329 - 418
		40	4.5	12 - 16		40	5.2	15 - 19	142 - 163	339 - 431
		60	8.8	9 - 11		60	10.7	10 - 13	150 - 172	329 - 418
		40	4.5	11 - 14	110	40	5.0	14 - 18	146 - 168	441 - 562
		60	8.8	8 - 10		60	10.2	10 - 12	154 - 177	429 - 545
		40	4.5	11 - 14		40	5.0	14 - 18	146 - 168	441 - 562
		60	8.8	8 - 10		60	10.2	10 - 12	154 - 177	429 - 545

Table 13. Water volume

Unit Size	Water Volume Cubic Inches	Water Volume Cubic Feet	Water Volume Gallons (U.S)
EXW*060	359.6	0.21	1.57
EXW*120	719.2	0.42	3.14
EXW*240	2079.0	1.20	8.98

Note: The above water volume is the total unit water volume (Source + Load), divide the above volume by 2 to obtain source or load side volumes individually.

Flow Checks

For the operating temperature drop (heating) and rise (cooling), refer to Table 7 through Table 12 for the proper water temperature change. Depending on the unit size entering water temperature and water flow rate, the cooling temperature rise is from 8°F-16°F. Based on the same criteria for heating, the temperature drop is from 2°F-13°F.

Pressure

Using the P/T ports and one 0-60 psi pressure gauge with the P/T port adapter, measure the pressure difference between the water-in and water-out connections. Compare the pressure differential to Table 7 through Table 12 to determine flow.

Start-up Checklist and Log

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

Job Name: _____

Model Number: _____

Date: _____

Serial Number: _____

Installing Contractor: Use this form to thoroughly check-out the system and units before and during start-up. (This form need not be returned to the factory unless requested during technical service support).

	Heat		Cool	
MODE	**Source**	**Load**	**Source**	**Load**
Entering fluid temperature	°F	°F	°F	°F
Leaving fluid temperature	°F	°F	°F	°F
Temperature differential	°F	°F	°F	°F
Water coil heat exchanger (Water Pressure IN)	°F	°F	°F	°F
Water coil heat exchanger (Water Pressure OUT)	°F	°F	°F	°F
Pressure Differential	°F	°F	°F	°F
COMPRESSOR				
Amps				
Volts				
Discharge line temperature *(after 10 minutes)*	°F	°F	°F	°F

Maintenance

Preventive Maintenance

Maintenance on the unit is simplified with the following preventive suggestions:

⚠WARNING

Hazardous Voltage!

Failure to disconnect power before servicing could result in death or serious injury.
Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

A strainer (60 mesh or greater) must be used on an open loop system to keep debris from entering the unit heat exchanger and to ensure a clean system.

For units on well water, it is important to check the cleanliness of the water-to-refrigerant heat exchanger. Should it become contaminated with dirt and scaling as a result of bad water, the heat exchanger will have to be back flushed and cleaned with a chemical that will remove the scale. This service should be performed by an experienced service person.

⚠WARNING

Hazardous Chemicals!

Failure to follow this safety precaution could result in death or serious injury. Coil cleaning agents can be either acidic or highly alkaline and can burn severely if contact with skin or eyes occurs.
Handle chemical carefully and avoid contact with skin. ALWAYS wear Personal Protective Equipment (PPE) including goggles or face shield, chemical resistant gloves, boots, apron or suit as required. For personal safety refer to the cleaning agent manufacturer's Materials Safety Data Sheet and follow all recommended safe handling practices.

It should be noted that the water quality should be checked periodically. Refer to the table below.

Table 14. Water quality table

Scaling	
Calcium and magnesium (total hardness)	Less than 350 ppm
Corrosion	
pH	7-9.5
Hydrogen Sulfide	Less than 1 ppm
Sulfates	Less than 25 ppm
Chlorides	Less than 125 ppm
Carbon Dioxide	Less than 75 ppm
Total dissolved solids (TDS)	Less than 1000 ppm
Biological Growth	
Iron Bacteria	Low
Erosion	
Suspended Solids	Low

Troubleshooting

⚠WARNING

Hazardous Service Procedures!

