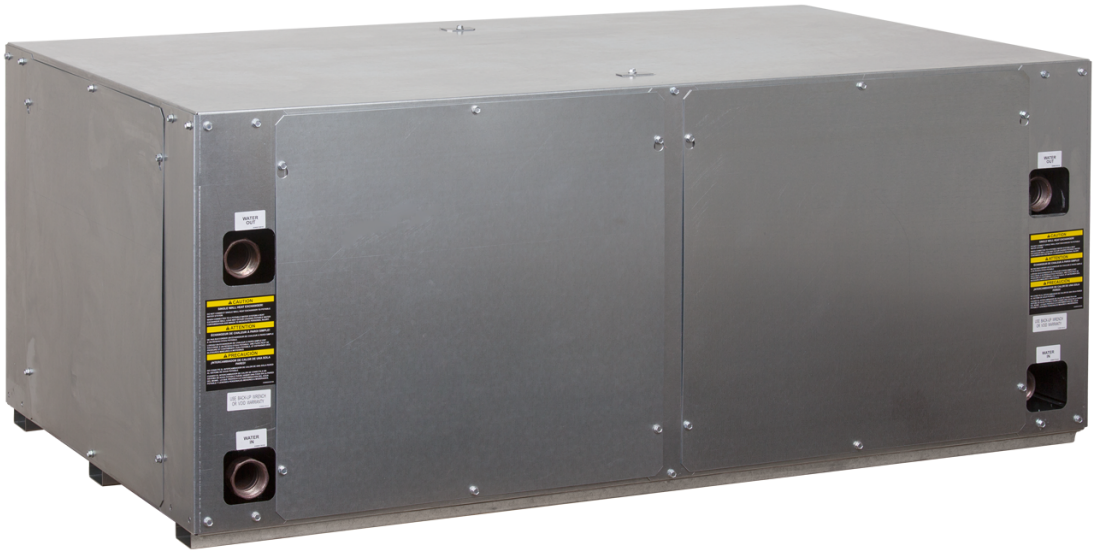
Installation, Operation, and Maintenance

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.

January 2026

WSHP-SVX023C-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 Labelling 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.**

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⚠ 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

R-454B Flammable A2L Refrigerant!

Failure to use proper equipment or components as described below could result in equipment failure, and possibly fire, which could result in death, serious injury, or equipment damage.

The equipment described in this manual uses R-454B refrigerant which is flammable (A2L). Use ONLY R-454B rated service equipment and components. For specific handling concerns with R-454B, contact your local representative.

⚠ WARNING

Cancer and Reproductive Harm!

This product can expose you to chemicals including lead and bisphenol A (BPA), which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

⚠ WARNING

Electrical Shock Hazard!

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

Properly connect the system's oversized protective earthing (grounding) terminal(s).

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Trademarks

All trademarks referenced in this document are the trademarks of their respective owners.

Product Safety Information

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. Children should be supervised to ensure that they do not play with the appliance.

Maximum altitude of use 3000 meters.

This appliance incorporates an earth connection for functional purposes only.

Revision History

- Updated operating data values.
- Update jobsite storage information.

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General Information

⚠ WARNING

Fiberglass Wool!

Exposure 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.

NOTICE

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

⚠ WARNING

Risk of Fire — Flammable Refrigerant!

Failure to follow instructions below could result in death or serious injury, and equipment damage.

The equipment shall be stored in a room without continuously operating ignition sources.

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* 20-ton 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.

Operating Limits

Table 1. Operating limits

Operating Limits	Cooling	Heating
Air limits		
Min. ambient air DB	45°F (7°C)	
Max. ambient air DB	130°F (54°C)	
Load side water limits		
Min. entering water temperature	50°F (10°C)	60°F (16°C)
Max. entering water temperature	85°F (30°C)	120°F (49°C)*
Max. water pressure	400 PSIG (2758 kPa)	
Water flow range	1.5 to 3.5 GPM/ton*	
Source side water limits		
Min. entering water temperature	50°F (10°C)	25°F (-4°C)
Max. entering water temperature	120°F (49°C)	85°F (30°C)
Max. water pressure	400 PSIG (2758 kPa)	
Water flow range	1.5 to 3.5 GPM/ton*	

Note: **Value may vary. See performance tables for more details.*

Model Number Description

Digit 1, 2, 3 — Unit Configuration

EXW = Water to Water Heat Pump

Digit 4 — Development Sequence

K = R-454B

Digit 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 2. Unit weights

Size	Approximate Shipping Weight with pallet (lb)	Approximate Weight without pallet (lb)
EXW*060	325	295
EXW*120	651	611
EXW*240	1179	1113

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

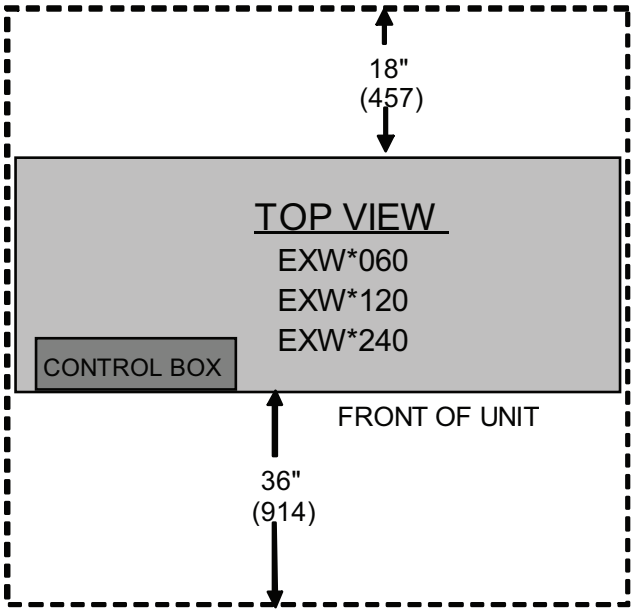
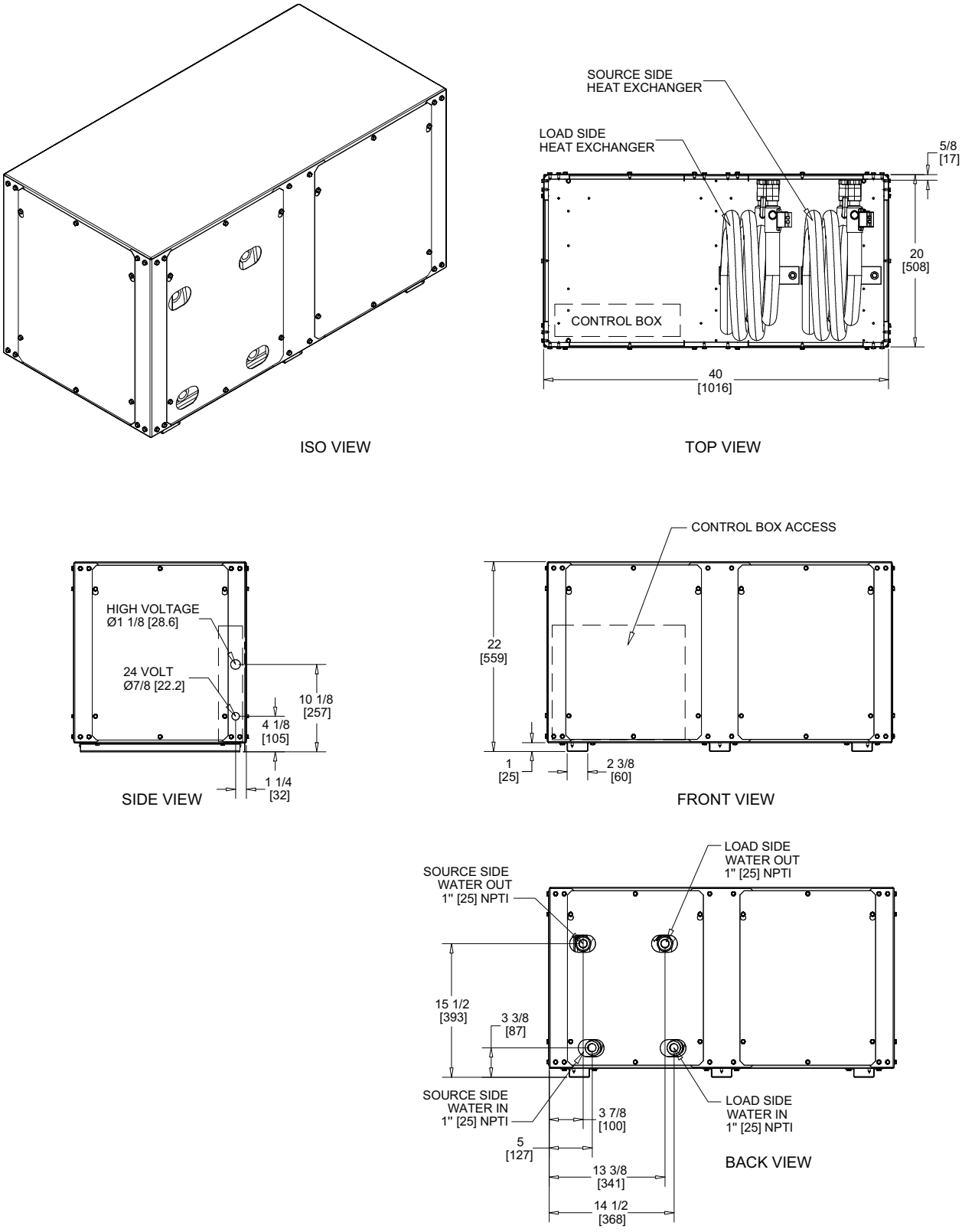


