CLIMATEMASTER
Geothermal Heating & Cooling

Trilogy® Q-Mode® (QE) Series IOM

97B0112N01

Residential Horizontal, Vertical & Downflow
Packaged Geothermal Heat Pumps

Installation, Operation &
Maintenance Instructions

Revised: 10 September, 2014J

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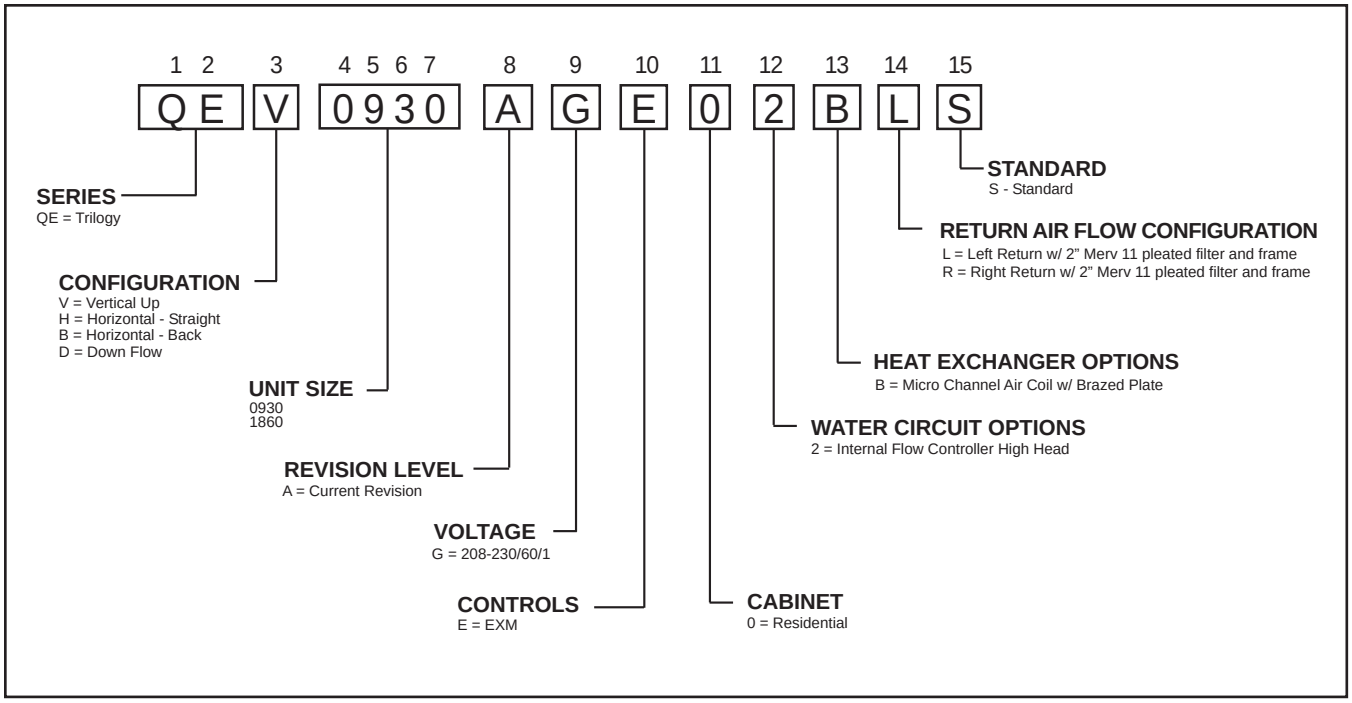
Model Nomenclature: General Overview



NOTE: Above model nomenclature is a general reference. Consult individual specification sections for detailed information.

Safety

Warnings, cautions and notices appear throughout this manual. Read these items carefully before attempting any installation, service, or troubleshooting of the equipment.

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

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

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

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

⚠ WARNING! ⚠

WARNING! The EarthPure® Application and Service Manual should be read and understood before attempting to service refrigerant circuits with HFC-410A.

⚠ WARNING! ⚠

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

⚠ WARNING! ⚠

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

⚠ CAUTION! ⚠

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

General Information

Inspection
Upon receipt of the equipment, carefully check the shipment against the bill of lading. Make sure all units and accessories have been received. Inspect the packaging of each unit, and inspect each unit for damage. Insure that the carrier makes proper notation of any shortages or damage on all copies of the freight bill and completes a common carrier inspection report. Concealed damage not discovered during unloading must be reported to the carrier within 15 days of receipt of shipment. If not filed within 15 days, the freight company can deny the claim without recourse. Note: It is the responsibility of the purchaser to file all necessary claims with the carrier. Notify your equipment supplier of all damage within fifteen (15) days of shipment.

Storage
Equipment should be stored in its original packaging in a clean, dry area. Store units in an upright position at all times. Stack units a maximum of 3 units high.

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

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

Pre-Installation
Installation, Operation, and Maintenance instructions are provided with each unit. Horizontal equipment is designed for installation in an attic or crawl space. Other unit configurations are typically installed in a mechanical closet or basement. The installation site chosen should include adequate service clearance around the unit. Before unit start-up, read all manuals and become familiar with the unit and its operation. Thoroughly check the system before operation.

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

⚠ CAUTION! ⚠

CAUTION! DO NOT store or install units in corrosive environments or in locations subject to temperature or humidity extremes (e.g., rooftops, etc. See Tables 10a and 10b for acceptable temperature ranges). Corrosive conditions and high temperature or humidity can significantly reduce performance, reliability, and service life. Always move and store units in an upright position. Tilting units on their sides may cause equipment damage.

⚠ CAUTION! ⚠

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

Duct System Installation
The duct system should be sized to handle the design airflow quietly. Refer to Figure 6 for horizontal duct system details or Figure 1 for vertical duct system details. A flexible connector is recommended for both discharge and return air duct connections on metal duct systems to eliminate the transfer of vibration to the duct system. To maximize sound attenuation of the unit blower, the supply and return plenums should include internal fiberglass duct liner or be constructed from ductboard for the first few feet. Application of the unit to uninsulated ductwork in an unconditioned space is not recommended, as the unit's performance will be adversely affected.

At least one 90° elbow should be included in the supply duct to reduce air noise. If air noise or excessive air flow is a problem, the blower speed can be changed. For airflow charts, consult catalog specifications for the series and model of the specific unit.

If the unit is connected to existing ductwork, a previous check should have been made to insure that the ductwork has the capacity to handle the airflow required for the unit. If ducting is too small, as in the replacement of a heating only system, larger ductwork should be installed. All existing ductwork should be checked for leaks and repaired as with the Trilogy's variable capacity and variable air flow duct and register sizing is crucial for proper air delivery and throw while maintaining acceptable sound levels.

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

Vertical Installation

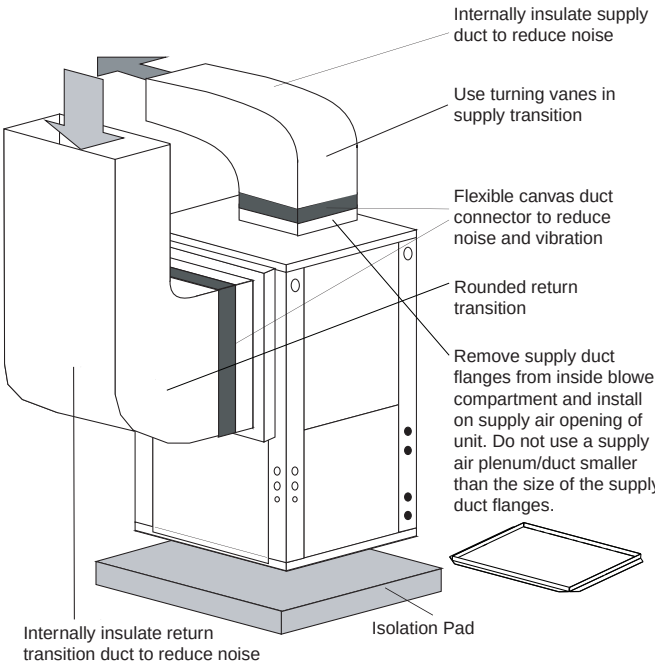
Vertical Unit Location

Packaged units are not designed for outdoor installation. Locate the unit in an INDOOR area that allows enough space for service personnel to perform typical maintenance or repairs without removing the unit from the installed location. Vertical units are typically installed in a mechanical closet or basement. Never install units in areas subject to freezing or where humidity levels could cause cabinet condensation (such as unconditioned spaces subject to 100% outside air). Also, provide sufficient room to make water, electrical, and duct connection(s).

If the unit is located in a confined space, such as a closet, provisions must be made for return air to freely enter the space by means of a louvered door or other method. Any access panel screws that would be difficult to remove after the unit is installed should be removed prior to setting the unit. Refer to Figures 1 and 2 for typical installation illustrations. Refer to unit catalog specifications for dimensional data.

1. Install the unit on a piece of rubber, neoprene or other mounting pad material for sound isolation. The pad should be at least 3/8" [10mm] to 1/2" [13mm] in thickness. Extend the pad beyond all four edges of the unit.
2. Do not block filter access with piping, conduit or other materials. Refer to unit catalog specifications for dimensional data.
3. Provide access to water valves and fittings and screwdriver access to the unit side panels, discharge collar and all electrical connections.

Figure 1: Vertical Unit Mounting Using Ducted Return

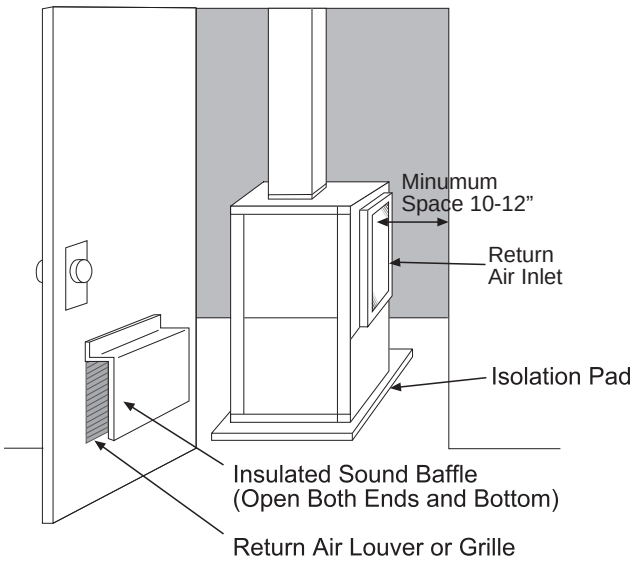


Sound Attenuation for Vertical Units

Sound attenuation is achieved by enclosing the unit within a small mechanical room or a closet. Additional measures for sound control include the following:

1. If free return, mount the unit so that the return air inlet is 90° to the return air grille (refer to Figure 2). Install a sound baffle as illustrated to reduce line-of sight sound transmitted through return air grilles.
2. Mount the unit on a Unit Isolation Pad to minimize vibration transmission to the building structure. For more information on Unit Isolation Pads, contact your distributor.

Figure 2: Vertical Sound Attenuation - Free Return

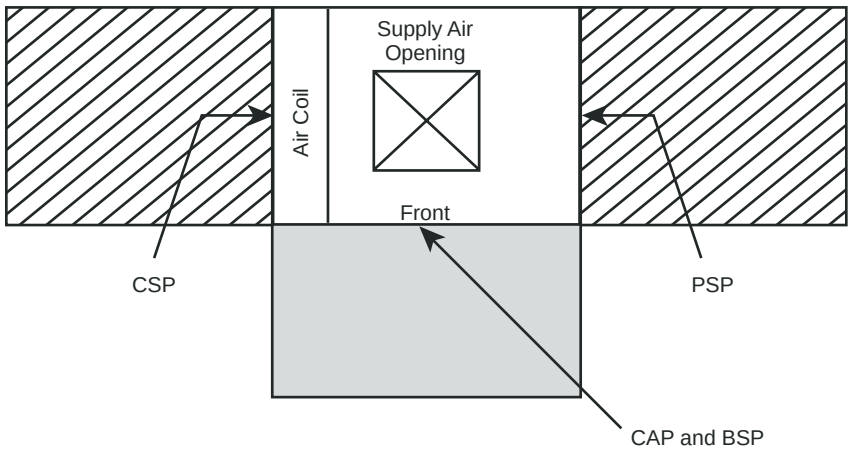


Vertical Installation

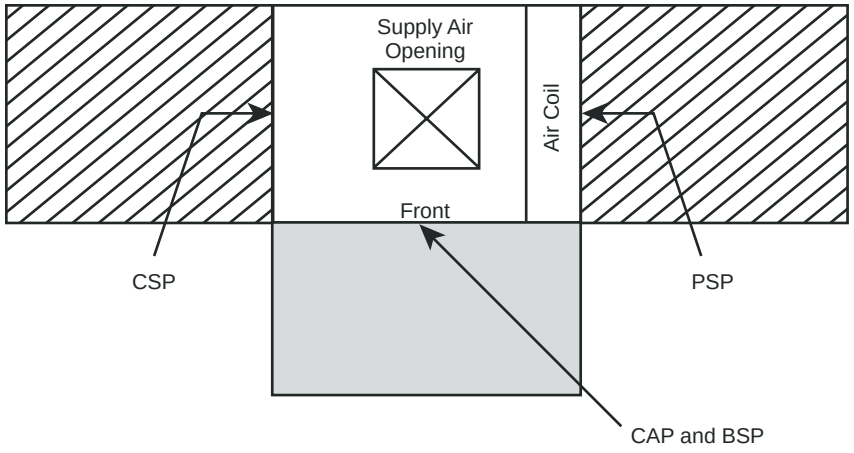
Figure 3: Vertical Service Access

Vertical Units

Left Return



Right Return



Notes:
1. While clear access to all removable panels is not required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
2. Front & Side access is preferred for improved service access. However, side access is not required if it is acceptable to slide the unit forward into the open if a compressor, pump volute, or heat exchanger replacement is required.
3. Top supply air is shown, the same clearances apply to bottom supply air units.

= mandatory 2′ service access

= (optional) additional 2′ service access

Legend:
CAP = Control/Compressor Access Panel
BSP = Blower Service Panel
CSP = Compressor Service Panel
PSP = Pump and Flow Meter Service Panel

Horizontal Installation

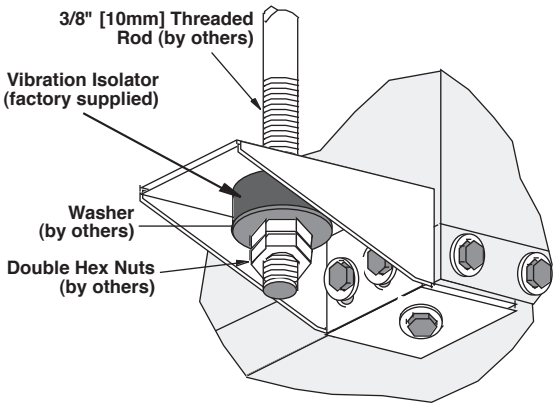
Horizontal Unit Location
Packaged units are not designed for outdoor installation. Locate the unit in an INDOOR area that allows enough space for service personnel to perform typical maintenance or repairs without removing unit from the ceiling. Horizontal units are typically installed in an attic or crawl space. Never install units in areas subject to freezing or where humidity levels could cause cabinet condensation (such as unconditioned spaces subject to 100% outside air). Consideration should be given to access for easy removal of the filter and access panels. Provide sufficient room to make water, electrical, and duct connection(s).

If the unit is located in a confined space, such as a closet, provisions must be made for return air to freely enter the space by means of a louvered door or return duct. Any access panel screws that would be difficult to remove after the unit is installed should be removed prior to setting the unit. Refer to Figure 6 for an illustration of a typical installation. Refer to unit catalog specifications for dimensional data.

Conform to the following guidelines when selecting a unit location:

1. Provide a hinged access door in concealed-spline or plaster ceilings. Provide removable ceiling tiles in T-bar or lay-in ceilings. Refer to horizontal unit dimensions for specific series and model in unit catalog specifications. Size the access opening to accommodate the service technician during the removal or replacement of the compressor and the removal or installation of the unit itself.
2. Provide access to hanger brackets, water valves and fittings. Provide screwdriver clearance to access panels, discharge collars and all electrical connections.
3. DO NOT obstruct the space beneath the unit with piping, electrical cables and other items that prohibit future removal of components or the unit itself.
4. Use a manual portable jack/lift to lift and support the weight of the unit during installation and servicing.

Figure 4: Hanger Bracket



Mounting Horizontal Units
Horizontal units have hanger kits pre-installed from the factory as shown in Figure 4. Figure 6 shows a typical horizontal unit installation.

Horizontal heat pumps are typically suspended above a ceiling or within a soffit using field supplied, threaded rods sized to support the weight of the unit.

Use four (4) field supplied threaded rods and factory provided vibration isolators to suspend the unit. Hang the unit clear of the floor slab above and support the unit by the mounting bracket assemblies only. DO NOT attach the unit flush with the floor slab above.

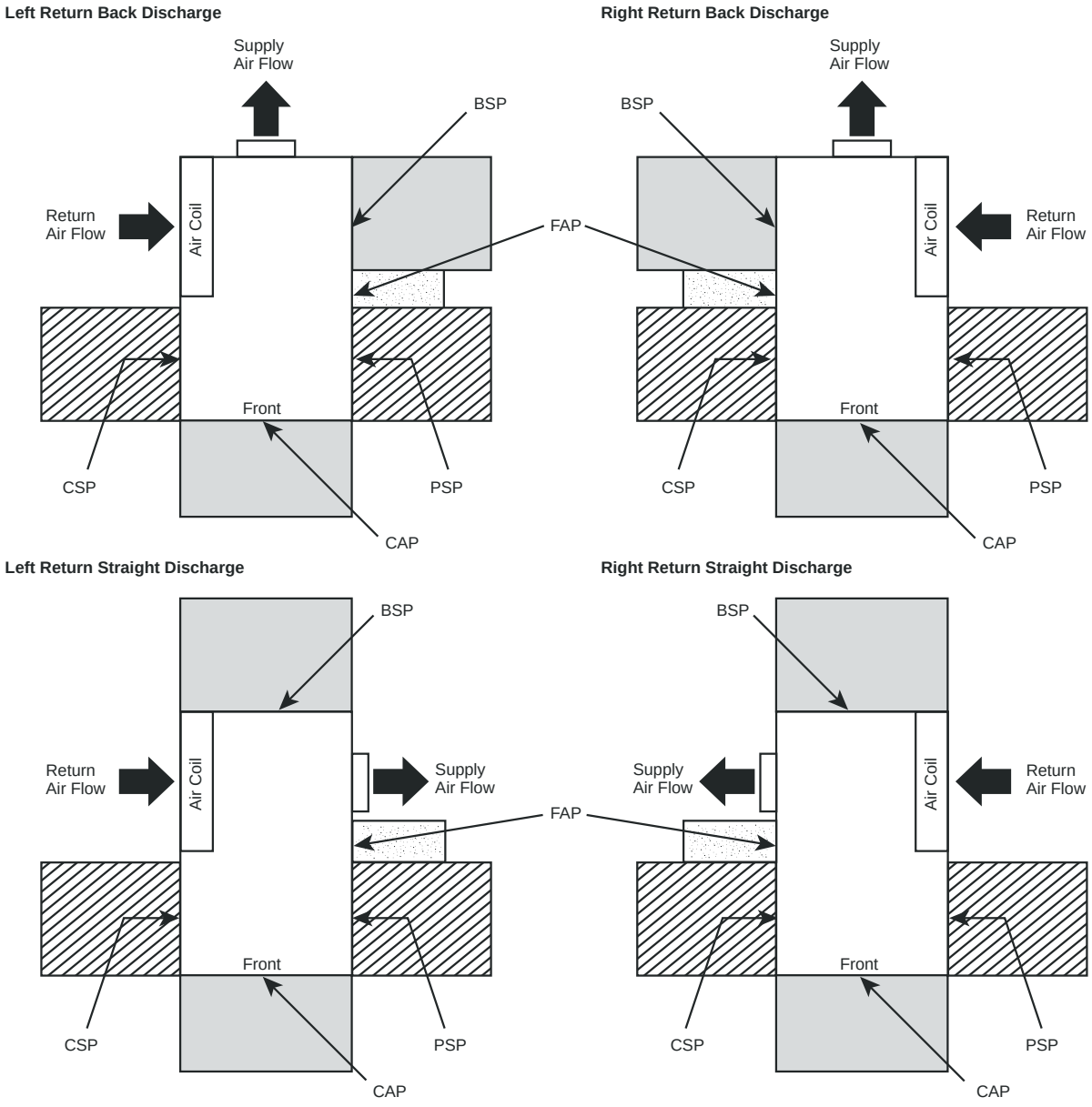
Pitch the unit toward the drain 1/4” to improve the condensate drainage. On small units (less than 2.5 Tons/8.8 kW) ensure that unit pitch does not cause condensate leaks inside the cabinet.

Horizontal units may also be installed on a base. When installed on a base or platform the horizontal unit should be set in a secondary drain pan on top of a vibration absorbing pad. This is required by many codes. The secondary drain pan prevents damage to the building structure by possible condensate overflow or water leakage.

NOTE: The top panel of a horizontal unit is a structural component. The top panel of a horizontal unit must never be removed from an installed unit unless the unit is properly supported from the bottom. Otherwise, damage to the unit cabinet may occur.

Horizontal Installation

Figure 5: Horizontal Service Access



Notes:
1. While clear access to all removable panels is not required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
2. CCP and BSP requires 2′ service access.
3. Blower service access is through back panel on straight discharge units or through panel opposite air coil on back discharge units.
4. Side access is not required if it is acceptable to drop the unit if major service such as compressor, pump volute, heat exchanger, or filter drier replacement is required.

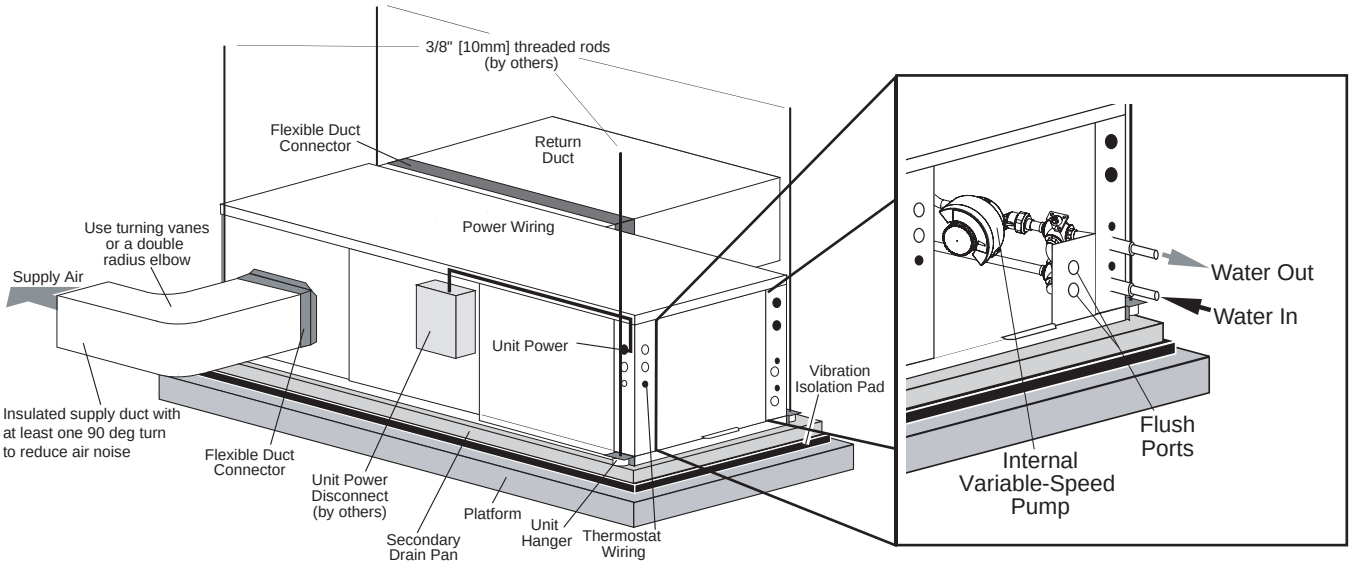
= mandatory 2′ service access

= (optional) additional 2′ service access

Legend:
CAP = Control Access Panel
BSP = Blower Service Panel
CSP = Compressor Service Panel
PSP = Pump and Flow Meter Service Panel
FAP = Filter Drier Access Panel

Horizontal Installation

Figure 6: Typical Closed Loop Horizontal Unit Installation (with Internal Flow Controller)



Horizontal Installation

Field Conversion of Air Discharge

Overview - Horizontal units can be field converted between side (straight) and back (end) discharge using the instructions below.

Note: It is not possible to field convert return air between left or right return models due to the necessity of refrigeration copper piping changes.

Preparation - It is best to field convert the unit on the ground before hanging. If the unit is already hung it should be taken down for the field conversion.

Side to Back Discharge Conversion

1. Place unit in well lit area. Remove the screws as shown in Figure 7 to free top panel and discharge panel.
2. Lift out the access panel and set aside. Lift and rotate the discharge panel to the other position as shown, being careful with the blower wiring.
3. Check blower wire routing and connections for tension or contact with sheet metal edges. Reroute if necessary.
4. Check refrigerant tubing for contact with other components.
5. Reinstall top panel and screws noting that the location for some screws will have changed.
6. Manually spin the fan wheel to ensure that the wheel is not rubbing or obstructed.
7. Replace access panels.

Back to Side Discharge Conversion - If the discharge is changed from back to side, use above instruction noting that illustrations will be reversed.

Left vs. Right Return - It is not possible to field convert return air between left or right return models due to the necessity of refrigeration copper piping changes. However, the conversion process of side to back or back to side discharge for either right or left return configuration is the same. In some cases, it may be possible to rotate the entire unit 180 degrees if the return air connection needs to be on the opposite side. Note that rotating the unit will move the piping to the other end of the unit.

Figure 7: Left Return Side to Back

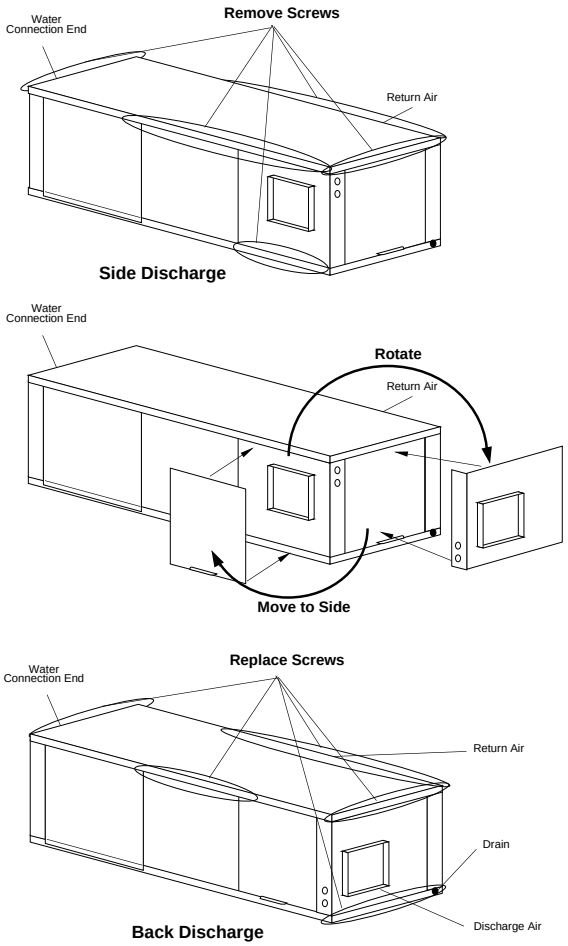
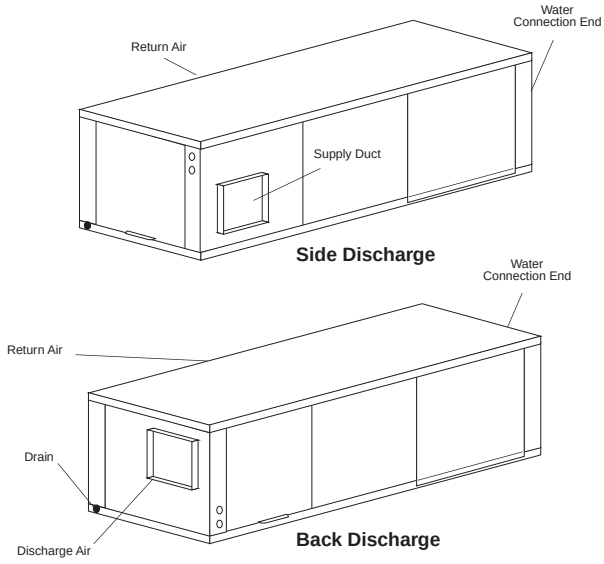


Figure 8: Right Return Side to Back



Condensate and Water Connection

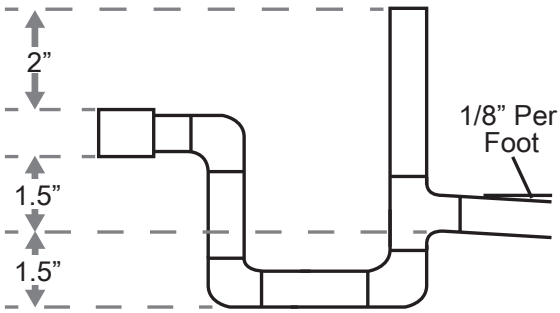
Condensate Piping
Pitch the unit toward the drain to improve the condensate drainage.

Install condensate trap at each unit with the top of the trap positioned below the unit condensate drain connection as shown in Figure 9. Design the depth of the trap (water-seal) based upon the amount of External Static Pressure (ESP) capability of the blower (where 2 inches [51mm] of ESP capability requires 2 inches [51mm] of trap depth). As a general rule, 1-1/2 inch [38mm] trap depth is the minimum.

Each unit must be installed with its own individual trap and connection to the condensate line (main) or riser. Provide a means to flush or blow out the condensate line. DO NOT install units with a common trap and/or vent.

Always vent the condensate line when dirt or air can collect in the line or a long horizontal drain line is required. Also vent when large units are working against higher external static pressure than other units connected to the same condensate main since this may cause poor drainage for all units on the line. WHEN A VENT IS INSTALLED IN THE DRAIN LINE, IT MUST BE LOCATED AFTER THE TRAP IN THE DIRECTION OF THE CONDENSATE FLOW.

Figure 9: Condensate Connection



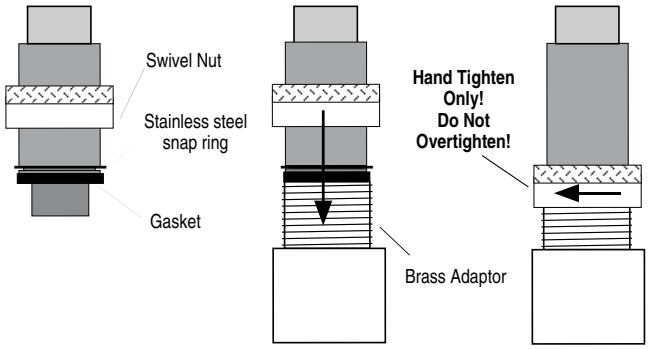
⚠ CAUTION! ⚠

CAUTION! Ensure condensate line is pitched toward drain 1/8 inch per ft [11mm per m] of run.

Water Connections-Residential (Distributor) Models
Residential models utilize swivel piping fittings for water connections that are rated for 450 psi (3101 kPa) operating pressure. **(Note that units with an internal variable-speed pump and flow meter have a maximum pressure rating of 100 PSI [689 kPa]). Pressure in excess of 100 PSI (689 kPa) will damage the unit.** The connections have a rubber gasket seal similar to a garden hose gasket, which when mated to the flush end of most 1” threaded male pipe fittings provides a leak-free seal without the need for thread sealing tape or joint compound. Check for burrs and ensure that the rubber seal is in the swivel connector prior to attempting any connection (rubber seals are shipped attached to the swivel connector). DO NOT OVER TIGHTEN or leaks may occur.

The female locking ring is threaded onto the pipe threads which holds the male pipe end against the rubber gasket, and seals the joint. HAND TIGHTEN ONLY! DO NOT OVERTIGHTEN!

Figure 10: Water Connections



⚠ WARNING! ⚠

WARNING! Polyolester Oil, commonly known as POE oil, is a synthetic oil used in many refrigeration systems including those with HFC-410A refrigerant. POE oil, if it ever comes in contact with PVC or CPVC piping, may cause failure of the PVC/CPVC. PVC/CPVC piping should never be used as supply or return water piping with water source heat pump products containing HFC-410A as system failures and property damage may result.

vFlow™ Heat Pump Applications Overview

vFlow™ is a revolutionary new, intelligent, and efficient way to circulate water (or water plus antifreeze) using INTERNAL, variable water flow control. The factory-installed high-efficiency variable-speed pump uses 60%-80% less wattage than a traditional fixed speed pump. vFlow™ technology improves performance of the unit by reducing the amount of energy required to optimize the flow of water throughout a GHP System and also reduces the space, cost, and labor required to install external water flow control mechanisms (flow controllers, solenoid and flow control valves).

vFlow™ Configuration:

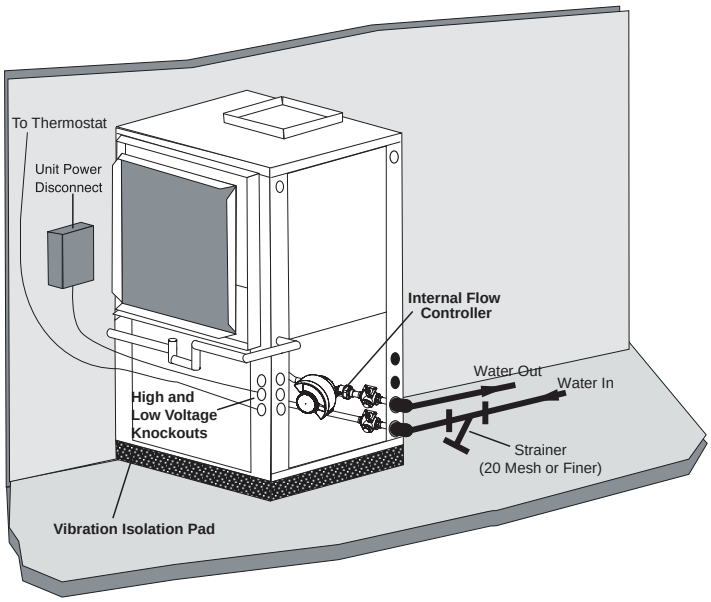
Internal Flow Controller - For Closed Loop Applications

This is the most common configuration for closed loops. With this factory-installed standard option, the unit is built with an Internal Variable Speed Pump and other components to flush and operate the unit correctly (including an expansion tank, flush ports and flushing valves). The pump speed is controlled by the EXM control based on the difference in entering and leaving water temperatures (ΔT). The Internal Flow Controller pump includes an internal check valve for multiple unit installations.

Note: Internal Flow Controllers are also very suitable for multiple unit installations depending on pump performance requirements.

Details are included in the following sections on ground loop applications.

Figure 11: Typical Closed-Loop Application (with Internal Flow Controller Shown)



⚠ CAUTION! ⚠

CAUTION! The following instructions represent industry accepted installation practices for closed loop earth coupled heat pump systems. Instructions are provided to assist the contractor in installing trouble free ground loops. These instructions are recommendations only. State/provincial and local codes MUST be followed and installation MUST conform to ALL applicable codes. It is the responsibility of the installing contractor to determine and comply with ALL applicable codes and regulations.

Closed Loop Heat Pump Applications with Internal Flow Controller

Units with internal flow control come with a built-in variable speed pump, an expansion tank, flushing ports and three-way valves (used to flush the unit). The variable speed pump is controlled by the EXM board based on the difference between the entering and leaving water temperature (ΔT). For operation outside of the normal entering water temperature range (50° or 60°F - 110°F for cooling, 30°F-70°F for heating) the EXM controller automatically adjusts the control ΔT to account for the abnormal entering water temperatures, maintaining an appropriate flow rate for proper unit operation. When entering water temperatures are abnormally low for cooling, or abnormally high for heating, the EXM controller will maintain suction and discharge pressures within the normal operating envelope of the compressor which will allow the unit to operate properly under those conditions. The internal expansion tank helps to maintain constant loop pressure despite the natural expansion and contraction of the loop as the seasons and loop temperatures vary to help avoid flat loop callbacks.

Pre-Installation

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

Piping Installation

The typical closed loop ground source system is shown in Figures 6 and 11. All earth loop piping materials should be limited to polyethylene fusion only for in-ground sections of the loop and it is also recommended for inside piping. Galvanized or steel fittings should not be used at any time due to their tendency to corrode. All plastic to metal threaded fittings should be avoided due to their potential to leak in ground loop applications. Loop temperatures can range between 25 and 110°F [-4 to 43°C]. Flow rates between 2.25 and 3 gpm per ton [2.41 to 3.23 l/m per kW] of cooling capacity is recommended in these applications.

Test individual horizontal loop circuits before backfilling. Test vertical U-bends and pond loop assemblies prior to installation. Pressures of at least 100 psi [689 kPa] should be used when testing the ground loop. Do not exceed the pipe pressure rating. Test entire ground loop when all loops are assembled.

Never exceed 100 psig pressure in a Trilogy unit.

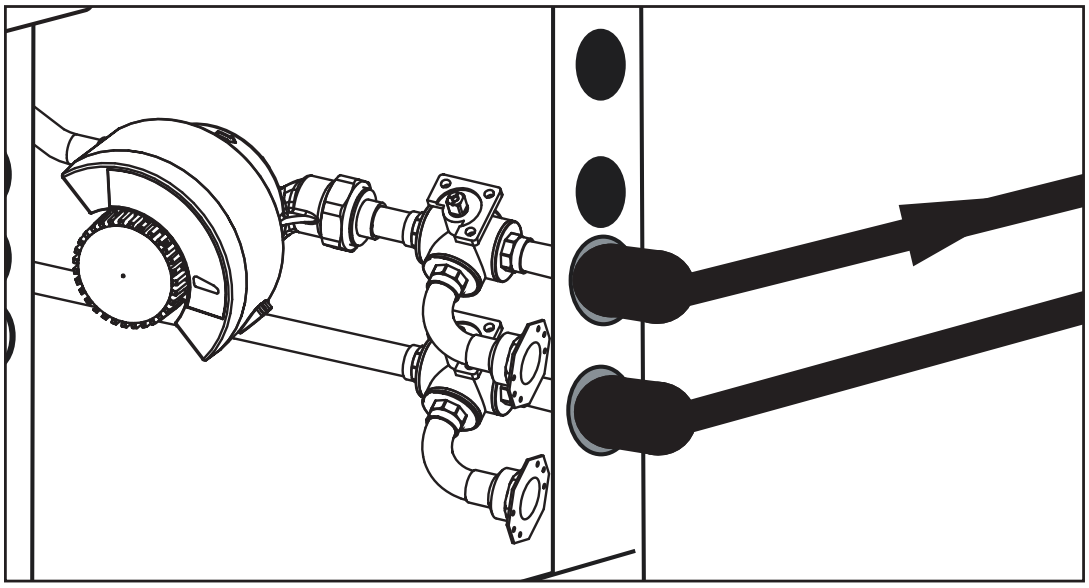
Exceeding 100 psig in a Trilogy unit will damage the internal pressure sensor. If pressure greater than 100 psig are desired for loop/piping testing the Trilogy unit must be isolated from that pressure by manual shut-off valves during pressure testing.

The following section will help to guide you through flushing a unit with internal flow control.

⚠ NOTICE! ⚠

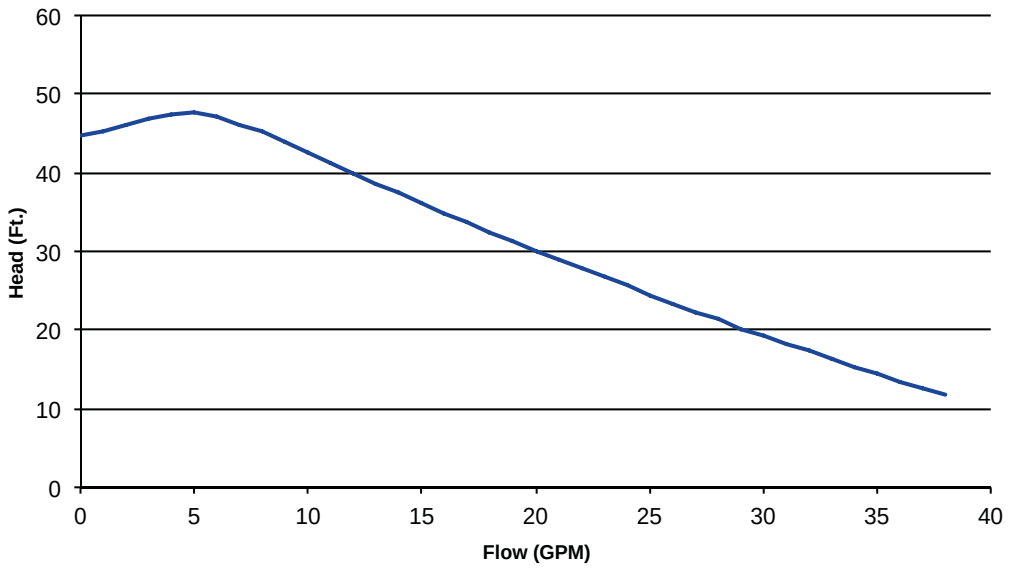
NOTICE! If installing MULTIPLE vFlow™ Internal Variable Speed Flow Controller units (in parallel) on one loop, please refer to section 'Multiple Unit Piping and Flushing' (later in this document).

Figure 12: Internal Flow Controller



Closed Loop Heat Pump Applications with Internal Flow Controller

Figure 13a: Magna Geo 25-140 (High Head) Pump Performance



GPM	Head (ft)
0.0	44.7
1.0	45.4
2.0	46.1
3.0	46.8
4.0	47.5
5.0	47.7
6.0	47.1
7.0	46.1
8.0	45.3
9.0	43.9
10.0	42.6
11.0	41.2
12.0	39.9
13.0	38.7
14.0	37.4
15.0	36.1
16.0	34.9
17.0	33.7
18.0	32.5
19.0	31.3
20.0	30.1
21.0	28.9
22.0	27.8
23.0	26.7
24.0	25.6
25.0	24.5

Flushing the Earth Loop

Once piping is completed between the unit and the ground loop, final purging and charging of the loop is needed.

A flush cart (at least a 1.5 hp [1.1kW] pump) is needed to achieve adequate flow velocity in the loop to purge air and dirt particles from the loop itself. Antifreeze solution is used in most areas to prevent freezing. Antifreeze should be used where piping passes through an area that may drop below freezing or any time the LWT of the unit may drop below 40°F. All air and debris must be removed from the earth loop piping system before operation. **Flush the loop with a high volume of water at a high velocity (2 fps [0.6 m/s] in all piping)** using a filter or flush bag in the loop return line of the flush cart to eliminate debris from the loop system. **Filtration of at least 100 microns should be used during the flushing process to ensure any debris that might clog/damage the heat exchanger or pump is removed.** See Table 1 for flow rate required to attain 2fps [0.6 m/s]. The steps below must be followed for proper flushing.

Table 1: Minimum Flow Required to Achieve 2 ft/sec variety

PE Pipe Size	Flow (GPM)
3/4"	4
1"	6
1 1/4"	10
1 1/2"	13
2"	21

Units with internal variable speed pumps also include a check valve internal to the pump. It is not possible to flush backwards through this pump. Care must be taken to connect the flush cart hoses so that the flush cart discharge is connected to the “water in” flushing valve of the heat pump.

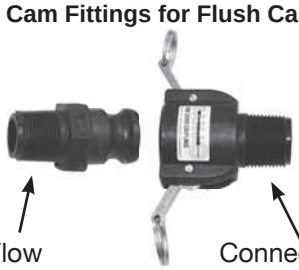
Loop Fill
Fill loop (valve position A, see Figure 15a) with water from a garden hose through flush cart before using flush cart pump to ensure an even fill and increase flushing speed. When water consistently returns back to the flush reservoir, switch to valve position B (figure 15b) to fill the unit.

Figure 14a: Typical Cleanable Flush Cart Strainer (100 mesh [0.149mm])

⚠ WARNING! ⚠

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

Figure 14b: Cam Fittings for Flush Cart Hoses



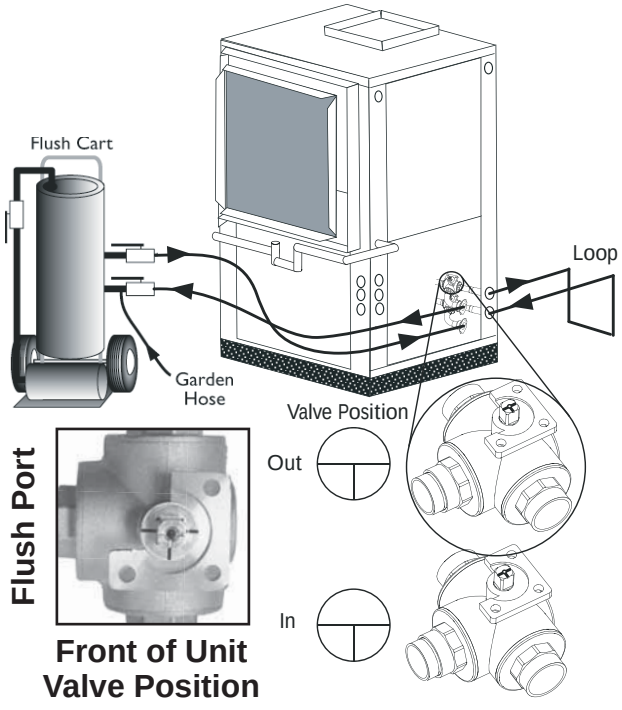
Isolate expansion tank during the flushing procedure using the ball valve. During dead heading of flush cart pump, isolation will prevent compression of bladder in the expansion tank and flush cart fluid level dropping below available capacity.

NOTICE: A hydrostatic pressure test is required on ALL piping, especially underground piping before final backfill per IGSHPA and the pipe manufacturers recommendations.

⚠ CAUTION! ⚠

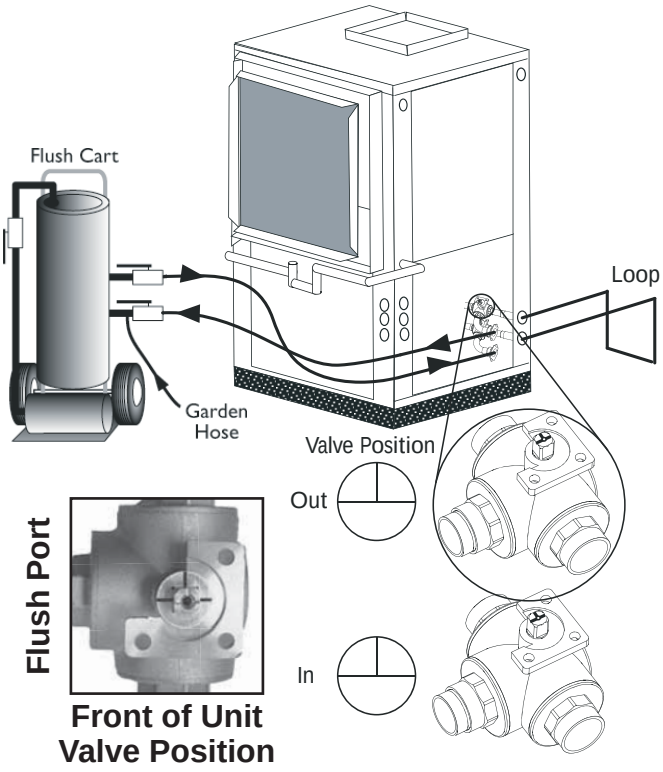
CAUTION! Never exceed a pressure of 100 psig in a Trilogy unit. Pressure greater than 100 psig will damage the unit pressure sensor causing the unit to miscommunicate certain data points and may cause the unit to nuisance fault.

Figure 15a: Valve Position A - Loop Fill/Flush



Flushing the Earth Loop

Figure 15b: Valve Position B - Unit Fill



Unit Fill

Unit fill valves should be switched to Position B to fill the unit heat exchanger (see Figure 15b). The valves position should be maintained until water is consistently returned into the flush reservoir.

⚠ CAUTION! ⚠

CAUTION! Never exceed a pressure of 100 psig in a Trilogy unit. Pressure greater than 100 psig will damage the unit pressure sensor causing the unit to miscommunicate certain data points and may cause the unit to nuisance fault.

