# Tranquility® High Efficiency (TR) Series

## Models TRH/V 006 - 060
## 60Hz - HFC-410A

## Installation, Operation & Maintenance

**97B0075N08**
**Revised: October 5, 2021**

ClimateMaster®

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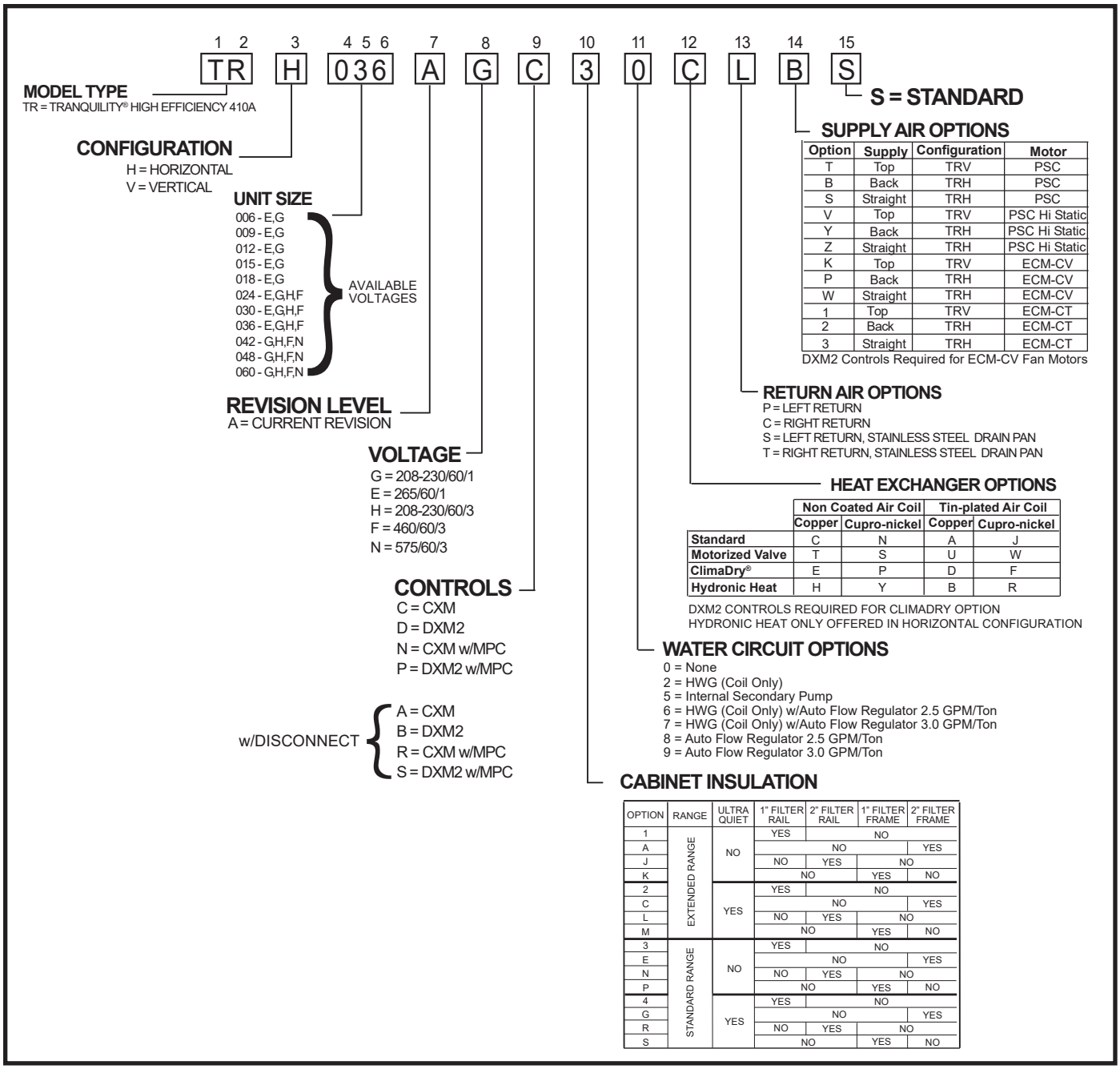
# Model Nomenclature – General Overview




| Option | Supply | Configuration | Motor |
|---|---|---|---|
| T | Top | TRV | PSC |
| B | Back | TRH | PSC |
| S | Straight | TRH | PSC |
| V | Top | TRV | PSC Hi Static |
| Y | Back | TRH | PSC Hi Static |
| Z | Straight | TRH | PSC Hi Static |
| K | Top | TRV | ECM-CV |
| P | Back | TRH | ECM-CV |
| W | Straight | TRH | ECM-CV |
| 1 | Top | TRV | ECM-CT |
| 2 | Back | TRH | ECM-CT |
| 3 | Straight | TRH | ECM-CT |

DXM2 Controls Required for ECM-CV Fan Motors

| | Non Coated Air Coil | | Tin-plated Air Coil | |
|---|---|---|---|---|
| | Copper | Cupro-nickel | Copper | Cupro-nickel |
| Standard | C | N | A | J |
| Motorized Valve | T | S | U | W |
| ClimaDry® | E | P | D | F |
| Hydronic Heat | H | Y | B | R |

| OPTION | RANGE | ULTRA QUIET | 1" FILTER RAIL | 2" FILTER RAIL | 1" FILTER FRAME | 2" FILTER FRAME |
|---|---|---|---|---|---|---|
| 1 | EXTENDED RANGE | NO | YES | NO | | |
| A | | | NO | | | YES |
| J | | | NO | YES | NO | |
| K | | | NO | | YES | NO |
| 2 | | YES | YES | NO | | |
| C | | | NO | | | YES |
| L | | | NO | YES | NO | |
| M | | | NO | | YES | NO |
| 3 | STANDARD RANGE | NO | YES | NO | | |
| E | | | NO | | | YES |
| N | | | NO | YES | NO | |
| P | | | NO | | YES | NO |
| 4 | | YES | YES | NO | | |
| G | | | NO | | | YES |
| R | | | NO | YES | NO | |
| S | | | NO | | YES | NO |

Note: Above model nomenclature is a general reference. Not all configurations are available on all models. Consult selection software for detailed information.

**ClimaDry® Option Notes:**

1. Unit must have DXM2 control option. 460 volt unit units require a four wire power supply with neutral.
2. ClimaDry® may not be combined with motorized water valve, internal secondary circulating pump, or automatic flow regulator options.
3. Unit minimum entering air temperature while in the dehumidification, cooling, or continuous fan modes is **65°F DB/55°F WB**. Operation below this minimum may result in nuisance faults.
4. A thermostat with dehumidification mode or thermostat and separate humidistat/dehumidistat is required for activation and control of ClimaDry®.
5. Sizes 006, 009, 012, 015, 018, downflow units and 575 volt units are not eligible for ClimaDry®.

# General 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.

**⚠ 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 can quickly become clogged with construction dirt and debris, which may cause system damage and void product warranty.

**⚠ WARNING! ⚠**

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

**⚠ WARNING! ⚠**

**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.

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

**Note: It is the responsibility of the purchaser to file all necessary claims with the carrier. Notify your equipment supplier of all damage within 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.

# General Information, Cont'd.

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

**Pre-Installation** - Installation, Operation, and Maintenance instructions are provided with each unit. Horizontal equipment is designed for installation above false ceiling or in a ceiling plenum. Other unit configurations are typically installed in a mechanical room. The installation site chosen should include adequate service clearance around the unit. Before unit 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. Some airflow patterns are field convertible (horizontal units only). Locate the airflow conversion section of this IOM.
7. Locate and verify any hot water generator (HWG), hanger, or other accessory kit located in the compressor section or blower section.

**⚠ CAUTION! ⚠**

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

**⚠ CAUTION! ⚠**

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

**⚠ CAUTION! ⚠**

**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.

**⚠ 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 the polymer drain pan, may cause the drain pan to leak. The polymer drain pan should never come in contact with POE oil as system failures and property damage may result.

# Unit Physical Data

### Tranquility® (TR) Series (60 Hz)

| TR Series | 006 | 009 | 012 | 015 | 018 | 024 | 030 | 036 | 042 | 048 | 060 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compressor (1 each)** | Rotary | | | | | Scroll | | | | | |
| Factory Charge HFC-410A - (oz.) | 19 | 20 | 23 | 35 | 43 | 40 | 48 | 50 | 70 | 74 | 82 |
| **ECM Fan Motor & Blower** | | | | | | | | | | | |
| Blower Wheel Size (Dia x w) | 6x5 | 6x5 | 6x5 | 9x7 | 9x7 | 9x7 | 9x7 | 9x8 | 9x8 | 10x10 | 11x10 |
| **PSC Fan Motor & Blower** | | | | | | | | | | | |
| Fan Motor Type/Speeds | PSC/3 | PSC/3 | PSC/3 | PSC/3 | PSC/3 | PSC/3 | PSC/3 | PSC/3 | PSC/3 | PSC/3 | PSC/3 |
| Blower Wheel Size (Dia x W) | 5x5 | 5x5 | 6x5 | 8x7 | 8x7 | 9x7 | 9x7 | 9x8 | 9x8 | 10x10 | 11x10 |
| **Water Connection Size** | | | | | | | | | | | |
| Source FPT | 1/2” | 1/2” | 1/2” | 1/2” | 1/2” | 3/4” | 3/4” | 3/4” | 3/4” | 1” | 1” |
| Optional HWG FPT | 1/2” | | | | | | | | | | |
| Coax Volume (gallons) | 0.123 | 0.143 | 0.167 | 0.286 | 0.45 | 0.286 | 0.323 | 0.323 | 0.89 | 0.738 | 0.939 |
| **Vertical** | | | | | | | | | | | |
| Air Coil Dimensions (H x W) | 10x15 | 10x15 | 10x15 | 20x17.25 | 20x17.25 | 20x17.25 | 20x17.25 | 24x21.75 | 24x21.76 | 28x25 | 28x25 |
| Filter Standard - 1” Throwaway | 10x18 | 10x18 | 10x18 | 20x20 | 20x20 | 20x20 | 20x20 | 24x24 | 24x24 | 28x28 | 28x28 |
| Weight - Operating (lbs.) | 110 | 112 | 121 | 163 | 168 | 184 | 192 | 213 | 228 | 283 | 298 |
| Weight - Packaged (lbs.) | 115 | 117 | 126 | 168 | 173 | 189 | 197 | 219 | 234 | 290 | 305 |
| **Horizontal** | | | | | | | | | | | |
| Air Coil Dimensions (H x W) | 10x15 | 10x15 | 10x15 | 16x22 | 16x22 | 16x22 | 16x22 | 20x25 | 20x25 | 20x35 | 20x35 |
| Filter Standard - 1” Throwaway | 10x18 | 10x18 | 10x18 | 16x25 | 16x25 | 18x25 | 18x25 | 20x28 or 2-20x14 | 20x28 or 2-20x14 | 1-20x24, 1-20x14 | 1-20x24, 1-20x14 |
| Weight - Operating (lbs.) | 110 | 112 | 121 | 163 | 168 | 184 | 192 | 213 | 228 | 283 | 298 |
| Weight - Packaged (lbs.) | 115 | 117 | 126 | 168 | 173 | 189 | 197 | 219 | 234 | 290 | 305 |

Notes: All units have TXV expansion device and 1/2” & 3/4” electrical knockouts.
575 volt fan motors are two speed.
FPT=Female Pipe Thread
Condensate Drain Connection is rubber coupling that couples to 3/4” schedule 40/80 PVC.
For ClimaDry® option add 30 lbs (13.6 kg).

| Unit Maximum Water Working Pressure | |
|---|---|
| **Options** | **Max Pressure PSIG [kPa]** |
| Base Unit | 500 [3447] |
| Internal Secondary Pump (ISP) | 145 [999] |
| Internal Motorized Water Valve (MWV) | 300 [2,068] |
| Internal Auto Flow Valve | 300 [2,068] |
| ClimaDry® | 145 [999] |

Use the lowest maximum pressure rating when multiple options are combined.

# Hydronic Heating Physical Data

| TR Series | 006 | 009 | 012 | 015 | 018 | 024 | 030 | 036 | 042 | 048 | 060 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compressor (1 each)** | Rotary | | | | | Scroll | | | | | |
| Factory Charge R410A - (oz.) | 17 | 20 | 23 | 35 | 43 | 43 | 48 | 50 | 70 | 74 | 82 |
| **ECM - CV Fan Motor & Blower** | | | | | | | | | | | |
| Fan Motor - Hybrid (hp) [W] | 1/8 | 1/8 | 1/4 | 1/3 | 1/3 | 1/2 | 3/4 | 3/4 | 3/4 | 1 | 1 |
| Blower Wheel Size - Hybrid (Dia x W) | 6x5 | 6x5 | 6x5 | 9x7 | 9x7 | 9x7 | 10X8T | 10X8A | 10X8A | 12X10T | 12X10T |
| **ECM - CT Fan Motor & Blower** | | | | | | | | | | | |
| Fan Motor - Hybrid (hp) [W] | 1/4 | 1/4 | 1/4 | 1/3 | 1/3 | 1/2 | 3/4 | 3/4 | 3/4 | 1 | 1 |
| Blower Wheel Size - Hybrid (Dia x W) | 6x5 | 6x5 | 6x5 | 9x7 | 9x7 | 9x7 | 10X8T | 10X8A | 10X8A | 12X10T | 12X10T |
| **Water Connection Size** | | | | | | | | | | | |
| FPT - All Other | 1/2” | 1/2” | 1/2” | 1/2” | 1/2” | 3/4” | 3/4” | 3/4” | 3/4” | 1” | 1” |
| **Horizontal** | | | | | | | | | | | |
| Air Coil Dimensions (H x W) | 10x15 | 10x15 | 10x15 | 16x22 | 16x22 | 16x22 | 16x22 | 20x25 | 20x25 | 20x35 | 20x35 |
| Filter Standard - 1” Throwaway | 10x18 | 10x18 | 10x18 | 16x25 | 16x25 | 18x25 | 18x25 | 20x28 or 2-20x14 | 20x28 or 2-20x14 | 1-20x24, 1-20x14 | 1-20x24, 1-20x14 |
| Weight - Operating - Hybrid (lbs.) | 154 | 156 | 165 | 215 | 221 | 253 | 261 | 309 | 324 | 373 | 405 |
| Weight - Packaged - Hybrid (lbs.) | 159 | 161 | 170 | 220 | 226 | 258 | 266 | 314 | 329 | 378 | 410 |

Notes: All units have TXV expansion device and 1/2” & 3/4” electrical knockouts.
FPT=Female Pipe Thread
Condensate Drain Connection is rubber coupling that couples 3/4” schedule 40/80 PVC.

| Unit Maximum Water Working Pressure | |
|---|---|
| **Options** | **Max Pressure PSIG [kPa]** |
| Base Unit | 300 [2068] |
| Internal Secondary Pump (ISP) | 145 [999] |
| Internal Auto Flow Valve | 300 [2,068] |

Use the lowest maximum pressure rating when multiple options are combined.

# Horizontal Installation

**Horizontal Unit Location**
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 above a false ceiling or in a ceiling plenum. 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, etc. 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 3 for an illustration of a typical installation. Refer to unit submittal data or engineering design guide for dimensional data.

**Conform to the following guidelines when selecting 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 submittal data. Size the access opening to accommodate the service technician during the removal or replacement of the compressor, control, or blower assembly.
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.

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

**Mounting Horizontal Units**
Horizontal units have 4 hanger brackets partially attached at the factory, one at each corner. Enclosed within the unit there is a hanger kit hardware bag containing vibration isolation grommets, washers, screws and a hanger installation instruction page. One additional screw from the hardware bag must be added to each hanger bracket before unit installation.Tighten each screw to 75 in-lbs (8.5 Nm). See Figure 1. Refer to the hanger installation instruction page contained in the hardware bag for details of final hanger bracket attachment and unit suspension. See Figure 1a.

Use four (4) field supplied threaded rods and factory provided vibration isolators to suspend the unit. Safely lift the unit into position supporting the bottom of the unit. Ensure the top of the unit is not in contact with any external objects. Connect the top end of the 4 all-thread rods, slide rods through the brackets and grommet then assemble washers and double nuts at each rod. Ensure that the unit is approximately level and that the threaded rod extends past the nuts.

Pitch the unit toward the drain as shown in Figure 2 to improve the condensate drainage. On small units (less than 2.5 tons/8.8kW) ensure that unit pitch does not cause condensate leaks inside the cabinet.

**Figure 1: Hanger Bracket**

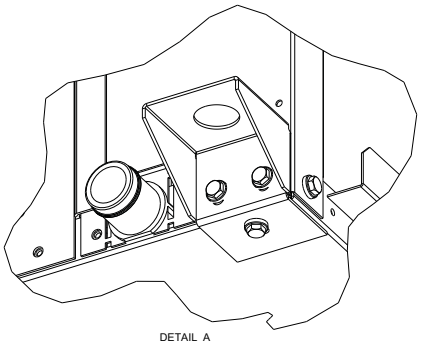
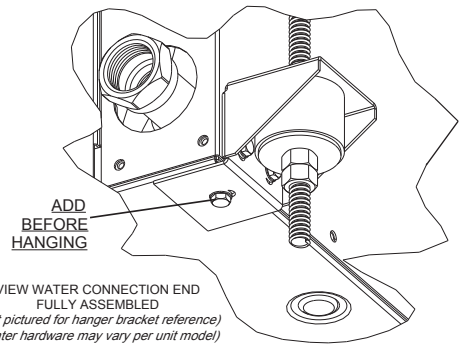



**Figure 1a:**



# Horizontal Installation, Cont'd.

**Figure 2: Horizontal Unit Pitch**

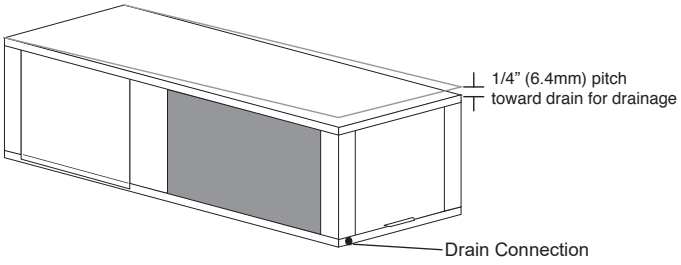
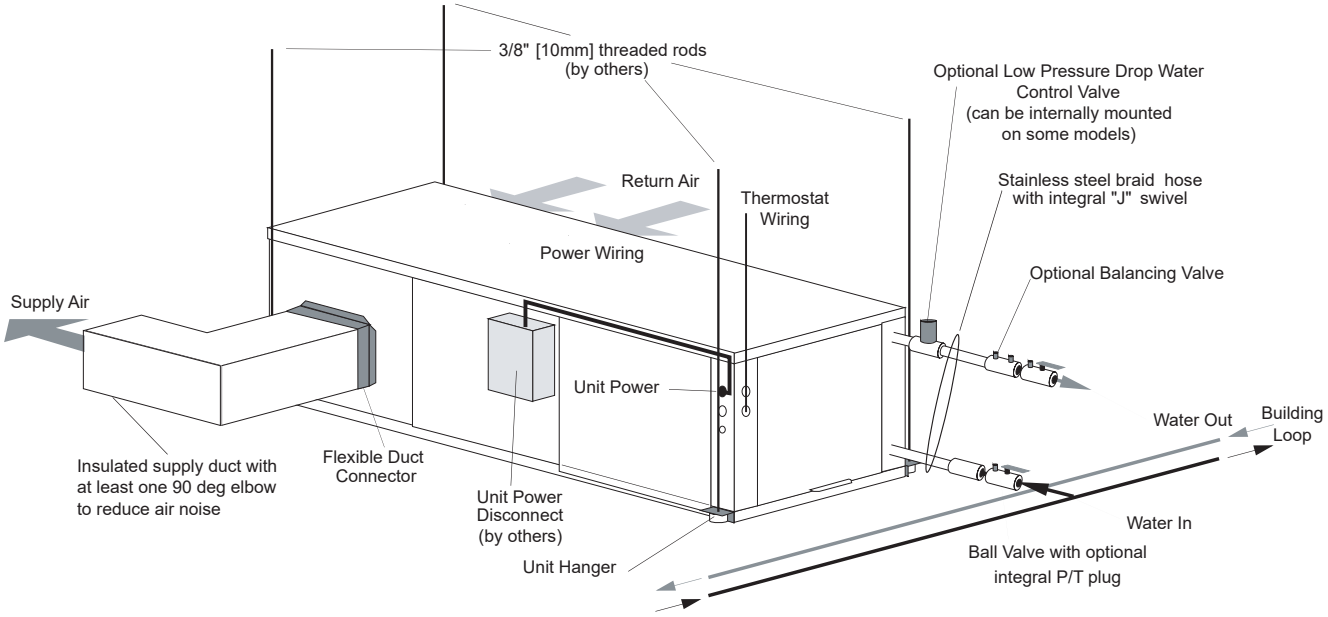



**Figure 3: Typical Horizontal Unit Installation**




**Air Coil -** To obtain maximum performance, the air coil should be cleaned before start-up. A 10% solution of dishwasher detergent and water is recommended for both sides of the coil. A thorough water rinse should follow. **UV based anti-bacterial systems may damage e-coated air coils.**

**Notice!** Installation Note - Ducted Return: Many horizontal WSHPs are installed in a return air ceiling plenum application (above ceiling). Vertical WSHPs are commonly installed in a mechanical room with free return (e.g. louvered door). Therefore, filter rails are the industry standard and are included on ClimateMaster commercial heat pumps for the purposes of holding the filter only. For ducted return applications, the filter rail must be removed and replaced with a duct flange or filter frame. Canvas or flexible connectors should also be used to minimize vibration between the unit and ductwork.

# 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 4 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. Re-route 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 4: Left Return Side to Back**

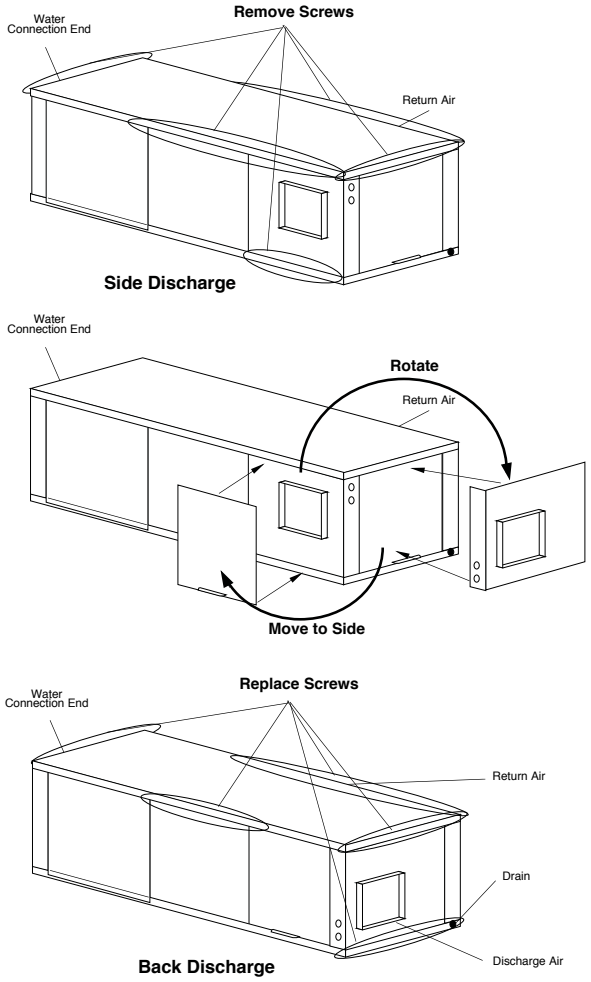
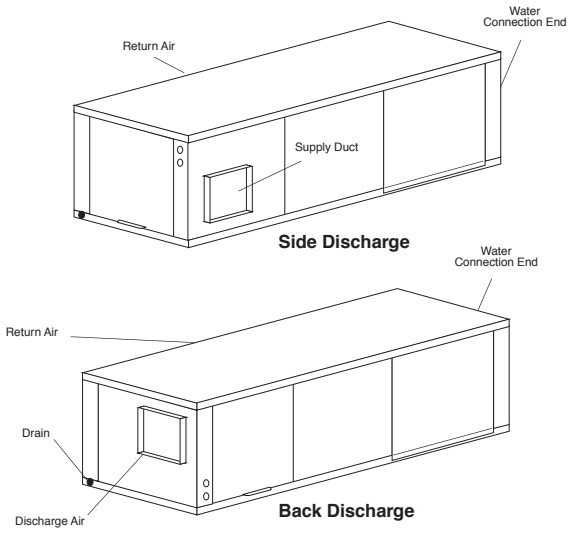



**Figure 5: Right Return Side to Back**



# Horizontal Installation

**Condensate Piping - Horizontal Units -** A condensate drain line must be installed and pitched away for the unit to allow for proper drainage. This connection must meet all local plumbing/building codes.

Pitch the unit toward the drain as shown in Figure 2 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.

Install condensate trap at each unit with the top of the trap positioned below the unit condensate drain connection as shown in Figure 6. Design the depth of the trap (water-seal) based upon the amount of ESP capability of the blower (where 2 inches [51 mm] of ESP capability requires 2 inches [51 mm] of trap depth). As a general rule, 1-1/2 inch [38 mm] trap depth is the minimum.

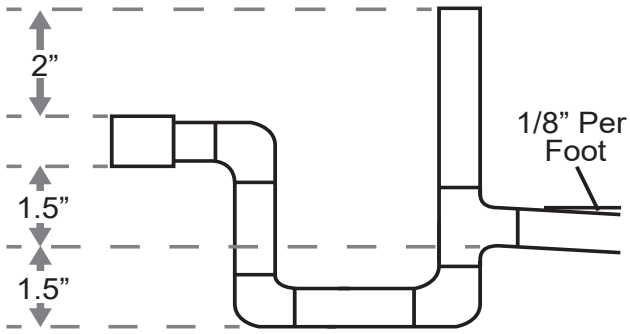
Each unit must be installed with its own individual trap and connection to the condensate line (main) or riser. Provide a means to flush or blow out the condensate line. DO NOT install units with a common trap and/or vent.

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.**

Condensate drain connection is a rubber coupling that couples to 3/4" schedule 40/80 PVC. Use hose clamps to secure the pipe inside the coupling. If the connection is not secure, the connection may leak.

Instructions for coupling the condensate drain to the trap are included in the bag that includes the coupling and hose clamps.

**Figure 6: Horizontal Condensate Connection**




**⚠ CAUTION! ⚠**

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

**Duct System Installation -** Proper duct sizing and design is critical to the performance of the unit. The duct system should be designed to allow adequate and even airflow through the unit during operation. Air flow through the unit MUST be at or above the minimum stated airflow for the unit to avoid equipment damage. Duct systems should be designed for quiet operation. Refer to Figure 3 for horizontal duct system details or Figure 8 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 may 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 submittal data 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 ensure 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 necessary.

# Vertical Installation

**Vertical Unit Location -** 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 mechanical room/closet. Vertical units are typically installed in a mechanical room or closet. 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, etc. 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 7 and 8 for typical installation illustrations. Refer to unit submittal data or engineering design guide 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" [10 mm] to 1/2" [13 mm] in thickness. Extend the pad beyond all four edges of the unit.
2. Provide adequate clearance for filter replacement and drain pan cleaning. Do not block filter access with piping, conduit or other materials. Refer to unit submittal data or engineering design guide for dimensional data.
3. Provide access for fan and fan motor maintenance and for servicing the compressor and coils without removing the unit.
4. Provide an unobstructed path to the unit within the closet or mechanical room. Space should be sufficient to allow removal of the unit, if necessary.
5. Provide access to water valves and fittings and screwdriver access to the unit side panels, discharge collar and all electrical connections.

**Figure 7: Vertical Unit Mounting**

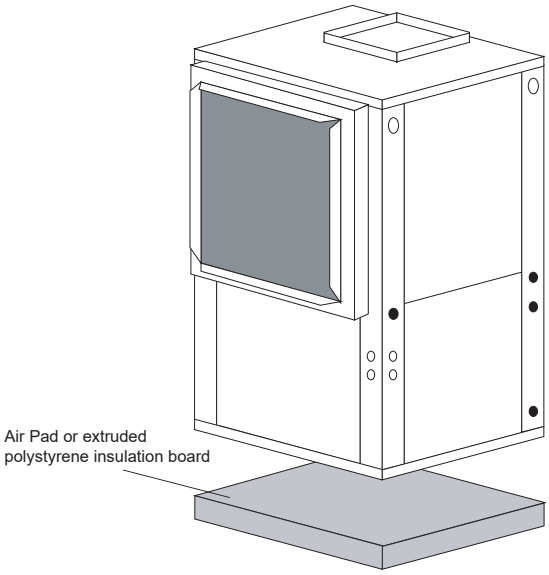
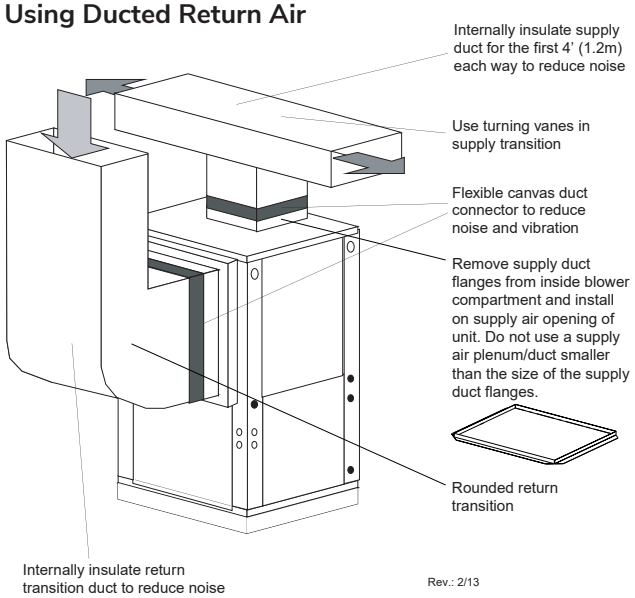



**Figure 8: Typical Vertical Unit Installation Using Ducted Return Air**



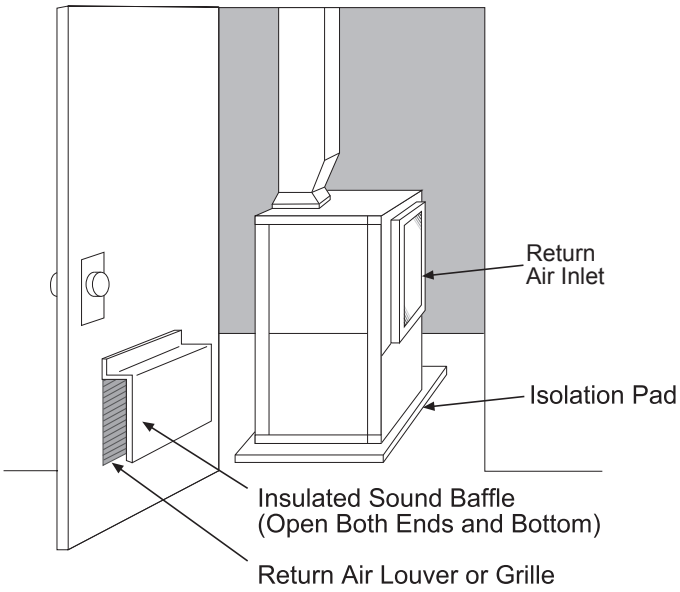

**Notice!** Installation Note - Ducted Return: Many horizontal WSHPs are installed in a return air ceiling plenum application (above ceiling). Vertical WSHPs are commonly installed in a mechanical room with free return (e.g. louvered door). Therefore, filter rails are the industry standard and are included on ClimateMaster commercial heat pumps for the purposes of holding the filter only. For ducted return applications, the filter rail must be removed and replaced with a duct flange or filter frame. Canvas or flexible connectors should also be used to minimize vibration between the unit and ductwork.

# Vertical Installation, Cont'd.

**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. Mount the unit so that the return air inlet is 90° to the return air grille. Refer to Figure 9. Install a sound baffle as illustrated to reduce line-of sight sound transmitted through return air grilles.
2. Mount the unit on a rubber or neoprene isolation pad to minimize vibration transmission to the building structure.

**Figure 9: Vertical Sound Attenuation**




**Notice! Units with clear plastic drain lines should have regular maintenance (as required) to avoid buildup of debris, especially in new construction.**

**Condensate Piping for Vertical Units -** A condensate line must be installed and pitched away from the unit to allow for proper drainage. This connection must meet all local plumbing/building codes.

Install condensate trap at each unit with the top of the trap positioned below the unit condensate drain connection as shown in Figure 10. Design the depth of the trap (water-seal) based upon the amount of 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.

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.**

Each unit must be installed with its own individual vent (where necessary) and a means to flush or blow out the condensate drain line. Do not install units with a common trap and/or vent.

Condensate drain connection is a rubber coupling that couples to 3/4" schedule 40/80 PVC. Use hose clamps to secure the pipe inside the coupling. If the connection is not secure, the connection may leak.

Instructions for coupling the condensate drain to the trap are included in the bag that includes the coupling and hose clamps.

# Piping Installation

**Installation of Supply and Return Piping**
Follow these piping guidelines.

1. Install a drain valve at the base of each supply and return riser to facilitate system flushing.
2. Install shut-off / balancing valves and unions at each unit to permit unit removal for servicing.
3. Place strainers at the inlet of each system circulating pump.
4. Select the proper hose length to allow slack between connection points. Hoses may vary in length by +2% to -4% under pressure.
5. Refer to Table 1. Do not exceed the minimum bend radius for the hose selected. Exceeding the minimum bend radius may cause the hose to collapse, which reduces water flow rate. Install an angle adapter to avoid sharp bends in the hose when the radius falls below the required minimum.

Insulation is not required on loop water piping except where the piping runs through unheated areas, outside the building or when the loop water temperature is below the minimum expected dew point of the pipe ambient conditions. Insulation is required if loop water temperature drops below the dew point (insulation is required for ground loop applications in most climates).

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

**Note: When antifreeze is used in the loop, ensure that it is compatible with the Teflon® tape or pipe joint compound that is applied.**

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

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

Refer to Figure 11 for an illustration of a typical supply/return hose kit. Adapters secure hose assemblies to the unit and risers. Install hose assemblies properly and check regularly to avoid system failure and reduced service life.

**Installer Caution:** After making water connections on units equipped with ClimaDry®, ensure the three union nuts on the internal three-way water valve are tight.

ClimaDry equipped units have a manual air bleed valve at the top of the reheat coil. This valve must be used to bleed the air from the reheat coil after filling the system, for the ClimaDry to operate properly.

**⚠ 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.

**⚠ CAUTION! ⚠**

**CAUTION!** Corrosive system water requires corrosion resistant fittings and hoses, and may require water treatment.

**⚠ CAUTION! ⚠**

**CAUTION!** Do not bend or kink supply lines or hoses.

**⚠ CAUTION! ⚠**

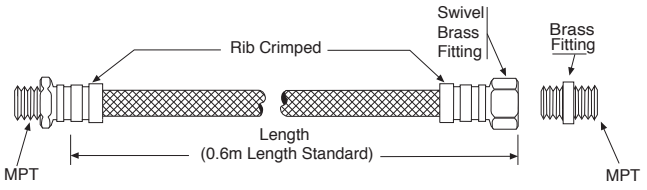
**CAUTION!** Piping must comply with all applicable codes.

**Table 1: Metal Hose Minimum Bend Radii**

| Hose Diameter | Minimum Bend Radii |
|---|---|
| 1/2" [12.7mm] | 2-1/2" [6.4cm] |
| 3/4" [19.1mm] | 4" [10.2cm] |
| 1" [25.4mm] | 5-1/2" [14cm] |
| 1-1/4" [31.8mm] | 6-3/4" [17.1cm] |

**NOTICE! Do not allow hoses to rest against structural building components. Compressor vibration may be transmitted through the hoses to the structure, causing unnecessary noise complaints.**

**Figure 11: Supply/Return Hose Kit**



# Water-Loop Heat Pump Applications

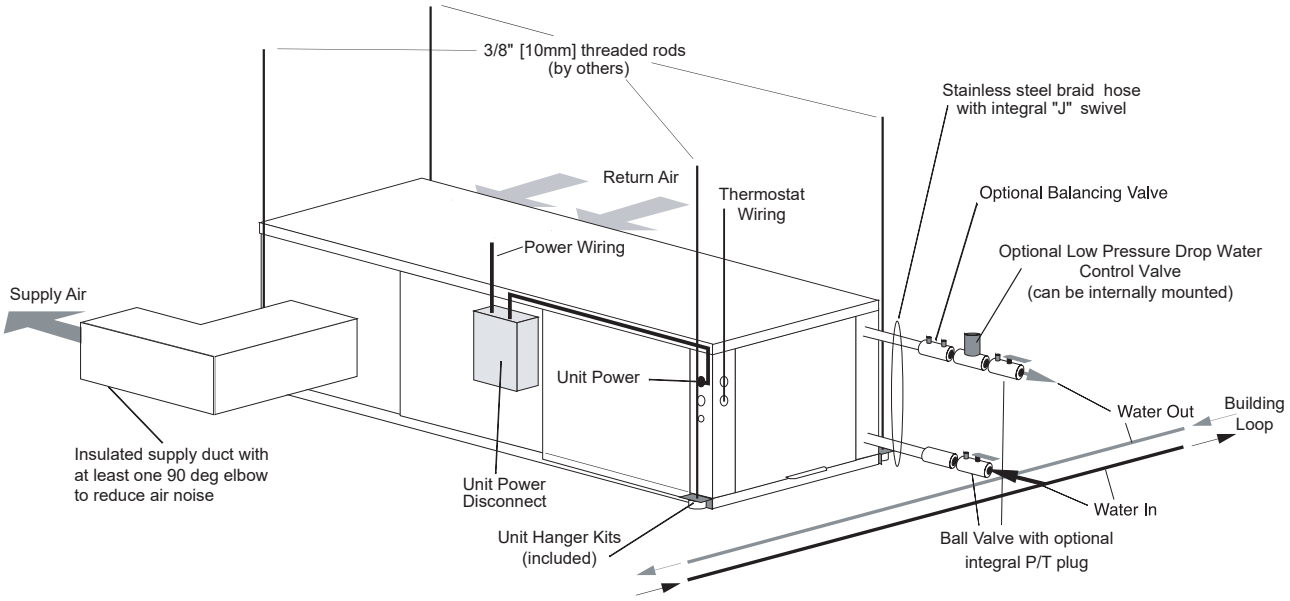
**Commercial Water Loop Applications**
Commercial systems typically include a number of units connected to a common piping system. Any unit plumbing maintenance work can introduce air into the piping system; therefore air elimination equipment is a major portion of the mechanical room plumbing. Consideration should be given to insulating the piping surfaces to avoid condensation. ClimateMaster recommends unit insulation any time the water temperature is expected to be below 60ºF (15.6ºC). Metal to plastic threaded joints should never be used due to their tendency to leak over time.

Teflon® tape thread sealant is recommended to minimize internal fouling of the heat exchanger. Do not over tighten connections and route piping so as not to interfere with service or maintenance access. Hose kits are available from ClimateMaster in different configurations as shown in Figure 12 for connection between the unit and the piping system. Depending upon selection, hose kits may include shut off valves, P/T plugs for performance measurement, high pressure stainless steel braided hose, "Y" type strainer with blow down valve, and/or "J" type swivel connection. Balancing valves and an external low pressure drop solenoid valve for use in variable speed pumping systems may also be included in the hose kit.

