PREMIUM G

Premium Forced Air Comfort System

Geothermal/Water Source Heat Pumps

- R-410A Refrigerant
- 1 - 6 Ton Single Speed
- 2 - 6 Ton Dual Capacity

INSTALLATION, OPERATION & MAINTENANCE MANUAL

Installation Information

Water Piping Connections

Electrical

Startup Procedures

Troubleshooting

Preventative Maintenance

ENERGY STAR

Intertek

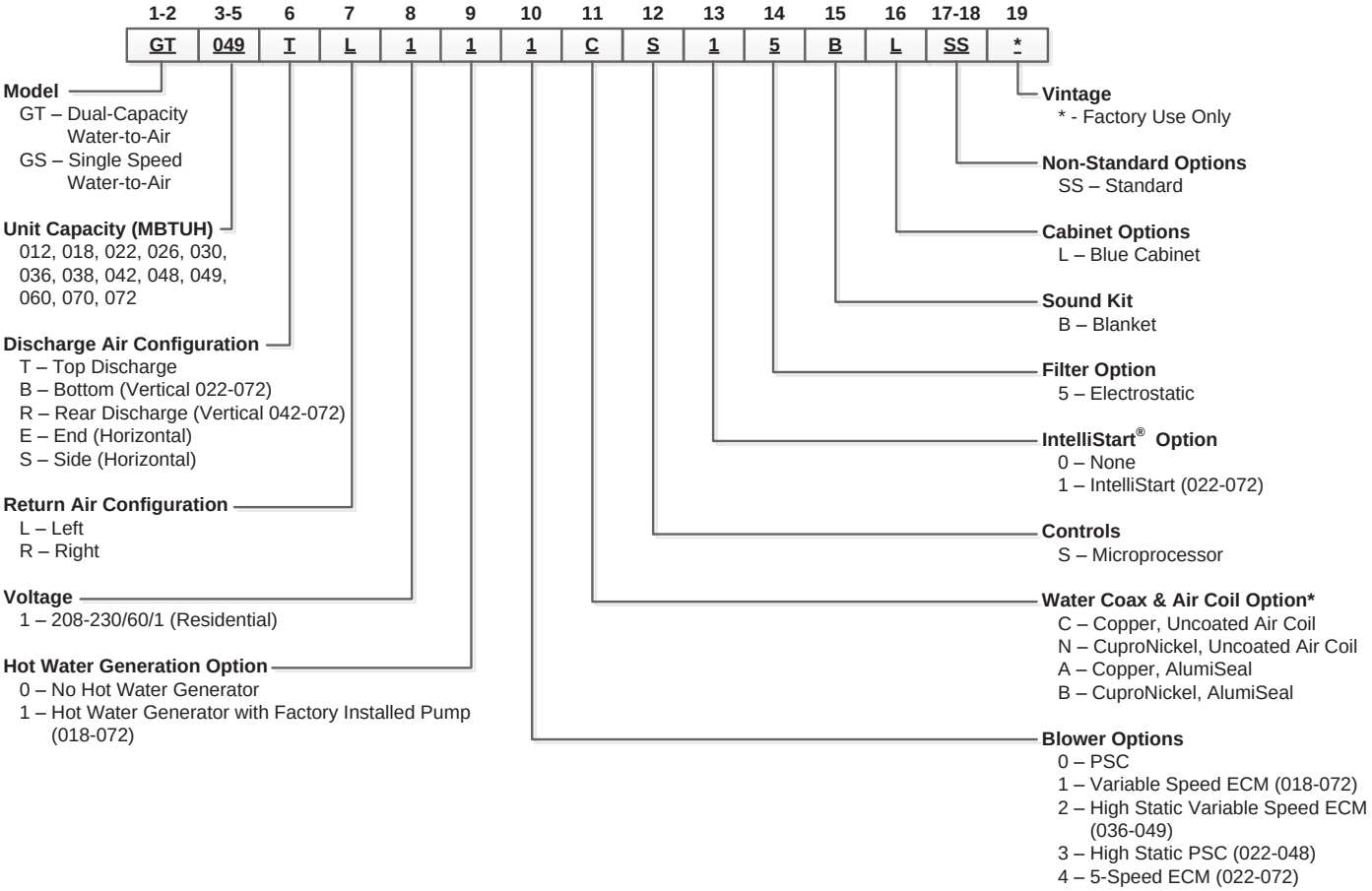
AHRI CERTIFIED
www.ahridirectory.org

GEOSMART ENERGY

TEC-IOM-G-0915v2

Table of Contents

Model Nomenclature



Rev.: 19 June 2015D

Aluminum Air Coil Implementation

Models: 012, 018, 022, 026, and 030; Vintage 'H' as of September 1st, 2015
Models: 036, 038, 042, 048, and 049; Vintage 'H' as of November 1st, 2015
Models: 060, 064, 070, and 072; Vintage 'H' as of January 1st, 2016
*Uncoated and AlumiSeal option only available for units with aluminum air coils
VIntages prior to 'H' have copper tube/aluminum fin e-coated coils

General Installation Information

Safety Considerations

WARNING: Before performing service or maintenance operations on a system, turn off main power switches to the indoor unit. If applicable, turn off the accessory heater power switch. Electrical shock could cause personal injury.

Installing and servicing heating and air conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair or service heating and air conditioning equipment. Untrained personnel can perform the basic maintenance functions of cleaning coils and cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on heating and air conditioning equipment, observe precautions in the literature, tags and labels attached to the unit and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use a quenching cloth for brazing operations and have a fire extinguisher available.

Moving and Storage

Move units in the normal “up” orientation. Horizontal units may be moved and stored per the information on the packaging. Do not stack more than three units in total height. Vertical units may be stored one upon another to a maximum height of two units. Do not attempt to move units while stacked. When the equipment is received, all items should be carefully checked against the bill of lading to be sure all crates and cartons have been received. Examine units for shipping damage, removing the units from the packaging if necessary. Units in question should also be internally inspected. If any damage is noted, the carrier should make the proper notation on the delivery receipt, acknowledging the damage.

Unit Location

Locate the unit in an indoor area that allows for easy removal of the filter and access panels. Location should have enough space for service personnel to perform maintenance or repair. 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. On horizontal units, allow adequate room below the unit for a condensate drain trap and do not locate the unit above supply piping. **Care should be taken when units are located in unconditioned spaces to prevent damage from frozen water lines and excessive heat that could damage electrical components.**

Filter Rack Conversion

A 1” electrostatic air filter is shipped with the heat pump. To field convert the filter rack to use 2” air filters, simply remove the plastic push pins from the top and bottom of the filter rack. To prevent air leakage, the push pin holes should be sealed.

Installing Vertical Units

Prior to setting the unit in place, remove and discard the compressor hold down shipping bolt located at the front of the compressor mounting bracket.

Vertical units are available in left or right air return configurations. Top and rear air discharge vertical units should be mounted level on a vibration absorbing pad slightly larger than the base to provide isolation between the unit and the floor. It is not necessary to anchor the unit to the floor (see below).

Bottomflow units should be mounted level and sealed well to floor to prevent air leakage. Bottomflow units require the supply air opening to be cut at least 1/2 in. larger than the unit’s air outlet. Protect the edges of combustible flooring with sheet metal over-wrap or other non-combustible material.