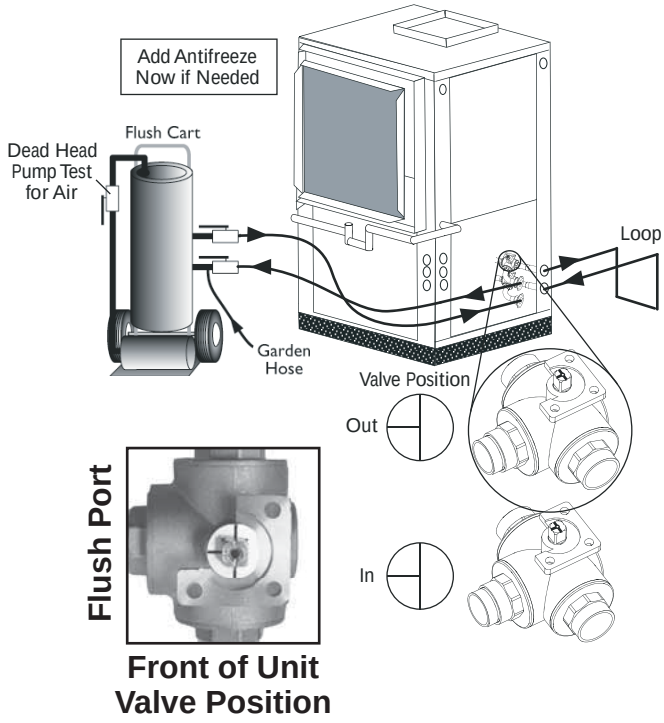
Loop Flush

Switch to valve Position A. The supply water may be shut off and the flush cart turned on to begin flushing. Once the flush reservoir is full, do not allow the water level in the flush cart tank to drop below the pump inlet line or air can be pumped back out to the earth loop. Try to maintain a fluid level in the tank above the return tee so that air can not be continuously mixed back into the fluid. Surges of 50 psi [345 kPa] can be used to help purge air pockets by simply shutting off the flush cart return valve going into the flush cart reservoir. This process 'dead heads' the pump to 50 psi [345 kPa]. To dead head the pump until maximum pumping pressure is reached, open the valve back up and a pressure surge will be sent through the loop to help purge air pockets from the piping system. Notice the drop in fluid level in the flush cart tank. If all air is purged from the system, the level will drop only 3/8" in a 10" [25.4 cm] diameter PVC flush tank (about a half gallon [1.9 liters]) since liquids are incompressible. If the level drops more than this level, flushing should continue since air is still being compressed in the loop fluid. Do this a number of times.

NOTICE: Actual flushing time require will vary for each installation due to piping length, configuration, and flush cart pump capacity. 3/8" or less fluid level drop is the ONLY indication that flushing is complete.

Move valves to position C. By switching both valves to this position, water will flow through the loop and the unit heat exchanger. Finally, the dead head test should be checked again for an indication of air in the loop. Fluid level drop is your only indication of air in the loop.

Figure 15c: Valve Position C - Full Flush



Pressurize and Operate

As shown in Figure 15d, close the flush cart return valve to pressurize the loop to at least 50 psi [345 kPa], not to exceed 75 psi [517 kPa]. Open the isolation valve to the expansion tank and bleed air from the expansion tank piping using the schraeder valve located in front of the expansion tank. This will allow loop pressure to compress the expansion tank bladder, thus charging the expansion tank

Flushing the Earth Loop

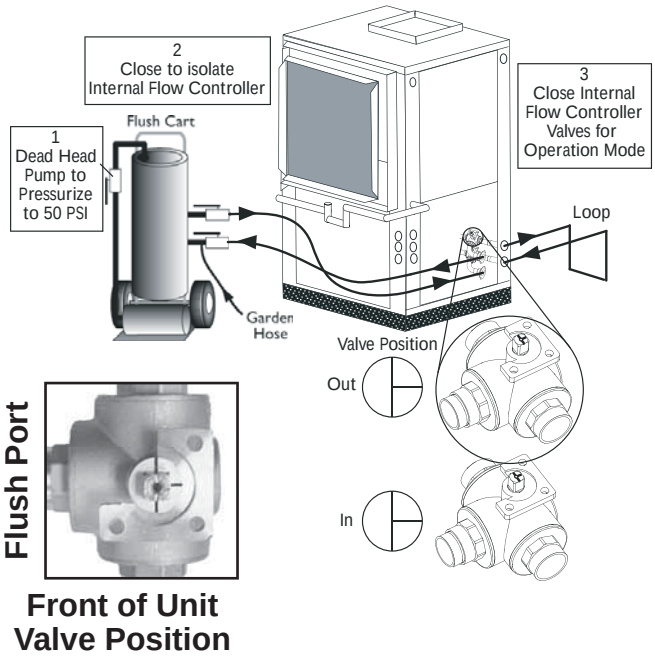
with liquid. After pressurizing, close the flush cart supply valve to isolate the flush cart. Move the Flow Controller valves to Position D.

Loop static pressure will fluctuate with the seasons and pressures will be higher in the winter months than during the cooling season. This fluctuation is normal and should be considered when charging the system initially. Unhook the flush cart from the Internal Flow Controller. Install Flow Controller caps to ensure that any condensation/leakage remains contained within the Flow Controller package.

If the loop pressure is between 50 and 75 psi [345 to 517 kPa] upon completion of flushing, pressures should be sufficient for all seasons.

NOTICE: It is recommended to run the unit in the heating, then cooling mode for 15-20 minutes each to 'temper' the fluid temperature and prepare it for pressurization. This procedure helps prevent the periodic "flat" loop condition of no pressure.

Figure 15d: Valve Position D - Pressurize and Operation



Multiple Unit Piping and Flushing

Often projects require more than one heat pump. Where possible, it makes sense for multiple units to share a common ground loop. Common ground loops for multiple units bring new challenges including the need to avoid backward flow through inactive units, increased pumping requirements, and more complex flushing needs. Below are guidelines for multiple unit piping and flushing on a common loop.

Units equipped with an internal flow controller (vFlow™) include an internal variable speed circulator controlled by the EXM microprocessor, internal 3-way flushing valves and an internal bladder type expansion tank. The internal pump includes an internal check valve. The pump curves for the internal circulator are shown in Figures 13a and 13b. The internal expansion tank will operate as a pressure battery for the geothermal system. It will absorb fluid from the loop when loop pressure rises and inject fluid into the loop when loop pressure falls. In this way the expansion tank will help to maintain a more constant loop pressure and avoid flat loops due to seasonal pressure changes in the loop.

When using the internal variable speed pump as the loop pump in multiple unit installations it is important to ensure that the variable speed pump can provide adequate flow through the heat pump against the loop head when all units are operating.

It may be possible to flush a multiple unit system through the unit's flushing valves. Flushing pressure drop of the valve may be calculated to determine if it is acceptable. Engineering data for the 3-way flushing valves can be found in Table 2.

Table 2: Internal 3-Way Flushing Valve Data

Model	Inlet Flushing Valve	Outlet Flushing Valve
QE*0930	3/4" FPT	3/4" MPT
QE*1860	3/4" FPT	1" MPT

Valve Size	Straight Flow (Normal Operation) Cv	90° Flow (Flushing) Cv
¾"	25	10.3
1"	58	14.5

⚠ CAUTION! ⚠

CAUTION! Never exceed a pressure of 100 psig or a flow rate of 30 gpm in a Trilogy unit. Pressure greater than 100 psig or flow rates greater than 30 gpm will damage the unit sensors causing the unit to miscommunicate certain data points and may cause the unit to nuisance fault.

For example, if a system includes two QE0930 units and four ¾ loop circuits we can calculate the flushing pressure drop as follows. From Table 1 we know that it will take 4 gpm to flush each ¾" circuit. If there is no provision to isolate the circuits for flushing, we will have to flush with a minimum of 4 circuits x 4 gpm/circuit = 16 gpm total. A check of other piping sizes used must be done to ensure that 16 gpm total flow will flush all piping.

Pressure drop through the flushing valve can be calculated using the following formula.

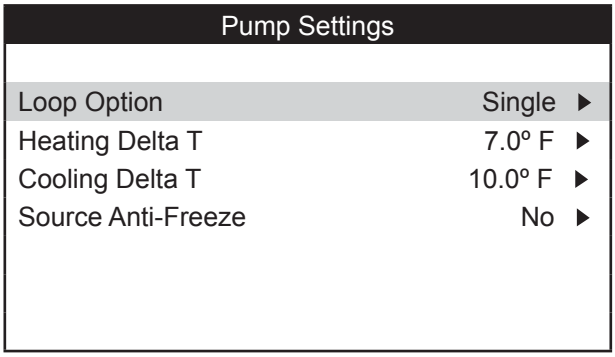
$\Delta P = (GPM/Cv)^2$ where,

ΔP = pressure drop in psi through the valve while flushing
GPM = flushing flow in gallons per minute
Cv = valve Cv in flushing mode

We know from Table 2 that the Cv for the flushing valve in a QE0930 is 10.3 in the flushing mode (90° flow). Therefore, $\Delta P = (GPM/Cv)^2 = (16/10.3)^2 = 2.4$ psi per valve (there are two flushing valves). So long as the flushing pump is able to provide 16 gpm at the flushing pressure drop of the loop plus the 2.4 x 2 valves = 4.8 psi (11 ft of hd) of the flushing valves, the internal flushing valves may be used. If the flushing pump is not able to overcome the pressure drop of the internal flushing valves, then larger external flushing valves must be used.

Unit Configuration
Multiple vFlow™ units with internal variable-speed flow controller and check valve, piped in parallel sharing a common loop MUST be properly configured. Use the iGate™ Connect thermostat to configure the loop. **Note: An access code is required to enter the Installation Settings menu from the iGate Connect thermostat. The access code is 4795.** It must be entered using the arrow keys on the thermostat to select each number and the OK button to enter each one.

Figure 16: Thermostat Screen - Pump Settings



Go to MAIN MENU>SETTINGS>INSTALLATION SETTINGS>EQUIPMENT>UNIT CONFIG>LOOP CONFIG to ensure the unit is configured for a variable speed internal pump (VS Pump). Then, to configure the unit for multiple units on a single loop go to MAIN MENU>SETTINGS>INSTALLATION SETTINGS> EQUIPMENT>LOOP PUMP CONFIG>LOOP OPTION and select 'Parallel'. This will set the unit to use special control logic for parallel units on a common ground loop.

Multiple Unit Piping and Flushing

Multiple Units with Internal Flow Controllers
The simplest multiple unit system is one with two (or more) units utilizing internal Flow Controllers with no external pumps or flushing valves. In this case the units are piped in parallel and use the internal flushing valves to flush the system. The variable speed pump includes an internal check valve to prevent back (short circuiting) flow through the units.

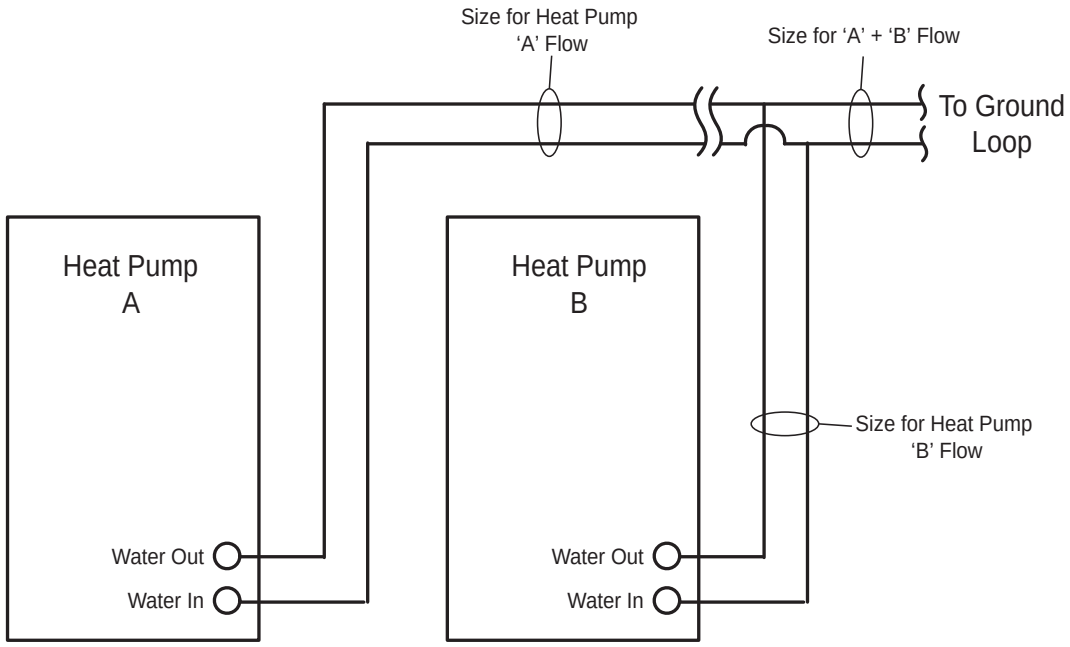
In this case, flush the loop through the internal flushing valves in the unit farthest from the loop first. Once the loop is flushed, change the internal flushing valves to flush the heat pump and loop together. Next, move the flushing cart to the next closest unit to the loop.

Again, flush the loop through the internal flushing valves. This is important as there may be air/debris in the lines from this unit to the common piping. Once flushing begins the air will be move into the loop and will need to be flushed out. After the loop is flushed through the second unit, change the flushing valves to flush the second unit and the loop. This process should be repeated for additional units working from the farthest from the loop to the closest to the loop.

This type of application can generally be employed for systems to 12 tons depending on loop design. However, it is important perform appropriate calculations to confirm that the variable speed pump can provide adequate flow through all heat pumps against the loop head when all units are operating.

Multiple Units with Internal Flow Controllers and External Flushing Valves
When the number of units or flushing requirements reaches a point where it is no longer feasible to flush through the internal valves (generally systems of more than 12 tons depending on loop design), external flushing valves should be installed. In this

Figure 16a: Multiple Units with Internal Flow Controllers



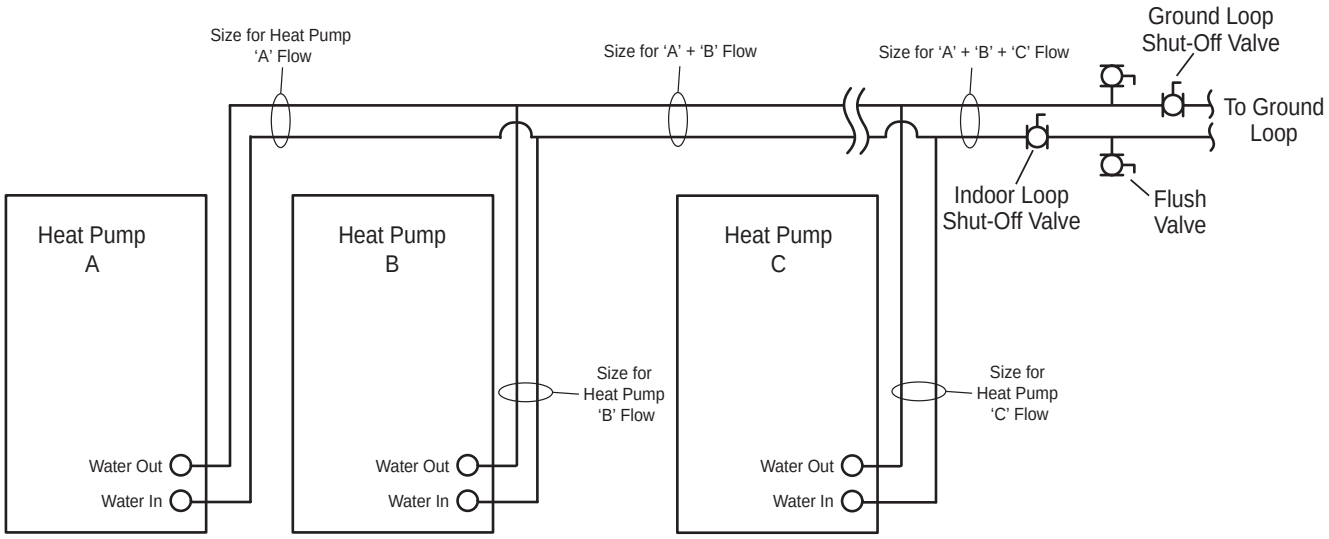
case, three-way flushing valves should be used or additional isolation valves must be installed to be able to isolate the loop during flushing.

First, flush the ground loop. The installer should close the indoor loop shut-off valve (or the internal flushing valves in all units) and open the ground loop shut-off valve to prevent flow through the indoor loop while flushing the ground loop.

Once the ground loop is flushed, close the ground loop shut-off valve and open the indoor loop valve(s) to flush the units and indoor piping. Remember that there is an internal check valve in the variable speed pump and that backward flow the unit is not possible.

Multiple Unit Piping and Flushing

Figure 16b: Multiple Units with Internal Flow Controllers and External Flushing Valves



Ground Loop Heat Pump Applications

Antifreeze Selection - General
In areas where minimum entering loop temperatures drop below 40°F [4.4°C] or where piping will be routed through areas subject to freezing, antifreeze is needed. Alcohols and glycols are commonly used as antifreeze solutions. Your local representative should be consulted for the antifreeze best suited to your area. Freeze protection should be maintained to 15°F [8.5°C] below the lowest expected entering loop temperature.

Initially calculate the total volume of fluid in the piping system using Table 3. Then use the percentage by volume shown in Table 4 for the amount of antifreeze. Antifreeze concentration should be checked from a well mixed sample using a hydrometer to measure specific gravity.

Table 3: Fluid Volume

Fluid Volume (gal [liters] per 100' [30 meters] Pipe)		
Pipe	Size	Volume (gal) [liters]
Copper	1"	4.1 [15.3]
	1.25"	6.4 [23.8]
	2.5"	9.2 [34.3]
Polyethylene	3/4" IPS SDR11	2.8 [10.4]
	1" iPS SDR11	4.5 [16.7]
	1.25" IPS SDR11	8.0 [29.8]
	1.5" IPS SDR11	10.9 [40.7]
	2" IPS SDR11	18.0 [67.0]
Unit Heat Exchanger	Typical	1.0 [3.8]
Flush Cart Tank	10" Dia x 3ft tall [254mm x 91.4cm tall]	10 [37.9]

⚠ WARNING! ⚠

WARNING! Always dilute alcohols with water (at least 50% solution) before using. Alcohol fumes are flammable and can cause serious injury or death if not handled properly.

When handling methanol (or any alcohol), always wear eye protection and rubber gloves as alcohols are easily absorbed through the skin.

Table 4: Antifreeze Percentages by Volume

Type	Minimum Temperature for Low Temperature Protection			
	10°F [-12.2°C]	15°F [-9.4°C]	20°F [-6.7°C]	25°F [-3.9°C]
Methanol	21%	17%	13%	8%
Propylene Glycol	29%	24%	18%	12%
Ethanol*	23%	20%	16%	11%

* Must not be denatured with any petroleum based product

Contact your ClimateMaster distributor if you have any questions as to antifreeze selection.

⚠ WARNING! ⚠

WARNING! Always use properly marked vehicles (D.O.T. placards), and clean/suitable/properly identified containers for handling flammable antifreeze mixtures. Post and advise those on the jobsite of chemical use and potential dangers of handling and storage.

NOTICE: DO NOT use automotive windshield washer fluid as antifreeze. Washer fluid contains chemicals that will cause foaming.

⚠ CAUTION! ⚠

CAUTION! Always obtain MSDS safety sheets for all chemicals used in ground loop applications including chemicals used as antifreeze.

Antifreeze Charging
It is highly recommended to utilize premixed antifreeze fluid where possible to alleviate many installation problems and extra labor.

The following procedure is based upon pure antifreeze and can be implemented during the Full Flush procedure with three way valves in the Figure 15c - Valve Position C. If a premixed mixture of 15°F [-9.4°C] freeze protection is used, the system can be filled and flushed with the premix directly to prevent handling pure antifreeze during the installation.

1) Flush loop until all air has been purged from system and pressurize to check for leaks before adding any antifreeze.
2) Run discharge line to a drain and hook up antifreeze drum to suction side of pump (if not adding below water level through approved container). Drain flush cart reservoir down to pump suction inlet so reservoir can accept the volume of antifreeze to be added.
3) Calculate the amount of antifreeze required by first calculating the total fluid volume of the loop from Table 3. Then calculate the amount of antifreeze needed using Table 4 for the appropriate freeze protection level. Many southern applications require freeze protection because of exposed piping to ambient conditions.
4) Isolate unit and prepare to flush only through loop (see Figure 15a). Start flush cart, and gradually introduce the required amount of liquid to the flush cart tank (always introduce alcohols under water or use suction of pump to draw in directly to prevent fuming) until attaining the proper antifreeze protection. The rise in flush reservoir level indicates amount of antifreeze added (some carts are marked with measurements in gallons or liters). A ten inch [25.4 cm] diameter cylinder, 3 foot [91.4 cm] tall holds approximately 8 gallons [30.3 liters] of fluid plus the hoses (approx. 2 gallons, [7.6 liters], which equals about

Ground Loop Heat Pump Applications

10 gallons [37.9 liters] total. If more than one tankful is required, the tank should be drained immediately by opening the waste valve of the flush cart noting the color of the discharge fluid. Adding food coloring to the antifreeze can help indicate where the antifreeze is in the circuit and prevents the dumping of antifreeze out the waste port. Repeat if necessary.

5) Be careful when handling methanol (or any alcohol). Always wear eye protection and rubber gloves. The fumes are flammable, and care should be taken with all flammable liquids. Open flush valves to flush through both the unit and the loop and flush until fluid is homogenous and mixed. It is recommended to run the unit in the heating and cooling mode for 15-20 minutes each to 'temper' the fluid temperature and prepare it for pressurization. Devoting this time to clean up can be useful. This procedure helps prevent the periodic "flat" loop condition.
6) Close the flush cart return valve; and immediately thereafter, close the flush cart supply valve, leaving a positive pressure in the loop of approximately 50 psi [345 kPa]. This is a good time to pressure check the system as well. Check the freeze protection of the fluid with the proper hydrometer to ensure that the correct amount of antifreeze has been added to the system. The hydrometer can be dropped into the flush reservoir and the reading compared to Chart 1a for Methanol, 1b for Propylene Glycol, and 1c for Ethanol to indicate the level of freeze protection. Do not antifreeze more than a +10°F [-12.2°C] freeze point. Specific gravity hydrometers are available in the residential price list. Repeat after reopening and flushing for a minute to ensure good second sample of fluid. Inadequate antifreeze protection can cause nuisance low temperature lockouts during cold weather.

⚠ WARNING! ⚠

WARNING! Always dilute alcohols with water (at least 50% solution) before using. Alcohol fumes are flammable and can cause serious injury or death if not handled properly.

When handling methanol (or any alcohol), always wear eye protection and rubber gloves as alcohols are easily absorbed through the skin.

7) Close the flush cart return valve; immediately thereafter, close the flush cart supply valve, shut off the flush cart leaving a positive pressure in the loop of approximately 50-75 psi [345-517 kPa]. Refer to Figure 15d for more details.

Low Water Temperature Cutout Setting - When anti-freeze is used in the ground loop heat exchanger the EXM controller Source Anti-Freeze setting (MENU>SETTINGS>INSTALLATION SETTINGS>EQUIPMENT>LOOP PUMP CONFIG>SOURCE ANTI-FREEZE) should be changed to "Yes" for systems with anti-freeze(10°F evaporator temperature), or "No" for systems without anti-freeze (30°F evaporator temperature). See Figure 17.

An access code is required to enter the Installation Settings menu from the iGate Connect thermostat. The access code is 4795. It must be entered using the arrow keys on the thermostat to select each number and the OK button to enter each one.

Chart 1a: Methanol Specific Gravity

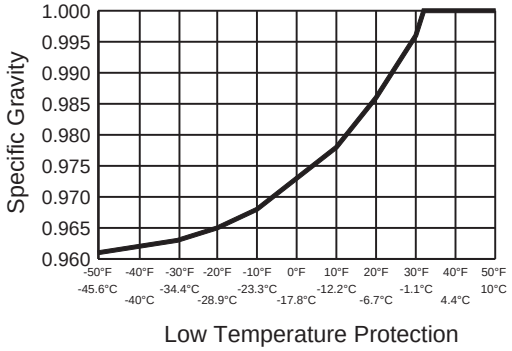


Chart 1b: Propylene Glycol Specific Gravity

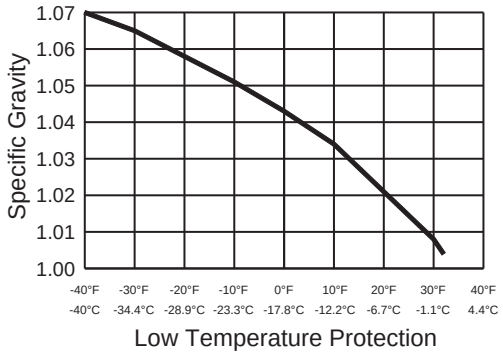


Chart 1c: Ethanol Specific Gravity

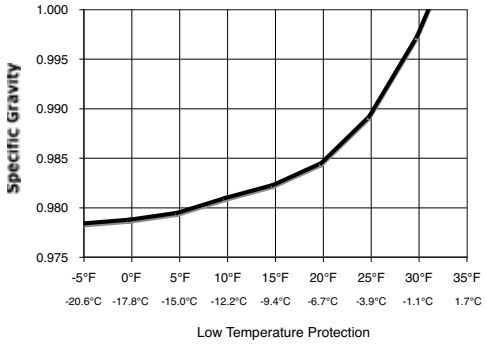
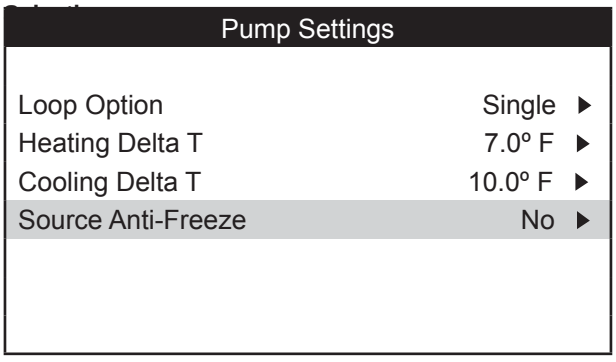


Figure C: Thermostat Screen - Low Temperature Cutout



Water Quality Requirements

Table 5: Water Quality Requirements for DHW Heat Exchanger

This guide is an attempt to give a picture of the resistance of the unit heat exchanger in water to corrosion by some important chemical factors. However, corrosion is actually a very complex process influenced by many different factors in combination. This table is therfore a considerable simplification, and its value should not be overestimated.

Water Containing	Concentration (mg/l or ppm)	Resistance
Alkalinity ($HCO3^-$)	< 70	+
	70-300	+
	> 300	+
Sulfate ($SO4^{2-}$)	< 70	+
	70-300	+
	> 300	0
$HCO3^-$ / $SO4^{2-}$	> 1.0	+
	< 1.0	+
Electrical Conductivity	< 10 µS/cm	+
	10-500 µS/cm	+
	> 500 µS/cm	+
pH	< 6.0	0
	6-7.5	0/+
	7.5-9.0	+
	> 9.0	+
Ammonia (NH3)	< 2	+
	2-20	+
	> 20	+
Chlorides (CL^-) (140°F maximum)	< 300	+
Free Chlorine (CL2)	< 1	+
	1-5	+
	> 5	0/+
Hydrogen Sulfide	< 0.05	+
	> 0.05	+
Free (aggressive) Carbon Dioxide (CO2)	< 5	+
	5-20	+
	> 20	+
Total Hardness (°dH)	4.0-8.5	+
Nitrate (NO3)	< 100	+
	> 100	+
Iron (Fe)	< 0.2	+
	> 0.2	+
Aluminum (Al)	< 0.2	+
	> 0.2	+
Manganese (Mn)	< 0.1	+
	> 0.1	+

Explanations:

+ Good resistance under normal conditions

0 Corrosion problems possible, particularly when there are other factors rated 0

− Use is not recommended

Hot Water Mode

The Trilogy unit provides significant savings when used to heat domestic water. Domestic hot water is available on demand and is available year round utilizing heat from the earth or reclaiming wasted heat from the space cooling mode. Hot water capacities are provided in the appropriate Trilogy performance data.

The Trilogy Q - Mode geothermal unit has two dedicated hot water modes, 1) heating domestic hot water with heat from the geothermal source and 2) heating domestic hot water with heat from the space cooling mode. The Trilogy unit is designed to be used with the iGate Connect thermostat and the iGate Smart Tank. The iGate Connect thermostat allows the installer to configure the water heating mode settings directly from the thermostat and allows the user to change water heating settings.

Configuring the Hot Water Mode
To configure the hot water pump via the potable water temperature difference go to MENU>SETTINGS>INSTALLATION SETTINGS>EQUIPMENT>HW PUMP CONFIG>WATER HEATING DELTA T.

An access code is required to enter the Installation Settings menu from the iGate Connect thermostat. The access code is 4795. It must be entered using the arrow keys on the thermostat to select each number and the OK button to enter each one.

Water Heating Delta T Sets the potable water flow rate for the water heating mode. The variable speed potable water pump will adjust the potable water flow to maintain the selected temperature difference between the entering and leaving potable water during the water heating mode. Valid range: 8.0°F to 12.0°F.

To configure the thresholds of the water heating mode go to MENU>SETTINGS>INSTALLATION SETTINGS> THRESHOLDS>ADVANCED SETTINGS>QE. There you will be able to configure the Cooling-HW Cut Out, the Cooling-HW Cut Out Offset, the Heating-HW Cut Out, and the Heating-HW Cut Out Offset.

Cooling-HW Cut Out Determines the point at which the space cooling demand outpaces the ability of the potable water heating mode to accept the heat of rejection from the cooling mode, when both are active at the same time. At this setting and above the heat of rejection from the cooling mode will be sent to the source (ground loop). Valid range: 70% to 100%. Default is 100%.

Cooling-HW Cut Out Offset This setting establishes the maximum acceptable space temperature rise during the cooling mode while the heat from the space is being rejected into the potable hot water. If the space temperature rises more than this amount, the potable water heating mode will be terminated and the cooling mode will reject the heat from the space to the source (ground loop). Valid range: 0.5°F to 1.5°F. Default is 1.0°F.

Heating-HW Cut Out Potable water heating normally takes priority over space heating. This setting determines the point at which the space heating demand will take priority over the potable water heating demand. Valid range: 70% to 100%. Default is 90%.

Heating-HW Cut Out Offset This setting establishes the maximum acceptable space temperature drop during the potable hot water mode before the unit switches to the space heating mode. If the space temperature drops more than this amount, the potable water heating mode will be terminated and the space heating mode will be activated. Valid range: 0.5°F to 1.5°F. Default is 1.0°F.

The Hot Water Heat Deadband can be configured at MENU> SETTINGS>INSTALLATION SETTINGS> THRESHOLDS> ADVANCED SETTINGS>AWS> HW HEAT DEADBAND.

HW Heat DeadBand Configures the amount of droop allowed from the potable Hot Water setpoint before activating water heating. Valid range: 10°F to 25°F. Default is 15°F.

Hot Water operation can be configured at MENU>HOT WATER

Hot Water Setpoint Establishes the set point for your hot water. Available range: 50°F to 135°F in 1°F increments. Default is 120°F.

⚠ WARNING! ⚠

WARNING! USING A HOT WATER SETPOINT OF 125°F OR ABOVE WILL RESULT IN WATER TEMPERATURES SUFFICIENT TO CAUSE SEVERE PHYSICAL INJURY IN THE FORM OF SCALDING OR BURNS. A HOT WATER SET POIINT TEMPERATURE ABOVE 125°F MUST ONLY BE USED ON SYSTEMS THAT EMPLOY AN APPROVED ANTI-SCALD VALVE (PART NUMBER AVAS4) AT THE HOT WATER STORAGE TANK WITH SUCH VALVE PROPERLY SET TO CONTROL WATER TEMPERATURES DISTRIBUTED TO ALL HOT WATER OUTLETS AT A TEMPERATURE LEVEL THAT PREVENTS SCALDING OR BURNS!

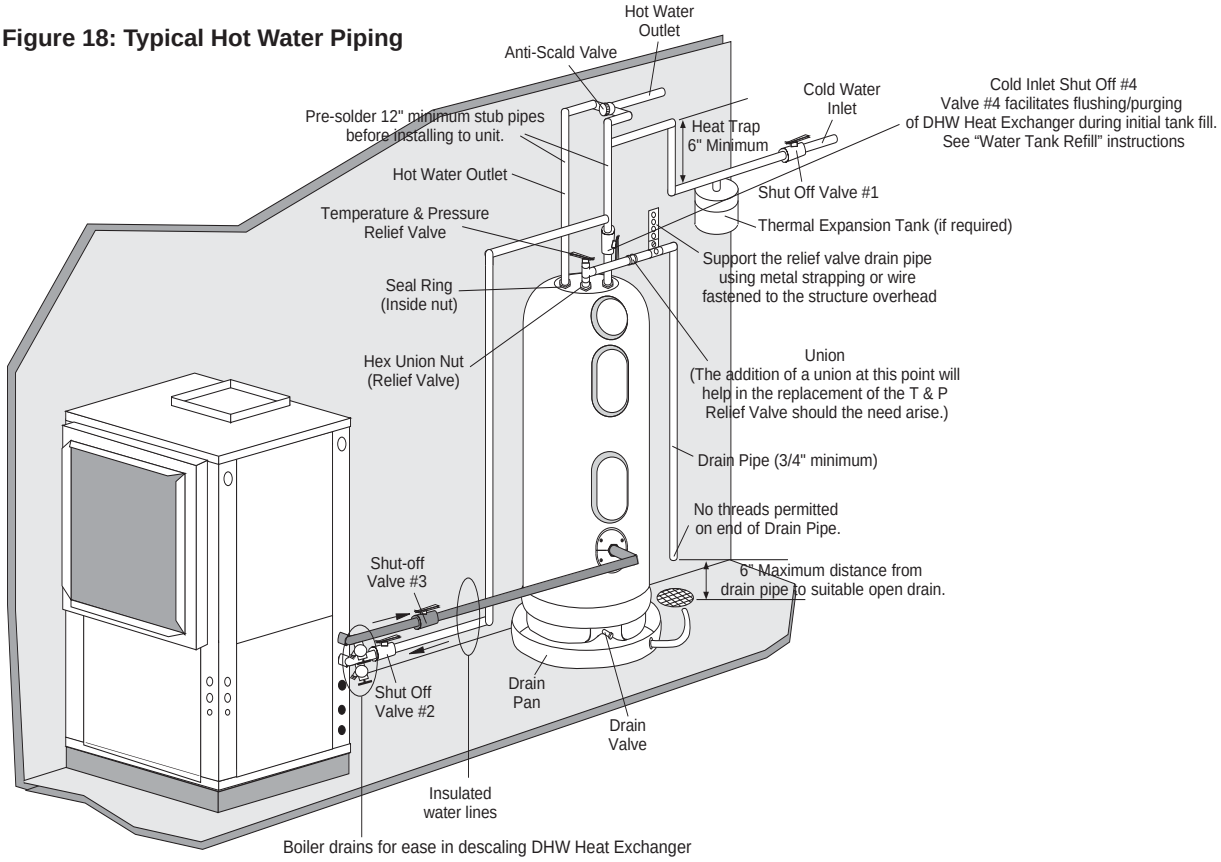
Hot Water Mode Determines the heat source for your hot water. Available selections: Off, Heat Pump, or Emergency Heat (electric tank elements).

Hot Water Efficiency When Hot Water Efficiency is enabled **(ON)** the AWS backup electric elements will operate when the connected heat pump is locked out or when the heat pump cannot keep up with the household hot water demand. When Hot Water Efficiency is disabled **(OFF)** the iGate Smart Tank electric elements will engage sooner when the connected heat pump is locked out or when the heat pump cannot keep up with the household hot water demand. Available selections: OFF or ON.

Hot Water Mode

Figure D shows a typical example of potable water piping connections.

Figure 18: Typical Hot Water Piping



It is always advisable to use water softening equipment on domestic water systems to reduce the scaling potential and lengthen equipment life. In extreme water conditions it may be necessary to avoid using the heat pump water heating mode since the potential cost of frequent maintenance may offset or exceed the heat pump savings. Consult Table 6 for scaling potential.

The iGate Smart Tank utilizes two tank sensors (one at the upper element and one at the lower element), the tank microprocessor control (WXM), and the Trilogy microprocessor control (EXM). During normal operation the WXM communicates the tank temperatures to the EXM and the EXM determines when to operate the heat pump and disables the tank electric heating elements. During abnormal conditions the WXM may enable the electric elements to supplement or supplant the heat pump operation.

⚠ WARNING! ⚠

WARNING! UNDER NO CIRCUMSTANCES SHOULD THE SENSORS BE DISCONNECTED OR REMOVED. FULL LOAD CONDITIONS CAN DRIVE HOT WATER TANK TEMPERATURES FAR ABOVE SAFE TEMPERATURE LEVELS IF SENSORS ARE DISCONNECTED OR REMOVED.

The hot water mode takes precedent over space conditioning under most circumstances. Under extreme space conditioning loads the heat pump may exit the hot water mode to satisfy the space requirements. In that case the WXM may enable operation of the electric heating elements while the heat pump is satisfying the space load.

The WXM controller relays tank water temperature to the heat pump. It includes a fault and status LED. The green status LED will be illuminated continuously unless the WXM has been placed in the test mode by pressing the test button and the WXM is enabling the operation of the electric elements. In the test mode the green LED will have a slow steady flash if the control is enabling the operation of the electric elements. Once placed in the test mode , the WXM controller will remain in the test mode for 20 minutes before reverting to normal operation.

No fault	1 flash
Defective upper element sensor	2 flashes
Defective lower element sensor	3 flashes

-Rapid flash = 2 flashes every 1 second
-Slow flash = 1 flash every 2 seconds
- Very slow flash = 1 flash every 5 seconds

Hot Water Mode

The heat pump, water piping, and hot water tank should be located where the ambient temperature does not fall below 50°F [10°C]. Keep water piping lengths at a minimum. DO NOT use a one way length greater than 100 ft. (one way) [15 m]. See Table 6 for recommended piping sizes and maximum lengths.

All installations must be in accordance with local codes. The installer is responsible for knowing the local requirements, and for performing the installation accordingly. DO NOT turn the hot water mode "ON" until "Initial Start-Up" section below is complete. Engaging the hot water mode before all installation steps are complete will damage the unit.

DHW Water Piping

1. Using at least 3/4" [12.7mm] I.D. copper, route and install the water piping and valves as shown in Figure 18. Install an approved anti-scald valve if the the hot water set point is set above 125°F. An appropriate method must be employed to purge air from the DHW piping. This may be accomplished by flushing water through the heat pump or by installing an air vent at the high point of the DHW piping system.
2. Insulate all DHW water piping with no less than 3/8" [10mm] wall closed cell insulation.
3. Make sure the tank drain valve is closed.
4. Check the union connections on the DHW pump to ensure they are tight before filling system.

Water Tank Refill

1. Close valve #4. Ensure that the DHW valves (valves #2 and #3) are open. Open the cold water supply (valve #1) to fill the tank through the DHW piping. This will force water flow through the DHW heat exchanger and purge air from the DHW piping.
2. Open a hot water faucet to vent air from the system until water flows from faucet; turn off faucet. Open valve #4.
3. Depress the hot water tank pressure relief valve handle to ensure that there is no air remaining in the tank.
4. Inspect all work for leaks.
5. Replace tank access covers and apply power to the storage tank.

Initial Start-Up

1. Make sure all valves in the DHW water circuit are fully open.
2. Turn on the heat pump hot water mode. From the home menu go to HOT WATER > HOT WATER MODE . Make sure the hot water set point is above the hot water temperature. The heat pump should begin to operate in the hot water mode.
3. Allow the unit to run a few minutes to stabilize. The temperature difference between the entering potable water and leaving potable water should match the temperature differential set at MENU > SETTINGS > INSTALLATION SETTINGS > EQUIPMENT > HW PUMP CONFIG > WATER HEATING DELTA T.

Table 6: DHW Water Piping Sizes and Length

Model	¾" Copper (max length*)	1" Copper (max length*)
0930	30	100
1860	30	100

*Maximum length is equivalent length (in feet) one way of type L copper.

⚠ CAUTION! ⚠

CAUTION! Use only copper piping for DHW piping due to the potential of high water temperatures for water that has been in the DHW heat exchanger during periods of no-flow conditions (DHW pump not energized). Piping other than copper may rupture due to high water temperature and potable water pressure.

Electrical - Line Voltage

⚠ WARNING! ⚠

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

⚠ CAUTION! ⚠

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

Power Connection
Line voltage connection is made by connecting the incoming line voltage wires to the terminal block as shown in Figure 19. Consult Table 7 for correct fuse size. Note: always refer to the unit dataplate for unit electrical data.

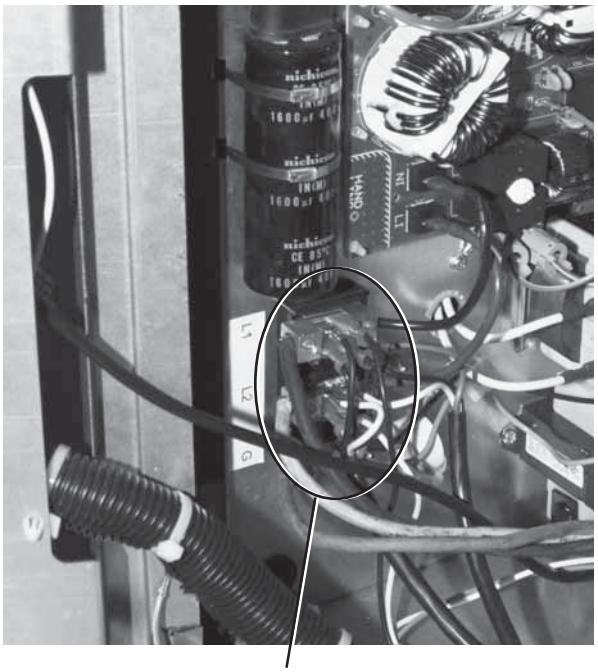
208 Volt Operation
All residential 208-230 Volt units are factory wired for 230 Volt operation. The transformer may be switched to the 208V tap as illustrated on the wiring diagram by switching the orange wire from the contactor terminal to the 208v transformer tap.

Table 7: Trilogy® (QE) Series ECM with Internal Flow Controller Electrical Data

QE Model	Rated Voltage	Compressor		HW Pump FLA	Ext Loop FLA	Fan Motor FLA	Total Unit FLA	Min Circuit Amps	Max/ Fuse HACR
		RLA	LRA						
0930	208/230/60/1	20.0	20.0	0.5	1.7	2.6	24.8	29.8	45
1860	208/230/60/1	28.0	28.0	0.5	1.7	6.9	37.1	44.1	70

Rated Voltage of 208-230/60/1
HACR circuit breaker in USA only
Min/Max Voltage of 197/254
All fuses Class RK-5

Figure 19: Trilogy Single Phase Line Voltage Field Wiring



Unit Power Supply
(see electrical tables 7a - 7b for minimum circuit amps and maximum breaker size)

⚠ WARNING! ⚠

WARNING! Disconnect electrical power source to prevent injury or death from electrical shock. The capacitors on the inverter board store electrical energy. They will remain charged long after power has been disconnected. Extreme care should be used when working around these capacitors.

⚠ CAUTION! ⚠

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

Electrical - Line Voltage
All field installed wiring, including electrical ground, must comply with the National Electrical Code as well as all applicable local codes. Refer to the unit electrical data for fuse sizes. Consult wiring diagram for field connections that must be made by the installing (or electrical) contractor.

All final electrical connections must be made with a length of flexible conduit to minimize vibration and sound transmission to the building.

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

Electrical - Low Voltage Wiring

Figure 20: Trilogy Low Voltage Field Wiring

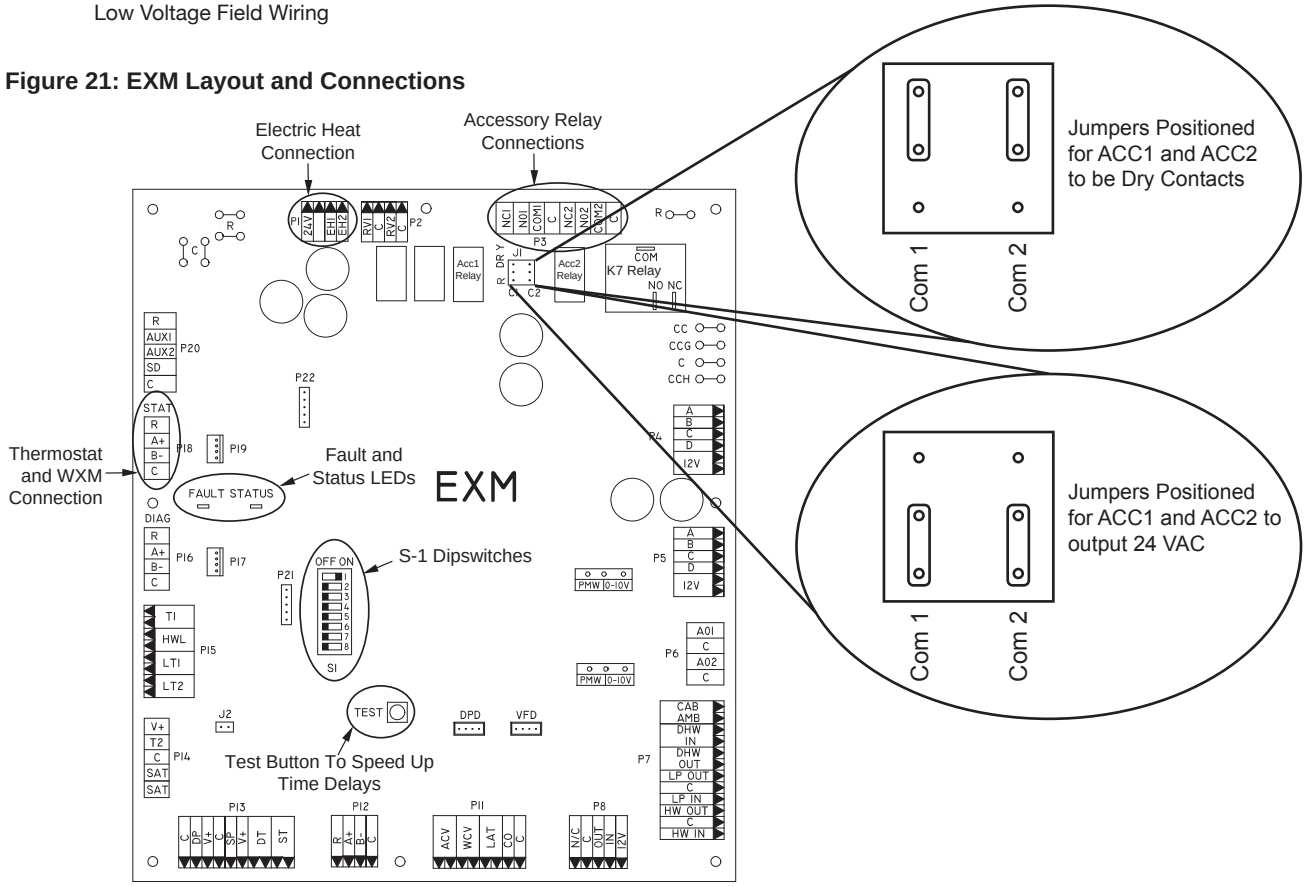
Accessory Connections

The EXM controller includes accessory relays. Each relay includes a normally open (NO) and a normally closed (NC) contact. Accessory relays may be configured to operate as shown in Table 8.