Figure 2. EXW*060



Dimensions and Clearances

Figure 3. EXW*120

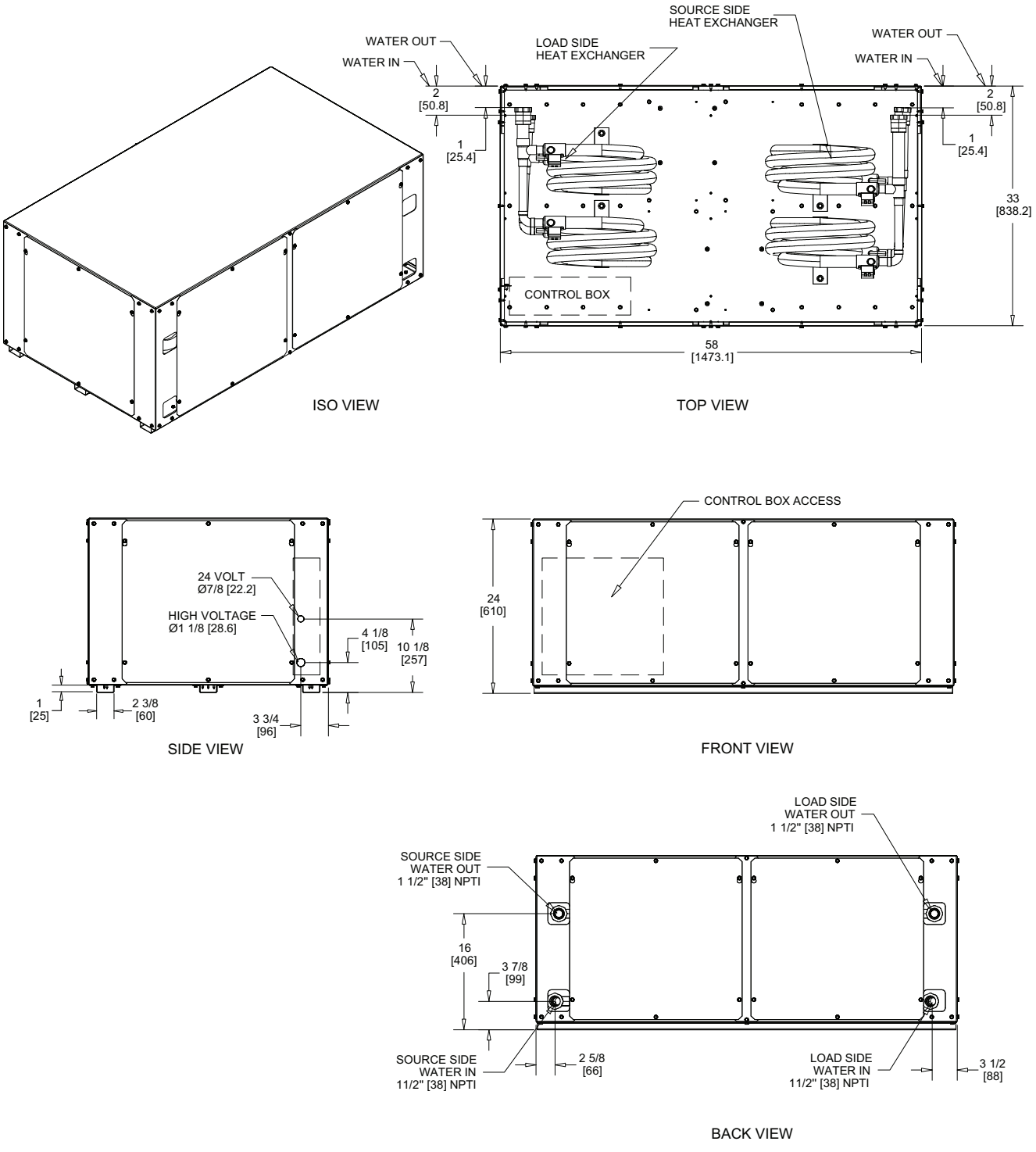
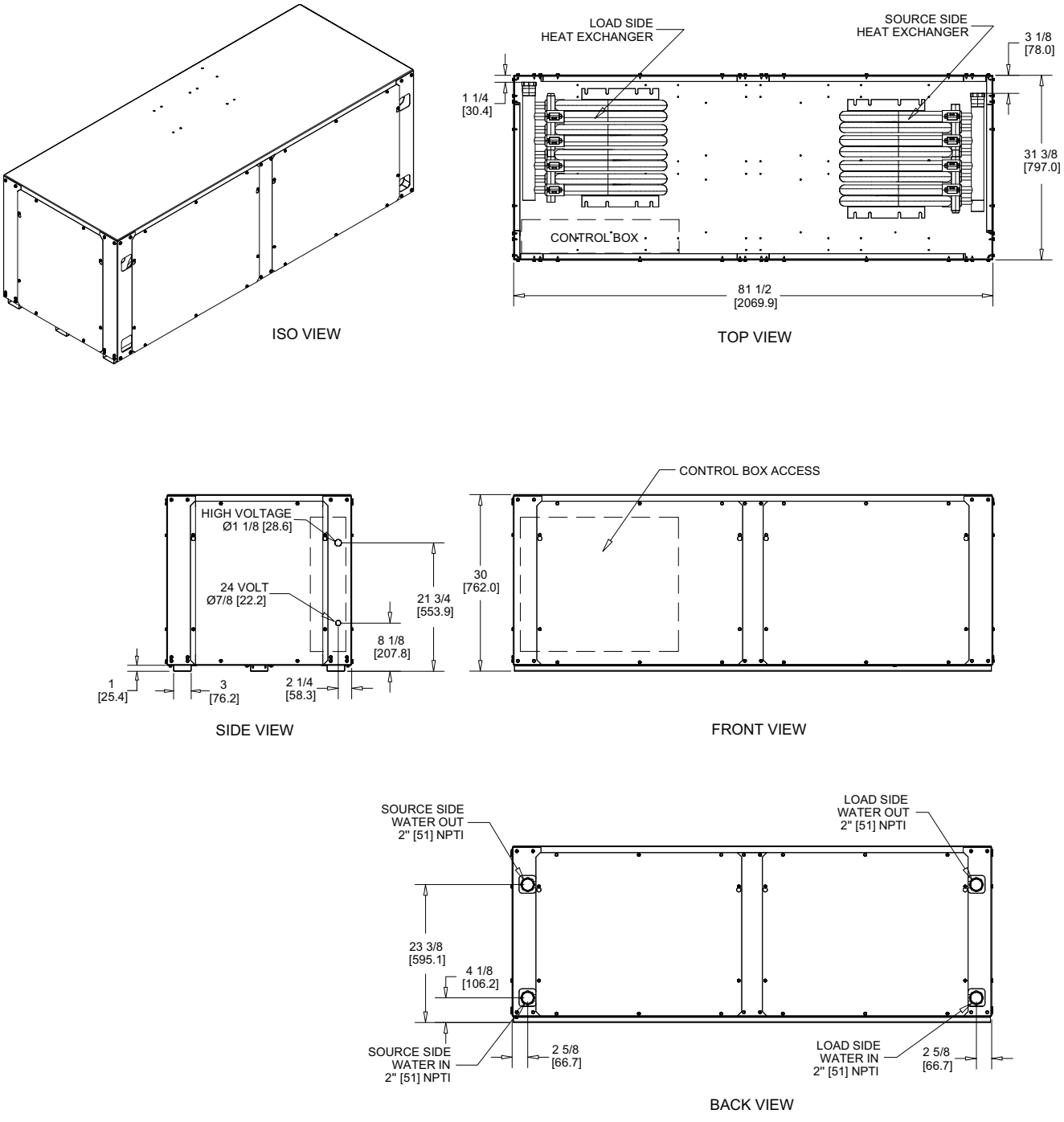


Figure 4. EXW*240



A2L Information and Installation Requirements

A2L Work Procedures

⚠ WARNING

Risk of Fire — Flammable Refrigerant!

Failure to follow instructions below could result in death or serious injury, and equipment damage.

- **To be repaired only by trained service personnel.**
- **Do not puncture refrigerant tubing.**
- **Dispose of properly in accordance with federal or local regulations.**
- **The equipment shall be stored in a room without continuously operating ignition sources.**

⚠ WARNING

Refrigerant under High Pressure!