Figure 1: Vertical Unit Mounting

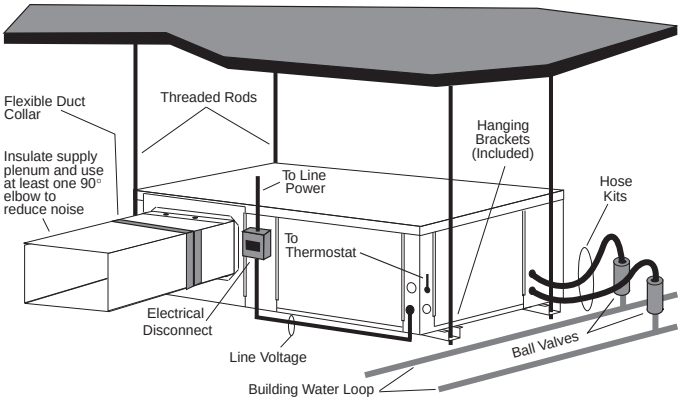
General Installation Information cont.

Installing Horizontal Units

Remove and discard the compressor hold down shipping bolt located at the front of the compressor mounting bracket prior to setting the unit in place. Horizontal units are available with side or end discharge. Horizontal units are normally suspended from a ceiling by four or six 3/8 in. diameter threaded rods. The rods are usually attached to the unit by hanger bracket kits furnished with each unit.

Lay out the threaded rods per the dimensions in Figure 3. Assemble the hangers to the unit as shown. Securely tighten the brackets to the unit using the weld nuts located on the underside of the bottom panel. When attaching the hanger rods to the bracket, a double nut is required since vibration could loosen a single nut. To allow filter access, one bracket on the filter side should be installed 180° from the position shown in Figure 3. The unit should be pitched approximately 1/4-inch towards the drain in both directions to facilitate the removal of condensate. Use only the bolts provided in the kit to attach hanger brackets. The use of longer bolts could damage internal parts.

Figure 2: Horizontal Unit Mounting

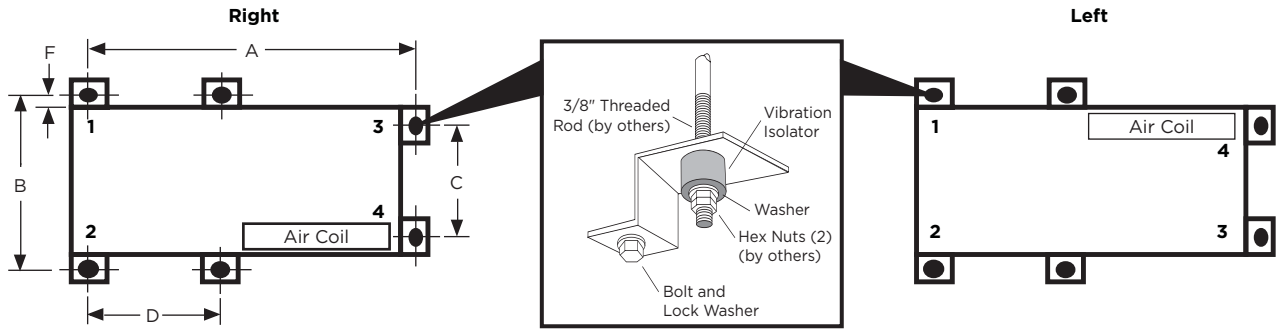


Some residential applications require the installation of horizontal units on an attic floor. In this case, the unit should be set in a full size secondary drain pan on top of a vibration absorbing pad. The secondary drain pan prevents possible condensate overflow or water leakage damage to the ceiling. The secondary drain pan is usually placed on a plywood base isolated from the ceiling joists by additional layers of vibration absorbing material.

CAUTION: Do not use rods smaller than 3/8-inch diameter since they may not be strong enough to support the unit. The rods must be securely anchored to the ceiling.

General Installation Information cont.

Figure 3: Hanger Location and Assembly



Hanger Dimensions

Model			Hanger Kit Part Number	Unit Hanger Dimensions			
				A	B	C	D
Single Speed	012	in.	99S500A04	44.7	25.1	21.4	n/a
		cm.		113.5	63.8	54.4	n/a
	018	in.	99S500A04	53.7	25.1	21.4	n/a
		cm.		136.4	63.8	54.4	n/a
	022-030	in.	99S500A04	63.4	24.8	21.1	n/a
		cm.		161.0	63.0	53.6	n/a
	036	in.	99S500A03	72.4	27.8	24.1	29.3
		cm.		183.9	70.6	61.2	74.4
	042-048	in.	99S500A03	77.4	27.8	24.1	29.3
		cm.		196.6	70.6	61.2	74.4
	060-070	in.	99S500A03	82.4	27.8	24.1	29.3
		cm.		209.3	70.6	61.2	74.4
Dual Capacity	026	in.	99S500A04	63.4	24.8	21.1	n/a
		cm.		161.0	63.0	53.6	n/a
	038	in.	99S500A03	72.4	27.8	24.1	29.3
		cm.		183.9	70.6	61.2	74.4
	049	in.	99S500A03	77.4	27.8	24.1	29.3
		cm.		196.6	70.6	61.2	74.4
	064	in.	99S500A03	82.4	27.8	24.1	29.3
		cm.		209.3	70.6	61.2	74.4
	072	in.	99S500A03	82.4	27.8	24.1	29.3
		cm.		209.3	70.6	61.2	74.4

2/8/12

Weight Distribution

Model		Vertical Weight	Horizontal Weight	Horizontal Weight Distribution			
				Front		Back	
				1	2	3	4
Single Speed	012	185	185	70	45	45	25
		[84]	[84]	[32]	[20]	[20]	[11]
	018	220	220	84	44	59	33
		[100]	[100]	[38]	[20]	[27]	[15]
	022	313	320	122	64	86	48
		[142]	[145]	[55]	[29]	[39]	[22]
	030	328	335	130	42	105	59
		[149]	[152]	[59]	[19]	[47]	[27]
	036	373	388	147	94	94	52
		[169]	[176]	[67]	[43]	[43]	[24]
	042	388	423	161	56	130	76
		[176]	[192]	[73]	[25]	[59]	[35]
	048	428	438	136	114	123	66
		[194]	[199]	[62]	[52]	[56]	[30]
	060	463	473	147	123	132	71
		[210]	[214]	[67]	[56]	[60]	[32]
	070	488	498	154	129	139	75
		[221]	[226]	[70]	[59]	[63]	[34]
Dual Capacity	026	313	320	121	78	78	43
		[142]	[145]	[55]	[35]	[35]	[20]
	038	378	388	147	94	94	52
		[171]	[176]	[67]	[43]	[43]	[24]
	049	428	438	136	114	123	66
		[194]	[199]	[62]	[52]	[56]	[30]
	064	473	483	150	126	135	72
		[214]	[219]	[68]	[57]	[61]	[33]
	072	488	500	155	130	140	75
		[221]	[226]	[70]	[59]	[64]	[34]

Weights are listed in lbs. [kg]

2/29/12

General Installation Information cont.

Duct System

An air outlet collar is provided on vertical top and rear air discharge units and all horizontal units to facilitate a duct connection (vertical bottomflow units have no collar). A flexible connector is recommended for discharge and return air duct connections on metal duct systems. Uninsulated duct should be insulated with a minimum of 1-inch duct insulation. Application of the unit to uninsulated ductwork in an unconditioned space is not recommended as the unit's performance will be adversely affected.

If the unit is connected to existing ductwork, check the duct system to ensure that it has the capacity to accommodate the air required for the unit application. If the duct is too small, as in the replacement of heating only systems, larger ductwork should be installed. All existing ductwork should be checked for leaks and repaired if necessary.