Failure to follow all precautions in this manual and on the tags, stickers, and labels could result in death or serious injury.
Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the following instructions: Unless specified otherwise, disconnect all electrical power including remote disconnect and discharge all energy storing devices such as capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized.When necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been trained in handling live electrical components perform these tasks.

Preliminary Trouble Inspection

If operational difficulties are encountered, be sure to perform the preliminary checks before referring to the troubleshooting chart below.

- Verify that the unit is receiving electric supply power.
- Ensure that the fuses in the fused disconnect (field installed) are intact.

After completing the preliminary checks, inspect the unit for other obvious problems such as leaking connection, broken or disconnected wires, etc. If everything appears to be in order, but the unit still fails to operate properly, refer to the troubleshooting chart below.

General Operation

The standard model is designed for indoor installation. When the unit is installed in an unconditioned space, the unit may not start in cool weather (approximately 45°F). It may then be necessary to start the unit in the cooling mode for three to five minutes. The unit may then be shut-off (there will be a two minute time-out of the unit), and restarted in the heating mode. The freeze protection thermostat should also be checked as it may be adversely affected by ambient temperature.

Like any other type of mechanical equipment, the unit performs best when it is well maintained.

Table 15. Troubleshooting checklist

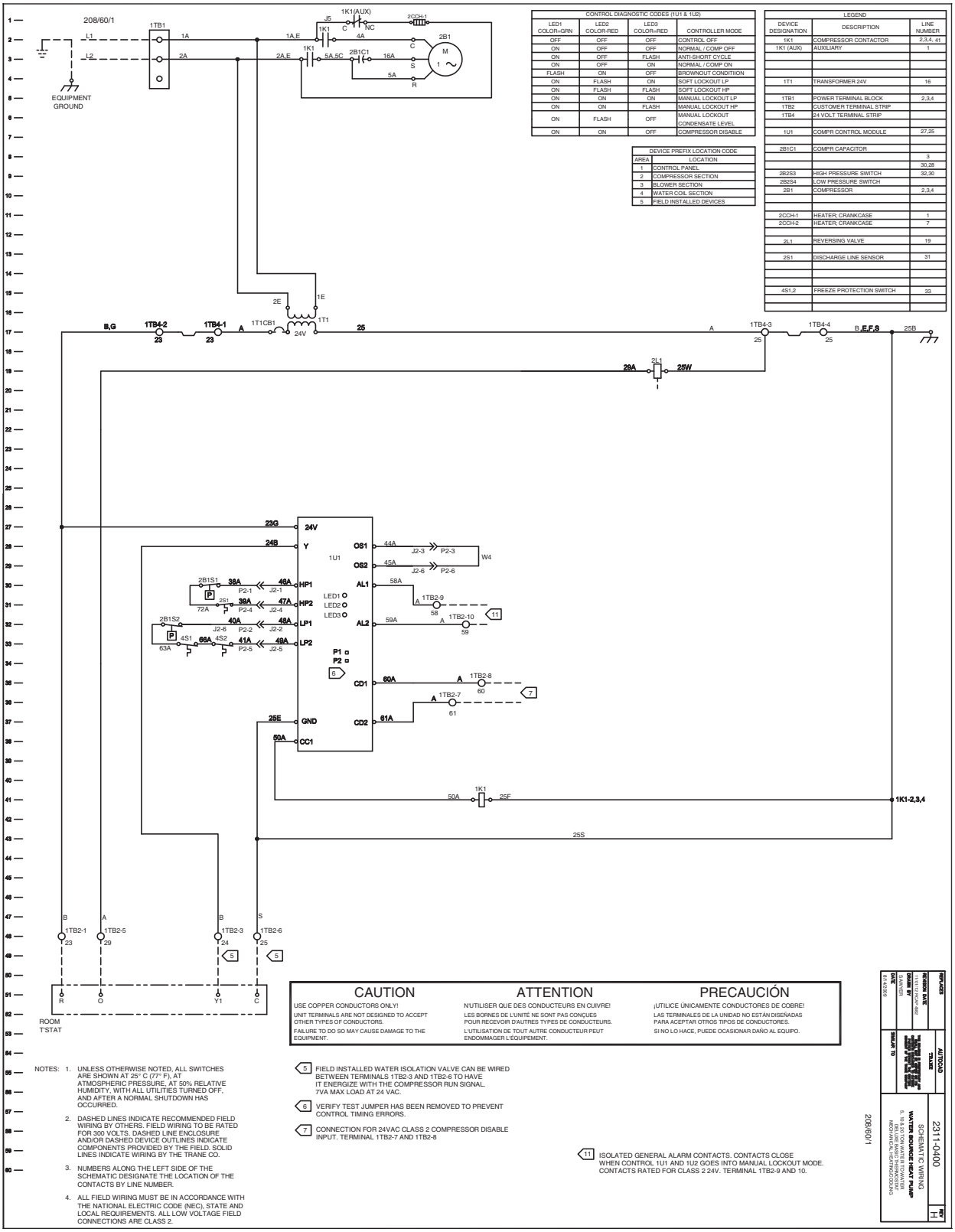
Problem	Heating	Cooling	Cause	Correction
No response to any thermostat setting	X	X	Main power off	Check fuses
	X	X	Defective control transformer	Replace
	X	X	Broken or loose connection	Repair
	X	X	Defective thermostat	Replace
	X	X	Transformer	Reset Transformer
Unit short cycles	X	X	Thermostat or sensor improperly located	Relocate
Insufficient capacity	X	X	Low on refrigerant charge	Locate leak, repair and recharge by weight (not by superheat)
	X	X	Restricted thermal expansion valve	Replace
	X	X	Defective reversing valve	See WSHP-SVXXX-EN for touch test chart
	X	X	Thermostat improperly located	Relocate
	X	X	Unit undersized	Recalculate heat gains/losses
	X	X	Inadequate water flow	Increase GPM
	X	X	Scaling in heat exchanger	Clean or replace
		X	Water too hot	Decrease temperature
	X		Water too cold	Increase temperature
High pressure switch open		X	Inadequate GPM	Increase water flow to unit
		X	Water too hot	Decrease temperature
	X	X	Overcharged with refrigerant	Decrease charge
	X	X	Defective pressure switch	Check or replace
High head pressure		X	Trash in heat exchanger	Backflush
		X	Low water flow	Increase GPM
	X	X	Overcharge of refrigerant	Decrease charge
	X	X	Non-condensable in system	Evacuate and recharge by weight
	X	X	Water too hot	Decrease temperature