Table 8: Accessory Relay Configuration

S1 DIP Switch	Accessory Relay	On	Off
S1-1	N/A	Modbus Master	Modbus Slave
S1-2	N/A	Diagnostics Master	Diagnostics Slave
S1-3	ACC1 (K3)	Tracks Blower	Tracks Compressor
S1-4	ACC2 (K4)	Tracks Blower	Tracks Compressor
S1-5	K7	Tracks Blower	Tracks Compressor
S1-6	N/A	Enable HW Performance Monitor	Disable HW Performance Monitor

Figure 21: EXM Layout and Connections

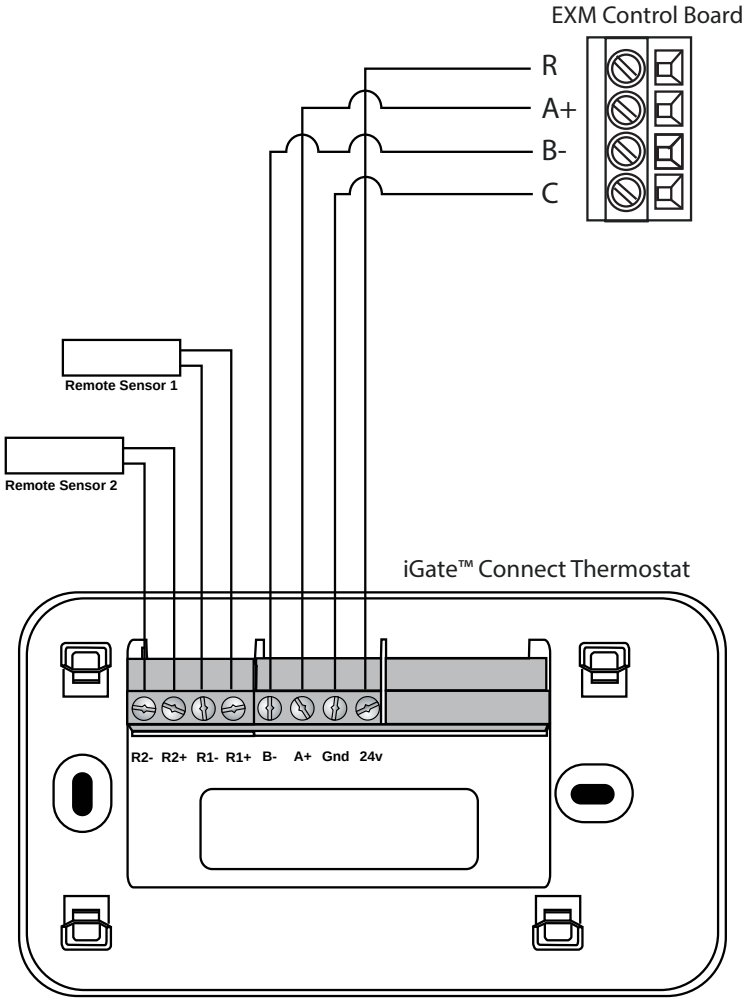


Electrical - Thermostat Wiring

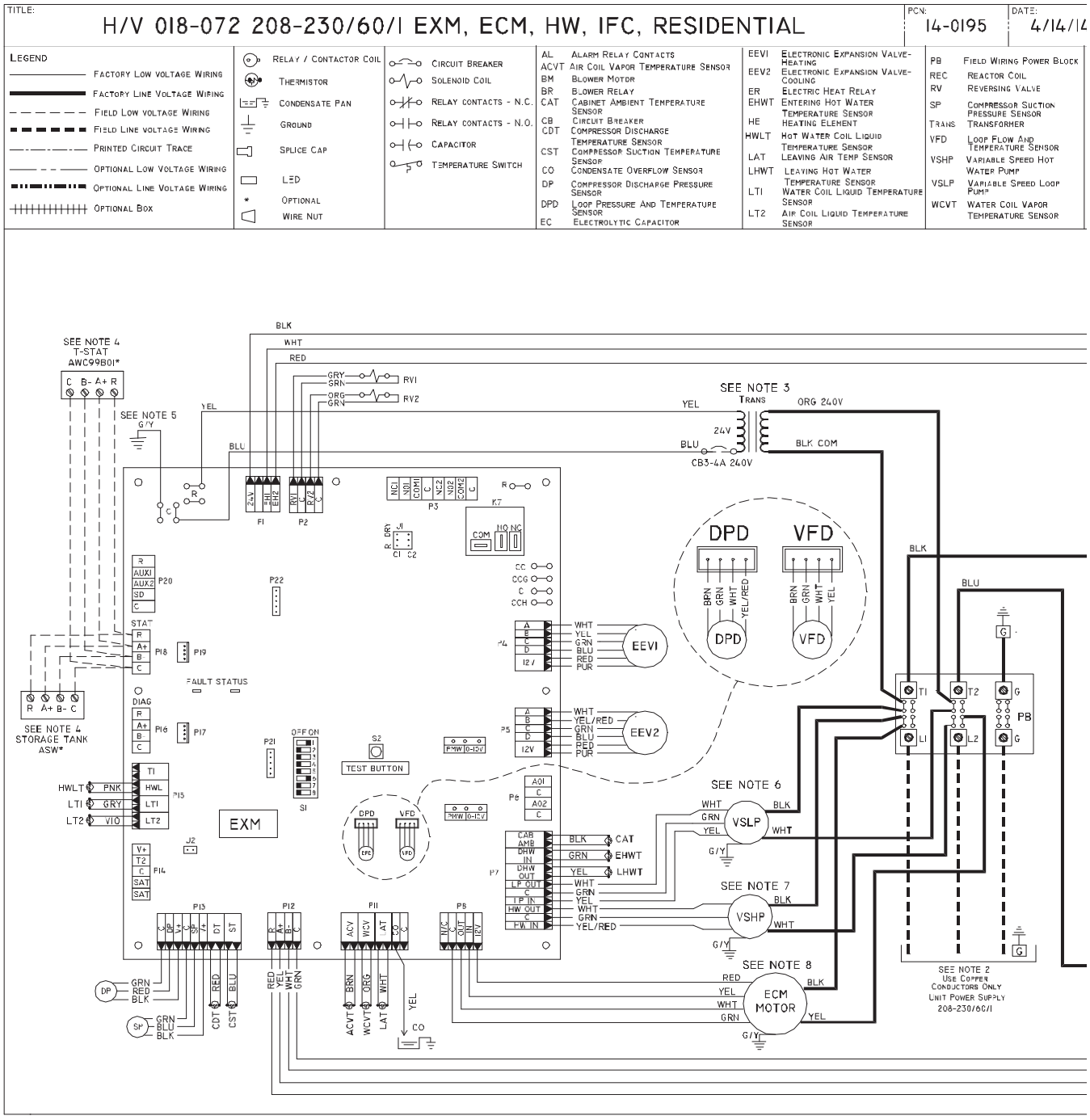
Thermostat Installation

The thermostat should be located on an interior wall in a larger room, away from supply duct drafts. DO NOT locate the thermostat in areas subject to sunlight, drafts or on external walls. The wire access hole behind the thermostat may in certain cases need to be sealed to prevent erroneous temperature measurement due to air infiltration through the wall cavity. Position the thermostat back plate against the wall so that it appears level and so the thermostat wires protrude through the middle of the back plate. Mark the position of the back plate mounting holes and drill holes with a 3/16" (5mm) bit. Install supplied anchors and secure plate to the wall. Thermostat wire must be 18 AWG or larger wire. Wire the thermostat as shown in Figure 22 to the low voltage terminal strip on the EXM control board. The AWC communicating thermostat provides simple configuration, monitoring and diagnosis.

Figure 22: iGate Connect Thermostat Connection to EXM

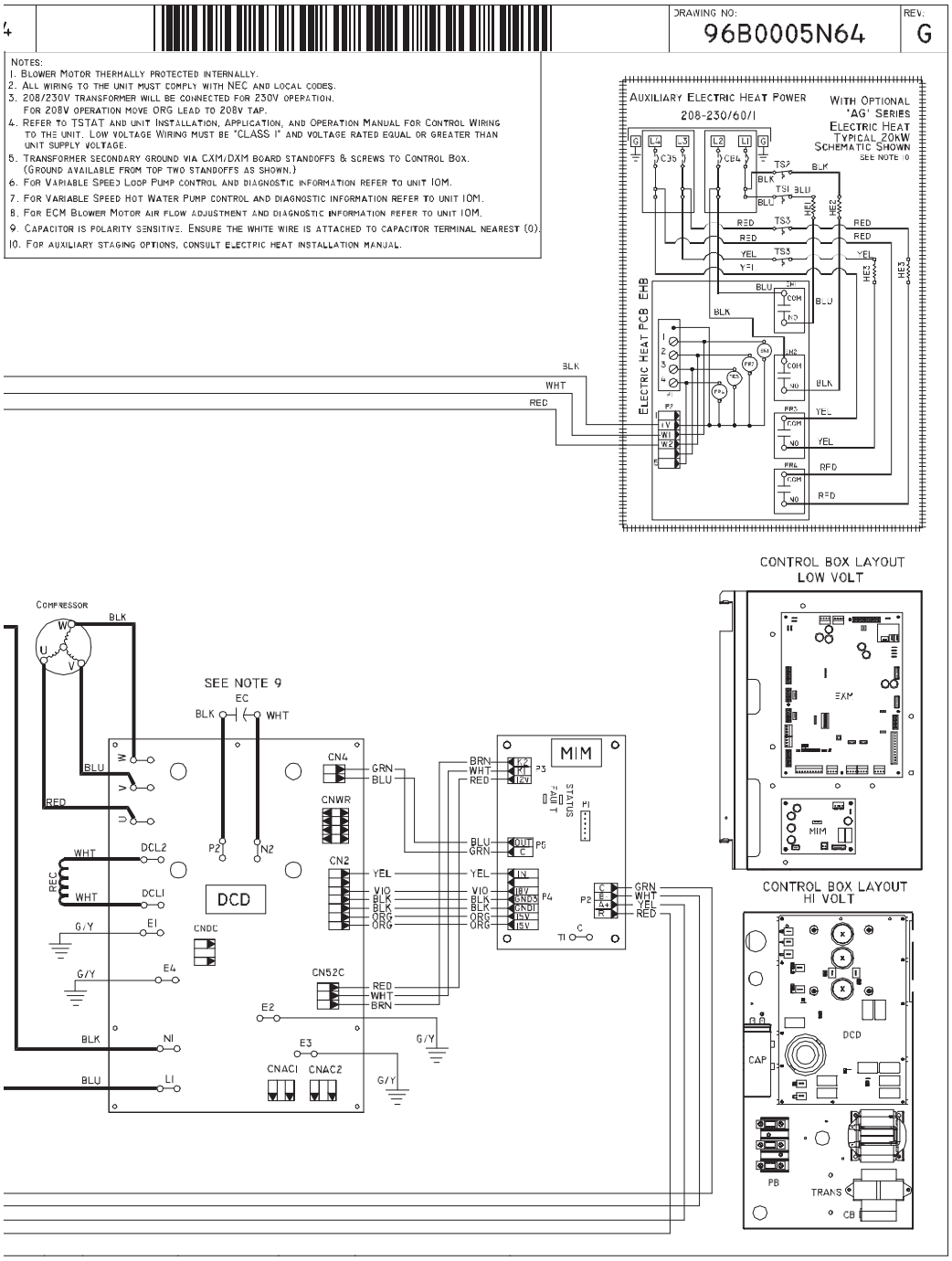


EXM Wiring Diagram - 96B0005N64 - Part 1 of 2



This diagram includes typical wiring details but is not applicable to all units. For specific unit wiring, refer to the diagram or the units' control panel.

EXM Wiring Diagram - 96B0005N64 - Part 2 of 2



ECM Blower Control

ECM Blower Configuration

The ECM blower in the Trilogy unit is controlled by the EXM microprocessor. The blower cfm will vary as the compressor speed varies and as configured for operation by the installer. The range of airflow available will be determined by the unit model capacities selected for Minimum Heating Capacity, Maximum Heating Capacity, Minimum Cooling Capacity, and Maximum Cooling Capacity.

The available airflow settings are Minimum Heating Airflow, Maximum Heating Airflow, Emergency Heat Airflow, Minimum Cooling Airflow, Maximum Cooling Airflow, Low Dehumidification Airflow, High Dehumidification Airflow, and Constant Fan Airflow. These settings can be accessed from the Home screen on the iGate Connect thermostat by pressing MENU > SETTINGS > INSTALLATION SETTINGS > EQUIPMENT > CAPACITY CONFIGURATION.

NOTE: An access code is required to enter the Installation Settings menu from the iGate Connect thermostat. The access code is 4795. It must be entered using the arrow keys on the thermostat to select each number and the OK button to enter each one.

Min Heating Airflow Configures the unit airflow while operating at minimum capacity in the heating mode. The installer may wish to select a higher cfm than the nominal 400 cfm/ton for this setting to ensure proper air movement during low capacity operation. Range will depend on model and minimum heating capacity selection.

Max Heating Airflow Configures the unit airflow while operating at maximum capacity in the heating mode. The installer may wish to select a lower cfm than the nominal 400 cfm/ton for this setting to avoid air velocity noise from the ductwork during maximum capacity operation. Range will depend on model and maximum heating capacity selection.

Emergency Heat Airflow Configures the unit airflow during the emergency heat mode (if applicable). Range will depend on unit model.

Min Cooling Airflow Configures the unit airflow while operating at minimum capacity in the cooling mode. The installer may wish to select a higher cfm than the nominal 400 cfm/ton for this setting to ensure proper air movement during low capacity operation. Range will depend on model and minimum cooling capacity selection.

Max Cooling Airflow Configures the unit airflow while operating at maximum capacity in the cooling mode. The installer may wish to select a lower cfm than the nominal 400 cfm/ton for this setting to avoid air velocity noise from the ductwork during maximum capacity operation. Range will depend on model and maximum cooling capacity selection.

Low Dehum Airflow Configures the unit airflow while operating at minimum capacity in the dehumidification mode. Range will depend on model and minimum cooling capacity selection.

High Dehum Airflow Configures the unit airflow while operating at maximum capacity in the dehumidification mode. Range will depend on model and maximum cooling capacity selection.

Constant Fan Airflow Configures the unit airflow while operating in the continuous fan mode. Range will depend on unit model.

The ECM Blower motor includes a “soft start” and “ramp down” feature for each unit run cycle. The soft start feature is a gentle increase of motor rpm ar blower start up. This creates a much quieter blower start cycle.

The ramp down feature allows the blower to slowly decrease rpm to a full stop at the end of each blower cycle. This creates a much quieter end to each blower cycle and adds to overall unit efficiency.

The duration of the “ramp down” (also known as “off delay”) periods are selectable. These selections can be accessed from the Home screen on the iGate Connect thermostat by pressing MENU > SETTINGS > INSTALLATION SETTINGS > EQUIPMENT > CAPACITY CONFIGURATION.

Heat Off Delay This setting determines whether or not (and how long) the blower will continue to operate after the compressor has cycled off at the end of each heating cycle. Valid range: 0 seconds to 255 seconds.

Cool Off Delay This setting determines whether or not (and how long) the blower will continue to operate after the compressor has cycled off at the end of each cooling cycle. Valid range: 0 seconds to 255 seconds.

Special Note for AHRI Testing: To achieve rated airflow for AHRI testing purposes, it is necessary to change the CFM settings to rated airflow.

ECM Blower Performance Data

Table 9: Trilogy® (QE) Series ECM Blower Performance Data Table

Trilogy Model	Max ESP (in wg)	Fan Motor (hp)	Range	Capacity	Cooling Mode	Dehum	Heating Mode	Fan Only Mode	Aux Emerg Mode
0930	0.3 at 1125; 0.6 at 1000	1/3	Default	9,000	300	275	300	350	850
				12,000	425	375	425		
				15,000	500	450	500		
				18,000	600	525	600		
				21,000	700	600	700		
				24,000	775	675	775		
				27,000	875	750	875		
				30,000	950	800	950		
			Minimum	9,000	225	225	200	225	700
				12,000	275	275	225		
				15,000	325	325	300		
				18,000	425	425	375		
				21,000	500	500	450		
				24,000	575	575	525		
				27,000	650	650	600		
				30,000	750	750	700		
			Maximum	9,000	375	375	375	1125	1125
				12,000	525	525	525		
				15,000	650	650	650		
				18,000	750	750	750		
				21,000	850	850	850		
				24,000	975	975	975		
				27,000	1075	1075	1075		
				30,000	1125	1125	1125		
1860	0.45 at 2250; 0.75 at 2000	1	Default	18,000	600	525	600	700	1500
				24,000	775	675	775		
				30,000	975	825	975		
				36,000	1150	1000	1150		
				42,000	1325	1150	1325		
				48,000	1525	1325	1525		
				54,000	1700	1475	1700		
				60,000	1875	1625	1875		
			Minimum	18,000	425	425	375	425	1350
				24,000	575	575	525		
				30,000	725	725	675		
				36,000	875	875	800		
				42,000	1025	1025	950		
				48,000	1200	1200	1075		
				54,000	1350	1350	1225		
				60,000	1500	1500	1375		
			Maximum	18,000	750	750	750	2250	2250
				24,000	975	975	975		
				30,000	1175	1175	1175		
				36,000	1400	1400	1400		
				42,000	1600	1600	1600		
				48,000	1825	1825	1825		
				54,000	2025	2025	2025		
				60,000	2250	2250	2250		

Airflow is controlled within 5% up to the Max ESP shown with wet coil

System Configuration

Navigating The Menus

The iGate™ Connect thermostat has an easy–to–read color screen that displays all the information you need to configure the thermostat. Use the navigation buttons on the right to quickly change the temperature, access features, and configure settings.

Using the Navigation Buttons
The navigation buttons located on the right of the iGate™ Connect thermostat let you select options and control the iGate™ Connect thermostat.

- ▲ **(up)** On the Home screen, press ▲ to increase the temperature set point by 1°F (0.5°C). For menus, press ▲ to move up.
- ▼ **(down)** On the Home screen, press ▼ to decrease the temperature set point by 1°F (0.5°C). For menus, press ▼ to move down.
- ◄ **(left)** On the Home screen, if Auto mode is enabled, press ◄ to switch between heat and cool set points. For menus, press ◄ to go back to the previous screen.
- ► **(right)** On the Home screen, if Auto mode is enabled, press ► to switch between heat and cool set points. For menus, press ► to choose the currently highlighted option.
- **OK** On a menu screen, press **OK** to choose the currently highlighted option. If a configuration option is selected, pressing **OK** will keep its new value and return back to the previous screen.
- **MENU** Pressing **MENU** displays a list of all available options. If a menu is currently displayed, pressing **MENU** will cancel any unsaved changes and return to the Home screen.
- **BACK** On a menu screen, press **BACK** to go back to the previous screen.

On–Screen Keyboard
If you need to type in any information, an on–screen keyboard will appear. To enter a letter or number, move to the character by pressing the arrow keys and then press OK to select it.
Select Caps to enter capital letters; select &@# to enter commonly used symbols. If you make a mistake, press ⌫ to delete the text .
To keep your changes, select Save. To cancel your changes, press BACK.

Configuring The iGate™ Connect Thermostat

The first step after installing the iGate™ Connect thermostat is to configure the settings for the various devices (such as a furnace or air conditioner) that are being connected. An access code is required to enter the Installation Settings menu from the iGate Connect thermostat. The access code is 4795. It must be entered using the arrow keys on the thermostat to select each number and the OK button to enter each one.

Thermostat Config
To configure the iGate™ Connect thermostat:
1. From the Home screen, press MENU.
2. Select Settings ► Installation.
3. Select Thermostat Config

Aux Heat Option Configures the thermostat for electric auxiliary heat or no auxiliary heat (none).

Equipment
To configure equipment on the iGate™ Connect thermostat:
1. From the Home screen, press MENU.
2. Select Settings ► Installation.
3. Select Equipment.

Capacity Configuration
Min Heating Capacity Configures the minimum unit heating capacity. When the space requires a heating capacity below this setting the unit will cycle off. Range will depend on unit model.

Max Heating Capacity Configures the maximum unit heating capacity. When the space requires a heating capacity above this setting the unit will call for auxiliary heat (if applicable). Range will depend on unit model.

Min Cooling Capacity Configures the minimum unit cooling capacity. When the space requires a cooling capacity below this setting the unit will cycle off. Range will depend on unit model.

Max Cooling Capacity Configures the maximum operational unit cooling capacity. Range will depend on unit model.

Unit Configuration
The Unit Configuration settings allow the installing technician to configure the thermostat to the installed equipment.
NOTE: Unit Config is only necessary when replacing an EXM controller. The Unit Config settings are programmed at the factory when the unit is built.

Heat Pump Family Select the family of heat pump installed.

Heat Pump Size Select the unit model (0930, 1545, 1860, or 2472).

Blower Type Select the blower type (None or ECM).

Loop Config Selects the type of internal flow device. None, VS Pump – variable speed internal pump, or MOD Valve – internal modulating water control valve.

Loop Pump (or Valve) Config
Configures the internal vFlow device to the application.

Loop Option (if applicable) Configures the internal variable speed pump to operate in a Single system (one unit, one

loop) or a Parallel system (multiple units, one common loop, parallel pumping).

Heating Delta T Sets the source flow rate for the heating mode. The vFlow device will adjust the flow to maintain this temperature difference between the entering and leaving water during the heating mode to this setting. Valid range: 4.0°F to 12.0°F. Default is 6.0°F.

Cooling Delta T Sets the source flow rate for the cooling mode. The vFlow device will adjust the flow to maintain this temperature difference between the entering and leaving water during the cooling mode to this setting. Valid range: 9.0°F to 20.0°F. Default is 10.0°F.

Source Anti–Freeze (if applicable) Configures the low temperature protection setting for the source water heat exchanger. Select Yes for systems with anti–freeze (10°F evaporator temperature setting) or No for systems without anti–freeze (30°F evaporator temperature setting).

HW Pump Config

Water Heating Delta T Sets the potable water flow rate for the water heating mode. The variable speed potable water pump will adjust the potable water flow to maintain the selected temperature difference between the entering and leaving potable water during the water heating mode. Valid range: 8.0°F to 12.0°F. Default is 8.0°F.

Thresholds
To configure thresholds on the iGate™ Connect thermostat:
1. From the Home screen, press MENU.
2. Select Settings ▶ Installation.
3. Select Thresholds.

This section configures the temperature, time, and capacity thresholds associated with the heating, cooling, and hot water (if applicable) equipment. You must configure the Equipment settings before setting the thresholds. Only the applicable threshold settings will be displayed.

Allow Auto Heat/Cool
Allows the user to be able to operate the unit in the auto changeover heat/cool mode. Select Yes for the user to be able to operate the thermostat in the auto heat/cool mode, otherwise select No.

Heat/Cool Min Delta
Selects the minimum temperature difference between the heating and cooling set points when the thermostat is operated in the auto changeover heat/cool mode. Valid range: 2°F to 10°F. The default value is 5°F.

Advanced Settings
Allows the installer to select the controller to configure, typically an EXM.

QE – EXM Settings

Aux Heat DeadBand Configures the amount of space temperature droop allowed from the heating setpoint at maximum unit capacity before allowing auxiliary heat for space heating. Valid range: 0.0°F to 5.0°F. Default is 1.0°F.

Anticipator Configures the sensitivity of the thermostat to the space temperature. A lower setting will cause the unit to respond more rapidly to changes in space temperature. A higher setting will cause the unit to respond more slowly to changes in space temperature. Valid range: 1 to 10. Default is 5.

Compressor ASCD Configures the minimum amount of time the compressor will remain off between cycles. Valid range: 5 minutes to 8 minutes. Default is 3 minutes.

Temp Correction
Adjusts the current space temperature displayed on the thermostat by the selected amount. Valid range: –10°F to +10°F in 0.5°F increments.

Humidity Control Settings
Configures humidity control settings (dehumidification/humidification).
To configure the humidity control settings on the iGate™ Connect thermostat:
1. From the Home screen, press MENU.
2. Select Settings ▶ Installation.
3. Select Humidity Control.

Humidity Mode

Determines active humidity mode(s). Valid selections: **Humidification** (This logic will communicate a Humidification output when the space humidity is less than the setpoint i.e. acts as a humidistat. When the Humidification output is active, the fan output will also be active. The Humidification output will not be communicated when the space humidity is above the setpoint.), **Dehumidification** (This logic will reduce the cooling airflow when the space humidity is greater than the setpoint to improve dehumidification i.e. acts as a dehumidistat. The cooling airflow will not be reduced when the space humidity is below the setpoint.), Both, or None.

Service Mode
To configure the service mode on the iGate™ Connect thermostat:
1. From the Home screen, press MENU.
2. Select Settings ▶ Installation.
3. Select Service Mode.

QE Unit – EXM Controller

Model Displays the unit model number
Serial Number Displays the unit serial number

System Configuration

Manual Operation Manual Operation mode allows the service technician to manually command operation for any of the thermostat outputs, blower speed, as well as pump speed or valve position (if applicable) to aid in troubleshooting.
Operating Mode Selects the manual mode of operation. Valid selections are: Standby, Const Fan, Cooling, Heating, Aux Heat, EM Heat, Hot Water, and Cooling/HW.
ECM Target Airflow Configures the target air flow during manual operation. Valid range will depend on unit model.
ECM Blower Speed Displays current ECM motor RPM.
Loop Pump Speed (if applicable) Sets loop pump speed for manual operation mode. Valid range: 0% to 100%. Default is 41%.
DHW Pump Speed (if applicable) Sets DHW pump speed for manual operation mode. Valid range: 0% to 100%. Default is 0%.

Diagnostics

The Diagnostics data set allows the service technician to view the real–time status of all physical inputs, switches, temperature sensor readings, as well as the operational status of the heat pump, at the thermostat. Scroll through diagnostic data using the up/down arrow buttons.

Compressor Diagnostics

Unit Capacity – displays the current operating capacity of the unit as a percentage of the unit's maximum capacity.
Compressor Speed – displays the current compressor speed in revolutions per second.
Comp Current – displays the current compressor amperage.
Inverter Current – displays the amperage draw of the inverter.
Comp Input Power – displays the power consumption of the compressor in watts.
Comp DC Voltage – displays the current DC bus voltage from the inverter.
Comp Heat Sink Temp – displays the temperature of the inverter heat sink.

Blower Diagnostics

ECM Target Airflow – displays the blower target cfm.
ECM Blower Speed – displays the blower rpm.
ECM Blower Power – displays the power consumption of the blower in watts.
ECM Blower Static – not used.
Leaving Air – displays the temperature of the air leaving the unit.
Entering Air – displays the temperature of the air entering the unit.

Loop Diagnostics

Loop Pump Speed – displays the speed of the loop pump as a percentage of its maximum capacity.
Loop Pump Watts – displays the power consumption of the loop pump in watts.
Loop Flow – displays the source flow rate in gpm.
Entering Water – displays the temperature of the water entering the source heat exchanger.
Leaving Water – displays the temperature of the water leaving the source heat exchanger.
Water pressure – displays the pressure of the water as it leaves the source heat exchanger.

Hot Water Pump Diagnostics

DHW Pump Speed – displays the speed of the DHW pump as a percentage.
DHW Pump Power – displays the power consumption of the DHW pump in watts.
DHW Flow – displays the DHW gpm flow rate.
Hot Water EWT – displays the temperature of the potable hot water entering the potable hot water heat exchanger.
Hot Water LWT – displays the temperature of the potable hot water leaving the potable hot water heat exchanger, returning to the hot water storage tank.

Refrigerant Diagnostics

Discharge Pressure – displays the refrigerant discharge pressure.
Discharge Saturation – displays the saturation temperature of the refrigerant discharge pressure.
Discharge Temp – displays the temperature of the compressor discharge line.
Suction Pressure – displays the refrigerant suction pressure.
Suction Saturation – displays the saturation temperature of the refrigerant suction pressure.
Suction Temp – displays the temperature of the compressor suction line.
Discharge Superheat – displays the amount of superheat at the discharge of the compressor.
Suction Superheat – displays the amount of superheat at the suction to the compressor.
Subcool – displays the amount of subcooling at the liquid line.
Wtr Coil Liquid – displays the temperature of the refrigerant liquid line between the source heat exchanger and the electronic expansion valve.
Wtr Coil Vapor – displays the temperature of the refrigerant vapor line between the heat/cool reversing valve and the source heat exchanger.
Air Coil Liquid – displays the temperature of the refrigerant liquid line between the air coil and the electronic expansion valve.
Air Coil Vapor – displays the temperature of the refrigerant vapor line between the air coil and the heat/cool reversing valve.
HW Coil Liquid – displays the temperature of the refrigerant liquid line leaving the potable water heat exchanger.

System Configuration

Refrigerant Valve Diagnostics

RV1 status – displays the status (on–DHW or off–no DHW) of the RV1 (potable water heating) reversing valve.
RV2 Status – displays the status (on–cooling, or off–heating) of the RV2 (heat/cool) reversing valve.
Water Coil EEV1 Stat – displays the status (on or off) of the heat electronic expansion valve.
Water Coil EEV1POS – displays the position of the heat electronic expansion valve in steps. 0=fully open, 1040 = fully closed.
Air Coil EEV2 Stat – displays the status (on or off) of the cool electronic expansion valve.
Air Coil EEV2POS – displays the position of the cool electronic expansion valve in steps. 0 = fully open, 1040 = fully closed.

Miscellaneous Diagnostics

Control Voltage – displays the unit's control voltage.
Cabinet Ambient – displays the ambient temperature in the unit's compressor section.
Ht of EXTR/REJ – displays the amount of heat of extraction (heating) or heat of rejection (cooling) to/from the loop depending on mode of operation.
Unit Power – displays the instantaneous power consumption of the unit.
COP/EER – displays the current operating efficiency of the unit (COP for space heating, EER for cooling mode, N/A for water heating mode).
AUX1 Switch – not used.
AUX2 Switch – not used.
SD Switch – not used.
T1 Temp – not used.
T2 Temp – not used.

DIP Switch Settings
Allows the service technician to view the status of all dipswitch settings for the connected communicating controls at the thermostat. NOTE: The unit control dipswitch settings cannot be changed from the thermostat.

S1–1 ON = Modbus Master, OFF = Modbus Slave
S1–2 ON = Diag Master, OFF = Diag Slave
S1–3 ON = ACC1 Tracks blower, OFF = ACC1 Tracks compressor
S1–4 ON = ACC2 Tracks blower, OFF = ACC2 Tracks compressor
S1–5 ON = ACC K7 Tracks blower, OFF = ACC K7 Tracks compressor
S1–6 ON = Enable DHW Performance Monitor, OFF = Disable DHW Performance Monitor

Fault History
Fault History stores and displays the five most recent fault or warning codes for the connected communicating control.

Clear Fault History
Clear Fault history will clear all fault codes stored in the thermostat as well as the fault history in any connected communicating controls.

AWS Tank – WXM Controller

Model Displays the unit model number
Serial Number Displays the storage tank serial number
Diagnostics
- Upper Tank Temp – displays the temperature of the DHW at the upper element of the storage tank.
- Lower Tank Temp – displays the temperature of the DHW at the lower element of the storage tank.
- Hot Water T3 Temp – not used.
- Hot Water T4 Temp – not used.

Sensors
Configures sensors to be displayed at thermostat.
To configure the sensors on the iGate™ Connect thermostat:
1. From the Home screen, press MENU.
2. Select Settings ▶ Installation.
3. Select Sensors.

Sensors
RS–1(sensor name) This is sensor number 1. It will not display a name until a name has been entered.
Name Establishes a name for sensor 1.
Type Configures the type of sensor. The sensor may be a dry contact or a temperature sensor. If a temperature sensor, the installer selects the manufacturer, model, and a temperature correction for the sensor.
Usage Configures the type of use for the sensor. Available options are Control Sensor (this temperature is used to control the unit), Monitoring Sensor (this will display the sensor temperature at the thermostat), or Outdoor Sensor (this will display the sensor temperature as the outdoor temperature at the thermostat).
RS–2(sensor name) This is sensor number 1. It will not display a name until a name has been entered.
Name Establishes a name for sensor 1.
Type Configures the type of sensor. The sensor may be a dry contact or a temperature sensor. If a temperature sensor, the installer selects the manufacturer, model, and a temperature correction for the sensor.
Usage Configures the type of use for the sensor. Available options are Control Sensor (this temperature is used to control the unit), Monitoring Sensor (this will display the sensor temperature at the thermostat), or Outdoor Sensor (this will display the sensor temperature as the outdoor temperature at the thermostat).

Reset HVAC Equipment Settings
You can quickly restore all HVAC equipment settings on the iGate™ Connect thermostat back to their factory defaults. Any user setting (not related to the equipment installed) will remain unchanged.

If you need to reset the entire thermostat back to its original factory default settings, including user settings and registration, select **Reset All Settings** instead.

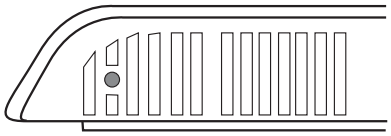
System Configuration

To reset the iGate™ Connect thermostat:
1. From the Home screen, press MENU.
2. Select Settings ▶ Reset.
3. Select HVAC Equipment Settings.
4. Select Yes.

Performing a Hardware Reset
In rare circumstances, static electricity or power surges may interrupt the operation of the thermostat, forcing a hardware reset.

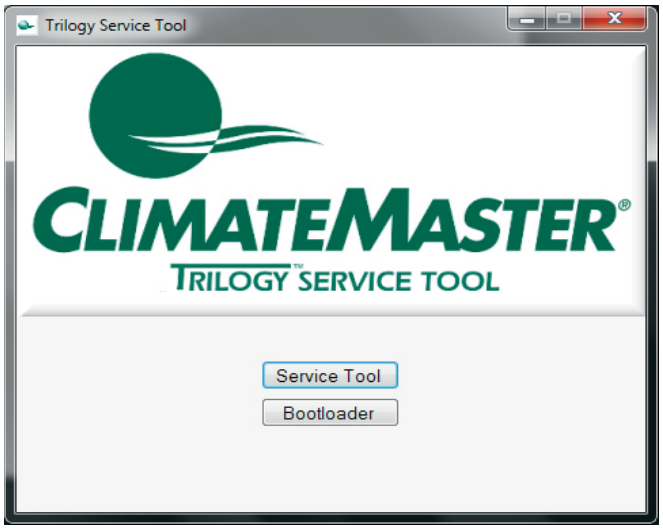
Rebooting the iGate™ Connect Thermostat
You can reboot the iGate™ Connect thermostat by pressing the physical hardware reset button, located through an opening in the bottom left corner of the iGate™ Connect thermostat. Rebooting will not alter programming or configuration options.

Reset Button



An alternative method to configure (and diagnose) the Trilogy unit is ClimateMaster's Trilogy PC Service Tool. This tool is a must for troubleshooting Trilogy units.

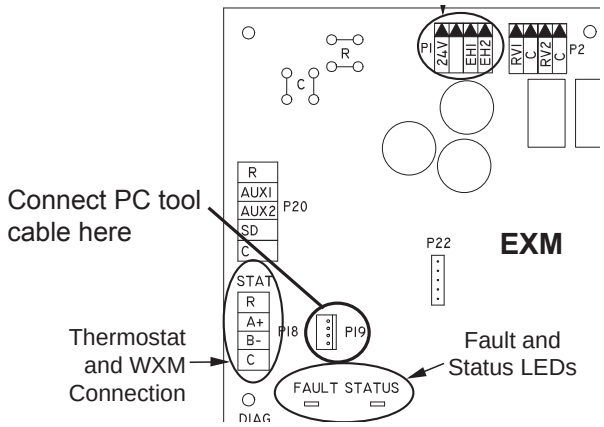
The service tool software installs on a PC / laptop. Connect the PC to the EXM board in the Trilogy using the cables from service tool kit ASVCTOOL01.



From the software you can:
1. Update the software on the EXM board using the bootloader.
2. Configure, diagnose and manual operation of the Trilogy from the service tool.

Configuration:
The service tool software includes three pages of configuration data for your Trilogy and the following are values that can be configured on these pages:
1. Equipment
   a. Unit family, blower type, loop config
   b. Loop delta T; single/parallel; Anti-freeze
   c. Capacity: Min/Max Cool/Heat
   d. Airflows
   e. Serial # updates
   f. Hot water delta T
   g. Aux. heat operating mode

2. Thresholds (limits)
   a. Cooling + Hot-Water %
   b. Cooling + Hot-Water offset
   c. Heating + Hot-water cutout
   d. Heating + Hot-water cutout offset
   e. Cooling-Dehumid cutout
   f. Anticipator
   g. Compressor ASCD minutes



System Configuration

3. Service mode/ clear fault history
    a. Enter service mode
    b. Manual operation:
    c. Operating mode
    d. Target airflow
    e. Loop pump speed
    f. Hot water pump speed
    g. Clear Fault History

Diagnostics / REAL-TIME operating data:
The service tool software includes five pages of configuration data for your Trilogy and you can get all 39 readings and 8 calculated values in REAL TIME from the EXM board. The following are values that can be viewed on these pages:

1. Calculations
    a. Discharge Superheat
    b. Suction Superheat
    c. Subcooling
    d. HR/HE
    e. Loop Pump Watts
    f. Hot Water GPM
    g. Hot Water Pump Watts
    h. Current % Capacity

2. Sensor values
    1. Space Temp
    2. Space Humidity
    3. Upper Hot Water Tank Temp
    4. Lower Hot Water Tank Temp
    5. Discharge Pressure
    6. Discharge Temp
    7. Suction Pressure
    8. Suction Temp
    9. Hot Water Liq Temp
    10. Air Coil Liq Temp
    11. Air Coil Vap Temp
    12. Loop Water Coil Liq Temp
    13. Loop Water Coil Vap Temp
    14. Loop Entering Water Temp
    15. Loop Leaving Water Temp
    16. Loop GPM
    17. Loop Pressure
    18. Loop Pump Speed
    19. Loop Pump Return
    20. Hot Water Entering Water Temp
    21. Hot Water Leaving Water Temp
    22. Hot Water Pump Speed
    23. Hot Water Pump Return
    24. Fan CFM
    25. Fan RPM
    26. Fan Watts
    27. Leaving Air temperature
    28. Target Compressor Speed
    29. Compressor Current
    30. Inverter Current
    31. Inverter DC Bus Volt
    32. Inverter Sink Temp
    33. Compressor Watts
    34. Electronic Expansion Valve1 Step
    35. Electronic Expansion Valve2 Step

System Configuration

36. Reversing Valve1 Status
37. Reversing Valve2 Status
38. Ambient Cabinet Temp
39. EXM Control Voltage

3. Dip switch status

Fault Codes
The service tool software includes five pages of data for every fault code and saves up to 5 fault codes. You can get all 39 readings and 8 calculated values in AT TIME OF FAULT from the EXM board.

Unit Commissioning and Operating Conditions

Operating Limits
Environment – Units are designed for indoor installation only. Never install units in areas subject to freezing or where humidity levels could cause cabinet condensation (such as unconditioned spaces subject to 100% outside air).
Power Supply – Voltage utilization shall comply with unit data plate.

Determination of operating limits is dependent primarily upon three factors: 1) return air temperature. 2) water temperature, and 3) ambient temperature. When any one of these factors is at minimum or maximum levels, the other two factors should be at normal levels to insure proper unit operation. Extreme variations in temperature and humidity and/or corrosive water or air will adversely affect unit performance, reliability, and service life. Consult Table 10a for operating limits.

Table 10a: Operating Limits

Operating Limits	Unit	
	Cooling	Heating
Air Limits		
Min. ambient air, DB	45ºF [7ºC]	39ºF [4ºC]
Rated ambient air, DB	80.6ºF [27ºC]	68ºF [20ºC]
Max. ambient air, DB	130ºF [54ºC]	85ºF [29ºC]
Min. entering air, DB/WB	65/45ºF [18/7ºC]	50ºF [10ºC]
Rated entering air, DB/WB	80.6/66.2ºF [27/19ºC]	68ºF [20ºC
Max. entering air, DB/WB	100/75ºF [38/24ºC]	80ºF [27ºC]
Water Limits		
Min. entering water	20ºF [-6.7ºC]	20ºF [-6.7ºC]
Normal entering water	50-110ºF [10-43ºC]	30-70ºF [-1 to 21ºC]
Max. entering water	120ºF [49ºC]	120ºF [49ºC]
Normal Water Flow	1.5 to 3.0 gpm / ton [1.6 to 3.2 l/m per kW]	

Commissioning Conditions
Consult Table 10b for commissioning conditions. Starting conditions vary depending upon model and are based upon the following notes:

Notes:
1. Conditions in Table 10b are not normal or continuous operating conditions. Minimum/maximum limits are start-up conditions to bring the building space up to occupancy temperatures. Units are not designed to operate under these conditions on a regular basis.
2. Voltage utilization complies with AHRI Standard 110.

Table 10b: Commissioning Limits

Commissioning Limits	Unit	
	Cooling	Heating
Air Limits		
Min. ambient air, DB	45ºF [7ºC]	39ºF [4ºC]
Rated ambient air, DB	80.6ºF [27ºC]	68ºF [20ºC]
Max. ambient air, DB	130ºF [54ºC]	85ºF [29ºC]
Min. entering air, DB/WB	60ºF [16ºC]	40ºF [4.5ºC]
Rated entering air, DB/WB	80.6/66.2ºF [27/19ºC]	68ºF [20ºC]
Max. entering air, DB/WB	110/83ºF [43/28ºC]	80ºF [27ºC]
Water Limits		
Min. entering water	20ºF [-6.7ºC]	20ºF [-6.7ºC]
Normal entering water	50-110ºF [10-43ºC]	30-70ºF [-1 to 21ºC]
Max. entering water	120ºF [49ºC]	120ºF [49ºC]
Normal Water Flow	1.5 to 3.0 gpm / ton [1.6 to 3.2 l/m per kW]	

Unit Start-Up and Operating Conditions

Unit and System Checkout
BEFORE POWERING SYSTEM, please check the following:

UNIT CHECKOUT
- ❑ Shutoff valves: Insure that all isolation valves are open.
- ❑ Line voltage and wiring: Verify that voltage is within an acceptable range for the unit and wiring and fuses/ breakers are properly sized. Verify that low voltage wiring is complete.
- ❑ Unit control transformer: Insure that transformer has the properly selected voltage tap. Residential 208-230V units are factory wired for 230V operation unless specified otherwise.
- ❑ Loop/water piping is complete and purged of air. Water/ piping is clean.
- ❑ Antifreeze has been added if necessary.
- ❑ Entering water and air: Insure that entering water and air temperatures are within operating limits of Tables 10a and 10b.
- ❑ Ensure that air has been purged from DHW piping and heat exchanger and that DHW pump unions are tight.
- ❑ Low water temperature cutout: Verify that low water temperature cut-out is properly set.
- ❑ Unit fan: Manually rotate fan to verify free rotation and insure that blower wheel is secured to the motor shaft. Be sure to remove any shipping supports if needed. DO NOT oil motors upon start-up. Fan motors are pre-oiled at the factory. Check unit fan CFM selection and compare to design requirements.
- ❑ Condensate line: Verify that condensate trap is installed and pitched.
- ❑ Unit air coil and filters: Insure that filter is clean and accessible. Clean air coil of all manufacturing oils.
- ❑ Unit controls: Verify that EXM field selection options are properly configured. Low voltage wiring is complete.
- ❑ Blower CFM and Water ΔT are properly configured.
- ❑ Service/access panels are in place.

SYSTEM CHECKOUT
- ❑ System water temperature: Check water temperature for proper range and also verify heating and cooling set points for proper operation.
- ❑ System pH: Check and adjust water pH if necessary to maintain a level between 6 and 8.5. Proper pH promotes system longevity (see Table 5).
- ❑ System flushing: Verify that all air is purged from the system. Air in the system can cause poor operation or system corrosion. Water used in the system must be potable quality initially and clean of dirt, piping slag, and strong chemical cleaning agents. Some antifreeze solutions may require distilled water.
- ❑ Internal Flow Controller: Verify that it is purged of air and in operating condition.
- ❑ System controls: Verify that system controls function and operate in the proper sequence.
- ❑ Low water temperature cutout: Verify that low water temperature setting is appropriate for the application.
- ❑ Miscellaneous: Note any questionable aspects of the installation.

⚠ CAUTION! ⚠

CAUTION! Verify that ALL water valves are open and allow water flow prior to engaging the compressor. Freezing of the heat exchanger or water lines can permanently damage the heat pump.

⚠ CAUTION! ⚠

CAUTION! To avoid equipment damage, DO NOT leave system filled in a building without heat during the winter unless antifreeze is added to the water loop. Heat exchangers (including the DHW heat exchanger) never fully drain by themselves and will freeze unless winterized with antifreeze.

Unit Start-up Procedure
1. Ensure all valves are adjusted to their full open position. Ensure line power to the heat pump is on.
2. Room temperature should be within the minimum-maximum ranges of listed in the unit IOM. During start-up checks, loop water temperature entering the heat pump should be between 30°F [-1°C] and 95°F [35°C].
3. It is recommended that Trilogy Q-Mode® units be first started in the hot water mode, when possible. This will allow liquid refrigerant to flow through the filter-drier before entering the EEV, allowing the filter-drier to catch any debris that might be in the system before it reaches the EEV. It will also warm the water in the hot water heat exchanger, preventing liquid refrigerant migration to the heat exchanger.
4. Place the unit in Manual Operation (MENU > SETTINGS > INSTALLATION SETTINGS > SERVICE MODE > QE MODEL > MANUAL OPERATION).
   a. The Manual Mode will energize the Loop Pump Speed and the DHW Pump Speed to default values.
   b. When in manual mode select the Hot Water operating mode (MENU > SETTINGS > INSTALLATION SETTINGS > SERVICE MODE > QE MODEL > MANUAL OPERATION > OPERATING MODE).
   c. Check for vibration, noise, and water leaks.
   d. Verify that the compressor is on and that the hot water temperature rise is within normal range. Allow the unit to run long enough to heat the water tank to at least 90°F.

NOTE: Allow three (3) minutes between tests for pressure to equalize before beginning heating test.

5. While still in the manual operation mode, turn on the blower by setting the ECM Target Airflow to a nominal amount (MENU > SETTINGS > INSTALLATION SETTINGS > SERVICE MODE > QE MODEL > MANUAL OPERATION > ECM TARGET AIRFLOW).
   a. Verify the blower is running and that air is moving appropriately through the duct system.

Unit Start-Up Procedure

b. Verify that the loop pump is running.
c. Set the unit operating mode to Heating (MENU > SETTINGS > INSTALLATION SETTINGS > SERVICE MODE > QE MODEL > MANUAL OPERATION > OPERATING MODE).
NOTE: The compressor will not start if the blower and pump are not operating at appropriate levels.
d. Check for vibration, noise, and water leaks
e. Check for warm air delivery at the supply air grilles within a few minutes after the unit has begun to operate and that the loop water temperature drop is within normal range.

NOTE: Allow three (3) minutes between tests for pressure to equalize before beginning cooling test.

6. Finally, set the unit to the Cooling Mode (MENU > SETTINGS > INSTALLATION SETTINGS > SERVICE MODE > QE MODEL > MANUAL OPERATION > OPERATING MODE).
   a. Verify that the compressor is on and that the water temperature rise (cooling mode) is within normal range.
   b. Check for cool air delivery at the supply air grilles within a few minutes after the unit has begun to operate.
   c. Check the elevation and cleanliness of the condensate lines. Dripping may be a sign of a blocked line. Check that the condensate trap is filled to provide a water seal.
7. If unit fails to operate properly, perform troubleshooting analysis (see troubleshooting section in this manual). If the check described fails to reveal the problem and the unit still does not operate, contact a trained service technician to insure proper diagnosis and repair of the equipment.
8. When testing is complete, exit the Manual Operation Menu and set thermostat to maintain desired comfort level for normal operation.
9. BE CERTAIN TO FILL OUT AND RETURN ALL WARRANTY REGISTRATION PAPERWORK.

NOTE: To obtain maximum performance, the air coil should be cleaned before start-up. A 10% solution of dishwasher detergent and water is recommended.