The piping system should be flushed to remove dirt, piping chips, and other foreign material prior to operation (see "Piping System Cleaning and Flushing Procedures" in this manual). The flow rate is usually set between 2.25 and 3.5 gpm per ton [2.9 and 4.5 l/m per kW] of cooling capacity. ClimateMaster recommends 3 gpm per ton [3.9 l/m per kW] for most applications of water loop heat pumps. To ensure proper maintenance and servicing, P/T ports are imperative for temperature and flow verification, as well as performance checks.

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

**Figure 12: Typical Water-Loop Application**




**Low Water Temperature Cutout Setting - CXM Control**
When antifreeze is selected, the LT1 jumper (JW3) should be clipped to select the low temperature (antifreeze 10.0°F [-12.2°C]) setpoint and avoid nuisance faults (see "Low Water Temperature Cutout Selection" in this manual). **Note: Low water temperature operation requires extended range equipment.**

# Ground-Loop Heat Pump Applications

**⚠ 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.

**⚠ CAUTION! ⚠**

**CAUTION!** Ground loop applications require extended range equipment and optional refrigerant/water circuit insulation.

### 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 Figure 13. All earth loop piping materials should be limited to polyethylene fusion only for in-ground sections of the loop. 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 earth coupled applications. A flanged fitting should be substituted. P/T plugs should be used so that flow can be measured using the pressure drop of the unit heat exchanger.

Earth loop temperatures can range between 25 and 110°F [-4 to 43°C]. Flow rates between 2.25 and 3 gpm [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. Do not exceed the pipe pressure rating. Test entire system when all loops are assembled.

### Flushing the Earth Loop

Upon completion of system installation and testing, flush the system to remove all foreign objects and purge to remove all air.

### Antifreeze

In areas where minimum entering loop temperatures drop below 40°F [5°C] or where piping will be routed through areas subject to freezing, antifreeze is required. Alcohols and glycols are commonly used as antifreeze; however your local sales office should be consulted to determine the antifreeze best suited to your area. Freeze protection should be maintained to 15°F [9°C] below the lowest expected entering loop temperature. For example, if 30°F [-1°C] is the minimum expected entering loop temperature, the leaving loop temperature would be 22 to 25°F [-6 to -4°C] and freeze protection should be at 15°F [-10°C].

Calculation is as follows:
30°F - 15°F = 15°F [-1°C - 9°C = -10°C].

All alcohols should be premixed and pumped from a reservoir outside of the building when possible or introduced under the water level to prevent fumes. Calculate the total volume of fluid in the piping system. Then use the percentage by volume shown in table 2 for the amount of antifreeze needed. Antifreeze concentration should be checked from a well mixed sample using a hydrometer to measure specific gravity.

### Low Water Temperature Cutout Setting - CXM Control

When antifreeze is selected, the LT1 jumper (JW3) should be clipped to select the low temperature (antifreeze 10.0°F [-12.2°C]) setpoint and avoid nuisance faults (see “Low Water Temperature Cutout Selection” in this manual). **Note: Low water temperature operation requires extended range equipment.**

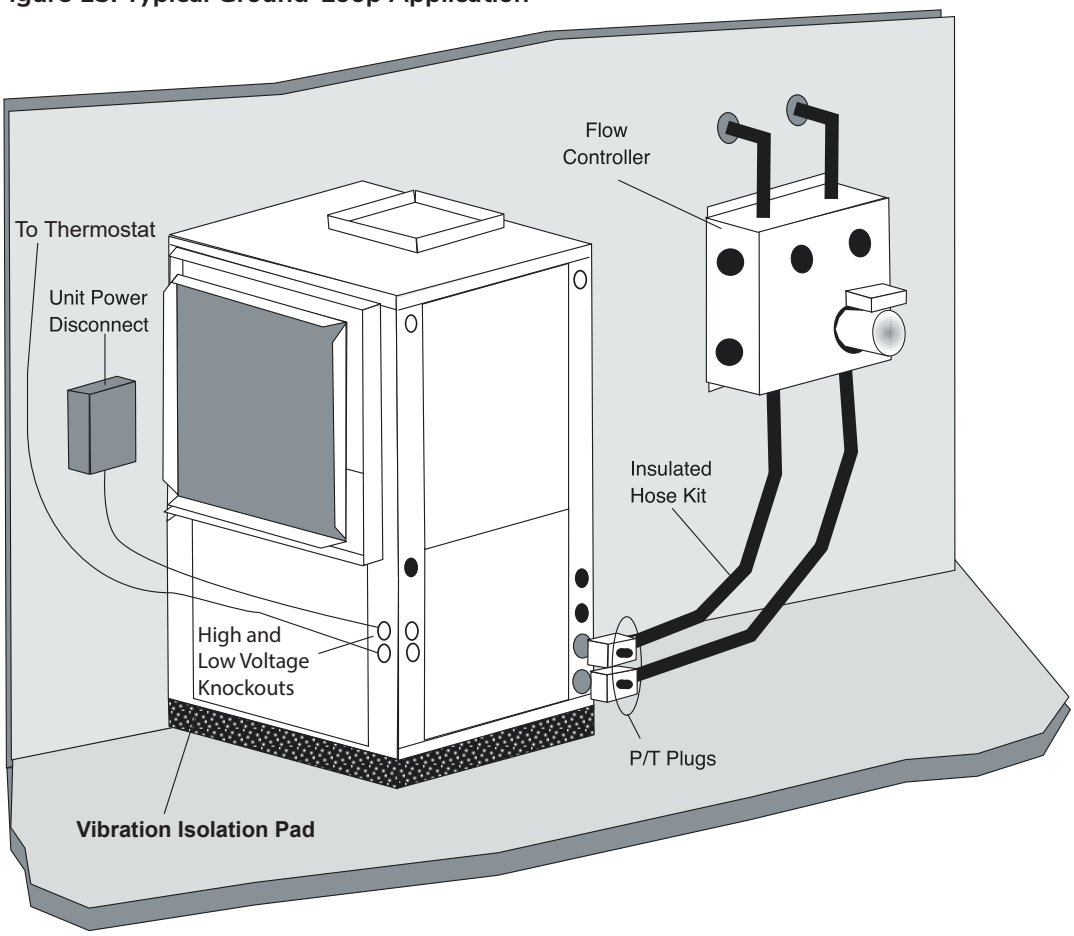
**Table 2: Antifreeze Percentages by Volume**

| 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 | 25% | 21% | 16% | 10% |
| 100% USP food grade Propylene Glycol | 38% | 25% | 22% | 15% |
| Ethanol* | 29% | 25% | 20% | 14% |

* Must not be denatured with any petroleum based product

# Ground-Loop Heat Pump Applications, Cont'd.

**Figure 13: Typical Ground-Loop Application**



# Ground-Water Heat Pump Applications

**Open Loop** - Ground Water Systems - Typical open loop piping is shown in Figure 14. Shut off valves should be included for ease of servicing. Boiler drains or other valves should be "tee'd" into the lines to allow acid flushing of the heat exchanger. Shut off valves should be positioned to allow flow through the coax via the boiler drains without allowing flow into the piping system. P/T plugs should be used so that pressure drop and temperature can be measured. Supply and return water piping materials should be limited to copper, PE, or similar material. PVC or CPVC should never be used as they are incompatible with the POE oils used in HFC-410A products and piping system failure and property damage may result.

**⚠ 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.

Water quantity should be plentiful and of good quality. Consult table 3 for water quality guidelines. The unit can be ordered with either a copper or cupro-nickel water heat exchanger. Consult Table 3 for recommendations. Copper is recommended for closed loop systems and open loop ground water systems that are not high in mineral content or corrosiveness. In conditions anticipating heavy scale formation or in brackish water, a cupro-nickel heat exchanger is recommended. In ground water situations where scaling could be heavy or where biological growth such as iron bacteria will be present, an open loop system is not recommended. Heat exchanger coils may over time lose heat exchange capabilities due to build up of mineral deposits. Heat exchangers must only be serviced by a qualified technician, as acid and special pumping equipment is required. Desuperheater coils can likewise become scaled and possibly plugged. In areas with extremely hard water, the owner should be informed that the heat exchanger may require occasional acid flushing. In some cases, the desuperheater option should not be recommended due to hard water conditions and additional maintenance required.

**Water Quality Standards** - Table 3 should be consulted for water quality requirements. Scaling potential should be assessed using the pH/Calcium hardness method. If the pH <7.5 and the calcium hardness is less than 100 ppm, scaling potential is low. If this method yields numbers out of range of those listed, the Ryznar Stability and Langelier Saturation indecies should be calculated. Use the appropriate scaling surface temperature for the application, 150°F [66°C] for direct use (well water/open loop) and DHW (desuperheater); 90°F [32°F] for indirect use. A monitoring plan should be implemented in these probable scaling situations. Other water quality issues such as iron fouling, corrosion prevention and erosion and clogging should be referenced in Table 3.

**Expansion Tank and Pump** - Use a closed, bladder-type expansion tank to minimize mineral formation due to air exposure. The expansion tank should be sized to provide at least one minute continuous run time of the pump using its drawdown capacity rating to prevent pump short cycling. Discharge water from the unit is not contaminated in any manner and can be disposed of in various ways, depending on local building codes (e.g. recharge well, storm sewer, drain field, adjacent stream or pond, etc.). Most local codes forbid the use of sanitary sewer for disposal. Consult your local building and zoning department to assure compliance in your area.

**Water Control Valve** - Note the placement of the water control valve in Figure 14. Always maintain water pressure in the heat exchanger by placing the water control valve(s) on the discharge line to prevent mineral precipitation during the off-cycle. Pilot operated slow closing valves are recommended to reduce water hammer. If water hammer persists, a mini-expansion tank can be mounted on the piping to help absorb the excess hammer shock. Ensure that the total 'VA' draw of the valve can be supplied by the unit transformer. For instance, a slow closing valve can draw up to 35VA. This can overload smaller 40 or 50 VA transformers depending on the other controls in the circuit. A typical pilot operated solenoid valve draws approximately 15VA (see Figure 19). Note the special wiring diagrams for slow closing valves (Figures 20 & 21).

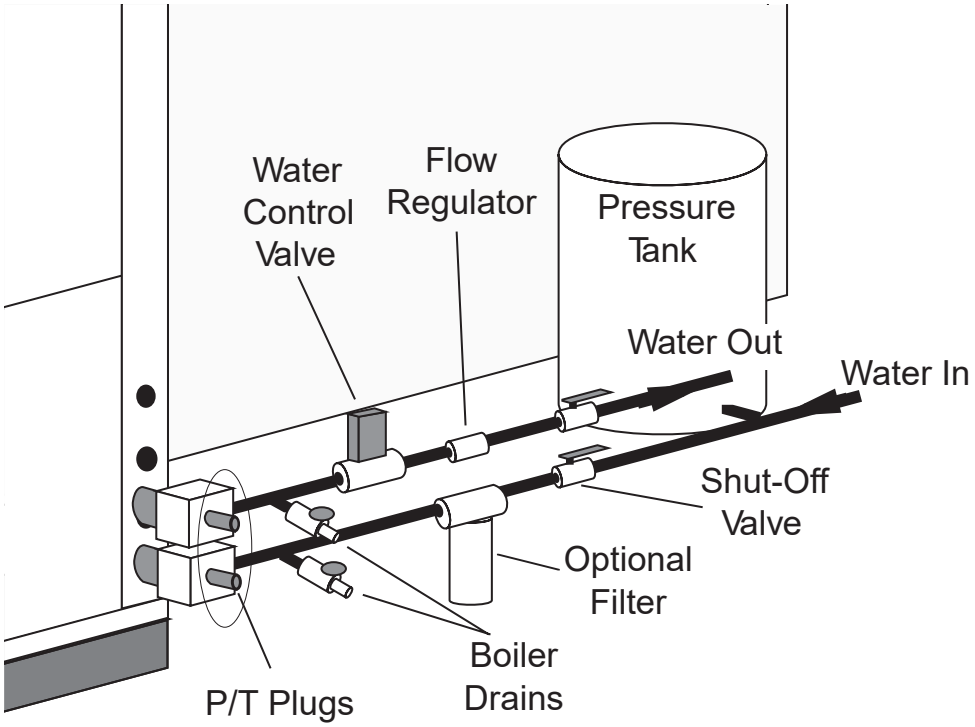
## Ground-Water Heat Pump Applications, Cont'd.

**Flow Regulation** - Flow regulation can be accomplished by two methods. One method of flow regulation involves simply adjusting the ball valve or water control valve on the discharge line. Measure the pressure drop through the unit heat exchanger, and determine flow rate from Table 9. Since the pressure is constantly varying, two pressure gauges may be needed. Adjust the valve until the desired flow of 1.5 to 2 gpm per ton [2.0 to 2.6 l/m per kW] is achieved. A second method of flow control requires a flow control device mounted on the outlet of the water control valve. The device is typically a brass fitting with an orifice of rubber or plastic material that is designed to allow a specified flow rate. On occasion, flow control devices may produce velocity noise that can be reduced by applying some back pressure from the ball valve located on the discharge line. Slightly closing the valve will spread the pressure drop over both devices, lessening the velocity noise.

**Note: When EWT is below 50°F [10°C], 2 gpm per ton (2.6 l/m per kW) is required.**

**Water Coil Low Temperature Limit Setting** - For all open loop systems the 30°F [-1.1°C] LT1 setting (factory setting-water) should be used to avoid freeze damage to the unit. See "Low Water Temperature Cutout Selection" in this manual for details on the low limit setting.

**Figure 14: Typical Open Loop/Well Application**



# Water Quality Standards

**Table 3: Water Quality Standards**

Clean water is essential to the performance and life span of water source heat pumps. Contaminants, chemicals, and minerals all have the potential to cause damage to the water heat heat exchanger if not treated properly. All closed water loop systems should undergo water quality testing and be maintained to the water quality standards listed in this table.

**CLIMATEMASTER WATER QUALITY STANDARDS**

**For Closed-Loop and Open-Loop Systems**

| | | | | Heat Exchanger Type | | | |
|---|---|---|---|---|---|---|---|
| | | | | Closed Loop Recirculating | Open Loop, Tower, Ground Source Well | | |
| | Description | Symbol | Units | All Heat Exchanger Types | COAXIAL HX Copper Tube in Tube | COAXIAL HX Cupronickel | Brazed Plate HX 316 SS |
| Scaling Potential | pH - Chilled Water <85°F | | | 7.0 to 9.0 | 7.0 to 9.0 | 7.0 to 9.0 | 7.0 to 9.0 |
| | pH - Heated Water >85°F | | | 8.0 to 10.0 | 8.0 to 10.0 | 8.0 to 10.0 | 8.0 to 10.0 |
| | Alkalinity | ($HCO3^-$) | ppm - $CaCO_3$ equiv. | 50 to 500 | 50 to 500 | 50 to 500 | 50 to 500 |
| | Calcium | (Ca) | ppm | <100 | <100 | <100 | <100 |
| | Magnesium | (Mg) | ppm | <100 | <100 | <100 | <100 |
| | Total Hardness | (CaCO3) | ppm - CaCO3 equiv. | 30 to 150 | 150 to 450 | 150 to 450 | 150 to 450 |
| | Langelier Saturation Index | LSI | | -0.5 to +0.5 | -0.5 to +0.5 | -0.5 to +0.5 | -0.5 to +0.5 |
| | Ryznar Stability Index | RSI | | 6.5 to 8.0 | 6.5 to 8.0 | 6.5 to 8.0 | 6.5 to 8.0 |
| Corrosion Prevention | Total Dissolved Solids | (TDS) | ppm - $CaCO_3$ equiv. | <1000 | <1000 | <1000 | <1500 |
| | Sulfate | ($SO_4^{2-}$) | ppm | <200 | <200 | <200 | <200 |
| | Nitrate | ($NO_3^-$) | ppm | <100 | <100 | <100 | <100 |
| | Chlorine (free) | (Cl) | ppm | <0.5 | <0.5 | <0.5 | <0.5 |
| | Chloride (water < 80°F) | ($Cl^-$) | ppm | <20 | <20 | <150 | <150 |
| | Chloride (water > 120°F) | | ppm | <20 | <20 | <125 | <125 |
| | Hydrogen Sulfide[α] | ($H_2S$) | ppb | <0.5 | <0.5 | <0.5 | <0.5 |
| | Carbon Dioxide | ($CO_2$) | ppm | 0 | <50 | 10 to 50 | 10 to 50 |
| | Iron Oxide | (Fe) | ppm | <1.0 | <1.0 | <1.0 | <0.2 |
| | Manganese | (Mn) | ppm | < 0.4 | <0.4 | <0.4 | <0.4 |
| | Ammonia | ($NH_3$) | ppm | <0.05 | <0.1 | <0.1 | <0.1 |
| | Chloramine | ($NH_2CL$) | ppm | 0 | 0 | 0 | 0 |
| Fouling & Biological | Iron Bacteria | | cells/mL | 0 | 0 | 0 | 0 |
| | Slime Forming Bacteria | | cells/mL | 0 | 0 | 0 | 0 |
| | Sulfate reducing bacteria | | cells/mL | 0 | 0 | 0 | 0 |
| | Suspended Solids[β] | (TSS) | ppm | <10 | <10 | <10 | <10 |
| Electrolysis All HX types | Earth Ground Resistance[χ] | | Ohms | 0 | Consult NEC & local electrical codes for grounding requirements | | |
| | Electrolysis Voltage[δ] | | mV | <300 | Measure voltage internal water loop to HP ground | | |
| | Leakage Current[δ] | | mA | <15 | Measure current in water loop pipe | | |

Building Primary Electrical Ground to unit, must meet local diameter and penetration length requirements

Do not connect heat pump to steel pipe unless dissimilar materials are separated by using Di-electric unions. Galvanic corrosion of heat pump water pipe will occur.

# Water Quality Standards, Cont'd.

1. The ClimateMaster Water Quality Table provides water quality requirements for coaxial & brazed plate heat exchangers.
2. The water must be evaluated by an independent testing facility comparing site samples against this Table. When water properties are outside of these parameters, the water must either be treated by a professional water treatment specialist to bring the water quality within the boundaries of this specification, or an external secondary heat exchanger must be used to isolate the heat pump water system from the unsuitable water. Failure to do so will void the warranty of the heat pump system and will limit liability for damage caused by leaks or system failure.
3. Regular sampling, testing and treatment of the water is necessary to assure that the water quality remains within acceptable levels thereby allowing the heat pump to operate at optimum levels.
4. If closed-loop systems are turned off for extended periods, water samples must be tested prior to operating the system.
5. For optimal performance, it is recommended that the closed-loop piping systems are initially filled with de-ionized water.
6. Well water with chemistry outside of these boundaries, and salt water or brackish water requires an external secondary heat exchanger. Surface/Pond water should not be used.
7. If water temperature is expected to fall below 40°F, antifreeze is required. Refer to the heat pump IOM for the correct solution ratios to prevent freezing.

| Strainer / Filter Sizing | | | |
|---|---|---|---|
| Mesh Size | Particle Size | | |
| | Microns | MM | Inch |
| 20 | 840 | 0.840 | 0.0340 |
| 30 | 533 | 0.533 | 0.0210 |
| 60 | 250 | 0.250 | 0.0100 |
| 100 | 149 | 0.149 | 0.0060 |
| 150 | 100 | 0.100 | 0.0040 |
| 200 | 74 | 0.074 | 0.0029 |

ppm = parts per million
ppb = parts per billion

α Hydrogen Sulfide has an odor of rotten eggs. If one detects this smell, a test for H2S must be performed. If H2S is detected above the limit indicated, remediation is necessary (Consult with your Water Testing/Treatment Professional) or a secondary heat exchanger is required using appropriate materials as recommended by the heat exchanger supplier.

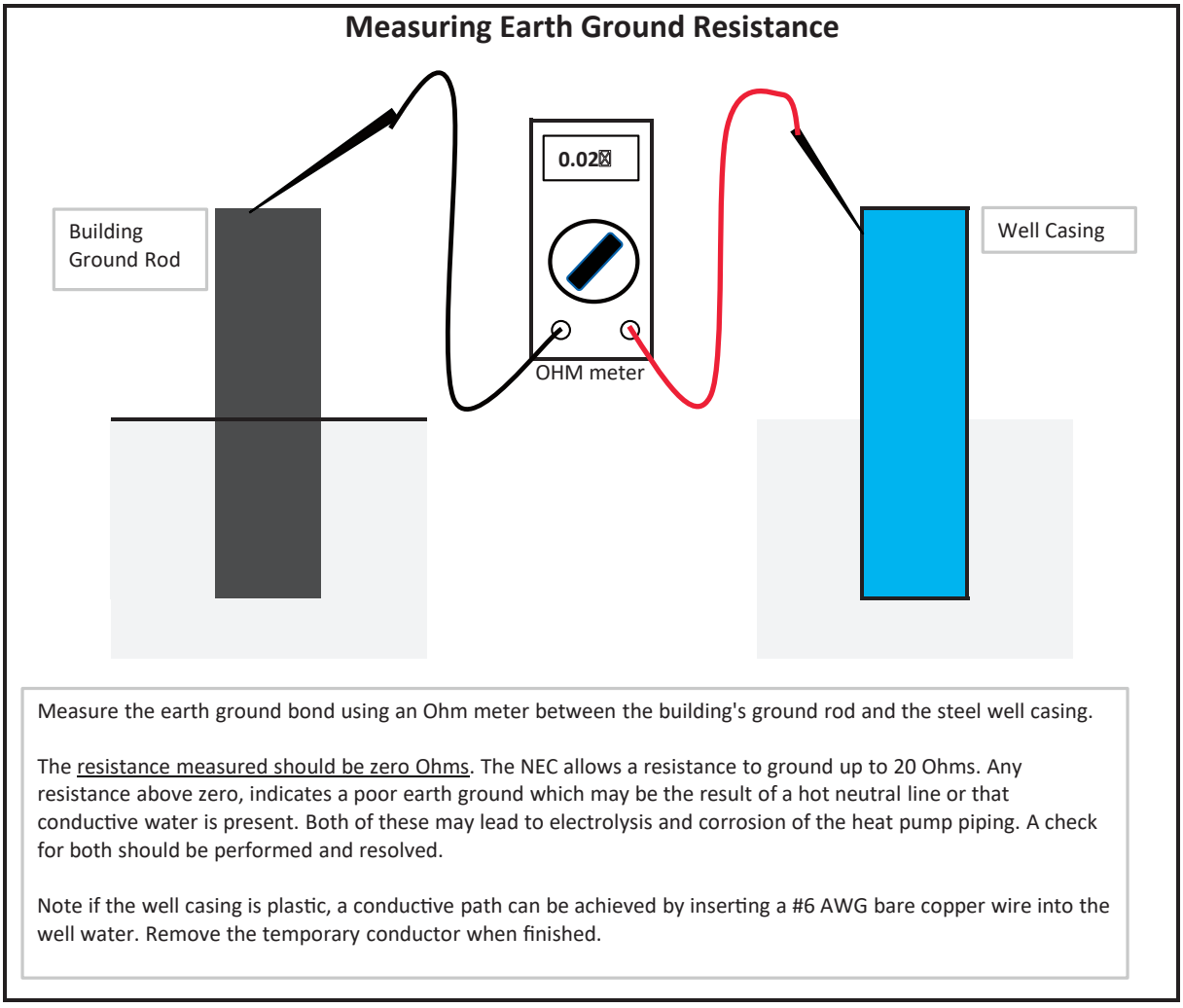
β Suspended solids and particulates must be filtered to prevent fouling and failure of heat exchangers. Strainers or particulate filters must be installed to provide a maximum particle size of 600 micron (0.60 mm, 0.023 in.) using a 20 to 30 mesh screen size. When a loop is installed in areas with fine material such as sand or clay, further filtration is required to a maximum of 100 micron. Refer to the Strainer / Filter Sizing Chart to capture the particle sizes encountered on the site.

χ An electrical grounding system using a dedicated ground rod meeting NEC and Local Electrical codes must be installed. Building Ground must not be connected the WSHP piping system or other plumbing pipes.

δ Refer to IOM for instructions on measuring resistance and leakage currents within water loops.

**Do not use PVC pipe for water loop (compressor POE oil and glycols damage PVC) use of HDPE pipe is recommended.**

# Water Quality Standards, Cont'd.



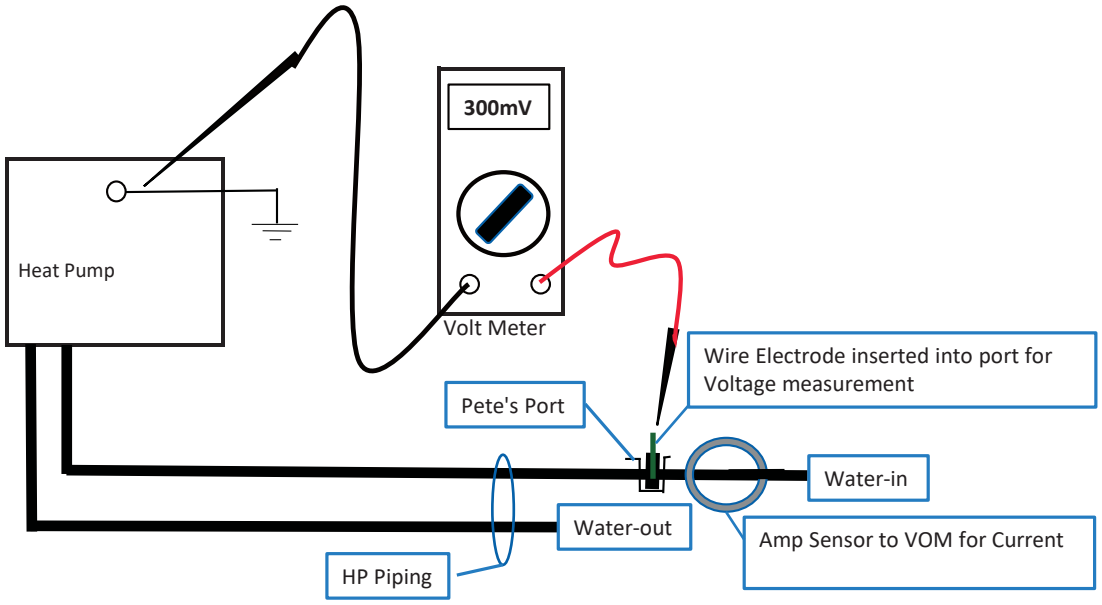

Measure the earth ground bond using an Ohm meter between the building's ground rod and the steel well casing.

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

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

# Water Quality Standards, Cont'd.

## Measuring Electrolysis Voltage and Current




Measure the electrolysis voltage using a volt meter between the heat pump ground and a #14 AWG solid copper wire electrode inserted into the water using a Pete's style access port.
The HP must be operating and the water stream flowing.

The voltage measured should be less that 300mV (0.300 V). If higher than 500mV electrolysis will occur and corrosion will result.

If voltage is measured, the cause is a high resistance earth ground or current on the neutral conductor. Remedial measures should be performed.

Measure the current flowing through the piping system by using an amp clamp probe on the water-in line. The HP must be operating and the water stream flowing.

There should be zero amps measured. If current is present, there is leakage current to the plumbing system and it must be rectified to prevent pipe corrosion.

# Electrical – Line Voltage

**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.

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

**⚠ 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.

# Electrical Data – Standard Unit – PSC Blower

| TR Commercial Electrical Table | | | | | | | STANDARD PSC | | | | HI STATIC PSC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MODEL | VOLTAGE CODE | RATED VOLTAGE | VOLTAGE MIN/MAX | COMPRESSOR | | | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR |
| | | | | QTY | RLA | LRA | | | | | | | | |
| 006 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 2.6 | 17.7 | 0.3 | 2.9 | 3.6 | 15A | | | | |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 2.6 | 13.5 | 0.4 | 3.0 | 3.6 | 15A | | | | |
| 009 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 3.7 | 22 | 0.8 | 4.5 | 5.5 | 15A | | | | |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 3.4 | 17.5 | 0.8 | 4.2 | 5.1 | 15A | | | | |
| 012 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 32.5 | 0.8 | 6.4 | 7.8 | 15A | | | | |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 4.2 | 31.5 | 0.8 | 5.0 | 6.1 | 15A | | | | |
| 015 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 29 | 0.9 | 6.5 | 7.9 | 15A | 0.9 | 6.5 | 7.9 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 5.0 | 28 | 0.7 | 5.7 | 7.0 | 15A | 0.7 | 5.7 | 7.0 | 15A |
| 018 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 7.4 | 33 | 0.9 | 8.3 | 10.2 | 15A | 0.9 | 8.3 | 10.2 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 6.0 | 28 | 0.7 | 6.7 | 8.2 | 15A | 0.7 | 6.7 | 8.2 | 15A |
| 024 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 12.8 | 58.3 | 1.5 | 14.3 | 17.5 | 30A | 2.7 | 15.5 | 18.7 | 30A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 9.6 | 54 | 1.2 | 10.8 | 13.2 | 20A | 2.9 | 12.5 | 14.9 | 20A |
| | F | 460 / 60 / 3 | 414 / 506 | 1 | 3.6 | 28 | 1.4 | 5.0 | 5.9 | 15A | 1.6 | 5.2 | 6.1 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 7.7 | 55.4 | 1.5 | 9.2 | 11.1 | 15A | 2.7 | 10.4 | 12.3 | 20A |
| 030 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 14.1 | 73 | 2.7 | 16.8 | 20.3 | 30A | 2.7 | 16.8 | 20.3 | 30A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 11.2 | 60 | 2.9 | 14.1 | 16.9 | 25A | 2.9 | 14.1 | 16.9 | 25A |
| | F | 460 / 60 / 3 | 414 / 506 | 1 | 4.2 | 28 | 1.6 | 5.8 | 6.9 | 15A | 1.6 | 5.8 | 6.9 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 8.9 | 58 | 2.7 | 11.6 | 13.8 | 20A | 2.7 | 11.6 | 13.8 | 20A |
| 036 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 16.7 | 79 | 2.7 | 19.4 | 23.6 | 40A | 2.7 | 19.4 | 23.6 | 40A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 13.5 | 72 | 2.0 | 15.5 | 18.9 | 30A | 2.9 | 16.4 | 19.8 | 30A |
| | F | 460 / 60 / 3 | 414 / 506 | 1 | 5.8 | 38 | 1.2 | 7.0 | 8.5 | 15A | 1.6 | 7.4 | 8.9 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 10.4 | 73 | 2.7 | 13.1 | 15.7 | 25A | 2.7 | 13.1 | 15.7 | 25A |
| 042 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 17.9 | 112 | 2.7 | 20.6 | 25.1 | 40A | 2.7 | 20.6 | 25.1 | 40A |
| | F | 460 / 60 / 3 | 414 / 506 | 1 | 6.0 | 44 | 1.6 | 7.6 | 9.1 | 15A | 1.6 | 7.6 | 9.1 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.5 | 88 | 2.7 | 16.2 | 19.6 | 30A | 2.7 | 16.2 | 19.6 | 30A |
| | N | 575 / 60 / 3 | 517.5 / 632.5 | 1 | 4.9 | 34 | 1.4 | 6.3 | 7.5 | 15A | 1.4 | 6.3 | 7.5 | 15A |
| 048 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 21.8 | 117 | 3.3 | 25.1 | 30.6 | 50A | 4.8 | 26.6 | 32.1 | 50A |
| | F | 460 / 60 / 3 | 414 / 506 | 1 | 6.2 | 41 | 1.7 | 7.9 | 9.5 | 15A | 2.4 | 8.6 | 10.2 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.7 | 83.1 | 3.3 | 17.0 | 20.4 | 30A | 4.8 | 18.5 | 21.9 | 35A |
| | N | 575 / 60 / 3 | 517.5 / 632.5 | 1 | 4.8 | 33 | 1.4 | 6.2 | 7.4 | 15A | 1.8 | 6.6 | 7.8 | 15A |
| 060 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 26.3 | 134 | 4.8 | 31.1 | 37.7 | 60A | 5.7 | 32.0 | 38.6 | 60A |
| | F | 460 / 60 / 3 | 414 / 506 | 1 | 7.8 | 52 | 2.4 | 10.2 | 12.2 | 15A | 2.5 | 10.3 | 12.3 | 20A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 15.6 | 110 | 4.8 | 20.4 | 24.3 | 40A | 5.7 | 21.3 | 25.2 | 40A |
| | N | 575 / 60 / 3 | 517.5 / 632.5 | 1 | 5.8 | 38.9 | 1.8 | 7.6 | 9.1 | 15A | 1.9 | 7.7 | 9.2 | 15A |

460 volt units require a neutral connection. All "F" voltage units with constant volume ECM require a four wire power supply with neutral. Motors are 265 volt and are wired between one hot leg and neutral.
All fuses Class RK-5

Tranquility® (TR) Series

Rev.: October 5, 2021

# Electrical Data – Internal Secondary Pump – PSC Blower

| TR Commercial Electrical Table W/ ISP | | | | | | | | STANDARD PSC | | | | HI STATIC PSC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MODEL | VOLTAGE CODE | RATED VOLTAGE | VOLTAGE MIN/MAX | COMPRESSOR | | | PUMP FLA | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR |
| | | | | QTY | RLA | LRA | | | | | | | | | |
| 006 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 2.6 | 17.7 | 0.4 | 0.3 | 3.3 | 4.0 | 15A | | | | |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 2.6 | 13.5 | 0.7 | 0.4 | 3.7 | 4.3 | 15A | | | | |
| 009 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 3.7 | 22 | 0.4 | 0.8 | 4.9 | 5.9 | 15A | | | | |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 3.4 | 17.5 | 0.7 | 0.8 | 4.9 | 5.8 | 15A | | | | |
| 012 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 32.5 | 0.8 | 0.8 | 7.2 | 8.6 | 15A | | | | |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 4.2 | 31.5 | 0.7 | 0.8 | 5.7 | 6.8 | 15A | | | | |
| 015 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 29 | 0.8 | 0.9 | 7.3 | 8.7 | 15A | 0.9 | 7.3 | 8.7 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 5.0 | 28 | 0.7 | 0.7 | 6.4 | 7.7 | 15A | 0.7 | 6.4 | 7.7 | 15A |
| 018 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 7.4 | 33 | 0.8 | 0.9 | 9.1 | 11.0 | 15A | 0.9 | 9.1 | 11.0 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 6.0 | 28 | 0.7 | 0.7 | 7.4 | 8.9 | 15A | 0.7 | 7.4 | 8.9 | 15A |
| 024 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 12.8 | 58.3 | 0.8 | 1.5 | 15.1 | 18.3 | 30A | 2.7 | 16.3 | 19.5 | 30A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 9.6 | 54 | 0.7 | 1.2 | 11.5 | 13.9 | 20A | 2.9 | 13.2 | 15.6 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 3.6 | 28 | 0.7 | 1.4 | 5.7 | 6.6 | 15A | 1.6 | 5.9 | 6.8 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 7.7 | 55.4 | 0.8 | 1.5 | 10.0 | 11.9 | 15A | 2.7 | 11.2 | 13.1 | 20A |
| 030 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 14.1 | 73 | 0.8 | 2.7 | 17.6 | 21.1 | 35A | 2.7 | 17.6 | 21.1 | 35A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 11.2 | 60 | 0.7 | 2.9 | 14.8 | 17.6 | 25A | 2.9 | 14.8 | 17.6 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 4.2 | 28 | 0.7 | 1.6 | 6.5 | 7.6 | 15A | 1.6 | 6.5 | 7.6 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 8.9 | 58 | 0.8 | 2.7 | 12.4 | 14.6 | 20A | 2.7 | 12.4 | 14.6 | 20A |
| 036 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 16.7 | 79 | 0.8 | 2.7 | 20.2 | 24.4 | 40A | 2.7 | 20.2 | 24.4 | 40A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 13.5 | 72 | 0.7 | 2.0 | 16.2 | 19.6 | 30A | 2.9 | 17.1 | 20.5 | 30A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 5.8 | 38 | 0.7 | 1.2 | 7.7 | 9.2 | 15A | 1.6 | 8.1 | 9.6 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 10.4 | 73 | 0.8 | 2.7 | 13.9 | 16.5 | 25A | 2.7 | 13.9 | 16.5 | 25A |
| 042 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 17.9 | 112 | 0.8 | 2.7 | 21.4 | 25.9 | 40A | 2.7 | 21.4 | 25.9 | 40A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.0 | 44 | 0.7 | 1.6 | 8.3 | 9.8 | 15A | 1.6 | 8.3 | 9.8 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.5 | 88 | 0.8 | 2.7 | 17.0 | 20.4 | 30A | 2.7 | 17.0 | 20.4 | 30A |
| 048 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 21.8 | 117 | 1.1 | 3.3 | 26.2 | 31.7 | 50A | 4.8 | 27.7 | 33.2 | 50A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.2 | 41 | 1.3 | 1.7 | 9.2 | 10.8 | 15A | 2.4 | 9.9 | 11.5 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.7 | 83.1 | 1.1 | 3.3 | 18.1 | 21.5 | 35A | 4.8 | 19.6 | 23.0 | 35A |
| 060 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 26.3 | 134 | 1.1 | 4.8 | 32.2 | 38.8 | 60A | 5.7 | 33.1 | 39.7 | 60A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 7.8 | 52 | 1.3 | 2.4 | 11.5 | 13.5 | 20A | 2.5 | 11.6 | 13.6 | 20A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 15.6 | 110 | 1.1 | 4.8 | 21.5 | 25.4 | 40A | 5.7 | 22.4 | 26.3 | 40A |