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.

⚠ 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.

The units described in this manual use R-454B refrigerant. Use ONLY R-454B rated service equipment or components with these units. For specific handling concerns with R-454B, contact your local Trane representative.

Installation, repair, removal, or disposal should be performed by trained service personnel.

At all times, Trane's maintenance and service guidelines shall be followed. If in doubt, contact Trane technical support for assistance.

Servicing

Prior to initiating work on equipment, check the area with an appropriate refrigerant detector. Ensure the service personnel are properly trained regarding work in 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. Be aware that the refrigerant does not contain an odor.

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available on hand. A dry powder or CO_2 fire extinguisher should be located adjacent to the charging area.

At all times, Trane's maintenance and service guidelines shall be followed. If in doubt, contact Trane technical support for assistance.

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

Ignition Source Mitigation

Do not use any sources of ignition when working on the refrigeration system.

Keep all ignition sources, including cigarette smoking, away from the site of installation, repair, removal or disposal, during which refrigerant can potentially be released to the surrounding space.

Survey the area around the equipment before initiating work to ensure no flammable hazards or ignition risks are present.

"No Smoking" signs shall be displayed.

Do not use devices that can be a source of ignition to accelerate defrosting of components. Use only defrost and cleaning procedures recommended by Trane. Do not pierce or burn.

Ventilation

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. If present, check that the ventilation system, including outlets, are operating adequately and are not obstructed.

Refrigerating Equipment

Refrigerant piping or components should not be installed in locations where substances which may corrode them are present.

Check that equipment hazard markings are visible and legible. Replace them if they are not.

For equipment using secondary fluids, like water or glycol, check that refrigerant is not present in the secondary fluid loop before conducting any hot work.

Electrical Devices

Do not apply power to the circuit if a fault exists which compromises safety. 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:

- Cabling is not subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. Account for the effects of aging or continual vibration from sources such as compressors or fans.
- Capacitors are discharged. This shall be done in a safe manner to avoid possibility of sparking.
- No live electrical components and wiring are exposed while charging, recovering, or purging the system.
- Verify continuity of earth bonding.
- Replace electrical components with Trane replacement parts, or those meeting the same ratings and qualified for flame arrest protection, UL LZGH2 category.

Leak Detection

Never use an open flame to detect leaks. A halide torch should not be used. Use only approved leak detection methods per this instruction manual.

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.) Verify the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL 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 pipe-work.

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 is found which requires brazing, all refrigerant shall be recovered from the system, or isolated (by means of shut-off valves) in a part of the system remote from the leak.

Refrigerant Removal and Evacuation

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 (special cylinders for the recovery of refrigerant, for example). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

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:

1. Safely remove refrigerant following local and national regulations.
2. Evacuate.
3. Purge the circuit with inert gas.
4. Evacuate (optional for A2L).
5. Continuously flush or purge with inert gas when using flame to open circuit.
6. Open the circuit.

Prior to refrigerant removal, open all appropriate valves, including solenoid and electronic expansion valves (EXVs). Use control settings, where available. When not available, manually open all electronically controlled valves using acceptable service procedures.

The recovery equipment shall be in good working order with instructions available. Equipment shall be suitable for the recovery of the flammable refrigerant. For specific handling concerns, contact the manufacturer. Ensure all hose connections are checked for tightness to avoid refrigerant leaks.

In addition, a set of calibrated weighing scales shall be available and in good working order.

The refrigerant shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. Do not mix refrigerants in recovery unit and especially not in cylinders.

Refrigerant recovery unit should be purged with an inert gas after each use or before using with a different refrigerant Class – for example, A2L to A1.

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.

The system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

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.

Refrigerant Charging

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

- Ensure that contamination of different refrigerants does not occur when using charging equipment.
- Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.

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

Prior to refrigerant charging, open all appropriate valves, including solenoid and electronic expansion valves (EXVs). Use control settings, where available. When not available, manually open all electronically controlled valves using acceptable service procedures.

Verify the equipment refrigerant charge is in accordance with the room area limitation as described in Minimum Room Area Limits section.

Decommissioning

Before carrying out the decommissioning procedure, it is essential that the trained service personnel is completely familiar with the equipment and all its details. 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:
    a. Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
    b. All personal protective equipment is available and being used correctly.
    c. The recovery process is supervised at all times by a competent person.
    d. 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, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
11. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.
12. When equipment has been decommissioned, attach a signed and dated label stating it has been decommissioned and emptied of refrigerant.
13. Ensure that there are labels on the equipment stating it contains flammable refrigerant.

A2L Application Considerations

This product is listed to UL standard 60335-2-40, Household and Similar Electrical Appliances – Safety – Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers, which defines safe design and use strategies for equipment using A2L refrigerants. This standard limits the refrigerant concentration in a space in the event of a refrigerant leak. To meet the requirements, the UL standard defines minimum room area, refrigerant charge limit, minimum circulation airflow and/or ventilation airflow requirements, and limits the use of ignition sources in spaces. The standard may require a unit refrigerant leak detection system.

For equipment with R-454B and charge amounts less than or equal to 3.91 lbs per circuit, this UL standard does not prescribe a room area limit and does not require a refrigerant leak detection system or any circulation airflow or ventilation airflow mitigation strategies.

Depending on the application, a specific requirement of ANSI/ASHRAE Standard 15, Safety Standard for Refrigeration Systems, could be more stringent than UL 60335-2-40 requirements. See *Refrigeration Systems and Machinery Rooms Application Considerations for Compliance with ASHRAE® Standard 15-2022 Application Engineering Manual* (APP-APM001*-EN) for more information.

Ignition Sources in Unit

This unit does not contain any ignition sources. All potential ignition sources, (including factory or field installed accessory electric heaters, gas heaters, relays, and contactors) were evaluated during product UL listing.

Minimum Room Area Limits (Refrigerant charge greater than 3.91 lb per circuit)

Equipment with R–454B charge amounts greater than 3.91 lb per circuit may require additional circulation or ventilation airflow mitigation strategies. In this case, minimum room area (A_{min}) threshold defines when additional ventilation airflow is required. If the room area is below the adjusted A_{min} threshold, additional ventilation is required to remove refrigerant in the event of a leak. Refer to UL 60335-2-40 Clause GG.8 and ANSI\ASHRAE Standard 15 Section 7 for natural and mechanical ventilation requirements.

The figures below display additional details on these requirements, including the minimum opening area for rooms naturally ventilated to an indoor or an outdoor space and the minimum airflow volume and exhaust room area for mechanically ventilated rooms.

Figure 5. Minimum opening area for natural ventilation – 20 ton

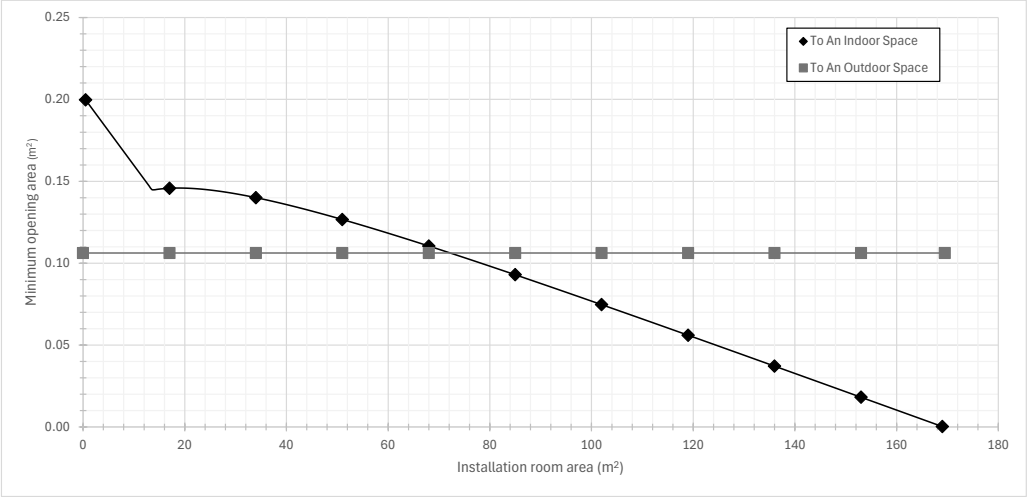


Figure 6. Minimum airflow volume and exhaust room area for mechanical ventilation- 20 ton