⚠ WARNING! ⚠

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

Table 11: Water Temperature Change Through Heat Exchanger

Water Flow, gpm (l/m)	Rise, Cooling °F	Drop, Heating °F
For Closed Loop: Ground Source or Closed Loop Systems at 3 gpm per ton (3.9 l/m per kw)	9 - 12	4 - 8
For Open Loop: Ground Water Systems at 1.5 gpm per ton (2.0 l/m per kw)	20 - 26	10 - 17

Unit Operating Conditions

Table 12a: 0930 Pressure and Temperature

0930		Cooling					
Entering Water Temp °F	DT	Suction Pressure PSIG	Discharge Pressure PSIG	Super heat	Sub cooling	Water Flow GPM	Air Temp Drop °F DB
50	20	136-141	209-229	8-12	9-14	2.1-3.1	17-23
	15	135-140	187-207	12-16	9-14	3.4-4.4	17-23
	10	134-139	165-185	17-21	8-13	4.7-5.7	17-23
70	20	140-145	298-318	8-12	10-15	2.3-3.3	17-23
	15	139-144	276-296	8-12	9-14	3.7-4.7	17-23
	10	139-144	254-274	8-12	9-14	5.1-6.1	17-23
90	20	139-144	387-407	8-12	11-16	2.5-3.5	17-23
	15	139-144	365-385	8-12	11-16	4.0-5.0	17-23
	10	139-144	343-363	8-12	11-16	5.5-6.5	17-23
110	20	135-140	476-496	8-12	13-18	2.7-3.7	17-23
	15	136-141	454-474	8-12	12-17	4.3-5.3	17-23
	10	137-142	432-452	8-12	12-17	5.9-6.9	17-23

0930		Heating					
Entering Water Temp °F	DT	Suction Pressure PSIG	Discharge Pressure PSIG	Super heat	Sub cooling	Water Flow GPM	Air Temp Rise °F DB
30	11	61-71	362-382	8-12	32-37	2.5-3.5	25-31
	8	69-74	352-372	8-12	30-35	4.0-5.0	25-31
	5	77-82	345-365	8-12	27-32	5.5-6.5	25-31
50	12	106-111	331-351	8-12	18-23	2.5-3.5	25-31
	9	112-117	331-351	8-12	16-21	4.0-5.0	25-31
	6	119-124	330-350	8-12	14-19	5.5-6.5	25-31
70	13	148-153	329-349	8-12	7-12	2.5-3.5	25-31
	10	155-160	329-349	8-12	6-11	4.0-5.0	25-31
	7	161-166	328-348	8-12	5-10	5.5-6.5	25-31
90	14	190-195	324-344	8-12	2-7	2.5-3.5	25-31
	11	197-202	324-344	8-12	1-6	4.0-5.0	25-31
	8	203-208	324-344	8-12	1-6	5.5-6.5	25-31

0930		Cooling + DHW					
Entering Water Temp °F	DT	Suction Pressure PSIG	Discharge Pressure PSIG	Super heat	Sub cooling	Water Flow GPM	Air Temp Drop °F DB
70	8	130-140	227-247	8-12	1-5	6.4-7.4	17-23
90	8	131-141	325-345	8-12	2-7	6.8-7.8	17-23
110	8	134-144	424-544	8-12	5-10	7.5-8.5	17-23

0930		DHW						
Source EWT	Source DT	Load EWT °F	Suction Pressure PSIG	Discharge Pressure PSIG	Super heat	Sub cooling	Water Flow GPM Source	Water Temp Rise °F Load
30	11.0	70	70-80	222-242	8-12	10-15	2.3-3.3	8-9
		90	70-80	302-322	8-12	10-15	1.9-2.9	8-9
		100	71-81	346-366	8-12	10-15	1.8-2.8	8-9
		110	72-82	395-415	8-12	10-15	1.5-2.5	8-9
		130	73-83	506-526	8-12	8-13	1.1-2.1	8-9
	8.0	70	75-85	221-241	8-12	10-15	3.6-4.6	8-9
		90	76-86	301-321	8-12	10-15	3.1-4.1	8-9
		100	77-87	346-366	8-12	10-15	2.9-3.9	8-9
		110	78-88	395-415	8-12	10-15	2.5-3.5	8-9
		130	79-89	506-526	8-12	8-13	1.8-2.8	8-9
	5.0	70	80-90	221-241	8-12	10-15	5.0-6.0	8-9
		90	81-91	301-321	8-12	10-15	4.3-5.3	8-9
		100	82-92	346-366	8-12	10-15	4.0-5.0	8-9
		110	83-93	395-415	8-12	10-15	3.5-4.5	8-9
		130	84-94	506-526	8-12	8-13	2.6-3.6	8-9
50	12.0	70	101-111	223-243	8-12	10-15	2.0-3.0	8-9
		90	102-112	303-323	8-12	10-15	1.7-2.7	8-9
		100	103-113	349-369	8-12	10-15	1.5-2.5	8-9
		110	103-113	398-418	8-12	10-15	1.4-2.4	8-9
		130	106-116	510-530	8-12	8-13	1.1-2.1	8-9
	9.0	70	105-115	224-244	8-12	10-15	3.2-4.2	8-9
		90	106-116	304-324	8-12	11-16	2.7-3.7	8-9
		100	107-117	350-370	8-12	11-16	2.5-3.5	8-9
		110	108-118	400-420	8-12	11-16	2.3-3.3	8-9
		130	111-121	512-532	8-12	9-14	1.8-2.8	8-9
	6.0	70	110-120	225-245	8-12	11-16	4.4-5.4	8-9
		90	111-121	305-325	8-12	11-16	3.8-4.8	8-9
		100	112-122	351-371	8-12	11-16	3.5-4.5	8-9
		110	113-123	401-421	8-12	11-16	3.2-4.2	8-9
		130	117-127	513-533	8-12	9-14	2.6-3.6	8-9
70	13.0	70	131-141	230-250	8-12	12-17	1.7-2.7	8-9
		90	133-143	311-331	8-12	12-17	1.5-2.5	8-9
		100	135-145	357-377	8-12	12-17	1.4-2.4	8-9
		110	137-147	407-427	8-12	12-17	1.2-2.2	8-9
		130	142-152	519-539	8-12	11-16	1.0-2.0	8-9
	10.0	70	137-147	231-251	8-12	12-17	2.8-3.8	8-9
		90	139-149	312-332	8-12	12-17	2.5-3.5	8-9
		100	141-151	358-378	8-12	12-17	2.3-3.3	8-9
		110	143-153	408-428	8-12	12-17	2.1-3.1	8-9
		130	150-160	520-540	8-12	11-16	1.7-2.7	8-9
	7.0	70	143-153	232-252	8-12	12-17	3.9-4.9	8-9
		90	146-156	313-333	8-12	12-17	3.5-4.5	8-9
		100	148-158	359-379	8-12	12-17	3.2-4.2	8-9
		110	150-160	408-428	8-12	12-17	2.9-3.9	8-9
		130	157-167	521-541	8-12	11-16	2.4-3.4	8-9
90	14.0	70	177-187	231-251	8-12	12-17	1.6-2.6	8-9
		90	181-191	312-332	8-12	12-17	1.3-2.3	8-9
		100	184-194	358-378	8-12	12-17	1.2-2.2	8-9
		110	188-198	407-427	8-12	11-16	1.1-2.1	8-9
		130	198-208	520-540	8-12	9-14	0.9-1.9	8-9
	11.0	70	187-197	230-250	8-12	11-16	2.6-3.6	8-9
		90	191-201	311-331	8-12	11-16	2.2-3.2	8-9
		100	194-204	356-376	8-12	11-16	2.1-3.1	8-9
		110	198-208	406-426	8-12	10-15	1.9-2.9	8-9
		130	209-219	519-539	8-12	8-13	1.6-2.6	8-9
	8.0	70	197-207	228-248	8-12	11-16	3.6-4.6	8-9
		90	201-211	308-328	8-12	10-15	3.1-4.1	8-9
		100	205-215	354-374	8-12	10-15	2.9-3.9	8-9
		110	210-220	404-424	8-12	9-14	2.7-3.7	8-9
		130	221-231	517-537	8-12	6-11	2.3-3.3	8-9

Unit Operating Conditions

Table 12b: 1860 Pressure and Temperature

1860		Cooling					
Entering Water Temp °F	DT	Suction Pressure PSIG	Discharge Pressure PSIG	Super heat	Sub cooling	Water Flow GPM	Air Temp Drop °F DB
50	20	127-137	208-228	8-12	7-12	10.8-11.8	17-23
	15	127-137	186-206	12-16	7-12	10.5-11.5	17-23
	10	127-137	163-183	17-21	6-11	10.3-11.3	17-23
70	20	125-135	298-318	8-12	8-13	11.7-12.7	17-23
	15	126-136	275-295	8-12	8-13	11.5-12.5	17-23
	10	126-136	253-273	8-12	7-12	11.2-12.2	17-23
90	20	120-130	387-407	8-12	10-15	12.6-13.6	17-23
	15	122-132	365-385	8-12	10-15	12.4-13.4	17-23
	10	123-133	342-362	8-12	9-14	12.2-13.2	17-23
110	20	112-122	477-497	8-12	12-17	13.6-14.6	17-23
	15	115-125	454-474	8-12	12-17	13.4-14.4	17-23
	10	117-127	432-452	8-12	11-16	13.1-14.1	17-23

1860		Heating					
Entering Water Temp °F	DT	Suction Pressure PSIG	Discharge Pressure PSIG	Super heat	Sub cooling	Water Flow GPM	Air Temp Rise °F DB
30	11	61-71	340-360	8-12	20-25	5.5-6.5	25-31
	8	68-78	337-357	8-12	17-22	8.5-9.5	25-31
	5	73-83	333-353	8-12	14-19	11.5-12.5	25-31
50	12	98-108	333-353	8-12	4-9	5.5-6.5	25-31
	9	105-115	333-353	8-12	3-8	8.5-9.5	25-31
	6	110-120	333-353	8-12	2-7	11.5-12.5	25-31
70	13	135-145	333-353	8-12	1-6	5.5-6.5	25-31
	10	141-151	333-353	8-12	1-6	8.5-9.5	25-31
	7	148-158	333-353	8-12	1-6	11.5-12.5	25-31
90	14	172-182	333-353	8-12	1-6	5.5-6.5	25-31
	11	177-187	333-353	13-17	1-6	8.5-9.5	25-31
	8	184-194	333-353	16-20	1-6	11.5-12.5	25-31

1860		Cooling + DHW					
Entering Water Temp °F	DT	Suction Pressure PSIG	Discharge Pressure PSIG	Super heat	Sub cooling	Water Flow GPM	Air Temp Drop °F DB
70	13.5	127-137	259-279	8-12	6-11	7.5-8.5	17-23
90	14.5	122-132	368-388	8-12	8-13	7.5-8.5	17-23
110	16.5	114-124	483-503	8-12	11-16	7.5-8.5	17-23

1860		DHW						
Source EWT	Source DT	Load EWT °F	Suction Pressure PSIG	Discharge Pressure PSIG	Super heat	Sub cooling	Water Flow GPM Source	Water Temp Rise °F Load
30	11.0	70	61-71	236-256	8-12	12-17	5.0-6.0	8-9
		90	61-71	321-341	8-12	13-18	4.0-5.0	8-9
		100	61-71	373-393	8-12	13-18	3.6-4.6	8-9
		110	61-71	432-452	8-12	14-19	3.2-4.2	8-9
		130	62-72	570-590	8-12	15-20	2.1-3.1	8-9
	8.0	70	66-76	235-255	8-12	12-17	7.8-8.8	8-9
		90	66-76	320-340	8-12	13-18	6.3-7.3	8-9
		100	66-76	371-391	8-12	13-18	5.9-6.9	8-9
		110	66-76	429-449	8-12	14-19	5.0-6.0	8-9
		130	67-77	564-584	8-12	14-19	3.4-4.4	8-9
	5.0	70	70-80	235-255	8-12	12-17	10.6-11.6	8-9
		90	70-80	319-339	8-12	12-17	8.5-9.5	8-9
		100	70-80	369-389	8-12	12-17	7.7-8.7	8-9
		110	71-81	426-446	8-12	13-18	6.8-7.8	8-9
		130	72-82	559-579	8-12	14-19	4.7-5.7	8-9
50	12.0	70	93-103	235-255	8-12	12-17	4.3-5.3	8-9
		90	94-104	315-335	8-12	12-17	3.7-4.7	8-9
		100	94-104	362-382	8-12	12-17	3.5-4.5	8-9
		110	95-105	416-436	8-12	12-17	3.1-4.1	8-9
		130	97-107	541-561	8-12	12-17	2.3-3.3	8-9
	9.0	70	97-107	235-255	8-12	12-17	6.8-7.8	8-9
		90	100-110	314-334	8-12	12-17	5.9-6.9	8-9
		100	101-111	361-381	8-12	12-17	5.4-6.4	8-9
		110	102-112	414-434	8-12	11-16	4.9-5.9	8-9
		130	103-113	538-558	8-12	11-16	3.7-4.7	8-9
	6.0	70	104-114	235-255	8-12	12-17	9.1-10.1	8-9
		90	106-116	314-334	8-12	12-17	8.1-9.1	8-9
		100	107-117	360-380	8-12	11-16	7.4-8.4	8-9
		110	108-118	413-433	8-12	11-16	6.7-7.7	8-9
		130	109-119	534-554	8-12	11-16	5.1-6.1	8-9
70	13.0	70	130-140	235-255	8-12	12-17	3.8-4.8	8-9
		90	133-143	312-332	8-12	12-17	3.4-4.4	8-9
		100	135-145	356-376	8-12	11-16	3.2-4.2	8-9
		110	137-147	408-428	8-12	10-15	2.9-3.9	8-9
		130	139-149	524-544	8-12	10-15	2.3-3.3	8-9
	10.0	70	136-146	235-255	8-12	12-17	6.0-7.0	8-9
		90	140-150	312-332	8-12	12-17	5.3-6.3	8-9
		100	142-152	356-376	8-12	11-16	5.0-6.0	8-9
		110	144-154	408-428	8-12	10-15	4.6-5.6	8-9
		130	147-157	522-542	8-12	10-15	3.7-4.7	8-9
	7.0	70	142-152	235-255	8-12	12-17	8.2-9.2	8-9
		90	147-157	312-332	8-12	12-17	7.3-8.3	8-9
		100	150-160	356-376	8-12	11-16	6.8-7.8	8-9
		110	152-162	408-428	8-12	10-15	6.3-7.3	8-9
		130	154-164	521-541	8-12	8-13	5.1-6.1	8-9
90	14.0	70	172-182	233-253	8-12	11-16	3.4-4.4	8-9
		90	180-190	311-331	8-12	11-16	3.1-4.1	8-9
		100	183-193	356-376	8-12	10-15	2.9-3.9	8-9
		110	186-196	405-425	8-12	9-14	2.6-3.6	8-9
		130	190-200	517-537	8-12	6-11	2.1-3.1	8-9
	11.0	70	180-190	232-252	8-12	11-16	5.3-6.3	8-9
		90	187-197	311-331	8-12	11-16	4.9-5.9	8-9
		100	191-201	356-376	8-12	10-15	4.6-5.6	8-9
		110	195-205	405-425	8-12	9-14	4.2-5.2	8-9
		130	198-208	517-537	8-12	6-11	3.4-4.4	8-9
	8.0	70	187-197	231-251	8-12	11-16	7.2-8.2	8-9
		90	195-205	311-331	8-12	11-16	6.7-7.7	8-9
		100	200-210	356-376	8-12	10-15	6.3-7.3	8-9
		110	203-213	405-425	8-12	8-13	5.8-6.8	8-9
		130	207-217	516-536	8-12	5-10	4.7-5.7	8-9

Table 13a: Performance Data — Trilogy® QE 0930 - Heating

EWT °F	DT	CFM/T	HC					KW					HE					COP				
20	6	300	9.0	12.0	18.0	24.0	27.6	0.98	1.19	1.77	2.52	3.01	5.6	8.0	12.0	15.4	17.3	2.7	3.0	3.0	2.8	2.7
	6	400	9.0	12.0	18.0	24.0	27.5	0.87	1.09	1.66	2.37	2.85	6.0	8.3	12.3	15.9	17.8	3.0	3.2	3.2	3.0	2.8
	6	500	9.0	12.0	18.0	24.0	27.5	0.79	1.00	1.57	2.30	2.81	6.3	8.6	12.7	16.1	17.9	3.3	3.5	3.4	3.1	2.9
30	12	300	9.0	12.0	18.0	24.0	29.3	0.95	1.13	1.68	2.38	3.07	5.8	8.1	12.3	15.9	18.8	2.8	3.1	3.1	2.9	2.8
	12	400	9.0	12.0	18.0	24.0	29.5	0.81	1.02	1.55	2.21	2.94	6.2	8.5	12.7	16.5	19.5	3.2	3.4	3.4	3.2	2.9
	12	500	9.0	12.0	18.0	24.0	29.6	0.75	0.94	1.46	2.15	2.92	6.5	8.8	13.0	16.7	19.6	3.5	3.8	3.6	3.3	3.0
	6	300	9.0	12.0	18.0	24.0	30.0	0.89	1.06	1.55	2.19	2.90	6.0	8.4	12.7	16.5	20.1	3.0	3.3	3.4	3.2	3.0
	6	400	9.0	12.0	18.0	24.0	30.0	0.74	0.93	1.40	1.99	2.71	6.5	8.8	13.2	17.2	20.8	3.5	3.8	3.8	3.5	3.2
	6	500	9.0	12.0	18.0	24.0	30.0	0.68	0.85	1.31	1.93	2.68	6.7	9.1	13.5	17.4	20.8	3.9	4.1	4.0	3.6	3.3
40	12	300	9.0	12.0	18.0	24.0	30.0	0.85	1.00	1.47	2.07	2.73	6.1	8.6	13.0	16.9	20.7	3.1	3.5	3.6	3.4	3.2
	12	400	9.0	12.0	18.0	24.0	30.0	0.70	0.87	1.30	1.86	2.52	6.6	9.0	13.5	17.7	21.4	3.8	4.0	4.0	3.8	3.5
	12	500	9.0	12.0	18.0	24.0	30.0	0.64	0.79	1.23	1.80	2.50	6.8	9.3	13.8	17.8	21.5	4.1	4.4	4.3	3.9	3.5
	6	300	9.0	12.0	18.0	24.0	30.0	0.79	0.93	1.35	1.90	2.48	6.3	8.8	13.4	17.5	21.5	3.3	3.8	3.9	3.7	3.5
	6	400	9.0	12.0	18.0	24.0	30.0	0.65	0.80	1.18	1.68	2.27	6.8	9.3	14.0	18.3	22.3	4.1	4.4	4.5	4.2	3.9
	6	500	9.0	12.0	18.0	24.0	30.0	0.59	0.72	1.11	1.63	2.25	7.0	9.5	14.2	18.5	22.3	4.5	4.9	4.8	4.3	3.9
50	13	300	9.0	12.0	18.0	24.0	30.0	0.76	0.89	1.29	1.81	2.37	6.4	9.0	13.6	17.8	21.9	3.5	3.9	4.1	3.9	3.7
	13	400	9.0	12.0	18.0	24.0	30.0	0.62	0.76	1.12	1.59	2.15	6.9	9.4	14.2	18.6	22.6	4.2	4.6	4.7	4.4	4.1
	13	500	9.0	12.0	18.0	24.0	30.0	0.56	0.69	1.05	1.54	2.14	7.1	9.7	14.4	18.7	22.7	4.7	5.1	5.0	4.6	4.1
	7	300	9.0	12.0	18.0	24.0	30.0	0.70	0.82	1.18	1.65	2.15	6.6	9.2	14.0	18.4	22.7	3.7	4.3	4.5	4.3	4.1
	7	400	9.0	12.0	18.0	24.0	30.0	0.58	0.70	1.02	1.44	1.94	7.0	9.6	14.5	19.1	23.4	4.6	5.0	5.2	4.9	4.5
	7	500	9.0	12.0	18.0	24.0	30.0	0.52	0.63	0.95	1.39	1.92	7.2	9.9	14.8	19.2	23.4	5.1	5.6	5.5	5.1	4.6
60	13	300	9.0	12.0	18.0	24.0	30.0	0.67	0.77	1.12	1.56	2.01	6.7	9.4	14.2	18.7	23.2	4.0	4.5	4.7	4.5	4.4
	13	400	9.0	12.0	18.0	24.0	30.0	0.55	0.66	0.96	1.35	1.81	7.1	9.7	14.7	19.4	23.8	4.8	5.3	5.5	5.2	4.9
	13	500	9.0	12.0	18.0	24.0	30.0	0.49	0.59	0.89	1.30	1.79	7.3	10.0	15.0	19.6	23.9	5.4	6.0	5.9	5.4	4.9
	7	300	9.0	12.0	18.0	24.0	30.0	0.61	0.71	1.02	1.42	1.81	6.9	9.6	14.5	19.2	23.8	4.3	5.0	5.2	5.0	4.8
	7	400	9.0	12.0	18.0	24.0	30.0	0.50	0.61	0.87	1.22	1.63	7.3	9.9	15.0	19.8	24.4	5.2	5.8	6.0	5.8	5.4
	7	500	9.0	12.0	18.0	24.0	30.0	0.44	0.54	0.81	1.18	1.62	7.5	10.2	15.2	20.0	24.5	5.9	6.5	6.5	6.0	5.4
70	13	300	9.0	12.0	18.0	24.0	30.0	0.58	0.67	0.96	1.33	1.70	7.0	9.7	14.7	19.5	24.2	4.6	5.3	5.5	5.3	5.2
	13	400	9.0	12.0	18.0	24.0	30.0	0.48	0.57	0.82	1.14	1.52	7.4	10.0	15.2	20.1	24.8	5.5	6.1	6.4	6.2	5.8
	13	500	9.0	12.0	18.0	24.0	30.0	0.42	0.50	0.76	1.10	1.51	7.6	10.3	15.4	20.2	24.9	6.3	7.0	6.9	6.4	5.8
	7	300	9.0	12.0	18.0	24.0	30.0	0.53	0.61	0.88	1.22	1.53	7.2	9.9	15.0	19.8	24.8	5.0	5.8	6.0	5.8	5.7
	7	400	9.0	12.0	18.0	24.0	30.0	0.43	0.52	0.75	1.04	1.38	7.5	10.2	15.4	20.5	25.3	6.1	6.7	7.0	6.8	6.4
	7	500	9.3	12.0	18.0	24.0	30.0	0.38	0.46	0.69	1.00	1.36	8.0	10.4	15.6	20.6	25.4	7.1	7.7	7.6	7.0	6.5
80	13	300	9.0	12.0	18.0	24.0	30.0	0.49	0.58	0.84	1.15	1.43	7.3	10.0	15.1	20.1	25.1	5.3	6.1	6.3	6.1	6.1
	13	400	9.4	12.0	18.0	24.0	30.0	0.41	0.49	0.71	0.98	1.29	8.0	10.3	15.6	20.7	25.6	6.6	7.2	7.5	7.2	6.8
	13	500	9.9	12.0	18.0	24.0	30.0	0.37	0.43	0.65	0.94	1.27	8.6	10.5	15.8	20.8	25.6	7.9	8.3	8.1	7.5	6.9
	7	300	9.4	12.0	18.0	24.0	30.0	0.46	0.53	0.77	1.06	1.30	7.9	10.2	15.4	20.4	25.6	6.0	6.6	6.8	6.6	6.7
	7	400	10.0	12.0	18.0	24.0	30.0	0.38	0.44	0.64	0.89	1.17	8.7	10.5	15.8	21.0	26.0	7.7	8.0	8.2	7.9	7.5
	7	500	10.7	12.0	18.0	24.0	30.0	0.34	0.38	0.59	0.86	1.16	9.5	10.7	16.0	21.1	26.1	9.2	9.3	8.9	8.2	7.6
90	13	300	9.8	12.0	18.0	24.0	30.0	0.44	0.50	0.74	1.01	1.23	8.2	10.3	15.5	20.6	25.8	6.5	7.0	7.1	7.0	7.2
	13	400	10.4	12.0	18.0	24.0	30.0	0.36	0.40	0.60	0.84	1.09	9.2	10.6	15.9	21.1	26.3	8.5	8.7	8.7	8.4	8.0
	13	500	11.2	12.0	18.0	24.0	30.0	0.32	0.35	0.55	0.81	1.09	10.1	10.8	16.1	21.2	26.3	10.2	10.2	9.5	8.7	8.1
	7	300	10.1	12.0	18.0	24.0	30.0	0.42	0.47	0.70	0.95	1.13	8.7	10.4	15.6	20.8	26.1	7.1	7.5	7.6	7.4	7.8
	7	400	10.9	12.0	18.0	24.0	30.0	0.32	0.35	0.54	0.76	1.00	9.8	10.8	16.1	21.4	26.6	10.1	10.1	9.7	9.2	8.8
	7	500	11.9	12.0	18.0	24.0	30.0	0.29	0.29	0.50	0.74	0.99	10.9	11.0	16.3	21.5	26.6	12.0	12.0	10.5	9.5	8.9
100	17	300	10.3	12.0	18.0	24.0	30.0	0.42	0.47	0.70	0.95	1.13	8.9	10.4	15.6	20.8	26.1	7.2	7.5	7.6	7.4	7.8
	17	400	11.2	12.0	18.0	24.0	30.0	0.33	0.35	0.54	0.76	1.00	10.1	10.8	16.1	21.4	26.6	10.1	10.1	9.7	9.2	8.8
	17	500	12.3	12.0	18.0	24.0	30.0	0.30	0.29	0.50	0.74	0.99	11.2	11.0	16.3	21.5	26.6	11.9	12.0	10.5	9.5	8.9
	17	300	10.1	12.0	18.0	24.0	30.0	0.42	0.47	0.70	0.95	1.13	8.7	10.4	15.6	20.8	26.1	7.1	7.5	7.6	7.4	7.8
	17	400	10.9	12.0	18.0	24.0	30.0	0.32	0.35	0.54	0.76	1.00	9.8	10.8	16.1	21.4	26.6	10.1	10.1	9.7	9.2	8.8
	17	500	11.9	12.0	18.0	24.0	30.0	0.29	0.29	0.50	0.74	0.99	10.9	11.0	16.3	21.5	26.6	12.0	12.0	10.5	9.5	8.9
110	27	300	10.3	12.0	18.0	24.0	30.0	0.42	0.47	0.70	0.95	1.13	8.9	10.4	15.6	20.8	26.1	7.2	7.5	7.6	7.4	7.8
	27	400	11.2	12.0	18.0	24.0	30.0	0.33	0.35	0.54	0.76	1.00	10.1	10.8	16.1	21.4	26.6	10.1	10.1	9.7	9.2	8.8
	27	500	12.3	12.0	18.0	24.0	30.0	0.30	0.29	0.50	0.74	0.99	11.2	11.0	16.3	21.5	26.6	11.9	12.0	10.5	9.5	8.9
	27	300	10.1	12.0	18.0	24.0	30.0	0.42	0.47	0.70	0.95	1.13	8.7	10.4	15.6	20.8	26.1	7.1	7.5	7.6	7.4	7.8
	27	400	10.9	12.0	18.0	24.0	30.0	0.32	0.35	0.54	0.76	1.00	9.8	10.8	16.1	21.4	26.6	10.1	10.1	9.7	9.2	8.8
	27	500	11.9	12.0	18.0	24.0	30.0	0.29	0.29	0.50	0.74	0.99	10.9	11.0	16.3	21.5	26.6	12.0	12.0	10.5	9.5	8.9
120	37	300	10.3	12.0	18.0	24.0	30.0	0.42	0.47	0.70	0.95	1.13	8.9	10.4	15.6	20.8	26.1	7.2	7.5	7.6	7.4	7.8
	37	400	11.2	12.0	18.0	24.0	30.0	0.33	0.35	0.54	0.76	1.00	10.1	10.8	16.1	21.4	26.6	10.1	10.1	9.7	9.2	8.8
	37	500	12.3	12.0	18.0	24.0	30.0	0.30	0.29	0.50	0.74	0.99	11.2	11.0	16.3	21.5	26.6	11.9	12.0	10.5	9.5	8.9
	37	300	10.1	12.0	18.0	24.0	30.0	0.42	0.47	0.70	0.95	1.13	8.7	10.4	15.6	20.8	26.1	7.1	7.5	7.6	7.4	7.8
	37	400	10.9	12.0	18.0	24.0	30.0	0.32	0.35	0.54	0.76	1.00	9.8	10.8	16.1	21.4	26.6	10.1	10.1	9.7	9.2	8.8
	37	500	11.9	12.0	18.0	24.0	30.0	0.29	0.29	0.50	0.74	0.99	10.9	11.0	16.3	21.5	26.6	12.0	12.0	10.5	9.5	8.9

* pressure drop is less than 1 ft
Interpolation is permissable, extrapolation is not.
Table does not include fan or pump power corerctions for AHRI/ISO conditions.

Above performance is based on 70°F db entering air condition.
Above data is based on 15% methanol.

Performance Data — Trilogy® QE0930 - Heating

HZ					LWT					GPM					WPD				
57	71	95	116	130	14.0	14.0	14.0	14.0	14.0	1.9	2.7	4.0	5.1	5.8	*	*	1.7	2.9	3.7
55	69	94	118	130	14.0	14.0	14.0	14.0	14.0	2.0	2.8	4.1	5.3	5.9	*	*	1.8	3.1	3.9
54	67	93	117	130	14.0	14.0	14.0	14.0	14.0	2.1	2.9	4.2	5.4	6.0	*	*	1.9	3.2	4.0
54	67	90	110	130	18.0	18.0	18.0	18.0	18.0	1.0	1.4	2.0	2.6	3.1	*	*	*	*	*
52	64	89	111	130	18.0	18.0	18.0	18.0	18.0	1.0	1.4	2.1	2.7	3.3	*	*	*	*	1.0
50	63	87	111	130	18.0	18.0	18.0	18.0	18.0	1.1	1.5	2.2	2.8	3.3	*	*	*	*	1.0
49	62	83	102	123	24.0	24.0	24.0	24.0	24.0	2.0	2.8	4.2	5.5	6.7	*	*	1.8	3.2	4.8
47	59	82	103	121	24.0	24.0	24.0	24.0	24.0	2.2	2.9	4.4	5.7	6.9	*	*	1.9	3.5	5.2
45	57	80	102	121	24.0	24.0	24.0	24.0	24.0	2.2	3.0	4.5	5.8	6.9	*	*	2.0	3.6	5.2
46	58	79	97	117	28.0	28.0	28.0	28.0	28.0	1.0	1.4	2.2	2.8	3.5	*	*	*	*	1.0
44	55	77	97	115	28.0	28.0	28.0	28.0	28.0	1.1	1.5	2.3	2.9	3.6	*	*	*	*	1.1
42	53	75	96	114	28.0	28.0	28.0	28.0	28.0	1.1	1.5	2.3	3.0	3.6	*	*	*	*	1.1
42	53	72	89	109	34.0	34.0	34.0	34.0	34.0	2.1	2.9	4.5	5.8	7.2	*	*	1.9	3.5	5.4
39	50	71	89	106	34.0	34.0	34.0	34.0	34.0	2.3	3.1	4.7	6.1	7.4	*	*	2.1	3.8	5.8
38	48	69	88	105	34.0	34.0	34.0	34.0	34.0	2.3	3.2	4.7	6.2	7.4	*	*	2.2	3.9	5.8
40	51	69	86	105	37.0	37.0	37.0	37.0	37.0	1.0	1.4	2.1	2.7	3.4	*	*	*	*	*
37	48	68	86	102	37.0	37.0	37.0	37.0	37.0	1.1	1.4	2.2	2.9	3.5	*	*	*	*	1.0
36	46	66	85	101	37.0	37.0	37.0	37.0	37.0	1.1	1.5	2.2	2.9	3.5	*	*	*	*	1.0
36	47	64	79	97	43.0	43.0	43.0	43.0	43.0	1.9	2.6	4.0	5.2	6.5	*	*	1.4	2.7	4.3
34	44	62	79	94	43.0	43.0	43.0	43.0	43.0	2.0	2.7	4.1	5.5	6.7	*	*	1.5	2.9	4.6
33	42	61	78	93	43.0	43.0	43.0	43.0	43.0	2.1	2.8	4.2	5.5	6.7	*	*	1.6	3.0	4.6
34	44	61	75	93	47.0	47.0	47.0	47.0	47.0	1.0	1.4	2.2	2.9	3.6	*	*	*	*	1.0
32	41	59	75	90	47.0	47.0	47.0	47.0	47.0	1.1	1.5	2.3	3.0	3.7	*	*	*	*	1.1
31	40	57	74	88	47.0	47.0	47.0	47.0	47.0	1.1	1.5	2.3	3.0	3.7	*	*	*	*	1.1
31	41	56	70	86	53.0	53.0	53.0	53.0	53.0	2.0	2.7	4.1	5.5	6.8	*	*	1.5	2.9	4.7
29	38	54	70	83	53.0	53.0	53.0	53.0	53.0	2.1	2.8	4.3	5.7	7.0	*	*	1.6	3.2	5.0
28	36	53	68	81	53.0	53.0	53.0	53.0	53.0	2.1	2.9	4.4	5.7	7.0	*	*	1.7	3.2	5.0
29	39	53	66	82	57.0	57.0	57.0	57.0	57.0	1.1	1.5	2.3	3.0	3.7	*	*	*	*	1.1
27	36	51	66	79	57.0	57.0	57.0	57.0	57.0	1.1	1.5	2.3	3.1	3.8	*	*	*	*	1.2
27	34	50	65	77	57.0	57.0	57.0	57.0	57.0	1.2	1.6	2.4	3.1	3.8	*	*	*	*	1.2
27	36	50	62	76	63.0	63.0	63.0	63.0	63.0	2.1	2.8	4.3	5.7	7.1	*	*	1.6	3.2	5.1
25	33	48	62	74	63.0	63.0	63.0	63.0	63.0	2.1	2.9	4.4	5.8	7.2	*	*	1.8	3.4	5.3
25	32	46	60	72	63.0	63.0	63.0	63.0	63.0	2.3	3.0	4.5	5.9	7.2	*	*	1.8	3.4	5.3
25	34	47	59	73	67.0	67.0	67.0	67.0	67.0	1.1	1.5	2.3	3.1	3.9	*	*	*	*	1.3
25	31	46	59	70	67.0	67.0	67.0	67.0	67.0	1.2	1.6	2.4	3.2	3.9	*	*	*	*	1.3
25	30	44	57	68	67.0	67.0	67.0	67.0	67.0	1.3	1.6	2.4	3.2	3.9	*	*	*	*	1.3
25	32	45	55	69	73.0	73.0	73.0	73.0	73.0	2.3	2.9	4.4	5.8	7.3	*	*	1.8	3.4	5.4
25	29	43	55	66	73.0	73.0	73.0	73.0	73.0	2.5	3.0	4.5	6.0	7.4	*	*	1.9	3.6	5.6
25	28	41	54	64	73.0	73.0	73.0	73.0	73.0	2.7	3.1	4.6	6.0	7.4	*	*	1.9	3.6	5.6
25	31	43	53	66	77.0	77.0	77.0	77.0	77.0	1.3	1.6	2.4	3.2	4.0	*	*	*	*	1.4
25	28	41	53	64	77.0	77.0	77.0	77.0	77.0	1.4	1.6	2.5	3.3	4.0	*	*	*	*	1.4
26	27	40	52	62	77.0	77.0	77.0	77.0	77.0	1.6	1.7	2.5	3.3	4.0	*	*	*	*	1.4
25	30	41	50	63	83.0	83.0	83.0	83.0	83.0	2.5	3.0	4.5	5.9	7.5	*	*	1.9	3.5	5.6
25	27	39	50	61	83.0	83.0	83.0	83.0	83.0	2.8	3.1	4.6	6.1	7.6	*	*	2.0	3.7	5.8
26	26	38	49	58	83.0	83.0	83.0	83.0	83.0	3.1	3.1	4.7	6.1	7.6	*	*	2.0	3.8	5.8
25	30	41	50	63	83.0	83.0	83.0	83.0	83.0	1.0	1.2	1.8	2.4	3.1	*	*	*	*	*
26	27	39	50	61	83.0	83.0	83.0	83.0	83.0	1.2	1.3	1.9	2.5	3.1	*	*	*	*	*
26	26	38	49	58	83.0	83.0	83.0	83.0	83.0	1.3	1.3	1.9	2.5	3.1	*	*	*	*	*
25	30	41	50	63	83.0	83.0	83.0	83.0	83.0	1.0	1.2	1.8	2.4	3.1	*	*	*	*	*
25	27	39	50	61	83.0	83.0	83.0	83.0	83.0	1.2	1.3	1.9	2.5	3.1	*	*	*	*	*
26	26	38	49	58	83.0	83.0	83.0	83.0	83.0	1.3	1.3	1.9	2.5	3.1	*	*	*	*	*
25	30	41	50	63	83.0	83.0	83.0	83.0	83.0	0.7	0.8	1.2	1.5	1.9	*	*	*	*	*
26	27	39	50	61	83.0	83.0	83.0	83.0	83.0	0.7	0.8	1.2	1.6	2.0	*	*	*	*	*
26	26	38	49	58	83.0	83.0	83.0	83.0	83.0	0.8	0.8	1.2	1.6	2.0	*	*	*	*	*
25	30	41	50	63	83.0	83.0	83.0	83.0	83.0	0.6	0.8	1.2	1.5	1.9	*	*	*	*	*
25	27	39	50	61	83.0	83.0	83.0	83.0	83.0	0.7	0.8	1.2	1.6	2.0	*	*	*	*	*
26	26	38	49	58	83.0	83.0	83.0	83.0	83.0	0.8	0.8	1.2	1.6	2.0	*	*	*	*	*
25	30	41	50	63	83.0	83.0	83.0	83.0	83.0	0.5	0.6	0.8	1.1	1.4	*	*	*	*	*
26	27	39	50	61	83.0	83.0	83.0	83.0	83.0	0.5	0.6	0.9	1.2	1.4	*	*	*	*	*
26	26	38	49	58	83.0	83.0	83.0	83.0	83.0	0.6	0.6	0.9	1.2	1.4	*	*	*	*	*
25	30	41	50	63	83.0	83.0	83.0	83.0	83.0	0.5	0.6	0.8	1.1	1.4	*	*	*	*	*
25	27	39	50	61	83.0	83.0	83.0	83.0	83.0	0.5	0.6	0.9	1.2	1.4	*	*	*	*	*
26	26	38	49	58	83.0	83.0	83.0	83.0	83.0	0.6	0.6	0.9	1.2	1.4	*	*	*	*	*

* pressure drop is less than 1 ft
Interpolation is permissable, extrapolation is not.
Table does not include fan or pump power corerctions for AHRI/ISO conditions.

Above performance is based on 70°F db entering air condition.
Above data is based on 15% methanol.

Table 13b: Performance Data — Trilogy® QE0930 - Cooling

EWT °F	DT	CFM/T	TC					SC					S/T					kW					HR				
20	45	300	9.0	12.0	18.0	24.0	30.0	5.7	7.9	11.8	15.6	19.9	0.64	0.66	0.66	0.65	0.66	0.17	0.23	0.40	0.63	0.97	9.6	12.8	19.4	26.2	33.3
	45	400	10.0	12.0	18.0	24.0	30.0	7.5	9.0	13.4	17.7	21.3	0.75	0.75	0.75	0.74	0.71	0.15	0.19	0.35	0.60	0.96	10.5	12.7	19.2	26.1	33.3
	45	500	10.6	12.0	18.0	24.0	30.0	9.0	10.3	14.6	17.8	22.3	0.85	0.86	0.81	0.74	0.74	0.15	0.18	0.41	0.71	1.05	11.1	12.6	19.4	26.4	33.6
30	40	300	9.0	12.0	18.0	24.0	30.0	5.8	8.0	11.9	15.6	20.0	0.64	0.67	0.66	0.65	0.67	0.22	0.28	0.46	0.71	1.07	9.7	13.0	19.6	26.4	33.7
	40	400	9.6	12.0	18.0	24.0	30.0	7.2	9.0	13.5	17.8	21.6	0.75	0.75	0.75	0.74	0.72	0.20	0.24	0.41	0.67	1.05	10.3	12.8	19.4	26.3	33.6
	40	500	10.6	12.0	18.0	24.0	30.0	9.3	10.7	15.0	18.4	23.1	0.88	0.89	0.83	0.77	0.77	0.18	0.21	0.44	0.75	1.11	11.2	12.7	19.5	26.6	33.8
	35	300	9.0	12.0	18.0	24.0	30.0	5.7	7.9	11.8	15.6	19.9	0.64	0.66	0.66	0.65	0.66	0.17	0.23	0.40	0.63	0.97	9.6	12.8	19.4	26.2	33.3
	35	400	10.0	12.0	18.0	24.0	30.0	7.5	9.0	13.4	17.7	21.3	0.75	0.75	0.75	0.74	0.71	0.15	0.19	0.35	0.60	0.96	10.5	12.7	19.2	26.1	33.3
	35	500	10.6	12.0	18.0	24.0	30.0	9.0	10.3	14.6	17.8	22.3	0.85	0.86	0.81	0.74	0.74	0.15	0.18	0.41	0.71	1.05	11.1	12.6	19.4	26.4	33.6
40	30	300	9.0	12.0	18.0	24.0	30.0	5.8	8.0	11.9	15.6	20.0	0.64	0.67	0.66	0.65	0.67	0.22	0.28	0.46	0.71	1.07	9.7	13.0	19.6	26.4	33.7
	30	400	9.6	12.0	18.0	24.0	30.0	7.2	9.0	13.5	17.8	21.6	0.75	0.75	0.75	0.74	0.72	0.20	0.24	0.41	0.67	1.05	10.3	12.8	19.4	26.3	33.6
	30	500	10.6	12.0	18.0	24.0	30.0	9.3	10.7	15.0	18.4	23.1	0.88	0.89	0.83	0.77	0.77	0.18	0.21	0.44	0.75	1.11	11.2	12.7	19.5	26.6	33.8
	25	300	9.0	12.0	18.0	24.0	30.0	5.7	7.9	11.8	15.6	19.9	0.64	0.66	0.66	0.65	0.66	0.17	0.23	0.40	0.63	0.97	9.6	12.8	19.4	26.2	33.3
	25	400	10.0	12.0	18.0	24.0	30.0	7.5	9.0	13.4	17.7	21.3	0.75	0.75	0.75	0.74	0.71	0.15	0.19	0.35	0.60	0.96	10.5	12.7	19.2	26.1	33.3
	25	500	10.6	12.0	18.0	24.0	30.0	9.0	10.3	14.6	17.8	22.3	0.85	0.86	0.81	0.74	0.74	0.15	0.18	0.41	0.71	1.05	11.1	12.6	19.4	26.4	33.6
50	20	300	9.0	12.0	18.0	24.0	30.0	5.8	8.0	11.9	15.6	20.0	0.64	0.67	0.66	0.65	0.67	0.22	0.28	0.46	0.71	1.07	9.7	13.0	19.6	26.4	33.7
	20	400	9.6	12.0	18.0	24.0	30.0	7.2	9.0	13.5	17.8	21.6	0.75	0.75	0.75	0.74	0.72	0.20	0.24	0.41	0.67	1.05	10.3	12.8	19.4	26.3	33.6
	20	500	10.6	12.0	18.0	24.0	30.0	9.3	10.7	15.0	18.4	23.1	0.88	0.89	0.83	0.77	0.77	0.18	0.21	0.44	0.75	1.11	11.2	12.7	19.5	26.6	33.8
	15	300	9.0	12.0	18.0	24.0	30.0	5.7	7.9	11.8	15.6	19.9	0.64	0.66	0.66	0.65	0.66	0.17	0.23	0.40	0.63	0.97	9.6	12.8	19.4	26.2	33.3
	15	400	10.0	12.0	18.0	24.0	30.0	7.5	9.0	13.4	17.7	21.3	0.75	0.75	0.75	0.74	0.71	0.15	0.19	0.35	0.60	0.96	10.5	12.7	19.2	26.1	33.3
	15	500	10.6	12.0	18.0	24.0	30.0	9.0	10.3	14.6	17.8	22.3	0.85	0.86	0.81	0.74	0.74	0.15	0.18	0.41	0.71	1.05	11.1	12.6	19.4	26.4	33.6
60	20	300	9.0	12.0	18.0	24.0	30.0	5.9	8.1	11.9	15.7	20.0	0.65	0.67	0.66	0.65	0.67	0.31	0.39	0.60	0.90	1.32	10.1	13.3	20.0	27.1	34.5
	20	400	9.0	12.0	18.0	24.0	30.0	6.8	9.1	13.6	18.0	21.9	0.76	0.75	0.76	0.75	0.73	0.28	0.35	0.54	0.84	1.27	10.0	13.2	19.8	26.9	34.3
	20	500	10.1	12.0	18.0	24.0	30.0	9.1	11.0	15.5	19.1	24.0	0.90	0.92	0.86	0.79	0.80	0.25	0.29	0.53	0.88	1.31	11.0	13.0	19.8	27.0	34.5
	10	300	9.0	12.0	18.0	24.0	30.0	5.8	8.0	11.9	15.6	20.0	0.64	0.67	0.66	0.65	0.67	0.22	0.28	0.46	0.71	1.07	9.7	13.0	19.6	26.4	33.7
	10	400	9.6	12.0	18.0	24.0	30.0	7.2	9.0	13.5	17.8	21.6	0.75	0.75	0.75	0.74	0.72	0.20	0.24	0.41	0.67	1.05	10.3	12.8	19.4	26.3	33.6
	10	500	10.6	12.0	18.0	24.0	30.0	9.3	10.7	15.0	18.4	23.1	0.88	0.89	0.83	0.77	0.77	0.18	0.21	0.44	0.75	1.11	11.2	12.7	19.5	26.6	33.8
70	20	300	9.0	12.0	18.0	24.0	30.0	5.9	8.1	12.0	15.7	20.0	0.66	0.68	0.66	0.65	0.67	0.40	0.51	0.77	1.15	1.66	10.4	13.7	20.6	27.9	35.7
	20	400	9.0	12.0	18.0	24.0	30.0	6.8	9.0	13.7	18.1	22.1	0.75	0.75	0.76	0.76	0.74	0.37	0.45	0.70	1.06	1.57	10.3	13.5	20.4	27.6	35.4
	20	500	9.0	12.0	18.0	24.0	30.0	7.8	11.0	15.5	19.3	24.5	0.86	0.92	0.86	0.80	0.82	0.33	0.40	0.67	1.09	1.60	10.1	13.4	20.3	27.7	35.5
	10	300	9.0	12.0	18.0	24.0	30.0	5.9	8.1	11.9	15.7	20.0	0.65	0.67	0.66	0.65	0.67	0.31	0.39	0.60	0.90	1.32	10.1	13.3	20.0	27.1	34.5
	10	400	9.0	12.0	18.0	24.0	30.0	6.8	9.1	13.6	18.0	21.9	0.76	0.75	0.76	0.75	0.73	0.28	0.35	0.54	0.84	1.27	10.0	13.2	19.8	26.9	34.3
	10	500	10.1	12.0	18.0	24.0	30.0	9.1	11.0	15.5	19.1	24.0	0.90	0.92	0.86	0.79	0.80	0.25	0.29	0.53	0.88	1.31	11.0	13.0	19.8	27.0	34.5
80	20	300	9.0	12.0	18.0	24.0	30.0	5.9	8.1	12.0	15.7	19.9	0.66	0.68	0.66	0.65	0.66	0.50	0.64	0.99	1.46	2.08	10.7	14.2	21.4	29.0	37.1
	20	400	9.0	12.0	18.0	24.0	30.0	6.7	9.0	13.7	18.2	22.2	0.75	0.75	0.76	0.76	0.74	0.46	0.57	0.89	1.35	1.95	10.6	14.0	21.0	28.6	36.7
	20	500	9.0	12.0	18.0	24.0	30.0	7.5	10.8	15.3	19.2	24.5	0.84	0.90	0.85	0.80	0.82	0.44	0.53	0.86	1.36	1.99	10.5	13.8	20.9	28.6	36.8
	10	300	9.0	12.0	18.0	24.0	30.0	5.9	8.1	12.0	15.7	20.0	0.66	0.68	0.66	0.65	0.67	0.40	0.51	0.77	1.15	1.66	10.4	13.7	20.6	27.9	35.7
	10	400	9.0	12.0	18.0	24.0	30.0	6.8	9.0	13.7	18.1	22.1	0.75	0.75	0.76	0.76	0.74	0.37	0.45	0.70	1.06	1.57	10.3	13.5	20.4	27.6	35.4
	10	500	9.0	12.0	18.0	24.0	30.0	7.8	11.0	15.5	19.3	24.5	0.86	0.92	0.86	0.80	0.82	0.33	0.40	0.67	1.09	1.60	10.1	13.4	20.3	27.7	35.5
90	20	300	9.0	12.0	18.0	24.0	30.0	5.9	8.1	12.0	15.7	20.0	0.66	0.68	0.67	0.65	0.67	0.62	0.80	1.25	1.84	2.59	11.1	14.7	22.3	30.3	38.8
	20	400	9.0	12.0	18.0	24.0	30.0	6.7	9.0	13.6	18.2	22.2	0.75	0.75	0.76	0.76	0.74	0.56	0.72	1.14	1.70	2.43	10.9	14.5	21.9	29.8	38.3
	20	500	9.0	12.0	18.0	24.0	30.0	7.4	10.5	15.0	18.9	24.4	0.82	0.88	0.84	0.79	0.81	0.56	0.68	1.09	1.71	2.47	10.9	14.3	21.7	29.8	38.4
	10	300	9.0	12.0	18.0	24.0	30.0	5.9	8.1	12.0	15.7	19.9	0.66	0.68	0.66	0.65	0.66	0.50	0.64	0.99	1.46	2.08	10.7	14.2	21.4	29.0	37.1
	10	400	9.0	12.0	18.0	24.0	30.0	6.7	9.0	13.7	18.2	22.2	0.75	0.75	0.76	0.76	0.74	0.46	0.57	0.89	1.35	1.95	10.6	14.0	21.0	28.6	36.7
	10	500	9.0	12.0	18.0	24.0	30.0	7.5	10.8	15.3	19.2	24.5	0.84	0.90	0.85	0.80	0.82	0.44	0.53	0.86	1.36	1.99	10.5	13.8	20.9	28.6	36.8
100	20	300	9.0	12.0	18.0	24.0	30.0	5.9	8.1	12.0	15.7	20.0	0.66	0.68	0.67	0.66	0.67	0.76	1.00	1.57	2.30	3.21	11.6	15.4	23.4	31.9	41.0
	20	400	9.0	12.0	18.0	24.0	30.0	6.8	9.1	13.7	18.2	22.3	0.76	0.75	0.76	0.76	0.74	0.70	0.91	1.44	2.14	3.01	11.4	15.1	22.9	31.3	40.3
	20	500	9.0	12.0	18.0	24.0	30.0	7.3	10.5	14.9	18.8	24.4	0.82	0.87	0.83	0.78	0.81	0.69	0.85	1.38	2.13	3.05	11.4	14.9	22.7	31.3	40.4
	10	300	9.0	12.0	18.0	24.0	30.0	5.9	8.1	12.0	15.7	20.0	0.66	0.68	0.67	0.65	0.67	0.62	0.80	1.25	1.84	2.59	11.1	14.7	22.3	30.3	38.8
	10	400	9.0	12.0	18.0	24.0	30.0	6.7	9.0	13.6	18.2	22.2	0.75	0.75	0.76	0.76	0.74	0.56	0.72	1.14	1.70	2.43	10.9	14.5	21.9	29.8	38.3
	10	500	9.0	12.0	18.0	24.0	30.0	7.4	10.5	15.0	18.9	24.4	0.82	0.88	0.84	0.79	0.81	0.56	0.68	1.09	1.71	2.47	10.9	14.3	21.7	29.8	38.4
110	20	300	9.0	12.0	18.0	24.0	30.0	5.9	8.2	12.1	15.8	20.1	0.66	0.68	0.67	0.66	0.67	0.93	1.24	1.97	2.86	3.94	12.2	16.2	24.7	33.7	43.5
	20	400	9.0	12.0	18.0	24.0	30.0	7.0	9.2	13.8	18.3	22.3	0.78	0.77	0.77	0.76	0.74	0.86	1.14	1.82	2.67	3.71	11.9	15.9	24.2	33.1	42.7
	20	500	9.0	12.0	18.0	24.0	30.0	7.7	10.7	15.0	18.9	24.5	0.86	0.90	0.84	0.79	0.82	0.84	1.06	1.71	2.62	3.73	11.9	15.6	23.8	32.9	42.7
	10	300	9.0	12.0	18.0	24.0	30.0	5.9	8.1	12.0	15.7	20.0	0.66	0.68	0.67	0.66	0.67	0.76	1.00	1.57	2.30	3.21	11.6	15.4	23.4	31.9	41.0
	10	400	9.0	12.0	18.0	24.0	30.0	6.8	9.1	13.7	18.2	22.3	0.76	0.75	0.76	0.76	0.74	0.70	0.91	1.44	2.14	3.01	11.4	15.1	22.9	31.3	40.3
	10	500	9.0	12.0	18.0	24.0	30.0	7.3	10.5	14.9	18.8	24.4	0.82	0.87	0.83	0.78	0.81	0.69	0.85	1.38	2.13	3.05	11.4	14.9	22.7	31.3	40.4
120	20	300	9.0	12.0	18.0	24.0	27.8	6.0	8.3	12.2	16.0	18.6	0.67	0.69	0.68	0.67	0.67	1.1	1.5	2.4	3.5	4.3	12.9	17.2	26.3	36.0	42.5
	20	400	9.0	12.0	18.0	24.0	28.8	7.4	9.5	14.0	18.4	21.7	0.82	0.80	0.78	0.77	0.75	1.1	1.4	2.3	3.3	4.3	12.7	16.9	25.8	35.3	43.3
	20	500	9.0	12.0	18.0	24.0	30.0	8.7	11.6	15.7	19.4	25.0	0.96	0.96	0.87	0.81	0.83	1.0	1.3	2.1	3.2	4.5	12.4	16.4	25.1	34.9	45.4
	10	300	9.0	12.0	18.0	24.0	30.0	5.9	8.2	12.1	15.8	20.1	0.66	0.68	0.67	0.66	0.67	0.9	1.2	2.0	2.9	3.9	12.2	16.2	24.7	33.7	43.5
	10	400	9.0	12.0	18.0	24.0	30.0	7.0	9.2	13.8	18.3	22.3	0.78	0.77	0.77	0.76	0.74	0.9	1.1	1.8	2.7	3.7	11.9	15.9	24.2	33.1	42.7
	10	500	9.0	12.0	18.0	24.0	30.0	7.7	10.7	15.0	18.9	24.5	0.86	0.90	0.84	0.79	0.82	0.8	1.1	1.7	2.6	3.7	11.9	15.6	23.8	32.9	42.7

* pressure drop is less than 1 ft
Interpolation is permissable, extrapolation is not.
Performance data in shaded area will be reduced for operating voltages below 240 vac.