Table 15. Troubleshooting checklist (continued)

Problem	Heating	Cooling	Cause	Correction
Low suction pressure	X	X	Undercharged	Locate leak, repair and recharge
	X	X	Restricted thermal expansion valve	Repair / replace
	X		Inadequate GPM	Increase GPM
Low Pressure switch open	X		Inadequate GPM	Increase GPM
	X		Water too cold	Increase temperature
	X	X	Undercharged with refrigerant	Increase charge
	X	X	Defective pressure switch	Replace
	X	X	Heat transfer fluid too cold	Raise water temperature
Freezestat open	X		Inadequate GPM	Increase GPM
	X		Water too cold	Increase GPM
	X	X	Defective freezestat	Replace freezestat
	X		Heat transfer fluid too cold	Replace freezestat

Wiring

Figure 10. Deluxe 24V - single circuit - single phase



CONTROL DIAGNOSTIC CODES (1U1 & 1U2)			
LED1 COLOR=GRN	LED2 COLOR=RED	LED3 COLOR=RED	CONTROLLER MODE
OFF	OFF	OFF	CONTROL OFF
ON	OFF	OFF	NORMAL / COMP OFF
ON	OFF	FLASH	ANTI-SHORT CYCLE
ON	OFF	ON	NORMAL / COMP ON
FLASH	ON	OFF	BROWNOUT CONDITIION
ON	FLASH	ON	SOFT LOCKOUT LP
ON	FLASH	FLASH	SOFT LOCKOUT HP
ON	ON	ON	MANUAL LOCKOUT LP
ON	ON	FLASH	MANUAL LOCKOUT HP
ON	FLASH	OFF	MANUAL LOCKOUT CONDENSATE LEVEL
ON	ON	OFF	COMPRESSOR DISABLE