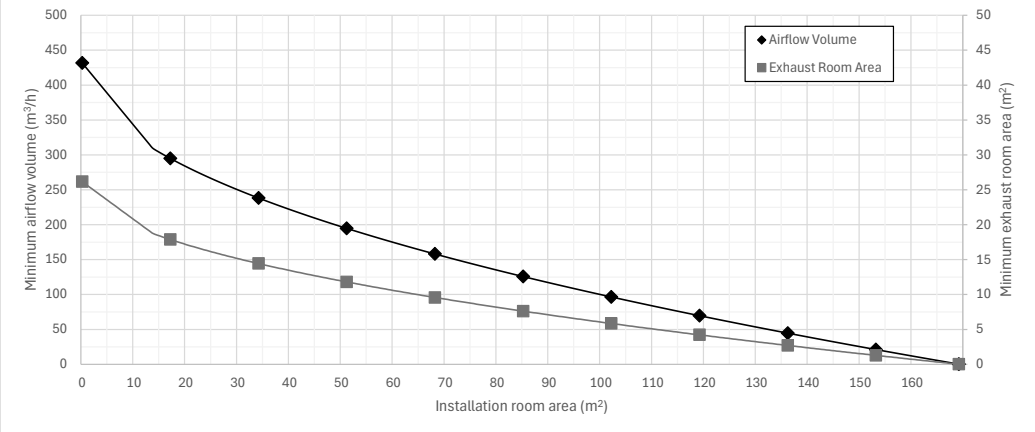


Table 3. Minimum room area 5 to 20 tons

Models	Minimum Room Area (m^2)	Minimum Room Area (ft^2)
EXWK060	27.9	300.0
EXWK120	29.2	314.3
EXWK240	169.2	1821.3

Minimum Room Area (A_{min}) Adjustments

Use equation below to adjust the minimum room area, as applicable, based on the unit's installation height, altitude, and occupancy level it serves.

$$A_{min.adj} = \text{Nameplate } A_{min} \times \text{Altitude Adj} \times \text{Height Adj} \times F_{occ}$$

Multiply the altitude adjustment factor in the table below by A_{min} listed on the unit nameplate or in the Installation, Operation, and Maintenance (IOM) manual.

Table 4. Altitude adjustment factor

Altitude (ft)	Sea Level to 2000	2001 to 4000	4001 to 6000	6001 to 8000	8001 to 10000	10001 to 12000	12001 to 14000	14001 to 15000	Over 15000
A_{min} Adjustment	1	1.05	1.11	1.17	1.24	1.32	1.41	1.51	1.57

In addition, A_{min} can be adjusted if the unit is installed in a room at a height that is higher than the minimum height shown on the unit. To adjust A_{min}, multiply by the ratio of the unit minimum release height (in meters) / actual release height (in meters). Use 0.6 m in the ratio for unit minimum installation heights less than or equal to 0.6 m.

For institutional occupancies, ASHRAE Standard 15 applies an additional adjustment factor F_{occ} to the amount of a charge allowed in a space. To calculate the adjusted A_{min} for institutional occupancies, multiply the A_{min} on the nameplate by two.

EXAMPLE 1: 20 Ton Packaged Rooftop Multi-Zone VAV System Serving an Institutional Occupancy Space

The packaged unit serves 7600 $ft.^2$ of a nursing home located at an attitude of 4000 ft. The unit has two equally charged 10 ton refrigeration circuits. Each circuit has 12 lbs of refrigerant with a minimum room area requirement of 180 $ft.^2$ with a 2.2 m release height.

$$TA_{min.adj} = 180\ ft.^2 \times 1.05 \times 2 = 378\ ft.^2$$

No additional ventilation is required.

EXAMPLE 2: 10 Ton Split System Serving a Single Commercial Occupancy Space

The split system serves a 1500 $ft.^2$ manufacturing space at 5000 ft. altitude. The final installed charge of the single circuit 10 ton unit is 20 lb. The unit has an open return with a release height of 1 m and ducted supply air. The unit A_{min} is 660 $ft.^2$.

$$A_{min.adj} = 660\ ft.^2 \times 1.11 = 733\ ft.^2$$

No additional ventilation is required.

Determining Room Area

The room area (A) is the room area enclosed by the projection to the floor of the walls, partitions, and doors of the space that the equipment serves.

Rooms connected by drop ceilings only are not considered a single room.

Rooms on the same floor of the building, and connected by an open passageway, can be considered part of the same room if the passageway is a permanent opening, extends to the floor and is intended for people to walk through.

Adjacent rooms on the same floor of the building and connected by permanent openings in the walls and/or doors between rooms (including gaps between the wall and the floor), can be considered part of the same room if the openings meet the following criteria.

- The opening is permanent and cannot be closed.
- Openings extending to the floor, such as door gaps, need to be at least 20 mm above the floor covering surface.
- Natural ventilations opening areas must meet the requirements of ANSI\ASHRAE Standard 15-2022, Section 7.2.3.2.

Rooms that are connected by a mechanical ventilation system can be considered a single room area if the mechanical ventilation system meets the requirements of ANSI\ASHRAE Standard 15-2022, Section 7.6.4.

- For mechanical ventilation as specified in UL 60335-2-40 Clause GG.8.3, the lower edge of openings extracting air from the room shall not be more than 100 mm above the floor.
- The openings supplying makeup air to the room shall be located such that the supplied makeup air mixes with the leaked refrigerant.

- When makeup air is supplied from the same space where the ventilation air extracted from the space is discharged, ventilation air discharge openings shall be separated by a sufficient distance (not less than 3 m) from the makeup air intake openings to prevent re-circulation to the space.

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

1. Verify the power supply complies with the unit nameplate specifications.
2. Inspect all control panel components; tighten any loose connections.
3. 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.
4. 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

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 non-potable water.*

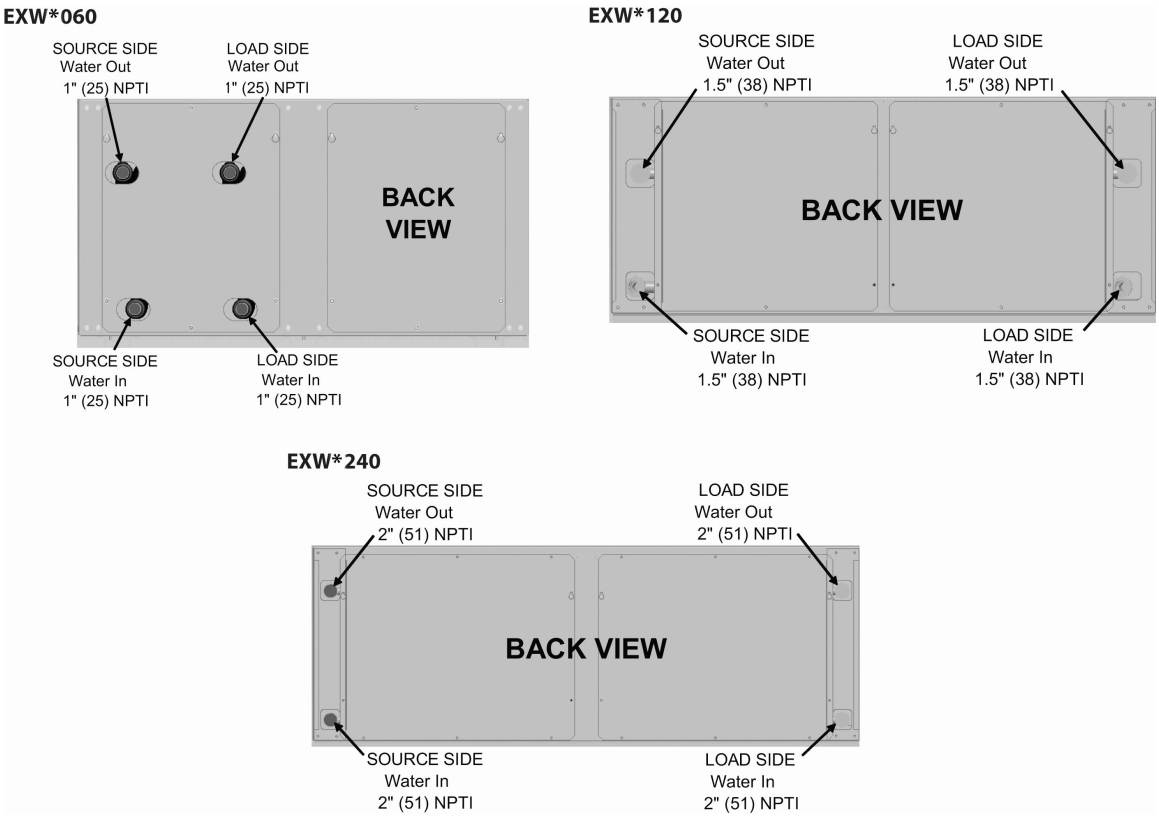
The source-side connection and the load-side connections are at the rear of the unit.