The duct system should be sized to handle the design airflow quietly and efficiently. To maximize sound attenuation of the unit blower, the supply and return plenums should include an internal duct liner of fiberglass or constructed of ductboard for the first few feet. On systems employing a sheet metal duct system, canvas connectors should be used between the unit and the ductwork. If air noise or excessive airflow is a problem, the blower speed can be changed.

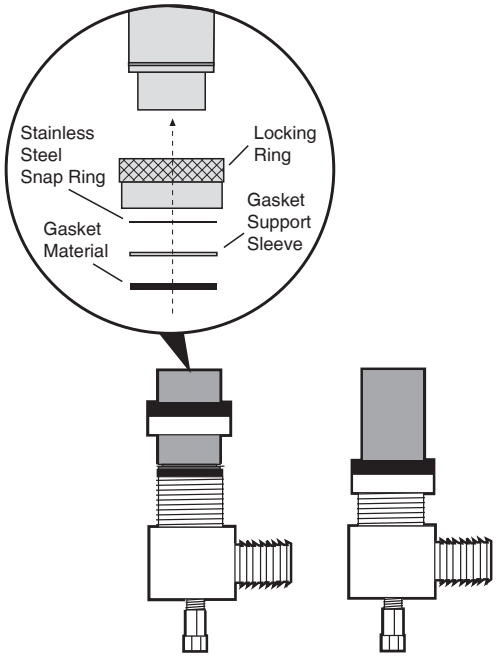
Water Piping

The proper water flow must be provided to each unit whenever the unit operates. To assure proper flow, use pressure/temperature ports to determine the flow rate. These ports should be located at the supply and return water connections on the unit. The proper flow rate cannot be accurately set without measuring the water pressure drop through the refrigerant-to-water heat exchanger.

All source water connections on residential units are swivel piping fittings (see Figure 4) that accept a 1-inch male pipe thread (MPT). The swivel connector has a rubber gasket seal similar to a rubber hose gasket, which when mated to the flush end of any 1-inch threaded pipe provides a leak-free seal without the need for thread sealing tape or compound. Check to ensure that the rubber seal is in the swivel connector prior to attempting any connection. The rubber seals are shipped attached to the waterline. To make the connection to a ground loop system, mate the brass connector (supplied in CK4LI connector kit) against the rubber gasket in the swivel connector and thread the female locking ring onto the pipe threads, while maintaining the brass connector in the desired direction. Tighten the connectors by hand, then gently snug the fitting with pliers to provide a leak-proof joint. When connecting to an open loop (ground water) system, thread any 1-inch MPT fitting (SCH80 PVC or copper) into the swivel connector and tighten in the same manner as noted above. The open and closed loop piping system should include pressure/temperature taps for serviceability.

Never use flexible hoses smaller than 1-inch inside diameter on the unit. Limit hose length to 10 feet per connection. Check carefully for water leaks.

Figure 4: Swivel Connections



Water Quality

It is the responsibility of the system designer and installing contractor to ensure that acceptable water quality is present and that all applicable codes have been met in these installations. Failure to adhere to the guidelines in the water quality table could result in loss of warranty. In ground water situations where scaling could be heavy or where biological growth such as iron bacteria will be present, a closed loop system is recommended. The heat exchanger coils in ground water systems may, over a period of time, lose heat exchange capabilities due to a buildup of mineral deposits inside. These can be cleaned, but only by a qualified service mechanic, as special solutions and pumping equipment are required. Hot water generator 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 flushing.

Heat pumps with cupronickel heat exchangers are recommended for open loop applications due to the increased resistance to build-up and corrosion, along with reduced wear caused by acid cleaning.

Low Water Coil Limit

Set the freeze sensing switch SW2-2 on the printed circuit board for applications using a closed loop antifreeze solution to "LOOP". On applications using an open loop/ground water system (or closed loop no antifreeze), set this dip switch to "WELL", the factory default setting (see DIP Switch Settings table in the Microprocessor Control section).

General Installation Information cont.

Material		Copper	90/10 Cupronickel	316 Stainless Steel
pH	**Acidity/Alkalinity**	7 - 9	7 - 9	7 - 9
Scaling	Calcium and Magnesium Carbonate	(Total Hardness) less than 350 ppm	(Total Hardness) less than 350 ppm	(Total Hardness) less than 350 ppm
Corrosion	Hydrogen Sulfide	Less than 0.5 ppm (rotten egg smell appears at 0.5 ppm)	10 - 50 ppm	Less than 1 ppm
	Sulfates	Less than 125 ppm	Less than 125 ppm	Less than 200 ppm
	Chlorine	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Chlorides	Less than 20 ppm	Less than 125 ppm	Less than 300 ppm
	Carbon Dioxide	Less than 50 ppm	10 - 50 ppm	10 - 50 ppm
	Ammonia	Less than 2 ppm	Less than 2 ppm	Less than 20 ppm
	Ammonia Chloride	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Ammonia Nitrate	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Ammonia Hydroxide	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Ammonia Sulfate	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Total Dissolved Solids (TDS)	Less than 1000 ppm	1000 - 1500 ppm	1000 - 1500 ppm
	LSI Index	+0.5 to -0.5	+0.5 to -0.5	+0.5 to -0.5
Iron Fouling (Biological Growth)	Iron, FE^{2+} (Ferrous) Bacterial Iron Potential	< 0.2 ppm	< 0.2 ppm	< 0.2 ppm
	Iron Oxide	Less than 1 ppm, above this level deposition will occur	Less than 1 ppm, above this level deposition will occur	Less than 1 ppm, above this level deposition will occur
Erosion	Suspended Solids	Less than 10 ppm and filtered for max. of 600 micron size	Less than 10 ppm and filtered for max. of 600 micron size	Less than 10 ppm and filtered for max. of 600 micron size
	Threshold Velocity (Fresh Water)	< 6 ft/sec	< 6 ft/sec	< 6 ft/sec

NOTES: Grains = ppm divided by 17
mg/L is equivalent to ppm

2/22/12

Condensate Drain

On vertical units, the internal condensate drain assembly consists of a drain tube which is connected to the drain pan, a 3/4-inch PVC female adapter and a flexible connecting hose. The female adapter may exit either the front or the side of the cabinet. The adapter should be glued to the field-installed PVC condensate piping. On vertical units, a condensate hose is inside all cabinets as a trapping loop; therefore, an external trap is not necessary.

On horizontal units, a PVC stub is provided for condensate drain piping connection. An external trap is required (see below). If a vent is necessary, an open stand pipe may be applied to a tee in the field-installed condensate piping.

Water Treatment

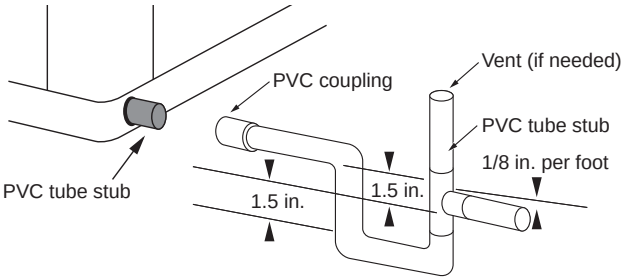
Do not use untreated or improperly treated water. Equipment damage may occur. The use of improperly treated or untreated water in this equipment may result in scaling, erosion, corrosion, algae or slime. Purchase of a pre-mix antifreeze could significantly improve system reliability if the water quality is controlled and there are additives in the mixture to inhibit corrosion. There are many examples of such fluids on the market today such as Environol™ 1000 (pre-mix ethanol), and others. The services of a qualified water treatment specialist should be engaged to determine what treatment, if any, is required. The product warranty specifically excludes liability for corrosion, erosion or deterioration of equipment.