Above performance is based on 80°F db / 67°F wb entering air conditions.
Above data is based on 15% methanol.
Table does not include fan or pump power corerctions for AHRI/ISO conditions.

Performance Data — Trilogy® QE0930 - Cooling

EER					Hz					LWT					GPM					WPD				
53.4	51.5	45.2	37.8	30.9	25	32	50	68	85	65.0	65.0	65.0	65.0	65.0	0.4	0.6	0.9	1.2	1.5	*	*	*	*	*
64.7	62.3	50.8	39.8	31.3	25	30	46	64	81	65.0	65.0	65.0	65.0	65.0	0.5	0.6	0.9	1.2	1.5	*	*	*	*	*
72.0	65.8	44.2	33.6	28.6	25	28	45	63	78	65.0	65.0	65.0	65.0	65.0	0.5	0.6	0.9	1.2	1.5	*	*	*	*	*
41.2	42.1	39.2	33.7	28.0	25	33	51	69	86	70.0	70.0	70.0	70.0	70.0	0.5	0.6	1.0	1.3	1.7	*	*	*	*	*
48.1	49.1	43.7	35.7	28.7	25	30	47	64	81	70.0	70.0	70.0	70.0	70.0	0.5	0.6	1.0	1.3	1.7	*	*	*	*	*
58.9	56.4	41.4	31.9	27.0	25	28	45	63	78	70.0	70.0	70.0	70.0	70.0	0.6	0.6	1.0	1.3	1.7	*	*	*	*	*
53.4	51.5	45.2	37.8	30.9	25	32	50	68	85	65.0	65.0	65.0	65.0	65.0	0.5	0.7	1.1	1.5	1.9	*	*	*	*	*
64.7	62.3	50.8	39.8	31.3	25	30	46	64	81	65.0	65.0	65.0	65.0	65.0	0.6	0.7	1.1	1.5	1.9	*	*	*	*	*
72.0	65.8	44.2	33.6	28.6	25	28	45	63	78	65.0	65.0	65.0	65.0	65.0	0.6	0.7	1.1	1.5	1.9	*	*	*	*	*
41.2	42.1	39.2	33.7	28.0	25	33	51	69	86	70.0	70.0	70.0	70.0	70.0	0.6	0.9	1.3	1.8	2.2	*	*	*	*	*
48.1	49.1	43.7	35.7	28.7	25	30	47	64	81	70.0	70.0	70.0	70.0	70.0	0.7	0.9	1.3	1.8	2.2	*	*	*	*	*
58.9	56.4	41.4	31.9	27.0	25	28	45	63	78	70.0	70.0	70.0	70.0	70.0	0.7	0.8	1.3	1.8	2.3	*	*	*	*	*
53.4	51.5	45.2	37.8	30.9	25	32	50	68	85	65.0	65.0	65.0	65.0	65.0	0.8	1.0	1.5	2.1	2.7	*	*	*	*	*
64.7	62.3	50.8	39.8	31.3	25	30	46	64	81	65.0	65.0	65.0	65.0	65.0	0.8	1.0	1.5	2.1	2.7	*	*	*	*	*
72.0	65.8	44.2	33.6	28.6	25	28	45	63	78	65.0	65.0	65.0	65.0	65.0	0.9	1.0	1.6	2.1	2.7	*	*	*	*	*
41.2	42.1	39.2	33.7	28.0	25	33	51	69	86	70.0	70.0	70.0	70.0	70.0	1.0	1.3	2.0	2.6	3.4	*	*	*	*	*
48.1	49.1	43.7	35.7	28.7	25	30	47	64	81	70.0	70.0	70.0	70.0	70.0	1.0	1.3	1.9	2.6	3.4	*	*	*	*	*
58.9	56.4	41.4	31.9	27.0	25	28	45	63	78	70.0	70.0	70.0	70.0	70.0	1.1	1.3	1.9	2.7	3.4	*	*	*	*	*
53.4	51.5	45.2	37.8	30.9	25	32	50	68	85	65.0	65.0	65.0	65.0	65.0	1.3	1.7	2.6	3.5	4.4	*	*	*	*	1.8
64.7	62.3	50.8	39.8	31.3	25	30	46	64	81	65.0	65.0	65.0	65.0	65.0	1.4	1.7	2.6	3.5	4.4	*	*	*	*	1.8
72.0	65.8	44.2	33.6	28.6	25	28	45	63	78	65.0	65.0	65.0	65.0	65.0	1.5	1.7	2.6	3.5	4.5	*	*	*	1.0	1.8
28.9	30.8	30.1	26.6	22.7	27	35	54	73	90	80.0	80.0	80.0	80.0	80.0	1.0	1.3	2.0	2.7	3.5	*	*	*	*	1.0
31.9	34.8	33.3	28.5	23.6	25	32	49	67	83	80.0	80.0	80.0	80.0	80.0	1.0	1.3	2.0	2.7	3.4	*	*	*	*	1.0
40.2	41.0	34.1	27.2	23.0	25	29	46	64	79	80.0	80.0	80.0	80.0	80.0	1.1	1.3	2.0	2.7	3.4	*	*	*	*	1.0
41.2	42.1	39.2	33.7	28.0	25	33	51	69	86	70.0	70.0	70.0	70.0	70.0	1.9	2.6	3.9	5.3	6.7	*	*	1.3	2.7	4.6
48.1	49.1	43.7	35.7	28.7	25	30	47	64	81	70.0	70.0	70.0	70.0	70.0	2.1	2.6	3.9	5.3	6.7	*	*	1.3	2.7	4.6
58.9	56.4	41.4	31.9	27.0	25	28	45	63	78	70.0	70.0	70.0	70.0	70.0	2.2	2.5	3.9	5.3	6.8	*	*	1.3	2.7	4.6
22.3	23.8	23.3	20.9	18.1	30	38	58	77	95	90.0	90.0	90.0	90.0	90.0	1.0	1.4	2.1	2.8	3.6	*	*	*	*	1.1
24.5	26.6	25.8	22.5	19.1	27	35	52	70	87	90.0	90.0	90.0	90.0	90.0	1.0	1.4	2.0	2.8	3.5	*	*	*	*	1.1
27.1	30.3	26.9	22.1	18.8	25	32	49	67	84	90.0	90.0	90.0	90.0	90.0	1.0	1.3	2.0	2.8	3.5	*	*	*	*	1.1
28.9	30.8	30.1	26.6	22.7	27	35	54	73	90	80.0	80.0	80.0	80.0	80.0	2.0	2.7	4.0	5.4	6.9	*	*	1.4	2.9	4.8
31.9	34.8	33.3	28.5	23.6	25	32	49	67	83	80.0	80.0	80.0	80.0	80.0	2.0	2.6	4.0	5.4	6.9	*	*	1.4	2.8	4.8
40.2	41.0	34.1	27.2	23.0	25	29	46	64	79	80.0	80.0	80.0	80.0	80.0	2.2	2.6	4.0	5.4	6.9	*	*	1.4	2.9	4.8
17.9	18.8	18.3	16.5	14.5	33	42	62	83	102	100.0	100.0	100.0	100.0	100.0	1.1	1.4	2.1	2.9	3.7	*	*	*	*	1.2
19.6	20.9	20.2	17.8	15.4	30	38	56	76	93	100.0	100.0	100.0	100.0	100.0	1.1	1.4	2.1	2.9	3.7	*	*	*	*	1.2
20.5	22.9	21.0	17.6	15.1	28	35	53	72	90	100.0	100.0	100.0	100.0	100.0	1.0	1.4	2.1	2.9	3.7	*	*	*	*	1.2
22.3	23.8	23.3	20.9	18.1	30	38	58	77	95	90.0	90.0	90.0	90.0	90.0	2.1	2.7	4.1	5.6	7.1	*	*	1.6	3.1	5.1
24.5	26.6	25.8	22.5	19.1	27	35	52	70	87	90.0	90.0	90.0	90.0	90.0	2.1	2.7	4.1	5.5	7.1	*	*	1.5	3.0	5.1
27.1	30.3	26.9	22.1	18.8	25	32	49	67	84	90.0	90.0	90.0	90.0	90.0	2.0	2.7	4.1	5.5	7.1	*	*	1.5	3.0	5.1
14.6	15.0	14.4	13.1	11.6	36	46	68	90	110	110.0	110.0	110.0	110.0	110.0	1.1	1.5	2.2	3.0	3.9	*	*	*	*	1.4
16.0	16.6	15.8	14.1	12.3	32	41	62	82	101	110.0	110.0	110.0	110.0	110.0	1.1	1.4	2.2	3.0	3.8	*	*	*	*	1.4
16.1	17.7	16.4	14.0	12.1	31	39	58	79	98	110.0	110.0	110.0	110.0	110.0	1.1	1.4	2.2	3.0	3.8	*	*	*	*	1.4
17.9	18.8	18.3	16.5	14.5	33	42	62	83	102	100.0	100.0	100.0	100.0	100.0	2.1	2.8	4.3	5.8	7.4	*	*	1.7	3.3	5.5
19.6	20.9	20.2	17.8	15.4	30	38	56	76	93	100.0	100.0	100.0	100.0	100.0	2.1	2.8	4.2	5.7	7.3	*	*	1.7	3.3	5.4
20.5	22.9	21.0	17.6	15.1	28	35	53	72	90	100.0	100.0	100.0	100.0	100.0	2.1	2.8	4.2	5.7	7.4	*	*	1.6	3.3	5.4
11.9	12.0	11.4	10.4	9.3	39	50	74	97	119	120.0	120.0	120.0	120.0	120.0	1.2	1.5	2.3	3.2	4.1	*	*	*	*	1.6
12.9	13.2	12.5	11.2	10.0	35	45	68	90	110	120.0	120.0	120.0	120.0	120.0	1.1	1.5	2.3	3.1	4.0	*	*	*	*	1.5
13.0	14.0	13.0	11.3	9.8	34	42	63	86	107	120.0	120.0	120.0	120.0	120.0	1.1	1.5	2.3	3.1	4.0	*	*	*	*	1.5
14.6	15.0	14.4	13.1	11.6	36	46	68	90	110	110.0	110.0	110.0	110.0	110.0	2.2	2.9	4.5	6.1	7.8	*	*	1.9	3.7	6.0
16.0	16.6	15.8	14.1	12.3	32	41	62	82	101	110.0	110.0	110.0	110.0	110.0	2.2	2.9	4.4	6.0	7.7	*	*	1.8	3.5	5.8
16.1	17.7	16.4	14.0	12.1	31	39	58	79	98	110.0	110.0	110.0	110.0	110.0	2.2	2.9	4.3	6.0	7.7	*	*	1.8	3.5	5.9
9.7	9.7	9.2	8.4	7.6	41	54	79	105	128	130.0	130.0	130.0	130.0	130.0	1.2	1.6	2.5	3.4	4.3	*	*	*	1.0	1.7
10.4	10.5	9.9	9.0	8.1	38	50	75	100	122	130.0	130.0	130.0	130.0	130.0	1.2	1.6	2.4	3.3	4.3	*	*	*	*	1.6
10.8	11.4	10.5	9.2	8.0	36	46	69	94	117	130.0	130.0	130.0	130.0	130.0	1.2	1.6	2.4	3.3	4.3	*	*	*	*	1.6
11.9	12.0	11.4	10.4	9.3	39	50	74	97	119	120.0	120.0	120.0	120.0	120.0	2.3	3.1	4.7	6.4	8.2	*	*	2.1	4.0	6.6
12.9	13.2	12.5	11.2	10.0	35	45	68	90	110	120.0	120.0	120.0	120.0	120.0	2.3	3.0	4.6	6.3	8.1	*	*	2.0	3.9	6.4
13.0	14.0	13.0	11.3	9.8	34	42	63	86	107	120.0	120.0	120.0	120.0	120.0	2.3	3.0	4.5	6.3	8.1	*	*	2.0	3.9	6.4
7.9	7.8	7.4	6.8	6.5	44	57	85	113	130	140.0	140.0	140.0	140.0	140.0	1.3	1.7	2.6	3.6	4.3	0.1	0.1	0.4	1.0	1.5
8.3	8.4	7.9	7.3	6.7	41	54	83	110	130	140.0	140.0	140.0	140.0	140.0	1.3	1.7	2.6	3.5	4.3	0.1	0.1	0.4	1.0	1.6
9.1	9.4	8.6	7.5	6.7	38	48	74	101	127	140.0	140.0	140.0	140.0	140.0	1.2	1.6	2.5	3.5	4.5	0.1	0.1	0.4	0.9	1.8
9.7	9.7	9.2	8.4	7.6	41	54	79	105	128	130.0	130.0	130.0	130.0	130.0	2.4	3.2	4.9	6.7	8.7	0.4	0.9	2.3	4.4	7.2
10.4	10.5	9.9	9.0	8.1	38	50	75	100	122	130.0	130.0	130.0	130.0	130.0	2.4	3.2	4.8	6.6	8.5	0.4	0.8	2.2	4.2	7.0
10.8	11.4	10.5	9.2	8.0	36	46	69	94	117	130.0	130.0	130.0	130.0	130.0	2.4	3.1	4.8	6.6	8.5	0.4	0.8	2.1	4.2	7.0

* pressure drop is less than 1 ft
Interpolation is permissable, extrapolation is not.
Performance data in shaded area will be reduced for operating voltages below 240 vac.

Above performance is based on 80°F db / 67°F wb entering air conditions.
Above data is based on 15% methanol.
Table does not include fan or pump power corerctions for AHRI/ISO conditions.

Table 13c: Performance Data — Trilogy® QE 0930 - Hot Water (Low)

Low																							
EWTS °F	DTS	LWTS	DTL →	8						10						12							
			EWTL	HC	KW	HE	COP	Hz	LWTL	HC	KW	HE	COP	Hz	LWTL	HC	KW	HE	COP	Hz	LWTL
20	6	14.0	70	16.5	1.08	12.8	4.5	83	78.0	16.4	1.10	12.7	4.4	83	80.0	16.3	1.13	12.5	4.3	83	82.0
	6	14.0	90	15.6	1.30	11.2	3.5	83	98.0	15.5	1.33	11.0	3.4	83	100.0	15.4	1.35	10.8	3.3	83	102.0
	6	14.0	110	14.5	1.55	9.3	2.8	83	118.0	14.4	1.57	9.1	2.7	83	120.0	14.3	1.60	8.9	2.6	83	122.0
	6	14.0	130	13.3	1.83	7.1	2.1	83	138.0	13.2	1.86	6.9	2.1	83	140.0	13.1	1.89	6.7	2.0	83	142.0
	6	14.0	135	13.0	1.90	6.5	2.0	83	143.0	12.9	1.93	6.3	2.0	83	145.0	12.8	1.97	6.1	1.9	83	147.0
30	12	18.0	70	16.5	0.99	13.2	4.9	78	78.0	16.5	1.01	13.0	4.8	78	80.0	16.4	1.03	12.8	4.7	78	82.0
	12	18.0	90	15.6	1.21	11.5	3.8	78	98.0	15.5	1.23	11.3	3.7	78	100.0	15.4	1.26	11.1	3.6	78	102.0
	12	18.0	110	14.6	1.45	9.6	2.9	78	118.0	14.5	1.48	9.4	2.9	78	120.0	14.4	1.50	9.2	2.8	78	122.0
	12	18.0	130	13.4	1.73	7.5	2.3	78	138.0	13.3	1.76	7.3	2.2	78	140.0	13.1	1.79	7.0	2.2	78	142.0
	12	18.0	135	13.1	1.80	6.9	2.1	78	143.0	12.9	1.84	6.7	2.1	78	145.0	12.8	1.87	6.4	2.0	78	147.0
	6	24.0	70	16.6	0.87	13.6	5.6	71	78.0	16.5	0.89	13.4	5.4	71	80.0	16.4	0.91	13.3	5.3	71	82.0
	6	24.0	90	15.7	1.09	11.9	4.2	71	98.0	15.6	1.11	11.8	4.1	71	100.0	15.5	1.14	11.6	4.0	71	102.0
	6	24.0	110	14.6	1.33	10.1	3.2	71	118.0	14.5	1.36	9.9	3.1	71	120.0	14.4	1.38	9.7	3.1	71	122.0
	6	24.0	130	13.5	1.60	8.0	2.5	71	138.0	13.3	1.63	7.8	2.4	71	140.0	13.2	1.66	7.5	2.3	71	142.0
	6	24.0	135	13.1	1.68	7.4	2.3	71	143.0	13.0	1.71	7.2	2.2	71	145.0	12.9	1.74	6.9	2.2	71	147.0
40	12	28.0	70	16.6	0.80	13.8	6.0	67	78.0	16.5	0.83	13.7	5.9	67	80.0	16.4	0.85	13.5	5.7	67	82.0
	12	28.0	90	15.7	1.02	12.2	4.5	67	98.0	15.6	1.05	12.0	4.4	67	100.0	15.5	1.07	11.8	4.2	67	102.0
	12	28.0	110	14.7	1.26	10.4	3.4	67	118.0	14.6	1.29	10.2	3.3	67	120.0	14.4	1.31	10.0	3.2	67	122.0
	12	28.0	130	13.5	1.53	8.3	2.6	67	138.0	13.4	1.56	8.0	2.5	67	140.0	13.2	1.59	7.8	2.4	67	142.0
	12	28.0	135	13.2	1.61	7.7	2.4	67	143.0	13.1	1.64	7.5	2.3	67	145.0	12.9	1.67	7.2	2.3	67	147.0
	6	34.0	70	16.6	0.72	14.1	6.7	62	78.0	16.5	0.74	14.0	6.5	62	80.0	16.4	0.76	13.8	6.3	62	82.0
	6	34.0	90	15.7	0.94	12.5	4.9	62	98.0	15.6	0.96	12.3	4.7	62	100.0	15.5	0.99	12.1	4.6	62	102.0
	6	34.0	110	14.7	1.18	10.7	3.7	62	118.0	14.6	1.20	10.5	3.6	62	120.0	14.5	1.23	10.3	3.5	62	122.0
	6	34.0	130	13.5	1.44	8.6	2.7	62	138.0	13.4	1.47	8.4	2.7	62	140.0	13.3	1.50	8.2	2.6	62	142.0
	6	34.0	135	13.2	1.52	8.1	2.6	62	143.0	13.1	1.55	7.8	2.5	62	145.0	13.0	1.58	7.6	2.4	62	147.0
50	13	37.0	70	16.6	0.69	14.2	7.1	59	78.0	16.5	0.71	14.1	6.8	59	80.0	16.4	0.73	13.9	6.6	59	82.0
	13	37.0	90	15.7	0.91	12.6	5.1	59	98.0	15.6	0.93	12.5	4.9	59	100.0	15.5	0.95	12.3	4.8	59	102.0
	13	37.0	110	14.7	1.14	10.8	3.8	59	118.0	14.6	1.17	10.6	3.7	59	120.0	14.5	1.19	10.4	3.6	59	122.0
	13	37.0	130	13.6	1.41	8.8	2.8	59	138.0	13.4	1.43	8.5	2.7	59	140.0	13.3	1.46	8.3	2.7	59	142.0
	13	37.0	135	13.3	1.48	8.2	2.6	59	143.0	13.1	1.51	8.0	2.6	59	145.0	13.0	1.54	7.8	2.5	59	147.0
	7	43.0	70	16.6	0.62	14.4	7.8	55	78.0	16.5	0.65	14.3	7.5	55	80.0	16.4	0.67	14.1	7.2	55	82.0
	7	43.0	90	15.7	0.84	12.8	5.5	55	98.0	15.6	0.86	12.7	5.3	55	100.0	15.5	0.89	12.5	5.1	55	102.0
	7	43.0	110	14.7	1.07	11.1	4.0	55	118.0	14.6	1.10	10.9	3.9	55	120.0	14.5	1.12	10.7	3.8	55	122.0
	7	43.0	130	13.6	1.34	9.0	3.0	55	138.0	13.5	1.36	8.8	2.9	55	140.0	13.4	1.39	8.6	2.8	55	142.0
	7	43.0	135	13.3	1.41	8.5	2.8	55	143.0	13.2	1.44	8.3	2.7	55	145.0	13.0	1.47	8.0	2.6	55	147.0
60	13	47.0	70	16.6	0.59	14.6	8.3	53	78.0	16.5	0.61	14.4	7.9	53	80.0	16.4	0.63	14.3	7.6	53	82.0
	13	47.0	90	15.7	0.80	13.0	5.7	53	98.0	15.6	0.83	12.8	5.5	53	100.0	15.5	0.85	12.6	5.4	53	102.0
	13	47.0	110	14.7	1.04	11.2	4.2	53	118.0	14.6	1.06	11.0	4.0	53	120.0	14.5	1.08	10.8	3.9	53	122.0
	13	47.0	130	13.6	1.29	9.2	3.1	53	138.0	13.5	1.32	9.0	3.0	53	140.0	13.4	1.35	8.8	2.9	53	142.0
	13	47.0	135	13.3	1.36	8.7	2.9	53	143.0	13.2	1.39	8.4	2.8	53	145.0	13.1	1.42	8.2	2.7	53	147.0
	7	53.0	70	16.5	0.54	14.7	9.0	49	78.0	16.5	0.56	14.6	8.7	49	80.0	16.4	0.58	14.4	8.3	49	82.0
	7	53.0	90	15.7	0.75	13.2	6.1	49	98.0	15.6	0.77	13.0	5.9	49	100.0	15.5	0.80	12.8	5.7	49	102.0
	7	53.0	110	14.7	0.98	11.4	4.4	49	118.0	14.6	1.00	11.2	4.3	49	120.0	14.5	1.03	11.0	4.2	49	122.0
	7	53.0	130	13.6	1.23	9.4	3.2	49	138.0	13.5	1.26	9.2	3.1	49	140.0	13.4	1.29	9.0	3.1	49	142.0
	7	53.0	135	13.3	1.30	8.9	3.0	49	143.0	13.2	1.33	8.7	2.9	49	145.0	13.1	1.36	8.5	2.8	49	147.0
70	13	57.0	70	16.5	0.50	14.8	9.7	47	78.0	16.4	0.52	14.7	9.2	47	80.0	16.4	0.54	14.5	8.8	47	82.0
	13	57.0	90	15.7	0.71	13.3	6.4	47	98.0	15.6	0.74	13.1	6.2	47	100.0	15.5	0.76	12.9	6.0	47	102.0
	13	57.0	110	14.7	0.94	11.5	4.6	47	118.0	14.6	0.96	11.4	4.5	47	120.0	14.5	0.99	11.2	4.3	47	122.0
	13	57.0	130	13.6	1.19	9.6	3.4	47	138.0	13.5	1.22	9.4	3.3	47	140.0	13.4	1.24	9.2	3.2	47	142.0
	13	57.0	135	13.3	1.26	9.1	3.1	47	143.0	13.2	1.28	8.8	3.0	47	145.0	13.1	1.31	8.6	2.9	47	147.0
	7	63.0	70	16.5	0.45	15.0	10.8	44	78.0	16.4	0.47	14.8	10.3	44	80.0	16.3	0.49	14.7	9.8	44	82.0
	7	63.0	90	15.7	0.66	13.4	7.0	44	98.0	15.6	0.68	13.3	6.7	44	100.0	15.5	0.70	13.1	6.5	44	102.0
	7	63.0	110	14.7	0.88	11.7	4.9	44	118.0	14.6	0.90	11.6	4.8	44	120.0	14.5	0.92	11.4	4.6	44	122.0
	7	63.0	130	13.6	1.12	9.8	3.6	44	138.0	13.5	1.15	9.6	3.5	44	140.0	13.4	1.17	9.4	3.3	44	142.0
	7	63.0	135	13.3	1.19	9.3	3.3	44	143.0	13.2	1.21	9.1	3.2	44	145.0	13.1	1.24	8.9	3.1	44	147.0
80	13	67.0	70	16.5	0.40	15.1	12.0	42	78.0	16.4	0.42	14.9	11.3	42	80.0	16.3	0.45	14.8	10.7	42	82.0
	13	67.0	90	15.7	0.61	13.6	7.5	42	98.0	15.6	0.63	13.4	7.2	42	100.0	15.5	0.65	13.2	6.9	42	102.0
	13	67.0	110	14.7	0.83	11.9	5.2	42	118.0	14.6	0.85	11.7	5.0	42	120.0	14.5	0.88	11.5	4.9	42	122.0
	13	67.0	130	13.6	1.07	10.0	3.7	42	138.0	13.5	1.10	9.8	3.6	42	140.0	13.4	1.12	9.6	3.5	42	142.0
	13	67.0	135	13.3	1.13	9.5	3.4	42	143.0	13.2	1.16	9.3	3.3	42	145.0	13.1	1.19	9.1	3.2	42	147.0
	7	73.0	70	16.4	0.33	15.3	14.6	39	78.0	16.3	0.35	15.1	13.7	39	80.0	16.3	0.37	15.0	12.9	39	82.0
	7	73.0	90	15.6	0.53	13.8	8.6	39	98.0	15.5	0.56	13.6	8.2	39	100.0	15.4	0.58	13.5	7.9	39	102.0
	7	73.0	110	14.7	0.75	12.1	5.8	39	118.0	14.6	0.77	12.0	5.6	39	120.0	14.5	0.79	11.8	5.4	39	122.0
	7	73.0	130	13.6	0.98	10.3	4.1	38	138.0	13.5	1.01	10.1	3.9	38	140.0	13.4	1.03	9.9	3.8	38	142.0
	7	73.0	135	13.3	1.04	9.8	3.7	38	143.0	13.2	1.07	9.6	3.6	39	145.0	13.1	1.10	9.4	3.5	39	147.0
90	13	77.0	70	16.4	0.27	15.4	17.8	36	78.0	16.3	0.29	15.3	16.4	36	80.0	16.2	0.31	15.2	15.3	36	82.0
	13	77.0	90	15.6	0.47	14.0	9.7	36	98.0	15.5	0.49	13.8	9.2	36	100.0	15.4	0.51	13.7	8.8	36	102.0
	13	77.0	110	14.7	0.68	12.3	6.3	36	118.0	14.6	0.70	12.2	6.1	36	120.0	14.5	0.73	12.0	5.8	36	122.0
	13	77.0	130	13.6	0.91	10.5	4.4	36	138.0	13.5	0.94	10.3	4.2	36	140.0	13.4	0.96	10.1	4.1	36	142.0
	13	77.0	135	13.3	0.97	10.0	4.0	36	143.0	13.2	1.00	9.8	3.9	36	145.0	13.1	1.02	9.6	3.7	36	147.0
	7	83.0	70	16.3	0.16	15.7	29.2	32	78.0	16.2	0.18	15.6	25.9	32	80.0	16.2	0.20	15.5	23.3	32	82.0
	7	83.0	90	15.5	0.36	14.3	12.6	32	98.0	15.5	0.38	14.1	11.8	32	100.0	15.4	0.40	14.0	11.2	32	102.0
	7	83.0	110	14.6	0.57	12.7	7.6	32	118.0	14.5	0.59	12.5	7.3	32	120.0	14.4	0.61	12.4	6.9	32	122.0
	7	83.0	130	13.6	0.79	10.9	5.0	32	138.0	13.5	0.81	10.7	4.9	32	140.0	13.4	0.84	10.5	4.7	32	142.0
	7	83.0	135	13.3	0.85	10.4	4.6	32	143.0	13.2	0.87	10.2	4.4	32	145.0	13.1	0.90	10.0	4.3	32	147.0

* pressure drop is less than 1 ft
Above data is based on 15% methanol.

Interpolation is permissable, extrapolation is not.

Performance Data — Trilogy® QE0930 - Hot Water (High)

High									
EWTS °F	DTS	LWTS	DTL →	8					
			EWTL	HC	KW	HE	COP	Hz	LWTL
20	6	14.0	70	26.1	2.02	19.2	3.8	130	78.0
	6	14.0	90	24.4	2.41	16.2	3.0	130	98.0
	6	14.0	110	20.7	2.52	12.1	2.4	119	118.0
	6	14.0	130	13.3	1.83	7.1	2.1	83	138.0
	6	14.0	135	13.0	1.90	6.5	2.0	83	143.0
30	12	18.0	70	26.1	1.89	19.7	4.0	124	78.0
	12	18.0	90	24.6	2.27	16.8	3.2	124	98.0
	12	18.0	110	20.9	2.39	12.7	2.6	113	118.0
	12	18.0	130	13.4	1.73	7.5	2.3	78	138.0
	12	18.0	135	13.1	1.80	6.9	2.1	78	143.0
	6	24.0	70	26.2	1.71	20.3	4.5	114	78.0
	6	24.0	90	24.7	2.08	17.6	3.5	114	98.0
	6	24.0	110	21.1	2.20	13.6	2.8	104	118.0
	6	24.0	130	13.5	1.60	8.0	2.5	71	138.0
	6	24.0	135	13.1	1.68	7.4	2.3	71	143.0
40	12	28.0	70	26.2	1.60	20.7	4.8	108	78.0
	12	28.0	90	24.8	1.95	18.2	3.7	108	98.0
	12	28.0	110	21.2	2.09	14.1	3.0	98	118.0
	12	28.0	130	13.5	1.53	8.3	2.6	67	138.0
	12	28.0	135	13.2	1.61	7.7	2.4	67	143.0
	6	34.0	70	26.2	1.43	21.3	5.4	99	78.0
	6	34.0	90	24.9	1.77	18.9	4.1	99	98.0
	6	34.0	110	21.4	1.92	14.9	3.3	90	118.0
	6	34.0	130	13.5	1.44	8.6	2.7	62	138.0
	6	34.0	135	13.2	1.52	8.1	2.6	62	143.0
50	13	37.0	70	26.1	1.35	21.5	5.7	95	78.0
	13	37.0	90	25.0	1.68	19.2	4.3	95	98.0
	13	37.0	110	21.5	1.84	15.2	3.4	87	118.0
	13	37.0	130	13.6	1.41	8.8	2.8	59	138.0
	13	37.0	135	13.3	1.48	8.2	2.6	59	143.0
	7	43.0	70	26.0	1.19	22.0	6.4	87	78.0
	7	43.0	90	25.0	1.51	19.8	4.8	87	98.0
	7	43.0	110	21.6	1.69	15.8	3.7	80	118.0
	7	43.0	130	13.6	1.34	9.0	3.0	55	138.0
	7	43.0	135	13.3	1.41	8.5	2.8	55	143.0
60	13	47.0	70	25.9	1.09	22.2	7.0	82	78.0
	13	47.0	90	25.0	1.41	20.2	5.2	82	98.0
	13	47.0	110	21.6	1.59	16.2	4.0	75	118.0
	13	47.0	130	13.6	1.29	9.2	3.1	53	138.0
	13	47.0	135	13.3	1.36	8.7	2.9	53	143.0
	7	53.0	70	25.8	0.95	22.5	8.0	75	78.0
	7	53.0	90	25.0	1.25	20.7	5.8	75	98.0
	7	53.0	110	21.7	1.45	16.7	4.4	69	118.0
	7	53.0	130	13.6	1.23	9.4	3.2	49	138.0
	7	53.0	135	13.3	1.30	8.9	3.0	49	143.0
70	13	57.0	70	25.6	0.86	22.7	8.7	71	78.0
	13	57.0	90	24.9	1.15	21.0	6.3	71	98.0
	13	57.0	110	21.7	1.36	17.1	4.7	66	118.0
	13	57.0	130	13.6	1.19	9.6	3.4	47	138.0
	13	57.0	135	13.3	1.26	9.1	3.1	47	143.0
	7	63.0	70	25.4	0.73	22.9	10.2	65	78.0
	7	63.0	90	24.8	1.01	21.4	7.2	65	98.0
	7	63.0	110	21.7	1.23	17.5	5.2	60	118.0
	7	63.0	130	13.6	1.12	9.8	3.6	44	138.0
	7	63.0	135	13.3	1.19	9.3	3.3	44	143.0
80	13	67.0	70	25.2	0.65	23.0	11.4	62	78.0
	13	67.0	90	24.7	0.92	21.6	7.9	62	98.0
	13	67.0	110	21.7	1.14	17.8	5.6	57	118.0
	13	67.0	130	13.6	1.07	10.0	3.7	42	138.0
	13	67.0	135	13.3	1.13	9.5	3.4	42	143.0
	7	73.0	70	24.9	0.53	23.0	13.6	57	78.0
	7	73.0	90	24.5	0.79	21.8	9.1	57	98.0
	7	73.0	110	21.6	1.02	18.1	6.2	52	118.0
	7	73.0	130	13.6	0.98	10.3	4.1	38	138.0
	7	73.0	135	13.3	1.04	9.8	3.7	38	143.0
90	13	77.0	70	24.6	0.46	23.1	15.6	54	78.0
	13	77.0	90	24.4	0.71	21.9	10.0	54	98.0
	13	77.0	110	21.5	0.94	18.3	6.7	50	118.0
	13	77.0	130	13.6	0.91	10.5	4.4	36	138.0
	13	77.0	135	13.3	0.97	10.0	4.0	36	143.0
	7	83.0	70	24.2	0.36	23.0	19.7	50	78.0
	7	83.0	90	24.1	0.60	22.1	11.8	50	98.0
	7	83.0	110	21.4	0.81	18.6	7.7	46	118.0
	7	83.0	130	13.6	0.79	10.9	5.0	32	138.0
	7	83.0	135	13.3	0.85	10.4	4.6	32	143.0

* pressure drop is less than 1 ft
Above data is based on 15% methanol.

Interpolation is permissable, extrapolation is not.

Table 13d: Performance Data — Trilogy® QE0930 - Cooling + Hot Water

EWTL °F	DT	CFM/T	TC					SC					S/T					kW					HR (HWC)				
70	12	300	9.0	12.0	18.0	24.0	30.0	5.7	7.7	11.7	15.7	19.7	0.64	0.65	0.65	0.65	0.66	0.33	0.44	0.70	1.05	1.50	10.1	13.5	20.4	27.6	35.1
	12	400	9.0	12.0	18.0	24.0	30.0	6.6	8.8	13.3	17.8	22.0	0.74	0.73	0.74	0.74	0.73	0.29	0.39	0.63	0.97	1.44	10.0	13.3	20.1	27.3	34.9
	12	500	9.0	12.0	18.0	24.0	30.0	7.4	10.0	14.9	19.6	24.2	0.83	0.83	0.83	0.82	0.81	0.27	0.35	0.63	1.04	1.56	9.9	13.2	20.1	27.5	35.3
	8	300	9.0	12.0	18.0	24.0	30.0	5.6	7.6	11.6	15.6	19.6	0.63	0.64	0.64	0.65	0.65	0.28	0.39	0.65	0.98	1.42	10.0	13.3	20.2	27.4	34.9
	8	400	9.0	12.0	18.0	24.0	30.0	6.6	8.7	13.2	17.7	21.9	0.73	0.73	0.73	0.74	0.73	0.25	0.35	0.58	0.90	1.35	9.8	13.2	20.0	27.1	34.6
	8	500	9.0	12.0	18.0	24.0	30.0	7.4	10.0	14.8	19.5	24.2	0.83	0.83	0.82	0.81	0.81	0.24	0.32	0.58	0.97	1.47	9.8	13.1	20.0	27.3	35.0
90	12	300	9.0	12.0	18.0	24.0	30.0	5.9	7.9	11.9	15.8	19.9	0.65	0.66	0.66	0.66	0.66	0.58	0.73	1.10	1.62	2.29	11.0	14.5	21.8	29.5	37.8
	12	400	9.0	12.0	18.0	24.0	30.0	6.7	9.0	13.5	18.0	22.1	0.75	0.75	0.75	0.75	0.74	0.52	0.64	0.99	1.49	2.20	10.8	14.2	21.4	29.1	37.5
	12	500	9.0	12.0	18.0	24.0	30.0	7.4	10.0	15.1	19.8	24.4	0.82	0.84	0.84	0.83	0.81	0.49	0.60	0.99	1.57	2.33	10.7	14.1	21.4	29.4	38.0
	8	300	9.0	12.0	18.0	24.0	30.0	5.9	7.9	11.9	15.8	19.9	0.65	0.66	0.66	0.66	0.66	0.53	0.66	1.01	1.48	2.16	10.8	14.3	21.4	29.1	37.4
	8	400	9.0	12.0	18.0	24.0	30.0	6.7	9.0	13.5	18.0	22.2	0.75	0.75	0.75	0.75	0.74	0.47	0.58	0.90	1.36	2.07	10.6	14.0	21.1	28.7	37.0
	8	500	9.0	12.0	18.0	24.0	30.0	7.4	10.0	15.0	19.8	24.4	0.82	0.84	0.83	0.82	0.81	0.44	0.54	0.90	1.44	2.21	10.5	13.9	21.1	28.9	37.5
110	12	300	9.0	12.0	18.0	24.0	30.0	5.8	7.8	11.7	15.7	19.8	0.64	0.65	0.65	0.66	0.66	0.85	1.10	1.72	2.53	3.56	11.9	15.7	23.9	32.6	42.1
	12	400	9.0	12.0	18.0	24.0	30.0	6.6	8.9	13.4	17.9	21.9	0.73	0.74	0.75	0.74	0.73	0.80	1.01	1.57	2.35	3.39	11.7	15.4	23.4	32.0	41.6
	12	500	9.0	12.0	18.0	24.0	30.0	7.5	10.2	15.2	19.9	24.4	0.83	0.85	0.84	0.83	0.81	0.78	0.97	1.55	2.40	3.49	11.7	15.3	23.3	32.2	41.9
	8	300	9.0	12.0	18.0	24.0	30.0	5.8	7.8	11.8	15.7	19.8	0.64	0.65	0.65	0.66	0.66	0.80	1.02	1.58	2.32	3.44	11.7	15.5	23.4	31.9	41.7
	8	400	9.0	12.0	18.0	24.0	30.0	6.6	8.9	13.5	17.9	22.0	0.74	0.74	0.75	0.75	0.73	0.74	0.93	1.44	2.15	3.27	11.5	15.2	22.9	31.3	41.2
	8	500	9.0	12.0	18.0	24.0	30.0	7.5	10.1	15.2	19.9	24.4	0.83	0.84	0.84	0.83	0.81	0.72	0.89	1.42	2.21	3.38	11.5	15.0	22.9	31.5	41.5
130	12	300	9.0	12.0	18.0	24.0	24.0	5.9	7.8	11.8	15.7	15.7	0.65	0.65	0.65	0.66	0.66	1.1	1.5	2.5	3.8	3.8	12.8	17.2	26.6	36.9	36.9
	12	400	9.0	12.0	18.0	24.0	24.0	6.7	8.9	13.5	17.8	17.8	0.74	0.75	0.75	0.74	0.74	1.1	1.5	2.4	3.5	3.5	12.8	17.0	26.0	36.0	36.0
	12	500	9.0	12.0	18.0	24.0	24.0	7.6	10.3	15.3	19.8	19.8	0.85	0.86	0.85	0.83	0.83	1.1	1.4	2.3	3.5	3.5	12.8	16.9	25.8	35.9	35.9
	8	300	9.0	12.0	18.0	24.0	26.8	5.8	7.8	11.7	15.7	17.6	0.65	0.65	0.65	0.65	0.66	1.1	1.4	2.4	3.6	4.3	12.6	16.9	26.0	36.2	41.5
	8	400	9.0	12.0	18.0	24.0	27.4	6.6	8.9	13.4	17.8	20.1	0.74	0.74	0.75	0.74	0.73	1.1	1.4	2.2	3.3	4.2	12.6	16.7	25.4	35.3	41.8
	8	500	9.0	12.0	18.0	24.0	28.4	7.6	10.3	15.3	19.9	23.0	0.84	0.85	0.85	0.83	0.81	1.1	1.3	2.1	3.3	4.5	12.6	16.5	25.3	35.3	43.7
135	8	300	9.0	12.0	18.0	18.0	18.0	5.9	7.8	11.8	11.8	11.8	0.65	0.65	0.65	0.65	0.65	1.1	1.6	2.6	2.6	2.6	12.9	17.3	26.8	26.8	26.8
	8	400	9.0	12.0	18.0	18.0	18.0	6.7	9.0	13.5	13.5	13.5	0.75	0.75	0.75	0.75	0.75	1.1	1.5	2.4	2.4	2.4	12.9	17.1	26.2	26.2	26.2
	8	500	9.0	12.0	18.0	18.0	18.0	7.6	10.3	15.3	15.3	15.3	0.85	0.86	0.85	0.85	0.85	1.1	1.5	2.3	2.3	2.3	12.9	17.0	26.0	26.0	26.0
	8	300	9.0	12.0	18.0	18.0	18.0	5.9	7.8	11.8	11.8	11.8	0.65	0.65	0.65	0.65	0.65	1.1	1.6	2.6	2.6	2.6	12.9	17.3	26.8	26.8	26.8
	8	400	9.0	12.0	18.0	18.0	18.0	6.7	9.0	13.5	13.5	13.5	0.75	0.75	0.75	0.75	0.75	1.1	1.5	2.4	2.4	2.4	12.9	17.1	26.2	26.2	26.2
	8	500	9.0	12.0	18.0	18.0	18.0	7.6	10.3	15.3	15.3	15.3	0.85	0.86	0.85	0.85	0.85	1.1	1.5	2.3	2.3	2.3	12.9	17.0	26.0	26.0	26.0

* pressure drop is less than 1 ft

Above performance is based on 80°F db / 67°F wb entering air conditions.

Performance Data — Trilogy® QE0930 - Cooling + Hot Water

EER					Hz					HW LWT					HW GPM					HW PD				
27.6	27.5	25.5	22.8	19.9	29	37	59	82	98	82.0	82.0	82.0	82.0	82.0	1.7	2.2	3.4	4.6	5.9	*	*	1.4	2.6	3.9
31.5	31.1	28.6	24.8	20.9	27	35	53	73	91	82.0	82.0	82.0	82.0	82.0	1.7	2.2	3.4	4.6	5.8	*	*	1.4	2.5	3.9
33.0	33.8	28.6	23.1	19.3	25	33	51	71	89	82.0	82.0	82.0	82.0	82.0	1.7	2.2	3.4	4.6	5.9	*	*	1.4	2.5	4.0
32.3	30.8	27.6	24.4	21.1	28	36	58	80	97	78.0	78.0	78.0	78.0	78.7	2.5	3.3	5.1	6.8	8.0	*	1.4	3.1	5.0	5.8
36.7	34.6	30.8	26.6	22.1	25	34	52	72	90	78.0	78.0	78.0	78.0	78.7	2.5	3.3	5.0	6.8	8.0	*	1.4	3.0	4.9	5.8
37.4	37.3	30.8	24.8	20.4	25	32	50	69	87	78.0	78.0	78.0	78.0	78.8	2.5	3.3	5.0	6.8	8.0	*	1.4	3.0	5.0	5.8
15.5	16.6	16.3	14.8	13.1	35	44	67	92	111	102.0	102.0	102.0	102.0	102.0	1.8	2.4	3.6	4.9	6.3	*	*	1.6	2.8	4.3
17.4	18.6	18.2	16.1	13.7	32	41	60	81	102	102.0	102.0	102.0	102.0	102.0	1.8	2.4	3.6	4.9	6.2	*	*	1.5	2.8	4.2
18.3	19.9	18.2	15.3	12.9	30	39	59	81	101	102.0	102.0	102.0	102.0	102.0	1.8	2.3	3.6	4.9	6.3	*	*	1.5	2.8	4.3
17.0	18.2	17.9	16.2	13.9	34	42	65	90	109	98.0	98.0	98.0	98.0	99.3	2.7	3.6	5.4	7.3	8.0	1.0	1.5	3.3	5.1	5.5
19.2	20.5	20.0	17.6	14.5	31	40	59	79	100	98.0	98.0	98.0	98.0	99.3	2.6	3.5	5.3	7.2	8.0	1.0	1.5	3.2	5.0	5.5
20.4	22.1	20.0	16.7	13.6	29	37	57	78	99	98.0	98.0	98.0	98.0	99.4	2.6	3.5	5.3	7.2	8.0	1.0	1.5	3.2	5.1	5.5
10.6	10.9	10.5	9.5	8.4	41	51	77	105	127	122.0	122.0	122.0	122.0	122.0	2.0	2.6	4.0	5.4	7.0	*	*	1.9	3.4	4.8
11.3	11.9	11.5	10.2	8.8	38	48	70	95	120	122.0	122.0	122.0	122.0	122.0	2.0	2.6	3.9	5.3	6.9	*	*	1.8	3.3	4.7
11.5	12.4	11.6	10.0	8.6	36	46	69	94	118	122.0	122.0	122.0	122.0	122.0	1.9	2.6	3.9	5.4	7.0	*	*	1.8	3.3	4.7
11.3	11.8	11.4	10.3	8.7	40	50	75	102	126	118.0	118.0	118.0	118.0	120.4	2.9	3.9	5.8	8.0	8.0	1.1	1.8	3.8	5.3	5.2
12.2	12.9	12.5	11.1	9.2	37	46	68	92	119	118.0	118.0	118.0	118.0	120.3	2.9	3.8	5.7	7.8	8.0	1.1	1.7	3.7	5.2	5.2
12.5	13.5	12.6	10.9	8.9	35	44	67	91	116	118.0	118.0	118.0	118.0	120.4	2.9	3.8	5.7	7.9	8.0	1.1	1.7	3.6	5.2	5.2
8.0	7.8	7.1	6.4	6.4	46	57	86	118	118	142.0	142.0	142.0	142.0	142.0	2.1	2.9	4.4	6.1	6.1	0.7	1.1	2.4	4.1	4.1
8.0	8.1	7.6	6.8	6.8	43	55	83	114	114	142.0	142.0	142.0	142.0	142.0	2.1	2.8	4.3	6.0	6.0	0.7	1.1	2.3	4.0	4.0
8.0	8.4	7.8	6.9	6.9	43	55	81	110	110	142.0	142.0	142.0	142.0	142.0	2.1	2.8	4.3	6.0	6.0	0.7	1.0	2.3	4.0	4.0
8.4	8.3	7.7	6.7	6.2	45	56	84	116	130	138.0	138.0	138.0	139.0	140.4	3.2	4.2	6.5	8.0	8.0	1.3	2.2	4.4	5.2	5.2
8.5	8.7	8.2	7.2	6.5	42	53	80	110	130	138.0	138.0	138.0	138.8	140.4	3.2	4.2	6.4	8.0	8.0	1.3	2.1	4.3	5.2	5.2
8.5	9.0	8.4	7.3	6.3	41	53	79	107	130	138.0	138.0	138.0	138.8	140.9	3.2	4.1	6.3	8.0	8.0	1.3	2.1	4.2	5.2	5.2
7.9	7.7	7.0	7.0	7.0	46	57	87	87	87	143.0	143.0	143.0	143.0	143.0	3.2	4.3	6.7	6.7	6.7	1.3	2.3	4.6	4.6	4.6
7.9	8.0	7.5	7.5	7.5	43	55	83	83	83	143.0	143.0	143.0	143.0	143.0	3.2	4.3	6.5	6.5	6.5	1.3	2.3	4.5	4.5	4.5
7.9	8.2	7.7	7.7	7.7	43	55	82	82	82	143.0	143.0	143.0	143.0	143.0	3.2	4.2	6.5	6.5	6.5	1.3	2.2	4.4	4.4	4.4
7.9	7.7	7.0	7.0	7.0	46	57	87	87	87	143.0	143.0	143.0	143.0	143.0	3.2	4.3	6.7	6.7	6.7	1.3	2.3	4.6	4.6	4.6
7.9	8.0	7.5	7.5	7.5	43	55	83	83	83	143.0	143.0	143.0	143.0	143.0	3.2	4.3	6.5	6.5	6.5	1.3	2.3	4.5	4.5	4.5
7.9	8.2	7.7	7.7	7.7	43	55	82	82	82	143.0	143.0	143.0	143.0	143.0	3.2	4.2	6.5	6.5	6.5	1.3	2.2	4.4	4.4	4.4

Interpolation is permissable, extrapolation is not.