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	CONTROL PANEL
2	COMPRESSOR SECTION
3	BLOWER SECTION
4	WATER COIL SECTION
5	FIELD INSTALLED DEVICES

LEGEND		
DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
1K1	COMPRESSOR CONTACTOR	2,3,4, 41
1K1 (AUX)	AUXILIARY	1
1T1	TRANSFORMER 24V	16
1TB1	POWER TERMINAL BLOCK	2,3,4
1TB2	CUSTOMER TERMINAL STRIP	
1TB4	24 VOLT TERMINAL STRIP	
1U1	COMPR CONTROL MODULE	27,25
2B1C1	COMPR CAPACITOR	
		3
		30,28
2B2S3	HIGH PRESSURE SWITCH	32,30
2B2S4	LOW PRESSURE SWITCH	
2B1	COMPRESSOR	2,3,4
2CCH-1	HEATER; CRANKCASE	1
2CCH-2	HEATER; CRANKCASE	7
2L1	REVERSING VALVE	19
2S1	DISCHARGE LINE SENSOR	31
4S1,2	FREEZE PROTECTION SWITCH	33

CAUTION	ATTENTION	PRECAUCIÓN
USE COPPER CONDUCTORS ONLY! UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS. FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.	N'UTILISER QUE DES CONDUCTEURS EN CUIVRE! LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS. L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.	¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE! LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES. SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.

NOTES:
1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25° C (77° F), AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED OFF, AND AFTER A NORMAL SHUTDOWN HAS OCCURRED.
2. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. FIELD WIRING TO BE RATED FOR 300 VOLTS. DASHED LINE ENCLOSURE AND/OR DASHED DEVICE OUTLINES INDICATE COMPONENTS PROVIDED BY THE FIELD. SOLID LINES INDICATE WIRING BY THE TRANE CO.
3. NUMBERS ALONG THE LEFT SIDE OF THE SCHEMATIC DESIGNATE THE LOCATION OF THE CONTACTS BY LINE NUMBER.
4. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC), STATE AND LOCAL REQUIREMENTS. ALL LOW VOLTAGE FIELD CONNECTIONS ARE CLASS 2.

5 FIELD INSTALLED WATER ISOLATION VALVE CAN BE WIRED BETWEEN TERMINALS 1TB2-3 AND 1TB2-6 TO HAVE IT ENERGIZE WITH THE COMPRESSOR RUN SIGNAL. 7VA MAX LOAD AT 24 VAC.