The heat exchangers and water lines in the units are copper or cupronickel tube. There may be other materials in the buildings piping system that the designer may need to take into consideration when deciding the parameters of the water quality. If antifreeze or water treatment solution is to be used, the designer should confirm it does not have a detrimental effect on the materials in the system.

Contaminated Water

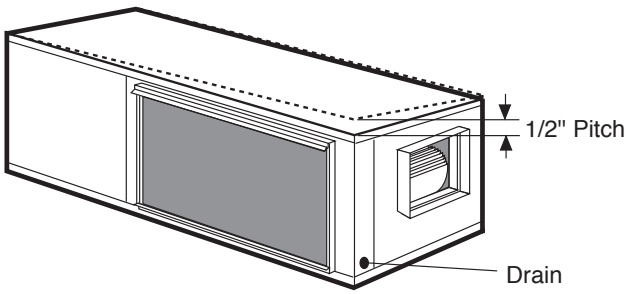
In applications where the water quality cannot be held to prescribed limits, the use of a secondary or intermediate heat exchanger is recommended to separate the unit fro the contaminated water. The table above outlines the water quality guidelines for unit heat exchangers. If these conditions are exceeded, a secondary heat exchanger is required. Failure to supply a secondary heat exchanger where needed will result in a warranty exclusion for primary heat exchanger corrosion or failure.

Figure 5: Horizontal Drain Connection



NOTE: Check dimensional data for actual PVC sizes.

Figure 6: Unit Pitch for Drain



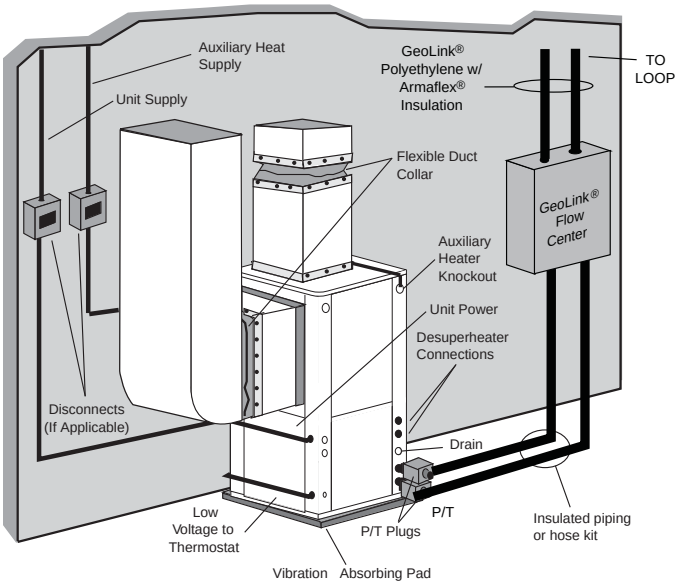
Closed Loop Ground Source Systems

NOTE: For closed loop systems with antifreeze protection, set SW2-2 to the “loop” position (see DIP Switch Settings table in the Microprocessor Control section).

Once piping is completed between the unit, pumps and the ground loop (see figure below), final purging and charging of the loop is required. A flush cart (or a 1.5 HP pump minimum) is needed to achieve adequate flow velocity in the loop to purge air and dirt particles from the loop itself. Antifreeze solution is used in most areas to prevent freezing. Flush the system adequately to remove as much air as possible then pressurize the loop to a static pressure of 40-50 psi (summer) or 50-75 psi (winter). This is normally adequate for good system operation. Loop static pressure will fluctuate with the seasons. Pressures will be higher in the winter months than during the cooling season. This fluctuation is normal and should be considered when initially charging the system.

After pressurization, be sure to turn the venting (burping) screw in the center of the pump two (2) turns open (water will drip out), wait until all air is purged from the pump, then tighten the plug. Ensure that the loop pumps provide adequate flow through the unit(s) by checking the pressure drop across the heat exchanger and comparing it to the unit capacity data in this catalog. 2.5 to 3 gpm of flow per ton of cooling capacity is recommended in earth loop applications.

Figure 7: Closed Loop Ground Source Application



NOTE: Additional information can be found in Flow Center installation manual and Flush Cart manual.

Multiple Units on One Flow Center

When two units are connected to one loop pumping system, pump control is automatically achieved by connecting the SL terminals on connector P2 in both units with 2-wire thermostat wire. These terminals are polarity dependant (see Figure 8a and 8b). The loop pump(s) may be powered from either unit, whichever is more convenient. If either unit calls, the loop pump(s) will automatically start. The use of two units on one flow center is generally limited to a total of 20 GPM capacity.

Figure 8a: Primary/Secondary Hook-up

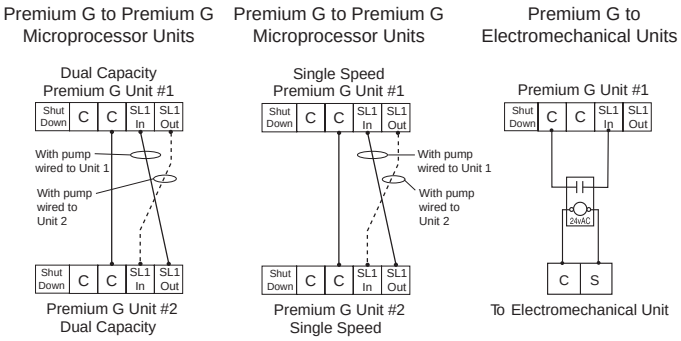
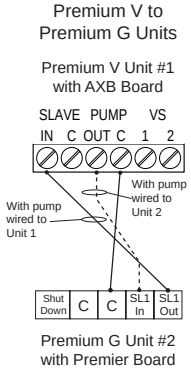


Figure 8b: Primary/Secondary Hook-up (Premium V to Premium G Units)



Open Loop Ground Water Systems

Typical open loop piping is shown below. Always maintain water pressure in the heat exchanger by placing water control valves at the outlet of the unit to prevent mineral precipitation. Use a closed, bladder-type expansion tank to minimize mineral formation due to air exposure. Insure proper water flow through the unit by checking pressure drop across the heat exchanger and comparing it to the figures in unit capacity data tables in the specification catalog. 1.5-2 GPM of flow per ton of cooling capacity is recommended in open loop applications. Due to only minor differences in flow rate from low to high, only one solenoid valve should be used. The valve should be sized for full flow.

Discharge water from the unit is not contaminated in any manner and can be disposed of in various ways, depending on local codes, i.e. recharge well, storm sewer, drain field, adjacent stream or pond, etc. Most local codes forbid the use of sanitary sewer for disposal. Consult your local building and zoning departments to assure compliance in your area.

NOTE: For open loop/groundwater systems or systems that do not contain an antifreeze solution, set SW2-Switch #2 to the "WELL" position (see DIP Switch Settings table in the Microprocessor Control section). Slow opening/closing solenoid valves type V100FPT are recommended to eliminate water hammer.