** 460 volt units require a neutral for the Internal Secondary Pump

# Electrical Data with ClimaDry® – PSC Blower

| TR Condenser Water Reheat Commercial Electrical Table | | | | | | | | STANDARD PSC | | | | HI STATIC PSC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MODEL | VOLTAGE CODE | RATED VOLTAGE | VOLTAGE MIN/MAX | COMPRESSOR | | | PUMP FLA | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR |
| | | | | QTY | RLA | LRA | | | | | | | | | |
| 024 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 12.8 | 58.3 | 0.8 | 1.5 | 15.1 | 18.3 | 30A | 2.7 | 16.3 | 19.5 | 30A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 9.6 | 54 | 0.7 | 1.2 | 11.5 | 13.9 | 20A | 2.9 | 13.2 | 15.6 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 3.6 | 28 | 0.7 | 1.4 | 5.7 | 6.6 | 15A | 1.6 | 5.9 | 6.8 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 7.7 | 55.4 | 0.8 | 1.5 | 10.0 | 11.9 | 15A | 2.7 | 11.2 | 13.1 | 20A |
| 030 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 14.1 | 73 | 0.8 | 2.7 | 17.6 | 21.1 | 35A | 2.7 | 17.6 | 21.1 | 35A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 11.2 | 60 | 0.7 | 2.9 | 14.8 | 17.6 | 25A | 2.9 | 14.8 | 17.6 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 4.2 | 28 | 0.7 | 1.6 | 6.5 | 7.6 | 15A | 1.6 | 6.5 | 7.6 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 8.9 | 58 | 0.8 | 2.7 | 12.4 | 14.6 | 20A | 2.7 | 12.4 | 14.6 | 20A |
| 036 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 16.7 | 79 | 0.8 | 2.7 | 20.2 | 24.4 | 40A | 2.7 | 20.2 | 24.4 | 40A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 13.5 | 72 | 0.7 | 2.0 | 16.2 | 19.6 | 30A | 2.9 | 17.1 | 20.5 | 30A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 5.8 | 38 | 0.7 | 1.2 | 7.7 | 9.2 | 15A | 1.6 | 8.1 | 9.6 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 10.4 | 73 | 0.8 | 2.7 | 13.9 | 16.5 | 25A | 2.7 | 13.9 | 16.5 | 25A |
| 042 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 17.9 | 112 | 0.8 | 2.7 | 21.4 | 25.9 | 40A | 2.7 | 21.4 | 25.9 | 40A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.0 | 44 | 0.7 | 1.6 | 8.3 | 9.8 | 15A | 1.6 | 8.3 | 9.8 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.5 | 88 | 0.8 | 2.7 | 17.0 | 20.4 | 30A | 2.7 | 17.0 | 20.4 | 30A |
| 048 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 21.8 | 117 | 1.1 | 3.3 | 26.2 | 31.7 | 50A | 4.8 | 27.7 | 33.2 | 50A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.2 | 41 | 1.3 | 1.7 | 9.2 | 10.8 | 15A | 2.4 | 9.9 | 11.5 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.7 | 83.1 | 1.1 | 3.3 | 18.1 | 21.5 | 35A | 4.8 | 19.6 | 23.0 | 35A |
| 060 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 26.3 | 134 | 1.1 | 4.8 | 32.2 | 38.8 | 60A | 5.7 | 33.1 | 39.7 | 60A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 7.8 | 52 | 1.3 | 2.4 | 11.5 | 13.5 | 20A | 2.5 | 11.6 | 13.6 | 20A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 15.6 | 110 | 1.1 | 4.8 | 21.5 | 25.4 | 40A | 5.7 | 22.4 | 26.3 | 40A |

**** 460 volt units with ClimaDry Require a Neutral**

# Electrical Data – ECM Blower

| TR Commercial Electrical Table | | | | | | | ECM-CV** | | | | ECM-CT | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MODEL | VOLTAGE CODE | RATED VOLTAGE | VOLTAGE MIN/MAX | COMPRESSOR | | | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR |
| | | | | QTY | RLA | LRA | | | | | | | | |
| 006 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 2.6 | 17.7 | 1.5 | 4.1 | 4.8 | 15A | 2.3 | 4.9 | 5.6 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 2.6 | 13.5 | 1.4 | 4.0 | 4.7 | 15A | 2.3 | 4.9 | 5.6 | 15A |
| 009 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 3.7 | 22 | 1.5 | 5.2 | 6.1 | 15A | 2.3 | 6.0 | 6.9 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 3.4 | 17.5 | 1.4 | 4.8 | 5.7 | 15A | 2.3 | 5.7 | 6.6 | 15A |
| 012 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 32.5 | 2.6 | 8.2 | 9.6 | 15A | 2.3 | 7.9 | 9.3 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 4.2 | 31.5 | 2.5 | 6.7 | 7.8 | 15A | 2.3 | 6.5 | 7.6 | 15A |
| 015 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 29 | 2.6 | 8.2 | 9.6 | 15A | 2.6 | 8.2 | 9.6 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 5.0 | 28 | 2.4 | 7.4 | 8.7 | 15A | 1.9 | 6.9 | 8.2 | 15A |
| 018 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 7.4 | 33 | 2.6 | 10.0 | 11.9 | 15A | 2.6 | 10.0 | 11.9 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 6.0 | 28 | 2.4 | 8.4 | 9.9 | 15A | 1.9 | 7.9 | 9.4 | 15A |
| 024 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 12.8 | 58.3 | 3.9 | 16.7 | 19.9 | 30A | 3.9 | 16.7 | 19.9 | 30A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 9.6 | 54 | 3.2 | 12.8 | 15.2 | 20A | 3.2 | 12.8 | 15.2 | 20A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 3.6 | 28 | 3.2 | 6.8 | 7.7 | 15A | 1.1 | 4.7 | 5.6 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 7.7 | 55.4 | 3.9 | 11.6 | 13.5 | 20A | 3.9 | 11.6 | 13.5 | 20A |
| 030 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 14.1 | 73 | 3.9 | 18.0 | 21.5 | 35A | 3.9 | 18.0 | 21.5 | 35A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 11.2 | 60 | 3.2 | 14.4 | 17.2 | 25A | 3.2 | 14.4 | 17.2 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 4.2 | 28 | 3.2 | 7.4 | 8.5 | 15A | 1.1 | 5.3 | 6.4 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 8.9 | 58 | 3.9 | 12.8 | 15.0 | 20A | 3.9 | 12.8 | 15.0 | 20A |
| 036 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 16.7 | 79 | 6.0 | 22.7 | 26.9 | 40A | 6.0 | 22.7 | 26.9 | 40A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 13.5 | 72 | 4.8 | 18.3 | 21.7 | 35A | 3.9 | 17.4 | 20.8 | 30A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 5.8 | 38 | 4.8 | 10.6 | 12.1 | 15A | 1.5 | 7.3 | 8.8 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 10.4 | 73 | 6.0 | 16.4 | 19.0 | 25A | 6.0 | 16.4 | 19.0 | 25A |
| 042 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 17.9 | 112 | 6.0 | 23.9 | 28.4 | 45A | 6.0 | 23.9 | 28.4 | 45A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.0 | 44 | 4.8 | 10.8 | 12.3 | 15A | 1.5 | 7.5 | 9.0 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.5 | 88 | 6.0 | 19.5 | 22.9 | 35A | 6.0 | 19.5 | 22.9 | 35A |
| 048 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 21.8 | 117 | 7.5 | 29.3 | 34.8 | 50A | 7.5 | 29.3 | 34.8 | 50A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.2 | 41 | 6.2 | 12.4 | 14.0 | 15A | 2.1 | 8.3 | 9.9 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.7 | 83.1 | 7.5 | 21.2 | 24.6 | 35A | 7.5 | 21.2 | 24.6 | 35A |
| 060 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 26.3 | 134 | 7.5 | 33.8 | 40.4 | 60A | 7.5 | 33.8 | 40.4 | 60A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 7.8 | 52 | 6.0 | 13.8 | 15.8 | 20A | 2.1 | 9.9 | 11.9 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 15.6 | 110 | 7.5 | 23.1 | 27.0 | 40A | 7.5 | 23.1 | 27.0 | 40A |

** 460 volt units with Internal Secondary Pump and/or ECM-CV Require a Neutral

# Electrical Data – ECM Blower with Internal Secondary Pump

| TR Commercial Electrical Table W/ ISP | | | | | | | | ECM-CV** | | | | ECM-CT | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MODEL | VOLTAGE CODE | RATED VOLTAGE | VOLTAGE MIN/MAX | COMPRESSOR | | | PUMP FLA | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR |
| | | | | QTY | RLA | LRA | | | | | | | | | |
| 006 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 2.6 | 17.7 | 0.4 | 1.5 | 4.5 | 5.2 | 15A | 2.3 | 5.3 | 6.0 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 2.6 | 13.5 | 0.7 | 1.4 | 4.7 | 5.4 | 15A | 2.3 | 5.6 | 6.3 | 15A |
| 009 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 3.7 | 22 | 0.4 | 1.5 | 5.6 | 6.5 | 15A | 2.3 | 6.4 | 7.3 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 3.4 | 17.5 | 0.7 | 1.4 | 5.5 | 6.4 | 15A | 2.3 | 6.4 | 7.3 | 15A |
| 012 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 32.5 | 0.8 | 2.6 | 9.0 | 10.4 | 15A | 2.3 | 8.7 | 10.1 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 4.2 | 31.5 | 0.7 | 2.5 | 7.4 | 8.5 | 15A | 2.3 | 7.2 | 8.3 | 15A |
| 015 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 29 | 0.8 | 2.6 | 9.0 | 10.4 | 15A | 2.6 | 9.0 | 10.4 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 5.0 | 28 | 0.7 | 2.4 | 8.1 | 9.4 | 15A | 1.9 | 7.6 | 8.9 | 15A |
| 018 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 7.4 | 33 | 0.8 | 2.6 | 10.8 | 12.7 | 20A | 2.6 | 10.8 | 12.7 | 20A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 6.0 | 28 | 0.7 | 2.1 | 8.8 | 10.3 | 15A | 1.9 | 8.6 | 10.1 | 15A |
| 024 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 12.8 | 58.3 | 0.8 | 3.9 | 17.5 | 20.7 | 30A | 3.9 | 17.5 | 20.7 | 30A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 9.6 | 54 | 0.7 | 3.2 | 13.5 | 15.9 | 25A | 3.2 | 13.5 | 15.9 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 3.6 | 28 | 0.7 | 3.2 | 7.5 | 8.4 | 15A | 1.1 | 5.4 | 6.3 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 7.7 | 55.4 | 0.8 | 3.9 | 12.4 | 14.3 | 20A | 3.9 | 12.4 | 14.3 | 20A |
| 030 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 14.1 | 73 | 0.8 | 3.9 | 18.8 | 22.3 | 35A | 3.9 | 18.8 | 22.3 | 35A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 11.2 | 60 | 0.7 | 3.2 | 15.1 | 17.9 | 25A | 3.2 | 15.1 | 17.9 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 4.2 | 28 | 0.7 | 3.2 | 8.1 | 9.2 | 15A | 1.1 | 6.0 | 7.1 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 8.9 | 58 | 0.8 | 3.9 | 13.6 | 15.8 | 20A | 3.9 | 13.6 | 15.8 | 25A |
| 036 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 16.7 | 79 | 0.8 | 6.0 | 23.5 | 27.7 | 40A | 6.0 | 23.5 | 27.7 | 40A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 13.5 | 72 | 0.7 | 4.8 | 19.0 | 22.4 | 35A | 3.9 | 18.1 | 21.5 | 30A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 5.8 | 38 | 0.7 | 4.8 | 11.3 | 12.8 | 15A | 1.5 | 8.0 | 9.5 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 10.4 | 73 | 0.8 | 6.0 | 17.2 | 19.8 | 25A | 6.0 | 17.2 | 19.8 | 30A |
| 042 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 17.9 | 112 | 0.8 | 6.0 | 24.7 | 29.2 | 45A | 6.0 | 24.7 | 29.2 | 45A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.0 | 44 | 0.7 | 4.8 | 11.5 | 13.0 | 15A | 1.5 | 8.2 | 9.7 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.5 | 88 | 0.8 | 6.0 | 20.3 | 23.7 | 35A | 6.0 | 20.3 | 23.7 | 35A |
| 048 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 21.8 | 117 | 1.1 | 7.5 | 30.4 | 35.9 | 50A | 7.5 | 30.4 | 35.9 | 50A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.2 | 41 | 1.3 | 6.2 | 13.7 | 15.3 | 20A | 2.1 | 9.6 | 11.2 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.7 | 83.1 | 1.1 | 7.5 | 22.3 | 25.7 | 35A | 7.5 | 22.3 | 25.7 | 35A |
| 060 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 26.3 | 134 | 1.1 | 7.5 | 34.9 | 41.5 | 60A | 7.5 | 34.9 | 41.5 | 60A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 7.8 | 52 | 1.3 | 6.0 | 15.1 | 17.1 | 20A | 2.1 | 11.2 | 13.2 | 20A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 15.6 | 110 | 1.1 | 7.5 | 24.2 | 28.1 | 40A | 7.5 | 24.2 | 28.1 | 40A |

** 460 volt units with Internal Secondary Pump and/or ECM-CV Require a Neutral

# Electrical Data – ECM Blower with ClimaDry®

| TR Condenser Water Reheat Commercial Electrical Table | | | | | | | | ECM-CV** | | | | ECM-CT | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MODEL | VOLTAGE CODE | RATED VOLTAGE | VOLTAGE MIN/MAX | COMPRESSOR | | | PUMP FLA | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR |
| | | | | QTY | RLA | LRA | | | | | | | | | |
| 024 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 12.8 | 58.3 | 0.8 | 3.9 | 17.5 | 20.7 | 30A | 3.9 | 17.5 | 20.7 | 30A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 9.6 | 54 | 0.7 | 3.2 | 13.5 | 15.9 | 25A | 3.2 | 13.5 | 15.9 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 3.6 | 28 | 0.7 | 3.2 | 7.5 | 8.4 | 15A | 1.1 | 5.4 | 6.3 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 7.7 | 55.4 | 0.8 | 3.9 | 12.4 | 14.3 | 20A | 3.9 | 12.4 | 14.3 | 20A |
| 030 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 14.1 | 73 | 0.8 | 3.9 | 18.8 | 22.3 | 35A | 3.9 | 18.8 | 22.3 | 35A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 11.2 | 60 | 0.7 | 3.2 | 15.1 | 17.9 | 25A | 3.2 | 15.1 | 17.9 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 4.2 | 28 | 0.7 | 3.2 | 8.1 | 9.2 | 15A | 1.1 | 6.0 | 7.1 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 8.9 | 58 | 0.8 | 3.9 | 13.6 | 15.8 | 20A | 3.9 | 13.6 | 15.8 | 25A |
| 036 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 16.7 | 79 | 0.8 | 6.0 | 23.5 | 27.7 | 40A | 6.0 | 23.5 | 27.7 | 40A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 13.5 | 72 | 0.7 | 4.8 | 19.0 | 22.4 | 35A | 3.9 | 18.1 | 21.5 | 30A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 5.8 | 38 | 0.7 | 4.8 | 11.3 | 12.8 | 15A | 1.5 | 8.0 | 9.5 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 10.4 | 73 | 0.8 | 6.0 | 17.2 | 19.8 | 25A | 6.0 | 17.2 | 19.8 | 30A |
| 042 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 17.9 | 112 | 0.8 | 6.0 | 24.7 | 29.2 | 45A | 6.0 | 24.7 | 29.2 | 45A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.0 | 44 | 0.7 | 4.8 | 11.5 | 13.0 | 15A | 1.5 | 8.2 | 9.7 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.5 | 88 | 0.8 | 6.0 | 20.3 | 23.7 | 35A | 6.0 | 20.3 | 23.7 | 35A |
| 048 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 21.8 | 117 | 1.1 | 7.5 | 30.4 | 35.9 | 50A | 7.5 | 30.4 | 35.9 | 50A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.2 | 41 | 1.3 | 6.2 | 13.7 | 15.3 | 20A | 2.1 | 9.6 | 11.2 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.7 | 83.1 | 1.1 | 7.5 | 22.3 | 25.7 | 35A | 7.5 | 22.3 | 25.7 | 35A |
| 060 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 26.3 | 134 | 1.1 | 7.5 | 34.9 | 41.5 | 60A | 7.5 | 34.9 | 41.5 | 60A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 7.8 | 52 | 1.3 | 6.0 | 15.1 | 17.1 | 20A | 2.1 | 11.2 | 13.2 | 20A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 15.6 | 110 | 1.1 | 7.5 | 24.2 | 28.1 | 40A | 7.5 | 24.2 | 28.1 | 40A |

**** 460 volt units with CimaDry and/or ECM-CV Require a Neutral**

# Electrical Data – Hybrid Unit – ECM Blower

| TR Hydronic Heat Commercial Electrical Table | | | | | | | ECM-CV** | | | | ECM-CT | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MODEL | VOLTAGE CODE | RATED VOLTAGE | VOLTAGE MIN/MAX | COMPRESSOR | | | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR |
| | | | | QTY | RLA | LRA | | | | | | | | |
| 006 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 2.6 | 17.7 | 1.5 | 4.1 | 4.8 | 15A | 2.3 | 4.9 | 5.6 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 2.6 | 13.5 | 1.4 | 4.0 | 4.7 | 15A | 2.3 | 4.9 | 5.6 | 15A |
| 009 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 3.7 | 22 | 1.5 | 5.2 | 6.1 | 15A | 2.3 | 6.0 | 6.9 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 3.4 | 17.5 | 1.4 | 4.8 | 5.7 | 15A | 2.3 | 5.7 | 6.6 | 15A |
| 012 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 32.5 | 2.6 | 8.2 | 9.6 | 15A | 2.3 | 7.9 | 9.3 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 4.2 | 31.5 | 2.5 | 6.7 | 7.8 | 15A | 2.3 | 6.5 | 7.6 | 15A |
| 015 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 29 | 2.6 | 8.2 | 9.6 | 15A | 2.6 | 8.2 | 9.6 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 5.0 | 28 | 2.4 | 7.4 | 8.7 | 15A | 1.9 | 6.9 | 8.2 | 15A |
| 018 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 7.4 | 33 | 2.6 | 10.0 | 11.9 | 15A | 2.6 | 10.0 | 11.9 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 6.0 | 28 | 2.4 | 8.4 | 9.9 | 15A | 1.9 | 7.9 | 9.4 | 15A |
| 024 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 12.8 | 58.3 | 3.9 | 16.7 | 19.9 | 30A | 3.9 | 16.7 | 19.9 | 30A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 9.6 | 54 | 3.2 | 12.8 | 15.2 | 20A | 3.2 | 12.8 | 15.2 | 20A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 3.6 | 28 | 3.2 | 6.8 | 7.7 | 15A | 1.1 | 4.7 | 5.6 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 7.7 | 55.4 | 3.9 | 11.6 | 13.5 | 20A | 3.9 | 11.6 | 13.5 | 20A |
| 030 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 14.1 | 73 | 6.0 | 20.1 | 23.6 | 35A | 6.0 | 20.1 | 23.6 | 35A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 11.2 | 60 | 4.7 | 15.9 | 18.7 | 25A | 3.9 | 15.1 | 17.9 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 4.2 | 28 | 4.8 | 9.0 | 10.1 | 15A | 1.5 | 5.7 | 6.8 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 8.9 | 58 | 6.0 | 14.9 | 17.1 | 25A | 6.0 | 14.9 | 17.1 | 25A |
| 036 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 16.7 | 79 | 6.0 | 22.7 | 26.9 | 40A | 6.0 | 22.7 | 26.9 | 40A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 13.5 | 72 | 4.8 | 18.3 | 21.7 | 35A | 3.9 | 17.4 | 20.8 | 30A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 5.8 | 38 | 4.8 | 10.6 | 12.1 | 15A | 1.5 | 7.3 | 8.8 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 10.4 | 73 | 6.0 | 16.4 | 19.0 | 25A | 6.0 | 16.4 | 19.0 | 25A |
| 042 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 17.9 | 112 | 6.0 | 23.9 | 28.4 | 45A | 6.0 | 23.9 | 28.4 | 45A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.0 | 44 | 4.8 | 10.8 | 12.3 | 15A | 1.5 | 7.5 | 9.0 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.5 | 88 | 6.0 | 19.5 | 22.9 | 35A | 6.0 | 19.5 | 22.9 | 35A |
| 048 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 4.9 | 34 | 7.5 | 12.4 | 34.8 | 50A | 7.5 | 12.4 | 34.8 | 50A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 21.8 | 117 | 6.2 | 28.0 | 14.0 | 15A | 2.1 | 23.9 | 9.9 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 6.2 | 41 | 7.5 | 13.7 | 24.6 | 35A | 7.5 | 12.7 | 24.6 | 35A |
| 060 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 13.7 | 83.1 | 7.5 | 21.2 | 40.4 | 60A | 7.5 | 21.2 | 40.4 | 60A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 4.8 | 33 | 6.0 | 10.8 | 15.8 | 20A | 2.1 | 6.9 | 11.9 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 26.3 | 134 | 7.5 | 33.8 | 27.0 | 40A | 7.5 | 33.8 | 27.0 | 40A |

** 460 volt units with ECM-CV Require a Neutral

Tranquility® (TR) Series

Rev.: October 5, 2021

# Electrical Data – Hybrid Unit with Internal Secondary Pump – ECM Blower

| TR Hydr0nic Heat Commercial Electrical Table W/ ISP | | | | | | | | ECM-CV** | | | | ECM-CT | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MODEL | VOLTAGE CODE | RATED VOLTAGE | VOLTAGE MIN/MAX | COMPRESSOR | | | PUMP FLA | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR | FAN MOTOR FLA | TOTAL UNIT FLA | MIN CIRCUIT AMP | MAX FUSE/ HACR |
| | | | | QTY | RLA | LRA | | | | | | | | | |
| 006 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 2.6 | 17.7 | 0.4 | 1.5 | 4.1 | 5.2 | 15A | 2.3 | 4.9 | 6.0 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 2.6 | 13.5 | 0.7 | 1.4 | 4.0 | 5.4 | 15A | 2.3 | 4.9 | 6.3 | 15A |
| 009 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 3.7 | 22 | 0.4 | 1.5 | 5.2 | 6.5 | 15A | 2.3 | 6.0 | 7.3 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 3.4 | 17.5 | 0.7 | 1.4 | 4.8 | 6.4 | 15A | 2.3 | 5.7 | 7.3 | 15A |
| 012 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 32.5 | 0.8 | 2.6 | 8.2 | 10.4 | 15A | 2.3 | 7.9 | 10.1 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 4.2 | 31.5 | 0.7 | 2.5 | 6.7 | 8.5 | 15A | 2.3 | 6.5 | 8.3 | 15A |
| 015 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 5.6 | 29 | 0.8 | 2.6 | 8.2 | 10.4 | 15A | 2.6 | 8.2 | 10.4 | 15A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 5.0 | 28 | 0.7 | 2.4 | 7.4 | 9.4 | 15A | 1.9 | 6.9 | 8.9 | 15A |
| 018 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 7.4 | 33 | 0.8 | 2.6 | 10.0 | 12.7 | 20A | 2.6 | 10.0 | 12.7 | 20A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 6.0 | 28 | 0.7 | 2.4 | 8.4 | 10.6 | 15A | 1.9 | 7.9 | 10.1 | 15A |
| 024 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 12.8 | 58.3 | 0.8 | 3.9 | 16.7 | 20.7 | 30A | 3.9 | 16.7 | 20.7 | 30A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 9.6 | 54 | 0.7 | 3.2 | 12.8 | 15.9 | 25A | 3.2 | 12.8 | 15.9 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 3.6 | 28 | 0.7 | 3.2 | 6.8 | 8.4 | 15A | 1.1 | 4.7 | 6.3 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 7.7 | 55.4 | 0.8 | 3.9 | 11.6 | 14.3 | 20A | 3.9 | 11.6 | 14.3 | 20A |
| 030 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 14.1 | 73 | 0.8 | 6.0 | 20.1 | 24.4 | 35A | 6.0 | 20.1 | 24.4 | 35A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 11.2 | 60 | 0.7 | 4.7 | 15.9 | 19.4 | 30A | 3.9 | 15.1 | 18.6 | 25A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 4.2 | 28 | 0.7 | 4.8 | 9.0 | 10.8 | 15A | 1.5 | 5.7 | 7.5 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 8.9 | 58 | 0.8 | 6.0 | 14.9 | 17.9 | 25A | 6.0 | 14.9 | 17.9 | 25A |
| 036 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 16.7 | 79 | 0.8 | 6.0 | 22.7 | 27.7 | 40A | 6.0 | 22.7 | 27.7 | 40A |
| | E | 265 / 60 / 1 | 238.5 / 291.5 | 1 | 13.5 | 72 | 0.7 | 4.8 | 18.3 | 22.4 | 35A | 3.9 | 17.4 | 21.5 | 30A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 5.8 | 38 | 0.7 | 4.8 | 10.6 | 12.8 | 15A | 1.5 | 7.3 | 9.5 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 10.4 | 73 | 0.8 | 6.0 | 16.4 | 19.8 | 25A | 6.0 | 16.4 | 19.8 | 30A |
| 042 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 17.9 | 112 | 0.8 | 6.0 | 23.9 | 29.2 | 45A | 6.0 | 23.9 | 29.2 | 45A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.0 | 44 | 0.7 | 4.8 | 10.8 | 13.0 | 15A | 1.5 | 7.5 | 9.7 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.5 | 88 | 0.8 | 6.0 | 19.5 | 23.7 | 35A | 6.0 | 19.5 | 23.7 | 35A |
| 048 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 21.8 | 117 | 1.1 | 7.5 | 29.3 | 35.9 | 50A | 7.5 | 29.3 | 35.9 | 50A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 6.2 | 41 | 1.3 | 6.2 | 12.4 | 15.3 | 20A | 2.1 | 8.3 | 11.2 | 15A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 13.7 | 83.1 | 1.1 | 7.5 | 21.2 | 25.7 | 35A | 7.5 | 21.2 | 25.7 | 35A |
| 060 | G | 208-230 / 60 / 1 | 187.2 / 253 | 1 | 26.3 | 134 | 1.1 | 7.5 | 33.8 | 41.5 | 60A | 7.5 | 33.8 | 41.5 | 60A |
| | F** | 460 / 60 / 3 | 414 / 506 | 1 | 7.8 | 52 | 1.3 | 6.0 | 13.8 | 17.1 | 20A | 2.1 | 9.9 | 13.2 | 20A |
| | H | 208-230 / 60 / 3 | 187.2 / 253 | 1 | 15.6 | 110 | 1.1 | 7.5 | 23.1 | 28.1 | 40A | 7.5 | 23.1 | 28.1 | 40A |

** 460 volt units with Internal Secondary Pump and/or ECM-CV Require a Neutral

# Electrical – Power Wiring

**⚠ WARNING! ⚠**

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

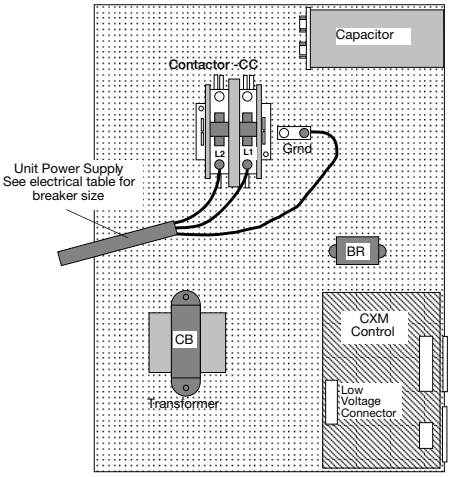
**⚠ CAUTION! ⚠**

**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.

**Figure 15: Single Phase Line Voltage Field Wiring. Three phase wiring is similar except that all three power wires are directly connected to the contactor.**




**Note: 460V units with ECM, ClimaDry®, or Internal Secondary Pump require a neutral wire.**

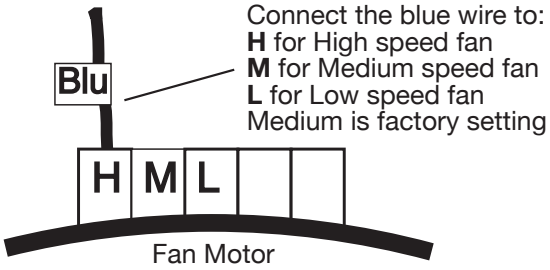
**Power Connection** - Line voltage connection is made by connecting the incoming line voltage wires to the "L" side of the contractor as shown in Figure 15. Consult electrical data tables for correct fuse size.

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

**Blower Speed Selection – Units with PSC Motor -** PSC (Permanent Split Capacitor) blower fan speed can be changed by moving the blue wire on the fan motor terminal block to the desired speed as shown in Figure 16. Most ClimateMaster units are shipped on the medium speed tap. Consult submittal data or engineering design guide for specific unit airflow tables. Typical unit design delivers rated airflow at nominal static (0.15 in. w.g. [37Pa]) on medium speed and rated airflow at a higher static (0.4 to 0.5 in. w.g. [100 to 125 Pa]) on high speed for applications where higher static is required. Low speed will deliver approximately 85% of rated airflow at 0.10 in. w.g. [25 Pa]. An optional high static blower is available on some models.

**Special Note for AHRI Testing:** To achieve rated airflow for AHRI testing purposes on all PSC products, it is necessary to change the fan speed to "HI" speed. When the heat pump has experienced less than 100 operational hours and the coil has not had sufficient time to be "seasoned", it is necessary to clean the coil with a mild surfactant such as Calgon to remove the oils left by manufacturing processes and enable the condensate to properly "sheet" off of the coil.

**Figure 16: PSC Motor Speed Selection**



# Electrical – Power & Low Voltage Wiring

ELECTRICAL - LOW VOLTAGE WIRING

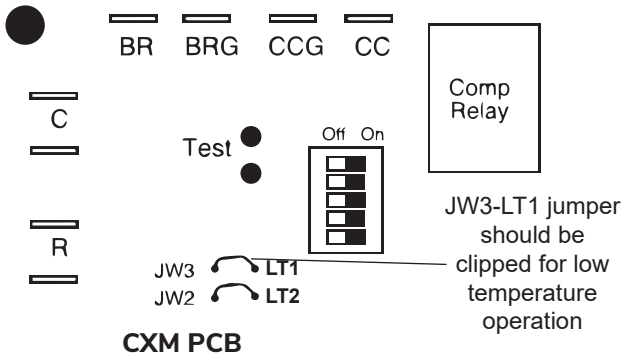
**Thermostat Connections** - The thermostat should be wired directly to the CXM or DXM2 board. See "Electrical – Thermostat" for specific terminal connections. Review the appropriate AOM (Application, Operation and Maintenance) manual for units with DDC controls.

**Low Water Temperature Cutout Selection -** The CXM/DXM2 control allows the field selection of low water (or water-antifreeze solution) temperature limit by clipping jumper JW3, which changes the sensing temperature associated with thermistor LT1. Note that the LT1 thermistor is located on the refrigerant line between the coaxial heat exchanger and expansion device (TXV). Therefore, LT1 is sensing refrigerant temperature, not water temperature, which is a better indication of how water flow rate/temperature is affecting the refrigeration circuit.

The factory setting for LT1 is for systems using water (30°F [-1.1°C] refrigerant temperature). In low water temperature (extended range) applications with antifreeze (most ground loops), jumper JW3 should be clipped as shown in Figure 17 to change the setting to 10°F [-12.2°C] refrigerant temperature, a more suitable temperature when using an antifreeze solution. All ClimateMaster units operating with entering water temperatures below 60°F [15.6°C] must include the optional water/refrigerant circuit insulation package to prevent internal condensation.

**Note: 460V units with ECM motor require a neutral wire.**

**Figure 17: LT1 Limit Setting**



# Electrical – Low Voltage Wiring

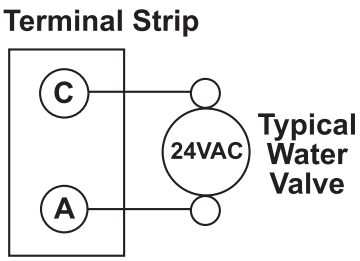
**Accessory Connections**
A terminal paralleling the compressor contactor coil has been provided on the CXM/DXM2 control. Terminal "A" is designed to control accessory devices, such as water valves. Note: This terminal should be used only with 24 Volt signals and not line voltage. Terminal "A" is energized with the compressor contactor. See Figure 18 or the specific unit wiring diagram for details.

**Low Voltage VA Ratings**

| Component | VA |
|---|---|
| Typical Blower Relay | 6 - 7 |
| Typical Reversing Valve Solenoid | 4 - 6 |
| 30A Compressor Contactor | 6 - 9 |
| Subtotal | 16 - 22 |
| + CXM board (5 - 9 VA)* | 21 - 31 |
| Remaing VA for Accessories | 19 - 29 |
| | |
| + DXM2 board (8 - 12 VA)* | 24 - 34 |
| Remaing VA for Accessories | 41 - 51 |

*Standard transformer for CXM board is 50VA. Optional DXM2 board and/or DDC controls include 75VA transformer.

**Figure 18: Accessory Wiring**




**Water Solenoid Valves -** An external solenoid valve(s) should be used on ground water installations to shut off flow to the unit when the compressor is not operating. A slow closing valve may be required to help reduce water hammer. Figure 18 shows typical wiring for a 24VAC external solenoid valve. Figures 19 and 20 illustrate typical slow closing water control valve wiring for Taco 500 series (ClimateMaster P/N AVM) and Taco SBV series valves. Slow closing valves take approximately 60 seconds to open (very little water will flow before 45 seconds). Once fully open, an end switch allows the compressor to be energized. Only relay or triac based electronic thermostats should be used with slow closing valves. When wired as shown, the slow closing valve will operate properly with the following notations:

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

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

**Figure 19: AVM Valve Wiring**

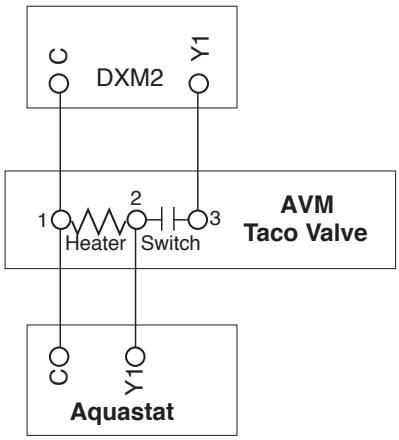
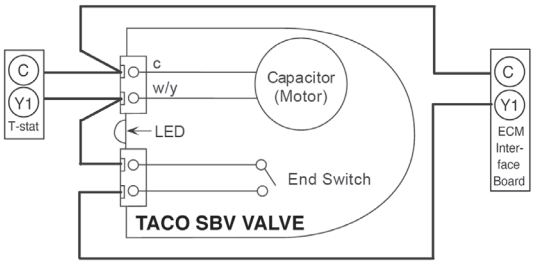



**Figure 20: Taco SBV Valve Wiring**



# 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. 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 wire. Representative thermostat wiring is shown in Figures 21 and 21a however, actual wiring connections should be determined from the thermostat IOM and or unit wiring diagram. Practically any heat pump thermostat will work with ClimateMaster heat pump units, provided it has the correct number of heating and cooling stages. Heat/Cool thermostats are required for the hydronic heating option.

**Figure 21: Units with PSC Fan**

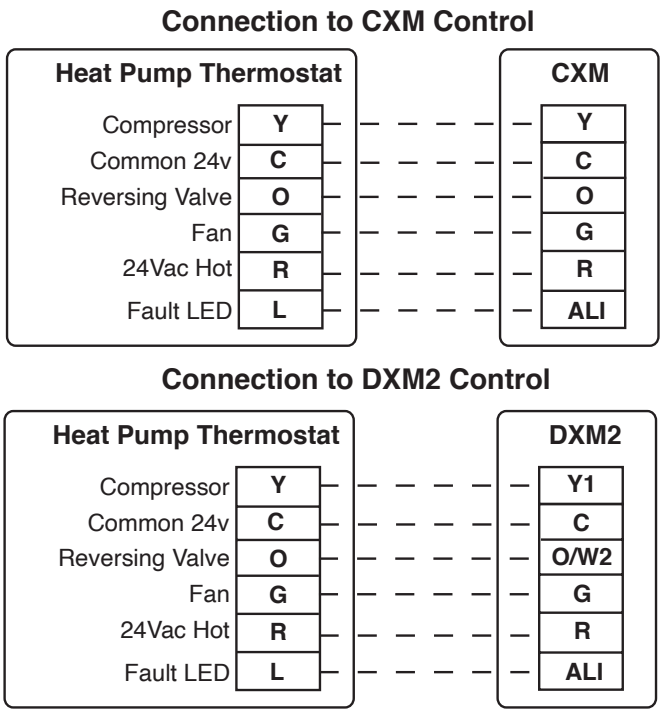
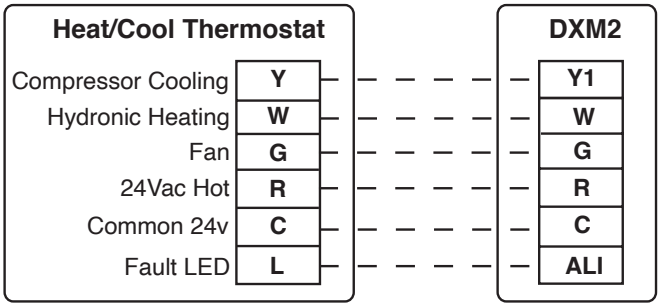
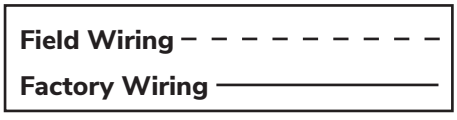



**Figure 21a: Units with Hydronic Heating and CT ECM Fan**



# Blower Performance Data – TR006

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 225 | 150 | PSC | Low | CFM | 210 | 190 | 160 | | | | | | | |
| | | | Medium | CFM | 260 | 240 | 210 | 190 | | | | | | |
| | | | High | CFM | 310 | 290 | 270 | 230 | 180 | | | | | |
| 225 | 150 | ECM - Constant Torque | 1 | RPM | 944 | 1028 | 1114 | 1206 | 1297 | | | | | |
| | | | | Power (W) | 22 | 24 | 25 | 28 | 30 | | | | | |
| | | | | CFM | 225 | 207 | 187 | 169 | 150 | | | | | |
| | | | 2 | RPM | | | 1201 | 1280 | 1362 | 1441 | 1523 | 1608 | 1694 | |
| | | | | Power (W) | | | 34 | 37 | 39 | 42 | 44 | 48 | 51 | |
| | | | | CFM | | | 233 | 217 | 201 | 185 | 173 | 164 | 150 | |
| | | | 3 | RPM | | | | 1324 | 1400 | 1476 | 1551 | 1628 | 1709 | 1786 |
| | | | | Power (W) | | | | 43 | 45 | 48 | 51 | 54 | 58 | 61 |
| | | | | CFM | | | | 241 | 227 | 212 | 200 | 188 | 179 | 168 |
| | | | 4 | RPM | | | | | | 1516 | 1588 | 1658 | 1730 | 1799 |
| | | | | Power (W) | | | | | | 55 | 58 | 61 | 65 | 67 |
| | | | | CFM | | | | | | 240 | 227 | 216 | 205 | 193 |
| 225 | 150 | ECM - Constant Volume | Minimum CFM | RPM | 763 | 933 | 1078 | 1201 | 1314 | 1417 | 1519 | 1615 | 1712 | |
| | | | | Power (W) | 16 | 21 | 27 | 40 | 36 | 41 | 46 | 52 | 59 | |
| | | | | CFM | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | |
| | | | Default CFM | RPM | 983 | 1102 | 1211 | 1319 | 1419 | 1516 | 1610 | 1708 | 1783 | 1817 |
| | | | | Power (W) | 29 | 35 | 41 | 47 | 53 | 60 | 67 | 76 | 81 | 77 |
| | | | | CFM | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 |
| | | | Maximum CFM | RPM | 1053 | 1162 | 1265 | 1366 | 1462 | 1553 | 1648 | 1733 | 1802 | 1817 |
| | | | | Power (W) | 35 | 41 | 47 | 53 | 60 | 67 | 76 | 84 | 88 | 78 |
| | | | | CFM | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |

See ECM control section for details on setting airflow.
Airflow is controlled within 5% up to the Max ESP shown with wet coil.
Do not select Dehumidification mode if HP CFM is on setting 1.
Black areas denote ESP where operation is not recommended.
PSC: Units factory shipped on medium speed. Other speeds require field selection.
CT ECM: Units factory shipped on Speed Tap 2 for Fan-Only and Speed Tap 3 for Heating/Cooling.
All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 208V for 208-230V units.
Only two speed fan (H & M) available on 575V units.
Performance stated is at the rated power supply. Performance may vary as the power supply varies from the rated.
All data is shown wet coil with clean 1" filter.
All data is ran at 80 °F DB and 67 °F WB.
CFM Tolerance is 7%.
RPM/Watt Tolerance 10%.