6 VERIFY TEST JUMPER HAS BEEN REMOVED TO PREVENT CONTROL TIMING ERRORS.

7 CONNECTION FOR 24VAC CLASS 2 COMPRESSOR DISABLE INPUT. TERMINAL 1TB2-7 AND 1TB2-8

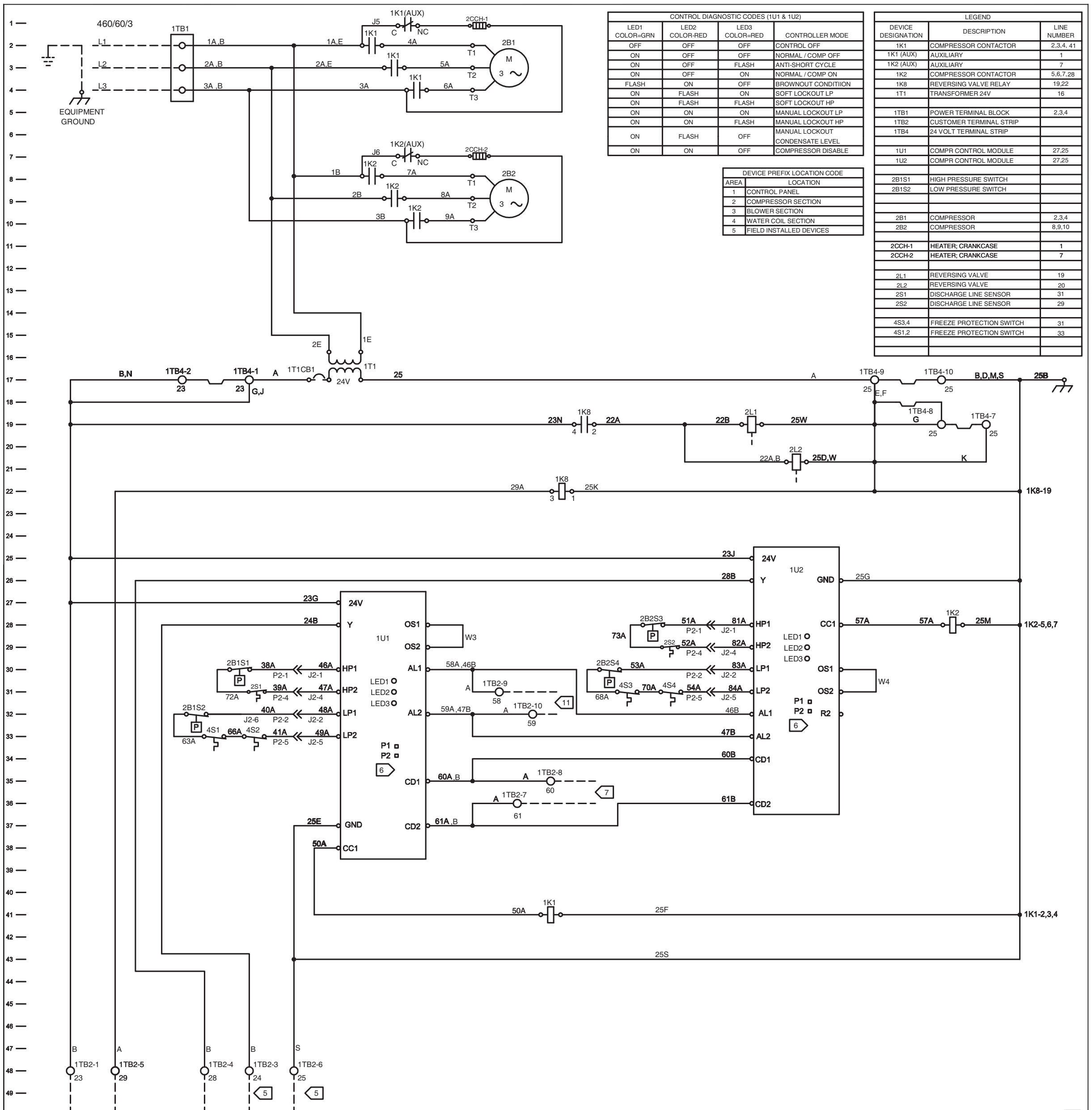
11 ISOLATED GENERAL ALARM CONTACTS. CONTACTS CLOSE WHEN CONTROL 1U1 AND 1U2 GOES INTO MANUAL LOCKOUT MODE. CONTACTS RATED FOR CLASS 2 24V. TERMINAL 1TB2-9 AND 10.

208/60/1

REPLACES
REVISED DATE
DRAWN BY S.WYCHER
DATE 9/14/2009
SIMILAR TO
AUTOCAD
TRANE

SCHEMATIC WIRING
2311-0400
WATER SOURCE HEAT PUMP
5, 10 & 15 TON WATER TO WATER
GEOTHERMAL HEAT PUMP
MECHANICAL HEATING/COOLING
REV H

Figure 11. Deluxe 24V - dual circuit - three phase



CONTROL DIAGNOSTIC CODES (1U1 & 1U2)			
LED1 COLOR=GRN	LED2 COLOR-RED	LED3 COLOR=RED	CONTROLLER MODE
OFF	OFF	OFF	CONTROL OFF
ON	OFF	OFF	NORMAL / COMP OFF
ON	OFF	FLASH	ANTI-SHORT CYCLE
ON	OFF	ON	NORMAL / COMP ON
FLASH	ON	OFF	BROWNOUT CONDITIION
ON	FLASH	ON	SOFT LOCKOUT LP
ON	FLASH	FLASH	SOFT LOCKOUT HP
ON	ON	ON	MANUAL LOCKOUT LP
ON	ON	FLASH	MANUAL LOCKOUT HP
ON	FLASH	OFF	MANUAL LOCKOUT CONDENSATE LEVEL
ON	ON	OFF	COMPRESSOR DISABLE