Figure 10: Open System - Groundwater Application

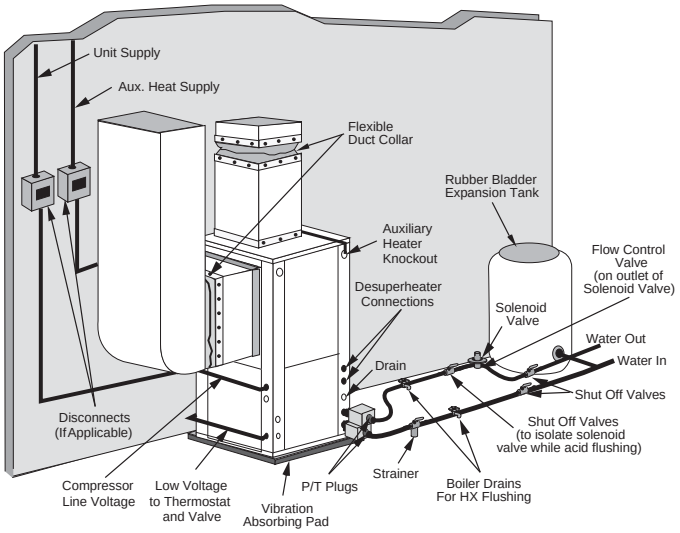


Figure 9a: Open Loop Solenoid Valve Connection Option
Typical slow operating external 24V water solenoid valve (type V100FPT) wiring.

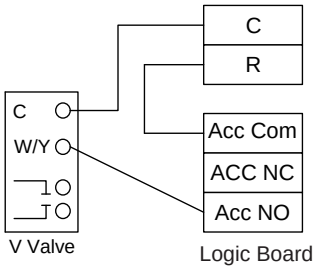
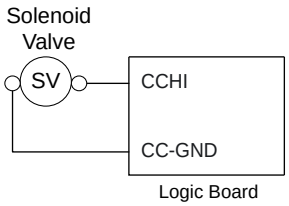


Figure 9b: Open Loop Solenoid Valve Connection Option
Typical quick operating external 24V water solenoid valve (type PPV100 or BPV100) wiring.



NOTE: SW2-3 should be in the Comp "ON" position.

Hot Water Generator Connections

To maximize the benefits of the hot water generator a minimum 50-gallon water heater is recommended For higher demand applications, use an 80-gallon water heater or two 50-gallon water heaters connected in a series as shown below. Two tanks plumbed in a series is recommended to maximize the hot water generator capability. Electric water heaters are recommended. Make sure all local electrical and plumbing codes are met for installing a hot water generator. Residential units with hot water generators contain an internal circulator and fittings. A water softener is recommended with hard water (greater than 10 grains or 170 total hardness).

NOTES: 1) Using a preheat tank, as shown in Figure 12, will maximize hot water generator capabilities. 2) The hot water generator coil is constructed of vented double wall copper suitable for potable water.

Water Tank Preparation

To install a unit with a hot water generator, follow these installation guidelines.

1. Turn off the power to the water heater.
2. Attach a water hose to the water tank drain connection and run the other end of the hose to an open drain or outdoors.
3. Close the cold water inlet valve to the water heater tank.
4. Drain the tank by opening the valve on the bottom of the tank, then open the pressure relief valve or hot water faucet.
5. Flush the tank by opening the cold water inlet valve to the water heater to free the tank of sediments. Close when draining water is clear.
6. Disconnect the garden hose and remove the drain valve from the water heater.
7. Refer to Plumbing Installation and Hot Water Generator Startup.

CAUTION: Elements will burn out if energized dry.

Figure 11: Typical Hot Water Generator Installation

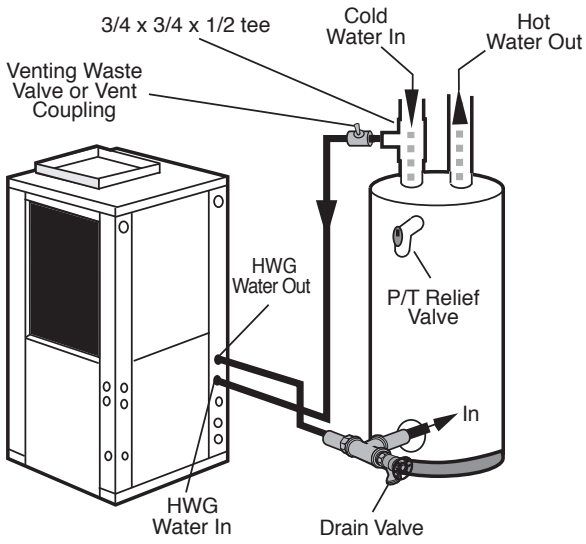
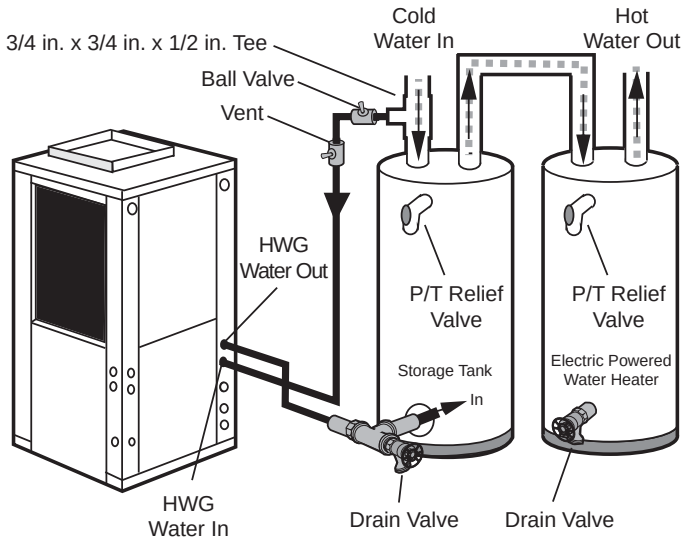


Figure 12: Hot Water Generator Installation In Preheat Tank



NOTE: This configuration maximizes hot water generator capability.

Hot Water Generator Connections cont.

Plumbing Installation

1. Inspect the dip tube in the water heater cold inlet for a check valve. If a check valve is present it must be removed or damage to the hot water generator circulator will occur.
2. Remove drain valve and fitting.
3. Thread the 3/4-inch NPT x 3-1/2-inch brass nipple into the water heater drain port.
4. Attach the center port of the 3/4-inch FPT tee to the opposite end of the brass nipple.
5. Attach the 1/2-inch copper to 3/4-inch NPT adaptor to the side of the tee closest to the unit.
6. Install the drain valve on the tee opposite the adaptor.
7. Run interconnecting tubing from the tee to hot water generator water out.
8. Cut the cold water “IN” line going to the water heater.
9. Insert the reducing solder tee in line with cold water “IN” line as shown.
10. Run interconnecting copper tubing between the unit hot water generator water “IN” and the tee (1/2-inch nominal). The recommended maximum distance is 50 feet.
11. To prevent air entrapment in the system, install a vent coupling at the highest point of the interconnecting lines.
12. Insulate all exposed surfaces of both connecting water lines with 3/8-inch wall closed cell insulation.

NOTE: All plumbing and piping connections must comply with local plumbing codes.