Table 14a: Performance Data — Trilogy® QE 1860 - Heating

EWT °F	DT	CFM/T	TC					KW					HE					COP				
20	6	300	18.0	24.0	36.0	48.0	57.0	2.0	2.6	4.0	5.6	6.9	11.0	15.0	22.2	28.8	33.6	2.6	2.7	2.6	2.5	2.4
	6	400	18.0	24.0	36.0	48.0	60.0	1.8	2.3	3.7	5.2	6.9	12.0	16.0	23.5	30.3	36.5	3.0	3.0	2.9	2.7	2.6
	6	500	18.0	24.0	36.0	48.0	60.0	1.6	2.2	3.4	5.0	6.8	12.6	16.7	24.2	31.0	37.0	3.3	3.3	3.1	2.8	2.6
30	12	300	18.0	24.0	36.0	48.0	60.0	1.94	2.47	3.79	5.29	6.82	11.4	15.6	23.1	29.9	36.7	2.7	2.8	2.8	2.7	2.6
	12	400	18.0	24.0	36.0	48.0	60.0	1.65	2.18	3.39	4.82	6.42	12.4	16.6	24.4	31.6	38.1	3.2	3.2	3.1	2.9	2.7
	12	500	18.0	24.0	36.0	48.0	60.0	1.48	2.01	3.21	4.64	6.34	12.9	17.1	25.0	32.2	38.4	3.6	3.5	3.3	3.0	2.8
	6	300	18.0	24.0	36.0	48.0	60.0	1.79	2.26	3.44	4.82	6.20	11.9	16.3	24.3	31.6	38.8	2.9	3.1	3.1	2.9	2.8
	6	400	18.0	24.0	36.0	48.0	60.0	1.51	1.96	3.05	4.34	5.81	12.9	17.3	25.6	33.2	40.2	3.5	3.6	3.5	3.2	3.0
	6	500	18.0	24.0	36.0	48.0	60.0	1.35	1.82	2.89	4.19	5.76	13.4	17.8	26.1	33.7	40.3	3.9	3.9	3.7	3.4	3.1
40	12	300	18.0	24.0	36.0	48.0	60.0	1.70	2.12	3.23	4.52	5.83	12.2	16.7	25.0	32.6	40.1	3.1	3.3	3.3	3.1	3.0
	12	400	18.0	24.0	36.0	48.0	60.0	1.42	1.83	2.84	4.05	5.43	13.2	17.7	26.3	34.2	41.5	3.7	3.8	3.7	3.5	3.2
	12	500	18.0	24.0	36.0	48.0	60.0	1.28	1.70	2.69	3.92	5.41	13.6	18.2	26.8	34.6	41.5	4.1	4.1	3.9	3.6	3.2
	6	300	18.0	24.0	36.0	48.0	60.0	1.57	1.94	2.94	4.12	5.31	12.6	17.4	26.0	33.9	41.9	3.4	3.6	3.6	3.4	3.3
	6	400	18.0	24.0	36.0	48.0	60.0	1.30	1.66	2.55	3.65	4.93	13.6	18.3	27.3	35.5	43.2	4.1	4.2	4.1	3.9	3.6
	6	500	18.0	24.0	36.0	48.0	60.0	1.16	1.53	2.42	3.54	4.94	14.0	18.8	27.7	35.9	43.2	4.5	4.6	4.4	4.0	3.6
50	13	300	18.0	24.0	36.0	48.0	60.0	1.51	1.86	2.80	3.93	5.07	12.9	17.7	26.4	34.6	42.7	3.5	3.8	3.8	3.6	3.5
	13	400	18.0	24.0	36.0	48.0	60.0	1.24	1.58	2.42	3.47	4.70	13.8	18.6	27.7	36.2	44.0	4.2	4.5	4.4	4.1	3.7
	13	500	18.0	24.0	36.0	48.0	60.0	1.11	1.46	2.30	3.37	4.72	14.2	19.0	28.2	36.5	43.9	4.7	4.8	4.6	4.2	3.7
	7	300	18.0	24.0	36.0	48.0	60.0	1.39	1.70	2.55	3.59	4.64	13.2	18.2	27.3	35.7	44.2	3.8	4.1	4.1	3.9	3.8
	7	400	18.0	24.0	36.0	48.0	60.0	1.14	1.43	2.19	3.15	4.28	14.1	19.1	28.5	37.3	45.4	4.6	4.9	4.8	4.5	4.1
	7	500	18.0	24.0	36.0	48.0	60.0	1.02	1.31	2.07	3.06	4.33	14.5	19.5	28.9	37.5	45.2	5.2	5.4	5.1	4.6	4.1
60	13	300	18.0	24.0	36.0	48.0	60.0	1.32	1.60	2.40	3.39	4.38	13.5	18.5	27.8	36.4	45.1	4.0	4.4	4.4	4.2	4.0
	13	400	18.0	24.0	36.0	48.0	60.0	1.08	1.34	2.04	2.95	4.04	14.3	19.4	29.0	37.9	46.2	4.9	5.2	5.2	4.8	4.4
	13	500	18.0	24.0	36.0	48.0	60.0	0.95	1.23	1.93	2.88	4.10	14.7	19.8	29.4	38.2	46.0	5.5	5.7	5.5	4.9	4.3
	7	300	18.0	24.0	36.0	48.0	60.0	1.21	1.46	2.19	3.11	4.03	13.9	19.0	28.5	37.4	46.3	4.4	4.8	4.8	4.5	4.4
	7	400	18.0	24.0	36.0	48.0	60.0	0.98	1.22	1.85	2.70	3.72	14.6	19.9	29.7	38.8	47.3	5.4	5.8	5.7	5.2	4.7
	7	500	18.0	24.0	36.0	48.0	60.0	0.86	1.10	1.75	2.63	3.80	15.1	20.2	30.0	39.0	47.0	6.1	6.4	6.0	5.3	4.6
70	13	300	18.0	24.0	36.0	48.0	60.0	1.14	1.37	2.07	2.94	3.82	14.1	19.3	29.0	38.0	47.0	4.6	5.1	5.1	4.8	4.6
	13	400	18.0	24.0	36.0	48.0	60.0	0.92	1.14	1.74	2.55	3.53	14.9	20.1	30.1	39.3	48.0	5.7	6.2	6.1	5.5	5.0
	13	500	18.0	24.0	36.0	48.0	60.0	0.80	1.03	1.64	2.49	3.63	15.3	20.5	30.4	39.5	47.6	6.6	6.9	6.4	5.6	4.8
	7	300	18.0	24.0	36.0	48.0	60.0	1.04	1.24	1.89	2.72	3.55	14.5	19.8	29.5	38.7	47.9	5.1	5.7	5.6	5.2	4.9
	7	400	18.6	24.0	36.0	48.0	60.0	0.85	1.02	1.58	2.35	3.29	15.8	20.5	30.6	40.0	48.8	6.5	6.9	6.7	6.0	5.3
	7	500	19.2	24.0	36.0	48.0	60.0	0.75	0.91	1.49	2.30	3.40	16.7	20.9	30.9	40.1	48.4	7.5	7.7	7.1	6.1	5.2
80	13	300	18.8	24.0	36.0	48.0	60.0	0.99	1.16	1.79	2.59	3.40	15.5	20.1	29.9	39.2	48.4	5.6	6.1	5.9	5.4	5.2
	13	400	19.9	24.0	36.0	48.0	60.0	0.81	0.95	1.49	2.24	3.16	17.1	20.8	30.9	40.4	49.2	7.2	7.4	7.1	6.3	5.6
	13	500	20.5	24.0	36.0	48.0	60.0	0.72	0.84	1.39	2.20	3.28	18.0	21.1	31.2	40.5	48.8	8.3	8.4	7.6	6.4	5.4
	7	300	20.6	24.0	36.0	48.0	60.0	0.92	1.04	1.64	2.42	3.20	17.5	20.5	30.4	39.7	49.1	6.6	6.8	6.4	5.8	5.5
	7	400	21.7	24.0	36.0	48.0	60.0	0.76	0.83	1.36	2.09	2.99	19.1	21.2	31.4	40.9	49.8	8.4	8.4	7.8	6.7	5.9
	7	500	22.3	24.0	36.0	48.0	60.0	0.68	0.73	1.27	2.06	3.13	20.0	21.5	31.7	41.0	49.3	9.7	9.6	8.3	6.8	5.6
90	13	300	21.7	24.0	36.0	48.0	60.0	0.88	0.96	1.55	2.33	3.10	18.7	20.7	30.7	40.1	49.4	7.3	7.4	6.8	6.0	5.7
	13	400	22.8	24.0	36.0	48.0	60.0	0.72	0.76	1.28	2.00	2.90	20.4	21.4	31.6	41.2	50.1	9.3	9.3	8.2	7.0	6.1
	13	500	23.4	24.0	36.0	48.0	60.0	0.64	0.66	1.20	1.98	3.06	21.2	21.7	31.9	41.2	49.6	10.7	10.6	8.8	7.1	5.7
	7	300	23.0	24.0	36.0	48.0	60.0	0.80	0.84	1.43	2.20	2.97	20.3	21.1	31.1	40.5	49.9	8.4	8.4	7.4	6.4	5.9
	7	400	24.2	24.2	36.0	48.0	60.0	0.64	0.64	1.17	1.90	2.80	22.0	22.0	32.0	41.5	50.4	11.0	11.0	9.1	7.4	6.3
	7	500	24.7	24.7	36.0	48.0	60.0	0.58	0.58	1.09	1.89	2.98	22.7	22.7	32.3	41.5	49.8	12.5	12.5	9.6	7.4	5.9
100	17	300	23.0	24.0	36.0	48.0	60.0	0.80	0.84	1.43	2.20	2.97	20.3	21.1	31.1	40.5	49.9	8.4	8.4	7.4	6.4	5.9
	17	400	24.2	24.0	36.0	48.0	60.0	0.64	0.64	1.17	1.90	2.80	22.0	21.8	32.0	41.5	50.4	11.0	11.0	9.1	7.4	6.3
	17	500	24.7	24.0	36.0	48.0	60.0	0.58	0.55	1.09	1.89	2.98	22.7	22.1	32.3	41.5	49.8	12.5	12.7	9.6	7.4	5.9
	17	300	23.0	24.0	36.0	48.0	60.0	0.80	0.84	1.43	2.20	2.97	20.3	21.1	31.1	40.5	49.9	8.4	8.4	7.4	6.4	5.9
	17	400	24.2	24.0	36.0	48.0	60.0	0.64	0.64	1.17	1.90	2.80	22.0	21.8	32.0	41.5	50.4	11.0	11.0	9.1	7.4	6.3
	17	500	24.7	24.0	36.0	48.0	60.0	0.58	0.55	1.09	1.89	2.98	22.7	22.1	32.3	41.5	49.8	12.5	12.7	9.6	7.4	5.9
110	27	300	23.0	24.0	36.0	48.0	60.0	0.80	0.84	1.43	2.20	2.97	20.3	21.1	31.1	40.5	49.9	8.4	8.4	7.4	6.4	5.9
	27	400	24.2	24.0	36.0	48.0	60.0	0.64	0.64	1.17	1.90	2.80	22.0	21.8	32.0	41.5	50.4	11.0	11.0	9.1	7.4	6.3
	27	500	24.7	24.0	36.0	48.0	60.0	0.58	0.55	1.09	1.89	2.98	22.7	22.1	32.3	41.5	49.8	12.5	12.7	9.6	7.4	5.9
	27	300	23.0	24.0	36.0	48.0	60.0	0.80	0.84	1.43	2.20	2.97	20.3	21.1	31.1	40.5	49.9	8.4	8.4	7.4	6.4	5.9
	27	400	24.2	24.0	36.0	48.0	60.0	0.64	0.64	1.17	1.90	2.80	22.0	21.8	32.0	41.5	50.4	11.0	11.0	9.1	7.4	6.3
	27	500	24.7	24.0	36.0	48.0	60.0	0.58	0.55	1.09	1.89	2.98	22.7	22.1	32.3	41.5	49.8	12.5	12.7	9.6	7.4	5.9
120	37	300	23.0	24.0	36.0	48.0	60.0	0.80	0.84	1.43	2.20	2.97	20.3	21.1	31.1	40.5	49.9	8.4	8.4	7.4	6.4	5.9
	37	400	24.2	24.0	36.0	48.0	60.0	0.64	0.64	1.17	1.90	2.80	22.0	21.8	32.0	41.5	50.4	11.0	11.0	9.1	7.4	6.3
	37	500	24.7	24.0	36.0	48.0	60.0	0.58	0.55	1.09	1.89	2.98	22.7	22.1	32.3	41.5	49.8	12.5	12.7	9.6	7.4	5.9
	37	300	23.0	24.0	36.0	48.0	60.0	0.80	0.84	1.43	2.20	2.97	20.3	21.1	31.1	40.5	49.9	8.4	8.4	7.4	6.4	5.9
	37	400	24.2	24.0	36.0	48.0	60.0	0.64	0.64	1.17	1.90	2.80	22.0	21.8	32.0	41.5	50.4	11.0	11.0	9.1	7.4	6.3
	37	500	24.7	24.0	36.0	48.0	60.0	0.58	0.55	1.09	1.89	2.98	22.7	22.1	32.3	41.5	49.8	12.5	12.7	9.6	7.4	5.9

* pressure drop is less than 1 ft
Interpolation is permissable, extrapolation is not.
Performance data in shaded area will be reduced for operating voltages below 240 vac.

Above performance is based on 70°F db entering air condition.
Above data is based on 15% methanol.
Table does not include fan or pump power corerctions for AHRI/ISO conditions.

Performance Data — Trilogy® QE 1860- Heating

HZ					LWT					GPM					WPD				
43	52	77	102	116	14.0	14.0	14.0	14.0	14.0	3.7	5.0	7.4	9.6	11.2	0.2	0.6	2.2	4.7	7.1
42	54	78	100	120	14.0	14.0	14.0	14.0	14.0	4.0	5.3	7.8	10.1	12.2	0.2	0.7	2.6	5.4	8.9
41	53	78	99	118	14.0	14.0	14.0	14.0	14.0	4.2	5.6	8.1	10.3	12.3	0.3	0.8	2.9	5.8	9.1
40	49	72	97	113	18.0	18.0	18.0	18.0	18.0	1.9	2.6	3.8	5.0	6.1	*	*	*	*	1.2
40	51	74	95	114	18.0	18.0	18.0	18.0	18.0	2.1	2.8	4.1	5.3	6.3	*	*	*	*	1.3
38	50	73	94	112	18.0	18.0	18.0	18.0	18.0	2.2	2.9	4.2	5.4	6.4	*	*	*	*	1.3
36	44	67	89	105	24.0	24.0	24.0	24.0	24.0	4.0	5.4	8.1	10.5	12.9	*	*	2.7	5.8	10.0
36	47	68	87	105	24.0	24.0	24.0	24.0	24.0	4.3	5.8	8.5	11.1	13.4	*	*	3.2	6.6	10.9
35	46	67	86	103	24.0	24.0	24.0	24.0	24.0	4.5	5.9	8.7	11.2	13.4	*	*	3.4	6.9	11.0
34	42	63	85	100	28.0	28.0	28.0	28.0	28.0	2.0	2.8	4.2	5.4	6.7	*	*	*	*	1.4
34	44	64	83	99	28.0	28.0	28.0	28.0	28.0	2.2	3.0	4.4	5.7	6.9	*	*	*	*	1.6
33	43	63	81	98	28.0	28.0	28.0	28.0	28.0	2.3	3.0	4.5	5.8	6.9	*	*	*	*	1.6
31	38	58	79	93	34.0	34.0	34.0	34.0	34.0	4.2	5.8	8.7	11.3	14.0	*	*	3.2	6.8	11.7
31	40	58	76	92	34.0	34.0	34.0	34.0	34.0	4.5	6.1	9.1	11.8	14.4	*	1.0	3.7	7.6	12.7
30	39	57	74	90	34.0	34.0	34.0	34.0	34.0	4.7	6.3	9.2	12.0	14.4	*	1.1	3.9	7.9	12.6
30	36	56	76	90	37.0	37.0	37.0	37.0	37.0	2.0	2.7	4.1	5.3	6.6	*	*	*	*	1.3
29	38	56	73	88	37.0	37.0	37.0	37.0	37.0	2.1	2.9	4.3	5.6	6.8	*	*	*	*	1.4
29	37	55	71	86	37.0	37.0	37.0	37.0	37.0	2.2	2.9	4.3	5.6	6.8	*	*	*	*	1.4
27	33	52	71	84	43.0	43.0	43.0	43.0	43.0	3.8	5.2	7.8	10.2	12.6	*	*	2.2	4.9	8.8
27	35	51	67	81	43.0	43.0	43.0	43.0	43.0	4.0	5.5	8.2	10.6	13.0	*	*	2.6	5.6	9.4
26	34	50	65	79	43.0	43.0	43.0	43.0	43.0	4.2	5.6	8.3	10.7	12.9	*	*	2.7	5.7	9.3
26	32	49	68	80	47.0	47.0	47.0	47.0	47.0	2.1	2.9	4.3	5.6	6.9	*	*	*	*	1.5
25	32	48	63	77	47.0	47.0	47.0	47.0	47.0	2.2	3.0	4.5	5.8	7.1	*	*	*	*	1.6
24	32	47	62	75	47.0	47.0	47.0	47.0	47.0	2.3	3.0	4.5	5.9	7.1	*	*	*	*	1.6
24	29	46	64	75	53.0	53.0	53.0	53.0	53.0	4.0	5.4	8.1	10.7	13.2	*	*	2.5	5.4	9.6
23	29	44	58	72	53.0	53.0	53.0	53.0	53.0	4.2	5.7	8.5	11.1	13.5	*	*	2.8	6.0	10.2
22	29	42	57	70	53.0	53.0	53.0	53.0	53.0	4.3	5.8	8.6	11.1	13.4	*	*	2.9	6.1	10.1
23	28	43	61	72	57.0	57.0	57.0	57.0	57.0	2.2	3.0	4.5	5.8	7.2	*	*	*	*	1.7
21	28	41	55	68	57.0	57.0	57.0	57.0	57.0	2.3	3.1	4.6	6.0	7.4	*	*	*	*	1.8
21	27	40	54	67	57.0	57.0	57.0	57.0	57.0	2.3	3.2	4.7	6.1	7.3	*	*	*	1.0	1.8
22	26	41	57	68	63.0	63.0	63.0	63.0	63.0	4.1	5.6	8.4	11.1	13.7	*	*	2.7	5.9	10.3
20	25	38	51	64	63.0	63.0	63.0	63.0	63.0	4.5	5.9	8.7	11.4	13.9	*	*	3.0	6.4	10.8
20	24	37	50	63	63.0	63.0	63.0	63.0	63.0	4.8	6.0	8.8	11.5	13.8	*	*	3.1	6.5	10.6
21	25	39	55	65	67.0	67.0	67.0	67.0	67.0	2.4	3.1	4.6	6.0	7.4	*	*	*	*	1.8
20	24	36	49	62	67.0	67.0	67.0	67.0	67.0	2.6	3.2	4.8	6.2	7.6	*	*	*	1.0	1.9
20	23	35	47	60	67.0	67.0	67.0	67.0	67.0	2.8	3.3	4.8	6.2	7.5	*	*	*	1.0	1.9
21	23	36	52	62	73.0	73.0	73.0	73.0	73.0	5.0	5.8	8.7	11.4	14.0	*	*	2.9	6.2	10.7
20	22	33	46	59	73.0	73.0	73.0	73.0	73.0	5.5	6.0	9.0	11.7	14.2	*	*	3.2	6.6	11.1
20	21	32	45	58	73.0	73.0	73.0	73.0	73.0	5.7	6.1	9.0	11.7	14.1	*	1.0	3.3	6.7	10.9
20	22	35	50	59	77.0	77.0	77.0	77.0	77.0	2.9	3.2	4.7	6.2	7.6	*	*	*	1.0	1.9
20	21	32	44	57	77.0	77.0	77.0	77.0	77.0	3.1	3.3	4.9	6.3	7.7	*	*	*	1.1	2.0
20	20	31	43	56	77.0	77.0	77.0	77.0	77.0	3.3	3.3	4.9	6.3	7.6	*	*	*	1.1	2.0
20	20	32	47	56	83.0	83.0	83.0	83.0	83.0	5.8	6.0	8.9	11.6	14.2	*	*	3.1	6.4	11.0
20	20	30	43	56	83.0	83.0	83.0	83.0	83.0	6.3	6.3	9.1	11.9	14.4	1.1	1.1	3.3	6.8	11.3
20	20	30	42	55	83.0	83.0	83.0	83.0	83.0	6.5	6.5	9.2	11.9	14.2	1.2	1.2	3.4	6.8	11.0
20	20	32	47	56	83.0	83.0	83.0	83.0	83.0	2.4	2.5	3.7	4.8	5.9	*	*	*	*	*
20	20	30	43	56	83.0	83.0	83.0	83.0	83.0	2.6	2.6	3.8	4.9	5.9	*	*	*	*	*
20	20	30	42	55	83.0	83.0	83.0	83.0	83.0	2.7	2.6	3.8	4.9	5.9	*	*	*	*	*
20	20	32	47	56	83.0	83.0	83.0	83.0	83.0	2.4	2.5	3.7	4.8	5.9	*	*	*	*	*
20	20	30	43	56	83.0	83.0	83.0	83.0	83.0	2.6	2.6	3.8	4.9	5.9	*	*	*	*	*
20	20	30	42	55	83.0	83.0	83.0	83.0	83.0	2.7	2.6	3.8	4.9	5.9	*	*	*	*	*
20	20	32	47	56	83.0	83.0	83.0	83.0	83.0	1.5	1.6	2.3	3.0	3.7	*	*	*	*	*
20	20	30	43	56	83.0	83.0	83.0	83.0	83.0	1.6	1.6	2.4	3.1	3.7	*	*	*	*	*
20	20	30	42	55	83.0	83.0	83.0	83.0	83.0	1.7	1.6	2.4	3.1	3.7	*	*	*	*	*
20	20	32	47	56	83.0	83.0	83.0	83.0	83.0	1.5	1.6	2.3	3.0	3.7	*	*	*	*	*
20	20	30	43	56	83.0	83.0	83.0	83.0	83.0	1.6	1.6	2.4	3.1	3.7	*	*	*	*	*
20	20	30	42	55	83.0	83.0	83.0	83.0	83.0	1.7	1.6	2.4	3.1	3.7	*	*	*	*	*
20	20	32	47	56	83.0	83.0	83.0	83.0	83.0	1.1	1.1	1.7	2.2	2.7	*	*	*	*	*
20	20	30	43	56	83.0	83.0	83.0	83.0	83.0	1.2	1.2	1.7	2.2	2.7	*	*	*	*	*
20	20	30	42	55	83.0	83.0	83.0	83.0	83.0	1.2	1.2	1.7	2.2	2.7	*	*	*	*	*
20	20	32	47	56	83.0	83.0	83.0	83.0	83.0	1.1	1.1	1.7	2.2	2.7	*	*	*	*	*
20	20	30	43	56	83.0	83.0	83.0	83.0	83.0	1.2	1.2	1.7	2.2	2.7	*	*	*	*	*
20	20	30	42	55	83.0	83.0	83.0	83.0	83.0	1.2	1.2	1.7	2.2	2.7	*	*	*	*	*

* pressure drop is less than 1 ft
Interpolation is permissable, extrapolation is not.
Performance data in shaded area will be reduced for operating voltages below 240 vac.

Above performance is based on 70°F db entering air condition.
Above data is based on 15% methanol.
Table does not include fan or pump power corerctions for AHRI/ISO conditions.

Table 14b: Performance Data — Trilogy® QE1860 - Cooling

EWT °F	DT	CFM/T	TC					SC					S/T					kW					HR				
20	45	300	18.0	24.0	36.0	48.0	60.0	11.3	15.5	23.0	30.1	37.8	0.63	0.65	0.64	0.63	0.63	0.26	0.40	0.81	1.38	2.10	18.9	25.4	38.8	52.7	67.2
	45	400	19.8	24.0	36.0	48.0	60.0	13.9	17.2	26.1	34.2	41.5	0.71	0.72	0.72	0.71	0.69	0.23	0.35	0.77	1.34	2.17	20.5	25.2	38.6	52.6	67.4
	45	500	20.1	24.0	36.0	48.0	60.0	15.7	18.4	28.3	37.9	44.1	0.78	0.77	0.78	0.79	0.74	0.27	0.29	0.83	1.77	2.70	21.0	25.0	38.8	54.0	69.2
30	40	300	18.0	24.0	36.0	48.0	60.0	11.2	15.3	22.8	30.0	37.7	0.62	0.64	0.63	0.62	0.63	0.41	0.54	0.95	1.57	2.36	19.4	25.8	39.3	53.3	68.0
	40	400	19.1	24.0	36.0	48.0	60.0	13.6	17.3	26.1	34.3	41.7	0.71	0.72	0.73	0.71	0.70	0.36	0.49	0.90	1.50	2.39	20.3	25.7	39.1	53.1	68.1
	40	500	20.1	24.0	36.0	48.0	60.0	16.0	18.8	28.7	38.5	45.0	0.80	0.78	0.80	0.80	0.75	0.35	0.36	0.91	1.89	2.87	21.2	25.2	39.1	54.4	69.8
	35	300	18.0	24.0	36.0	48.0	60.0	11.3	15.5	23.0	30.1	37.8	0.63	0.65	0.64	0.63	0.63	0.26	0.40	0.81	1.38	2.10	18.9	25.4	38.8	52.7	67.2
	35	400	19.8	24.0	36.0	48.0	60.0	13.9	17.2	26.1	34.2	41.5	0.71	0.72	0.72	0.71	0.69	0.23	0.35	0.77	1.34	2.17	20.5	25.2	38.6	52.6	67.4
	35	500	20.1	24.0	36.0	48.0	60.0	15.7	18.4	28.3	37.9	44.1	0.78	0.77	0.78	0.79	0.74	0.27	0.29	0.83	1.77	2.70	21.0	25.0	38.8	54.0	69.2
40	30	300	18.0	24.0	36.0	48.0	60.0	11.2	15.3	22.8	30.0	37.7	0.62	0.64	0.63	0.62	0.63	0.41	0.54	0.95	1.57	2.36	19.4	25.8	39.3	53.3	68.0
	30	400	19.1	24.0	36.0	48.0	60.0	13.6	17.3	26.1	34.3	41.7	0.71	0.72	0.73	0.71	0.70	0.36	0.49	0.90	1.50	2.39	20.3	25.7	39.1	53.1	68.1
	30	500	20.1	24.0	36.0	48.0	60.0	16.0	18.8	28.7	38.5	45.0	0.80	0.78	0.80	0.80	0.75	0.35	0.36	0.91	1.89	2.87	21.2	25.2	39.1	54.4	69.8
	25	300	18.0	24.0	36.0	48.0	60.0	11.3	15.5	23.0	30.1	37.8	0.63	0.65	0.64	0.63	0.63	0.26	0.40	0.81	1.38	2.10	18.9	25.4	38.8	52.7	67.2
	25	400	19.8	24.0	36.0	48.0	60.0	13.9	17.2	26.1	34.2	41.5	0.71	0.72	0.72	0.71	0.69	0.23	0.35	0.77	1.34	2.17	20.5	25.2	38.6	52.6	67.4
	25	500	20.1	24.0	36.0	48.0	60.0	15.7	18.4	28.3	37.9	44.1	0.78	0.77	0.78	0.79	0.74	0.27	0.29	0.83	1.77	2.70	21.0	25.0	38.8	54.0	69.2
50	20	300	18.0	24.0	36.0	48.0	60.0	11.2	15.3	22.8	30.0	37.7	0.62	0.64	0.63	0.62	0.63	0.41	0.54	0.95	1.57	2.36	19.4	25.8	39.3	53.3	68.0
	20	400	19.1	24.0	36.0	48.0	60.0	13.6	17.3	26.1	34.3	41.7	0.71	0.72	0.73	0.71	0.70	0.36	0.49	0.90	1.50	2.39	20.3	25.7	39.1	53.1	68.1
	20	500	20.1	24.0	36.0	48.0	60.0	16.0	18.8	28.7	38.5	45.0	0.80	0.78	0.80	0.80	0.75	0.35	0.36	0.91	1.89	2.87	21.2	25.2	39.1	54.4	69.8
	15	300	18.0	24.0	36.0	48.0	60.0	11.3	15.5	23.0	30.1	37.8	0.63	0.65	0.64	0.63	0.63	0.26	0.40	0.81	1.38	2.10	18.9	25.4	38.8	52.7	67.2
	15	400	19.8	24.0	36.0	48.0	60.0	13.9	17.2	26.1	34.2	41.5	0.71	0.72	0.72	0.71	0.69	0.23	0.35	0.77	1.34	2.17	20.5	25.2	38.6	52.6	67.4
	15	500	20.1	24.0	36.0	48.0	60.0	15.7	18.4	28.3	37.9	44.1	0.78	0.77	0.78	0.79	0.74	0.27	0.29	0.83	1.77	2.70	21.0	25.0	38.8	54.0	69.2
60	20	300	18.0	24.0	36.0	48.0	60.0	11.1	15.2	22.6	29.8	37.6	0.62	0.63	0.63	0.62	0.63	0.62	0.76	1.26	2.02	3.02	20.1	26.6	40.3	54.9	70.3
	20	400	18.0	24.0	36.0	48.0	60.0	12.8	17.3	26.0	34.3	41.9	0.71	0.72	0.72	0.71	0.70	0.55	0.72	1.18	1.89	2.93	19.9	26.5	40.0	54.4	70.0
	20	500	19.3	24.0	36.0	48.0	60.0	15.6	18.9	29.0	39.2	46.1	0.81	0.79	0.81	0.82	0.77	0.51	0.53	1.13	2.22	3.38	21.0	25.8	39.9	55.6	71.5
	10	300	18.0	24.0	36.0	48.0	60.0	11.2	15.3	22.8	30.0	37.7	0.62	0.64	0.63	0.62	0.63	0.41	0.54	0.95	1.57	2.36	19.4	25.8	39.3	53.3	68.0
	10	400	19.1	24.0	36.0	48.0	60.0	13.6	17.3	26.1	34.3	41.7	0.71	0.72	0.73	0.71	0.70	0.36	0.49	0.90	1.50	2.39	20.3	25.7	39.1	53.1	68.1
	10	500	20.1	24.0	36.0	48.0	60.0	16.0	18.8	28.7	38.5	45.0	0.80	0.78	0.80	0.80	0.75	0.35	0.36	0.91	1.89	2.87	21.2	25.2	39.1	54.4	69.8
70	20	300	18.0	24.0	36.0	48.0	60.0	11.1	15.2	22.6	29.7	37.7	0.62	0.63	0.63	0.62	0.63	0.78	0.98	1.64	2.63	3.94	20.7	27.4	41.6	57.0	73.4
	20	400	18.0	24.0	36.0	48.0	60.0	12.8	17.2	25.8	34.1	42.0	0.71	0.72	0.72	0.71	0.70	0.71	0.93	1.51	2.40	3.68	20.4	27.2	41.2	56.2	72.6
	20	500	18.0	24.0	36.0	48.0	60.0	14.5	18.6	28.7	39.1	46.3	0.81	0.77	0.80	0.81	0.77	0.69	0.72	1.45	2.72	4.10	20.3	26.5	41.0	57.3	74.0
	10	300	18.0	24.0	36.0	48.0	60.0	11.1	15.2	22.6	29.8	37.6	0.62	0.63	0.63	0.62	0.63	0.62	0.76	1.26	2.02	3.02	20.1	26.6	40.3	54.9	70.3
	10	400	18.0	24.0	36.0	48.0	60.0	12.8	17.3	26.0	34.3	41.9	0.71	0.72	0.72	0.71	0.70	0.55	0.72	1.18	1.89	2.93	19.9	26.5	40.0	54.4	70.0
	10	500	19.3	24.0	36.0	48.0	60.0	15.6	18.9	29.0	39.2	46.1	0.81	0.79	0.81	0.82	0.77	0.51	0.53	1.13	2.22	3.38	21.0	25.8	39.9	55.6	71.5
80	20	300	18.0	24.0	36.0	48.0	60.0	11.2	15.2	22.6	29.9	38.0	0.62	0.63	0.63	0.62	0.63	0.96	1.25	2.16	3.46	5.15	21.3	28.3	43.4	59.8	77.6
	20	400	18.0	24.0	36.0	48.0	60.0	12.8	17.0	25.5	33.8	41.9	0.71	0.71	0.71	0.70	0.70	0.87	1.16	1.95	3.09	4.68	21.0	28.0	42.6	58.5	76.0
	20	500	18.0	24.0	36.0	48.0	60.0	14.1	18.0	28.1	38.5	46.1	0.78	0.75	0.78	0.80	0.77	0.87	0.98	1.90	3.40	5.08	21.0	27.3	42.5	59.6	77.3
	10	300	18.0	24.0	36.0	48.0	60.0	11.1	15.2	22.6	29.7	37.7	0.62	0.63	0.63	0.62	0.63	0.78	0.98	1.64	2.63	3.94	20.7	27.4	41.6	57.0	73.4
	10	400	18.0	24.0	36.0	48.0	60.0	12.8	17.2	25.8	34.1	42.0	0.71	0.72	0.72	0.71	0.70	0.71	0.93	1.51	2.40	3.68	20.4	27.2	41.2	56.2	72.6
	10	500	18.0	24.0	36.0	48.0	60.0	14.5	18.6	28.7	39.1	46.3	0.81	0.77	0.80	0.81	0.77	0.69	0.72	1.45	2.72	4.10	20.3	26.5	41.0	57.3	74.0
90	20	300	18.0	24.0	36.0	48.0	60.0	11.3	15.3	22.7	30.1	38.4	0.63	0.64	0.63	0.63	0.64	1.19	1.63	2.86	4.57	6.72	22.1	29.5	45.8	63.6	82.9
	20	400	18.0	24.0	36.0	48.0	60.0	12.8	16.9	25.2	33.5	41.7	0.71	0.70	0.70	0.70	0.70	1.07	1.48	2.54	4.00	5.97	21.6	29.0	44.7	61.7	80.4
	20	500	18.0	24.0	36.0	48.0	60.0	13.7	17.6	27.5	37.9	45.6	0.76	0.73	0.76	0.79	0.76	1.10	1.31	2.48	4.28	6.31	21.8	28.5	44.5	62.6	81.5
	10	300	18.0	24.0	36.0	48.0	60.0	11.2	15.2	22.6	29.9	38.0	0.62	0.63	0.63	0.62	0.63	0.96	1.25	2.16	3.46	5.15	21.3	28.3	43.4	59.8	77.6
	10	400	18.0	24.0	36.0	48.0	60.0	12.8	17.0	25.5	33.8	41.9	0.71	0.71	0.71	0.70	0.70	0.87	1.16	1.95	3.09	4.68	21.0	28.0	42.6	58.5	76.0
	10	500	18.0	24.0	36.0	48.0	60.0	14.1	18.0	28.1	38.5	46.1	0.78	0.75	0.78	0.80	0.77	0.87	0.98	1.90	3.40	5.08	21.0	27.3	42.5	59.6	77.3
100	20	300	18.0	24.0	36.0	48.0	56.8	11.4	15.4	22.9	30.5	36.6	0.63	0.64	0.64	0.63	0.64	1.53	2.15	3.81	5.99	7.94	23.2	31.3	49.0	68.5	83.9
	20	400	18.0	24.0	36.0	48.0	60.0	12.9	16.9	25.0	33.3	41.7	0.72	0.70	0.69	0.69	0.69	1.37	1.93	3.33	5.20	7.63	22.7	30.6	47.4	65.7	86.0
	20	500	18.0	24.0	36.0	48.0	60.0	13.9	17.5	27.2	37.5	45.2	0.77	0.73	0.76	0.78	0.75	1.40	1.75	3.22	5.39	7.84	22.8	30.0	47.0	66.4	86.7
	10	300	18.0	24.0	36.0	48.0	60.0	11.3	15.3	22.7	30.1	38.4	0.63	0.64	0.63	0.63	0.64	1.19	1.63	2.86	4.57	6.72	22.1	29.5	45.8	63.6	82.9
	10	400	18.0	24.0	36.0	48.0	60.0	12.8	16.9	25.2	33.5	41.7	0.71	0.70	0.70	0.70	0.70	1.07	1.48	2.54	4.00	5.97	21.6	29.0	44.7	61.7	80.4
	10	500	18.0	24.0	36.0	48.0	60.0	13.7	17.6	27.5	37.9	45.6	0.76	0.73	0.76	0.79	0.76	1.10	1.31	2.48	4.28	6.31	21.8	28.5	44.5	62.6	81.5
110	20	300	18.0	24.0	36.0	44.5	44.5	11.4	15.5	23.1	28.5	28.5	0.63	0.64	0.64	0.64	0.64	2.0	2.9	5.0	6.9	6.9	25.0	33.9	53.2	68.2	68.2
	20	400	18.0	24.0	36.0	48.0	50.5	13.3	17.1	25.0	33.3	35.1	0.74	0.71	0.70	0.69	0.69	1.8	2.6	4.4	6.7	7.3	24.2	32.8	51.0	71.0	75.4
	20	500	18.0	24.0	36.0	48.0	52.0	14.8	18.2	27.5	37.6	40.6	0.82	0.76	0.76	0.78	0.78	1.8	2.3	4.2	6.7	7.7	24.1	31.9	50.2	71.0	78.3
	10	300	18.0	24.0	36.0	48.0	56.8	11.4	15.4	22.9	30.5	36.6	0.63	0.64	0.64	0.63	0.64	1.5	2.2	3.8	6.0	7.9	23.2	31.3	49.0	68.5	83.9
	10	400	18.0	24.0	36.0	48.0	60.0	12.9	16.9	25.0	33.3	41.7	0.72	0.70	0.69	0.69	0.69	1.4	1.9	3.3	5.2	7.6	22.7	30.6	47.4	65.7	86.0
	10	500	18.0	24.0	36.0	48.0	60.0	13.9	17.5	27.2	37.5	45.2	0.77	0.73	0.76	0.78	0.75	1.4	1.7	3.2	5.4	7.8	22.8	30.0	47.0	66.4	86.7
120	20	300	18.0	24.0	36.0	37.0	37.0	11.4	15.5	23.2	23.9	23.9	0.63	0.65	0.65	0.65	0.65	2.8	3.9	6.6	6.9	6.9	27.5	37.3	58.6	60.5	60.5
	20	400	18.0	24.0	36.0	42.5	42.5	13.9	17.6	25.3	29.7	29.7	0.77	0.73	0.70	0.70	0.70	2.5	3.4	5.8	7.2	7.2	26.4	35.7	55.6	67.2	67.2
	20	500	18.0	24.0	36.0	45.5	45.5	16.7	19.8	28.7	36.5	36.5	0.93	0.83	0.80	0.80	0.80	2.3	3.0	5.3	7.7	7.7	25.8	34.2	54.0	71.7	71.7
	10	300	18.0	24.0	36.0	44.5	44.5	11.4	15.5	23.1	28.5	28.5	0.63	0.64	0.64	0.64	0.64	2.0	2.9	5.0	6.9	6.9	25.0	33.9	53.2	68.2	68.2
	10	400	18.0	24.0	36.0	48.0	50.5	13.3	17.1	25.0	33.3	35.1	0.74	0.71	0.70	0.69	0.69	1.8	2.6	4.4	6.7	7.3	24.2	32.8	51.0	71.0	75.4
	10	500	18.0	24.0	36.0	48.0	52.0	14.8	18.2	27.5	37.6	40.6	0.82	0.76	0.76	0.78	0.78	1.8	2.3	4.2	6.7	7.7	24.1	31.9	50.2	71.0	78.3

* pressure drop is less than 1 ft
Interpolation is permissable, extrapolation is not.
Performance data in shaded area will be reduced for operating voltages below 240 vac.

Above performance is based on 80°F db / 67°F wb entering air conditions.
Above data is based on 15% methanol.
Table does not include fan or pump power corerctions for AHRI/ISO conditions.

Performance Data — Trilogy® QE 1860 - Cooling

EER					Hz					LWT					GPM					WPD				
68.1	59.4	44.2	34.7	28.6	20	25	39	56	71	65.0	65.0	65.0	65.0	65.0	0.8	1.1	1.7	2.3	3.0	*	*	*	*	*
86.6	67.8	46.9	35.8	27.6	20	24	37	51	67	65.0	65.0	65.0	65.0	65.0	0.9	1.1	1.7	2.3	3.0	*	*	*	*	*
73.9	82.5	43.3	27.1	22.2	20	24	37	52	69	65.0	65.0	65.0	65.0	65.0	0.9	1.1	1.7	2.4	3.1	*	*	*	*	*
44.4	44.8	37.8	30.7	25.5	21	26	41	58	73	70.0	70.0	70.0	70.0	70.0	1.0	1.3	2.0	2.7	3.4	*	*	*	*	*
53.7	48.8	39.8	31.9	25.1	20	25	38	52	68	70.0	70.0	70.0	70.0	70.0	1.0	1.3	2.0	2.7	3.4	*	*	*	*	*
57.6	65.9	39.5	25.5	20.9	20	24	37	51	69	70.0	70.0	70.0	70.0	70.0	1.1	1.3	2.0	2.7	3.5	*	*	*	*	*
68.1	59.4	44.2	34.7	28.6	20	25	39	56	71	65.0	65.0	65.0	65.0	65.0	1.1	1.5	2.2	3.0	3.8	*	*	*	*	*
86.6	67.8	46.9	35.8	27.6	20	24	37	51	67	65.0	65.0	65.0	65.0	65.0	1.2	1.4	2.2	3.0	3.9	*	*	*	*	*
73.9	82.5	43.3	27.1	22.2	20	24	37	52	69	65.0	65.0	65.0	65.0	65.0	1.2	1.4	2.2	3.1	4.0	*	*	*	*	*
44.4	44.8	37.8	30.7	25.5	21	26	41	58	73	70.0	70.0	70.0	70.0	70.0	1.3	1.7	2.6	3.6	4.5	*	*	*	*	*
53.7	48.8	39.8	31.9	25.1	20	25	38	52	68	70.0	70.0	70.0	70.0	70.0	1.4	1.7	2.6	3.5	4.5	*	*	*	*	*
57.6	65.9	39.5	25.5	20.9	20	24	37	51	69	70.0	70.0	70.0	70.0	70.0	1.4	1.7	2.6	3.6	4.7	*	*	*	*	*
68.1	59.4	44.2	34.7	28.6	20	25	39	56	71	65.0	65.0	65.0	65.0	65.0	1.5	2.0	3.1	4.2	5.4	*	*	*	*	*
86.6	67.8	46.9	35.8	27.6	20	24	37	51	67	65.0	65.0	65.0	65.0	65.0	1.6	2.0	3.1	4.2	5.4	*	*	*	*	*
73.9	82.5	43.3	27.1	22.2	20	24	37	52	69	65.0	65.0	65.0	65.0	65.0	1.7	2.0	3.1	4.3	5.5	*	*	*	*	*
44.4	44.8	37.8	30.7	25.5	21	26	41	58	73	70.0	70.0	70.0	70.0	70.0	1.9	2.6	3.9	5.3	6.8	*	*	*	*	1.4
53.7	48.8	39.8	31.9	25.1	20	25	38	52	68	70.0	70.0	70.0	70.0	70.0	2.0	2.6	3.9	5.3	6.8	*	*	*	*	1.4
57.6	65.9	39.5	25.5	20.9	20	24	37	51	69	70.0	70.0	70.0	70.0	70.0	2.1	2.5	3.9	5.4	7.0	*	*	*	*	1.5
68.1	59.4	44.2	34.7	28.6	20	25	39	56	71	65.0	65.0	65.0	65.0	65.0	2.5	3.4	5.2	7.0	9.0	*	*	*	1.5	3.2
86.6	67.8	46.9	35.8	27.6	20	24	37	51	67	65.0	65.0	65.0	65.0	65.0	2.7	3.4	5.1	7.0	9.0	*	*	*	1.5	3.2
73.9	82.5	43.3	27.1	22.2	20	24	37	52	69	65.0	65.0	65.0	65.0	65.0	2.8	3.3	5.2	7.2	9.2	*	*	*	1.7	3.5
29.1	31.5	28.6	23.8	19.8	22	28	43	62	79	80.0	80.0	80.0	80.0	80.0	2.0	2.7	4.0	5.5	7.0	*	*	*	*	1.5
32.8	33.3	30.4	25.4	20.4	20	26	40	55	72	80.0	80.0	80.0	80.0	80.0	2.0	2.6	4.0	5.4	7.0	*	*	*	*	1.5
37.8	45.7	31.8	21.6	17.8	20	25	38	53	71	80.0	80.0	80.0	80.0	80.0	2.1	2.6	4.0	5.6	7.2	*	*	*	*	1.6
44.4	44.8	37.8	30.7	25.5	21	26	41	58	73	70.0	70.0	70.0	70.0	70.0	3.9	5.2	7.9	10.7	13.6	*	*	2.2	5.2	10.0
53.7	48.8	39.8	31.9	25.1	20	25	38	52	68	70.0	70.0	70.0	70.0	70.0	4.1	5.1	7.8	10.6	13.6	*	*	2.1	5.2	10.0
57.6	65.9	39.5	25.5	20.9	20	24	37	51	69	70.0	70.0	70.0	70.0	70.0	4.2	5.0	7.8	10.9	14.0	*	*	2.1	5.5	10.7
23.0	24.4	21.9	18.2	15.2	23	30	47	68	87	90.0	90.0	90.0	90.0	90.0	2.1	2.7	4.2	5.7	7.3	*	*	*	*	1.7
25.3	25.9	23.8	20.0	16.3	22	28	43	59	78	90.0	90.0	90.0	90.0	90.0	2.0	2.7	4.1	5.6	7.3	*	*	*	*	1.7
26.2	33.2	24.7	17.6	14.6	20	26	40	57	77	90.0	90.0	90.0	90.0	90.0	2.0	2.6	4.1	5.7	7.4	*	*	*	*	1.8
29.1	31.5	28.6	23.8	19.8	22	28	43	62	79	80.0	80.0	80.0	80.0	80.0	4.0	5.3	8.1	11.0	14.1	*	*	2.3	5.5	10.7
32.8	33.3	30.4	25.4	20.4	20	26	40	55	72	80.0	80.0	80.0	80.0	80.0	4.0	5.3	8.0	10.9	14.0	*	*	2.3	5.4	10.6
37.8	45.7	31.8	21.6	17.8	20	25	38	53	71	80.0	80.0	80.0	80.0	80.0	4.2	5.2	8.0	11.1	14.3	*	*	2.2	5.7	11.2
18.8	19.2	16.7	13.9	11.6	25	33	52	75	98	100.0	100.0	100.0	100.0	100.0	2.1	2.8	4.3	6.0	7.8	*	*	*	*	2.0
20.7	20.7	18.5	15.5	12.8	23	31	47	66	87	100.0	100.0	100.0	100.0	100.0	2.1	2.8	4.3	5.9	7.6	*	*	*	*	1.9
20.7	24.5	19.0	14.1	11.8	22	29	45	63	85	100.0	100.0	100.0	100.0	100.0	2.1	2.7	4.2	6.0	7.7	*	*	*	*	2.0
23.0	24.4	21.9	18.2	15.2	23	30	47	68	87	90.0	90.0	90.0	90.0	90.0	4.1	5.5	8.3	11.4	14.7	*	*	2.5	6.0	11.7
25.3	25.9	23.8	20.0	16.3	22	28	43	59	78	90.0	90.0	90.0	90.0	90.0	4.1	5.4	8.2	11.2	14.5	*	*	2.4	5.8	11.4
26.2	33.2	24.7	17.6	14.6	20	26	40	57	77	90.0	90.0	90.0	90.0	90.0	4.1	5.3	8.2	11.5	14.8	*	*	2.4	6.1	12.0
15.2	14.8	12.6	10.5	8.9	28	37	59	85	111	110.0	110.0	110.0	110.0	110.0	2.2	3.0	4.6	6.4	8.3	*	*	*	1.1	2.4
16.8	16.2	14.2	12.0	10.0	25	34	53	74	99	110.0	110.0	110.0	110.0	110.0	2.2	2.9	4.5	6.2	8.0	*	*	*	1.0	2.2
16.4	18.3	14.5	11.2	9.5	25	33	51	72	96	110.0	110.0	110.0	110.0	110.0	2.2	2.8	4.4	6.3	8.2	*	*	*	1.0	2.3
18.8	19.2	16.7	13.9	11.6	25	33	52	75	98	100.0	100.0	100.0	100.0	100.0	4.3	5.7	8.7	12.0	15.5	*	*	2.8	6.8	13.3
20.7	20.7	18.5	15.5	12.8	23	31	47	66	87	100.0	100.0	100.0	100.0	100.0	4.2	5.6	8.5	11.7	15.2	*	*	2.7	6.4	12.6
20.7	24.5	19.0	14.1	11.8	22	29	45	63	85	100.0	100.0	100.0	100.0	100.0	4.2	5.5	8.5	11.9	15.5	*	*	2.6	6.7	13.1
11.7	11.1	9.5	8.0	7.2	31	42	68	98	120	120.0	120.0	120.0	120.0	120.0	2.3	3.1	4.9	6.8	8.4	*	*	*	1.3	2.4
13.2	12.4	10.8	9.2	7.9	28	38	60	85	113	120.0	120.0	120.0	120.0	120.0	2.3	3.1	4.7	6.6	8.6	*	*	*	1.2	2.6
12.9	13.7	11.2	8.9	7.7	27	37	57	82	110	120.0	120.0	120.0	120.0	120.0	2.3	3.0	4.7	6.6	8.7	*	*	*	1.2	2.7
15.2	14.8	12.6	10.5	8.9	28	37	59	85	111	110.0	110.0	110.0	110.0	110.0	4.4	5.9	9.2	12.7	16.6	*	*	3.2	7.8	15.4
16.8	16.2	14.2	12.0	10.0	25	34	53	74	99	110.0	110.0	110.0	110.0	110.0	4.3	5.8	8.9	12.3	16.1	*	*	3.0	7.2	14.3
16.4	18.3	14.5	11.2	9.5	25	33	51	72	96	110.0	110.0	110.0	110.0	110.0	4.4	5.7	8.9	12.5	16.3	*	*	2.9	7.5	14.8
8.8	8.3	7.1	6.4	6.4	36	48	79	103	103	130.0	130.0	130.0	130.0	130.0	2.5	3.4	5.3	6.8	6.8	0.1	0.1	0.5	1.2	1.2
9.9	9.4	8.2	7.1	6.9	32	44	70	98	105	130.0	130.0	130.0	130.0	130.0	2.4	3.3	5.1	7.1	7.5	0.1	0.1	0.4	1.4	1.7
10.1	10.4	8.7	7.1	6.7	30	41	65	93	104	130.0	130.0	130.0	130.0	130.0	2.4	3.2	5.0	7.1	7.8	0.1	0.1	0.4	1.4	1.9
11.7	11.1	9.5	8.0	7.2	31	42	68	98	120	120.0	120.0	120.0	120.0	120.0	4.6	6.3	9.8	13.7	16.8	0.4	1.0	3.8	9.4	15.7
13.2	12.4	10.8	9.2	7.9	28	38	60	85	113	120.0	120.0	120.0	120.0	120.0	4.5	6.1	9.5	13.1	17.2	0.4	0.9	3.5	8.4	16.6
12.9	13.7	11.2	8.9	7.7	27	37	57	82	110	120.0	120.0	120.0	120.0	120.0	4.6	6.0	9.4	13.3	17.3	0.4	0.9	3.4	8.7	17.0
6.5	6.2	5.4	5.4	5.4	42	57	92	95	95	140.0	140.0	140.0	140.0	140.0	2.7	3.7	5.9	6.1	6.1	0.0	0.0	0.6	0.7	0.7
7.3	7.0	6.3	5.9	5.9	36	50	81	98	98	140.0	140.0	140.0	140.0	140.0	2.6	3.6	5.6	6.7	6.7	0.0	0.0	0.5	1.1	1.1
7.9	8.0	6.8	5.9	5.9	33	46	74	100	100	140.0	140.0	140.0	140.0	140.0	2.6	3.4	5.4	7.2	7.2	0.0	0.0	0.4	1.4	1.4
8.8	8.3	7.1	6.4	6.4	36	48	79	103	103	130.0	130.0	130.0	130.0	130.0	5.0	6.8	10.6	13.6	13.6	0.4	1.2	4.7	9.1	9.1
9.9	9.4	8.2	7.1	6.9	32	44	70	98	105	130.0	130.0	130.0	130.0	130.0	4.8	6.6	10.2	14.2	15.1	0.4	1.1	4.2	10.1	11.8
10.1	10.4	8.7	7.1	6.7	30	41	65	93	104	130.0	130.0	130.0	130.0	130.0	4.8	6.4	10.0	14.2	15.7	0.4	1.0	4.0	10.1	13.0

* pressure drop is less than 1 ft
Interpolation is permissable, extrapolation is not.
Performance data in shaded area will be reduced for operating voltages below 240 vac.