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 7. 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 5, p. 20 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.*

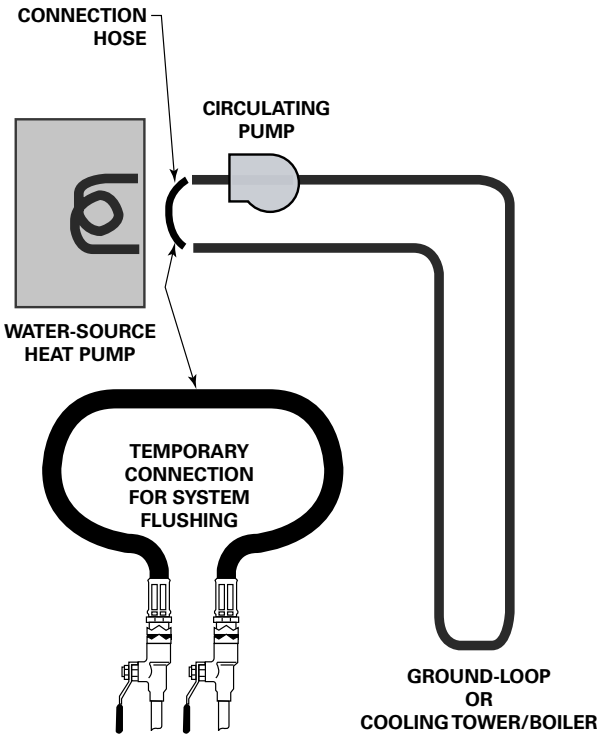
2. With the air vents closed, start the circulating pump and then crack the air vents to bleed off the trapped air, assuring circulation through all components of the system.

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. Shutdown 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 shutdown.*

Figure 8. 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 antifreeze, 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 5. 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 6. System flushing flow rates

Pipe	Gallons per 100 ft.	Minimum Flush GPM
¾ in. PE	3.02	3.8
1 in. PE	4.73	6.0
1¼ in. PE	7.55	9.5
1½ in. PE	9.93	13.0
2 in. 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

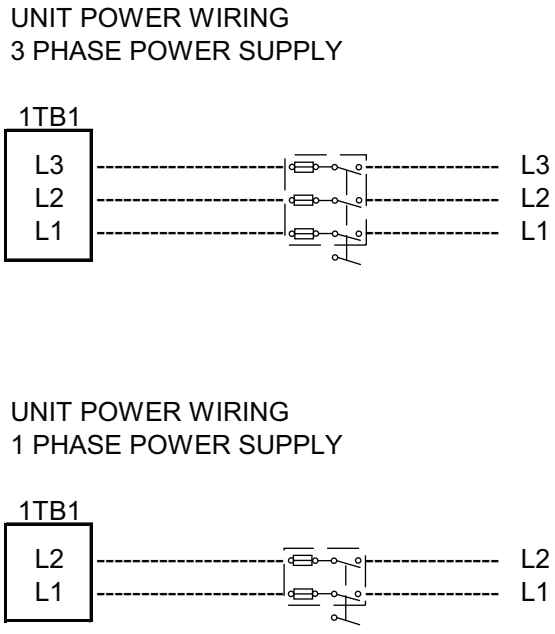
A field supplied disconnect switch must be installed at or near the unit in accordance with the National Electric Code (NEC latest edition).

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 9. 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 10. Field connections - low voltage terminal board - EXW*060

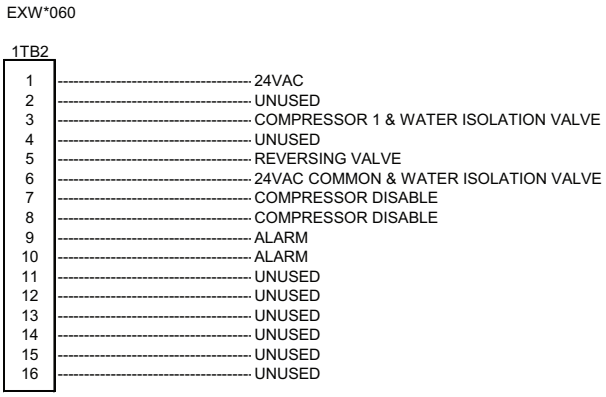
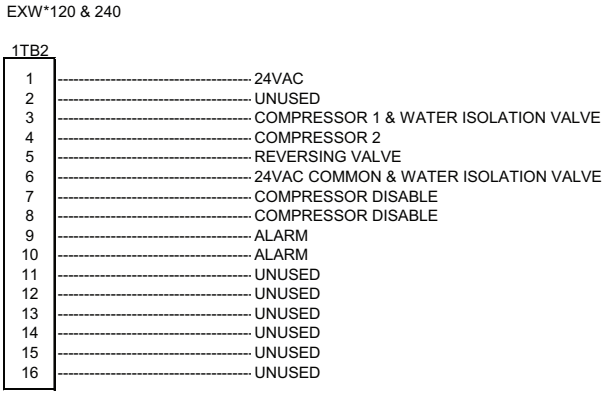


Figure 11. Field connections - low voltage terminal board - EXW*120 and EXW*240



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 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 7. 24V AC conductors

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

Table 8. Deluxe controller diagnostic LEDs

Color: Green	Color: Red		Controller Mode
LED1	LED2	LED3	
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

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,” p. 25 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,” p. 25.
5. Turn the system control switch to the OFF position. Unit should stop running and the reversing valve should deenergize.
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,” p. 25 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,” p. 25.
10. Set the system control to maintain the desired space temperature.
11. Instruct the owner on system operation.

Operating Data

Table 9. Operating data for cooling EXW*060

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*060	50	10	7.8	12-15	60	10	8.6	11-14	91-112	174-213
		15	15.9	8-10		10	8.6	11-14	91-112	164-200
		10	7.8	13-16		15	17.4	8-10	98-120	177-216
		15	15.9	9-11		15	17.4	8-10	98-120	165-202
		10	7.7	14-17	70	10	8.3	13-16	107-130	180-219
		15	15.9	9-12		10	8.3	13-16	106-130	168-205
		10	7.7	15-18		15	16.8	9-11	115-141	182-223
		15	15.9	10-12		15	16.8	9-11	115-140	170-207
		10	7.7	16-20	80	10	8.1	15-18	123-151	185-226
		15	15.9	11-13		10	8.1	15-18	123-150	172-210
		10	7.7	17-21		15	16.2	11-13	134-164	189-231
		15	15.8	11-14		15	16.2	11-13	134-163	174-212
	70	10	7.1	12-15	60	10	8.6	11-13	96-118	234-286
		15	14.5	8-10		10	8.6	11-13	96-118	222-271
		10	7.1	13-16		15	17.4	8-9	103-126	236-289
		15	14.5	9-11		15	17.4	8-9	103-126	224-273
		10	7.1	14-17	70	10	8.3	12-15	113-138	240-293
		15	14.5	9-11		10	8.3	12-15	112-137	226-276
		10	7.1	15-18		15	16.8	9-11	121-148	243-297
		15	14.5	10-12		15	16.8	9-11	121-148	228-279
		10	7.1	16-19	80	10	8.0	14-17	130-159	246-301
		15	14.5	11-13		10	8.0	14-17	130-159	231-282
		10	7.0	17-21		15	16.2	10-12	141-172	250-306
		15	14.5	11-14		15	16.2	10-13	140-172	233-285
	90	10	6.6	12-15	60	10	8.5	10-12	100-123	305-373
		15	13.5	8-10		10	8.5	10-12	100-122	292-357
		10	6.6	13-16		15	17.2	7-9	107-130	308-376
		15	13.5	9-10		15	17.3	7-9	107-130	293-359
		10	6.6	14-17	70	10	8.2	11-14	117-143	311-381
		15	13.4	9-11		10	8.2	12-14	117-143	296-362
		10	6.6	14-18		15	16.7	8-10	125-153	314-384
		15	13.4	10-12		15	16.7	8-10	125-153	298-364
		10	6.5	15-19	80	10	8.0	13-16	136-166	318-389
		15	13.4	10-13		10	8.0	13-16	135-165	300-367
		10	6.5	16-20		15	16.1	9-11	146-178	321-393
		15	13.4	11-13		15	16.1	9-12	145-178	303-370
	110	10	6.2	12-14	60	10	8.5	9-11	103-126	390-476
		15	12.7	8-10		10	8.5	9-11	103-126	376-460
		10	6.2	12-15		15	17.2	6-7	109-133	392-479
		15	12.7	8-10		15	17.2	6-8	109-133	378-462
		10	6.2	13-16	70	10	8.2	10-12	120-147	396-484
		15	12.7	9-11		10	8.2	10-13	120-147	380-465
		10	6.2	14-17		15	16.6	7-9	128-156	398-487
		15	12.7	9-11		15	16.6	7-9	128-156	382-467
		10	6.2	15-18	80	10	8.0	12-14	139-170	403-492
		15	12.7	10-12		10	8.0	12-14	139-170	385-470
		10	6.2	16-19		15	16.1	8-10	149-182	405-495
		15	12.7	10-13		15	16.1	8-10	148-181	387-473