# Blower Performance Data – TR009

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 325 | 225 | PSC | Low | CFM | 340 | 322 | 300 | 260 | | | | | | |
| | | | Medium | CFM | 390 | 360 | 320 | 290 | 260 | | | | | |
| | | | High | CFM | 410 | 380 | 350 | 320 | 280 | | | | | |
| 325 | 225 | ECM - Constant Torque | 1 | RPM | 1137 | 1203 | 1266 | 1344 | 1413 | | | | | |
| | | | | Power (W) | 40 | 42 | 44 | 47 | 49 | | | | | |
| | | | | CFM | 294 | 278 | 259 | 245 | 230 | | | | | |
| | | | 2 | RPM | 1361 | 1413 | 1464 | 1503 | 1577 | 1640 | 1700 | 1751 | 1803 | 1831 |
| | | | | Power (W) | 67 | 70 | 73 | 74 | 79 | 82 | 85 | 88 | 90 | 85 |
| | | | | CFM | 370 | 357 | 343 | 326 | 318 | 302 | 291 | 278 | 265 | 235 |
| | | | 3 | RPM | | | 1538 | 1589 | 1642 | 1695 | 1749 | 1812 | 1829 | 1847 |
| | | | | Power (W) | | | 86 | 88 | 91 | 95 | 98 | 101 | 96 | 90 |
| | | | | CFM | | | 370 | 358 | 346 | 334 | 322 | 307 | 280 | 247 |
| | | | 4 | RPM | | | | | | | 1835 | 1853 | 1869 | 1875 |
| | | | | Power (W) | | | | | | | 120 | 113 | 107 | 102 |
| | | | | CFM | | | | | | | 340 | 309 | 276 | 234 |
| 325 | 225 | ECM - Constant Volume | Minimum CFM | RPM | 929 | 1083 | 1210 | 1324 | 1432 | 1529 | 1595 | 1723 | 1792 | |
| | | | | Power (W) | 25 | 32 | 39 | 45 | 53 | 60 | 66 | 78 | 83 | |
| | | | | CFM | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 | |
| | | | Default CFM | RPM | 1209 | 1326 | 1430 | 1535 | 1635 | 1732 | 1792 | 1801 | 1811 | |
| | | | | Power (W) | 49 | 58 | 67 | 77 | 88 | 100 | 105 | 95 | 88 | |
| | | | | CFM | 325 | 325 | 325 | 325 | 325 | 325 | 325 | 325 | 325 | |
| | | | Maximum CFM | RPM | 1691 | 1753 | 1765 | 1769 | 1778 | 1784 | 1793 | 1803 | 1813 | |
| | | | | Power (W) | 126 | 134 | 131 | 125 | 119 | 118 | 105 | 98 | 90 | |
| | | | | CFM | 375 | 375 | 375 | 375 | 375 | 375 | 375 | 375 | 375 | |

See ECM control section for details on setting airflow.
Airflow is controlled within 5% up to the Max ESP shown with wet coil.
Do not select Dehumidification mode if HP CFM is on setting 1.
Black areas denote ESP where operation is not recommended.
PSC: Units factory shipped on medium speed. Other speeds require field selection.
CT ECM: Units factory shipped on Speed Tap 2 for Fan-Only and Speed Tap 3 for Heating/Cooling.
All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 208V for 208-230V units.
Only two speed fan (H & M) available on 575V units.
Performance stated is at the rated power supply. Performance may vary as the power supply varies from the rated.
All data is shown wet coil with clean 1" filter.
All data is ran at 80 °F DB and 67 °F WB.
CFM Tolerance is 7%.
RPM/Watt Tolerance 10%.

# Blower Performance Data – TR012

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 380 | 300 | PSC | Low | CFM | 360 | 350 | 320 | 310 | | | | | | |
| | | | Medium | CFM | 420 | 400 | 380 | 360 | 340 | | | | | |
| | | | High | CFM | 470 | 450 | 430 | 400 | 380 | 320 | | | | |
| 380 | 300 | ECM - Constant Torque | 1 | RPM | 1338 | 1385 | 1436 | 1491 | 1551 | | | | | |
| | | | | Power (W) | 64 | 66 | 69 | 71 | 75 | | | | | |
| | | | | CFM | 358 | 345 | 332 | 319 | 305 | | | | | |
| | | | 2 | RPM | 1477 | 1517 | 1561 | 1612 | 1660 | 1711 | 1769 | 1819 | | |
| | | | | Power (W) | 86 | 88 | 91 | 94 | 97 | 100 | 103 | 104 | | |
| | | | | CFM | 400 | 388 | 377 | 365 | 354 | 342 | 328 | 309 | | |
| | | | 3 | RPM | 1632 | 1672 | 1709 | 1747 | 1785 | 1820 | 1835 | 1856 | | |
| | | | | Power (W) | 116 | 119 | 122 | 124 | 126 | 126 | 121 | 114 | | |
| | | | | CFM | 449 | 437 | 427 | 414 | 401 | 385 | 359 | 327 | | |
| | | | 4 | RPM | 1698 | 1729 | 1765 | 1798 | 1821 | 1836 | 1842 | 1843 | | |
| | | | | Power (W) | 131 | 133 | 135 | 137 | 135 | 130 | 123 | 110 | | |
| | | | | CFM | 467 | 456 | 444 | 433 | 414 | 390 | 361 | 318 | | |
| 380 | 300 | ECM - Constant Volume | Minimum CFM | RPM | 1258 | 1368 | 1464 | 1555 | 1635 | 1718 | 1793 | 1830 | | |
| | | | | Power (W) | 55 | 64 | 73 | 81 | 90 | 99 | 107 | 106 | | |
| | | | | CFM | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | | |
| | | | Default CFM | RPM | 1598 | 1672 | 1743 | 1813 | 1831 | 1845 | 1859 | 1875 | | |
| | | | | Power (W) | 105 | 115 | 125 | 135 | 132 | 127 | 123 | 118 | | |
| | | | | CFM | 380 | 380 | 380 | 380 | 380 | 380 | 380 | 380 | | |
| | | | Maximum CFM | RPM | 1798 | 1823 | 1834 | 1844 | 1858 | 1872 | 1886 | 1901 | 1920 | |
| | | | | Power (W) | 147 | 149 | 146 | 143 | 139 | 134 | 130 | 126 | 120 | |
| | | | | CFM | 415 | 415 | 415 | 415 | 415 | 415 | 415 | 415 | 415 | |

See ECM control section for details on setting airflow.
Airflow is controlled within 5% up to the Max ESP shown with wet coil.
Do not select Dehumidification mode if HP CFM is on setting 1.
Black areas denote ESP where operation is not recommended.
PSC: Units factory shipped on medium speed. Other speeds require field selection.
CT ECM: Units factory shipped on Speed Tap 2 for Fan-Only and Speed Tap 3 for Heating/Cooling.
All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 208V for 208-230V units.
Only two speed fan (H & M) available on 575V units.
Performance stated is at the rated power supply. Performance may vary as the power supply varies from the rated.
All data is shown wet coil with clean 1" filter.
All data is ran at 80 °F DB and 67 °F WB.
CFM Tolerance is 7%.
RPM/Watt Tolerance 10%.

# Blower Performance Data - TR015

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 525 | 375 | PSC | Low | CFM | 503 | 490 | 479 | 439 | | | | | | |
| | | | Medium | CFM | 595 | 575 | 562 | 510 | 451 | | | | | |
| | | | High | CFM | | | | 581 | 510 | 386 | | | | |
| 525 | 375 | PSC - High Static | Low | CFM | 462 | 456 | 443 | 425 | 385 | | | | | |
| | | | Medium | CFM | 546 | 539 | 531 | 513 | 481 | 414 | | | | |
| | | | High | CFM | | | | | | 547 | 426 | | | |
| 525 | 375 | ECM - Constant Torque | 1 | RPM | 655 | 614 | 701 | 770 | 851 | 937 | | | | |
| | | | | Power (W) | 67 | 55 | 62 | 68 | 75 | 82 | | | | |
| | | | | CFM | 648 | 588 | 542 | 493 | 441 | 378 | | | | |
| | | | 2 | RPM | 655 | 720 | 799 | 863 | 946 | 1021 | 1078 | | | |
| | | | | Power (W) | 67 | 74 | 81 | 87 | 95 | 102 | 108 | | | |
| | | | | CFM | 648 | 608 | 557 | 514 | 460 | 402 | 354 | | | |
| | | | 3 | RPM | 687 | 744 | 822 | 883 | 950 | 1032 | 1098 | 1150 | | |
| | | | | Power (W) | 79 | 86 | 94 | 101 | 107 | 117 | 124 | 130 | | |
| | | | | CFM | 695 | 659 | 611 | 570 | 526 | 475 | 422 | 377 | | |
| | | | 4 | RPM | 716 | 771 | 844 | 906 | 965 | 1037 | 1110 | 1170 | 1219 | |
| | | | | Power (W) | 92 | 98 | 107 | 114 | 121 | 129 | 138 | 145 | 151 | |
| | | | | CFM | 737 | 705 | 661 | 622 | 582 | 534 | 482 | 438 | 396 | |
| | | | 5 | RPM | 763 | 790 | 851 | 924 | 978 | 1039 | 1113 | 1175 | 1233 | 1281 |
| | | | | Power (W) | 106 | 110 | 117 | 126 | 133 | 141 | 151 | 159 | 165 | 172 |
| | | | | CFM | 745 | 745 | 708 | 662 | 626 | 585 | 535 | 488 | 444 | 402 |
| 525 | 375 | ECM - Constant Volume | Minimum CFM | RPM | | 617 | 741 | 848 | 945 | 1028 | 1103 | 1171 | | |
| | | | | Power (W) | | 36 | 52 | 68 | 84 | 99 | 114 | 129 | | |
| | | | | CFM | | 375 | 375 | 375 | 375 | 375 | 375 | 375 | | |
| | | | Default CFM | RPM | | 661 | 767 | 859 | 944 | 1028 | 1107 | 1179 | 1247 | |
| | | | | Power (W) | | 55 | 74 | 90 | 108 | 127 | 147 | 166 | 186 | |
| | | | | CFM | | 525 | 525 | 525 | 525 | 525 | 525 | 525 | 525 | |
| | | | Maximum CFM | RPM | 586 | 695 | 795 | 882 | 963 | 1038 | 1111 | 1180 | 1248 | 1312 |
| | | | | Power (W) | 54 | 73 | 93 | 112 | 132 | 152 | 173 | 194 | 216 | 238 |
| | | | | CFM | 625 | 625 | 625 | 625 | 625 | 625 | 625 | 625 | 625 | 625 |

See ECM control section for details on setting airflow.
Airflow is controlled within 5% up to the Max ESP shown with wet coil.
Do not select Dehumidification mode if HP CFM is on setting 1.
Black areas denote ESP where operation is not recommended.
PSC: Units factory shipped on medium speed. Other speeds require field selection.
CT ECM: Units factory shipped on Speed Tap 2 for Fan-Only and Speed Tap 3 for Heating/Cooling.
All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 208V for 208-230V units.
Only two speed fan (H & M) available on 575V units.
Performance stated is at the rated power supply. Performance may vary as the power supply varies from the rated.
All data is shown wet coil with clean 1" filter.
All data is ran at 80 °F DB and 67 °F WB.
CFM Tolerance is 7%.
RPM/Watt Tolerance 10%.

# Blower Performance Data – TR018

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 600 | 450 | PSC | Low | CFM | 524 | 509 | 493 | 451 | | | | | | |
| | | | Medium | CFM | 611 | 588 | 564 | 514 | | | | | | |
| | | | High | CFM | 704 | 668 | 643 | 617 | 504 | | | | | |
| 600 | 450 | PSC - High Static | Low | CFM | 461 | | | | | | | | | |
| | | | Medium | CFM | 553 | 543 | 533 | 506 | 468 | | | | | |
| | | | High | CFM | 670 | 661 | 645 | 628 | 587 | 534 | | | | |
| 600 | 450 | ECM - Constant Torque | 1 | RPM | 693 | 763 | 837 | 882 | | | | | | |
| | | | | Power (W) | 73 | 78 | 85 | 90 | | | | | | |
| | | | | CFM | 600 | 558 | 518 | 491 | | | | | | |
| | | | 2 | RPM | 745 | 801 | 873 | 904 | 966 | 1031 | 1098 | | | |
| | | | | Power (W) | 92 | 99 | 107 | 109 | 116 | 123 | 131 | | | |
| | | | | CFM | 676 | 641 | 599 | 570 | 536 | 498 | 452 | | | |
| | | | 3 | RPM | 782 | 831 | 890 | 958 | 992 | 1048 | 1106 | 1171 | 1223 | |
| | | | | Power (W) | 112 | 118 | 126 | 135 | 140 | 147 | 155 | 163 | 170 | |
| | | | | CFM | 741 | 713 | 677 | 640 | 619 | 586 | 554 | 512 | 471 | |
| | | | 4 | RPM | 833 | 875 | 924 | 986 | 1046 | 1072 | 1124 | 1177 | 1236 | 1290 |
| | | | | Power (W) | 138 | 144 | 152 | 161 | 170 | 174 | 181 | 190 | 199 | 207 |
| | | | | CFM | 802 | 780 | 751 | 714 | 680 | 662 | 633 | 603 | 567 | 529 |
| | | | 5 | RPM | 895 | 924 | 968 | 1016 | 1078 | 1133 | 1151 | 1199 | 1249 | 1302 |
| | | | | Power (W) | 170 | 175 | 182 | 190 | 201 | 210 | 214 | 222 | 231 | 240 |
| | | | | CFM | 854 | 848 | 820 | 791 | 754 | 724 | 711 | 683 | 655 | 625 |
| 600 | 450 | ECM - Constant Volume | Minimum CFM | RPM | | | | | 1096 | 1179 | 1275 | 1361 | | |
| | | | | Power (W) | | | | | 111 | 132 | 157 | 180 | | |
| | | | | CFM | | | | | 450 | 450 | 450 | 450 | | |
| | | | Default CFM | RPM | 847 | 918 | 971 | 1095 | 1208 | 1297 | 1360 | 1418 | 1467 | |
| | | | | Power (W) | 85 | 101 | 113 | 145 | 178 | 206 | 228 | 248 | 266 | |
| | | | | CFM | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | |
| | | | Maximum CFM | RPM | 1036 | 1080 | 1131 | 1172 | 1213 | 1317 | 1406 | 1494 | | |
| | | | | Power (W) | 157 | 171 | 186 | 200 | 214 | 251 | 286 | 323 | | |
| | | | | CFM | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | | |

See ECM control section for details on setting airflow.
Airflow is controlled within 5% up to the Max ESP shown with wet coil.
Do not select Dehumidification mode if HP CFM is on setting 1.
Black areas denote ESP where operation is not recommended.
PSC: Units factory shipped on medium speed. Other speeds require field selection.
CT ECM: Units factory shipped on Speed Tap 2 for Fan-Only and Speed Tap 3 for Heating/Cooling.
All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 208V for 208-230V units.
Only two speed fan (H & M) available on 575V units.
Performance stated is at the rated power supply. Performance may vary as the power supply varies from the rated.
All data is shown wet coil with clean 1" filter.
All data is ran at 80 °F DB and 67 °F WB.
CFM Tolerance is 7%.
RPM/Watt Tolerance 10%.

# Blower Performance Data – TR024

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 850 | 600 | PSC | Low | CFM | 760 | 741 | 722 | 694 | 665 | 618 | | | | |
| | | | Medium | CFM | 941 | 912 | 874 | 836 | 789 | 732 | 665 | | | |
| | | | High | CFM | | | | 950 | 884 | 827 | 732 | 656 | | |
| 850 | 600 | PSC - High Static | Low | CFM | | 979 | 931 | 884 | 827 | 751 | 675 | | | |
| | | | Medium | CFM | | | | 988 | 922 | 846 | 713 | | | |
| | | | High | CFM | | | | | 979 | 903 | 798 | 665 | | |
| 800 | 600 | ECM - Constant Torque | 1 | RPM | 817 | 865 | 915 | 973 | | | | | | |
| | | | | Power (W) | 116 | 122 | 128 | 135 | | | | | | |
| | | | | CFM | 755 | 728 | 695 | 653 | | | | | | |
| | | | 2 | RPM | 877 | 920 | 966 | 1012 | 1070 | 1142 | 1198 | | | |
| | | | | Power (W) | 146 | 152 | 159 | 166 | 174 | 185 | 193 | | | |
| | | | | CFM | 836 | 810 | 782 | 750 | 708 | 657 | 616 | | | |
| | | | 3 | RPM | 938 | 974 | 1017 | 1057 | 1102 | 1158 | 1227 | 1283 | 1323 | 1355 |
| | | | | Power (W) | 181 | 187 | 194 | 201 | 209 | 218 | 230 | 239 | 246 | 252 |
| | | | | CFM | 910 | 887 | 861 | 834 | 804 | 762 | 714 | 674 | 642 | 619 |
| | | | 4 | RPM | 1015 | 1048 | 1084 | 1121 | 1159 | 1199 | 1244 | 1309 | 1369 | 1412 |
| | | | | Power (W) | 232 | 240 | 247 | 254 | 262 | 270 | 278 | 291 | 303 | 312 |
| | | | | CFM | 996 | 975 | 952 | 929 | 904 | 876 | 845 | 798 | 755 | 725 |
| | | | 5 | RPM | | | | | 1219 | 1255 | 1293 | 1331 | 1384 | 1446 |
| | | | | Power (W) | | | | | 323 | 331 | 340 | 348 | 361 | 374 |
| | | | | CFM | | | | | 999 | 975 | 951 | 923 | 884 | 840 |
| 800 | 600 | ECM - Constant Volume | Minimum CFM | RPM | 706 | 788 | 867 | 941 | 1013 | 1080 | 1143 | 1203 | 1259 | 1311 |
| | | | | Power (W) | 71 | 89 | 107 | 124 | 141 | 159 | 177 | 195 | 213 | 230 |
| | | | | CFM | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 |
| | | | Default CFM | RPM | 882 | 943 | 1002 | 1059 | 1114 | 1168 | 1220 | 1271 | 1319 | 1366 |
| | | | | Power (W) | 145 | 165 | 185 | 205 | 225 | 245 | 266 | 285 | 306 | 326 |
| | | | | CFM | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 |
| | | | Maximum CFM | RPM | 1077 | 1122 | 1162 | 1200 | 1233 | 1263 | 1288 | 1310 | 1329 | 1343 |
| | | | | Power (W) | 284 | 300 | 315 | 332 | 351 | 364 | 379 | 396 | 412 | 428 |
| | | | | CFM | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |

See ECM control section for details on setting airflow.
Airflow is controlled within 5% up to the Max ESP shown with wet coil.
Do not select Dehumidification mode if HP CFM is on setting 1.
ClimaDry is factory wired to operate in stage 2 airflow.
Black areas denote ESP where operation is not recommended.
PSC: Units factory shipped on medium speed. Other speeds require field selection.
CT ECM: Units factory shipped on Speed Tap 2 for Fan-Only and Speed Tap 3 for Heating/Cooling.
All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 208V for 208-230V units.
Only two speed fan (H & M) available on 575V units.
Performance stated is at the rated power supply. Performance may vary as the power supply varies from the rated.
All data is shown wet coil with clean 1" filter.
All data is ran at 80 °F DB and 67 °F WB.
CFM Tolerance is 7%.
RPM/Watt Tolerance 10%.

All TR units with optional CV-ECM fan motor automatically adjusts for the reheat coil. The small additional pressure drop of the reheat coil causes the CV-ECM motor to slightly increase RPM to overcome the added pressure drop, and maintain selected CFM up to the maximum ESP.

# Blower Performance Data – TR030

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 1000 | 750 | PSC | Low | CFM | 1017 | 979 | 931 | 884 | 827 | 751 | | | | |
| | | | Medium | CFM | 1140 | 1093 | 1036 | 988 | 922 | 846 | | | | |
| | | | High | CFM | | | 1102 | 1045 | 979 | 903 | 798 | | | |
| 1000 | 750 | PSC - High Static | Low | CFM | 979 | 941 | 912 | 865 | 798 | | | | | |
| | | | Medium | CFM | | | | 1074 | 979 | 884 | 779 | | | |
| | | | High | CFM | | | | | 1102 | 988 | 874 | 760 | | |
| 1000 | 750 | ECM - Constant Torque | 1 | RPM | 880 | 925 | 994 | 1049 | 1101 | | | | | |
| | | | | Power (W) | 158 | 165 | 176 | 184 | 192 | | | | | |
| | | | | CFM | 904 | 873 | 832 | 796 | 763 | | | | | |
| | | | 2 | RPM | 956 | 998 | 1038 | 1105 | 1156 | 1203 | 1248 | 1295 | 1344 | |
| | | | | Power (W) | 211 | 219 | 227 | 240 | 250 | 258 | 267 | 276 | 285 | |
| | | | | CFM | 1020 | 992 | 965 | 927 | 894 | 864 | 835 | 805 | 771 | |
| | | | 3 | RPM | 1034 | 1072 | 1110 | 1145 | 1209 | 1250 | 1303 | 1346 | 1387 | 1422 |
| | | | | Power (W) | 280 | 289 | 298 | 306 | 321 | 330 | 342 | 351 | 361 | 368 |
| | | | | CFM | 1139 | 1113 | 1089 | 1064 | 1027 | 999 | 966 | 937 | 910 | 879 |
| | | | 4 | RPM | 1095 | 1130 | 1166 | 1201 | 1237 | 1299 | 1337 | 1387 | 1428 | 1465 |
| | | | | Power (W) | 336 | 346 | 355 | 364 | 374 | 389 | 399 | 413 | 423 | 430 |
| | | | | CFM | 1216 | 1193 | 1168 | 1146 | 1123 | 1086 | 1062 | 1028 | 1002 | 975 |
| | | | 5 | RPM | | | | 1268 | 1301 | 1333 | 1394 | 1426 | 1473 | 1491 |
| | | | | Power (W) | | | | 452 | 462 | 471 | 490 | 499 | 508 | 478 |
| | | | | CFM | | | | 1250 | 1229 | 1208 | 1173 | 1151 | 1112 | 1036 |
| 1000 | 750 | ECM - Constant Volume | Minimum CFM | RPM | 872 | 928 | 990 | 1046 | 1096 | 1143 | 1192 | 1238 | 1282 | 1327 |
| | | | | Power (W) | 71 | 89 | 108 | 127 | 145 | 162 | 181 | 199 | 217 | 235 |
| | | | | CFM | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 |
| | | | Default CFM | RPM | 1131 | 1177 | 1218 | 1252 | 1295 | 1337 | 1381 | 1415 | | |
| | | | | Power (W) | 251 | 274 | 296 | 315 | 337 | 362 | 387 | 407 | | |
| | | | | CFM | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | | |
| | | | Maximum CFM | RPM | 1260 | 1299 | 1334 | 1373 | 1403 | | | | | |
| | | | | Power (W) | 388 | 410 | 431 | 453 | 471 | | | | | |
| | | | | CFM | 1150 | 1150 | 1150 | 1150 | 1150 | | | | | |

See ECM control section for details on setting airflow.
Airflow is controlled within 5% up to the Max ESP shown with wet coil.
Do not select Dehumidification mode if HP CFM is on setting 1.
ClimaDry is factory wired to operate in stage 2 airflow.
Black areas denote ESP where operation is not recommended.
PSC: Units factory shipped on medium speed. Other speeds require field selection.
CT ECM: Units factory shipped on Speed Tap 2 for Fan-Only and Speed Tap 3 for Heating/Cooling.
All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 208V for 208-230V units.
Only two speed fan (H & M) available on 575V units.
Performance stated is at the rated power supply. Performance may vary as the power supply varies from the rated.
All data is shown wet coil with clean 1" filter.
All data is ran at 80 °F DB and 67 °F WB.
CFM Tolerance is 7%.
RPM/Watt Tolerance 10%.

All TR units with optional CV-ECM fan motor automatically adjusts for the reheat coil. The small additional pressure drop of the reheat coil causes the CV-ECM motor to slightly increase RPM to overcome the added pressure drop, and maintain selected CFM up to the maximum ESP.

# Blower Performance Data – TR036

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 1150 | 900 | PSC | Low | CFM | 970 | 960 | 951 | 941 | 902 | | | | | |
| | | | Medium | CFM | 1106 | 1096 | 1086 | 1067 | 1009 | 912 | | | | |
| | | | High | CFM | 1436 | 1387 | 1329 | 1280 | 1174 | 1077 | 931 | | | |
| 1150 | 900 | PSC - High Static | Low | CFM | 980 | 970 | 960 | 931 | 902 | | | | | |
| | | | Medium | CFM | 1300 | 1280 | 1261 | 1222 | 1193 | 1116 | 1038 | | | |
| | | | High | CFM | | | | 1484 | 1426 | 1358 | 1251 | 1135 | 931 | |
| 1150 | 900 | ECM - Constant Torque | 1 | RPM | 842 | 891 | 945 | | | | | | | |
| | | | | Power (W) | 166 | 175 | 184 | | | | | | | |
| | | | | CFM | 974 | 941 | 904 | | | | | | | |
| | | | 2 | RPM | 936 | 983 | 1028 | 1075 | 1125 | 1167 | 1203 | 1241 | | |
| | | | | Power (W) | 241 | 251 | 261 | 272 | 282 | 292 | 299 | 307 | | |
| | | | | CFM | 1132 | 1103 | 1074 | 1041 | 1005 | 973 | 944 | 916 | | |
| | | | 3 | RPM | 988 | 1032 | 1076 | 1117 | 1160 | 1205 | 1246 | 1282 | 1315 | 1354 |
| | | | | Power (W) | 294 | 304 | 316 | 326 | 337 | 349 | 359 | 367 | 375 | 385 |
| | | | | CFM | 1271 | 1242 | 1214 | 1185 | 1153 | 1118 | 1083 | 1056 | 1029 | 999 |
| | | | 4 | RPM | 1056 | 1090 | 1130 | 1170 | 1208 | 1250 | 1292 | 1332 | 1370 | 1403 |
| | | | | Power (W) | 376 | 387 | 399 | 409 | 421 | 433 | 446 | 457 | 468 | 478 |
| | | | | CFM | 1403 | 1377 | 1351 | 1324 | 1295 | 1268 | 1233 | 1201 | 1169 | 1143 |
| | | | 5 | RPM | | | 1193 | 1228 | 1265 | 1295 | 1323 | 1358 | 1392 | 1419 |
| | | | | Power (W) | | | 499 | 510 | 523 | 524 | 521 | 519 | 516 | 514 |
| | | | | CFM | | | 1485 | 1460 | 1434 | 1396 | 1347 | 1295 | 1240 | 1194 |
| 1150 | 900 | ECM - Constant Volume | Minimum CFM | RPM | 682 | 788 | 898 | 976 | 1043 | 1107 | 1170 | 1230 | 1297 | 1371 |
| | | | | Power (W) | 105 | 132 | 164 | 188 | 211 | 233 | 257 | 280 | 307 | 339 |
| | | | | CFM | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 |
| | | | Default CFM | RPM | 830 | 895 | 961 | 1054 | 1145 | 1209 | 1267 | 1321 | 1371 | 1419 |
| | | | | Power (W) | 205 | 232 | 261 | 303 | 349 | 382 | 415 | 446 | 475 | 505 |
| | | | | CFM | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 |
| | | | Maximum CFM | RPM | 1042 | 1040 | 1095 | 1149 | 1199 | 1273 | 1355 | 1420 | 1459 | 1493 |
| | | | | Power (W) | 406 | 403 | 438 | 474 | 511 | 564 | 629 | 680 | 692 | 691 |
| | | | | CFM | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |

See ECM control section for details on setting airflow.
Airflow is controlled within 5% up to the Max ESP shown with wet coil.
Do not select Dehumidification mode if HP CFM is on setting 1.
ClimaDry is factory wired to operate in stage 2 airflow.
Black areas denote ESP where operation is not recommended.
PSC: Units factory shipped on medium speed. Other speeds require field selection.
CT ECM: Units factory shipped on Speed Tap 2 for Fan-Only and Speed Tap 3 for Heating/Cooling.
All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 208V for 208-230V units.
Only two speed fan (H & M) available on 575V units.
Performance stated is at the rated power supply. Performance may vary as the power supply varies from the rated.
All data is shown wet coil with clean 1" filter.
All data is ran at 80 °F DB and 67 °F WB.
CFM Tolerance is 7%.
RPM/Watt Tolerance 10%.

All TR units with optional CV-ECM fan motor automatically adjusts for the reheat coil. The small additional pressure drop of the reheat coil causes the CV-ECM motor to slightly increase RPM to overcome the added pressure drop, and maintain selected CFM up to the maximum ESP.

# Blower Performance Data – TR042

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 1400 | 1050 | PSC | Low | CFM | 1074 | 1064 | | | | | | | | |
| | | | Medium | CFM | 1368 | 1321 | 1273 | 1207 | 1131 | 1064 | | | | |
| | | | High | CFM | 1501 | 1444 | 1378 | 1302 | 1226 | 1131 | | | | |
| 1400 | 1050 | PSC - High Static | Low | CFM | | | | | | | | | | |
| | | | Medium | CFM | 1302 | 1283 | 1254 | 1235 | 1188 | 1121 | | | | |
| | | | High | CFM | | 1473 | 1444 | 1397 | 1378 | 1311 | 1178 | | | |
| 1400 | 1050 | ECM - Constant Torque | 1 | RPM | 916 | 957 | 1004 | 1065 | | | | | | |
| | | | | Power (W) | 238 | 248 | 259 | 272 | | | | | | |
| | | | | CFM | 1186 | 1152 | 1113 | 1056 | | | | | | |
| | | | 2 | RPM | 1013 | 1050 | 1084 | 1128 | 1179 | 1227 | 1279 | 1317 | 1356 | 1400 |
| | | | | Power (W) | 331 | 369 | 352 | 365 | 381 | 396 | 411 | 423 | 437 | 446 |
| | | | | CFM | 1345 | 1317 | 1283 | 1251 | 1215 | 1181 | 1150 | 1124 | 1094 | 1050 |
| | | | 3 | RPM | 1108 | 1142 | 1178 | 1207 | 1247 | 1293 | 1336 | 1382 | 1426 | 1462 |
| | | | | Power (W) | 448 | 461 | 474 | 486 | 501 | 518 | 534 | 551 | 568 | 581 |
| | | | | CFM | 1507 | 1482 | 1455 | 1427 | 1396 | 1365 | 1331 | 1296 | 1276 | 1246 |
| | | | 4 | RPM | 1200 | 1231 | 1263 | 1292 | 1321 | 1356 | 1397 | 1440 | 1479 | 1505 |
| | | | | Power (W) | 582 | 595 | 609 | 622 | 635 | 651 | 669 | 688 | 706 | 681 |
| | | | | CFM | 1641 | 1623 | 1601 | 1577 | 1548 | 1519 | 1488 | 1455 | 1423 | 1355 |
| | | | 5 | RPM | | | 1317 | 1372 | 1392 | 1412 | 1436 | 1469 | 1500 | 1504 |
| | | | | Power (W) | | | 756 | 775 | 776 | 774 | 772 | 768 | 765 | 679 |
| | | | | CFM | | | 1743 | 1717 | 1688 | 1645 | 1596 | 1541 | 1490 | 1352 |
| 1400 | 1050 | ECM - Constant Volume | Minimum CFM | RPM | 786 | 855 | 920 | 985 | 1059 | 1125 | 1186 | 1240 | 1292 | 1346 |
| | | | | Power (W) | 154 | 177 | 200 | 224 | 252 | 280 | 306 | 331 | 355 | 383 |
| | | | | CFM | 1050 | 1050 | 1050 | 1050 | 1050 | 1050 | 1050 | 1050 | 1050 | 1050 |
| | | | Default CFM | RPM | 997 | 1042 | 1094 | 1145 | 1193 | 1241 | 1292 | 1345 | 1400 | 1451 |
| | | | | Power (W) | 334 | 359 | 390 | 421 | 453 | 484 | 517 | 555 | 595 | 636 |
| | | | | CFM | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 |
| | | | Maximum CFM | RPM | 1224 | 1245 | 1282 | 1305 | 1327 | | | | | |
| | | | | Power (W) | 658 | 674 | 703 | 700 | 697 | | | | | |
| | | | | CFM | 1750 | 1750 | 1750 | 1750 | 1750 | | | | | |

See ECM control section for details on setting airflow.
Airflow is controlled within 5% up to the Max ESP shown with wet coil.
Do not select Dehumidification mode if HP CFM is on setting 1.
ClimaDry is factory wired to operate in stage 2 airflow.
Black areas denote ESP where operation is not recommended.
PSC: Units factory shipped on medium speed. Other speeds require field selection.
CT ECM: Units factory shipped on Speed Tap 2 for Fan-Only and Speed Tap 3 for Heating/Cooling.
All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 208V for 208-230V units.
Only two speed fan (H & M) available on 575V units.
Performance stated is at the rated power supply. Performance may vary as the power supply varies from the rated.
All data is shown wet coil with clean 1" filter.
All data is ran at 80 °F DB and 67 °F WB.
CFM Tolerance is 7%.
RPM/Watt Tolerance 10%.

All TR units with optional CV-ECM fan motor automatically adjusts for the reheat coil. The small additional pressure drop of the reheat coil causes the CV-ECM motor to slightly increase RPM to overcome the added pressure drop, and maintain selected CFM up to the maximum ESP.

# Blower Performance Data – TR048

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 1600 | 1200 | PSC | Low | CFM | 1644 | 1606 | 1568 | 1492 | 1378 | 1264 | | | | |
| | | | Medium | CFM | 1805 | 1767 | 1682 | 1625 | 1520 | 1340 | | | | |
| | | | High | CFM | | 1881 | 1815 | 1710 | 1596 | 1416 | 1216 | 1216 | | |
| 1600 | 1200 | PSC - High Static | Low | CFM | 1748 | 1720 | 1691 | 1644 | 1587 | 1520 | 1435 | 1311 | | |
| | | | Medium | CFM | 1938 | 1891 | 1843 | 1796 | 1739 | 1691 | 1625 | 1539 | 1416 | 1254 |
| | | | High | CFM | | | | 1957 | 1910 | 1862 | 1786 | 1701 | 1577 | 1435 |
| 1500 | 1200 | ECM - Constant Torque | 1 | RPM | 767 | 811 | 848 | 886 | 935 | | | | | |
| | | | | Power (W) | 225 | 237 | 247 | 257 | 270 | | | | | |
| | | | | CFM | 1397 | 1349 | 1304 | 1259 | 1202 | | | | | |
| | | | 2 | RPM | 826 | 869 | 905 | 940 | 979 | 1026 | 1073 | | | |
| | | | | Power (W) | 287 | 300 | 312 | 322 | 334 | 349 | 363 | | | |
| | | | | CFM | 1527 | 1484 | 1441 | 1398 | 1351 | 1294 | 1240 | | | |
| | | | 3 | RPM | 881 | 925 | 960 | 993 | 1027 | 1064 | 1108 | 1150 | 1214 | |
| | | | | Power (W) | 358 | 374 | 387 | 398 | 410 | 423 | 439 | 454 | 473 | |
| | | | | CFM | 1660 | 1619 | 1577 | 1537 | 1494 | 1452 | 1399 | 1349 | 1254 | |
| | | | 4 | RPM | 959 | 997 | 1034 | 1064 | 1093 | 1124 | 1157 | 1195 | 1206 | |
| | | | | Power (W) | 474 | 491 | 507 | 521 | 533 | 546 | 560 | 576 | 511 | |
| | | | | CFM | 1837 | 1795 | 1760 | 1722 | 1685 | 1647 | 1608 | 1560 | 1382 | |
| | | | 5 | RPM | | 1078 | 1113 | 1145 | 1174 | 1200 | 1213 | 1200 | | |
| | | | | Power (W) | | 649 | 667 | 684 | 698 | 714 | 695 | 588 | | |
| | | | | CFM | | 1993 | 1956 | 1919 | 1886 | 1854 | 1784 | 1588 | | |
| 1500 | 1200 | ECM - Constant Volume | Minimum CFM | RPM | 703 | 766 | 827 | 886 | 943 | 998 | 1051 | 1102 | 1150 | 1196 |
| | | | | Power (W) | 174 | 205 | 237 | 269 | 302 | 336 | 371 | 407 | 444 | 482 |
| | | | | CFM | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| | | | Default CFM | RPM | 833 | 884 | 932 | 986 | 1043 | 1089 | 1137 | 1191 | 1242 | 1293 |
| | | | | Power (W) | 287 | 329 | 369 | 412 | 455 | 495 | 536 | 578 | 620 | 662 |
| | | | | CFM | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| | | | Maximum CFM | RPM | 993 | 1038 | 1082 | 1129 | 1178 | 1220 | 1264 | 1311 | 1357 | 1402 |
| | | | | Power (W) | 562 | 616 | 669 | 724 | 781 | 832 | 885 | 940 | 994 | 1048 |
| | | | | CFM | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |

See ECM control section for details on setting airflow.
Airflow is controlled within 5% up to the Max ESP shown with wet coil.
Do not select Dehumidification mode if HP CFM is on setting 1.
ClimaDry is factory wired to operate in stage 2 airflow.
Black areas denote ESP where operation is not recommended.
PSC: Units factory shipped on medium speed. Other speeds require field selection.
CT ECM: Units factory shipped on Speed Tap 2 for Fan-Only and Speed Tap 3 for Heating/Cooling.
All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 208V for 208-230V units.
Only two speed fan (H & M) available on 575V units.
Performance stated is at the rated power supply. Performance may vary as the power supply varies from the rated.
All data is shown wet coil with clean 1" filter.
All data is ran at 80 °F DB and 67 °F WB.
CFM Tolerance is 7%.
RPM/Watt Tolerance 10%.

All TR units with optional CV-ECM fan motor automatically adjusts for the reheat coil. The small additional pressure drop of the reheat coil causes the CV-ECM motor to slightly increase RPM to overcome the added pressure drop, and maintain selected CFM up to the maximum ESP.