Above performance is based on 80°F db / 67°F wb entering air conditions.
Above data is based on 15% methanol.
Table does not include fan or pump power corerctions for AHRI/ISO conditions.

Table 14c: Performance Data — Trilogy® QE1860 - Hot Water (Low)

Low																							
EWTS °F	DTS	LWTS	DTL →	8						10						12							
			EWTL	HC	KW	HE	COP	Hz	LWTL	HC	KW	HE	COP	Hz	LWTL	HC	KW	HE	COP	Hz	LWTL
20	6	14.0	70	33.3	2.38	25.2	4.1	72	78.0	33.0	2.45	24.7	4.0	72	80.0	32.7	2.51	24.2	3.8	72	82.0
	6	14.0	90	30.9	3.07	20.4	2.9	72	98.0	30.7	3.15	19.9	2.9	72	100.0	30.5	3.23	19.4	2.8	72	102.0
	6	14.0	110	29.1	3.94	15.6	2.2	72	118.0	28.9	4.04	15.1	2.1	72	120.0	28.8	4.14	14.7	2.0	72	122.0
	6	14.0	130	27.5	5.00	10.5	1.6	72	138.0	27.4	5.11	9.9	1.6	72	140.0	27.2	5.23	9.4	1.5	72	142.0
	6	14.0	135	27.1	5.29	9.1	1.5	72	143.0	27.0	5.41	8.5	1.5	72	145.0	26.8	5.54	7.9	1.4	72	147.0
30	12	18.0	70	33.3	2.19	25.8	4.4	67	78.0	33.0	2.25	25.3	4.3	67	80.0	32.7	2.31	24.8	4.2	67	82.0
	12	18.0	90	30.9	2.83	21.2	3.2	67	98.0	30.7	2.91	20.8	3.1	67	100.0	30.5	2.98	20.3	3.0	67	102.0
	12	18.0	110	29.1	3.65	16.7	2.3	67	118.0	28.9	3.74	16.2	2.3	67	120.0	28.8	3.83	15.7	2.2	67	122.0
	12	18.0	130	27.5	4.64	11.6	1.7	67	138.0	27.3	4.75	11.1	1.7	67	140.0	27.1	4.86	10.5	1.6	67	142.0
	12	18.0	135	27.0	4.91	10.3	1.6	67	143.0	26.8	5.03	9.7	1.6	67	145.0	26.7	5.14	9.1	1.5	67	147.0
	6	24.0	70	33.2	1.94	26.6	5.0	61	78.0	33.0	1.99	26.2	4.9	61	80.0	32.7	2.04	25.7	4.7	61	82.0
	6	24.0	90	31.0	2.52	22.4	3.6	61	98.0	30.8	2.58	22.0	3.5	61	100.0	30.6	2.65	21.5	3.4	61	102.0
	6	24.0	110	29.1	3.25	18.1	2.6	61	118.0	29.0	3.33	17.6	2.5	61	120.0	28.8	3.41	17.1	2.5	61	122.0
	6	24.0	130	27.4	4.15	13.2	1.9	61	138.0	27.2	4.25	12.7	1.9	61	140.0	27.0	4.35	12.1	1.8	61	142.0
	6	24.0	135	26.9	4.40	11.9	1.8	61	143.0	26.7	4.50	11.3	1.7	61	145.0	26.4	4.61	10.7	1.7	61	147.0
40	12	28.0	70	33.2	1.79	27.1	5.4	57	78.0	32.9	1.84	26.7	5.3	57	80.0	32.7	1.89	26.2	5.1	57	82.0
	12	28.0	90	31.0	2.33	23.0	3.9	57	98.0	30.8	2.39	22.6	3.8	57	100.0	30.6	2.45	22.2	3.7	57	102.0
	12	28.0	110	29.2	3.01	18.9	2.8	57	118.0	29.0	3.09	18.4	2.7	57	120.0	28.8	3.17	18.0	2.7	57	122.0
	12	28.0	130	27.3	3.86	14.1	2.1	57	138.0	27.1	3.95	13.6	2.0	57	140.0	26.9	4.04	13.1	1.9	57	142.0
	12	28.0	135	26.7	4.09	12.8	1.9	57	143.0	26.5	4.19	12.2	1.9	57	145.0	26.3	4.29	11.7	1.8	57	147.0
	6	34.0	70	33.1	1.59	27.7	6.1	52	78.0	32.9	1.63	27.3	5.9	52	80.0	32.6	1.68	26.9	5.7	52	82.0
	6	34.0	90	31.0	2.08	23.9	4.4	52	98.0	30.8	2.13	23.5	4.2	52	100.0	30.6	2.19	23.2	4.1	52	102.0
	6	34.0	110	29.2	2.70	20.0	3.2	52	118.0	29.0	2.77	19.5	3.1	52	120.0	28.8	2.84	19.1	3.0	52	122.0
	6	34.0	130	27.1	3.46	15.3	2.3	52	138.0	26.9	3.55	14.8	2.2	52	140.0	26.7	3.63	14.3	2.2	52	142.0
	6	34.0	135	26.6	3.68	14.0	2.1	52	143.0	26.3	3.77	13.5	2.0	52	145.0	26.1	3.86	12.9	2.0	52	147.0
50	13	37.0	70	33.1	1.50	27.9	6.5	49	78.0	32.8	1.54	27.6	6.2	49	80.0	32.6	1.58	27.2	6.0	49	82.0
	13	37.0	90	31.0	1.97	24.3	4.6	49	98.0	30.8	2.02	24.0	4.5	49	100.0	30.7	2.07	23.6	4.3	49	102.0
	13	37.0	110	29.2	2.56	20.4	3.3	49	118.0	29.0	2.62	20.0	3.2	49	120.0	28.8	2.69	19.6	3.1	49	122.0
	13	37.0	130	27.1	3.29	15.9	2.4	49	138.0	26.8	3.37	15.4	2.3	49	140.0	26.6	3.45	14.8	2.3	49	142.0
	13	37.0	135	26.5	3.49	14.6	2.2	49	143.0	26.2	3.57	14.0	2.1	49	145.0	25.9	3.66	13.5	2.1	49	147.0
	7	43.0	70	33.0	1.34	28.4	7.2	45	78.0	32.8	1.38	28.1	7.0	45	80.0	32.6	1.41	27.7	6.7	45	82.0
	7	43.0	90	31.0	1.76	25.0	5.2	45	98.0	30.9	1.81	24.7	5.0	45	100.0	30.7	1.86	24.3	4.8	45	102.0
	7	43.0	110	29.2	2.30	21.3	3.7	45	118.0	29.0	2.36	20.9	3.6	45	120.0	28.8	2.43	20.5	3.5	45	122.0
	7	43.0	130	26.9	2.97	16.8	2.7	45	138.0	26.7	3.04	16.3	2.6	45	140.0	26.4	3.11	15.8	2.5	45	142.0
	7	43.0	135	26.3	3.15	15.5	2.4	45	143.0	26.0	3.23	15.0	2.4	45	145.0	25.7	3.31	14.4	2.3	45	147.0
60	13	47.0	70	32.9	1.24	28.7	7.8	42	78.0	32.7	1.27	28.3	7.5	42	80.0	32.5	1.31	28.0	7.3	42	82.0
	13	47.0	90	31.0	1.64	25.4	5.5	42	98.0	30.9	1.69	25.1	5.4	42	100.0	30.7	1.74	24.8	5.2	42	102.0
	13	47.0	110	29.2	2.15	21.8	4.0	42	118.0	29.0	2.21	21.4	3.8	42	120.0	28.8	2.27	21.0	3.7	42	122.0
	13	47.0	130	26.8	2.78	17.4	2.8	42	138.0	26.6	2.85	16.9	2.7	42	140.0	26.3	2.92	16.3	2.6	42	142.0
	13	47.0	135	26.1	2.95	16.1	2.6	42	143.0	25.8	3.02	15.5	2.5	42	145.0	25.5	3.10	15.0	2.4	43	147.0
	7	53.0	70	32.8	1.10	29.0	8.7	39	78.0	32.6	1.13	28.7	8.4	39	80.0	32.4	1.17	28.4	8.1	39	82.0
	7	53.0	90	31.0	1.48	26.0	6.1	39	98.0	30.9	1.52	25.7	5.9	39	100.0	30.7	1.57	25.3	5.7	39	102.0
	7	53.0	110	29.2	1.95	22.5	4.4	39	118.0	28.9	2.00	22.1	4.2	39	120.0	28.7	2.06	21.7	4.1	39	122.0
	7	53.0	130	26.7	2.52	18.1	3.1	39	138.0	26.4	2.59	17.6	3.0	39	140.0	26.1	2.65	17.1	2.9	39	142.0
	7	53.0	135	25.9	2.68	16.8	2.8	39	143.0	25.6	2.75	16.2	2.7	39	145.0	25.3	2.82	15.7	2.6	39	147.0
70	13	57.0	70	32.7	1.01	29.2	9.5	37	78.0	32.5	1.05	29.0	9.1	37	80.0	32.4	1.08	28.7	8.8	37	82.0
	13	57.0	90	31.0	1.38	26.3	6.6	37	98.0	30.9	1.42	26.0	6.4	37	100.0	30.7	1.46	25.7	6.1	37	102.0
	13	57.0	110	29.1	1.83	22.9	4.7	37	118.0	28.9	1.88	22.5	4.5	37	120.0	28.7	1.93	22.1	4.4	37	122.0
	13	57.0	130	26.6	2.37	18.5	3.3	37	138.0	26.3	2.43	18.0	3.2	37	140.0	26.0	2.49	17.5	3.1	37	142.0
	13	57.0	135	25.8	2.52	17.2	3.0	37	143.0	25.5	2.59	16.6	2.9	37	145.0	25.1	2.65	16.1	2.8	37	147.0
	7	63.0	70	32.6	0.88	29.5	10.8	34	78.0	32.4	0.92	29.3	10.4	34	80.0	32.3	0.95	29.0	10.0	34	82.0
	7	63.0	90	31.0	1.24	26.8	7.3	34	98.0	30.9	1.28	26.5	7.1	34	100.0	30.7	1.32	26.2	6.8	34	102.0
	7	63.0	110	29.1	1.67	23.4	5.1	34	118.0	28.9	1.71	23.0	4.9	34	120.0	28.7	1.76	22.7	4.8	34	122.0
	7	63.0	130	26.4	2.17	19.0	3.6	34	138.0	26.1	2.22	18.5	3.4	34	140.0	25.8	2.28	18.0	3.3	34	142.0
	7	63.0	135	25.6	2.31	17.7	3.2	34	143.0	25.2	2.37	17.2	3.1	34	145.0	24.9	2.42	16.6	3.0	34	147.0
80	13	67.0	70	32.5	0.80	29.7	11.9	32	78.0	32.3	0.83	29.5	11.4	32	80.0	32.2	0.86	29.2	10.9	32	82.0
	13	67.0	90	31.0	1.15	27.1	7.9	32	98.0	30.8	1.19	26.8	7.6	32	100.0	30.7	1.23	26.5	7.3	32	102.0
	13	67.0	110	29.1	1.56	23.8	5.5	32	118.0	28.9	1.61	23.4	5.3	32	120.0	28.6	1.66	23.0	5.1	32	122.0
	13	67.0	130	26.3	2.05	19.3	3.8	32	138.0	26.0	2.10	18.8	3.6	32	140.0	25.6	2.15	18.3	3.5	32	142.0
	13	67.0	135	25.5	2.18	18.0	3.4	32	143.0	25.1	2.23	17.5	3.3	32	145.0	24.7	2.29	16.9	3.2	32	147.0
	7	73.0	70	32.3	0.66	30.1	14.3	30	78.0	32.2	0.69	29.8	13.6	30	80.0	32.1	0.73	29.6	12.9	30	82.0
	7	73.0	90	31.0	1.02	27.5	8.9	30	98.0	30.8	1.06	27.2	8.6	30	100.0	30.6	1.09	26.9	8.2	30	102.0
	7	73.0	110	29.1	1.42	24.2	6.0	30	118.0	28.8	1.46	23.8	5.8	30	120.0	28.6	1.51	23.4	5.6	30	122.0
	7	73.0	130	26.2	1.88	19.8	4.1	30	138.0	25.8	1.93	19.2	3.9	30	140.0	25.4	1.98	18.7	3.8	30	142.0
	7	73.0	135	25.2	2.00	18.4	3.7	30	143.0	24.8	2.05	17.8	3.5	30	145.0	24.4	2.10	17.2	3.4	30	147.0
90	13	77.0	70	32.2	0.56	30.3	16.7	28	78.0	32.1	0.60	30.1	15.7	28	80.0	32.0	0.63	29.8	14.8	28	82.0
	13	77.0	90	30.9	0.93	27.8	9.8	28	98.0	30.8	0.96	27.5	9.4	28	100.0	30.6	1.00	27.2	8.9	28	102.0
	13	77.0	110	29.0	1.33	24.5	6.4	28	118.0	28.8	1.37	24.1	6.2	28	120.0	28.5	1.41	23.7	5.9	28	122.0
	13	77.0	130	26.0	1.77	20.0	4.3	28	138.0	25.7	1.82	19.5	4.1	28	140.0	25.3	1.87	18.9	4.0	28	142.0
	13	77.0	135	25.1	1.89	18.6	3.9	28	143.0	24.7	1.94	18.0	3.7	28	145.0	24.2	1.99	17.4	3.6	28	147.0
	7	83.0	70	32.0	0.40	30.7	23.2	26	78.0	31.9	0.44	30.4	21.2	26	80.0	31.9	0.48	30.2	19.5	26	82.0
	7	83.0	90	30.9	0.78	28.2	11.6	26	98.0	30.7	0.82	27.9	10.9	26	100.0	30.6	0.86	27.6	10.4	26	102.0
	7	83.0	110	29.0	1.19	24.9	7.2	26	118.0	28.7	1.23	24.5	6.9	26	120.0	28.5	1.27	24.1	6.6	26	122.0
	7	83.0	130	25.9	1.62	20.3	4.7	26	138.0	25.5	1.67	19.8	4.5	26	140.0	25.1	1.71	19.2	4.3	26	142.0
	7	83.0	135	24.9	1.74	18.9	4.2	26	143.0	24.4	1.78	18.3	4.0	26	145.0	24.0	1.83	17.7	3.8	26	147.0

* pressure drop is less than 1 ft
Above data is based on 15% methanol.

Interpolation is permissable, extrapolation is not.

Performance Data — Trilogy® QE1860 - Hot Water (High)

High									
EWTS °F	DTS	LWTS	DTL →	12					
			EWTL	HC	KW	HE	COP	Hz	LWTL
20	6	14.0	70	47.2	4.31	32.5	3.2	105	82.0
	6	14.0	90	45.1	5.42	26.6	2.4	105	102.0
	6	14.0	110	39.1	5.81	19.3	2.0	94	122.0
	6	14.0	130	27.2	5.23	9.4	1.5	72	142.0
	6	14.0	135	26.8	5.54	7.9	1.4	72	147.0
30	12	18.0	70	48.8	4.06	34.9	3.5	101	82.0
	12	18.0	90	46.7	5.13	29.2	2.7	101	102.0
	12	18.0	110	39.9	5.48	21.2	2.1	90	122.0
	12	18.0	130	27.1	4.86	10.5	1.6	67	142.0
	12	18.0	135	26.7	5.14	9.1	1.5	67	147.0
	6	24.0	70	50.5	3.68	37.9	4.0	94	82.0
	6	24.0	90	48.5	4.70	32.4	3.0	94	102.0
	6	24.0	110	40.8	4.99	23.8	2.4	83	122.0
	6	24.0	130	27.0	4.35	12.1	1.8	61	142.0
	6	24.0	135	26.4	4.61	10.7	1.7	61	147.0
40	12	28.0	70	51.2	3.43	39.5	4.4	89	82.0
	12	28.0	90	49.3	4.41	34.2	3.3	89	102.0
	12	28.0	110	41.1	4.68	25.2	2.6	78	122.0
	12	28.0	130	26.9	4.04	13.1	1.9	57	142.0
	12	28.0	135	26.3	4.29	11.7	1.8	57	147.0
	6	34.0	70	51.8	3.05	41.4	5.0	82	82.0
	6	34.0	90	50.0	3.98	36.4	3.7	82	102.0
	6	34.0	110	41.4	4.22	27.0	2.9	72	122.0
	6	34.0	130	26.7	3.63	14.3	2.2	52	142.0
	6	34.0	135	26.1	3.86	12.9	2.0	52	147.0
50	13	37.0	70	51.8	2.87	42.1	5.3	79	82.0
	13	37.0	90	50.2	3.76	37.3	3.9	79	102.0
	13	37.0	110	41.4	4.00	27.7	3.0	69	122.0
	13	37.0	130	26.6	3.45	14.8	2.3	49	142.0
	13	37.0	135	25.9	3.66	13.5	2.1	49	147.0
	7	43.0	70	51.6	2.51	43.1	6.0	70	82.0
	7	43.0	90	50.3	3.35	38.9	4.4	70	102.0
	7	43.0	110	41.3	3.59	29.0	3.4	62	122.0
	7	43.0	130	26.4	3.11	15.8	2.5	45	142.0
	7	43.0	135	25.7	3.31	14.4	2.3	45	147.0
60	13	47.0	70	51.3	2.28	43.5	6.6	67	82.0
	13	47.0	90	50.2	3.08	39.7	4.8	67	102.0
	13	47.0	110	41.1	3.32	29.8	3.6	59	122.0
	13	47.0	130	26.3	2.92	16.3	2.6	42	142.0
	13	47.0	135	25.5	3.10	15.0	2.4	43	147.0
	7	53.0	70	50.5	1.97	43.8	7.5	63	82.0
	7	53.0	90	50.0	2.71	40.7	5.4	63	102.0
	7	53.0	110	40.8	2.96	30.7	4.0	55	122.0
	7	53.0	130	26.1	2.65	17.1	2.9	39	142.0
	7	53.0	135	25.3	2.82	15.7	2.6	39	147.0
70	13	57.0	70	50.0	1.78	43.9	8.2	60	82.0
	13	57.0	90	49.8	2.48	41.3	5.9	60	102.0
	13	57.0	110	40.6	2.73	31.2	4.3	52	122.0
	13	57.0	130	26.0	2.49	17.5	3.1	37	142.0
	13	57.0	135	25.1	2.65	16.1	2.8	37	147.0
	7	63.0	70	49.0	1.54	43.8	9.3	56	82.0
	7	63.0	90	49.5	2.18	42.1	6.7	56	102.0
	7	63.0	110	40.3	2.43	32.0	4.9	48	122.0
	7	63.0	130	25.8	2.28	18.0	3.3	34	142.0
	7	63.0	135	24.9	2.42	16.6	3.0	34	147.0
80	13	67.0	70	48.4	1.40	43.7	10.1	53	82.0
	13	67.0	90	49.4	2.00	42.5	7.2	53	102.0
	13	67.0	110	40.1	2.25	32.4	5.2	46	122.0
	13	67.0	130	25.6	2.15	18.3	3.5	32	142.0
	13	67.0	135	24.7	2.29	16.9	3.2	32	147.0
	7	73.0	70	47.7	1.25	43.4	11.2	48	82.0
	7	73.0	90	49.4	1.79	43.3	8.1	48	102.0
	7	73.0	110	40.1	2.02	33.2	5.8	42	122.0
	7	73.0	130	25.4	1.98	18.7	3.8	30	142.0
	7	73.0	135	24.4	2.10	17.2	3.4	30	147.0
90	13	77.0	70	47.3	1.19	43.3	11.7	45	82.0
	13	77.0	90	49.6	1.68	43.9	8.6	45	102.0
	13	77.0	110	40.2	1.89	33.7	6.2	40	122.0
	13	77.0	130	25.3	1.87	18.9	4.0	28	142.0
	13	77.0	135	24.2	1.99	17.4	3.6	28	147.0
	7	83.0	70	47.0	1.15	43.1	11.9	41	82.0
	7	83.0	90	50.3	1.58	44.9	9.3	41	102.0
	7	83.0	110	40.6	1.75	34.7	6.8	36	122.0
	7	83.0	130	25.1	1.71	19.2	4.3	26	142.0
	7	83.0	135	24.0	1.83	17.7	3.8	26	147.0

* pressure drop is less than 1 ft

Interpolation is permissable, extrapolation is not.

Above data is based on 15% methanol.

Table 14d: Performance Data — Trilogy® QE1860 - Cooling + Hot Water

EWT °F	DT	CFM/T	TC					SC					S/T					kW					HR (HWC)				
70	12	300	18.0	24.0	36.0	48.0	60.0	11.3	15.7	23.1	29.7	36.9	0.63	0.66	0.64	0.62	0.62	0.62	0.71	1.33	2.40	3.79	20.1	26.4	40.5	56.2	72.9
	12	400	18.0	24.0	36.0	48.0	60.0	13.2	17.5	25.7	33.7	42.1	0.73	0.73	0.72	0.70	0.70	0.55	0.71	1.23	2.10	3.53	19.9	26.4	40.2	55.2	72.1
	12	500	18.0	24.0	36.0	48.0	60.0	14.7	19.1	28.1	36.9	45.1	0.82	0.80	0.78	0.77	0.75	0.50	0.70	1.25	2.21	3.91	19.7	26.4	40.3	55.5	73.3
	8	300	18.0	24.0	36.0	48.0	60.0	11.4	15.9	23.2	29.7	36.9	0.63	0.66	0.65	0.62	0.62	0.55	0.63	1.28	2.40	3.79	19.9	26.1	40.4	56.2	72.9
	8	400	18.0	24.0	36.0	48.0	60.0	13.2	17.6	25.8	33.7	42.1	0.73	0.73	0.72	0.70	0.70	0.46	0.62	1.18	2.10	3.53	19.6	26.1	40.0	55.2	72.1
	8	500	18.0	24.0	36.0	48.0	60.0	14.7	19.2	28.2	36.9	45.1	0.82	0.80	0.78	0.77	0.75	0.41	0.62	1.21	2.21	3.91	19.4	26.1	40.1	55.5	73.3
90	12	300	18.0	24.0	36.0	48.0	60.0	11.3	15.5	22.8	29.5	37.4	0.63	0.65	0.63	0.61	0.62	1.04	1.26	2.26	4.09	6.70	21.5	28.3	43.7	61.9	82.9
	12	400	18.0	24.0	36.0	48.0	60.0	13.0	17.2	25.3	33.1	41.3	0.72	0.72	0.70	0.69	0.69	0.98	1.23	2.04	3.52	6.00	21.3	28.2	43.0	60.0	80.5
	12	500	18.0	24.0	36.0	48.0	60.0	14.6	19.0	27.8	36.5	44.9	0.81	0.79	0.77	0.76	0.75	0.94	1.19	2.00	3.57	6.39	21.2	28.1	42.8	60.2	81.8
	8	300	18.0	24.0	36.0	48.0	60.0	11.3	15.5	22.8	29.5	37.4	0.63	0.65	0.63	0.61	0.62	0.94	1.12	2.19	4.09	6.70	21.2	27.8	43.5	61.9	82.9
	8	400	18.0	24.0	36.0	48.0	60.0	13.0	17.3	25.3	33.1	41.3	0.72	0.72	0.70	0.69	0.69	0.89	1.11	1.97	3.52	6.00	21.0	27.8	42.7	60.0	80.5
	8	500	18.0	24.0	36.0	48.0	60.0	14.6	19.0	27.8	36.5	44.9	0.81	0.79	0.77	0.76	0.75	0.85	1.07	1.93	3.57	6.39	20.9	27.7	42.6	60.2	81.8
110	12	300	18.0	24.0	36.0	44.0	44.0	11.1	15.3	22.6	27.1	27.1	0.61	0.64	0.63	0.62	0.62	1.66	2.19	3.94	5.99	5.99	23.7	31.5	49.5	64.5	64.5
	12	400	18.0	24.0	36.0	48.0	49.0	12.5	16.8	24.8	32.5	33.2	0.70	0.70	0.69	0.68	0.68	1.50	2.02	3.45	6.20	6.49	23.1	30.9	47.8	69.2	71.2
	12	500	18.0	24.0	36.0	48.0	50.0	14.1	18.4	27.3	36.1	37.5	0.78	0.77	0.76	0.75	0.75	1.48	1.95	3.33	6.11	6.74	23.0	30.7	47.4	68.8	73.0
	8	300	18.0	24.0	36.0	44.0	44.0	11.2	15.4	22.6	27.1	27.1	0.62	0.64	0.63	0.62	0.62	1.51	1.97	3.94	5.99	5.99	23.2	30.7	49.5	64.5	64.5
	8	400	18.0	24.0	36.0	48.0	49.0	12.6	16.9	24.8	32.5	33.2	0.70	0.70	0.69	0.68	0.68	1.38	1.83	3.45	6.20	6.49	22.7	30.3	47.8	69.2	71.2
	8	500	18.0	24.0	36.0	48.0	50.0	14.3	18.6	27.3	36.1	37.5	0.79	0.78	0.76	0.75	0.75	1.36	1.78	3.32	6.11	6.74	22.6	30.1	47.3	68.8	73.0
130	12	300	18.0	24.0	33.0	33.0	33.0	9.1	13.5	19.1	19.1	19.1	0.51	0.56	0.58	0.58	0.58	2.67	3.68	5.85	5.85	5.85	27.1	36.6	52.9	52.9	52.9
	12	400	18.0	24.0	36.0	36.0	36.0	12.2	16.5	24.5	24.5	24.5	0.68	0.69	0.68	0.68	0.68	2.32	3.28	5.96	5.96	5.96	25.9	35.2	56.4	56.4	56.4
	12	500	18.0	24.0	36.0	36.0	36.0	12.5	16.9	25.9	25.9	25.9	0.70	0.71	0.72	0.72	0.72	2.16	3.02	5.50	5.50	5.50	25.4	34.3	54.8	54.8	54.8
	8	300	18.0	24.0	33.0	33.0	33.0	9.7	14.0	19.1	19.1	19.1	0.54	0.58	0.58	0.58	0.58	2.43	3.33	5.85	5.85	5.85	26.3	35.4	52.9	52.9	52.9
	8	400	18.0	24.0	36.0	36.0	36.0	12.3	16.5	24.5	24.5	24.5	0.68	0.69	0.68	0.68	0.68	2.13	2.98	5.96	5.96	5.96	25.3	34.2	56.4	56.4	56.4
	8	500	18.0	24.0	36.0	36.0	36.0	13.0	17.3	25.9	25.9	25.9	0.72	0.72	0.72	0.72	0.72	2.01	2.78	5.50	5.50	5.50	24.9	33.5	54.8	54.8	54.8
135	8	300	18.0	24.0	28.0	28.0	28.0	9.0	13.1	15.5	15.5	15.5	0.50	0.55	0.55	0.55	0.55	2.74	3.90	4.99	4.99	4.99	27.3	37.3	45.0	45.0	45.0
	8	400	18.0	24.0	28.0	28.0	28.0	12.2	16.5	19.2	19.2	19.2	0.68	0.69	0.69	0.69	0.69	2.38	3.43	4.37	4.37	4.37	26.1	35.7	42.9	42.9	42.9
	8	500	18.0	24.0	28.0	28.0	28.0	12.4	16.7	19.6	19.6	19.6	0.69	0.70	0.70	0.70	0.70	2.20	3.12	3.97	3.97	3.97	25.5	34.7	41.5	41.5	41.5

* pressure drop is less than 1 ft
Interpolation is permissable, extrapolation is not.

Above performance is based on 80°F db / 67°F wb entering air conditions.

Performance Data — Trilogy® QE1860 - Cooling + Hot Water

EER					Hz					HW LWT					HW GPM					HW WPD				
28.9	33.9	27.0	20.0	15.8	22	29	44	62	84	82.0	82.0	82.0	84.0	88.2	3.4	4.4	6.8	8.0	8.0	1.1	1.8	4.1	5.8	5.8
32.8	33.6	29.2	22.8	17.0	20	27	41	57	76	82.0	82.0	82.0	83.8	88.0	3.3	4.4	6.7	8.0	8.0	1.1	1.8	4.0	5.8	5.8
36.3	34.5	28.7	21.8	15.4	19	26	39	55	75	82.0	82.0	82.0	83.9	88.3	3.3	4.4	6.7	8.0	8.0	1.1	1.8	4.1	5.8	5.8
32.8	38.2	28.2	20.0	15.8	22	29	44	62	84	78.0	78.0	80.1	84.0	88.2	5.0	6.5	8.0	8.0	8.0	2.3	3.9	5.8	5.8	5.8
39.4	38.5	30.6	22.8	17.0	20	26	40	57	76	78.0	78.0	80.0	83.8	88.0	4.9	6.5	8.0	8.0	8.0	2.2	3.9	5.8	5.8	5.8
43.5	38.6	29.8	21.8	15.4	19	25	39	55	75	78.0	78.0	80.0	83.9	88.3	4.9	6.5	8.0	8.0	8.0	2.2	3.9	5.8	5.8	5.8
17.4	19.1	15.9	11.7	9.0	26	34	53	77	109	102.0	102.0	102.0	105.5	110.7	3.6	4.7	7.3	8.0	8.0	1.1	2.0	4.7	5.7	5.6
18.4	19.5	17.7	13.6	10.0	24	31	48	69	96	102.0	102.0	102.0	105.0	110.1	3.6	4.7	7.2	8.0	8.0	1.1	1.9	4.6	5.7	5.6
19.1	20.1	18.0	13.5	9.4	23	30	45	66	96	102.0	102.0	102.0	105.0	110.5	3.5	4.7	7.1	8.0	8.0	1.1	1.9	4.5	5.7	5.6
19.1	21.3	16.4	11.7	9.0	25	33	52	77	109	98.0	98.0	100.9	105.5	110.7	5.3	7.0	8.0	8.0	8.0	2.5	4.3	5.7	5.7	5.6
20.2	21.5	18.3	13.6	10.0	23	30	47	69	96	98.0	98.0	100.7	105.0	110.1	5.3	7.0	8.0	8.0	8.0	2.5	4.3	5.7	5.7	5.6
21.3	22.3	18.7	13.5	9.4	22	29	45	66	96	98.0	98.0	100.6	105.0	110.5	5.2	6.9	8.0	8.0	8.0	2.4	4.3	5.7	5.7	5.6
10.8	11.0	9.1	7.3	7.3	32	42	68	90	90	122.0	122.0	122.4	126.1	126.1	3.9	5.2	8.0	8.0	8.0	1.3	2.4	5.5	5.5	5.5
12.0	11.9	10.4	7.7	7.5	28	38	59	90	93	122.0	122.0	122.0	127.3	127.8	3.9	5.1	8.0	8.0	8.0	1.2	2.3	5.5	5.5	5.5
12.2	12.3	10.8	7.9	7.4	28	36	56	86	92	122.0	122.0	122.0	127.2	128.2	3.8	5.1	7.9	8.0	8.0	1.2	2.3	5.4	5.5	5.5
11.9	12.2	9.1	7.3	7.3	30	41	68	90	90	118.0	118.0	122.4	126.1	126.1	5.8	7.7	8.0	8.0	8.0	2.9	5.1	5.5	5.5	5.5
13.0	13.1	10.4	7.7	7.5	27	37	59	90	93	118.0	118.0	121.9	127.3	127.8	5.7	7.6	8.0	8.0	8.0	2.8	5.0	5.5	5.5	5.5
13.2	13.5	10.9	7.9	7.4	27	35	56	86	92	118.0	118.0	121.8	127.2	128.2	5.7	7.5	8.0	8.0	8.0	2.8	4.9	5.5	5.5	5.5
6.7	6.5	5.6	5.6	5.6	36	51	76	76	76	142.0	142.0	143.2	143.2	143.2	4.5	6.1	8.0	8.0	8.0	1.7	3.2	5.3	5.3	5.3
7.7	7.3	6.0	6.0	6.0	34	47	78	78	78	142.0	142.0	144.1	144.1	144.1	4.3	5.9	8.0	8.0	8.0	1.6	2.9	5.3	5.3	5.3
8.3	7.9	6.5	6.5	6.5	31	43	71	71	71	142.0	142.0	143.7	143.7	143.7	4.2	5.7	8.0	8.0	8.0	1.5	2.8	5.3	5.3	5.3
7.4	7.2	5.6	5.6	5.6	35	49	76	76	76	138.0	138.0	143.2	143.2	143.2	6.6	8.8	8.0	8.0	8.0	3.7	6.4	5.3	5.3	5.3
8.5	8.1	6.0	6.0	6.0	33	45	78	78	78	138.0	138.0	144.1	144.1	144.1	6.3	8.5	8.0	8.0	8.0	3.4	6.0	5.3	5.3	5.3
8.9	8.6	6.5	6.5	6.5	31	42	71	71	71	138.0	138.0	143.7	143.7	143.7	6.2	8.4	8.0	8.0	8.0	3.3	5.8	5.3	5.3	5.3
6.6	6.2	5.6	5.6	5.6	36	52	64	64	64	143.0	144.3	146.3	146.3	146.3	6.8	8.0	8.0	8.0	8.0	3.9	5.3	5.2	5.2	5.2
7.6	7.0	6.4	6.4	6.4	34	48	58	58	58	143.0	143.9	145.7	145.7	145.7	6.5	8.0	8.0	8.0	8.0	3.6	5.3	5.2	5.2	5.2
8.2	7.7	7.1	7.1	7.1	31	43	53	53	53	143.0	143.7	145.4	145.4	145.4	6.4	8.0	8.0	8.0	8.0	3.5	5.3	5.2	5.2	5.2

* pressure drop is less than 1 ft
Interpolation is permissable, extrapolation is not.

Above performance is based on 80°F db / 67°F wb entering air conditions.

Performance Tables Legend

CFM/T	=	airflow, cubic feet/minute per ton	COP	=	Coefficient of Performance = BTU output/BTU input
EWT	=	entering water temperature, °F	LWT	=	leaving water temperature, °F
GPM	=	water flow in US gallons/minute	LAT	=	leaving air temperature, °F
EAT	=	entering air temperature, Fahrenheit (dry bulb/wet bulb)	LC	=	latent cooling capacity, Mbtuh
HC	=	heating capacity, Mbtuh	S/T	=	sensible to total cooling ratio
TC	=	total cooling capacity, Mbtuh	EWTS	=	entering water temperature (source)
SC	=	sensible cooling capacity, Mbtuh	EWTL	=	entering water temperature (load)
KW	=	total power unit input, KiloWatts	DTS	=	temperature difference (source)
HR	=	total heat of rejection, Mbtuh	DTL	=	temperature difference (load)
DT	=	temperature difference	LWTS	=	leaving water temperature (source)
HZ	=	compressor hertz	LWTL	=	leaving water temperature (load)
HE	=	total heat of extraction, Mbtuh	HW	=	hot water (potable)
WPD	=	Water coil pressure drop (ft hd)	HWC	=	hot water capacity, Mbtuh
EER	=	Energy Efficiency Ratio = BTU output/Watt input			

Preventive Maintenance

Water Coil Maintenance
(All other water loop applications)
Generally water coil maintenance is not needed for closed loop systems. However, if the piping is known to have high dirt or debris content, it is best to establish a periodic maintenance schedule with the owner so the water coil can be checked regularly. Should periodic coil cleaning be necessary, use standard coil cleaning procedures, which are compatible with both the heat exchanger material and copper water lines. Generally, the more water flowing through the unit, the less chance for scaling. However, flow rates over 3 gpm per ton (3.9 l/m per kW) may produce water (or debris) velocities that can erode the heat exchanger wall and ultimately produce leaks.

Hot Water Heat Exchanger
See water coil maintenance for ground water units. If the potable water is hard or not chemically softened, the high temperatures of the DWH Heat Exchanger will tend to scale even quicker than the water coil and may need more frequent inspections. In areas with extremely hard water, a routine maintenance schedule should be established to flush the hot water heat exchanger.

Filters
Filters must be clean to obtain maximum performance. Filters should be inspected every month under normal operating conditions and be replaced when necessary. Units should never be operated without a filter.

Washable, high efficiency, electrostatic filters, when dirty, can exhibit a very high pressure drop for the fan motor and reduce air flow, resulting in poor performance. It is especially important to provide consistent washing of these filters (in the opposite direction of the normal air flow) once per month using a high pressure wash similar to those found at self-serve car washes.

Condensate Drain
In areas where airborne bacteria may produce a “slimy” substance in the drain pan, it may be necessary to treat the drain pan chemically with an algaecide approximately every three months to minimize the problem. The condensate pan may also need to be cleaned periodically to insure indoor air quality. The condensate drain can pick up lint and dirt, especially with dirty filters. Inspect the drain twice a year to avoid the possibility of plugging and eventual overflow.

Fan Motors
All residential units have permanently lubricated fan motors. Further lubrication is not recommended.

Air Coil
The air coil must be cleaned to obtain maximum performance. Check once a year under normal operating conditions and, if dirty, brush or vacuum clean. Care must be taken not to damage the aluminum fins while cleaning. CAUTION: Fin edges are sharp.

Cabinet
Do not allow water to stay in contact with the cabinet for long periods of time to prevent corrosion of the cabinet sheet metal. Generally, vertical cabinets are set up from the floor a few inches [7 - 8 cm] to prevent water from entering the cabinet. The cabinet can be cleaned using a mild detergent.

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

Troubleshooting

Sensor Inputs

All sensor inputs are 'paired wires' connecting each component to the board. Therefore, continuity on pressure switches, for example can be checked at the board connector. The thermistor resistance should be measured with the connector removed so that only the impedance of the thermistor is measured. If desired, this reading can be compared to the thermistor resistance chart shown in Table 18. An ice bath can be used to check the calibration of the thermistor.

Table 15: Nominal resistance at various temperatures

Temp (ºC)	Temp (ºF)	Resistance (kOhm)	Temp (ºC)	Temp (ºF)	Resistance (kOhm)
-17.8	0.0	85.34	55	131.0	2.99
-17.5	0.5	84.00	56	132.8	2.88
-16.9	1.5	81.38	57	134.6	2.77
-12	10.4	61.70	58	136.4	2.67
-11	12.2	58.40	59	138.2	2.58
-10	14.0	55.30	60	140.0	2.49
-9	15.8	52.38	61	141.8	2.40
-8	17.6	49.64	62	143.6	2.32
-7	19.4	47.05	63	145.4	2.23
-6	21.2	44.61	64	147.2	2.16
-5	23.0	42.32	65	149.0	2.08
-4	24.8	40.15	66	150.8	2.01
-3	26.6	38.11	67	152.6	1.94
-2	28.4	36.18	68	154.4	1.88
-1	30.2	34.37	69	156.2	1.81
0	32.0	32.65	70	158.0	1.75
1	33.8	31.03	71	159.8	1.69
2	35.6	29.50	72	161.6	1.64
3	37.4	28.05	73	163.4	1.58
4	39.2	26.69	74	165.2	1.53
5	41.0	25.39	75	167.0	1.48
6	42.8	24.17	76	168.8	1.43
7	44.6	23.02	77	170.6	1.39
8	46.4	21.92	78	172.4	1.34
9	48.2	20.88	79	174.2	1.30
10	50.0	19.90	80	176.0	1.26
11	51.8	18.97	81	177.8	1.22
12	53.6	18.09	82	179.6	1.18
13	55.4	17.26	83	181.4	1.14
14	57.2	16.46	84	183.2	1.10
15	59.0	15.71	85	185.0	1.07
16	60.8	15.00	86	186.8	1.04
17	62.6	14.32	87	188.6	1.01
18	64.4	13.68	88	190.4	0.97
19	66.2	13.07	89	192.2	0.94
20	68.0	12.49	90	194.0	0.92
21	69.8	11.94	91	195.8	0.89
22	71.6	11.42	92	197.6	0.86
23	73.4	10.92	93	199.4	0.84
24	75.2	10.45	94	201.2	0.81
25	77.0	10.00	95	203.0	0.79
26	78.8	9.57	96	204.8	0.76
27	80.6	9.16	97	206.6	0.74
28	82.4	8.78	98	208.4	0.72
29	84.2	8.41	99	210.2	0.70
30	86.0	8.06	100	212.0	0.68
31	87.8	7.72	101	213.8	0.66
32	89.6	7.40	102	215.6	0.64
33	91.4	7.10	103	217.4	0.62
34	93.2	6.81	104	219.2	0.60
35	95.0	6.53	105	221.0	0.59
36	96.8	6.27	106	222.8	0.57
37	98.6	6.01	107	224.6	0.55
38	100.4	5.77	108	226.4	0.54
39	102.2	5.54	109	228.2	0.52
40	104.0	5.33	110	230.0	0.51
41	105.8	5.12	111	231.8	0.50
42	107.6	4.92	112	233.6	0.48
43	109.4	4.72	113	235.4	0.47
44	111.2	4.54	114	237.2	0.46
45	113.0	4.37	115	239.0	0.44
46	114.8	4.20	116	240.8	0.43
47	116.6	4.04	117	242.6	0.42
48	118.4	3.89	118	244.4	0.41
49	120.2	3.74	119	246.2	0.40
50	122.0	3.60	120	248.0	0.39
51	123.8	3.47	121	249.8	0.38
52	125.6	3.34	122	251.6	0.37
53	127.4	3.22	123	253.4	0.36
54	129.2	3.10			

Table 16: Troubleshooting

Code	Fault	Mode	Possible Cause	Solution
2	**High Discharge Pressure**			
		CL	Reduced or no water flow	Check loop pump operation
		CL	Reduced or no water flow	Check water flow and adjust to proper flow rate
		CL, HW	Water temp out of range	Bring water temp within design parameters
		HW	Reduced or no water flow	Check HW pump operation
		HW	Reduced or no water flow	Check water flow and adjust to proper flow rate
		HT	Reduced or no air flow	Check for dirty air filter - clean or replace
		HT	Reduced or no air flow	Check fan motor operation and air flow restrictions
		HT	Reduced or no air flow	Dirty air coil
		HT	Reduced or no air flow	External static is too high - correct duct work
		HT	Air temp out of range	Bring air temp within design parameters
		ALL	Overcharged	Check superheat and subcooling vs. manual mode operating condition table
		ALL	Faulty discharge transducer	Check transducer
3	**Low Suction Pressure**			
		ALL	Insufficient charge	Check for refrigerant leaks
		HT, HW	Incorrect loop configuration	Check freeze protection trip point setting
		HT, HW	Reduced or no water flow	Check loop pump operation
		HT, HW	Reduced or no water flow	Check water flow and adjust to proper flow rate
		CL, HW	Reduced or no air flow	Check for dirty air filter - clean or replace
		CL, HW	Reduced or no air flow	Check fan motor operation and air flow restrictions
		CL, HW	Reduced or no air flow	Dirty air coil
		CL, HW	Reduced or no air flow	External static is too high - correct duct work
		HT, HW	Improperly functioning EEV1	Check coil windings with ohmmeter. WHITE/RED, GREEN/RED, YELLOW/ VIOLET, and BLUE/VIOLET should each read between 36 and 44 ohms.
		HT, HW	Improperly functioning EEV1	Check output signal from EXM.
		CL, HW	Improperly functioning EEV2	Check coil windings with ohmmeter. WHITE/RED, GREEN/RED, YELLOW/ VIOLET, and BLUE/VIOLET should each read between 36 and 44 ohms.
		CL, HW	Improperly functioning EEV2	Check output signal from EXM.
		HT, HW	Water temp out of range	Bring water temp within design parameters
		CL, HW	Air temp out of range	Bring air temp within design parameters
		ALL	Faulty suction transducer	Check transducer
		ALL	Faulty check valve	Check different operational modes to isolate valve
		ALL	Restriction after the EEV	Check for temperature drop at various sections along refrigerant circuit. i.e., across filter-dryer, etc.
6	**Condensate Overflow**			
		ALL	Blocked Drain	Check for blockage and clean drain.
		ALL	Improper Trap	Check trap dimensions and location ahead of vent
		CL, HW	Poor drainage	Check for piping slope away from unit
		CL, HW	Poor drainage	Check slope of unit towards outlet
		CL, HW	Poor drainage	Poor venting - check vent location
		CL, HW	Moisture on sensor	Check for moisture shorting to air coil
		ALL	Plugged air filter	Clean or replace air filter
		ALL	Restricted return air flow	Find and eliminate restriction - increaes return duct and/or grille size
7	**Over / Under Voltage**			
		ALL	Under voltage	Check power supply and 24Vac before and during operation
		ALL	Under voltage	Check power supply wires
		ALL	Under voltage	Check 24Vac transformer tap for correct power supply voltage
		ALL	Over voltage	Check power supply and 24Vac before and during operation
		ALL	Over voltage	Check 24Vac transformer tap for correct power supply voltage
10	**ECM Low RPM**			
		HT, CL	Blower does not operate	Check blower line voltage
		HT, CL	Blower does not operate	Check blower low voltage wiring
		HT, CL	Blower operating with incorrect airflow	Wrong unit size selected - check unit configuration
		HT, CL	Blower operating with incorrect airflow	Wrong unit family selected - check unit configuration
		HT, CL	Blower operating with incorrect airflow	Incorrect motor size
		HT, CL	Blower operating with incorrect airflow	Incorrect blower selection

Troubleshooting (Cont.)