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	CONTROL PANEL
2	COMPRESSOR SECTION
3	BLOWER SECTION
4	WATER COIL SECTION
5	FIELD INSTALLED DEVICES

LEGEND		
DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
1K1	COMPRESSOR CONTACTOR	2,3,4, 41
1K1 (AUX)	AUXILIARY	1
1K2 (AUX)	AUXILIARY	7
1K2	COMPRESSOR CONTACTOR	5,6,7,28
1K8	REVERSING VALVE RELAY	19,22
1T1	TRANSFORMER 24V	16
1TB1	POWER TERMINAL BLOCK	2,3,4
1TB2	CUSTOMER TERMINAL STRIP	
1TB4	24 VOLT TERMINAL STRIP	
1U1	COMPR CONTROL MODULE	27,25
1U2	COMPR CONTROL MODULE	27,25
2B1S1	HIGH PRESSURE SWITCH	
2B1S2	LOW PRESSURE SWITCH	
2B1	COMPRESSOR	2,3,4
2B2	COMPRESSOR	8,9,10
2CCH-1	HEATER; CRANKCASE	1
2CCH-2	HEATER; CRANKCASE	7
2L1	REVERSING VALVE	19
2L2	REVERSING VALVE	20
2S1	DISCHARGE LINE SENSOR	31
2S2	DISCHARGE LINE SENSOR	29
4S3,4	FREEZE PROTECTION SWITCH	31
4S1,2	FREEZE PROTECTION SWITCH	33

CAUTION

USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

ATTENTION

N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!

LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.

L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.

PRECAUCIÓN

¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!

LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.

SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.

NOTES:

1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25° C (77° F), AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED OFF, AND AFTER A NORMAL SHUTDOWN HAS OCCURRED.
2. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. FIELD WIRING TO BE RATED FOR 300 VOLTS. DASHED LINE ENCLOSURE AND/OR DASHED DEVICE OUTLINES INDICATE COMPONENTS PROVIDED BY THE FIELD. SOLID LINES INDICATE WIRING BY THE TRANE CO.
3. NUMBERS ALONG THE LEFT SIDE OF THE SCHEMATIC DESIGNATE THE LOCATION OF THE CONTACTS BY LINE NUMBER.
4. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC), STATE AND LOCAL REQUIREMENTS. ALL LOW VOLTAGE FIELD CONNECTIONS ARE CLASS 2.

5 FIELD INSTALLED WATER ISOLATION VALVE CAN BE WIRED BETWEEN TERMINALS 1TB2-3 AND 1TB2-6 TO HAVE IT ENERGIZE WITH THE COMPRESSOR RUN SIGNAL. 7VA MAX LOAD AT 24 VAC.

6 VERIFY TEST JUMPER HAS BEEN REMOVED TO PREVENT CONTROL TIMING ERRORS.

7 CONNECTION FOR 24VAC CLASS 2 COMPRESSOR DISABLE INPUT. TERMINAL 1TB2-7 AND 1TB2-8

11 ISOLATED GENERAL ALARM CONTACTS. CONTACTS CLOSE WHEN CONTROL 1U1 AND 1U2 GOES INTO MANUAL LOCKOUT MODE. CONTACTS RATED FOR CLASS 2 24V. TERMINAL 1TB2-9 AND 10.

Warranty

Standard Warranty

The standard water-source heat pump warranty is Trane's parts-only warranty, running 12-months from startup, not to exceed 18-months from shipment. There is a standard 5-year compressor warranty.

Extended Warranty

The optional extended warranty is a second through fifth year warranty. The time starts at the end of standard 1-year coverage through the fifth year.

These extended warranties apply only to new equipment installed in domestic Trane sales territories and must be ordered prior to start-up.

Trane - by Trane Technologies (NYSE: TT), a global climate innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or tranetechnologies.com.

WSHP-SVX02F-EN 12 Jun 2023
Supersedes WSHP-SVX02E-EN (Jun 2022)