# Blower Performance Data – TR060

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 1950 | 1500 | PSC | Low | CFM | 1803 | 1774 | 1744 | 1695 | 1637 | 1568 | | | | |
| | | | Medium | CFM | 1999 | 1950 | 1901 | 1852 | 1793 | 1744 | 1676 | 1588 | | |
| | | | High | CFM | | 1881 | 1815 | 1710 | 1596 | 1416 | 1216 | 1216 | | |
| 1950 | 1500 | PSC - High Static | Low | CFM | 1882 | 1872 | 1852 | 1842 | 1813 | 1793 | 1764 | 1715 | 1666 | 1588 |
| | | | Medium | CFM | 2107 | 2097 | 2038 | 1999 | 1980 | 1940 | 1891 | 1842 | 1460 | 1715 |
| | | | High | CFM | 2342 | 2323 | 2293 | 2254 | 2195 | 2156 | 2087 | 2019 | 1940 | 1852 |
| 1950 | 1500 | ECM - Constant Torque | 1 | RPM | 768 | 797 | 830 | 863 | | | | | | |
| | | | | Power (W) | 342 | 354 | 366 | 380 | | | | | | |
| | | | | CFM | 1685 | 1640 | 1593 | 1545 | | | | | | |
| | | | 2 | RPM | 836 | 867 | 895 | 922 | 955 | 989 | 1020 | 1048 | 1081 | |
| | | | | Power (W) | 460 | 476 | 489 | 501 | 518 | 533 | 548 | 561 | 577 | |
| | | | | CFM | 1879 | 1833 | 1795 | 1754 | 1705 | 1657 | 1608 | 1563 | 1514 | |
| | | | 3 | RPM | 923 | 953 | 974 | 1000 | 1025 | 1052 | 1079 | 1109 | 1137 | |
| | | | | Power (W) | 648 | 666 | 678 | 694 | 708 | 724 | 740 | 757 | 773 | |
| | | | | CFM | 2113 | 2069 | 2039 | 1998 | 1963 | 1925 | 1885 | 1840 | 1795 | |
| | | | 4 | RPM | 972 | 994 | 1020 | 1041 | 1066 | 1090 | 1114 | 1144 | 1170 | |
| | | | | Power (W) | 771 | 785 | 803 | 817 | 832 | 848 | 864 | 883 | 900 | |
| | | | | CFM | 2235 | 2198 | 2163 | 2130 | 2094 | 2061 | 2019 | 1977 | 1939 | |
| | | | 5 | RPM | 1003 | 1025 | 1050 | 1074 | 1099 | 1122 | 1147 | 1166 | 1194 | 1209 |
| | | | | Power (W) | 866 | 881 | 899 | 916 | 934 | 951 | 970 | 977 | 973 | 969 |
| | | | | CFM | 2322 | 2290 | 2253 | 2219 | 2188 | 2152 | 2120 | 2083 | 2013 | 1940 |
| 1950 | 1500 | ECM - Constant Volume | Minimum CFM | RPM | 705 | 773 | 836 | 894 | 949 | 998 | 1044 | 1085 | 1121 | 1153 |
| | | | | Power (W) | 246 | 301 | 354 | 405 | 453 | 500 | 544 | 587 | 627 | 665 |
| | | | | CFM | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| | | | Default CFM | RPM | 852 | 899 | 949 | 992 | 1031 | 1085 | 1136 | 1179 | 1225 | 1272 |
| | | | | Power (W) | 501 | 562 | 629 | 683 | 731 | 804 | 871 | 926 | 986 | 1047 |
| | | | | CFM | 1950 | 1950 | 1950 | 1950 | 1950 | 1950 | 1950 | 1950 | 1950 | 1950 |
| | | | Maximum CFM | RPM | 995 | 1020 | 1044 | 1069 | 1094 | | | | | |
| | | | | Power (W) | 885 | 896 | 901 | 916 | 937 | | | | | |
| | | | | CFM | 2200 | 2200 | 2200 | 2200 | 2200 | | | | | |

See ECM control section for details on setting airflow.
Airflow is controlled within 5% up to the Max ESP shown with wet coil.
Do not select Dehumidification mode if HP CFM is on setting 1.
ClimaDry is factory wired to operate in stage 2 airflow.
Black areas denote ESP where operation is not recommended.
PSC: Units factory shipped on medium speed. Other speeds require field selection.
CT ECM: Units factory shipped on Speed Tap 2 for Fan-Only and Speed Tap 3 for Heating/Cooling.
All airflow is rated and shown above at the lower voltage if unit is dual voltage rated, e.g. 208V for 208-230V units.
Only two speed fan (H & M) available on 575V units.
Performance stated is at the rated power supply. Performance may vary as the power supply varies from the rated.
All data is shown wet coil with clean 1" filter.
All data is ran at 80 °F DB and 67 °F WB.
CFM Tolerance is 7%.
RPM/Watt Tolerance 10%.

All TR units with optional CV-ECM fan motor automatically adjusts for the reheat coil. The small additional pressure drop of the reheat coil causes the CV-ECM motor to slightly increase RPM to overcome the added pressure drop, and maintain selected CFM up to the maximum ESP.

# Blower Performance Data – TR Hybrid 006

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 225 | 150 | ECM - Constant Torque | 1 | RPM | 1019 | 1081 | 1165 | 1240 | 1322 | | | | | |
| | | | | Power (W) | 30 | 33 | 35 | 37 | 40 | | | | | |
| | | | | CFM | 228 | 211 | 190 | 168 | 158 | | | | | |
| | | | 2 | RPM | | | 1265 | 1336 | 1418 | 1475 | 1545 | 1616 | 1686 | |
| | | | | Power (W) | | | 45 | 48 | 50 | 53 | 55 | 58 | 60 | |
| | | | | CFM | | | 241 | 228 | 211 | 191 | 179 | 167 | 159 | |
| | | | 3 | RPM | | | | 1381 | 1454 | 1522 | 1583 | 1646 | 1715 | 1782 |
| | | | | Power (W) | | | | 57 | 60 | 61 | 64 | 66 | 68 | 70 |
| | | | | CFM | | | | 247 | 235 | 220 | 202 | 190 | 180 | 169 |
| | | | 4 | RPM | | | | | | 1559 | 1624 | 1683 | 1741 | 1806 |
| | | | | Power (W) | | | | | | 71 | 74 | 76 | 78 | 80 |
| | | | | CFM | | | | | | 244 | 232 | 220 | 210 | 195 |
| 225 | 150 | ECM - Constant Volume | Minimum CFM | RPM | 926 | 1027 | 1124 | 1231 | 1343 | 1434 | 1531 | 1638 | 1740 | 1841 |
| | | | | Power (W) | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 |
| | | | | CFM | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| | | | Default CFM | RPM | 1029 | 1137 | 1248 | 1353 | 1456 | 1569 | 1680 | 1785 | 1893 | 2001 |
| | | | | Power (W) | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 |
| | | | | CFM | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 |
| | | | Maximum CFM | RPM | 1084 | 1185 | 1285 | 1386 | 1487 | 1587 | 1687 | 1788 | 1888 | 1989 |
| | | | | Power (W) | 33 | 41 | 50 | 56 | 60 | 71 | 80 | 86 | 93 | 101 |
| | | | | CFM | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
See performance correction tables for operating conditions other than those listed above.

# Blower Performance Data – TR Hybrid 009

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 325 | 225 | ECM - Constant Torque | 1 | RPM | 1199 | 1256 | 1310 | 1373 | 1452 | | | | | |
| | | | | Power (W) | 50 | 53 | 55 | 57 | 60 | | | | | |
| | | | | CFM | 283 | 269 | 255 | 243 | 229 | | | | | |
| | | | 2 | RPM | 1325 | 1374 | 1431 | 1477 | 1541 | 1605 | 1670 | 1730 | 1783 | |
| | | | | Power (W) | 60 | 63 | 65 | 67 | 70 | 71 | 74 | 76 | 78 | |
| | | | | CFM | 332 | 314 | 298 | 286 | 276 | 263 | 251 | 239 | 228 | |
| | | | 3 | RPM | 1461 | 1505 | 1553 | 1600 | 1645 | 1699 | 1746 | 1804 | 1823 | 1843 |
| | | | | Power (W) | 80 | 83 | 85 | 88 | 90 | 93 | 95 | 98 | 100 | 103 |
| | | | | CFM | 374 | 358 | 348 | 338 | 328 | 321 | 302 | 287 | 256 | 223 |
| | | | 4 | RPM | | | | | | 1819 | 1834 | 1822 | 1827 | 1849 |
| | | | | Power (W) | | | | | | 130 | 120 | 110 | 100 | 90 |
| | | | | CFM | | | | | | 372 | 353 | 300 | 265 | 231 |
| 325 | 225 | ECM - Constant Volume | Minimum CFM | RPM | 976 | 1080 | 1182 | 1290 | 1401 | 1499 | 1601 | 1709 | 1814 | 1918 |
| | | | | Power (W) | 33 | 41 | 50 | 56 | 60 | 71 | 80 | 86 | 93 | 101 |
| | | | | CFM | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 |
| | | | Default CFM | RPM | | | 1684 | 1714 | 1753 | 1754 | 1765 | 1795 | | |
| | | | | Power (W) | | | 110 | 109 | 110 | 104 | 100 | 99 | | |
| | | | | CFM | | | 325 | 325 | 325 | 325 | 325 | 325 | | |
| | | | Maximum CFM | RPM | | | | | 1757 | 1766 | 1774 | 1783 | | |
| | | | | Power (W) | | | | | 120 | 108 | 100 | 98 | | |
| | | | | CFM | | | | | 375 | 375 | 375 | 375 | | |

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
See performance correction tables for operating conditions other than those listed above.

# Blower Performance Data – TR Hybrid 012

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 400 | 300 | ECM - Constant Torque | 1 | RPM | 1402 | 1449 | 1492 | 1539 | 1597 | | | | | |
| | | | | Power (W) | 70 | 73 | 75 | 78 | 80 | | | | | |
| | | | | CFM | 348 | 335 | 325 | 311 | 299 | | | | | |
| | | | 2 | RPM | 1524 | 1570 | 1604 | 1649 | 1690 | 1737 | 1794 | | | |
| | | | | Power (W) | 90 | 93 | 97 | 100 | 103 | 107 | 110 | | | |
| | | | | CFM | 377 | 374 | 365 | 354 | 345 | 335 | 317 | | | |
| | | | 3 | RPM | 1727 | 1765 | 1790 | 1794 | 1796 | 1802 | 1807 | | | |
| | | | | Power (W) | 130 | 128 | 124 | 121 | 120 | 115 | 110 | | | |
| | | | | CFM | 435 | 427 | 416 | 397 | 376 | 351 | 320 | | | |
| | | | 4 | RPM | 1760 | 1780 | 1784 | 1786 | 1796 | 1798 | 1816 | | | |
| | | | | Power (W) | 140 | 137 | 132 | 130 | 122 | 117 | 110 | | | |
| | | | | CFM | 445 | 432 | 416 | 391 | 376 | 354 | 324 | | | |
| 400 | 300 | ECM - Constant Volume | Minimum CFM | RPM | 1318 | 1404 | 1487 | 1576 | 1667 | 1748 | 1831 | 1920 | 2006 | 2092 |
| | | | | Power (W) | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 |
| | | | | CFM | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 |
| | | | Default CFM | RPM | 1648 | 1716 | 1787 | 1852 | 1913 | 1988 | 2059 | 2124 | 2192 | 2260 |
| | | | | Power (W) | 97 | 109 | 120 | 134 | 150 | 159 | 170 | 184 | 197 | 209 |
| | | | | CFM | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 |
| | | | Maximum CFM | RPM | 2023 | 2028 | 2032 | 2038 | 2045 | 2048 | 2052 | 2058 | 2063 | 2068 |
| | | | | Power (W) | 200 | 195 | 190 | 185 | 180 | 175 | 170 | 165 | 160 | 155 |
| | | | | CFM | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 |

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
See performance correction tables for operating conditions other than those listed above.

# Blower Performance Data – TR Hybrid 015

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| **525** | 375 | ECM - Constant Torque | 1 | RPM | | 838 | 902 | 974 | 1055 | 1126 | | | | |
| | | | | Power (W) | | 83 | 90 | 96 | 103 | 110 | | | | |
| | | | | CFM | | 589 | 549 | 505 | 452 | 393 | | | | |
| | | | 2 | RPM | | | 935 | 996 | 1070 | 1146 | 1210 | 1266 | | |
| | | | | Power (W) | | | 107 | 110 | 118 | 126 | 132 | 137 | | |
| | | | | CFM | | | 618 | 561 | 517 | 460 | 411 | 371 | | |
| | | | 3 | RPM | | | | 1016 | 1081 | 1150 | 1233 | 1291 | 1338 | |
| | | | | Power (W) | | | | 125 | 132 | 141 | 149 | 155 | 159 | |
| | | | | CFM | | | | 615 | 576 | 529 | 471 | 428 | 386 | |
| | | | 4 | RPM | | | | | | 1163 | 1241 | 1316 | 1365 | 1413 |
| | | | | Power (W) | | | | | | 160 | 169 | 177 | 184 | 189 |
| | | | | CFM | | | | | | 602 | 557 | 493 | 454 | 417 |
| | | | 5 | RPM | | | | | | | 1252 | 1317 | 1391 | 1438 |
| | | | | Power (W) | | | | | | | 191 | 198 | 208 | 215 |
| | | | | CFM | | | | | | | 626 | 577 | 519 | 480 |
| **525** | 375 | ECM - Constant Volume | Minimum CFM | RPM | 723 | 793 | 813 | 934 | 1004 | 1074 | 1161 | | | |
| | | | | Power (W) | 27 | 44 | 62 | 80 | 97 | 115 | 133 | | | |
| | | | | CFM | 375 | 375 | 375 | 375 | 375 | 375 | 375 | | | |
| | | | Default CFM | RPM | 756 | 830 | 872 | 976 | 1049 | 1123 | 1207 | 1269 | 1343 | |
| | | | | Power (W) | 53 | 76 | 99 | 121 | 143 | 166 | 189 | 211 | 234 | |
| | | | | CFM | 525 | 525 | 525 | 525 | 525 | 525 | 525 | 525 | 525 | |
| | | | Maximum CFM | RPM | 777 | 851 | 924 | 1000 | 1078 | 1149 | 1221 | 1298 | 1372 | 1446 |
| | | | | Power (W) | 84 | 107 | 131 | 154 | 176 | 200 | 224 | 247 | 270 | 293 |
| | | | | CFM | 625 | 625 | 625 | 625 | 625 | 625 | 625 | 625 | 625 | 625 |

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
See performance correction tables for operating conditions other than those listed above.

# Blower Performance Data – TR Hybrid 018

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 600 | 450 | ECM - Constant Torque | 1 | RPM | 774 | 842 | 914 | 1002 | 1101 | | | | | |
| | | | | Power (W) | 87 | 93 | 100 | 110 | 120 | | | | | |
| | | | | CFM | 659 | 634 | 600 | 557 | 505 | | | | | |
| | | | 2 | RPM | 823 | 873 | 942 | 1017 | 1100 | 1209 | 1267 | 1318 | | |
| | | | | Power (W) | 104 | 110 | 118 | 127 | 136 | 149 | 155 | 161 | | |
| | | | | CFM | 707 | 691 | 658 | 622 | 580 | 515 | 464 | 426 | | |
| | | | 3 | RPM | 866 | 905 | 975 | 1038 | 1111 | 1191 | 1299 | 1354 | 1397 | |
| | | | | Power (W) | 124 | 129 | 138 | 146 | 156 | 166 | 180 | 188 | 192 | |
| | | | | CFM | 754 | 749 | 715 | 685 | 648 | 608 | 542 | 496 | 456 | |
| | | | 4 | RPM | | | | 1070 | 1133 | 1201 | 1277 | 1378 | 1443 | 1487 |
| | | | | Power (W) | | | | 174 | 184 | 194 | 205 | 220 | 230 | 236 |
| | | | | CFM | | | | 756 | 726 | 691 | 653 | 597 | 543 | 507 |
| | | | 5 | RPM | | | | | | | 1288 | 1359 | 1442 | 1532 |
| | | | | Power (W) | | | | | | | 236 | 248 | 262 | 276 |
| | | | | CFM | | | | | | | 737 | 702 | 659 | 593 |
| 600 | 450 | ECM - Constant Volume | Minimum CFM | RPM | 682 | 772 | 860 | 950 | 1041 | 1128 | 1216 | 1306 | 1395 | 1484 |
| | | | | Power (W) | 46 | 69 | 93 | 115 | 136 | 161 | 185 | 207 | 230 | 253 |
| | | | | CFM | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 |
| | | | Default CFM | RPM | 752 | 829 | 904 | 982 | 1062 | 1136 | 1211 | 1289 | 1366 | 1442 |
| | | | | Power (W) | 75 | 99 | 122 | 145 | 167 | 191 | 215 | 238 | 261 | 284 |
| | | | | CFM | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 |
| | | | Maximum CFM | RPM | 831 | 902 | 967 | 1042 | 1123 | 1183 | 1248 | 1323 | 1394 | 1464 |
| | | | | Power (W) | 123 | 150 | 177 | 205 | 234 | 260 | 287 | 315 | 342 | 370 |
| | | | | CFM | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 |

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
See performance correction tables for operating conditions other than those listed above.

# Blower Performance Data – TR Hybrid 024

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 800 | 600 | ECM - Constant Torque | 1 | RPM | 816 | 871 | 928 | 988 | 1045 | 1119 | | | | |
| | | | | Power (W) | 125 | 133 | 141 | 149 | 157 | 168 | | | | |
| | | | | CFM | 787 | 756 | 723 | 686 | 649 | 604 | | | | |
| | | | 2 | RPM | 875 | 925 | 974 | 1030 | 1084 | 1137 | 1196 | 1271 | 1315 | |
| | | | | Power (W) | 160 | 168 | 177 | 186 | 195 | 204 | 214 | 227 | 235 | |
| | | | | CFM | 876 | 848 | 819 | 787 | 753 | 720 | 684 | 634 | 603 | |
| | | | 3 | RPM | 934 | 979 | 1026 | 1070 | 1124 | 1174 | 1224 | 1275 | 1339 | 1399 |
| | | | | Power (W) | 200 | 209 | 218 | 226 | 237 | 247 | 257 | 267 | 280 | 293 |
| | | | | CFM | 962 | 936 | 909 | 883 | 851 | 820 | 789 | 755 | 715 | 676 |
| | | | 4 | RPM | | | 1083 | 1127 | 1167 | 1218 | 1263 | 1309 | 1355 | 1405 |
| | | | | Power (W) | | | 270 | 280 | 289 | 301 | 311 | 322 | 333 | 345 |
| | | | | CFM | | | 1004 | 980 | 954 | 925 | 896 | 867 | 838 | 807 |
| | | | 5 | RPM | | | | | | | 1314 | 1357 | 1399 | 1444 |
| | | | | Power (W) | | | | | | | 380 | 391 | 403 | 416 |
| | | | | CFM | | | | | | | 1004 | 977 | 950 | 923 |
| 800 | 600 | ECM - Constant Volume | Minimum CFM | RPM | 766 | 833 | 899 | 967 | 1037 | 1101 | 1167 | 1235 | 1302 | 1369 |
| | | | | Power (W) | 80 | 99 | 118 | 136 | 154 | 174 | 193 | 211 | 229 | 248 |
| | | | | CFM | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 |
| | | | Default CFM | RPM | 890 | 950 | 1006 | 1071 | 1141 | 1192 | 1247 | 1312 | 1372 | 1433 |
| | | | | Power (W) | 148 | 172 | 194 | 218 | 244 | 265 | 287 | 312 | 335 | 359 |
| | | | | CFM | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 |
| | | | Maximum CFM | RPM | 1034 | 1088 | 1144 | 1195 | 1244 | 1302 | 1358 | 1409 | 1463 | 1516 |
| | | | | Power (W) | 256 | 285 | 316 | 343 | 368 | 401 | 432 | 459 | 488 | 517 |
| | | | | CFM | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
See performance correction tables for operating conditions other than those listed above.

# Blower Performance Data – TR Hybrid 030

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 1000 | 750 | ECM - Constant Torque | 1 | RPM | 886 | 927 | 965 | 994 | 1040 | 1071 | 1101 | | | |
| | | | | Power (W) | 205 | 214 | 222 | 229 | 239 | 246 | 252 | | | |
| | | | | CFM | 916 | 886 | 857 | 837 | 799 | 772 | 749 | | | |
| | | | 2 | RPM | 969 | 1009 | 1045 | 1077 | 1109 | 1139 | 1168 | 1214 | 1234 | 1267 |
| | | | | Power (W) | 277 | 287 | 297 | 306 | 314 | 322 | 330 | 342 | 348 | 357 |
| | | | | CFM | 1030 | 1004 | 977 | 951 | 929 | 907 | 883 | 838 | 828 | 807 |
| | | | 3 | RPM | 1058 | 1097 | 1131 | 1162 | 1192 | 1221 | 1249 | 1281 | 1322 | 1330 |
| | | | | Power (W) | 369 | 382 | 393 | 404 | 414 | 423 | 432 | 443 | 456 | 460 |
| | | | | CFM | 1147 | 1123 | 1098 | 1075 | 1052 | 1030 | 1012 | 986 | 947 | 949 |
| | | | 4 | RPM | | 1180 | 1213 | 1243 | 1272 | 1300 | 1326 | 1352 | 1377 | 1400 |
| | | | | Power (W) | | 494 | 507 | 518 | 530 | 541 | 551 | 561 | 571 | 580 |
| | | | | CFM | | 1244 | 1219 | 1198 | 1176 | 1152 | 1134 | 1116 | 1098 | 1082 |
| | | | 5 | RPM | | | | | | | | 1434 | 1458 | 1477 |
| | | | | Power (W) | | | | | | | | 711 | 722 | 723 |
| | | | | CFM | | | | | | | | 1246 | 1228 | 1200 |
| 1000 | 750 | ECM - Constant Volume | Minimum CFM | RPM | 841 | 892 | 942 | 994 | 1048 | 1096 | 1146 | 1198 | 1249 | 1300 |
| | | | | Power (W) | 160 | 184 | 208 | 232 | 256 | 280 | 304 | 328 | 352 | 375 |
| | | | | CFM | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 |
| | | | Default CFM | RPM | 1027 | 1070 | 1112 | 1156 | 1202 | 1243 | 1285 | 1330 | 1373 | 1416 |
| | | | | Power (W) | 324 | 354 | 383 | 413 | 443 | 472 | 502 | 532 | 561 | 591 |
| | | | | CFM | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| | | | Maximum CFM | RPM | 1211 | 1245 | 1271 | 1312 | 1361 | 1379 | 1405 | | | |
| | | | | Power (W) | 604 | 626 | 635 | 671 | 720 | 716 | 725 | | | |
| | | | | CFM | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | | | |

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
See performance correction tables for operating conditions other than those listed above.

# Blower Performance Data – TR Hybrid 036

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 1150 | 900 | ECM - Constant Torque | 1 | RPM | 791 | 831 | 872 | 912 | 954 | | | | | |
| | | | | Power (W) | 180 | 189 | 198 | 206 | 215 | | | | | |
| | | | | CFM | 1032 | 1003 | 970 | 938 | 903 | | | | | |
| | | | 2 | RPM | 838 | 875 | 912 | 950 | 990 | 1033 | 1071 | | | |
| | | | | Power (W) | 218 | 227 | 236 | 246 | 255 | 265 | 275 | | | |
| | | | | CFM | 1116 | 1089 | 1062 | 1031 | 997 | 963 | 930 | | | |
| | | | 3 | RPM | 902 | 937 | 971 | 1006 | 1041 | 1076 | 1111 | 1150 | 1193 | 1249 |
| | | | | Power (W) | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 351 | 364 | 380 |
| | | | | CFM | 1229 | 1206 | 1180 | 1153 | 1125 | 1095 | 1068 | 1036 | 1001 | 944 |
| | | | 4 | RPM | 993 | 1026 | 1057 | 1088 | 1119 | 1152 | 1184 | 1214 | 1247 | 1283 |
| | | | | Power (W) | 391 | 402 | 414 | 425 | 436 | 448 | 459 | 470 | 482 | 496 |
| | | | | CFM | 1398 | 1374 | 1354 | 1329 | 1304 | 1278 | 1252 | 1226 | 1201 | 1172 |
| | | | 5 | RPM | 1046 | 1079 | 1107 | 1139 | 1170 | 1186 | 1226 | 1258 | 1287 | 1318 |
| | | | | Power (W) | 474 | 487 | 498 | 511 | 530 | 527 | 544 | 557 | 570 | 584 |
| | | | | CFM | 1503 | 1480 | 1458 | 1438 | 1428 | 1388 | 1361 | 1338 | 1313 | 1290 |
| 1150 | 900 | ECM - Constant Volume | Minimum CFM | RPM | 728 | 784 | 838 | 895 | 953 | 1006 | 1060 | 1117 | | |
| | | | | Power (W) | 126 | 148 | 171 | 193 | 215 | 238 | 261 | 284 | | |
| | | | | CFM | 900 | 900 | 900 | 900 | 900 | 900 | 900 | 900 | | |
| | | | Default CFM | RPM | 883 | 931 | 976 | 1026 | 1077 | 1120 | 1166 | 1215 | 1263 | 1310 |
| | | | | Power (W) | 253 | 283 | 311 | 341 | 372 | 400 | 429 | 459 | 489 | 518 |
| | | | | CFM | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 |
| | | | Maximum CFM | RPM | 1023 | 1065 | 1107 | 1150 | 1194 | | | | | |
| | | | | Power (W) | 446 | 485 | 524 | 563 | 601 | | | | | |
| | | | | CFM | 1500 | 1500 | 1500 | 1500 | 1500 | | | | | |

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
See performance correction tables for operating conditions other than those listed above.

# Blower Performance Data – TR Hybrid 042

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 1400 | 1050 | ECM - Constant Torque | 1 | RPM | 883 | 918 | 954 | 992 | 1030 | | | | | |
| | | | | Power (W) | 248 | 257 | 266 | 277 | 287 | | | | | |
| | | | | CFM | 1189 | 1156 | 1126 | 1089 | 1053 | | | | | |
| | | | 2 | RPM | 970 | 1001 | 1033 | 1065 | 1097 | 1130 | 1168 | 1207 | 1245 | |
| | | | | Power (W) | 338 | 349 | 359 | 370 | 380 | 391 | 403 | 417 | 429 | |
| | | | | CFM | 1348 | 1320 | 1290 | 1259 | 1227 | 1195 | 1163 | 1124 | 1087 | |
| | | | 3 | RPM | 1068 | 1098 | 1126 | 1153 | 1182 | 1211 | 1240 | 1271 | 1302 | 1340 |
| | | | | Power (W) | 465 | 479 | 490 | 502 | 513 | 525 | 537 | 550 | 562 | 578 |
| | | | | CFM | 1513 | 1485 | 1460 | 1432 | 1405 | 1375 | 1349 | 1319 | 1287 | 1254 |
| | | | 4 | RPM | 1160 | 1185 | 1213 | 1237 | 1262 | 1289 | 1314 | 1340 | 1367 | 1395 |
| | | | | Power (W) | 611 | 625 | 638 | 649 | 661 | 675 | 688 | 700 | 714 | 728 |
| | | | | CFM | 1679 | 1655 | 1628 | 1604 | 1577 | 1553 | 1529 | 1503 | 1476 | 1450 |
| | | | 5 | RPM | | | 1271 | 1292 | 1309 | 1327 | 1346 | 1364 | 1385 | 1405 |
| | | | | Power (W) | | | 753 | 761 | 759 | 757 | 756 | 754 | 753 | 751 |
| | | | | CFM | | | 1736 | 1709 | 1672 | 1634 | 1595 | 1558 | 1514 | 1472 |
| 1400 | 1050 | ECM - Constant Volume | Minimum CFM | RPM | 816 | 870 | 921 | 976 | 1034 | | | | | |
| | | | | Power (W) | 176 | 204 | 232 | 260 | 288 | | | | | |
| | | | | CFM | 1050 | 1050 | 1050 | 1050 | 1050 | | | | | |
| | | | Default CFM | RPM | 986 | 1032 | 1077 | 1125 | 1173 | 1217 | 1262 | 1309 | 1356 | 1402 |
| | | | | Power (W) | 360 | 397 | 434 | 471 | 508 | 545 | 582 | 619 | 656 | 693 |
| | | | | CFM | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 |
| | | | Maximum CFM | RPM | | | 1265 | 1284 | | | | | | |
| | | | | Power (W) | | | 778 | 776 | | | | | | |
| | | | | CFM | | | 1750 | 1750 | | | | | | |

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
See performance correction tables for operating conditions other than those listed above.

# Blower Performance Data – TR Hybrid 048

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 1500 | 1200 | ECM - Constant Torque | 1 | RPM | 731 | 770 | 807 | 840 | | | | | | |
| | | | | Power (W) | 251 | 263 | 275 | 285 | | | | | | |
| | | | | CFM | 1396 | 1328 | 1262 | 1206 | | | | | | |
| | | | 2 | RPM | 798 | 833 | 867 | 900 | 931 | 963 | 1000 | | | |
| | | | | Power (W) | 340 | 354 | 366 | 378 | 389 | 401 | 415 | | | |
| | | | | CFM | 1576 | 1517 | 1449 | 1393 | 1343 | 1291 | 1235 | | | |
| | | | 3 | RPM | 864 | 902 | 935 | 965 | 995 | 1024 | 1054 | 1085 | 1121 | 1183 |
| | | | | Power (W) | 458 | 476 | 491 | 505 | 519 | 533 | 547 | 561 | 578 | 608 |
| | | | | CFM | 1767 | 1715 | 1655 | 1599 | 1546 | 1497 | 1449 | 1400 | 1345 | 1259 |
| | | | 4 | RPM | 927 | 956 | 986 | 1016 | 1044 | 1084 | 1112 | 1138 | 1166 | 1194 |
| | | | | Power (W) | 598 | 615 | 632 | 649 | 666 | 682 | 698 | 713 | 729 | 747 |
| | | | | CFM | 1980 | 1928 | 1877 | 1824 | 1772 | 1697 | 1651 | 1609 | 1565 | 1521 |
| | | | 5 | RPM | | | | | 1103 | 1129 | 1155 | 1181 | 1207 | 1232 |
| | | | | Power (W) | | | | | 831 | 848 | 866 | 885 | 904 | 921 |
| | | | | CFM | | | | | 1963 | 1916 | 1872 | 1830 | 1791 | 1755 |
| 1500 | 1200 | ECM - Constant Volume | Minimum CFM | RPM | 724 | 774 | 824 | 875 | 928 | 977 | 1026 | 1078 | 1129 | 1179 |
| | | | | Power (W) | 192 | 231 | 272 | 310 | 348 | 389 | 429 | 468 | 508 | 547 |
| | | | | CFM | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| | | | Default CFM | RPM | 883 | 925 | 965 | 1008 | 1052 | 1091 | 1131 | 1174 | 1216 | 1257 |
| | | | | Power (W) | 408 | 453 | 498 | 544 | 589 | 634 | 679 | 725 | 770 | 815 |
| | | | | CFM | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| | | | Maximum CFM | RPM | 993 | 1031 | 1068 | 1109 | 1151 | 1187 | 1224 | 1264 | 1303 | 1342 |
| | | | | Power (W) | 625 | 678 | 730 | 786 | 843 | 893 | 945 | 1000 | 1054 | 1108 |
| | | | | CFM | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
See performance correction tables for operating conditions other than those listed above.

# Blower Performance Data – TR Hybrid 060

| Rated CFM | Min CFM | Motor Type | Motor Speed Setting | | External Static Pressure (in. wg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 1950 | 1500 | ECM - Constant Torque | 1 | RPM | 856 | 886 | 916 | 946 | 978 | | | | | |
| | | | | Power (W) | 448 | 462 | 476 | 490 | 505 | | | | | |
| | | | | CFM | 1739 | 1693 | 1646 | 1595 | 1546 | | | | | |
| | | | 2 | RPM | 943 | 969 | 997 | 1026 | 1054 | 1081 | 1110 | 1140 | 1170 | 1199 |
| | | | | Power (W) | 622 | 637 | 654 | 670 | 687 | 702 | 719 | 736 | 753 | 770 |
| | | | | CFM | 1954 | 1915 | 1872 | 1828 | 1780 | 1736 | 1692 | 1648 | 1604 | 1562 |
| | | | 3 | RPM | 1029 | 1053 | 1079 | 1106 | 1133 | 1159 | 1185 | 1210 | 1230 | 1250 |
| | | | | Power (W) | 833 | 850 | 868 | 887 | 906 | 925 | 943 | 960 | 957 | 953 |
| | | | | CFM | 2166 | 2126 | 2087 | 2045 | 2000 | 1954 | 1914 | 1872 | 1814 | 1755 |
| | | | 4 | RPM | 1049 | 1073 | 1099 | 1125 | 1149 | 1169 | 1189 | 1208 | 1228 | 1248 |
| | | | | Power (W) | 897 | 915 | 934 | 952 | 963 | 959 | 955 | 952 | 948 | 946 |
| | | | | CFM | 2224 | 2186 | 2145 | 2107 | 2055 | 1988 | 1926 | 1864 | 1804 | 1745 |
| | | | 5 | RPM | | | | | | | | | | |
| | | | | Power (W) | | | | | | | | | | |
| | | | | CFM | | | | | | | | | | |
| 1950 | 1500 | ECM - Constant Volume | Minimum CFM | RPM | 814 | 862 | 908 | 956 | 1006 | 1051 | 1097 | 1145 | 1192 | 1240 |
| | | | | Power (W) | 324 | 376 | 428 | 479 | 530 | 582 | 634 | 685 | 736 | 788 |
| | | | | CFM | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| | | | Default CFM | RPM | 1046 | 1072 | 1093 | 1123 | 1158 | 1175 | 1196 | | | |
| | | | | Power (W) | 854 | 872 | 874 | 908 | 956 | 943 | 945 | | | |
| | | | | CFM | 1950 | 1950 | 1950 | 1950 | 1950 | 1950 | 1950 | | | |
| | | | Maximum CFM | RPM | 1078 | 1097 | 1116 | | | | | | | |
| | | | | Power (W) | 955 | 950 | 946 | | | | | | | |
| | | | | CFM | 2200 | 2200 | 2200 | | | | | | | |

Interpolation is permissible; extrapolation is not.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
See performance correction tables for operating conditions other than those listed above.

# Constant Volume ECM Control

The ECM Constant Volume (CV) blower motor (optional) is controlled directly by the DXM2 control board that converts thermostat inputs and CFM settings to signals used by the ECM-CV motor controller. The DXM2 control must be used to control the CV ECM motor.

To take full advantage of the ECM-CV motor features, a communicating multi-stage thermostat should be used (ATC32U03C). The DXM2 control maintains a selectable operating airflow [CFM] for each heat pump operating mode. For each operating mode there are maximum and minimum airflow limits. See the ECM-CV Blower Performance tables for the maximum, minimum, and default operating airflows. Airflow levels are selected using the configuration menus of a communicating thermostat (ATC32U03C) or configuration/ diagnostic tool (ACDU03C) and harness 11B0100N27). The configuration menus allow the installer to independently select and adjust the operating airflow for each of the operating modes. Airflow can be selected in 25 CFM increments within the minimum and maximum limits shown in the ECM-CV Blower Performance Table. The blower operating modes include:

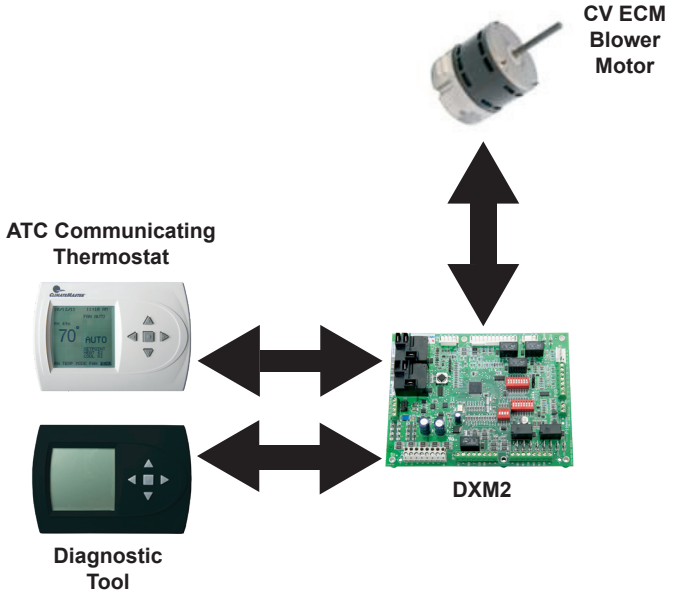
- First Stage Cooling (Y1 & O)
- Second Stage Cooling (Y1, Y2, & O)
- First Stage Heating (Y1)
- Second Stage Heating (Y1 & Y2)
- Fan (G with no Y1, Y2, or W)

**The ECM-CV motor includes "soft start" and "ramp down" features.** The soft start feature is a gentle increase of motor rpm at 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 overall unit efficiency. The ramp down feature is eliminated during an ESD (Emergency Shut Down) situation. When the DXM2 ESD input is activated, the blower and all other control outputs are immediately de-activated.

The ramp down feature (also known as the heating or cooling "Off Delay") is field selectable by the installer. The allowable range is 0 to 255 seconds.

**1. Constant Dehumidification Mode:** When the dehumidification mode is selected (via DIP switch or jumper setting), the ECM motor will operate with a multiplier applied to the cooling CFM settings (approx. 20-25% lower airflow). Any time the unit is running in the cooling mode, it will operate at the lower airflow to improve latent capacity. The "DEHUM" LED will be illuminated at all times. Heating airflow is not affected. Note: Do not select dehumidification mode if cooling setting is tap 1.




| AIRFLOW SELECTION | CFM |
|---|---|
| HEAT STAGE 1 | 600 |
| HEAT STAGE 2 | 750 |
| AUXILIARY HEAT | 850 |
| EMERGENCY HEAT | 850 |
| COOL STAGE 1 | 525 |
| COOL STAGE 2 | 700 |
| COOL DEHUMID 1 | 425 |
| COOL DEHUMID 2 | 550 |
| CONTINUOUS FAN | 350 |
| HEAT OFF DELAY | 60 |
| COOL OFF DELAY | 30 |
| ◀ PREVIOUS | NEXT ▶ |

Airflow Configuration Screen on Communicating Thermostat or (ACDU) Service Tool.

**2. Automatic (Humidistat-controlled):** Dehumidification Mode: When the dehumidification mode is selected (via DIP switch) AND a humidistat is connected to terminal DH, the cooling airflow will only be reduced when the humidistat senses that additional dehumidification is required. The DH terminal is reverse logic. Therefore, a humidistat (not dehumidistat) is required. The "DEHUM" LED will be illuminated only when the humidistat is calling for dehumidification mode. Heating airflow is not affected.

# TR Series Wiring Diagram Matrix

All current diagrams can be located online at climatemaster.com. Click 'Commercial Professional' (go to 'Resources/ literature/wiring diagrams' in the upper right), use part numbers below to lookup wiring diagrams

| Unit Controller | Fan Motor | ClimaDry | Hybrid | 208v/1 - 265v/1 | | 208v/3 | 460v/3 | 575v/3 |
|---|---|---|---|---|---|---|---|---|
| | | | | 006-012 | 015-060 | 024-060 | 024-060 | 042-060 |
| CXM | PSC | None | None | 96B0500N11 | | 96B0500N21 | 96B0500N31 | |
| | CT ECM | None | None | 96B0506N11 | | 96B0506N21 | 96B0506N31 | |
| | | None | Hybrid | 96B0511N11 | | 96B0511N21 | 96B0511N31 | |
| DXM2 | PSC | None | None | 96B0521N11 | | 96B0521N21 | 96B0521N31 | |
| | | ClimaDry | None | | 96B0524N11 | 96B0524N21 | 96B0524N31 | |
| | CT ECM | None | None | 96B0527N11 | | 96B0527N21 | 96B0527N31 | |
| | | None | Hybrid | 96B0532N11 | | 96B0532N21 | 96B0532N31 | |
| | | ClimaDry | None | | 96B0528N11 | 96B0528N21 | 96B0528N31 | |
| | CV ECM | None | None | 96B0523N01 | 96B0523N11 | 96B0523N21 | 96B0523N31 | |
| | | None | Hybrid | 96B0530N01 | 96B0530N11 | 96B0530N21 | 96B0530N31 | |
| | | ClimaDry | None | | 96B0525N11 | 96B0525N21 | 96B0525N31 | |
| Auxiliary WD for MPC | | | | 96B0147N14 | | | | |
| Auxiliary WD for MPC & Hybrid | | | | 96B0147N16 | | | | |
| Auxiliary WD for MPC & Reheat | | | | 96B0147N15 | | | | |
| Control Box Layouts | | | | 96B0500N00 | | | | |

# CXM Controls

**CXM Control -** For detailed control information, see CXM Application, Operation and Maintenance (AOM) manual (part # 97B0003N12).