Code	Fault	Mode	Possible Cause	Solution
11	**Low Air Coil Pressure**			
		CL, HW	Low Return Air temp	Bring air temp within design parameters
		CL, HW	Plugged air filter	Clean or replace air filter
		CL, HW	Bad Suction Pressure Transducer	If supply voltage at BLK and GND wires reads 4.5-5.5 VDC but signal at GND and RED is not between 0.5-4.5 VDC, replace sensor
		CL, HW	Insufficient charge	Check for refrigerant leaks
12	**Control Fault**			
		ANY	EXM not properly programmed	reprogram EXM using Service Tool
		ANY	Bad EXM	replace EXM
13	**Low Pump Flow**			
		ALL	Flat loop	Flush and repressurize loop.
		ALL	Air pocket	Flush and repressurize loop.
		ALL	System setup for single and not parallel pumping.	Change unit loop pump configuration.
		ALL	Pump Failure	Check pump.
		ALL	Bad Flow Sensor	Check flow sensor.
14	**High Discharge temp**			
		ALL	Insufficient charge	Check for refrigerant leaks
		HT, HW	Water temp out of range	Bring water temp within design parameters
		CL, HW	Air temp out of range	Bring air temp within design parameters
		ALL	Faulty EEV	Check EEV operation, superheat will be high as well
		ALL	Fouled heat exchanger	Clean appropiate coil
15	**Discharge Pressure Sensor**			
		ALL	Bad tranducer	If supply voltage at BLK and GND wires reads 4.5-5.5 VDC but signal at GND and RED is not between 0.5-4.5 VDC, replace sensor
		ALL	Bad wiring harness	Check harness
		ALL	Bad EXM	If supply voltage across BLK and GND doesn't read 4.5-5.5 VDC replace EXM
		ALL	Bad EXM	If voltage across GND and RED reads between 0.5-4.5 VDC but fault still exists, replace EXM
16	**Suction Pressure Sensor**			
		ALL	Bad tranducer	If supply voltage at BLK and GND wires reads 4.5-5.5 VDC but signal at GND and BLU is not between 0.5-4.5 VDC, replace sensor
		ALL	Bad wiring harness	Check harness
		ALL	Bad EXM	If supply voltage across BLK and GND doesn't read 4.5-5.5 VDC replace EXM
		ALL	Bad EXM	If voltage across GND and BLU reads between 0.5-4.5 VDC but fault still exists, replace EXM
17	**Space temp Sensor**			
		HT, CL	Bad thermostat	Check thermostat to ensure that it is operating
		HT, CL	Bad EXM	Use T-Stat service mode to check other temp values as well as space humidity. If not, replace EXM
		HT, CL	Bad wiring	Check wiring between the thermostat and EXM
		HT, CL	Incorrect master/slave setting	Check that DIP switch 1 is set to the ON position
18	**Space Humidity Sensor**			
		HT, CL	Bad thermostat	Check thermostat to ensure that it is operating
		HT, CL	Bad EXM	Use T-Stat service mode to check other temp values as well as space temp. If not, replace EXM
		HT, CL	Bad wiring	Check wiring between the thermostat and EXM
		HT, CL	Incorrect master/slave setting	Check that DIP switch 1 is set to the ON position
19	**Low Refrigerant Pressure Differential**			
		ALL	Stuck RV	Replace improperly functioning RV
		ALL	Bad compressor	Check compressor to ensure it is operating.
20	**ECM configuration fault (any)**			
		HT, CL	Incorrect unit configuration	Check unit size
		HT, CL	Incorrect motor size	Check motor size
21	**High Blower Static**			
		HT, CL	Plugged air filter	Clean or replace air filter
		HT, CL	Bad duct work	Correct duct work.

Troubleshooting

Code	Fault	Mode	Possible Cause	Solution
22	**Grundfos Flow Sensor**			
		ALL	Bad tranducer	If supply voltage across BRN and WHT wires reads 4.75-5.25 VDC but a signal is not present, replace sensor
		ALL	Bad wiring harness	Check harness
		ALL	Bad EXM	If supply voltage across BRN and WHT doesn't read 4.75-5.25 VDC replace EXM
23	**Grundfos Pressure Sensor**			
		ALL	Bad tranducer	If supply voltage across BRN and WHT wires reads 4.75-5.25 VDC but a signal is not present, replace sensor
		ALL	Bad wiring harness	Check harness
		ALL	Bad EXM	If supply voltage across BRN and WHT doesn't read 4.75-5.25 VDC replace EXM
24	**Leaving Air temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine, board is bad. Replace EXM
25	**High EWT Warning**			
		ALL	High EWT	Bring water temp within design parameters
26	**Low EWT Warning**			
		ALL	Low EWT	Bring water temp within design parameters
27	**Cabinet temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine, board is bad. Replace EXM
28	**No Loop Pump Feedback**			
		ALL	No line voltage	Check power cable or unit voltage
		ALL	Control signal cable	Check signal cable and verify that voltage is between 3-4 VDC with the pump OFF and between 0-2 VDC with the pump ON.
		ALL	Bad EXM	If a feedback signal is present but the EXM doesn't read it properly the board is damaged. Replace the EXM.
29	**Low Loop Pump Voltage**			
		ALL	Low pump voltage	Check line voltage to the pump and increase
30	**Loop Pump Locked Rotor**			
		ALL	contaminants or trash in the pump impeller	Remove the pump head, clean out contaminants and flush system
		ALL	Seized impeller	Replace pump.
31	**Loop Pump Voltage Shutdown**			
		ALL	Low pump voltage	Check line voltage to the pump
32	**Loop Pump Sensor**			
		ALL	Bad RPM sensor	Replace pump if the line voltage and control signal is present at the pump but it doesn't operate.
33	**No DHW Pump Feedback**			
		HW	No line voltage	Check power cable or unit voltage
		HW	Control signal cable	Check signal cable and verify that voltage is between 3-4 VDC with the pump OFF and between 0-2 VDC with the pump ON.
		HW	Bad EXM	If a feedback signal is present but the EXM doesn't read it properly the board is damaged. Replace the EXM.
34	**Low DHW Pump Voltage**			
		HW	Low pump voltage	Check line voltage to the pump and increase
35	**DHW Pump Locked Rotor**			
		HW	contaminants or trash in the pump impeller	Remove the pump head, clean out contaminants and flush system
		HW	Seized impeller	Replace pump head
36	**DHW Pump Voltage Shutdown**			
		HW	Low pump voltage	Check line voltage to the pump
37	**DHW Pump Sensor**			
		HW	Bad RPM sensor	Replace pump if the line voltage and control signal is present at the pump but it doesn't operate.

Troubleshooting (Cont.)

Code	Fault	Mode	Possible Cause	Solution
38	**Suction temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine board is bad, replace EXM
39	**Discharge temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine board is bad, replace EXM
40	**Entering HW Temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine board is bad, replace EXM
41	**Leaving HW Temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine board is bad, replace EXM
42	**Air Coil Liquid temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine board is bad, replace EXM
43	**Air Coil Vapor temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine board is bad, replace EXM
44	**Water Coil Liquid temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine board is bad, replace EXM
45	**Water Coil Vapor temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine board is bad, replace EXM
46	**HW HX Liquid temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine board is bad, replace EXM
47	**Spare temp 1 sensor fault**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad EXM	If harness and sensor are fine board is bad, replace EXM
48	**Lower HW Tank temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad WXM	If harness and sensor are fine board is bad, replace WXM
49	**Upper HW Tank temp Sensor**			
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Bad wiring harness	Check wiring harness
		ALL	Bad WXM	If harness and sensor are fine board is bad, replace WXM
50	**Reduced HW Setpoint Warning**			
		HW	Discharge temp reached it's limit during a HW cycle	See high discharge temp pausible causes
		HW		Reduce HW setpoint
		HW	Discharge press. reached 10 PSIG below trip point	See high discharge pressure pausible causes
		HW		Reduce HW setpoint
		HW	HW heat exchanger is fouled	Clean HW heat exchanger per instructions

Troubleshooting

Code	Fault	Mode	Possible Cause	Solution
51	**High Suction Pressure Warning**			
		ALL	Overcharged	Check superheat and subcooling vs. typical operating condition table
		ALL	Faulty discharge transducer	Check transducer
		CL, HW	High EWT	Bring water temp within design parameters
		HT	High EAT	Bring air temp within design parameters
52	**Low Suction Pressure Warning**			
		HT, HW	Low LWT	Bring water temp within design parameters
		ALL	Insufficient charge	Check for refrigerant leaks
		HT, HW	Incorrect loop configuration	Check freeze protection trip point setting
		HT, HW	Reduced or no water flow	Check loop pump operation
		HT, HW	Reduced or no water flow	Check water flow and adjust to proper flow rate
		CL, HW	Reduced or no air flow	Check for dirty air filter - clean or replace
		CL, HW	Reduced or no air flow	Check fan motor operation and air flow restrictions
		CL, HW	Reduced or no air flow	Dirty air coil
		CL, HW	Reduced or no air flow	External static is too high - correct duct work
		HT, HW	Improperly functioning EEV1	Check coil windings with ohmmeter. WHITE/RED, GREEN/RED, YELLOW/ VIOLET, and BLUE/VIOLET should each read between 36 and 44 ohms.
		HT, HW	Improperly functioning EEV1	Check output signal from EXM.
		CL, HW	Improperly functioning EEV2	Check coil windings with ohmmeter. WHITE/RED, GREEN/RED, YELLOW/ VIOLET, and BLUE/VIOLET should each read between 36 and 44 ohms.
		CL, HW	Improperly functioning EEV2	Check output signal from EXM.
		HT, HW	Water temp out of range	Bring water temp within design parameters
		CL, HW	Air temp out of range	Bring air temp within design parameters
		ALL	Faulty suction transducer	Check transducer
		ALL	Faulty check valve	Check different operational modes to isolate valve
		ALL	Restriction after the EEV	Check for temperature drop at various sections along refrigerant circuit. i.e., across filter-dryer, etc.
53	**Low Discharge Pressure Warning**			
		CL, HW	Low EWT	Bring water temp within design parameters
		HT	Low EAT	Bring air temp within design parameters
54	**Loss of WXM Communications**			
		HT, CL	Bad WXM	Check WXM to ensure that it is operating
		HT, CL	Bad EXM	Use T-Stat service mode to check other temp values. If temps are incorrect or issues result in viewing information, replace EXM.
		HT, CL	Bad wiring	Check wiring between the WXM and EXM
		HT, CL	Incorrect master/slave setting	Check that DIP switch 1 is set to the ON position
55	**WXM High temp Warning**			
		HW	Elements thermostat are set too high	Lower element thermostat setpoint
56	**HW HX performance Warning**			
		HW	HW heat exchanger is fouled	Clean HW heat exchanger per instuctions
57	**Low Discharge Superheat**			
		ALL	Faulty EEV	Check EEV operation
		ALL	Bad discharge pressure transducer	Troubleshoot transducer
		ALL	Bad discharge temp sensor	Check temp vs. resistance curve per calculator
		ALL	Improperly installed discharge temp sensor	Check location and position of temp sensor
58	**Low Suction Superheat**			
		ALL	Faulty EEV	Check EEV operation
		ALL	Bad suction pressure trans-ducer	Troubleshoot transducer
		ALL	Bad suction temp sensor	Check temp vs. resistance curve per calculator
		ALL	Improperly installed suction temp sensor	Check location and position of temp sensor
59	**High Suction Superheat**			
		ALL	Faulty EEV	Check EEV operation
		ALL	Bad check valve	Check temp across check valve in unused circuit to determine if there is leakage
		ALL	Low charge	Check unit capacity in mode check

Troubleshooting (Cont.)

Code	Fault	Mode	Possible Cause	Solution
		ALL	Bad suction pressure transducer	Troubleshoot transducer
		ALL	Bad suction temp sensor	Check temp vs. resistance curve per calculator
		ALL	Improperly installed suction temp sensor	Check location and position of temp sensor
60	**General Compressor Fault**			
		HT, CL	Check compressor sub faults	See Low Level sub-faults (codes 61-71, 75 and 76)
61	**High temp Shutdown**			
		HT, CL	Improper contact with heat sink	Check heat sink contact with inverter board
		HT, CL	Damaged thermistor	Replace inverter board if reading coming back from board is higher than 200ºF ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
62	**High Current At Start Up**			
		HT, CL	Low input voltage	Check input voltage
		HT, CL	Incorrect compressor wiring	Check wiring from inverter to compressor
		HT, CL	Defective compressor	Check compressor
		HT, CL	Damaged Inverter board	Remove wiring check if there is short circuit between P2-U, P2-V, P2-W, N2-U, N2-V, and N2-W. If so, replace inverter board. ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
		HT, CL	Incorrect Inverter Board	Check inverter board to ensure it is the correct size ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
63	**High Current Shutdown**			
		HT, CL	Low input voltage	Check input voltage
		HT, CL	Incorrect compressor wiring	Check wiring from inverter to compressor
		HT, CL	Defective compressor	Check compressor
		HT, CL	Damaged Inverter board	Remove wiring check if there is short circuit between P2-U, P2-V, P2-W, N2-U, N2-V, and N2-W. If so, replace inverter board. ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
		HT, CL	Incorrect Inverter Board	Check inverter board to ensure it is the correct size ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
64	**High DC Voltage Shutdown**			
		HT, CL	High input voltage	Check input voltage
		HT, CL	Damaged Inverter board	If DC bus voltage stays above 400V, replace inverter board. ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
65	**Current Sensor Warning**			
		HT, CL	Damaged Inverter board	Replace inverter board. ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
66	**Heat Sink Thermistor Error**			
		HT, CL	Damaged Inverter board	Replace inverter board. ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
67	**Current Sensor Error**			
		HT, CL	Damaged Inverter board	Replace inverter board. ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
68	**Lack of Inverter COMM / Initialization**			
		ALL	Faulty control cable CN4	Check continuity on harness between MIM and CN4
		ALL	Faulty control cable CN2	Check continuity on harness between MIM and CN2
		ALL	Faulty 5 V power supply on MIM	Check C and OUT for 4.75-5.25 VDC
		ALL	Faulty 15 V power supply on MIM	Check GND and 15V for 14.25-15.75 VDC
		ALL	Faulty 18 V power supply on MIM	Check GND and 18V for 17.50-19.00 VDC
		ALL	Damaged Inverter board	Replace inverter board. ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.

Troubleshooting

Code	Fault	Mode	Possible Cause	Solution
69	**Low Voltage Shutdown - Inverter**			
		HT, CL	Low input voltage	Check input voltage
		HT, CL	Incorrect compressor wiring	Check wiring from drive to compressor
		HT, CL	Incorrect wiring between CN2 and MIM	Check wiring from drive to MIM
		HT, CL	Damaged Inverter board	If DC bus voltage stays below 200V, replace drive board. ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
70	**Power Supply Sync Warning**			
		HT, CL	Bad Input Voltage	Check input voltage
71	**Converter Over Current Shutdown**			
		HT, CL	Low Input Voltage	Check input voltage
72	**Protect Operation - Compressor Current**			
		ALL	Internal draging of compressor	Check compressor and if all looks normal and problem is still present, replace compressor
		ALL	High compressor load	Reduce maximum operating speed of the system
		ALL	Incorrect Inverter Board	Check board to ensure it is the correct size
		ALL	Damaged Inverter board	If DC bus voltage stays below 200V, replace drive board. ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
73	**Protect Operation - Heat Sink Temp.**			
		ALL	Improper inverter contact with heat sink	Check heat sink contact with inverter board ***WARNING - Inverter board capacitors maintain high voltage for up to 15 minutes before fully discharging.
74	**Protect Operation - Input Current**			
		ALL	Low input voltage	Check input voltage
		ALL	High compressor load	Reduce maximum operating speed of the system
		CL	Water temp at range limit	Decrease loop temp
		HW	Water temp at range limit	Decrease HW setpoint
		CL, HW	Water temp at range limit	Decrease pump DT
		HT	Air temp at range limit	Decrease intering air temp
		HT	Air temp at range limit	Increase airflow setpoint
75	**Lack of MIM Communications**			
		ALL	Faulty control cable	Check continuity on harness between EXM and MIM
		ALL	Damaged MIM	Replace MIM
		ALL	Damaged EXM	Replace EXM
76	**Low Voltage Shutdown**			
		ALL	Under voltage	Check power supply and 24Vac before and during operation
		ALL		Check power supply wires
		ALL		Check 24Vac transformer tap for correct power supply voltage
77	**Low Leaving Air temp**			
		ALL	Low EAT	Bring EAT into range
		ALL	Check unit capacity	Run mode to check unit capacity
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Incorrect airflow	Check airflow and reduce if nessesary.
		ALL	Improperly installed airflow sensor	Check installation
78	**High Leaving Air temp**			
		ALL	High SAT	Bring SAT into range
		ALL	Low airflow	Increase airflow
		ALL	Bad thermistor	Check temp vs. resistance curve per calculator
		ALL	Improperly installed airflow sensor	Check installation

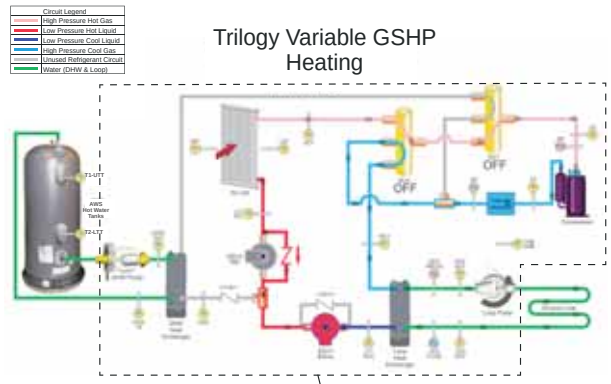
Troubleshooting (Cont.)

Code	Fault	Mode	Possible Cause	Solution
79	**Low Subcooling**			
		ALL	Low charge	Check unit capacity in mode check
80	**ECM Blower Motor Fault**			
		HT, CL	High level fault condition	See low level faults (81-86)
81	**ECM Lost Rotor Fault**			
		HT, CL	Check blower assembly	Blower wheel set screw loose
		HT, CL	Check blower assembly	Blower wheel dragging
		HT, CL	Check blower assembly	Blower wheel locked
82	**ECM Current Trip Fault**			
		HT, CL	Low input voltage	Check input voltage
		HT, CL	Bad ECM	Replace motor
83	**ECM temp Limit Fault**			
		HT, CL	High ambient motor temp	Reduce cabinet temp
		HT, CL	Dirty motor housing	Clean motor
84	**ECM Locked Rotor Fault**			
		HT, CL	Debris in blower assembly	Check blower and clean assembly
		HT, CL	Blower wheel draging	Check blower assembly
		HT, CL	Bad motor bearing	Replace motor
85	**ECM Over Voltage Fault**			
		HT, CL	High input voltage	Check input voltage
		HT, CL	Bad ECM	If nothing is found from other solutions, replace motor
86	**ECM Under Voltage Fault**			
		HT, CL	Low input voltage	Check input voltage
		HT, CL	Power cable	Check power cable
		HT, CL	Bad ECM	If nothing is found from other solutions, replace motor
87	**ECM Blocked Inlet Fault**			
		HT, CL	Low input voltage	Check input voltage to ensure it is a rated nominal voltage
		HT, CL	Dirty air filter	Clean or replace
		HT, CL	Dirty air coil	Clean air coil
		HT, CL	External static is too high	Correct duct work
88	**ECM Power Limit Warning**			
		HT, CL	Low input voltage	Check input voltage to ensure it is a rated nominal voltage
		HT, CL	Dirty air filter	Clean or replace
		HT, CL	Dirty air coil	Clean air coil
		HT, CL	External static is too high	Correct duct work
89	**ECM temp Limit Warning**			
		HT, CL	High ambient motor temp	Reduce cabinet temp
		HT, CL	Dirty motor housing	Clean motor
90	**ECM No Communications Fault**			
		HT, CL	Control signal cable	Check cable
		HT, CL	Bad ECM	If cable is OK, replace motor
		HT, CL	Bad EXM	If cable and motor are OK, replace EXM
		HT, CL	No input voltage	Check input voltage
91	**ECM Horsepower Configuration Fault**			
		HT, CL	Incorrect motor	Check motor size
		HT, CL	Incorrect unit configuration	Check unit configuration
92	**ECM Bad Parameter fault**			
		ALL	Incorrect HP motor detected	Check motor size
		ALL	Incorrect unit configuration	Check unit configuration
93	**Heating Check Valve**			
		HT, HW	High superheat in heating	Check temp across check valve in cooling + HW mode to determine if there is leakage
		HT, HW	High superheat in heating	Check temp across EEV1 to determine if there is leakage.

Troubleshooting

Code	Fault	Mode	Possible Cause	Solution
94	**Cooling Check Valve**			
		CL, HW	High superheat in cooling	Check temp across check valve when operating in HW mode to determine if there is leakage
		CL, HW	High superheat in cooling	Check temp across EEV2 to determine if there is leakage.
95	**HW Check Valve**			
		HT, CL	High superheat in cooling or heating	Check temp across check valve in HW circuit to determine if there is leakage
96	**Low HW Delta T warning**			
		ALL	Low unit capacity	Run HW check mode
		ALL	Low unit capacity	Bad entering HW temp sensor
		ALL	Low unit capacity	Improperly installed entering HW temp sensor
		ALL	Low unit capacity	Bad leaving HW temp sensor
		ALL	Low unit capacity	Improperly installed leaving HW temp sensor
97	**Pressure Sensor Calibration Fault**			
		ANY	Unit Not Equalized	With unit mode OFF, wait appropriate period for transducers to equalize
		OFF	Bad discharge pressure transducer	Troubleshoot transducer
		OFF	Bad suction pressure transducer	Troubleshoot transducer
98	**Loop Flow w/o Loop Pump Warning**			
		OFF	Loop pump check valve stuck open	Remove internal check valve and clean. System should also be flushed using a 100 mesh strainer to remove particles from system.
99	**Excessive Transition Mode Operation**			
		ANY	Stuck Reversing Valve	Run system in service mode to verify operation or perform magnet test.
		ANY	Bad Compressor	Check compressor operation.
100	**Low Loop Pressure Warning**			
		ANY	Low Loop Pressure	Check loop pressure
		ANY	Bad Pressure (DPD) Sensor	Check sensor
		ANY	Improperly installed (DPD) sensor	Remove sensor and reinstall

Refrigeration Troubleshooting Form - Heating



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QE Unit

Customer:

Startup Date:

Model #:

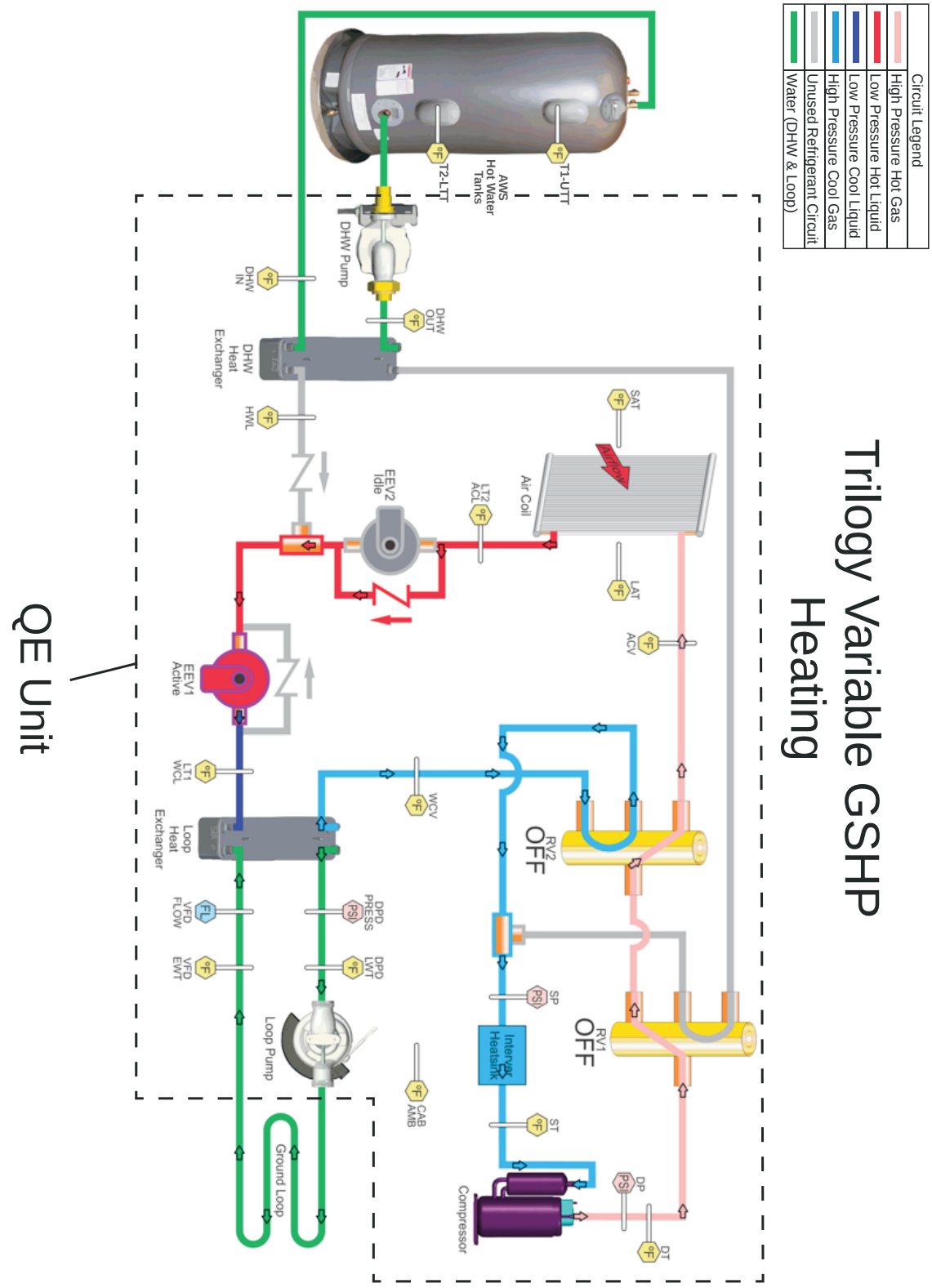
Serial #:

Antifreeze type & %:

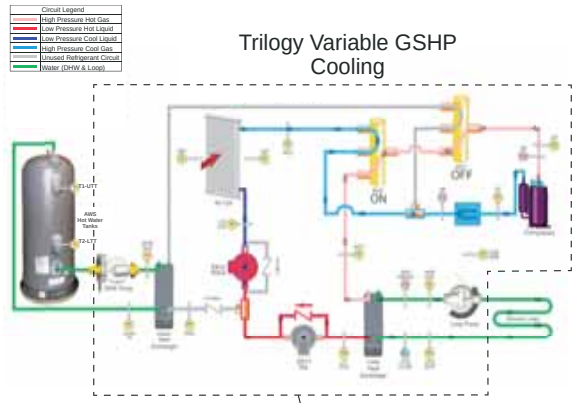
Complaint:

	Description	Value	Notes
1	Voltage		
2	Compressor Current		
3	Inverter Current		
4	Compressor Speed		
5	Fan CFM		
6	Fan RPM		
7	EEV1 Position		
8	EEV2 Position		
9	Suction Pressure (SP)		
10	Suction Saturation Temp		
11	Suction Superheat		
12	Discharge Temp (DT)		
13	Discharge Pressure (DP)		
14	Discharge Saturation Temp		
15	Discharge Superheat		
16	Subcooling		
17	Air Coil Liquid Temp (ACL)		
18	Air Coil Vapor Temp (ACV)		
19	Water Coil Liquid Temp (WCL)		
20	Water Coil Vapor Temp (WCV)		
21	HR / HE		
22	Supply Air Temp (SAT)		
23	Leaving Air Temp (LAT)		
24	Loop EWT		
25	Loop LWT		
26	Loop GPM		
27	Loop Pressure		
28	Loop Pump Speed		
29	Loop Pump Feedback		
30	HW Liquid Temp		
31	DHW IN		
32	DHW OUT		
33	DHW GPM		
34	DHW Pump Speed		
35	DHW Pump Feedback		
36	DHW Upper Tank Temp (UTT)		
37	DHW Lower Tank Temp (LTT)		

Refrigeration Troubleshooting Form - Heating



Refrigeration Troubleshooting Form - Cooling



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QE Unit

Customer:

Startup Date:

Model #:

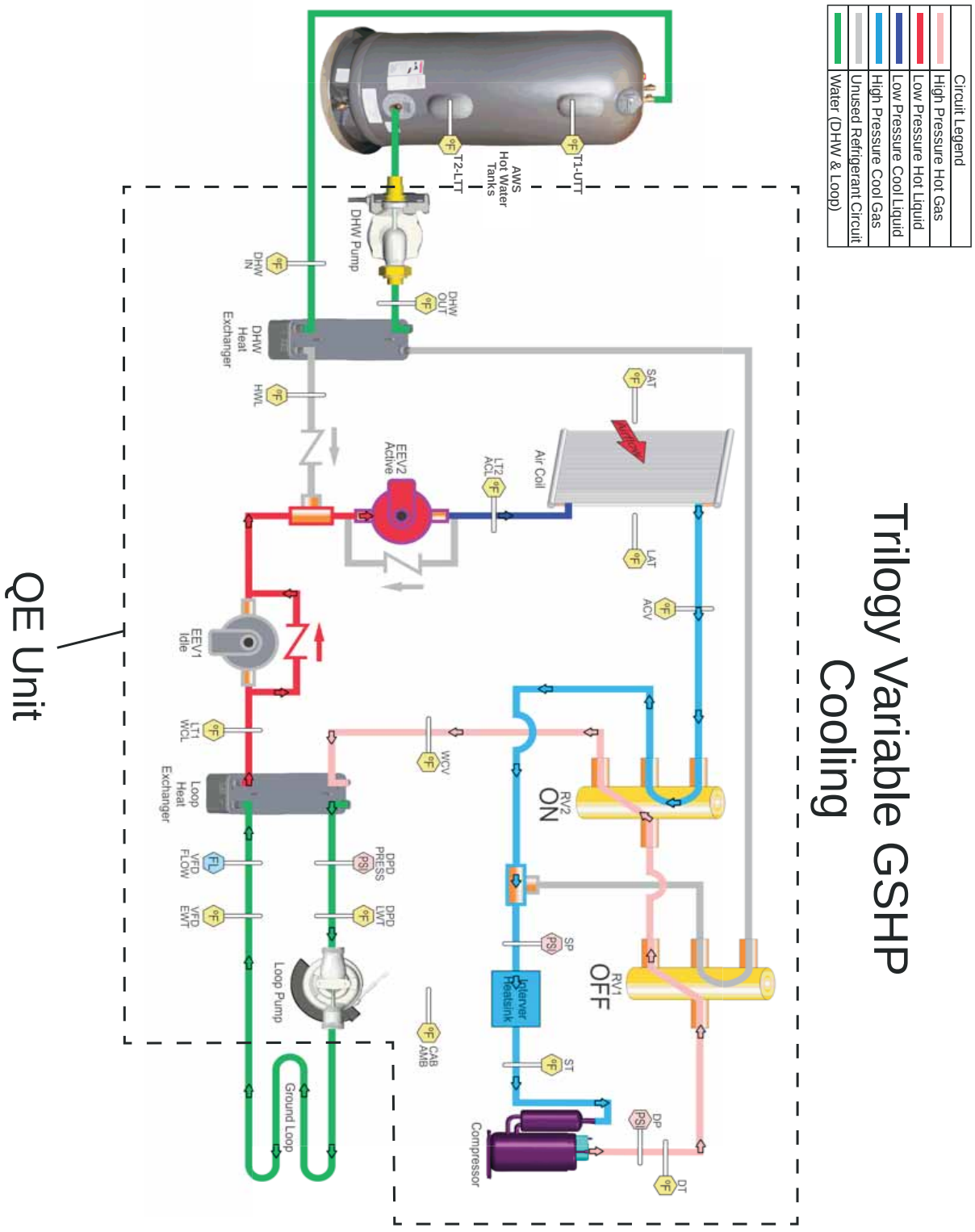
Serial #:

Antifreeze type & %:

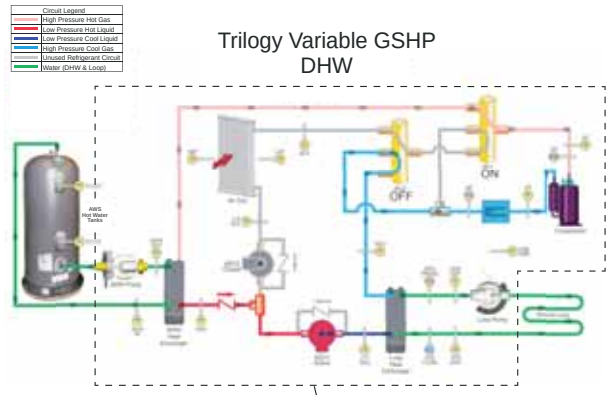
Complaint:

	Description	Value	Notes
1	Voltage		
2	Compressor Current		
3	Inverter Current		
4	Compressor Speed		
5	Fan CFM		
6	Fan RPM		
7	EEV1 Position		
8	EEV2 Position		
9	Suction Pressure (SP)		
10	Suction Saturation Temp		
11	Suction Superheat		
12	Discharge Temp (DT)		
13	Discharge Pressure (DP)		
14	Discharge Saturation Temp		
15	Discharge Superheat		
16	Subcooling		
17	Air Coil Liquid Temp (ACL)		
18	Air Coil Vapor Temp (ACV)		
19	Water Coil Liquid Temp (WCL)		
20	Water Coil Vapor Temp (WCV)		
21	HR / HE		
22	Supply Air Temp (SAT)		
23	Leaving Air Temp (LAT)		
24	Loop EWT		
25	Loop LWT		
26	Loop GPM		
27	Loop Pressure		
28	Loop Pump Speed		
29	Loop Pump Feedback		
30	HW Liquid Temp		
31	DHW IN		
32	DHW OUT		
33	DHW GPM		
34	DHW Pump Speed		
35	DHW Pump Feedback		
36	DHW Upper Tank Temp (UTT)		
37	DHW Lower Tank Temp (LTT)		

Refrigeration Troubleshooting Form - Cooling



Refrigeration Troubleshooting Form - DHW



See next page for full-size image

Customer:

Startup Date:

Model #:

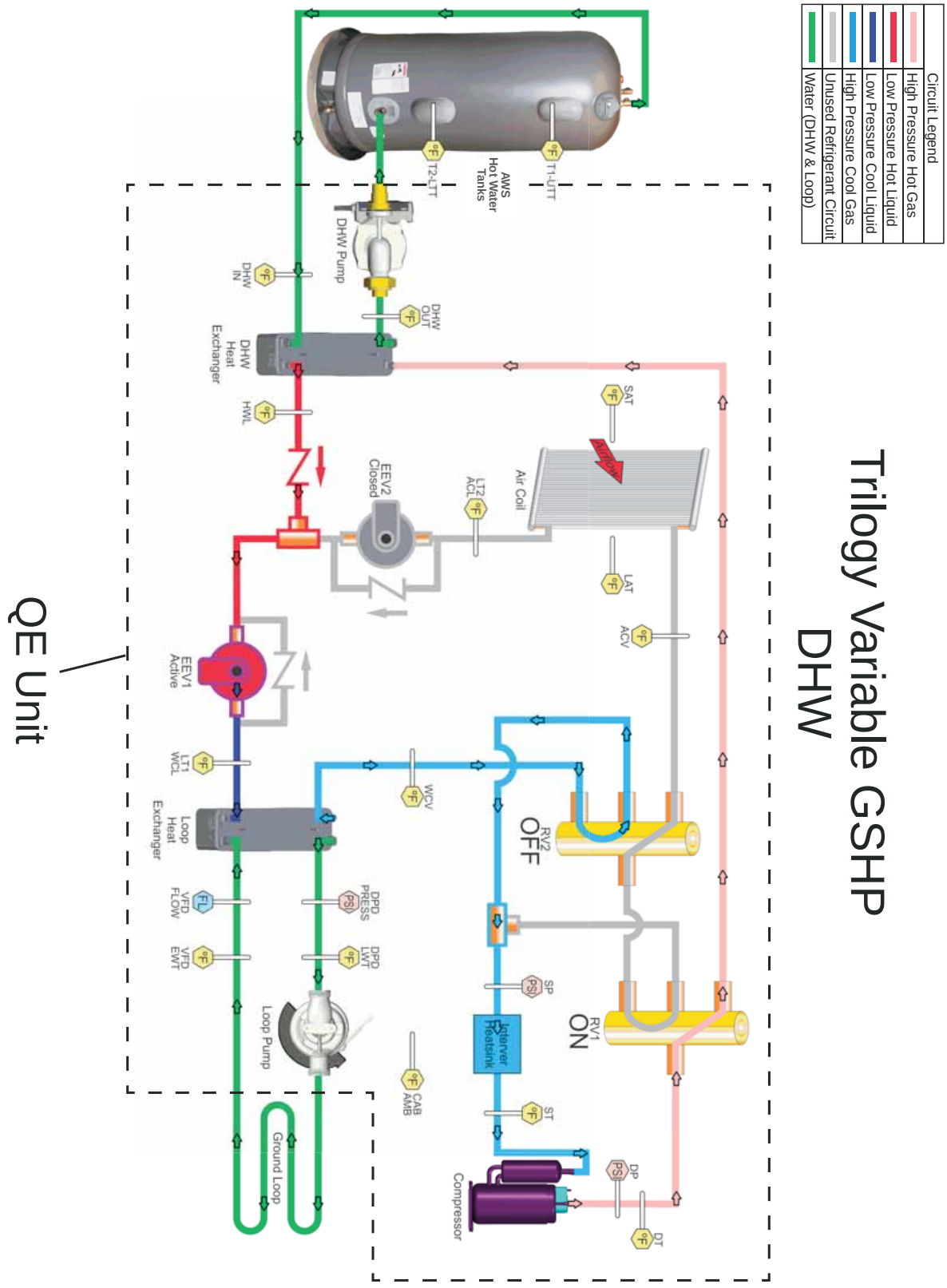
Serial #:

Antifreeze type & %:

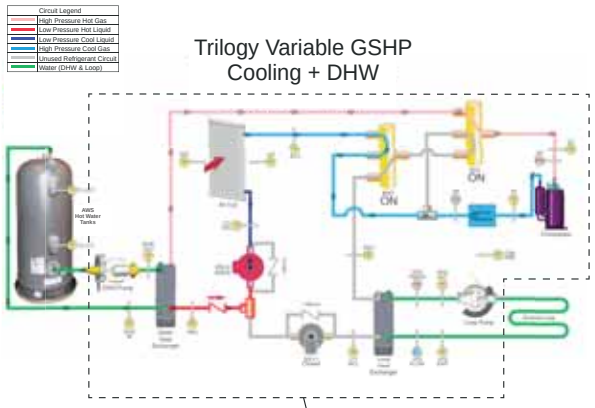
Complaint:

	Description	Value	Notes
1	Voltage		
2	Compressor Current		
3	Inverter Current		
4	Compressor Speed		
5	Fan CFM		
6	Fan RPM		
7	EEV1 Position		
8	EEV2 Position		
9	Suction Pressure (SP)		
10	Suction Saturation Temp		
11	Suction Superheat		
12	Discharge Temp (DT)		
13	Discharge Pressure (DP)		
14	Discharge Saturation Temp		
15	Discharge Superheat		
16	Subcooling		
17	Air Coil Liquid Temp (ACL)		
18	Air Coil Vapor Temp (ACV)		
19	Water Coil Liquid Temp (WCL)		
20	Water Coil Vapor Temp (WCV)		
21	HR / HE		
22	Supply Air Temp (SAT)		
23	Leaving Air Temp (LAT)		
24	Loop EWT		
25	Loop LWT		
26	Loop GPM		
27	Loop Pressure		
28	Loop Pump Speed		
29	Loop Pump Feedback		
30	HW Liquid Temp		
31	DHW IN		
32	DHW OUT		
33	DHW GPM		
34	DHW Pump Speed		
35	DHW Pump Feedback		
36	DHW Upper Tank Temp (UTT)		
37	DHW Lower Tank Temp (LTT)		

Refrigeration Troubleshooting Form - DHW



Refrigeration Troubleshooting Form - Cooling + DHW



See next page for full-size image

QE Unit

Customer:

Startup Date:

Model #:

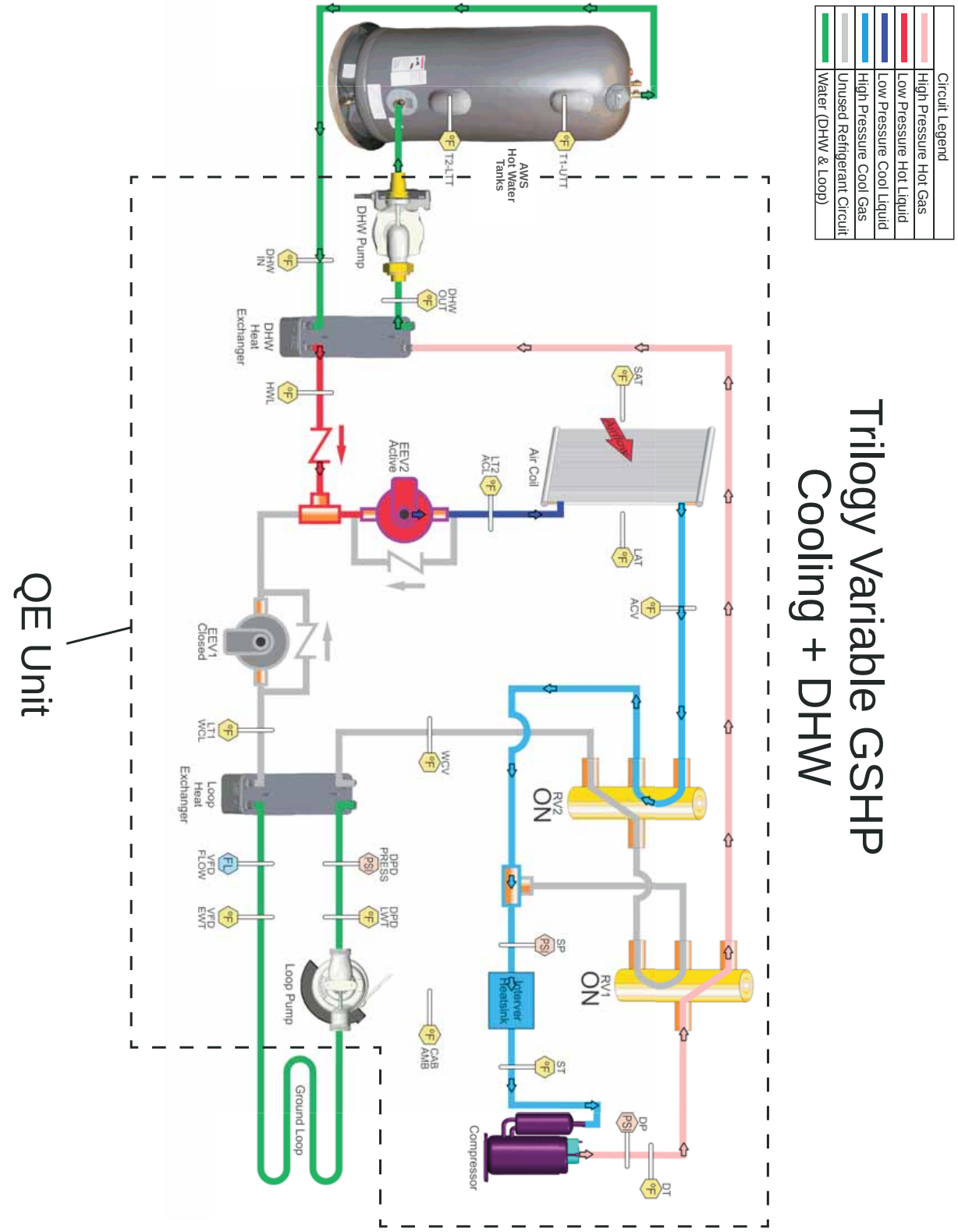
Serial #:

Antifreeze type & %:

Complaint:

	Description	Value	Notes
1	Voltage		
2	Compressor Current		
3	Inverter Current		
4	Compressor Speed		
5	Fan CFM		
6	Fan RPM		
7	EEV1 Position		
8	EEV2 Position		
9	Suction Pressure (SP)		
10	Suction Saturation Temp		
11	Suction Superheat		
12	Discharge Temp (DT)		
13	Discharge Pressure (DP)		
14	Discharge Saturation Temp		
15	Discharge Superheat		
16	Subcooling		
17	Air Coil Liquid Temp (ACL)		
18	Air Coil Vapor Temp (ACV)		
19	Water Coil Liquid Temp (WCL)		
20	Water Coil Vapor Temp (WCV)		
21	HR / HE		
22	Supply Air Temp (SAT)		
23	Leaving Air Temp (LAT)		
24	Loop EWT		
25	Loop LWT		
26	Loop GPM		
27	Loop Pressure		
28	Loop Pump Speed		
29	Loop Pump Feedback		
30	HW Liquid Temp		
31	DHW IN		
32	DHW OUT		
33	DHW GPM		
34	DHW Pump Speed		
35	DHW Pump Feedback		
36	DHW Upper Tank Temp (UTT)		
37	DHW Lower Tank Temp (LTT)		

Refrigeration Troubleshooting Form - Cooling + DHW



CLIMATE MASTER, INC.
LIMITED EXPRESS WARRANTY/LIMITATION OF REMEDIES AND LIABILITY FOR RESIDENTIAL CLASS PRODUCTS WITH LABOR ALLOWANCE

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

GRANT OF LIMITED EXPRESS WARRANTY

CM warrants its Residential Class products, purchased and retained in the United States of America and Canada, to be free from defects in material and workmanship under normal use and maintenance as follows: (1) Air conditioning, heating and/or heat pump units built or sold by CM ("CM Units") for ten (10) years from the Warranty Inception Date (as defined below); (2) Thermostats, auxiliary electric heaters and geothermal pumping modules built or sold by CM, when installed with CM Units, for ten (10) years from the Warranty Inception Date (as defined below); and (3) Other accessories and parts built or sold by CM, when installed with CM Units, for one (1) year from the date of shipment from CM. The "Warranty Inception Date" shall be the date of original unit installation, or six (6) months from date of unit shipment from CM, whichever comes first.

To make a claim under this warranty, parts must be returned to CM in Oklahoma City, Oklahoma, freight prepaid, no later than ninety (90) days after the date of the failure of the part; if CM determines the part to be defective and within CM's Limited Express Warranty, CM shall, when such part has been either replaced or repaired, return such to a factory recognized distributor, dealer or service organization, F.O.B. CM, Oklahoma City, Oklahoma, freight prepaid. The warranty on any part repaired or replaced under warranty expires at the end of the original warranty period.

This Limited Express Warranty shall cover the labor incurred by CM authorized service personnel in connection with the installation of a new or repaired warranty part that is covered by this Limited Express Warranty only to the extent specifically set forth in the then existing labor allowance schedule provided by CM's Warranty Department and only as follows: (1) CM Units for five (5) years from the Warranty Inception Date; (2) Thermostats, auxiliary electric heaters and geothermal pumping modules built or sold by CM, when installed with CM Units, for five (5) years from the Warranty Inception Date. Actual Labor costs are not covered by this Limited Express Warranty to the extent they exceed the amount allowed under said allowance schedule, they are not specifically provided for in said allowance schedule, they are not the result of work performed by CM authorized service personnel, they are incurred in connection with a part not covered by this Limited Express Warranty, or they are incurred more than the time periods set forth in this paragraph after the Warranty Inception Date.

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

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

This Limited Express Warranty applies to CM Residential Class products ordered from CM on or after May 1, 2010 (this would generally include CM Units with serial numbers beginning with "N118" and higher), and is not retroactive to any products ordered from CM prior to May 1, 2010 (this would generally include CM Units with serial numbers beginning with "N117" and lower). If you are unsure if this Limited Express Warranty applies to the product you have purchased, contact CM at the phone number or address reflected below.

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

LIMITATION OF REMEDIES

In the event of a breach of the Limited Express Warranty, CM will only be obligated at CM's option to repair the failed part or unit, or to furnish a new or rebuilt part or unit in exchange for the part or unit which has failed. If after written notice to CM's factory in Oklahoma City, Oklahoma of each defect, malfunction or other failure, and a reasonable number of attempts by CM to correct the defect, malfunction or other failure, and the remedy fails of its essential purpose, CM shall refund the purchase price paid to CM in exchange for the return of the sold good(s). Said refund shall be the maximum liability of CM. **THIS REMEDY IS THE SOLE AND EXCLUSIVE REMEDY OF THE BUYER OR PURCHASER AGAINST CM FOR BREACH OF CONTRACT, FOR THE BREACH OF ANY WARRANTY OR FOR CM'S NEGLIGENCE OR IN STRICT LIABILITY.**

LIMITATION OF LIABILITY

CM shall have no liability for any damages if CM's performance is delayed for any reason or is prevented to any extent by any event such as, but not limited to: any war, civil unrest, government restrictions or restraints, strikes, or work stoppages, fire, flood, accident, shortages of transportation, fuel, material, or labor, acts of God or any other reason beyond the sole control of CM. **CM EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGE IN CONTRACT, FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, OR IN TORT, WHETHER FOR CM's NEGLIGENCE OR AS STRICT LIABILITY.**

OBTAINING WARRANTY PERFORMANCE

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

Climate Master, Inc. • Customer Service • 7300 SW 44th Street • Oklahoma City, Oklahoma 73179 • (405) 745-6000 • e-service@climatemaster.com

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

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

Rev.: 4/10
Part No.: RP851

Notes

Notes

Revision History

Date	Page #	Description
10 Sept., 14	14	Removed UPM Geo Pump Table
28 Aug., 14	11	Added Polyolester Oil Information Warning Box
21 Aug., 14	27	Updated Electrical Data
26 Mar., 14	All	First Published

ISO 9001:2008 Certified
Quality: First & Always

ENERGY STAR PARTNER

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Geothermal Heating & Cooling
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