Table 10. Operating data for heating EXW*060

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*060	35	10	12.0	7-9	70	10	7.5	9-11	65-80	221-271
		15	24.3	5-6		15	7.5	9-11	69-84	222-272
		10	12.0	7-9		10	15.3	6-7	65-80	213-260
		15	24.3	5-6		15	15.3	6-7	69-84	214-261
		10	12.0	7-8	90	10	7.0	8-10	66-81	293-358
		15	24.3	5-6		15	7.0	9-11	70-85	294-359
		10	12.0	7-8		10	14.3	6-7	66-81	284-347
		15	24.3	5-6		15	14.3	6-7	70-85	285-348
		10	12.0	6-7	110	10	6.6	8-10	68-83	377-460
		15	24.3	4-5		15	6.6	9-10	71-87	378-462
		10	12.0	6-7		10	13.5	5-7	68-83	368-450
		15	24.3	4-5		15	13.5	6-7	71-87	369-451
	55	10	8.4	10-12	70	10	7.4	12-14	90-110	233-285
		15	17.0	7-9		15	7.4	12-15	95-116	234-286
		10	8.4	10-12		10	15.1	8-9	90-110	221-270
		15	17.0	7-9		15	15.1	8-10	95-116	222-271
		10	8.4	9-11	90	10	6.9	11-14	92-112	308-376
		15	17.0	6-8		15	6.9	12-15	97-118	309-378
		10	8.4	9-11		10	14.2	8-9	92-112	294-360
		15	17.0	6-8		15	14.2	8-10	97-118	295-361
		10	8.4	8-10	110	10	6.6	11-13	94-115	395-483
		15	16.9	6-7		15	6.5	12-14	99-121	396-484
		10	8.4	8-10		10	13.4	7-9	94-115	382-466
		15	16.9	6-7		15	13.4	8-9	99-121	382-467
	75	10	7.7	13-16	70	10	7.3	14-18	116-142	246-301
		15	15.5	9-11		15	7.3	15-19	125-153	249-304
		10	7.7	13-16		10	15.0	10-12	116-142	231-283
		15	15.5	9-11		15	14.9	10-12	125-152	233-285
		10	7.7	12-14	90	10	6.9	14-17	119-145	323-395
		15	15.5	8-10		15	6.8	15-18	127-155	325-398
		10	7.7	12-15		10	14.0	9-11	119-145	306-374
		15	15.5	8-10		15	14.0	10-12	127-155	307-376
		10	7.7	11-13	110	10	6.5	14-17	122-149	411-502
		15	15.5	8-9		15	6.5	14-17	129-158	413-505
		10	7.7	11-13		10	13.3	9-11	122-149	394-481
		15	15.5	8-9		15	13.3	9-12	129-158	395-483
	85	10	7.5	15-18	70	10	7.3	16-20	134-164	252-308
		15	15.0	10-13		15	7.3	17-21	145-177	255-311
		10	7.5	15-18		10	14.9	11-13	134-163	235-287
		15	15.1	11-13		15	14.9	12-14	144-176	237-290
		10	7.4	14-17	90	10	6.8	16-19	137-167	329-402
		15	15.0	10-12		15	6.8	17-21	147-180	332-406
		10	7.4	14-17		10	14.0	11-13	137-167	310-379
		15	15.0	10-12		15	14.0	11-14	147-180	312-381
		10	7.4	12-15	110	10	6.5	15-19	141-172	417-509
		15	15.0	9-11		15	6.5	16-20	150-184	420-513
		10	7.4	12-15		10	13.3	10-12	140-172	397-485
		15	15.0	9-11		15	13.2	11-13	150-183	399-488

Table 11. Operating data for cooling EXW*120

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*120	50	20	7.8	12-15	60	20	8.6	11-14	91-112	174-213
		30	15.9	8-10		20	8.6	11-14	91-112	164-200
		20	7.8	13-16		30	17.4	8-10	98-120	176-215
		30	15.9	9-11		30	17.4	8-10	98-120	165-202
		20	7.7	14-17	70	20	8.3	13-16	107-130	179-219
		30	15.9	9-12		20	8.3	13-16	106-130	167-204
		20	7.7	15-18		30	16.8	9-11	115-141	182-222
		30	15.9	10-12		30	16.8	9-11	115-140	169-207
		20	7.7	16-20	80	20	8.1	15-18	123-151	184-225
		30	15.9	11-13		20	8.1	15-18	123-150	171-209
		20	7.7	17-21		30	16.2	11-13	134-164	188-230
		30	15.8	11-14		30	16.2	11-13	134-163	174-212
	70	20	7.1	12-15	60	20	8.6	11-13	97-118	234-286
		30	14.5	8-10		20	8.6	11-13	96-118	222-271
		20	7.1	13-16		30	17.4	8-9	103-126	236-288
		30	14.5	9-11		30	17.4	8-9	103-126	223-273
		20	7.1	14-17	70	20	8.3	12-15	113-138	239-293
		30	14.5	9-11		20	8.3	12-15	112-137	226-276
		20	7.1	15-18		30	16.8	9-11	121-148	242-296
		30	14.5	10-12		30	16.8	9-11	121-148	228-278
		20	7.1	16-19	80	20	8.0	14-17	130-159	246-300
		30	14.5	11-13		20	8.0	14-17	130-159	230-281
		20	7.0	17-20		30	16.2	10-12	141-172	249-305
		30	14.5	11-14		30	16.2	10-12	140-172	233-285
	90	20	6.6	12-15	60	20	8.5	10-12	101-123	305-373
		30	13.5	8-10		20	8.5	10-12	100-123	291-356
		20	6.6	13-16		30	17.2	7-8	107-131	307-375
		30	13.5	8-10		30	17.2	7-9	107-130	293-358
		20	6.6	14-17	70	20	8.2	11-14	117-143	311-380
		30	13.4	9-11		20	8.2	11-14	117-143	296-361
		20	6.6	14-18		30	16.6	8-10	125-153	314-383
		30	13.4	10-12		30	16.7	8-10	125-153	297-363
		20	6.5	15-19	80	20	8.0	13-16	136-166	317-388
		30	13.4	10-13		20	8.0	13-16	135-165	300-367
		20	6.5	16-20		30	16.1	9-11	146-178	321-392
		30	13.4	11-13		30	16.1	9-11	146-178	302-369
	110	20	6.2	12-14	60	20	8.5	8-10	103-126	389-476
		30	12.7	8-10		20	8.5	9-10	103-126	376-459
		20	6.2	12-15		30	17.2	6-7	109-133	391-478
		30	12.7	8-10		30	17.2	6-7	109-133	377-461
		20	6.2	13-16	70	20	8.2	10-12	121-148	395-483
		30	12.7	9-11		20	8.2	10-12	120-147	380-464
		20	6.2	14-17		30	16.6	7-9	128-156	398-486
		30	12.7	9-11		30	16.6	7-9	128-156	381-466
		20	6.2	15-18	80	20	8.0	11-14	140-171	402-491
		30	12.7	10-12		20	8.0	12-14	139-170	384-470
		20	6.2	16-19		30	16.1	8-10	149-182	405-495
		30	12.7	10-13		30	16.1	8-10	149-182	386-472

Table 12. 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	12.0	7-9	70	20	7.5	9-11	66-80	221-271
		30	24.3	5-6		30	7.5	9-11	69-84	222-272
		20	12.0	7-9		20	15.3	6-7	66-80	213-260
		30	24.3	5-6		30	15.3	6-7	69-84	214-261
		20	12.0	7-8	90	20	7.0	8-10	67-81	293-358
		30	24.3	5-6		30	7.0	9-11	70-85	294-359
		20	12.0	7-8		20	14.3	6-7	67-81	284-347
		30	24.3	5-6		30	14.3	6-7	70-85	284-348
		20	12.0	6-7	110	20	6.6	8-10	68-83	376-459
		30	24.3	4-5		30	6.6	8-10	71-87	377-461
		20	12.0	6-7		20	13.5	5-7	68-83	367-449
		30	24.3	4-5		30	13.5	6-7	71-87	368-450
	55	20	8.4	10-12	70	20	7.4	12-14	90-110	232-284
		30	17.0	7-9		30	7.4	12-15	95-117	234-286
		20	8.4	10-12		20	15.1	8-9	90-110	220-269
		30	17.0	7-9		30	15.1	8-10	95-116	221-271
		20	8.4	9-11	90	20	6.9	11-14	92-112	307-375
		30	17.0	6-8		30	6.9	12-14	97-118	308-377
		20	8.4	9-11		20	14.2	7-9	92-112	294-359
		30	17.0	6-8		30	14.2	8-10	97-118	294-360
		20	8.4	8-10	110	20	6.6	11-13	94-115	394-482
		30	16.9	6-7		30	6.6	11-14	99-121	395-483
		20	8.4	8-10		20	13.4	7-9	94-115	381-465
		30	16.9	6-7		30	13.4	8-9	99-121	381-466
	75	20	7.7	13-16	70	20	7.3	14-18	116-142	246-300
		30	15.5	9-11		30	7.3	15-19	125-153	248-303
		20	7.7	13-16		20	15.0	10-12	116-142	231-282
		30	15.5	9-11		30	15.0	10-12	125-153	232-284
		20	7.7	12-14	90	20	6.9	14-17	119-145	322-394
		30	15.5	8-10		30	6.8	15-18	127-155	324-397
		20	7.7	12-15		20	14.0	9-11	119-145	305-373
		30	15.5	8-10		30	14.0	10-12	127-155	307-375
		20	7.7	11-13	110	20	6.5	14-17	122-149	410-501
		30	15.5	8-9		30	6.5	14-17	130-158	412-504
		20	7.7	11-13		20	13.3	9-11	122-149	393-480
		30	15.5	8-9		30	13.3	9-12	129-158	394-482
	85	20	7.5	15-18	70	20	7.3	16-20	134-164	251-307
		30	15.0	10-13		30	7.3	17-21	145-177	254-310
		20	7.5	15-18		20	14.9	11-13	134-164	234-287
		30	15.1	11-13		30	14.9	12-14	145-177	237-289
		20	7.4	14-17	90	20	6.8	16-19	137-168	328-401
		30	15.0	10-12		30	6.8	17-20	147-180	331-404
		20	7.4	14-17		20	14.0	10-13	137-167	309-378
		30	15.0	10-12		30	14.0	11-14	147-180	311-380
		20	7.4	12-15	110	20	6.5	15-19	141-172	416-508
		30	15.0	9-11		30	6.5	16-20	150-184	418-511
		20	7.4	12-15		20	13.3	10-12	140-172	396-484
		30	15.0	9-11		30	13.3	11-13	150-183	398-486