**Field Selectable Inputs -** Test mode: Test mode allows the service technician to check the operation of the control in a timely manner. At board, momentarily shorting the test terminals or externally, momentarily push test button (See Fig 22), the CXM control enters a 20 minute test mode period in which all time delays are sped up 15 times. Upon entering test mode, the status LED will flash a code representing the last fault. For diagnostic ease at the thermostat, the alarm relay will also cycle during test mode. The alarm relay will cycle on and off similar to the status LED to indicate a code representing the last fault, at the thermostat. Test mode can be exited by shorting the test terminals or holding button for 3 seconds.

**Retry Mode:** If the control is attempting a retry of a fault, the status LED will slow flash (slow flash = one flash every 2 seconds) to indicate the control is in the process of retrying.

**Field Configuration Options -** Note: In the following field configuration options, jumper wires should be clipped ONLY when power is removed from the CXM control.

Water coil low temperature limit setting: Jumper 3 (JW3-LT1 Low Temp) provides field selection of temperature limit setting for LT1 of 30°F or 10°F [-1°F or -12°C] (refrigerant temperature).
*Not Clipped = 30°F [-1°C]. Clipped = 10°F [-12°C].*

Air coil low temperature limit setting: Jumper 2 (JW2-LT2 Low Temp) provides field selection of temperature limit setting for LT2 of 30°F or 10°F [-1°F or -12°C] (refrigerant temperature). **Note: This jumper should only be clipped under extenuating circumstances, as recommended by the factory.**
*Not Clipped = 30°F [-1°C]. Clipped = 10°F [-12°C].*

Alarm relay setting: Jumper 1 (JW1-AL2 Dry) provides field selection of the alarm relay terminal AL2 to be jumpered to 24VAC or to be a dry contact (no connection).
*Not Clipped = AL2 connected to R. Clipped = AL2 dry contact (no connection).*

**DIP Switches -** Note: In the following field configuration options, DIP switches should only be changed when power is removed from the CXM control.

DIP switch 1: Unit Performance Sentinel Disable - provides field selection to disable the UPS feature.
*On = Enabled. Off = Disabled.*

DIP switch 2: Stage 2 Selection - provides selection of whether compressor has an "on" delay. If set to stage 2, the compressor will have a 3 second delay before energizing. Also, if set for stage 2, the alarm relay will NOT cycle during test mode.
On = Stage 1. Off = Stage 2

DIP switch 3: Not Used.

DIP switch 4: DDC Output at EH2 - provides selection for DDC operation. If set to "DDC Output at EH2," the EH2 terminal will continuously output the last fault code of the controller. If set to "EH2 normal," EH2 will operate as standard electric heat output.
*On = EH2 Normal. Off = DDC Output at EH2.*

**Note: Some CXM controls only have a 2 position DIP switch package. If this is the case, this option can be selected by clipping the jumper which is in position 4 of SW1.**
*Jumper not clipped = EH2 Normal. Jumper clipped = DDC Output at EH2.*

DIP switch 5: Factory Setting - Normal position is "On." Do not change selection unless instructed to do so by the factory.

**Table 5a: LED And Alarm Relay Operations**

| Description of Operation | LED | Alarm |
|---|---|---|
| Normal Mode | ON | Open |
| Normal Mode w/UPS Warning | ON | Cycle (Closed 5 seconds, Open 25 seconds) |
| CXM is non-functional | OFF | Open |
| Fault Retry | Slow Flash | Open |
| Lockout | Fast Flash | Closed |
| Over/Under Voltage Shutdown | Slow Flash | Open (Closed after 15 Minutes) |
| Test Mode - No Fault in Memory | Flashing Code 1 | Cycling Code 1 |
| Test Mode - HP Fault in Memory | Flashing Code 2 | Cycling Code 2 |
| Test Mode - LP Fault in Memory | Flashing Code 3 | Cycling Code 3 |
| Test Mode - LT1 Fault in Memory | Flashing Code 4 | Cycling Code 4 |
| Test Mode - LT2 Fault in Memory | Flashing Code 5 | Cycling Code 5 |
| Test Mode - CO Fault in Memory | Flashing Code 6 | Cycling Code 6 |
| Test Mode - Over/Under Shutdown in Memory | Flashing Code 7 | Cycling Code 7 |
| Test Mode - UPS in Memory | Flashing Code 8 | Cycling Code 8 |
| Test Mode - Swapped Thermistor | Flashing Code 9 | Cycling Code 9 |

- Slow Flash = 1 flash every 2 seconds
- Fast Flash = 2 flashes every 1 second
- Flash code 2 = 2 quick flashes, 10 second pause, 2 quick flashes, 10 second pause, etc.
- On pulse 1/3 second; off pulse 1/3 second

**⚠ CAUTION! ⚠**

**CAUTION!** Do not restart units without inspection and remedy of faulting condition. Equipment damage may occur.

# DXM2 Controls

**DXM2 Control -** For detailed control information, see DXM2 Application, Operation and Maintenance (AOM) manual (part # 97B0003N15).

**Field Selectable Inputs -** Test mode: Test mode allows the service technician to check the operation of the control in a timely manner. By momentarily pressing the TEST pushbutton, the DXM2 control enters a 20 minute test mode period in which all time delays are sped up 15 times. Upon entering test mode, the status LED display will change, either flashing rapidly to indicate the control is in the test mode, or displaying a numeric flash code representing the current airflow if an ECM blower is connected and operating. For diagnostic ease at conventional thermostats, the alarm relay will also cycle during test mode. The alarm relay will cycle on and off similar to the fault LED to indicate a code representing the last fault, at the thermostat. Test mode can be exited by pressing the TEST pushbutton for 3 seconds.

**Retry Mode –** If the control is attempting a retry of a fault, the fault LED will slow flash (slow flash = one flash every 2 seconds) to indicate the control is in the process of retrying.

**Field Configuration Options –** Note: In the following field configuration options, jumper wires should be clipped ONLY when power is removed from the DXM2 control.

Water coil low temperature limit setting: Jumper 3 (JW3-LT1 Low Temp) provides field selection of temperature limit setting for LT1 of 30°F or 10°F [-1°F or -12°C] (refrigerant temperature).

*Not Clipped = 30°F [-1°C]. Clipped = 10°F [-12°C].*

Alarm relay setting: Jumper 1 (JW1-AL2 Dry) provides field selection of the alarm relay terminal AL2 to be jumpered to 24VAC or to be a dry contact (no connection). Not Clipped = AL2 connected to R. Clipped = AL2 dry contact (no connection).

**JUMPERS (Set at Factory)**

**A0-2: Configure Modulating Valve or Variable-Speed Pump**

Set A0-2 jumper to "IOV" if using Internal Modulating Motorized Valve or "PMW" if using Internal Variable-Speed Pump.

**DIP Switches –** Note: In the following field configuration options, DIP switches should only be changed when power is removed from the DXM2 control.

**DIP Package #1 (S1) –** DIP Package #1 has 8 switches and provides the following setup selections:

**1.1 -** Unit Performance Sentinel (UPS) disable: DIP Switch 1.1 provides field selection to disable the UPS feature.

*On = Enabled. Off = Disabled.*

**1.2 -** Compressor relay staging operation: DIP 1.2 provides selection of compressor relay staging operation. The compressor relay can be selected to turn on with a stage 1 or stage 2 call from the thermostat. This is used with dual stage units (2 compressors where 2 DXM2 controls are being used) or with master/slave applications. In master/slave applications, each compressor and fan will stage according to its appropriate DIP 1.2 setting. If set to stage 2, the compressor will have a 3 second on-delay before energizing during a Stage 2 demand. Also, if set for stage 2, the alarm relay will NOT cycle during test mode.

*On = Stage 1. Off = Stage 2.*

**1.3 -** Thermostat type (heat pump or heat/cool): DIP 1.3 provides selection of thermostat type. Heat pump or heat/cool thermostats can be selected. When in heat/cool mode, Y1 is the input call for cooling stage 1; Y2 is the input call for cooling stage 2; W1 is the input call for heating stage 1; and O/W2 is the input call for heating stage 2. In heat pump mode, Y1 is the input call for compressor stage 1; Y2 is the input call for compressor stage 2; W1 is the input call for heating stage 3 or emergency heat; and O/W2 is the input call for reversing valve (heating or cooling, depending upon DIP 1.4).

*On = Heat Pump. Off = Heat/Cool.*

**1.4 -** Thermostat type (O/B): DIP 1.4 provides selection of thermostat type for reversing valve activation. Heat pump thermostats with "O" output (reversing valve energized for cooling) or "B" output (reversing valve energized for heating) can be selected with DIP 1.4.

*On = HP stat with "O" output for cooling. Off = HP stat with "B" output for heating.*

**1.5 -** Dehumidification mode: DIP 1.5 provides selection of normal or dehumidification fan mode. In dehumidification mode, the fan speed relay will remain off during cooling stage 2. In normal mode, the fan speed relay will turn on during cooling stage 2.

*On = Normal fan mode. Off = Dehumidification mode.*

# DXM2 Controls, Cont'd.

**1.6 –** DDC output at EH2: DIP 1.6 provides selection for DDC operation. If set to "DDC Output at EH2," the EH2 terminal will continuously output the last fault code of the controller. If set to "EH2 normal," EH2 will operate as standard electric heat output.

*On = EH2 Normal. Off = DDC Output at EH2.*

**1.7–** Boilerless operation: DIP 1.7 provides selection of boilerless operation. In boilerless mode, the compressor is only used for heating when LT1 is above the temperature specified by the setting of DIP 1.8. Below DIP 1.8 setting, the compressor is not used and the control goes into emergency heat mode, staging on EH1 and EH2 to provide heating.

*On = normal. Off = Boilerless operation.*

**1.8 –** Boilerless changeover temperature: DIP 1.8 provides selection of boilerless changeover temperature setpoint. Note that the LT1 thermistor is sensing refrigerant temperature between the coaxial heat exchanger and the expansion device (TXV). Therefore, the 50°F [10°C] setting is not 50°F [10°C] water, but approximately 60°F [16°C] EWT.

*On = 50°F [10°C]. Off = 40°F [16°C].*

**DIP Package #2 (S2) –** A combination of dip switches **2.1, 2.2, 2.3, and 2.4, 2.5, 2.6** deliver configuration of ACC1 and ACC2 relay options respectively. See Table 5b for description and functionality.

**2.7 –** Auto dehumidification fan mode or high fan mode: DIP 2.7 provides selection of auto dehumidification fan mode or high fan mode. In auto dehumidification mode, the fan speed relay will remain off during cooling stage 2 IF the H input is active. In high fan mode, the fan enable and fan speed relays will turn on when the H input is active.

*On = Auto dehumidification mode (default). Off = High fan mode.*

**2.8 –** Special factory selection: DIP 2.8 provides special factory selection. Normal position is "On". Do not change selection unless instructed to do so by the factory.

**Table 5b: Accessory DIP Switch Settings**

| DIP 2.1 | DIP 2.2 | DIP 2.3 | ACC1 Relay Option |
|---|---|---|---|
| On | On | On | Cycle with fan |
| Off | On | On | Digital NSB |
| On | Off | On | Water Valve - slow opening |
| On | On | Off | OAD |
| Off | Off | Off | Reheat Option - Humidistat |
| Off | On | Off | Reheat Option - Dehumidistat |
| **DIP 2.4** | **DIP 2.5** | **DIP 2.6** | **ACC2 Relay Option** |
| On | On | On | Cycle with compressor |
| Off | On | On | Digital NSB |
| On | Off | On | Water Valve - slow opening |
| On | On | Off | OAD |

All other DIP combinations are invalid

**DIP Package #3 (S3)**

– DIP Package #3 has 4 switches and provides the following setup and operating selections:

**3.1 –** Communications configuration: DIP 3.1 provides selection of the DXM2 operation in a communicating system. The DXM2 may operate as the Master of certain network configurations. In most configurations the DXM2 will operate as a master device.

*On = Communicating Master device (default). Off = communicating Slave device.*

**3.2 –** HWG Test Mode: DIP 3.2 provides forced operation of the HWG pump output, activating the HWG pump output for up to five minutes.

*On = HWG test mode. Off = Normal HWG mode (default).*

**3.3 –** HWG Temperature: DIP 3.3 provides the selection of the HWG operating setpoint.

*On = 150°F [66°C]. Off = 125°F [52°C] (default).*

**3.4 –** HWG Status: DIP 3.4 provides HWG operation control.

*On = HWG mode enabled. Off = HWG mode disabled (default).*

**⚠ CAUTION! ⚠**

**CAUTION!** Do not restart units without inspection and remedy of faulting condition. Equipment damage may occur.

# DXM2 Controls, Cont'd.

### Table 5c: LED and Alarm Relay Output Table

| DMX2 CONTROLLER FAULT CODES | | | |
|---|---|---|---|
| **DMX2 Fault and Status LED Operation with Test Mode Not Active** | **Fault LED (Red)** | **Status LED (Green)** | **Alarm Relay** |
| **DXM2 Is Non-Functional** | Off | Off | Open |
| **Normal Operation - No Active Communications** | On | On | Open |
| **Normal Operation - With Active Communications** | Very Slow Flash | ON | Open |
| **Control Is Currently In Fault Retry Mode** | Slow Flash | - | Open |
| **Control Is Currently Locked Out** | Fast Flash | - | Closed |
| **Control Is Currently In An Over/ Under Voltage Condition** | Slow Flash | - | Open (Closed After 15 min) |
| **Hot Water Mode Active** | - | Slow Flash | Open |
| **(NSB) Night Setback Condition Recognized** | - | Flashing Code 2 | - |
| **(ESD) Emergency Shutdown Condition Recognized** | - | Flashing Code 3 | - |
| **Invalid Thermostat Input Combination** | - | Flashing Code 4 | - |
| **High Hot Water Temperature Lockout Active** | - | Flashing Code 5 | - |
| **Hot Water Mode Sensor Fault Active** | - | Flashing Code 6 | - |
| **DMX2 Fault LED and Status Operation with Test Mode Active** | **Fault LED (Red)** | **Status LED (Green)** | **Alarm Relay** |
| **No Fault Since Power Up In Memory** | Flashing Code 1 | - | Cycling Code 1 |
| **High Pressure Fault In Memory** | Flashing Code 2 | - | Cycling Code 2 |
| **Low Pressure Fault In Memory** | Flashing Code 3 | - | Cycling Code 3 |
| **Low Temperature Protection 1 In Fault Memory** | Flashing Code 4 | - | Cycling Code 4 |
| **Low Temperature Protection 2 In Fault Memory** | Flashing Code 5 | - | Cycling Code 5 |
| **Condensate Overflow Fault In Memory** | Flashing Code 6 | - | Cycling Code 6 |
| **Over/Under Voltage Shutdown In Memory** | Flashing Code 7 | - | Cycling Code 7 |
| **UPS Warning In Memory** | Flashing Code 8 | - | Cycling Code 8 |
| **UPT Fault In Memory** | Flashing Code 9 | - | Cycling Code 9 |
| **ECM Air Flow Fault In Memory** | Flashing Code 10 | - | Cycling Code 10 |
| **Test Mode Active With No ECM Connected Or Operating** | - | Fast Flash | - |
| **Test Mode Active With ECM Operating** | - | Flashing ECM Airflow | - |

- Fast Flash = 2 flashes every 1 second.
- Slow Flash = 1 flash every 2 seconds.
- Very Slow Flash = 1 flash every 5 seconds.
- Numeric Codes = On pulse 1/3 second; Off pulse 1/3 second followed by a 10 second delay.
- ECM Airflow = 1 flash per 100 CFM; On pulse 1/3 second followed by a 10 second delay.
- Alarm Relay Open = alarm signal off; Alarm Relay Closed = alarm signal on.

# DXM2 Controls, Cont'd.

**DXM2 Control Start-up Operation –** The control will not operate until all inputs and safety controls are checked for normal conditions. The compressor will have a 5 minute anti-short cycle delay at power-up. The first time after power-up that there is a call for compressor, the compressor will follow a 5 to 80 second random start delay. After the random start delay and anti-short cycle delay, the compressor relay will be energized. On all subsequent compressor calls, the random start delay is omitted.

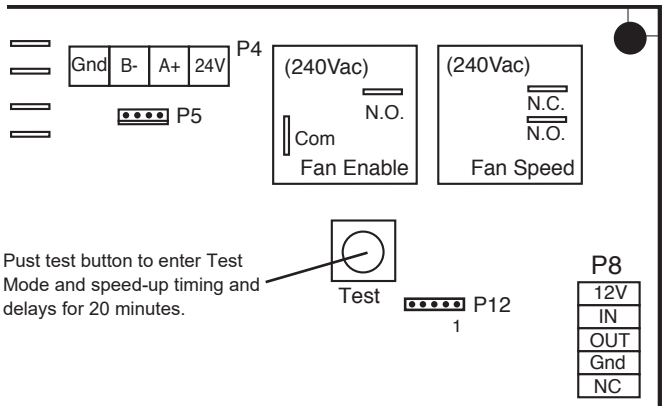
**Table 5d: Unit Operation**

| Conventional T-stat signal (Non-Communicating) | Unit |
|---|---|
| | ECM fan |
| G | Fan only |
| G, Y1 | Stage 1 heating[1] |
| G, Y1, Y2 | Stage 2 heating[1] |
| G, Y1, Y2, W | Stage 3 heating[1] |
| G, W | Emergency heat |
| G, Y1, O | Stage 1 cooling[2] |
| G, Y1, Y2, O | Stage 2 cooling[2] |

[1] Stage 1 = 1st stage compressor, 1st stage fan operation
Stage 2 = 2nd stage compressor, 2nd stage fan operation
Stage 3 = 2nd stage compressor, auxiliary electric heat, 3rd stage fan operation

[2] Stage 1 = 1st stage compressor, 1st stage fan operation, reversing valve
Stage 2 = 2nd stage compressor, 2nd stage fan operation, reversing valve

**Figure 22: Test Mode Button**



# Safety Features – CXM and DXM2 Controls

**Safety Features – CXM/DXM2 Control**
The safety features below are provided to protect the compressor, heat exchangers, wiring, and other components from damage caused by operation outside of design conditions.

Anti-short cycle protection: The control features a 5 minute anti-short cycle protection for the compressor. **Note: The 5 minute anti-short cycle also occurs at power up.**

Random start: The control features a random start upon power up of 5-80 seconds.

Fault Retry: In Fault Retry mode, the Status LED begins slowly flashing to signal that the control is trying to recover from a fault input. The control will stage off the outputs and then "try again" to satisfy the thermostat input call. Once the thermostat input call is satisfied, the control will continue on as if no fault occurred. If 3 consecutive faults occur without satisfying the thermostat input call, the control will go into "lockout" mode. The last fault causing the lockout will be stored in memory and can be viewed at the "fault" LED (DXM2 board) or by going into test mode (CXM board). **Note: LT1/LT2 faults are factory set at only one try.**

Lockout: In lockout mode, the status LED will begin fast flashing. The compressor relay is turned off immediately. Lockout mode can be "soft" reset by turning off the thermostat (or satisfying the call). A "soft" reset keeps the fault in memory but resets the control. A "hard" reset (disconnecting power to the control) resets the control and erases fault memory.

Lockout with emergency heat: While in lockout mode, if W becomes active (CXM), emergency heat mode will occur. If DXM2 is configured for heat pump thermostat type (DIP 1.3), emergency heat will become active if O/W2 is energized.

High pressure switch: When the high pressure switch opens due to high refrigerant pressures, the compressor relay is de-energized immediately since the high pressure switch is in series with the compressor contactor coil. The high pressure fault recognition is immediate (does not delay for 30 continuous seconds before de-energizing the compressor).

*High pressure lockout code = 2*

Example: 2 quick flashes, 10 sec pause, 2 quick flashes, 10 sec. pause, etc.

Low pressure switch: The low pressure switch must be open and remain open for 30 continuous seconds during "on" cycle to be recognized as a low pressure fault. If the low pressure switch is open for 30 seconds prior to compressor power up it will be considered a low pressure (loss of charge) fault. The low pressure switch input is bypassed for the initial 120 seconds of a compressor run cycle.

*Low pressure lockout code = 3*

Water coil low temperature (LT1): The LT1 thermistor temperature must be below the selected low temperature limit setting for 30 continuous seconds during a compressor run cycle to be recognized as a LT1 fault. The LT1 input is bypassed for the initial 120 seconds of a compressor run cycle. LT1 is set at the factory for one try. Therefore, the control will go into lockout mode once the LT1 fault has occurred.

*LT1 lockout code = 4*

Air coil low temperature (LT2): The LT2 thermistor temperature must be below the selected low temperature limit setting for 30 continuous seconds during a compressor run cycle to be recognized as a LT2 fault. The LT2 input is bypassed for the initial 60 seconds of a compressor run cycle. LT2 is set at the factory for one try. Therefore, the control will go into lockout mode once the LT2 fault has occurred.

*LT2 lockout code = 5*

Condensate overflow: The condensate overflow sensor must sense overflow level for 30 continuous seconds to be recognized as a CO fault. Condensate overflow will be monitored at all times.

*CO lockout code = 6*

Over/under voltage shutdown: An over/under voltage condition exists when the control voltage is outside the range of 19VAC to 30VAC. Over/under voltage shut down is a self-resetting safety. If the voltage comes back within range for at least 0.5 seconds, normal operation is restored. This is not considered a fault or lockout. If the CXM/DXM2 is in over/under voltage shutdown for 15 minutes, the alarm relay will close.

*Over/under voltage shut down code = 7*

Unit Performance Sentinel-UPS (patent pending): The UPS feature indicates when the heat pump is operating inefficiently. A UPS condition exists when:

a. In heating mode with compressor energized, LT2 is greater than 125°F [52°C] for 30 continuous seconds, or:
b. In cooling mode with compressor energized, LT1 is greater than 125°F [52°C] for 30 continuous seconds, or:
c. In cooling mode with compressor energized, LT2 is less than 40°F [4.5°C] for 30 continuous seconds.

# Safety Features – CXM and DXM2 Controls, Cont'd.

If a UPS condition occurs, the control will immediately go to UPS warning. The status LED will remain on as if the control is in normal mode. Outputs of the control, excluding LED and alarm relay, will NOT be affected by UPS. The UPS condition cannot occur during a compressor off cycle. During UPS warning, the alarm relay will cycle on and off. The cycle rate will be "on" for 5 seconds, "off" for 25 seconds, "on" for 5 seconds, "off" for 25 seconds, etc.

*UPS warning code = 8*

Swapped LT1/LT2 thermistors: During test mode, the control monitors to see if the LT1 and LT2 thermistors are in the appropriate places. If the control is in test mode, the control will lockout with code 9 after 30 seconds if:

a. The compressor is on in the cooling mode and the LT1 sensor is colder than the LT2 sensor, or:
b. The compressor is on in the heating mode and the LT2 sensor is colder than the LT1 sensor.

*Swapped LT1/LT2 thermistor code = 9.*

ESD (DXM2 only): The ESD (Emergency Shut Down) mode can be enabled from an external common signal to terminal ESD to shut down the unit. The green status light will flash code 3 when the unit is in ESD mode.

*ESD mode = code 3 (green "status" LED)*

**Diagnostic Features**

The LED on the CXM board advises the technician of the current status of the CXM control. The LED can display either the current CXM mode or the last fault in memory if in test mode. If there is no fault in memory, the LED will flash Code 1 (when in test mode).

The green status LED and red fault LED on the DXM2 board advise the technician of the current status of the DXM2 control. The status LED will indicate the current mode that the DXM2 control is in. The fault LED will ALWAYS flash a code representing the LAST fault in memory. If there is no fault in memory, the fault LED will flash Code 1. The yellow test LED will turn on when in test mode. **CAUTION: Do not restart units without inspection and remedy of faulting condition. Damage may occur.**

**CXM/DXM2 Control Start-up Operation**

The control will not operate until all inputs and safety controls are checked for normal conditions. The compressor will have a 5 minute anti-short cycle delay at power-up. The first time after power-up that there is a call for compressor, the compressor will follow a 5 to 80 second random start delay. After the random start delay and anti-short cycle delay, the compressor relay will be energized. On all subsequent compressor calls, the random start delay is omitted.

# ClimaDry® Modulating Reheat Option

## ClimaDry® Sequence Of Operation

A heat pump equipped with ClimaDry® can operate in three modes, cooling, cooling with reheat, and heating. The cooling/heating modes are like any other ClimateMaster WSHP. The reversing valve ("O" signal) is energized in cooling, along with the compressor contactor(s) and blower relay. In the heating mode the reversing valve is de-energized. Almost any thermostat will activate the heat pump in heating or cooling modes. The DXM2 microprocessor board, which is standard with the ClimaDry® option, will accept either heat pump (Y,O) thermostats or non-heat pump (Y,W) thermostats.

The reheat mode requires either a separate humidistat/dehumidistat or a thermostat that has an integrated dehumidification function for activation. The DXM2 board is configured to work with either a humidistat or dehumidistat input to terminal "H" (DIP switch settings for the DXM2 board are shown below in table 7). Upon receiving an "H" input, the DXM2 board will activate the cooling mode and engage reheat. Table 8 shows the relationship between thermostat input signals and unit operation.

There are four operational inputs for single stage units and six operational inputs for dual stage units:

-Fan Only
-1st Stage Cooling
-2nd Stage Cooling
-1st Stage Heating
-2nd Stage Heating
-Reheat Mode

**Fan Only:** A (G) call from the thermostat to the (G terminal of the DXM2 control board will bring the unit on in fan only mode.

**1st Stage Cooling:** A simultaneous call from (G), (Y1), and (O) to the (G), (Y1), (O/W2) terminals of the DXM2 control board will bring the unit on in 1st Stage Cooling.

**2nd Stage Cooling:** A simultaneous call from (G), (Y1), (Y2), and (O) to the (G), (Y1), (Y2), and (O/W2)terminals of the DXM2 control board will bring the unit on in 2nd Stage Cooling. When the call is satisfied at the thermostat the unit will continue to run in 1st Stage Cooling until the 1st Stage Cooling call is removed or satisfied, shutting down the unit. Note: Not all units have two-stage cooling functionality (e.g. GC series units).

**1st Stage Heating:** A simultaneous call from (G) and (Y1) to the (G) and (Y1) terminals of the DXM2 control board will bring the unit on in 1st Stage Heating.

**2nd Stage Heating:** A simultaneous call from (G), (Y1), and (Y2) to the (G), (Y1), and (Y2) terminals of the DXM2 control board will bring the unit on in 2nd Stage Heating. When the call is satisfied at the thermostat the unit will continue to run in 1st Stage Heating until the call is removed or satisfied, shutting down the unit. NOTE: Not all units have two-stage heating functionality (e.g. GC series units).

**Reheat Mode:** A call from the Humidistat/Dehumidistat to the (H) terminal of the DXM2 control board will bring the unit on in Reheat Mode if there is no call for cooling at the thermostat. When the Humidistat Dehumidification call is removed or satisfied the unit will shut down. Note: Cooling always overrides Reheat Mode. In the Cooling mode, the unit cools and dehumidifies. If the cooling thermostat is satisfied but there is still a call for dehumidification, the unit will continue to operate in Reheat Mode.

## ClimaDry® Component Functions

The ClimaDry® option consists of the following components:

- Proportional Controller
- Supply Air Sensor
- Motorized Valve
- Loop Pump
- Hydronic Coil

The Proportional Controller operates on 24 VAC power supply and automatically adjusts the water valve based upon the Supply Air Sensor. The Supply Air Sensor senses supply air temperature at the blower inlet providing the input signal necessary for the proportional control to drive the motorized valve during the reheat mode of operation. The Motorized Valve is a proportional actuator/three-way valve combination used to divert the condenser water from the coax to the hydronic reheat coil during the reheat mode of operation. The proportional controller sends a signal to the motorized valve based on the supply air temperature of the supply air sensor.

# ClimaDry® Modulating Reheat Option, Cont'd.

The Loop Pump circulates condenser water through the hydronic reheat coil during the reheat mode of operation. In this application, the loop pump is only energized during the reheat mode of operation. The Hydronic Coil is utilized during the reheat mode of operation to reheat the air to the setpoint of the proportional controller. Condenser water is diverted by the motorized valve and pumped through the hydronic coil by the loop pump in proportion to the control setpoint. The amount of reheating is dependent on the setpoint and how far from setpoint the supply air temperature is. The factory setpoint is 70–75°F [21-24°C], generally considered "neutral" air.

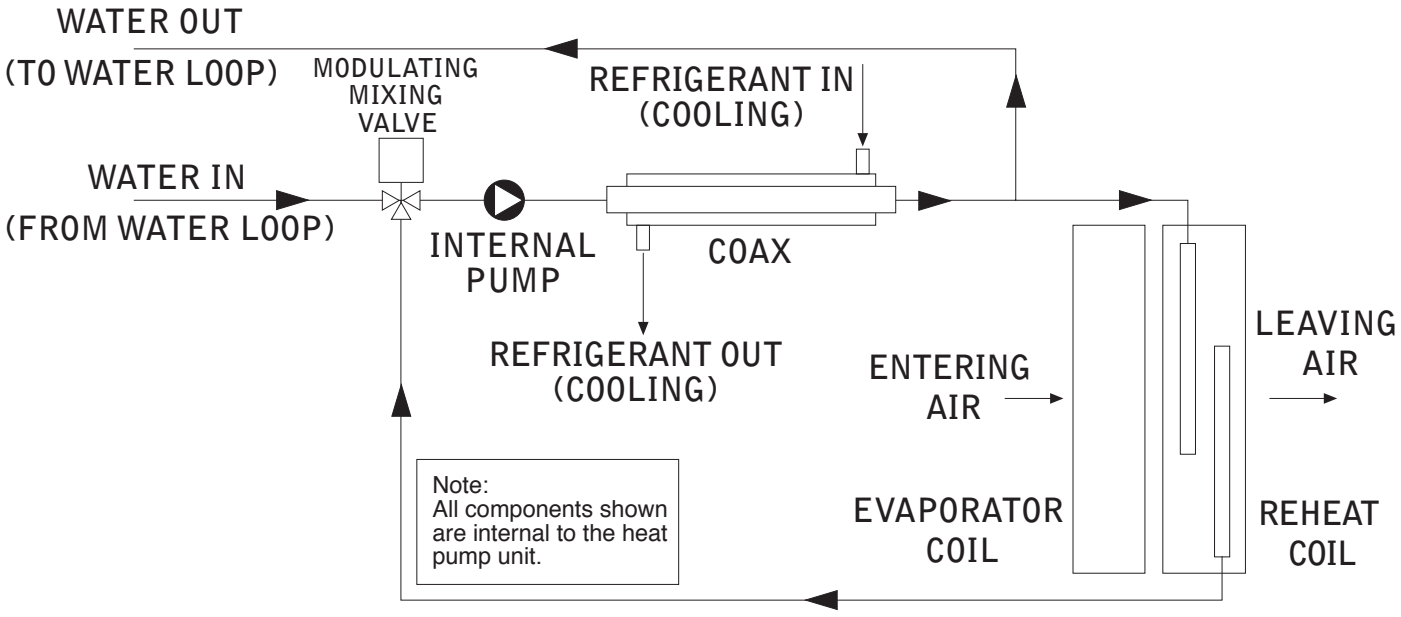
### ClimaDry® Application Considerations

Unlike most hot gas reheat options, the ClimaDry® option will operate over a wide range of EWTs. Special flow regulation (water regulating valve) is not required for low EWT conditions. However, below 55°F [13°C], supply air temperatures may not be maintained at 72°F [22°C] because the cooling capacity exceeds the reheat coil capacity at low water temperatures. Below 55°F [13°C], essentially all water is diverted to the reheat coil (no heat of rejection to the building loop). Although the ClimaDry® option will work fine with low EWTs, overcooling of the space may result with well water systems or on rare occasions with ground loop (geothermal) systems **(Note: Extended range units are required for well water and ground loop systems).** Since dehumidification is generally only required in cooling, most ground loop systems will not experience overcooling of the supply air temperature. If overcooling of the space is a concern (e.g. computer room well water application), auxiliary heating may be required to maintain space temperature when the unit is operating in the dehumidification mode.

Unit minimum entering air temperature while in the dehumidification, cooling, or continuous fan modes is **65°F DB/55°F WB**. Operation below this minimum may result in nuisance faults.

Water-Source Heat Pumps with ClimaDry® should not be used as make-up air units. These applications should use equipment specifically designed for makeup air.

**Figure 23: ClimaDry® Schematic**



# ClimaDry® Modulating Reheat Option, Cont'd.

**Table 7: Humidistat/Dehumidistat Logic & DXM2 (2.1, 2.2., 2.3) DIP Settings**

| Sensor | 2.1 | 2.2 | 2.3 | Logic | Reheat (ON) - H | Reheat (OFF) - H |
|---|---|---|---|---|---|---|
| **Humidistat** | OFF | OFF | OFF | Reverse | 0 VAC | 24 VAC |
| **Dehumidistat** | OFF | ON | OFF | Standard | 24 VAC | 0 VAC |

**Table 8: ClimaDry® Operating Modes**

| Mode | Input | | | | | Output | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | O | G | Y1 | Y2[3] | H | O | G | Y1 | Y2[3] | Reheat |
| **No Demand** | ON/OFF | OFF | OFF | OFF | OFF | ON/OFF | OFF | OFF | OFF | OFF |
| **Fan Only** | ON/OFF | ON | OFF | OFF | OFF | ON/OFF | ON | OFF | OFF | OFF |
| **Cooling 1st Stage** | ON | ON | ON | OFF | OFF | ON | ON | ON | OFF | OFF |
| **Cooling 2nd Stage** | ON | ON | ON | ON | OFF | ON | ON | ON | ON | OFF |
| **Cooling & Dehumidistat[1]** | ON | ON | ON | ON/OFF | ON | ON | ON | ON | ON/OFF | OFF |
| **Dehumidistat Only** | ON/OFF | OFF | OFF | OFF | ON | ON | ON | ON | ON | ON |
| **Heating 1st Stage** | OFF | ON | ON | OFF | OFF | OFF | ON | ON | OFF | OFF |
| **Heating 2nd Stage** | OFF | ON | ON | ON | OFF | OFF | ON | ON | ON | OFF |
| **Heating & Dehumidistat[2]** | OFF | ON | ON | ON/OFF | ON | OFF | ON | ON | ON/OFF | OFF |

[1]Cooling input takes priority over dehumidify input.
[2]DXM2 is programmed to ignore the H demand when the unit is in heating mode.
[3]N/A for single stage units; Full load operation for dual capacity units.
[4]ON/OFF = Either ON or OFF.

# Unit Starting 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 – A voltage variation of +/– 10% of nameplate utilization voltage is acceptable.

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 ensure 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 6a for operating limits.

## Commissioning Conditions

Starting conditions vary depending upon model and are based upon the following notes:

**Notes:**

1. Conditions in Table 6b 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 range complies with AHRI Standard 110.

**Table 6a: Operating Limits**

| Operating Limits | TC | |
|---|---|---|
| | Cooling | Heating |
| **Air Limits** | | |
| Min. ambient air, DB | 45°F [7°C] | 39°F [4°C] |
| Rated ambient air, DB | 80.6°F [27°C] | 68°F [20°C] |
| Max. ambient air, DB | 130°F [54.4°C] | 85°F [29°C] |
| Min. entering air, DB/WB | *65/50°F [18/10°C] | 45°F [7.2°C] |
| Rated entering air, DB/WB | 80.6/66.2°F [27/19°C] | 68°F [20°C] |
| Max. entering air, DB/WB | 95/75°F [35/24°C] | 80°F [27°C] |
| **Water Limits** | | |
| Min. entering water | 30°F [-1°C] | 20°F [-6.7°C] |
| Normal entering water | 50-110°F [10-43°C] | 30-70°F [-1 to 21°C] |
| Max. entering water | 120°F [49°C] | 90°F [32°C] |
| **Normal Water Flow** | 1.5 to 3.0 gpm/ton [1.6 to 3.2 l/m per kW] | |

*If with ClimaDry® 65/55°F (18/13°C)

**Table 6b: Building Commissioning Limits**

| Commissioning Limits | Cooling | Heating |
|---|---|---|
| **Air Limits** | | |
| Min. ambient air, DB | 45°F [7°C] | 39°F [4°C] |
| Rated ambient air, DB | 80.6°F [27°C] | 68°F [20°C] |
| Max. ambient air, DB | 130°F [54.4°C] | 85°F [29°C] |
| Min. entering air, DB/WB | 50/45°F [10/7°C] | 40°F [4.5°C] |
| Rated entering air, DB/WB | 80.6/66.2°F [27/19°C] | 68°F [20°C] |
| Max. entering air, DB/WB | 110/83°F [43/28°C] | 80°F [27°C] |
| **Water Limits** | | |
| Min. entering water | 30°F [-1°C] | 20°F [-6.7°C] |
| Normal entering water | 50-110°F [10-43°C] | 30-70°F [-1 to 21°C] |
| Max. entering water | 120°F [49°C] | 90°F [32°C] |
| **Normal Water Flow** | 1.5 to 3.0 gpm/ton [1.6 to 3.2 l/m per kW] | |

# Piping System Cleaning and Flushing

**Piping System Cleaning and Flushing** - Cleaning and flushing the WLHP piping system is the single most important step to ensure proper start-up and continued efficient operation of the system.

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

1. Ensure that electrical power to the unit is disconnected.
2. Install the system with the supply hose connected directly to the return riser valve. Use a single length of flexible hose.
3. Open all air vents. Fill the system with water. DO NOT allow system to overflow. Bleed all air from the system. Pressurize and check the system for leaks and repair as appropriate. ClimaDry®-equipped units have a manual air bleed valve at the top of the reheat coil. This valve must be used to bleed the air from the reheat coil after filling the system, for ClimaDry to operate properly.
4. Verify that all strainers are in place (ClimateMaster recommends a strainer with a #20 stainless steel wire mesh). Start the pumps, and systematically check each vent to ensure that all air is bled from the system.
5. Verify that make-up water is available. Adjust make-up water as required to replace the air which was bled from the system. Check and adjust the water/air level in the expansion tank.
6. Set the boiler to raise the loop temperature to approximately 85°F [29°C]. Open a drain at the lowest point in the system. Adjust the make-up water replacement rate to equal the rate of bleed.
7. Refill the system and add trisodium phosphate in a proportion of approximately one pound per 150 gallons (.8 kg per 1000 l) of water (or other equivalent approved cleaning agent). Reset the boiler to raise the loop temperature to 100°F [38°C]. Circulate the solution for a minimum of 8 to 24 hours. At the end of this period, shut off the circulating pump and drain the solution. Repeat system cleaning if desired.
8. When the cleaning process is complete, remove the short-circuited hoses. Reconnect the hoses to the proper supply, and return the connections to each of the units. Refill the system and bleed off all air.
9. Test the system pH with litmus paper. The system water should be in the range of pH 6.0 - 8.5 (see table 3). Add chemicals, as appropriate to maintain neutral pH levels.
10. When the system is successfully cleaned, flushed, refilled and bled, check the main system panels, safety cutouts and alarms. Set the controls to properly maintain loop temperatures.