Hot Water Generator Startup

1. Close the drain valve to the water heater.
2. Open the cold water supply to the tank.
3. Open a hot water faucet in the building to bleed air from the system. Close when full.
4. Open the pressure relief valve to bleed any remaining air from the tank, then close.
5. If so equipped, unscrew the indicator plug on the motor end of the pump until all air is purged from the pump, then tighten the plug. Use vent couplings to bleed air from the lines.
6. Carefully inspect all plumbing for water leaks and correct as required.
7. Before restoring electrical supply to the water heater, adjust the temperature setting on the tank.
   - On tanks with both upper and lower elements, the lower element should be turned down to the lowest setting, approximately 100°F. The upper element should be adjusted to 120°F to 130°F. Depending upon the specific needs of the customer, you may want to adjust the upper element differently.
   - On tanks with a single element, lower the thermostat setting to 120°F.
8. After the thermostat(s) is adjusted, replace the access cover and restore electrical supply to the water heater.
9. Make sure that any valves in the hot water generator water circulating circuit are open.
10. Turn on the unit to first stage heating.
11. The HWG pump should be running. When the pump is first started, open the inspection port (if equipped) until water dribbles out, then replace. Allow the pump to run for at least five minutes to ensure that water has filled the circulator properly. Be sure the switch for the HWG pump (SW4) is “ON”. The HWG “OFF” LED on the unit should not be illuminated.
12. The temperature difference between the water entering and leaving the hot water generator should be 5°F to 15°F. The water flow should be approximately 0.4 GPM per ton of nominal cooling.
13. Allow the unit to heat water for 15 to 20 minutes to be sure operation is normal.

CAUTION: Never operate the HWG circulating pump while dry. If the unit is placed in operation before the hot water generator piping is connected, be sure that the pump switch is set to the OFF position.

Electrical Connections

General

Be sure the available power is the same voltage and phase as that 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.

Unit Power Connection

Connect the incoming line voltage wires to L1 and L2 of the contactor as shown in Figure 13B for single-phase unit. Consult the Unit Electrical Data in this manual for correct fuse sizes.

Accessory Relay

A set of “dry” contacts has been provided to control accessory devices, such as water solenoid valves on open loop installations, electronic air cleaners, humidifiers, etc. This relay contact should be used only with 24 volt signals and not line voltage power. The relay has both normally open and normally closed contacts and can operate with either the fan or the compressor. Use DIP switch SW2-3 to cycle the relay with fan or compressor. The relay contacts are available on terminals #1 and #3 for normally open, and for normally closed on P3.

208 Volt Operation

All 208/230 units are factory wired for 230 volt operation. For 208 volt operation, the red and blue transformer wires must be switched on terminal strip PS.

Figure 13A:
Wire access

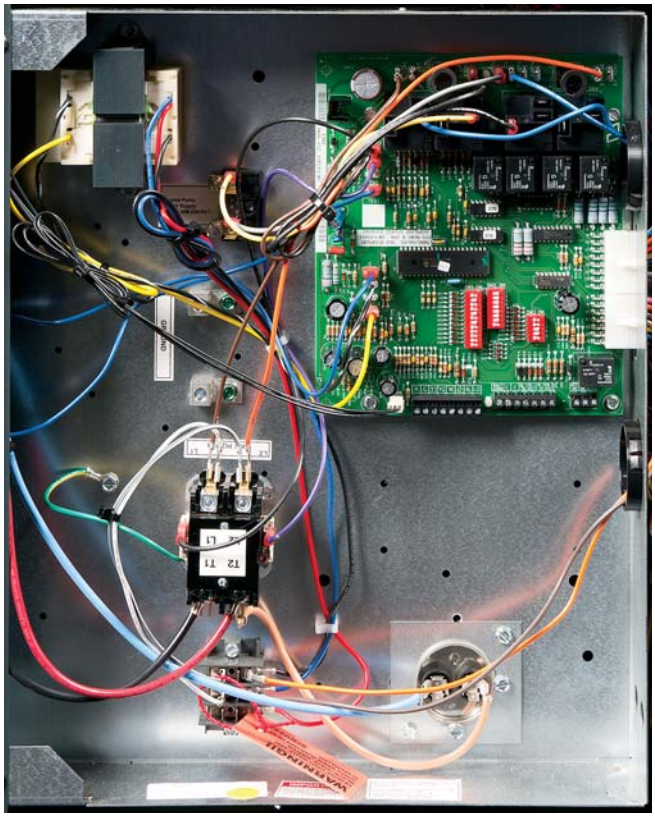
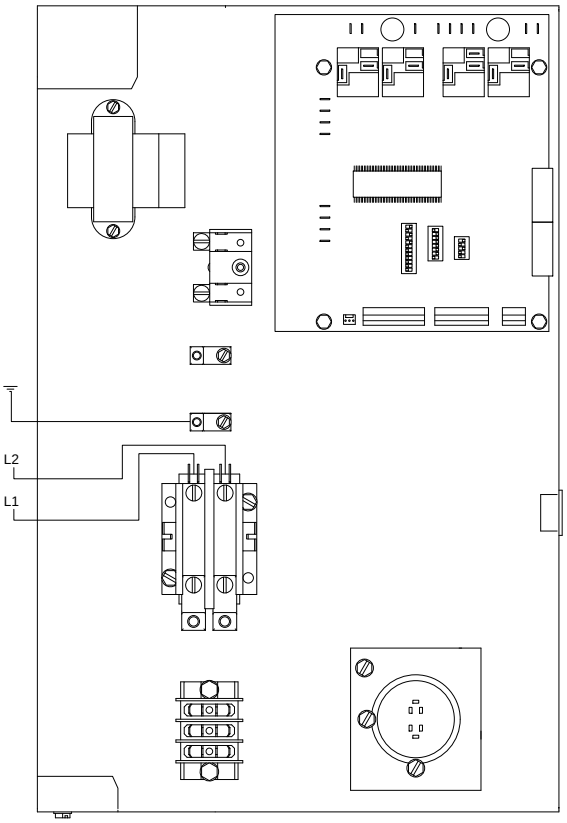


Figure 13B:
Line Voltage 208-230/60/1 control box

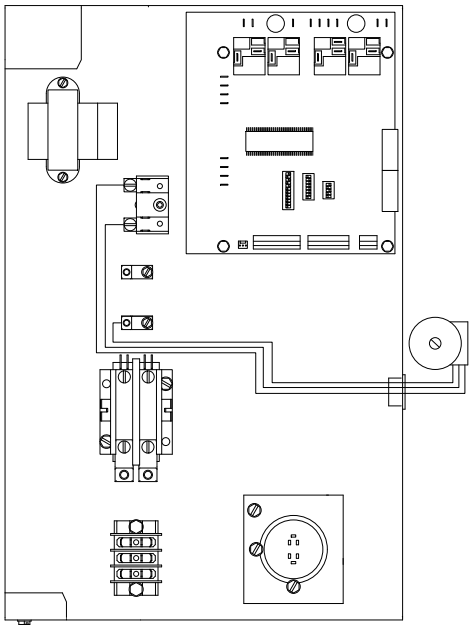


Electrical Connections cont.

Pump Power Wiring

See Figure 14 for electrical connections from control box to pumps.

Figure 14: Pump Wiring 208-230/60/1

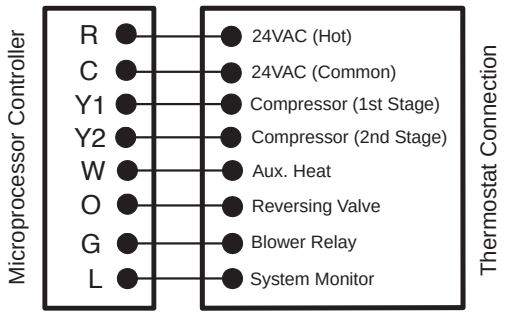


Electronic Thermostat Installation

Position the thermostat subbase against the wall so that it is level and the thermostat wires protrude through the middle of the subbase. Mark the position of the subbase mounting holes and drill holes with a 3/16-inch bit. Install supplied anchors and secure base to the wall. Thermostat wire must be 8-conductor,18-AWG wire. Strip the wires back 1/4-inch (longer strip lengths may cause shorts) and insert the thermostat wires into the connector as shown. Tighten the screws to insure secure connections. The thermostat has the same type connectors, requiring the same wiring. See instructions enclosed in the thermostat for detailed installation and operation information.