Table 13. 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	7.5	12-15	60	40	7.2	11-13	86-105	176-216
		60	15.4	8-10		40	7.2	11-13	86-105	167-204
		40	7.5	13-15		60	14.6	8-9	92-113	178-218
		60	15.4	8-10		60	14.6	8-9	92-113	168-205
		40	7.5	14-17	70	40	7.0	12-15	101-124	181-221
		60	15.4	9-11		40	7.0	12-15	101-123	170-207
		40	7.5	14-18		60	14.1	9-11	109-133	184-224
		60	15.3	10-12		60	14.1	9-11	109-133	172-210
		40	7.5	15-19	80	40	6.8	14-17	117-143	186-228
		60	15.3	10-12		40	6.8	14-17	117-143	174-212
		40	7.4	16-20		60	13.7	10-12	127-156	190-232
		60	15.3	11-13		60	13.7	10-13	127-155	176-215
	70	40	7.3	12-15	60	40	7.3	10-13	93-114	238-291
		60	14.9	8-10		40	7.3	10-13	93-114	226-277
		40	7.3	13-15		60	14.7	7-9	100-122	240-293
		60	14.9	8-10		60	14.7	7-9	100-122	228-278
		40	7.3	14-17	70	40	7.0	12-15	109-134	243-297
		60	14.9	9-11		40	7.0	12-15	109-133	230-281
		40	7.3	14-18		60	14.2	8-10	117-143	246-301
		60	14.9	10-12		60	14.2	9-10	117-143	232-283
		40	7.2	15-19	80	40	6.8	14-17	127-155	249-304
		60	14.9	10-12		40	6.8	14-17	126-154	234-286
		40	7.2	16-20		60	13.7	10-12	137-167	253-309
		60	14.9	11-13		60	13.7	10-12	136-167	237-289
	90	40	6.7	12-14	60	40	7.3	10-12	98-120	312-381
		60	13.7	8-10		40	7.3	10-12	98-119	299-365
		40	6.7	12-15		60	14.7	7-8	104-127	314-383
		60	13.7	8-10		60	14.7	7-8	104-127	300-367
		40	6.7	13-16	70	40	7.0	11-14	114-140	317-388
		60	13.7	9-11		40	7.0	11-14	114-140	303-370
		40	6.7	14-17		60	14.2	8-10	122-149	320-391
		60	13.7	9-11		60	14.2	8-10	122-149	304-372
		40	6.7	15-18	80	40	6.8	13-16	133-162	323-395
		60	13.7	10-12		40	6.8	13-16	132-161	307-375
		40	6.7	16-19		60	13.8	9-11	142-174	326-399
		60	13.6	11-13		60	13.8	9-11	142-173	309-377
	110	40	6.3	11-14	60	40	7.3	9-11	100-122	396-484
		60	13.0	8-9		40	7.3	9-11	100-122	383-468
		40	6.3	12-14		60	14.7	6-7	106-129	398-486
		60	13.0	8-10		60	14.7	6-7	106-129	384-470
		40	6.3	13-16	70	40	7.0	10-12	117-143	401-490
		60	12.9	9-10		40	7.0	10-12	117-143	387-473
		40	6.3	13-16		60	14.2	7-9	124-152	403-493
		60	12.9	9-11		60	14.2	7-9	124-152	388-474
		40	6.3	14-17	80	40	6.8	11-14	136-166	407-498
		60	12.9	10-12		40	6.8	12-14	136-166	391-478
		40	6.3	15-18		60	13.7	8-10	145-177	410-501
		60	12.9	10-12		60	13.7	8-10	145-177	393-480

Table 14. Operating data for heating EXW*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	10.3	7-9	70	40	6.2	9-11	61-75	223-273
		60	20.9	5-6		60	6.2	9-11	64-79	224-274
		40	10.3	7-9		40	12.7	6-7	61-75	214-262
		60	20.9	5-6		60	12.7	6-7	64-79	215-263
		40	10.3	7-8	90	40	5.8	9-11	63-76	297-363
		60	20.9	5-6		60	5.8	9-11	65-80	297-363
		40	10.3	7-8		40	11.9	6-7	63-76	287-351
		60	20.9	5-6		60	11.9	6-7	65-80	287-351
		40	10.3	6-8	110	40	5.5	9-11	64-78	383-469
		60	20.9	4-5		60	5.5	9-11	67-81	384-469
		40	10.3	6-8		40	11.2	6-7	64-78	374-457
		60	20.9	4-5		60	11.2	6-7	67-81	374-457
	55	40	7.7	9-11	70	40	7.0	11-14	87-106	234-287
		60	15.7	6-8		60	7.0	12-15	91-112	236-288
		40	7.7	9-11		40	14.4	8-9	87-106	223-272
		60	15.7	6-8		60	14.4	8-10	91-111	224-273
		40	7.7	9-11	90	40	6.6	11-14	89-108	307-376
		60	15.6	6-7		60	6.6	12-14	93-113	309-377
		40	7.7	9-11		40	13.5	7-9	89-108	295-360
		60	15.6	6-7		60	13.5	8-9	93-113	295-361
		40	7.7	8-10	110	40	6.2	11-13	91-111	392-479
		60	15.6	6-7		60	6.2	11-14	95-116	393-480
		40	7.7	8-10		40	12.7	7-9	91-111	379-463
		60	15.6	6-7		60	12.7	7-9	94-115	380-464
	75	40	7.3	12-15	70	40	6.8	14-17	115-140	249-305
		60	14.7	9-10		60	6.7	15-18	123-150	252-308
		40	7.3	12-15		40	13.9	9-12	114-140	234-286
		60	14.7	9-11		60	13.8	10-12	122-150	235-288
		40	7.3	11-14	90	40	6.3	14-17	117-143	323-395
		60	14.7	8-10		60	6.3	14-18	124-152	326-398
		40	7.3	11-14		40	13.0	9-11	116-142	307-375
		60	14.7	8-10		60	13.0	10-12	124-152	308-377
		40	7.2	10-13	110	40	6.0	13-16	119-145	408-498
		60	14.6	7-9		60	6.0	14-17	126-154	410-501
		40	7.2	11-13		40	12.3	9-11	119-145	392-479
		60	14.6	7-9		60	12.3	9-11	126-154	393-480
	85	40	7.0	14-17	70	40	6.7	16-20	132-161	255-312
		60	14.2	10-12		60	6.7	17-21	142-174	258-316
		40	7.0	14-17		40	13.8	11-13	132-161	238-291
		60	14.2	10-12		60	13.8	11-14	142-173	240-293
		40	7.0	13-16	90	40	6.3	15-19	135-164	330-403
		60	14.2	9-11		60	6.3	16-20	144-176	333-407
		40	7.0	13-16		40	13.0	10-13	134-164	311-380
		60	14.2	9-11		60	13.0	11-13	144-176	313-383
		40	7.0	12-15	110	40	6.0	15-18	137-168	414-506
		60	14.2	9-10		60	6.0	16-19	146-179	417-509
		40	7.0	12-15		40	12.3	10-12	137-167	396-484
		60	14.2	9-11		60	12.3	10-13	146-179	397-486

Table 15. 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 9, p. 25 through Table 14, p. 30 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 to 16°F. Based on the same criteria for heating, the temperature drop is from 2°F to 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 9, p. 25 through Table 14, p. 30 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).