**⚠ CAUTION! ⚠**

**CAUTION!** DO NOT use “Stop Leak” or similar chemical agent in this system. Addition of chemicals of this type to the loop water will foul the heat exchanger and inhibit unit operation.

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

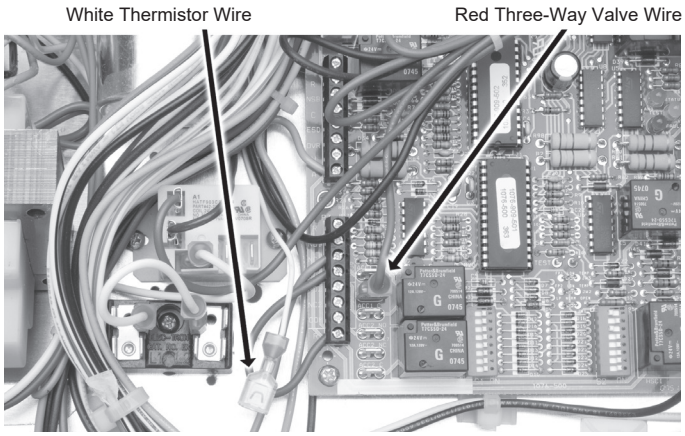
# Flushing/Purging Units with ClimaDry®

When flushing/purging units equipped with ClimaDry® the unit should be fully flushed/purged before attempting to flush/purge the ClimaDry® coil. Once the unit is flushed, energize the modulating three-way dehumidification valve to allow flow through the ClimaDry® hydronic circuit.

The unit must be powered (but not operating) during flushing/purging. Unit power is required to operate the three-way modulating valve during flushing.

Disable the ClimaDry® sensor located in the supply air stream by removing the white wire from the low voltage terminal block (LVTB) as shown in the figure that follows. Energize the modulating three-way dehumidification valve by removing the red wire from the ACC1 'N.O.' terminal on the DXM2 board. Connect this wire to the ACC1 'NC' terminal of the DXM2 controller, as shown in figure 1, to energize the modulating three-way dehumidification valve. Once energized, the valve will take 45 – 75 seconds to fully shift. Continue flushing during this time. After the valve has completed its shift, use the air bleed from the top of the reheat coil to purge air from the coil.

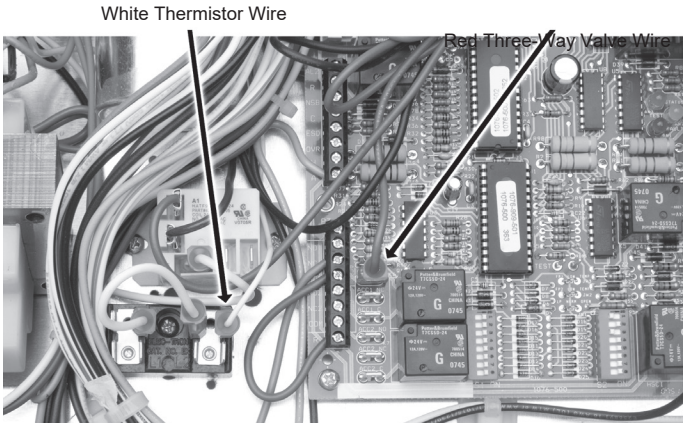
### Flushing/Purging Wiring




De-energize the valve by removing the red wire from the ACC1 'NC' terminal on the DXM2 board. The valve will spring return to its normal position in just a few seconds. After the valve has fully returned, repeat the process of running the valve through its cycle and purging air from the reheat coil.

Under extreme circumstances this procedure may be required multiple times to purge all air from the circuit. After completing the flushing/purging procedure, reconnect the red wire to the ACC1 'N.O.' terminal on the DXM2 for normal operation. Reconnect the white sensor wire to the LVTB, as shown below. If air is allowed to collect in the ClimaDry® piping, nuisance trips may occur. Additional flush/purge cycles may be used when required.

### Normal Unit Wiring



# Unit and System Checkout

**⚠ 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.

## Unit and System Checkout

BEFORE POWERING SYSTEM, please check the following:

### UNIT FEATURES

- ❑ Balancing/shutoff valves: Ensure that all isolation valves are open and water control valves are wired.
- ❑ 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: Ensure that transformer has the properly selected voltage tap.
- ❑ Entering water and air: Ensure that entering water and air temperatures are within operating limits of Tables 6a-b.
- ❑ Low water temperature cutout: Verify that low water temperature cut-out on the CXM/DXM2 control is properly set.
- ❑ Unit fan: Manually rotate fan to verify free rotation and ensure 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 speed selection and compare to design requirements.
- ❑ Condensate line: Verify that condensate line is open and properly pitched toward drain.
- ❑ Water flow balancing: Record inlet and outlet water temperatures for each heat pump upon startup. This check can eliminate nuisance trip outs and high velocity water flow that could erode heat exchangers.
- ❑ Unit air coil and filters: Ensure that filter is clean and accessible. Clean air coil of all manufacturing oils.
- ❑ Unit controls: Verify that CXM or DXM2 field selection options are properly set.

### 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 longevity of hoses and fittings (see table 3).
- ❑ System flushing: Verify that all hoses are connected end to end when flushing to ensure that debris bypasses the unit heat exchanger, water valves and other components. Water used in the system must be potable quality initially and clean of dirt, piping slag, and strong chemical cleaning agents. Verify that all air is purged from the system. Air in the system can cause poor operation or system corrosion.
- ❑ Cooling tower/boiler: Check equipment for proper setpoints and operation.
- ❑ Standby pumps: Verify that the standby pump is properly installed 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 cut-out controls are provided for the outdoor portion of the loop. Otherwise, operating problems may occur.
- ❑ System control center: Verify that the control center and alarm panel have appropriate setpoints and are operating as designed.
- ❑ Miscellaneous: Note any questionable aspects of the installation.

**⚠ CAUTION! ⚠**

**CAUTION!** Verify that ALL water control valves are open and allow water flow prior to engaging the compressor. Freezing of the coax 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 never fully drain by themselves and will freeze unless winterized with antifreeze.

**NOTICE! Failure to remove shipping brackets from spring-mounted compressors will cause excessive noise, and could cause component failure due to added vibration.**

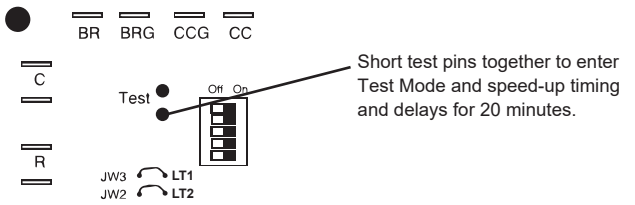
# Unit Start-Up Procedure

**Unit Start-up Procedure**

1. Turn the thermostat fan position to “ON”. Blower should start.
2. Balance air flow at registers.
3. Adjust all valves to their full open positions. Turn on the line power to all heat pumps.
4. Room temperature should be within the minimum-maximum ranges of tables 6a-b. During start-up checks, loop water temperature entering the heat pump should be between 60°F [16°C] and 95°F [35°C].
5. Two factors determine the operating limits of ClimateMaster heat pumps, (a) return air temperature, and (b) water temperature. When any one of these factors is at a minimum or maximum level, the other factor must be at normal level to ensure proper unit operation.
   a. Adjust the unit thermostat to the warmest setting. Place the thermostat mode switch in the “COOL” position. Slowly reduce thermostat setting until the compressor activates.
   b. Check for cool air delivery at the unit grille within a few minutes after the unit has begun to operate. **Note: Units have a five minute time delay in the control circuit that can be eliminated on the CXM/DXM2 control board as shown below in Figure 22. See controls description for details.**
   c. Verify that the compressor is on and that the water flow rate is correct by measuring pressure drop through the heat exchanger using the P/T plugs and comparing to table 7.
   d. 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.
   e. Refer to table 9. Check the temperature of both entering and leaving water. If temperature is within range, proceed with the test. Verify correct water flow by comparing unit pressure drop across the heat exchanger versus the data in table 7. Heat of rejection (HR) can be calculated and compared to submittal data capacity pages. The formula for HR for systems with water is as follows: HR (Btuh) = TD x GPM x 500,where TD is the temperature difference between the entering and leaving water, and GPM is the flow rate in U.S. GPM, determined by comparing the pressure drop across the heat exchanger to table 7. In S-I units, the formula is as follows: HR (kW) = TD x l/s x 4.18.
   f. Check air temperature drop across the air coil when compressor is operating. Air temperature drop should be between 15°F and 25°F [8°C and 14°C].
   g. Turn thermostat to “OFF” position. A hissing noise indicates proper functioning of the reversing valve.
6. Allow five (5) minutes between tests for pressure to equalize before beginning heating test.
   a. Adjust the thermostat to the lowest setting. Place the thermostat mode switch in the “HEAT” position.
   b. Slowly raise the thermostat to a higher temperature until the compressor activates.
   c. Check for warm air delivery within a few minutes after the unit has begun to operate.
   d. Refer to table 9. Check the temperature of both entering and leaving water. If temperature is within range, proceed with the test. If temperature is outside of the operating range, check refrigerant pressures and compare to table 8. Verify correct water flow by comparing unit pressure drop across the heat exchanger versus the data in table 7. Heat of extraction (HE) can be calculated and compared to submittal data capacity pages. The formula for HE for systems with water is as follows: HE (kW) = TD xGPM x 500, where TD is the temperature difference between the entering and leaving water, and l/s is the flow rate in U.S. GPM, determined by comparing the pressure drop across the heat exchanger to table 7. In S-I units, the formula is as follows: HE (kW) = TD x l/s x 4.18.
   e. Check air temperature rise across the air coil when compressor is operating. Air temperature rise should be between 20°F and 30°F [11°C and 17°C].
   f. Check for vibration, noise, and water leaks.
7. If unit fails to operate, perform troubleshooting analysis (see troubleshooting section). If the check described fails to reveal the problem and the unit still does not operate, contact a trained service technician to ensure proper diagnosis and repair of the equipment.
8. When testing is complete, set system to maintain desired comfort level.

**Note: If performance during any mode appears abnormal, refer to the CXM/DXM2 section or troubleshooting section of this manual. To obtain maximum performance, the air coil should be cleaned before start-up. A 10% solution of dishwasher detergent and water is recommended.**

**Figure 3: Test Mode Pins**



# Unit Start-Up Procedure, Cont'd.

### Motorized Water Valve Option Corrections

| Model | Cv | MOPD | WPD Adders | | |
|---|---|---|---|---|---|
| | | | GPM | PSI | FT |
| 006 | 4.9 | 150 | 0.8 | 0.03 | 0.06 |
| | 4.9 | 150 | 1.1 | 0.05 | 0.12 |
| | 4.9 | 150 | 1.5 | 0.09 | 0.22 |
| 009 | 4.9 | 150 | 1.1 | 0.05 | 0.12 |
| | 4.9 | 150 | 1.7 | 0.12 | 0.28 |
| | 4.9 | 150 | 2.2 | 0.2 | 0.47 |
| 012 | 4.9 | 150 | 1.5 | 0.09 | 0.22 |
| | 4.9 | 150 | 2.3 | 0.22 | 0.51 |
| | 4.9 | 150 | 3 | 0.37 | 0.87 |
| 015 | 4.9 | 150 | 1.8 | 0.13 | 0.31 |
| | 4.9 | 150 | 2.6 | 0.28 | 0.65 |
| | 4.9 | 150 | 3.5 | 0.51 | 1.18 |
| 018 | 4.9 | 150 | 2.3 | 0.22 | 0.51 |
| | 4.9 | 150 | 3.4 | 0.48 | 1.11 |
| | 4.9 | 150 | 4.5 | 0.84 | 1.95 |
| 024 | 4.9 | 150 | 3 | 0.37 | 0.87 |
| | 4.9 | 150 | 4.5 | 0.84 | 1.95 |
| | 4.9 | 150 | 6 | 1.5 | 3.46 |
| 030 | 10.3 | 150 | 3.8 | 0.14 | 0.31 |
| | 10.3 | 150 | 5.5 | 0.29 | 0.66 |
| | 10.3 | 150 | 7.5 | 0.53 | 1.22 |
| 036 | 10.3 | 150 | 4.5 | 0.19 | 0.44 |
| | 10.3 | 150 | 6.8 | 0.44 | 1.01 |
| | 10.3 | 150 | 9 | 0.76 | 1.76 |
| 042 | 10.3 | 150 | 5.3 | 0.26 | 0.61 |
| | 10.3 | 150 | 7.9 | 0.59 | 1.36 |
| | 10.3 | 150 | 10.5 | 1.04 | 2.4 |
| 048 | 10.3 | 150 | 6 | 0.34 | 0.78 |
| | 10.3 | 150 | 9 | 0.76 | 1.76 |
| | 10.3 | 150 | 12 | 1.36 | 3.14 |
| 060 | 10.3 | 150 | 7.5 | 0.53 | 1.22 |
| | 10.3 | 150 | 11.3 | 1.2 | 2.78 |
| | 10.3 | 150 | 15 | 2.12 | 4.9 |

### ClimaDry® Option Corrections - (When Operating in Non-ClimaDry® Mode)

| Model | WPD Adders | | |
|---|---|---|---|
| | GPM | PSI | FT |
| 024 | 3.0 | 0.881 | 2.036 |
| | 4.5 | 1.983 | 4.581 |
| 030 | 3.8 | 0.622 | 1.437 |
| | 5.6 | 1.351 | 3.121 |
| 036 | 4.5 | 0.872 | 2.015 |
| | 6.8 | 1.992 | 4.602 |
| 042 | 5.3 | 1.210 | 2.796 |
| | 7.9 | 2.689 | 6.212 |
| 048 | 6.0 | 1.551 | 3.583 |
| | 9.0 | 3.490 | 8.062 |
| 060 | 7.5 | 1.491 | 3.445 |
| | 11.3 | 3.385 | 7.820 |

### Table 7: TR Coax Water Pressure Drop

| Model | U.S. GPM | l/s | Pressure Drop, psi [kPa]* | | | |
|---|---|---|---|---|---|---|
| | | | 30°F [-1°C] | 50°F [10°C] | 70°F [21°C] | 90°F [32°C] |
| TR 006 | 0.75 | 0.05 | 0.5 (3.7) | 0.3 (2.3) | 0.2 (1.6) | 0.2 (1.6) |
| | 1.1 | 0.07 | 0.8 (5.3) | 0.5 (3.5) | 0.4 (2.7) | 0.3 (2.2) |
| | 1.5 | 0.09 | 1.3 (8.8) | 0.9 (6.1) | 0.7 (4.8) | 0.6 (4.0) |
| TR 009 | 1.1 | 0.07 | 1.3 (9.0) | 0.6 (4.4) | 0.4 (2.8) | 0.3 (1.9) |
| | 1.8 | 0.11 | 2.1 (14.1) | 1.4 (9.4) | 1.1 (7.4) | 0.9 (6.2) |
| | 2.3 | 0.14 | 3.5 (24.3) | 2.6 (17.9) | 2.1 (14.7) | 1.8 (12.7) |
| TR 012 | 1.5 | 0.09 | 1.9 (12.8) | 1.1 (7.6) | 0.8 (5.3) | 0.6 (4.1) |
| | 2.3 | 0.15 | 3.6 (25.0) | 2.6 (17.8) | 2.1 (14.3) | 1.8 (12.1) |
| | 3.0 | 0.19 | 6.7 (46.1) | 5.0 (34.3) | 4.1 (28.3) | 3.6 (24.5) |
| TR 015 | 1.9 | 0.12 | 1.0 (6.9) | 0.6 (4.4) | 0.5 (3.4) | 0.4 (2.8) |
| | 2.8 | 0.18 | 1.8 (12.4) | 1.4 (9.3) | 1.1 (7.6) | 1.0 (6.9) |
| | 3.8 | 0.24 | 3.3 (22.7) | 2.5 (17.5) | 2.1 (14.7) | 1.9 (13.1) |
| TR 018 | 2.3 | 0.14 | 2.1 (14.5) | 1.4 (9.9) | 1.1 (7.6) | 0.9 (6.2) |
| | 3.4 | 0.21 | 3.4 (23.4) | 2.6 (17.6) | 2.1 (14.7) | 1.8 (12.4) |
| | 4.5 | 0.28 | 5.9 (40.6) | 4.6 (31.5) | 3.9 (26.9) | 3.4 (23.4) |
| TR 024 | 3.0 | 0.19 | 2.2 (15.2) | 1.7 (11.6) | 1.4 (9.6) | 1.2 (8.3) |
| | 4.5 | 0.28 | 4.0 (27.6) | 3.2 (22.2) | 2.8 (19.3) | 2.5 (17.2) |
| | 6.0 | 0.38 | 7.2 (49.6) | 5.9 (40.6) | 5.2 (35.8) | 4.7 (32.4) |
| TR 030 | 3.8 | 0.24 | 1.3 (9.0) | 0.9 (6.1) | 0.7 (4.8) | 0.6 (4.1) |
| | 5.6 | 0.35 | 2.3 (15.8) | 1.8 (12.5) | 1.5 (10.3) | 1.4 (9.6) |
| | 7.5 | 0.47 | 4.2 (28.9) | 3.4 (23.2) | 2.9 (20) | 2.6 (17.9) |
| TR 036 | 4.5 | 0.28 | 1.8 (12.4) | 1.4 (9.6) | 1.2 (8.3) | 1.0 (6.9) |
| | 6.8 | 0.43 | 3.1 (21.4) | 2.4 (16.8) | 2.1 (14.7) | 1.9 (13.1) |
| | 9.0 | 0.57 | 5.4 (37.2) | 4.4 (30.0) | 3.8 (26.2) | 3.4 (23.4) |
| TR 042 | 5.3 | 0.33 | 2.3 (15.8) | 1.8 (12.1) | 1.5 (10.3) | 1.3 (9.0) |
| | 7.9 | 0.50 | 4.3 (29.6) | 3.5 (24.2) | 3.1 (26.4) | 2.8 (19.3) |
| | 10.5 | 0.66 | 7.9 (54.4) | 6.5 (44.8) | 5.7 (39.3) | 5.2 (35.8) |
| TR 048 | 6.0 | .038 | 1.8 (12.4) | 1.5 (10.1) | 1.3 (9.0) | 1.2 (8.3) |
| | 9.0 | 0.57 | 3.4 (23.4) | 3.0 (20.4) | 2.7 (18.6) | 2.6 (17.9) |
| | 12.0 | 0.76 | 6.2 (42.7) | 5.5 (37.9) | 5.1 (35.1) | 4.8 (35.1) |
| TR 060 | 7.5 | 0.47 | 3.4 (23.4) | 2.8 (19.2) | 2.4 (16.5) | 2.2 (15.2) |
| | 11.3 | 0.71 | 6.8 (46.9) | 5.9 (40.8) | 5.4 (37.2) | 5.0 (34.5) |
| | 15.0 | 0.95 | 12.6 (86.8) | 11.1 (76.8) | 10.3 (71.0) | 9.6 (66.1) |

## ⚠ 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.

## ⚠ CAUTION! ⚠

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

## ⚠ CAUTION! ⚠

**CAUTION!** Many units are installed with a factory or field supplied manual or electric shut-off valve. DAMAGE WILL OCCUR if shut-off valve is closed during unit operation. A high pressure switch must be installed on the heat pump side of any field provided shut-off valves and connected to the heat pump controls in series with the built-in refrigerant circuit high pressure switch to disable compressor operation if water pressure exceeds pressure switch setting. The field installed high pressure switch shall have a cut-out pressure of 300 psig and a cut-in pressure of 250 psig.

# Unit Operating Conditions

**Operating Pressure/Temperature tables include the following notes:**

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

**Table 8: TR Series Typical Unit Operating Pressures and Temperatures**

| 006 | | Full Load Cooling - without HWG active | | | | | | Full Load Heating - without HWG active | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entering Water Temp °F | Water Flow GPM/ ton | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Rise °F | Air Temp Drop °F DB | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Drop °F | Air Temp Rise °F DB |
| 30* | 1.5 | 124-134 | 159-179 | 17-22 | 5-10 | 18.7-20.7 | 17-23 | 71-81 | 295-315 | 13-18 | 5-10 | 5.9-7.9 | 17-23 |
| | 2.25 | 120-130 | 147-167 | 20-25 | 5-10 | 13.6-15.6 | 18-24 | 72-82 | 296-316 | 14-19 | 5-10 | 4.2-6.2 | 17-23 |
| | 3 | 117-127 | 136-156 | 24-29 | 5-10 | 8.5-10.5 | 18-24 | 74-84 | 297-317 | 15-20 | 5-10 | 2.5-4.5 | 17-23 |
| 50 | 1.5 | 132-142 | 210-230 | 7-12 | 5-10 | 16.2-18.2 | 18-24 | 105-115 | 330-350 | 8-13 | 9-14 | 8.2-10.2 | 22-28 |
| | 2.25 | 131-141 | 199-219 | 8-13 | 5-10 | 11.9-13.9 | 19-25 | 110-120 | 335-355 | 9-14 | 9-14 | 6.1-8.1 | 22-28 |
| | 3 | 130-140 | 189-209 | 9-14 | 4-9 | 7.7-9.7 | 19-25 | 115-125 | 339-359 | 9-14 | 9-14 | 4-6 | 23-29 |
| 70 | 1.5 | 136-146 | 275-295 | 5-10 | 5-10 | 15.1-17.1 | 17-23 | 136-146 | 362-382 | 9-14 | 10-15 | 11.3-13.3 | 27-33 |
| | 2.25 | 136-146 | 262-282 | 6-11 | 4-9 | 11.1-13.1 | 18-24 | 141-151 | 368-388 | 9-14 | 10-15 | 16.9-18.9 | 28-34 |
| | 3 | 135-145 | 250-270 | 6-11 | 4-9 | 7.2-9.2 | 18-24 | 147-157 | 374-394 | 9-14 | 10-15 | 5.6-7.6 | 29-35 |
| 90 | 1.5 | 142-152 | 365-385 | 5-10 | 4-9 | 13.8-15.8 | 16-22 | 170-180 | 402-422 | 14-19 | 12-17 | 14.4-16.4 | 33-39 |
| | 2.25 | 141-151 | 353-373 | 5-10 | 4-9 | 10.2-12.2 | 16-22 | 173-183 | 407-427 | 15-20 | 12-17 | 11.1-13.1 | 33-39 |
| | 3 | 140-150 | 340-360 | 5-10 | 4-9 | 6.6-8.6 | 16-22 | 177-187 | 412-432 | 17-22 | 12-17 | 7.7-9.1 | 34-40 |
| 110 | 1.5 | 148-158 | 462-482 | 5-10 | 4-9 | 12.5-14.5 | 14-20 | | | | | | |
| | 2.25 | 147-157 | 449-469 | 5-10 | 3-8 | 9.2-11.2 | 14-20 | | | | | | |
| | 3 | 146-156 | 438-458 | 5-10 | 3-8 | 5.9-7.9 | 14-20 | | | | | | |

*Based on 15% Methanol antifreeze solution

| 009 | | Full Load Cooling - without HWG active | | | | | | Full Load Heating - without HWG active | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entering Water Temp °F | Water Flow GPM/ ton | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Rise °F | Air Temp Drop °F DB | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Drop °F | Air Temp Rise °F DB |
| 30* | 1.5 | 113-123 | 160-180 | 22-27 | 13-18 | 19.5-21.5 | 17-23 | 69-79 | 331-351 | 11-16 | 20-25 | 7.3-9.3 | 17-23 |
| | 2.25 | 110-120 | 147-167 | 25-30 | 11-16 | 14.2-16.2 | 17-23 | 72-82 | 335-355 | 11-16 | 20-25 | 5.4-7.4 | 18-24 |
| | 3 | 108-118 | 135-155 | 28-33 | 9-14 | 8.9-10.9 | 16-21 | 75-85 | 339-359 | 11-16 | 21-26 | 3.5-5.5 | 19-25 |
| 50 | 1.5 | 124-134 | 211-231 | 9-14 | 10-15 | 18-20 | 17-23 | 101-111 | 360-380 | 9-14 | 20-25 | 9.8-11.8 | 23-29 |
| | 2.25 | 122-132 | 199-219 | 12-17 | 9-14 | 13.2-15.2 | 17-23 | 105-115 | 363-383 | 9-14 | 19-24 | 7.4-9.4 | 24-30 |
| | 3 | 120-130 | 187-207 | 15-20 | 8-13 | 8.4-10.4 | 17-23 | 110-120 | 366-386 | 9-14 | 19-24 | 4.9-6.9 | 24-30 |
| 70 | 1.5 | 129-139 | 275-295 | 7-12 | 8-13 | 17.4-19.4 | 16-22 | 130-140 | 400-420 | 10-15 | 20-25 | 12.8-14.8 | 28-34 |
| | 2.25 | 128-138 | 261-281 | 8-13 | 7-12 | 12.8-14.8 | 16-22 | 137-147 | 407-427 | 10-15 | 19-24 | 9.6-11.6 | 29-35 |
| | 3 | 127-137 | 247-267 | 8-13 | 6-11 | 8.2-10.2 | 16-22 | 144-154 | 414-434 | 10-15 | 18-23 | 6.4-8.4 | 30-36 |
| 90 | 1.5 | 136-146 | 364-384 | 7-12 | 3-8 | 15.7-17.7 | 15-21 | 170-180 | 449-469 | 13-18 | 17-22 | 16-18 | 34-40 |
| | 2.25 | 135-145 | 350-370 | 7-12 | 4-9 | 11.7-13.7 | 15-21 | 178-188 | 455-475 | 14-19 | 15-20 | 12-14 | 35-41 |
| | 3 | 134-144 | 336-356 | 7-12 | 4-9 | 7.6-9.6 | 15-21 | 186-196 | 460-480 | 15-20 | 13-18 | 7.9-9.9 | 36-42 |
| 110 | 1.5 | 142-152 | 467-487 | 5-10 | 4-9 | 13.5-15.5 | 13-19 | | | | | | |
| | 2.25 | 141-151 | 451-471 | 5-10 | 4-9 | 9.9-11.9 | 13-19 | | | | | | |
| | 3 | 140-150 | 435-455 | 5-10 | 3-8 | 6.3-8.3 | 13-19 | | | | | | |

*Based on 15% Methanol antifreeze solution

# Unit Operating Conditions, Cont'd.

**Table 8, Cont'd.: TR Series Typical Unit Operating Pressures and Temperatures**

| 012 | | Full Load Cooling - without HWG active | | | | | | Full Load Heating - without HWG active | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entering Water Temp °F | Water Flow GPM/ ton | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Rise °F | Air Temp Drop °F DB | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Drop °F | Air Temp Rise °F DB |
| 30* | 1.5 | 116-126 | 155-175 | 14-19 | 9-14 | 19.4-21.4 | 18-24 | 70-80 | 311-331 | 8-13 | 8-13 | 6.9-8.9 | 18-24 |
| | 2.25 | 113-123 | 144-164 | 15-20 | 8-13 | 14.3-16.3 | 18-24 | 72-82 | 315-335 | 8-13 | 8-13 | 5.1-7.1 | 19-25 |
| | 3 | 111-121 | 132-152 | 17-22 | 6-11 | 9.1-11.1 | 18-24 | 75-85 | 319-339 | 8-13 | 8-13 | 3.2-5.2 | 19-25 |
| 50 | 1.5 | 123-133 | 208-228 | 8-13 | 9-14 | 18.1-20.1 | 17-23 | 102-112 | 354-364 | 8-13 | 9-14 | 9.3-11.3 | 25-31 |
| | 2.25 | 122-132 | 196-216 | 9-14 | 7-12 | 13.4-15.4 | 18-24 | 106-116 | 355-375 | 8-13 | 9-14 | 7-9 | 26-32 |
| | 3 | 121-131 | 184-204 | 9-14 | 5-10 | 8.6-10.6 | 18-24 | 110-120 | 355-375 | 8-13 | 9-14 | 4.6-6.6 | 26-32 |
| 70 | 1.5 | 127-137 | 266-286 | 7-12 | 8-13 | 17.2-19.2 | 16-22 | 131-141 | 392-412 | 9-14 | 8-13 | 12-14 | 30-36 |
| | 2.25 | 126-136 | 255-275 | 8-13 | 7-12 | 12.7-14.7 | 16-22 | 137-147 | 395-415 | 9-14 | 8-13 | 9-11 | 31-37 |
| | 3 | 126-136 | 244-264 | 8-13 | 5-10 | 8.2-10.2 | 16-22 | 144-154 | 398-418 | 9-14 | 7-12 | 6-8 | 32-38 |
| 90 | 1.5 | 133-143 | 362-382 | 6-11 | 7-12 | 16-18 | 15-21 | 175-185 | 443-463 | 10-15 | 3-8 | 15-17 | 36-42 |
| | 2.25 | 132-142 | 342-362 | 7-12 | 5-10 | 11.8-13.8 | 15-21 | 183-193 | 452-472 | 11-16 | 3-8 | 11.2-13.2 | 37-43 |
| | 3 | 132-142 | 331-351 | 7-12 | 4-9 | 7.6-9.6 | 15-21 | 190-200 | 461-491 | 13-18 | 3-8 | 7.4-9.4 | 38-44 |
| 110 | 1.5 | 140-150 | 459-479 | 6-11 | 4-9 | 14.4-16.4 | 13-19 | | | | | | |
| | 2.25 | 140-150 | 441-461 | 6-11 | 4-9 | 10.6-12.6 | 13-19 | | | | | | |
| | 3 | 139-149 | 431-451 | 6-11 | 3-8 | 6.9-8.9 | 13-19 | | | | | | |

*Based on 15% Methanol antifreeze solution

| 015 | | Full Load Cooling - without HWG active | | | | | | Full Load Heating - without HWG active | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entering Water Temp °F | Water Flow GPM/ ton | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Rise °F | Air Temp Drop °F DB | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Drop °F | Air Temp Rise °F DB |
| 30* | 1.5 | 116-126 | 167-187 | 15-20 | 9-14 | 18.3-20.3 | 18-24 | 70-80 | 279-299 | 6-11 | 1-5 | 7-8 | 16-22 |
| | 2.25 | 116-126 | 154-174 | 15-20 | 7-12 | 13.9-15.9 | 19-25 | 73-83 | 281-301 | 7-12 | 1-5 | 5.1-7.1 | 17-23 |
| | 3 | 116-126 | 140-160 | 15-20 | 7-12 | 9.5-11.5 | 19-25 | 75-85 | 284-304 | 7-12 | 1-5 | 3.3-5.3 | 17-23 |
| 50 | 1.5 | 128-138 | 194-214 | 11-14 | 9-14 | 17.9-19.9 | 18-24 | 102-112 | 312-332 | 10-15 | 2-6 | 9.9-11.9 | 22-28 |
| | 2.25 | 128-138 | 180-200 | 11-14 | 7-12 | 13.7-15.7 | 19-25 | 106-116 | 316-336 | 10-15 | 2-6 | 7.4-9.4 | 23-29 |
| | 3 | 128-138 | 166-186 | 11-14 | 7-12 | 9.4-11.4 | 19-25 | 110-120 | 321-341 | 10-15 | 2-6 | 4.9-6.9 | 23-29 |
| 70 | 1.5 | 136-146 | 289-309 | 7-12 | 9-14 | 17.4-19.4 | 17-23 | 128-138 | 335-355 | 12-17 | 3-8 | 12.9-14.9 | 27-34 |
| | 2.25 | 136-146 | 275-295 | 7-12 | 7-12 | 15.3-17.3 | 18-24 | 134-144 | 340-360 | 12-17 | 3-8 | 9.7-11.7 | 28-35 |
| | 3 | 136-146 | 261-281 | 7-12 | 6-11 | 8.8-10.8 | 18-24 | 141-151 | 346-366 | 12-17 | 3-8 | 6.5-8.5 | 28-35 |
| 90 | 1.5 | 139-149 | 386-406 | 6-11 | 9-14 | 16.8-18.8 | 16-22 | 160-170 | 373-393 | 15-20 | 3-8 | 15.8-17.8 | 30-38 |
| | 2.25 | 139-149 | 370-390 | 6-11 | 7-12 | 12.5-14.5 | 16-22 | 167-177 | 380-400 | 16-21 | 3-8 | 12-14 | 31-39 |
| | 3 | 139-149 | 356-376 | 6-11 | 6-11 | 8.2-9.2 | 16-22 | 174-184 | 388-408 | 17-22 | 3-8 | 8.1-10.1 | 32-40 |
| 110 | 1.5 | 145-155 | 483-503 | 6-11 | 9-14 | 15.8-17.8 | 15-21 | | | | | | |
| | 2.25 | 144-154 | 466-486 | 6-11 | 7-12 | 11.7-13.7 | 15-21 | | | | | | |
| | 3 | 143-153 | 449-469 | 6-11 | 6-11 | 7.5-9.5 | 15-21 | | | | | | |

*Based on 15% Methanol antifreeze solution

| 018 | | Full Load Cooling - without HWG active | | | | | | Full Load Heating - without HWG active | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entering Water Temp °F | Water Flow GPM/ ton | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Rise °F | Air Temp Drop °F DB | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Drop °F | Air Temp Rise °F DB |
| 30* | 1.5 | 122-132 | 171-191 | 15-20 | 14-19 | 22.5-24.5 | 20-28 | 70-80 | 272-292 | 4-9 | 2-6 | 7.4-9.4 | 18-24 |
| | 2.25 | 122-132 | 157-177 | 15-20 | 13-18 | 16.8-19.8 | 20-28 | 73-83 | 275-295 | 4-9 | 2-6 | 5.5-7.5 | 19-25 |
| | 3 | 122-132 | 145-165 | 15-20 | 13-18 | 11.2-13.2 | 20-28 | 77-87 | 278-298 | 4-9 | 2-6 | 3.5-5.5 | 19-25 |
| 50 | 1.5 | 136-146 | 198-218 | 10-15 | 14-19 | 22-24 | 19-25 | 101-111 | 302-322 | 8-13 | 3-7 | 10.3-12.3 | 23-29 |
| | 2.25 | 134-144 | 183-203 | 10-15 | 13-18 | 16.5-18.5 | 19-25 | 105-115 | 306-326 | 8-13 | 3-7 | 7.9-9.9 | 24-30 |
| | 3 | 133-143 | 171-191 | 11-16 | 13-18 | 11-13 | 19-25 | 109-119 | 311-331 | 8-13 | 3-7 | 5.5-7.5 | 25-31 |
| 70 | 1.5 | 139-149 | 293-313 | 6-10 | 14-19 | 19-21 | 18-24 | 130-140 | 329-349 | 10-15 | 4-9 | 13.6-15.6 | 27-33 |
| | 2.25 | 138-148 | 280-300 | 6-10 | 13-18 | 14.4-16.4 | 18-24 | 137-147 | 337-357 | 10-15 | 4-9 | 10.4-12.4 | 29-35 |
| | 3 | 137-147 | 267-287 | 7-11 | 13-18 | 9.8-11.7 | 18-24 | 139-149 | 342-362 | 10-15 | 4-9 | 7.2-9.2 | 30-36 |
| 90 | 1.5 | 142-152 | 389-409 | 5-10 | 17-22 | 16-18 | 17-23 | 160-170 | 360-380 | 13-18 | 5-10 | 17-19 | 33-41 |
| | 2.25 | 141-151 | 376-396 | 5-10 | 15-20 | 12.3-14.3 | 17-23 | 169-179 | 368-388 | 14-19 | 5-10 | 12.9-14.9 | 35-43 |
| | 3 | 140-150 | 363-383 | 5-10 | 13-18 | 8.5-10.5 | 17-23 | 178-188 | 376-396 | 14-19 | 4-9 | 8.8-10.8 | 36-44 |
| 110 | 1.5 | 148-158 | 486-506 | 5-10 | 17-22 | 14.9-16.9 | 16-22 | | | | | | |
| | 2.25 | 147-157 | 472-492 | 5-10 | 15-20 | 11.4-13.4 | 16-22 | | | | | | |
| | 3 | 146-156 | 458-478 | 5-10 | 13-18 | 7.8-9.8 | 16-22 | | | | | | |

*Based on 15% Methanol antifreeze solution

# Unit Operating Conditions, Cont'd.

**Table 8, Cont'd.: TR Series Typical Unit Operating Pressures and Temperatures**

| 024 | | Full Load Cooling - without HWG active | | | | | | Full Load Heating - without HWG active | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entering Water Temp °F | Water Flow GPM/ ton | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Rise °F | Air Temp Drop °F DB | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Drop °F | Air Temp Rise °F DB |
| 30* | 1.5 | 121-131 | 174-194 | 13-18 | 6-11 | 19.3-21.3 | 20-28 | 65-75 | 287-307 | 4-9 | 3-8 | 6.8-8.8 | 17-23 |
| | 2.25 | 120-130 | 165-185 | 13-18 | 5-10 | 14.5-16.5 | 20-28 | 68-78 | 290-310 | 5-10 | 3-8 | 5-7 | 18-24 |
| | 3 | 120-130 | 155-175 | 13-18 | 5-10 | 9.6-11.6 | 20-28 | 71-81 | 292-312 | 5-10 | 3-8 | 3.2-5.2 | 18-24 |
| 50 | 1.5 | 127-137 | 245-265 | 8-13 | 6-11 | 18.3-20.3 | 19-27 | 96-106 | 318-338 | 6-11 | 3-8 | 9.8-11.8 | 22-28 |
| | 2.25 | 128-138 | 231-251 | 8-13 | 7-12 | 13.7-15.7 | 19-27 | 101-111 | 322-342 | 7-12 | 3-8 | 7.2-9.2 | 23-29 |
| | 3 | 128-138 | 217-237 | 8-13 | 7-12 | 9.1-11.1 | 19-27 | 105-115 | 327-347 | 8-13 | 3-8 | 4.8-6.8 | 24-30 |
| 70 | 1.5 | 130-140 | 352-372 | 6-11 | 8-13 | 17.5-19.5 | 18-26 | 127-137 | 349-369 | 9-14 | 3-8 | 12.7-14.7 | 27-34 |
| | 2.25 | 130-140 | 334-354 | 6-11 | 9-14 | 26.2-28.2 | 18-26 | 132-142 | 353-373 | 9-14 | 3-8 | 9.5-11.5 | 28-35 |
| | 3 | 130-140 | 306-326 | 6-11 | 9-14 | 8.7-10.7 | 18-26 | 137-147 | 358-378 | 10-15 | 3-8 | 6.3-8.3 | 29-36 |
| 90 | 1.5 | 134-144 | 439-459 | 5-10 | 11-16 | 16.7-18.7 | 17-23 | 159-169 | 379-399 | 13-18 | 3-8 | 15.6-17.6 | 32-40 |
| | 2.25 | 133-143 | 416-436 | 5-10 | 12-17 | 12.5-14.5 | 17-23 | 164-174 | 384-404 | 14-19 | 3-8 | 11.7-13.7 | 33-41 |
| | 3 | 133-143 | 394-414 | 5-10 | 12-17 | 8.3-10.3 | 17-23 | 170-180 | 390-410 | 16-21 | 3-8 | 7.8-9.8 | 34-42 |
| 110 | 1.5 | 140-150 | 536-556 | 4-9 | 22-27 | 17.1-19.1 | 17-23 | | | | | | |
| | 2.25 | 139-149 | 512-532 | 4-9 | 19-23 | 12.6-14.6 | 17-23 | | | | | | |
| | 3 | 138-148 | 488-508 | 4-9 | 17-22 | 8-10 | 17-23 | | | | | | |