Note: DIP switch SW2-8 is required to be in the “OFF” position for the control to operate with FaultFlash thermostats. SW2-8 in the “ON” position configures the control to operate with typical thermostats (continuous lockout signal). There must be a wire connecting Y2 on the microprocessor controller to 2nd stage compressor on the thermostat for proper operation.

Figure 15: Thermostat Wiring (Y1 Style Signals)



Auxiliary Heat Ratings

Model	kW		Stages	Btu/h		Min cfm	Model Size Compatibility					
	208V	230V		208V	230V		012	018	022	026 - 030	036 - 042	048 - 072
EAS(H)4A	2.9	3.8	1	9,700	12,900	250	•					
EAM(H)5A	3.6	4.8	1	12,300	16,300	450		•	•	•		
EAM(H)8A	5.7	7.6	2	19,400	25,900	550		•	•	•		
EAM(H)10A	7.2	9.6	2	24,600	32,700	650				•		
EAL(H)10A	7.2	9.6	2	24,600	32,700	1100					•	•
EAL(H)15A	10.8	14.4	3	36,900	49,100	1250					•	•
EAL(H)20A	14.4	19.2	4	49,200	65,500	1500						•

Order the “H” part number when installed on horizontal and vertical rear discharge units 6/11/15
Air flow level for auxiliary heat (Aux) must be above the minimum cfm in this table

Auxiliary Heat Electrical Data

Model	Supply Circuit	Heater Amps		Min Circuit Amp		Fuse (USA)		Fuse (CAN)		CKT BRK	
		208 V	240 V	208 V	240 V	208 V	240 V	208 V	240 V	208 V	240 V
EAS(H)4A	Single	13.7	15.8	17.9	20.5	20	20	20	20	20	20
EAM(H)5A	Single	17.3	20.0	26.7	30.0	30	30	30	30	30	30
EAM(H)8A	Single	27.5	31.7	39.3	44.6	40	45	40	45	40	45
EAM(H)10A	Single	34.7	40.0	48.3	55.0	50	60	50	60	50	60
EAL(H)10A	Single	34.7	40.0	53.3	60.0	60	60	60	60	60	60
EAL(H)15A	Single	52.0	60.0	75.0	85.0	80	90	80	90	70	100
	L1/L2	34.7	40.0	53.3	60.0	60	60	60	60	60	60
	L3/L4	17.3	20.0	21.7	25.0	25	25	25	25	20	30
EAL(H)20A	Single	69.3	80.0	96.7	110.0	100	110	100	110	100	100
	L1/L2	34.7	40.0	53.3	60.0	60	60	60	60	60	60
	L3/L4	34.7	40.0	43.3	50.0	45	50	45	50	40	50

All heaters rated single phase 60 cycle and include unit blower load 6/11/15
All fuses type “D” time delay (or HACR circuit breaker in USA)
Supply wire size to be determined by local codes

Electrical Data

Single Speed Unit with Variable Speed ECM Motor

Model	Rated Voltage	Voltage Min/Max	Compressor				HWG Pump FLA	Ext Loop FLA	Blower Motor FLA	Total Unit FLA	Min Circ Amp	Max Fuse/ HACR
			MCC	RLA	LRA	LRA**						
018	208-230/60/1	187/253	10.4	6.7	33.5	N/A	0.4	5.4	4.0	16.5	18.1	20
022	208-230/60/1	187/253	14.0	9.0	48.0	17.0	0.4	5.4	4.0	18.8	21.0	30
030	208-230/60/1	187/253	20.0	12.8	58.3	21.0	0.4	5.4	4.0	22.6	25.8	35
036	208-230/60/1	187/253	22.0	14.1	73.0	26.0	0.4	5.4	4.0	23.9	27.4	40
036*	208-230/60/1	187/253	22.0	14.1	73.0	26.0	0.4	5.4	7.0	26.9	30.4	40
042	208-230/60/1	187/253	26.0	16.6	79.0	28.0	0.4	5.4	4.0	26.4	30.6	45
042*	208-230/60/1	187/253	26.0	16.6	79.0	28.0	0.4	5.4	7.0	29.4	33.6	50
048	208-230/60/1	187/253	31.0	19.8	109.0	38.0	0.4	5.4	4.0	29.6	34.6	50
048*	208-230/60/1	187/253	31.0	19.8	109.0	38.0	0.4	5.4	7.0	32.6	37.6	50
060	208-230/60/1	187/253	41.2	26.4	134.0	47.0	0.4	5.4	7.0	39.2	45.8	70
070	208-230/60/1	187/253	44.2	28.3	178.0	63.0	0.4	5.4	7.0	41.1	48.2	70

7/15/13

* With optional 1 hp variable speed ECM motor
** With optional IntelliStart®
Rated voltage of 208/230/60/1
All fuses Class RK-5
HACR circuit breaker in USA only

Single Speed Unit with 5-Speed ECM Motor

Model	Rated Voltage	Voltage Min/Max	Compressor				HWG Pump FLA	Ext Loop FLA	Blower Motor FLA	Total Unit FLA	Min Circ Amp	Max Fuse/ HACR
			MCC	RLA	LRA	LRA**						
022	208-230/60/1	187/253	14.0	9.0	48.0	17.0	0.4	5.4	4.1	18.9	21.1	30
030	208-230/60/1	187/253	20.0	12.8	58.3	21.0	0.4	5.4	4.1	22.7	25.9	35
036	208-230/60/1	187/253	22.0	14.1	73.0	26.0	0.4	5.4	4.1	24.0	27.5	40
042	208-230/60/1	187/253	26.0	16.6	79.0	28.0	0.4	5.4	7.6	30.0	34.2	50
048	208-230/60/1	187/253	31.0	19.8	109.0	38.0	0.4	5.4	7.6	33.2	38.2	50
060	208-230/60/1	187/253	41.2	26.4	134.0	47.0	0.4	5.4	7.6	39.8	46.4	70
070	208-230/60/1	187/253	44.2	28.3	178.0	63.0	0.4	5.4	7.6	41.7	48.8	70

7/15/13

** With optional IntelliStart®
Rated voltage of 208/230/60/1
All fuses Class RK-5
HACR circuit breaker in USA only

Single Speed Unit with PSC Motor

Model	Rated Voltage	Voltage Min/Max	Compressor				HWG Pump FLA	Ext Loop FLA	Blower Motor FLA	Total Unit FLA	Min Circ Amp	Max Fuse/ HACR
			MCC	RLA	LRA	LRA**						
012	208-230/60/1	187/253	7.7	4.9	25.0	N/A	-	5.4	0.6	10.9	12.2	15
018	208-230/60/1	187/253	10.4	6.7	33.5	N/A	0.4	5.4	1.1	13.6	15.2	20
022	208-230/60/1	187/253	14.0	9.0	48.0	17.0	0.4	5.4	1.2	16.0	18.2	25
022*	208-230/60/1	187/253	14.0	9.0	48.0	17.0	0.4	5.4	1.5	16.3	18.5	25
030	208-230/60/1	187/253	20.0	12.8	58.3	21.0	0.4	5.4	1.5	20.1	23.3	35
030*	208-230/60/1	187/253	20.0	12.8	58.3	21.0	0.4	5.4	2.8	21.4	24.6	35
036	208-230/60/1	187/253	22.0	14.1	73.0	26.0	0.4	5.4	2.8	22.7	26.2	40
036*	208-230/60/1	187/253	22.0	14.1	73.0	26.0	0.4	5.4	3.5	23.4	26.9	40
042	208-230/60/1	187/253	26.0	16.6	79.0	28.0	0.4	5.4	3.5	25.9	30.1	45
042*	208-230/60/1	187/253	26.0	16.6	79.0	28.0	0.4	5.4	4.6	27.0	31.2	45
048	208-230/60/1	187/253	31.0	19.8	109.0	38.0	0.4	5.4	3.5	29.1	34.1	50
048*	208-230/60/1	187/253	31.0	19.8	109.0	38.0	0.4	5.4	4.6	30.2	35.2	50
060	208-230/60/1	187/253	41.2	26.4	134.0	47.0	0.4	5.4	5.9	38.1	44.7	70
070	208-230/60/1	187/253	44.2	28.3	158.0	63.0	0.4	5.4	5.9	41.8	49.3	70