MODE	Heat		Cool	
	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 16. Water quality table

Scaling	
Calcium and magnesium (total hardness)	Less than 350 ppm
Corrosion	
pH	7 to 9.5
Hydrogen Sulfide	Less than 1 ppm
Sulfates	Less than 25 ppm
Chlorides	Less than 125 ppm
Carbon Dioxide	Less than 75 ppm

Table 16. Water quality table (continued)

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 17. 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

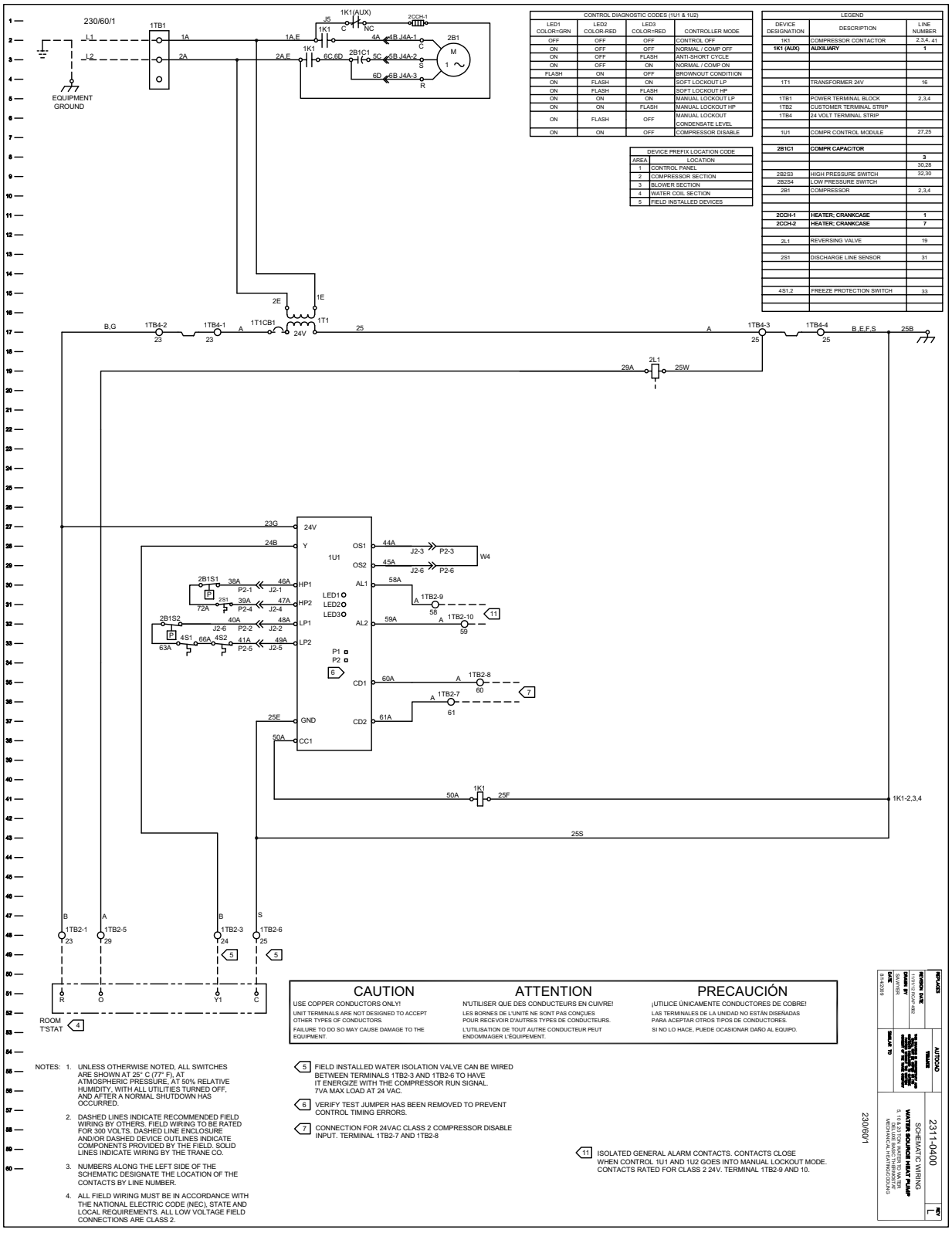
Table 17. Troubleshooting checklist (continued)

Problem	Heating	Cooling	Cause	Correction
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
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

Wiring diagrams shown are typical. For as-built wiring diagrams, see unit submittal or contact technical support.

Figure 12. 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!	N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!	¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.	LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.	LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.	L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.	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.

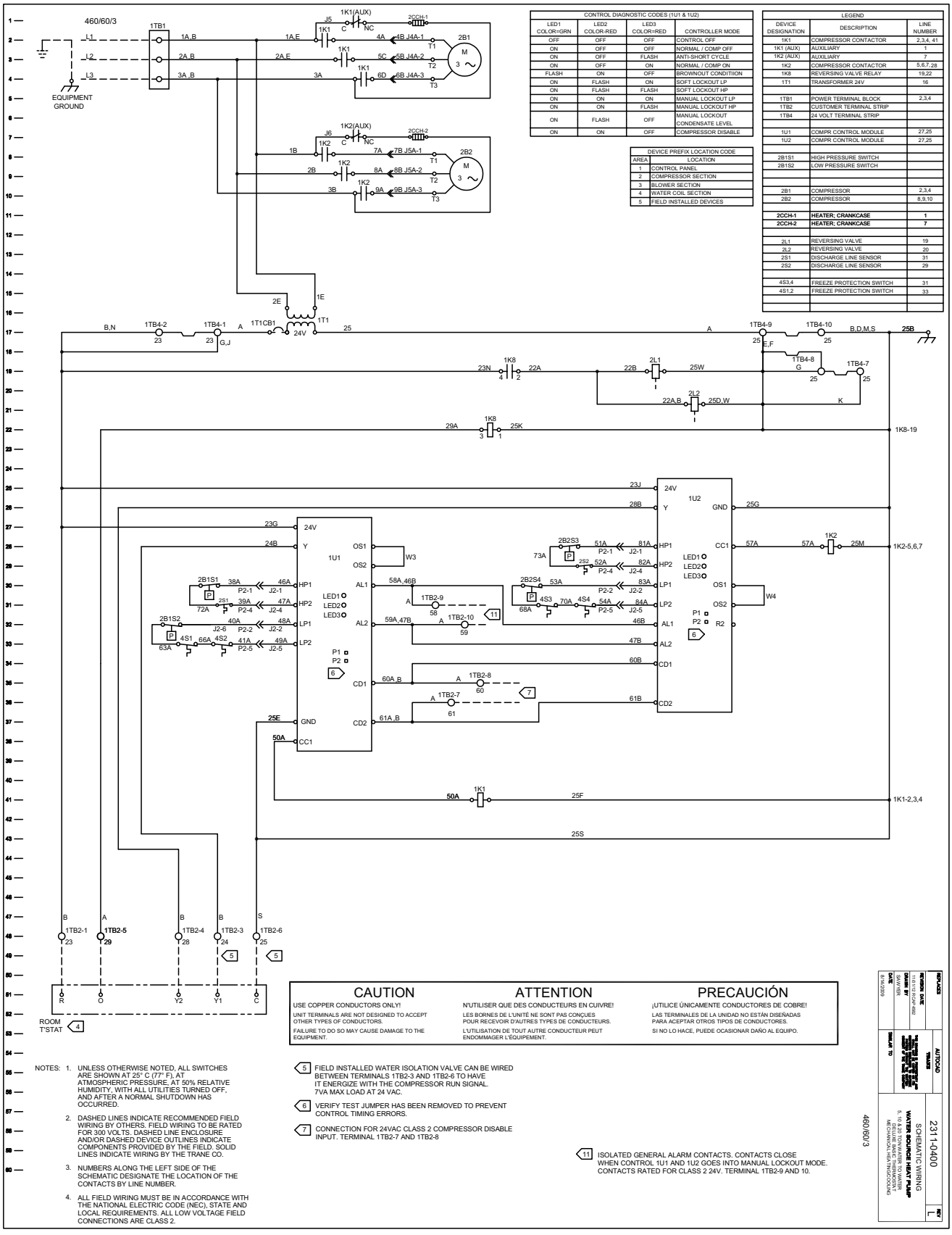
6 VERIFY TEST JUMPER HAS BEEN REMOVED TO PREVENT CONTROL TIMING ERRORS.

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.

REPLACES
REVISION DATE
11/01/10 (SCAP-68)
DRAWN BY
DATE 8/14/2009
AUTOCAD
TRANE
WATER-SOURCE HEAT PUMP
SCHEMATIC WIRING
2311-0400
REV
230/60/1

Figure 13. Deluxe 24V - dual circuit - three phase



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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
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REPLACES
DRAWN BY: SAVVIER
DATE: 9/14/2009
AUTOCAD
SIMILAR TO
TRANE
SCHEMATIC WIRING
WATER SOURCE HEAT PUMP
5, 10 & 20 TON WATER TO WATER
& BRINE TO WATER
MECHANICAL=ELECTRIC/COOLING
2311-0400
REV L
460/60/3

Warranty

Standard Warranty

The standard water-source heat pump warranty is Trane's parts-only warranty, running 12-months from start-up, 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 innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or tranetechnologies.com.

Trane has a policy of continuous product and product data improvements and reserves the right to change design and specifications without notice. We are committed to using environmentally conscious print practices.

WSHP-SVX023C-EN 12 Jan 2026
Supersedes WSHP-SVX023B-EN (February 2025)

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