*Based on 15% Methanol antifreeze solution

| 030 | | Full Load Cooling - without HWG active | | | | | | Full Load Heating - without HWG active | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entering Water Temp °F | Water Flow GPM/ ton | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Rise °F | Air Temp Drop °F DB | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Drop °F | Air Temp Rise °F DB |
| 30* | 1.5 | 113-123 | 188-208 | 14-19 | 14-19 | 19.5-21.5 | 18-26 | 67-77 | 322-342 | 8-13 | 15-20 | 6.9-8.9 | 17-25 |
| | 2.25 | 114-124 | 177-197 | 14-19 | 13-18 | 14.5-16.5 | 19-27 | 69-79 | 324-344 | 8-13 | 15-20 | 5.1-7.1 | 18-26 |
| | 3 | 114-124 | 166-186 | 14-19 | 13-18 | 9.5-11.5 | 19-27 | 71-81 | 326-346 | 8-13 | 15-20 | 3.3-5.3 | 18-26 |
| 50 | 1.5 | 124-134 | 248-268 | 11-16 | 14-19 | 18.7-20.7 | 18-26 | 95-105 | 346-366 | 10-15 | 15-20 | 9.8-11.8 | 23-31 |
| | 2.25 | 124-134 | 233-253 | 11-16 | 13-18 | 13.9-15.9 | 19-27 | 99-109 | 350-370 | 10-15 | 15-20 | 7.3-9.3 | 24-32 |
| | 3 | 124-134 | 218-238 | 11-16 | 13-18 | 9.1-11.1 | 19-27 | 103-113 | 355-375 | 11-16 | 15-20 | 4.8-6.8 | 25-33 |
| 70 | 1.5 | 132-142 | 333-353 | 9-14 | 13-18 | 17.5-19.5 | 18-26 | 125-135 | 376-396 | 13-18 | 14-19 | 12.7-14.7 | 27-35 |
| | 2.25 | 132-142 | 313-333 | 9-14 | 12-17 | 13-15 | 18-26 | 133-143 | 386-406 | 13-18 | 14-19 | 9.8-11.8 | 28-36 |
| | 3 | 132-142 | 293-313 | 9-14 | 12-17 | 8.5-10.5 | 18-26 | 136-146 | 393-413 | 13-18 | 14-19 | 6.4-8.4 | 30-38 |
| 90 | 1.5 | 135-145 | 431-451 | 7-12 | 17-22 | 16.5-18.5 | 17-25 | 155-165 | 415-435 | 15-20 | 13-18 | 15.6-18.6 | 33-41 |
| | 2.25 | 135-145 | 411-431 | 7-12 | 15-20 | 12.3-14.3 | 17-25 | 167-177 | 422-442 | 16-21 | 13-18 | 11.8-13.8 | 34-42 |
| | 3 | 135-145 | 391-411 | 7-12 | 13-18 | 8-10 | 17-25 | 170-180 | 430-450 | 17-22 | 13-18 | 7.9-9.9 | 36-44 |
| 110 | 1.5 | 140-150 | 528-548 | 6-11 | 17-22 | 16.2-18.2 | 16-24 | | | | | | |
| | 2.25 | 140-150 | 506-526 | 7-12 | 15-20 | 11.9-13.9 | 16-24 | | | | | | |
| | 3 | 139-149 | 485-505 | 7-12 | 13-18 | 7.6-9.6 | 16-24 | | | | | | |

*Based on 15% Methanol antifreeze solution

| 036 | | Full Load Cooling - without HWG active | | | | | | Full Load Heating - without HWG active | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entering Water Temp °F | Water Flow GPM/ ton | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Rise °F | Air Temp Drop °F DB | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Drop °F | Air Temp Rise °F DB |
| 30* | 1.5 | 113-123 | 185-205 | 17-22 | 9-14 | 19.5-21.5 | 18-26 | 64-74 | 327-347 | 4-9 | 15-20 | 7.7-9.7 | 19-27 |
| | 2.25 | 113-123 | 174-194 | 17-22 | 8-13 | 14.5-16.5 | 19-27 | 66-76 | 331-351 | 4-9 | 15-20 | 5.7-7.7 | 19-27 |
| | 3 | 113-123 | 163-183 | 17-22 | 8-13 | 9.6-11.6 | 19-27 | 69-79 | 335-365 | 4-9 | 15-20 | 3.7-5.7 | 20-28 |
| 50 | 1.5 | 121-131 | 249-269 | 12-17 | 9-14 | 19.4-21.4 | 17-25 | 91-101 | 360-380 | 10-15 | 15-20 | 11.2-13.2 | 25-33 |
| | 2.25 | 120-130 | 231-251 | 12-17 | 8-13 | 14.4-16.4 | 18-26 | 96-106 | 370-390 | 9-14 | 16-21 | 8.2-10.2 | 26-34 |
| | 3 | 120-130 | 214-234 | 12-17 | 8-13 | 9.4-11.4 | 18-26 | 102-112 | 380-400 | 8-13 | 16-21 | 5.2-7.2 | 27-35 |
| 70 | 1.5 | 128-138 | 327-347 | 9-14 | 13-18 | 19.1-21.1 | 16-24 | 125-135 | 402-422 | 10-15 | 14-19 | 14.7-16.7 | 32-40 |
| | 2.25 | 128-138 | 304-324 | 9-14 | 11-16 | 14.1-16.1 | 17-25 | 132-142 | 413-433 | 10-15 | 14-19 | 11-13 | 33-41 |
| | 3 | 127-137 | 282-302 | 9-14 | 10-15 | 9.1-11.1 | 17-25 | 140-150 | 423-443 | 10-15 | 14-19 | 7.3-9.3 | 34-42 |
| 90 | 1.5 | 132-142 | 416-436 | 8-13 | 20-25 | 18.8-20.8 | 15-23 | 158-168 | 445-465 | 13-18 | 12-17 | 18.1-20.1 | 37-45 |
| | 2.25 | 132-142 | 396-416 | 8-13 | 18-23 | 13.9-15.9 | 16-24 | 167-177 | 456-476 | 13-18 | 11-16 | 13.8-15.8 | 38-46 |
| | 3 | 131-141 | 376-396 | 8-13 | 16-21 | 8.9-10.9 | 16-24 | 177-187 | 467-487 | 14-19 | 11-16 | 9.4-11.4 | 40-48 |
| 110 | 1.5 | 138-148 | 550-570 | 8-13 | 20-25 | 18.5-20.5 | 15-23 | | | | | | |
| | 2.25 | 136-146 | 525-545 | 8-13 | 18-23 | 13.6-15.6 | 15-23 | | | | | | |
| | 3 | 135-145 | 500-520 | 8-13 | 16-21 | 8.7-10.7 | 15-23 | | | | | | |

*Based on 15% Methanol antifreeze solution

# Unit Operating Conditions, Cont'd.

**Table 8, Cont'd.: TR Series Typical Unit Operating Pressures and Temperatures**

| 042 | | Full Load Cooling - without HWG active | | | | | | Full Load Heating - without HWG active | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entering Water Temp °F | Water Flow GPM/ ton | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Rise °F | Air Temp Drop °F DB | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Drop °F | Air Temp Rise °F DB |
| 30* | 1.5 | 115-125 | 174-194 | 12-17 | 10-15 | 19.8-21.8 | 16-24 | 66-76 | 314-334 | 6-11 | 11-16 | 7.3-9.3 | 18-26 |
| | 2.25 | 115-125 | 159-179 | 12-17 | 9-14 | 14.6-16.6 | 16-24 | 69-79 | 318-338 | 5-10 | 12-17 | 5.4-7.4 | 19-27 |
| | 3 | 115-125 | 144-164 | 12-17 | 9-14 | 9.5-11.5 | 16-24 | 72-82 | 321-341 | 4-9 | 12-17 | 3.4-5.4 | 19-27 |
| 50 | 1.5 | 123-133 | 233-253 | 9-14 | 10-15 | 19-21 | 16-24 | 97-107 | 354-374 | 9-14 | 13-18 | 10.2-12.2 | 24-32 |
| | 2.25 | 122-132 | 219-239 | 9-14 | 9-14 | 14-16 | 16-24 | 101-111 | 360-380 | 8-13 | 13-18 | 7.6-9.6 | 25-33 |
| | 3 | 122-132 | 205-225 | 9-14 | 9-14 | 9.1-11.1 | 16-24 | 106-116 | 365-385 | 6-11 | 13-18 | 5-7 | 26-34 |
| 70 | 1.5 | 128-138 | 309-329 | 6-11 | 12-17 | 18.3-20.3 | 16-24 | 130-140 | 394-414 | 7-12 | 13-18 | 13.3-15.3 | 30-38 |
| | 2.25 | 128-138 | 290-310 | 6-11 | 11-14 | 13.5-15.5 | 16-24 | 136-146 | 401-421 | 7-12 | 13-18 | 9.9-1.9 | 31-39 |
| | 3 | 128-138 | 271-291 | 6-11 | 11-14 | 8.7-10.7 | 16-24 | 143-153 | 409-429 | 8-13 | 13-18 | 6.6-8.6 | 32-40 |
| 90 | 1.5 | 133-143 | 406-426 | 5-10 | 14-19 | 17.6-19.6 | 16-24 | 164-174 | 434-454 | 10-15 | 12-17 | 16.4-18.4 | 37-45 |
| | 2.25 | 133-143 | 386-406 | 5-10 | 13-18 | 12.9-14.9 | 16-24 | 172-182 | 443-463 | 11-16 | 12-17 | 12.3-14.3 | 38-46 |
| | 3 | 132-142 | 367-387 | 5-10 | 13-18 | 8.3-10.3 | 16-24 | 180-190 | 453-473 | 11-16 | 12-17 | 8.3-10.3 | 39-47 |
| 110 | 1.5 | 138-148 | 505-525 | 5-10 | 19-24 | 16.8-18.8 | 16-24 | | | | | | |
| | 2.25 | 138-148 | 484-504 | 5-10 | 16-21 | 12.4-14.4 | 16-24 | | | | | | |
| | 3 | 138-148 | 463-483 | 5-10 | 14-19 | 7.9-9.9 | 16-24 | | | | | | |

*Based on 15% Methanol antifreeze solution

| 048 | | Full Load Cooling - without HWG active | | | | | | Full Load Heating - without HWG active | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entering Water Temp °F | Water Flow GPM/ ton | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Rise °F | Air Temp Drop °F DB | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Drop °F | Air Temp Rise °F DB |
| 30* | 1.5 | 119-129 | 190-210 | 15-20 | 10-15 | 19.3-21.3 | 18-26 | 63-73 | 284-304 | 5-10 | 3-8 | 6.9-8.9 | 17-25 |
| | 2.25 | 119-129 | 179-199 | 15-20 | 9-14 | 14.6-16.6 | 19-27 | 66-76 | 288-308 | 6-10 | 3-8 | 5-7 | 18-26 |
| | 3 | 119-129 | 158-178 | 15-20 | 9-14 | 9.8-11.8 | 19-27 | 69-79 | 292-312 | 6-11 | 3-8 | 3.1-5.1 | 18-26 |
| 50 | 1.5 | 124-134 | 248-268 | 10-15 | 10-15 | 19-21 | 18-26 | 92-102 | 309-329 | 8-13 | 3-8 | 9.5-11.5 | 23-31 |
| | 2.25 | 123-133 | 230-250 | 10-15 | 9-14 | 14.3-16.3 | 19-27 | 96-106 | 313-333 | 9-14 | 3-8 | 7-9 | 24-32 |
| | 3 | 123-133 | 213-233 | 10-15 | 9-14 | 9.6-11.6 | 19-27 | 100-110 | 317-337 | 9-14 | 3-8 | 4.6-6.6 | 24-32 |
| 70 | 1.5 | 129-139 | 337-357 | 8-13 | 12-17 | 18.6-20.6 | 17-25 | 123-133 | 339-359 | 11-16 | 3-8 | 12.5-14.5 | 29-37 |
| | 2.25 | 129-139 | 328-348 | 8-13 | 11-16 | 14-16 | 18-26 | 128-138 | 344-364 | 11-16 | 3-8 | 9.3-11.3 | 29-37 |
| | 3 | 129-139 | 300-320 | 8-13 | 11-16 | 9.4-11.4 | 18-26 | 133-143 | 350-370 | 12-17 | 3-8 | 6.2-8.2 | 30-38 |
| 90 | 1.5 | 134-144 | 426-446 | 6-11 | 15-20 | 18.2-20.2 | 16-24 | 153-163 | 369-389 | 14-19 | 1-6 | 15.4-17.4 | 33-41 |
| | 2.25 | 134-144 | 406-426 | 6-11 | 15-20 | 13.7-15.7 | 17-25 | 160-170 | 376-396 | 15-20 | 1-6 | 11.6-13.6 | 35-43 |
| | 3 | 134-144 | 386-406 | 6-11 | 15-20 | 9.2-11.2 | 17-25 | 167-177 | 384-404 | 16-21 | 1-6 | 7.8-9.8 | 36-44 |
| 110 | 1.5 | 140-150 | 560-580 | 4-9 | 23-28 | 17.7-19.7 | 16-24 | | | | | | |
| | 2.25 | 140-150 | 536-556 | 4-9 | 20-25 | 13.4-15.4 | 16-24 | | | | | | |
| | 3 | 139-149 | 511-531 | 4-9 | 18-22 | 9-11 | 16-24 | | | | | | |

*Based on 15% Methanol antifreeze solution

| 060 | | Full Load Cooling - without HWG active | | | | | | Full Load Heating - without HWG active | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entering Water Temp °F | Water Flow GPM/ ton | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Rise °F | Air Temp Drop °F DB | Suction Pressure PSIG | Discharge Pressure PSIG | Superheat °F | Subcooling °F | Water Temp Drop °F | Air Temp Rise °F DB |
| 30* | 1.5 | 108-118 | 180-200 | 16-21 | 10-15 | 20.6 | 19-27 | 61-71 | 314-334 | 6-11 | 14-19 | 7.6-9.6 | 19-27 |
| | 2.25 | 108-118 | 165-185 | 16-21 | 9-14 | 15.2-17.2 | 20-28 | 64-74 | 317-337 | 7-12 | 13-18 | 5.6-7.6 | 20-28 |
| | 3 | 108-118 | 150-170 | 16-21 | 9-14 | 9.7-11.7 | 20-28 | 66-76 | 319-339 | 7-12 | 13-18 | 3.6-5.6 | 20-28 |
| 50 | 1.5 | 113-123 | 206-226 | 11-14 | 10-15 | 19.8-21.8 | 18-26 | 90-100 | 350-370 | 11-16 | 14-19 | 10.5-12.5 | 25-33 |
| | 2.25 | 113-123 | 190-210 | 11-14 | 9-14 | 14.5-16.5 | 19-27 | 95-105 | 357-377 | 11-16 | 14-19 | 7.9-9.9 | 27-35 |
| | 3 | 113-123 | 173-193 | 11-14 | 9-14 | 9.3-11.3 | 19-27 | 99-109 | 364-384 | 10-15 | 14-19 | 5.2-7.2 | 28-36 |
| 70 | 1.5 | 119-129 | 305-325 | 9-14 | 12-17 | 18.8-20.8 | 17-25 | 123-133 | 391-411 | 12-17 | 14-19 | 13.7-15.7 | 33-41 |
| | 2.25 | 118-128 | 287-307 | 9-14 | 11-14 | 13.8-15.8 | 18-26 | 129-139 | 399-419 | 12-17 | 14-19 | 10.3-12.3 | 34-42 |
| | 3 | 118-128 | 269-289 | 9-14 | 11-14 | 8.8-10.8 | 18-26 | 135-145 | 407-427 | 13-18 | 14-19 | 6.9-8.9 | 35-43 |
| 90 | 1.5 | 124-134 | 402-422 | 7-12 | 14-19 | 17.8-19.8 | 16-24 | 157-167 | 431-451 | 13-18 | 13-18 | 16.8-18.8 | 38-46 |
| | 2.25 | 124-134 | 382-402 | 7-12 | 13-18 | 13.1-15.1 | 17-25 | 164-184 | 440-460 | 14-19 | 13-18 | 12.7-14.7 | 39-47 |
| | 3 | 123-133 | 363-383 | 7-12 | 13-18 | 8.3-10.3 | 17-25 | 172-182 | 450-470 | 16-21 | 12-17 | 8.6-10.6 | 41-49 |
| 110 | 1.5 | 130-140 | 500-520 | 7-12 | 20-25 | 17-19 | 16-24 | | | | | | |
| | 2.25 | 129-139 | 479-499 | 6-11 | 16-21 | 12.4-14.4 | 16-24 | | | | | | |
| | 3 | 128-138 | 458-478 | 5-10 | 13-18 | 7.8-9.8 | 16-24 | | | | | | |

*Based on 15% Methanol antifreeze solution

# Unit Operating Conditions, Cont'd.

**Table 9: Water Temperature Change Through Heat Exchanger**

| Water Flow, gpm [l/m] | Rise, Cooling °F, [°C] | Drop, Heating °F, [°C] |
|---|---|---|
| For Closed Loop: Ground Source or Closed Loop Systems at 3 gpm per ton [3.2 l/m per kW] | 9 - 12 [5 - 6.7] | 4 - 8 [2.2 - 4.4] |
| For Open Loop: Ground Water Systems at 1.5 gpm per ton [1.6 l/m per kW] | 20 - 26 [11.1 - 14.4] | 10 - 17 [5.6 - 9.4] |

# Preventive Maintenance

**Water Coil Maintenance -** (Direct ground water applications only) If the system is installed in an area with a known high mineral content (125 P.P.M. or greater) in the water, it is best to establish a periodic maintenance schedule with the owner so the coil can be checked regularly. Consult the well water applications section of this manual for a more detailed water coil material selection. Should periodic coil cleaning be necessary, use standard coil cleaning procedures, which are compatible with the heat exchanger material and copper water lines. Generally, the more water flowing through the unit, the less chance for scaling. Therefore, 1.5 gpm per ton [1.6 l/m per kW] is recommended as a minimum flow. Minimum flow rate for entering water temperatures below 50°F [10°C] is 2.0 gpm per ton [2.2 l/m per kW].

**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. Dirty installations are typically the result of deterioration of iron or galvanized piping or components in the system. Open cooling towers requiring heavy chemical treatment and mineral buildup through water use can also contribute to higher maintenance. Should periodic coil cleaning be necessary, use standard coil cleaning procedures, which are compatible with both the heat exchanger material and copper water lines. Generally, the more water flowing through the unit, the less chance for scaling. However, flow rates over 3 gpm per ton (3.9 l/m per kW) can produce water (or debris) velocities that can erode the heat exchanger wall and ultimately produce leaks.

**Hot Water Generator Coils -** See water coil maintenance for ground water units. If the potable water is hard or not chemically softened, the high temperatures of the desuperheater will tend to scale even quicker than the water coil and may need more frequent inspections. In areas with extremely hard water, a HWG is not recommended.

**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 ensure 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.

**Compressor -** Conduct annual amperage checks to ensure that amp draw is no more than 10% greater than indicated on the serial plate data.

**Fan Motors -** All units have lubricated fan motors. Fan motors should never be lubricated unless obvious, dry operation is suspected. Periodic maintenance oiling is not recommended, as it will result in dirt accumulating in the excess oil and cause eventual motor failure. Conduct annual dry operation check and amperage check to ensure amp draw is no more than 10% greater than indicated on serial plate data.

**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.

# Functional Troubleshooting

| Fault | Htg | Clg | Possible Cause | Solution |
|---|---|---|---|---|
| **Main power problems** | X | X | Green Status LED Off | Check line voltage circuit breaker and disconnect. |
| | | | | Check for line voltage between L1 and L2 on the contactor. |
| | | | | Check for 24VAC between R and C on CXM/DXM2 |
| | | | | Check primary/secondary voltage on transformer. |
| **HP Fault Code 2** **High Pressure** | | X | Reduced or no water flow in cooling | Check pump operation or valve operation/setting. |
| | | | | Check water flow adjust to proper flow rate. |
| | | X | Water Temperature out of range in cooling | Bring water temp within design parameters. |
| | X | | Reduced or no air flow in heating | Check for dirty air filter and clean or replace. |
| | | | | Check fan motor operation and airflow restrictions. |
| | | | | Dirty Air Coil- construction dust etc. |
| | | | | Too high of external static. Check static vs blower table. |
| | X | | Air temperature out of range in heating | Bring return air temp within design parameters. |
| | X | X | Overcharged with refrigerant | Check superheat/subcooling vs typical operating condition table. |
| | X | X | Bad HP Switch | Check switch continuity and operation. Replace. |
| **LP/LOC Fault Code 3** **Low Pressure / Loss of Charge** | X | X | Insufficient charge | Check for refrigerant leaks |
| | X | | Compressor pump down at start-up | Check charge and start-up water flow. |
| **LT1 Fault Code 4** **Water coil low temperature limit** | X | | Reduced or no water flow in heating | Check pump operation or water valve operation/setting. |
| | | | | Plugged strainer or filter. Clean or replace.. |
| | | | | Check water flow adjust to proper flow rate. |
| | X | | Inadequate antifreeze level | Check antifreeze density with hydrometer. |
| | X | | Improper temperature limit setting (30°F vs 10°F [-1°C vs -2°C]) | Clip JW3 jumper for antifreeze (10°F [-12°C]) use. |
| | X | | Water Temperature out of range | Bring water temp within design parameters. |
| | X | X | Bad thermistor | Check temp and impedance correlation per chart |
| **LT2 Fault Code 5** **Air coil low temperature limit** | | X | Reduced or no air flow in cooling | Check for dirty air filter and clean or replace. |
| | | | | Check fan motor operation and airflow restrictions. |
| | | | | Too high of external static. Check static vs blower table. |
| | | X | Air Temperature out of range | Too much cold vent air? Bring entering air temp within design parameters. |
| | | X | Improper temperature limit setting (30°F vs 10°F [-1°C vs -12°C]) | Normal airside applications will require 30°F [-1°C] only. |
| | X | X | Bad thermistor | Check temp and impedance correlation per chart. |
| **Condensate Fault Code 6** | X | X | Blocked drain | Check for blockage and clean drain. |
| | X | X | Improper trap | Check trap dimensions and location ahead of vent. |
| | | X | Poor drainage | Check for piping slope away from unit. |
| | | | | Check slope of unit toward outlet. |
| | | | | Poor venting. Check vent location. |
| | | X | Moisture on sensor | Check for moisture shorting to air coil. |
| | X | X | Plugged air filter | Replace air filter. |
| | x | X | Restricted Return Air Flow | Find and eliminate restriction. Increase return duct and/or grille size. |
| **Over/Under Voltage Code 7** **(Auto resetting)** | X | X | Under Voltage | Check power supply and 24VAC voltage before and during operation. |
| | | | | Check power supply wire size. |
| | | | | Check compressor starting. Need hard start kit? |
| | | | | Check 24VAC and unit transformer tap for correct power supply voltage. |
| | X | X | Over Voltage | Check power supply voltage and 24VAC before and during operation. |
| | | | | Check 24VAC and unit transformer tap for correct power supply voltage. |
| **Unit Performance Sentinel Code 8** | X | | Heating mode LT2>125°F [52°C] | Check for poor air flow or overcharged unit. |
| | | X | Cooling Mode LT1>125°F [52°C] OR LT2< 40ºF [4ºC]) | Check for poor water flow, or air flow. |
| **Swapped Thermistor Code 9** | X | X | LT1 and LT2 swapped | Reverse position of thermistors |
| **No Fault Code Shown** | X | X | No compressor operation | See "Only Fan Operates". |
| | X | X | Compressor overload | Check and replace if necessary. |
| | X | X | Control board | Reset power and check operation. |
| **Unit Short Cycles** | X | X | Dirty air filter | Check and clean air filter. |
| | X | X | Unit in "test mode" | Reset power or wait 20 minutes for auto exit. |
| | X | X | Unit selection | Unit may be oversized for space. Check sizing for actual load of space. |
| | X | X | Compressor overload | Check and replace if necessary |
| **Only Fan Runs** | X | X | Thermostat position | Ensure thermostat set for heating or cooling operation. |
| | X | X | Unit locked out | Check for lockout codes. Reset power. |
| | X | X | Compressor Overload | Check compressor overload. Replace if necessary. |
| | X | X | Thermostat wiring | Check thermostat wiring at heat pump. Jumper Y and R for compressor operation in test mode. |
| **Only Compressor Runs** | X | X | Thermostat wiring | Check G wiring at heat pump. Jumper G and R for fan operation |
| | X | X | Fan motor relay | Jumper G and R for fan operation. Check for Line voltage across BR contacts. |
| | X | X | | Check fan power enable relay operation (if present). |
| | X | X | Fan motor | Check for line voltage at motor. Check capacitor. |
| | X | X | Thermostat wiring | Check thermostat wiring at heat pump. Jumper Y and R for compressor operation in test mode |
| **Unit Doesn't Operate in Cooling** | | X | Reversing valve | Set for cooling demand and check 24VAC on RV coil and at CXM/DXM2 board. |
| | | | | If RV is stuck, run high pressure up by reducing water flow and while operating engage and disengage RV coil voltage to push valve. |
| | | X | Thermostat setup | Check for 'O' RV setup not 'B'. |
| | | X | Thermostat wiring | Check O wiring at heat pump. Jumper O and R for RV coil 'click'. |
| | | X | Thermostat wiring | Put thermostat in cooling mode. Check 24 VAC on O (check between C and O); check for 24 VAC on W (check between W and C). There should be voltage on O, but not on W. If voltage is present on W, thermostat may be bad or wired incorrectly. |

# Performance Troubleshooting

| Performance Troubleshooting | Htg | Clg | Possible Cause | Solution |
|---|---|---|---|---|
| Insufficient capacity/ Not cooling or heating | X | X | Dirty filter | Replace or clean. |
| | X | | Reduced or no air flow in heating | Check for dirty air filter and clean or replace. |
| | | | | Check fan motor operation and airflow restrictions. |
| | | | | Too high of external static. Check static vs. blower table. |
| | | X | Reduced or no air flow in cooling | Check for dirty air filter and clean or replace. |
| | | | | Check fan motor operation and airflow restrictions. |
| | | | | Too high of external static. Check static vs. blower table. |
| | X | X | Leaky duct work | Check supply and return air temperatures at the unit and at distant duct registers if significantly different, duct leaks are present. |
| | X | X | Low refrigerant charge | Check superheat and subcooling per chart. |
| | X | X | Restricted metering device | Check superheat and subcooling per chart. Replace. |
| | | X | Defective reversing valve | Perform RV touch test. |
| | X | X | Thermostat improperly located | Check location and for air drafts behind stat. |
| | X | X | Unit undersized | Recheck loads & sizing. Check sensible clg. load and heat pump capacity. |
| | X | X | Scaling in water heat exchanger | Perform scaling check and clean if necessary. |
| | X | X | Inlet water too hot or too cold | Check load, loop sizing, loop backfill, ground moisture. |
| High Head Pressure | X | | Reduced or no air flow in heating | Check for dirty air filter and clean or replace. |
| | | | | Check fan motor operation and air flow restrictions. |
| | | | | Too high of external static. Check static vs. blower table. |
| | | X | Reduced or no water flow in cooling | Check pump operation or valve operation/setting. |
| | | | | Check water flow. Adjust to proper flow rate. |
| | | X | Inlet water too hot | Check load, loop sizing, loop backfill, ground moisture. |
| | X | | Air temperature out of range in heating | Bring return air temperature within design parameters. |
| | | X | Scaling in water heat exchanger | Perform scaling check and clean if necessary. |
| | X | X | Unit overcharged | Check superheat and subcooling. Re-weigh in charge. |
| | X | X | Non-condensables in system | Vacuum system and re-weigh in charge. |
| | X | X | Restricted metering device. | Check superheat and subcooling per chart. Replace. |
| Low Suction Pressure | X | | Reduced water flow in heating. | Check pump operation or water valve operation/setting. |
| | | | | Plugged strainer or filter. Clean or replace. |
| | | | | Check water flow. Adjust to proper flow rate. |
| | X | | Water temperature out of range. | Bring water temperature within design parameters. |
| | | X | Reduced air flow in cooling. | Check for dirty air filter and clean or replace. |
| | | | | Check fan motor operation and air flow restrictions. |
| | | | | Too high of external static. Check static vs. blower table. |
| | | X | Air temperature out of range | Too much cold vent air? Bring entering air temperature within design parameters. |
| | X | X | Insufficient charge | Check for refrigerant leaks. |
| Low Discharge Air Temperature in Heating | X | | Too high of air flow | Check fan motor speed selection and air flow chart. |
| | X | | Poor performance | See ‘Insufficient Capacity’ |
| High humidity | | X | Too high of air flow | Check fan motor speed selection and airflow chart. |
| | | X | Unit oversized | Recheck loads & sizing. Check sensible clg load and heat pump capacity. |

# Start-Up Log Sheet

**Installer:** Complete unit and system checkout and follow unit start-up procedures in the IOM. Use this form to record unit information, temperatures and pressures during start-up. Keep this form for future reference.

**Job Name:** _____ **Street Address:** _____

**Model Number:** _____ **Serial Number:** _____

**Unit Location in Building:** _____

**Date:** _____ **Sales Order No:** _____

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

| Fan Motor | Description | Value |
|---|---|---|
| PSC | Speed Tap | |
| CT ECM | Speed Tap | |
| CV ECM | CFM Setting | |

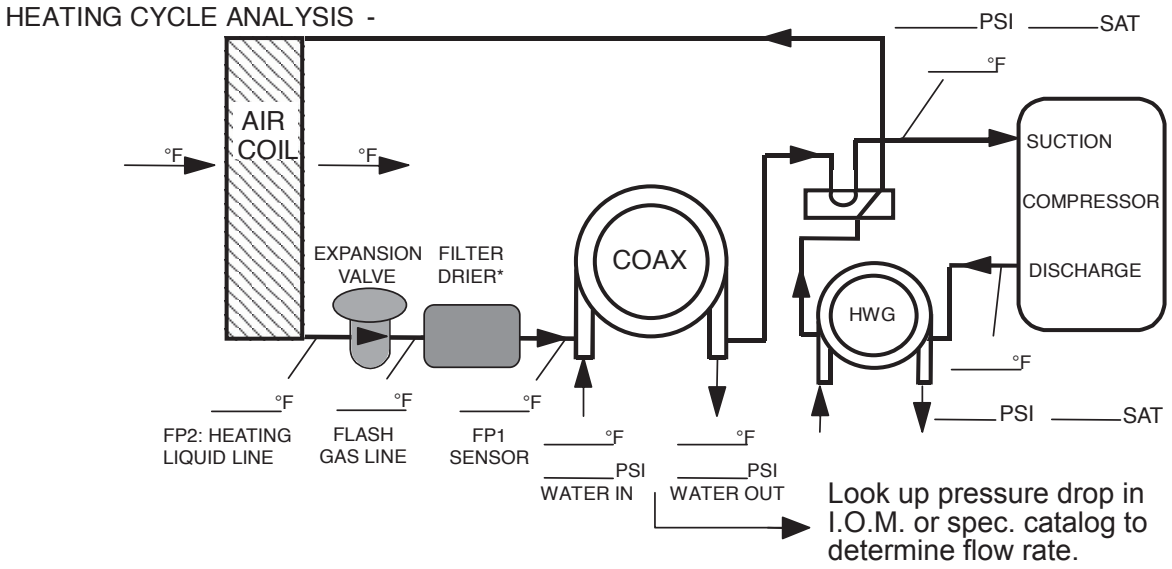
**Temperatures: F or C** **Antifreeze: _____%**

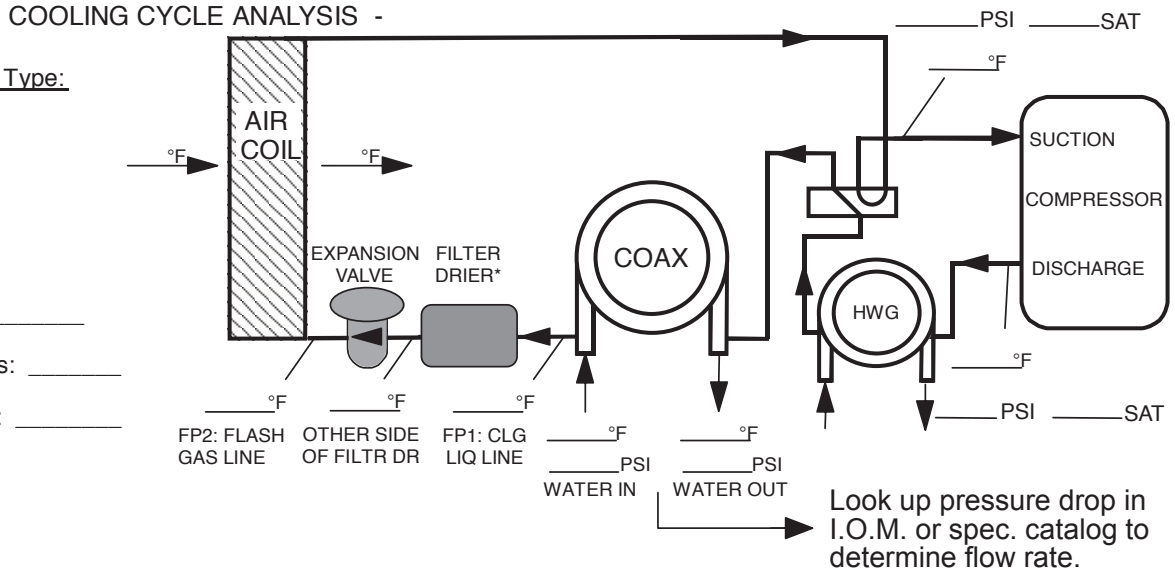
**Pressures: PSIG or kPa** **Type: _____**

| | Cooling Mode | | Heating Mode |
|---|---|---|---|
| Entering Fluid Temperature | | | |
| Leaving Fluid Temperature | | | |
| Temperature Differential | | | |
| Return-Air Temperature | DB | WB | DB |
| Supply-Air Temperature | DB | WB | DB |
| **Temperature Differential** | | | |
| Water Coil Heat Exchanger (Water Pressure IN) | | | |
| Water Coil Heat Exchanger (Water Pressure OUT) | | | |
| Pressure Differential | | | |
| Water Flow GPM | | | |
| **Compressor** | | | |
| Amps | | | |
| Volts | | | |
| Discharge Line Temperature | | | |
| **Motor** | | | |
| Amps | | | |
| Volts | | | |

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

# Functional Troubleshooting




Heat of Extraction (Absorption) or Heat of Rejection =

_____ flow rate (gpm) x _____ temp.diff. (deg. F) x _____ fluid factor† = _____ (Btu/hr)

Superheat = Suction temperature - suction saturation temp. = _____ (deg F)

Subcooling = Discharge saturation temp. - liquid line temp. = _____ (deg F)

† Use 500 for water, 485 for antifreeze.

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**Note: Never connect refrigerant gauges during startup procedures. Conduct water-side analysis using P/T ports to determine water flow and temperature difference. If water-side analysis shows poor performance, refrigerant troubleshooting may be required. Connect refrigerant gauges as a last resort.**

# CLIMATE MASTER, INC.
# LIMITED EXPRESS WARRANTY/ LIMITATION OF REMEDIES AND LIABILITY

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

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

**GRANT OF LIMITED EXPRESS WARRANTY**
CM warrants CM products purchased and retained in the United States of America and Canada to be free from defects in material and workmanship under normal use and maintenance as follows: (1) All complete air conditioning, heating and/or heat pump units built or sold by CM for twelve (12) months from date of unit start up or eighteen (18) months from date of shipment (from factory), whichever comes first; (2) Repair and replacement parts, which are not supplied under warranty, for ninety (90) days from date of shipment (from factory). All parts must be returned to CM's factory in Oklahoma City, Oklahoma, freight prepaid, no later than sixty (60) days after the date of the failure of the part; if CM determines the part to be defective and within CM's Limited Express Warranty, CM shall, when such part has been either replaced or repaired, return such to a factory recognized dealer, contractor or service organization, F.O.B. CM's factory, Oklahoma City, Oklahoma, freight prepaid. The warranty on any parts repaired or replaced under warranty expires at the end of the original warranty period.

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

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

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

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

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

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

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

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

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

Rev.: 11/09

LC083

# Warranty (International)

CLIMATEMASTER
Geothermal Heat Pump Systems

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## (FOR INTERNATIONAL CLASS PRODUCTS)

Disclaimer: It is expressly understood that unless a statement is specifically identified as a warranty, statements made by Climate Master, Inc., a Delaware corporation, U. S. A. ("CM") or its representatives, relating to CM's products, whether oral, written or contained in any sales literature, catalog, this or any other agreement or other materials, 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 AND TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, CM MAKES NO WARRANTY AS TO ANY OF CM'S PRODUCTS, AND CM MAKES NO WARRANTY AGAINST LATENT DEFECTS OR ANY WARRANTY OF MERCHANTABILITY OF THE GOODS OR OF THE FITNESS OF THE GOODS FOR ANY PARTICULAR PURPOSE.**

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

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

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

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

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

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

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

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

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

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

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

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

Rev.: 10/09

LC079

## Notes:

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Tranquility® (TR) Series

Rev.: October 5, 2021

# Revision History

| Date: | Item: | Action: |
|---|---|---|
| 10/5/21 | Pages 20-23 | Updated Water Quailty Standards table |
| 9/24/21 | Pages 3, 57 | Removed LON option, discontinued |
| 07/08/21 | All | Font Update, Added Polymer Drain Pan |
| 11/2/20 | All | Added Hydronic Heating Option |
| 5/26/20 | Pg. 48 | Add Wiring Diagram Matrix |
| 5/15/20 | All | Updated to DXM2 and took off “II” from ClimaDry |
| 10/26/18 | Decoder | Added disconnect to controls |
| 07/25/17 | Page 7 | Updated hanger mounting instructions |
| 10/16/16 | Page 38 | Added Note For ClimaDry® |
| 06/22/16 | Photo Cover | Revised |
| 04/15/15 | Text | Updated |
| 03/4/16 | Pages 39 and 40 | Edit ECM control text |
| 01/22/15 | All | Added ECM (sizes 015 to 060) |
| 06/16/14 | Page 8 & 11 | Changed Text - Filter “rack” to “frame” |
| 05/29/14 | Physical Data Table | Removed Fan Motor (hp) |
| 05/12/14 | Physical Data Table and Water Quality Table | Updated Ref. Charge Size 024 and Unit Maximum Working Water Pressure; Updated Water Quality Table |
| 10/07/13 | Figure 10a: Vertical Condensate Drain | Updated |
| 07/18/13 | Operating Limit EAT ClimaDry® and Wiring Diagrams on Pages 34 and 36 | Updated |
| 02/05/13 | Electrical Tables | Miscellaneous Edits |
| 11/09/12 | POE Oil Warning | Added |
| 09/27/12 | Water Quality Table<br>Condensate Drain Connection<br>EAT Limits | Updated<br>Updated<br>Updates to Text - ClimaDry® Option |
| 04/16/12 | ClimaDry® II Option Information | Merge Data From ClimaDry® II Submittal |
| 08/09/11 | Unit Maximum Working Water Pressure | Updated to Reflect New Safeties |
| 08/01/11 | Created | |

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