07/15/13

* With optional high static motor
** With optional IntelliStart®
Rated voltage of 208/230/60/1
All fuses Class RK-5
HACR circuit breaker in USA only

Electrical Data cont.

Dual Capacity Unit with Variable Speed ECM Motor

Model	Rated Voltage	Voltage Min/Max	Compressor				HWG Pump FLA	Ext Loop FLA	Blower Motor FLA	Total Unit FLA	Min Circ Amp	Max Fuse/ HACR
			MCC	RLA	LRA	LRA**						
026	208-230/60/1	187/253	18.2	11.6	58.3	21.0	0.4	5.4	4.0	21.4	24.4	35
038	208-230/60/1	187/253	23.8	15.2	83.0	30.0	0.4	5.4	4.0	25.0	28.8	40
038*	208-230/60/1	187/253	23.8	15.2	83.0	30.0	0.4	5.4	7.0	28.0	31.8	50
049	208-230/60/1	187/253	33.0	21.1	104.0	37.0	0.4	5.4	4.0	30.9	36.2	50
049*	208-230/60/1	187/253	33.0	21.1	104.0	37.0	0.4	5.4	7.0	33.9	39.2	60
064	208-230/60/1	187/253	42.3	27.1	152.9	54.0	0.4	5.4	7.0	39.9	46.6	70
072	208-230/60/1	187/253	46.3	29.6	179.2	63.0	0.4	5.4	7.0	42.4	49.8	70

9/1/15

* With optional 1 hp variable speed ECM motor
** With optional IntelliStart®
Rated voltage of 208/230/60/1
All fuses Class RK-5
HACR circuit breaker in USA only

Dual Capacity Unit with 5-Speed ECM Motor

Model	Rated Voltage	Voltage Min/Max	Compressor				HWG Pump FLA	Ext Loop FLA	Blower Motor FLA	Total Unit FLA	Min Circ Amp	Max Fuse/ HACR
			MCC	RLA	LRA	LRA**						
026	208-230/60/1	187/253	18.2	11.6	58.3	21.0	0.4	5.4	4.1	21.5	24.5	35
038	208-230/60/1	187/253	23.8	15.2	83.0	30.0	0.4	5.4	4.1	25.1	28.9	40
049	208-230/60/1	187/253	33.0	21.1	104.0	37.0	0.4	5.4	7.6	34.5	39.8	60
064	208-230/60/1	187/253	42.3	27.1	152.9	54.0	0.4	5.4	7.6	40.5	47.2	70
072	208-230/60/1	187/253	46.3	29.6	179.2	63.0	0.4	5.4	7.6	43.0	50.4	80

9/1/15

** With optional IntelliStart®
Rated voltage of 208/230/60/1
All fuses Class RK-5
HACR circuit breaker in USA only

Blower Performance Data

Single Speed Unit with Variable Speed ECM Motor

MODEL	MAX ESP	AIR FLOW DIP SWITCH SETTINGS											
		1	2	3	4	5	6	7	8	9	10	11	12
022	**0.50**		400	500 L	**600 M**	**700**	**800 H**	**900**	1000	1100	1200		
030	**0.50**		400	500 L	600	**700 M**	**800**	**900 H**	**1000**	**1100**	1200		
036	**0.50**	650	750	850 L	1000	**1100 M**	**1200**	**1300 H**	**1400**	**1500**			
036 w/1hp*	**0.75**	800	1000 L	**1100 M**	**1300 H**	**1500**	**1600**	1800					
042	**0.50**	650	800	900 L	1050	**1150 M**	**1250**	**1350**	**1450 H**	**1550**			
042 w/1hp*	**0.75**	800	900 L	1000	**1200 M**	**1400 H**	**1600**	**1700**	**1850**	2000	2200	2300	2400
048	**0.50**	650	800	900	1050 L	1150	**1250**	**1350 M**	**1450**	**1550 H**			
048 w/1hp*	**0.75**	800	900	1000 L	1200	**1400 M**	**1600 H**	**1700**	**1850**	2000	2200	2300	2400
060	**0.75**	800	950	1100 L	1300	**1500 M**	**1750**	**1950 H**	**2100**	**2300**			
070	**0.75**	800	950	1100 L	1300	**1500**	**1750 M**	**1950**	**2100 H**	**2300**			

5/30/06

Factory settings are at recommended L-M-H DIP switch locations
M-H settings MUST be located within boldface CFM range
Lowest and Highest DIP switch settings are assumed to be L and H respectively

CFM is controlled within ±5% up to the maximum ESP
Max ESP includes allowance for wet coil and standard filter

Dual Capacity Unit with Variable Speed ECM Motor

MODEL	MAX ESP	AIR FLOW DIP SWITCH SETTINGS											
		1	2	3	4	5	6	7	8	9	10	11	12
026	**0.50**		400	500 L	600	**700 M**	**800**	**900 H**	**1000**	1100	1200		
038	**0.50**	650	750 L	850	1000	**1100 M**	**1200**	**1300 H**	**1400**	**1500**			
038 w/1hp*	**0.75**	800 L	1000	**1100 M**	**1300 H**	**1500**	**1600**	1800					
049	**0.50**	650	800 L	900	1050	1150	**1250**	**1350 M**	**1450**	**1550 H**			
049 w/1hp*	**0.75**	800 L	900	1000	1200	**1400 M**	**1600 H**	**1700**	**1850**	2000	2200	2300	2400
064	**0.75**	800	950 L	1100	1300	**1500 M**	**1750**	**1950 H**	**2100**	**2300**			
072	**0.75**	800	950	1100 L	1300	**1500**	**1750 M**	**1950**	**2100 H**	**2300**			

5/30/06

Factory settings are at recommended L-M-H DIP switch locations
M-H settings MUST be located within boldface CFM range
Lowest and Highest DIP switch settings are assumed to be L and H respectively

CFM is controlled within ±5% up to the maximum ESP
Max ESP includes allowance for wet coil and standard filter

Blower Performance Data cont.

Setting Variable Speed ECM Blower Speed

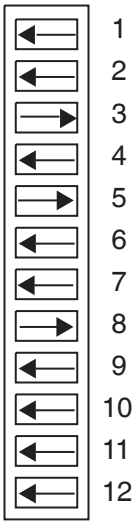
ECM blower motors have a 12-speed selector dip switch on the logic board (SW1) and are factory set for optimum performance. To change speeds, select the appropriate speeds on dip switch SW1. Consult the ECM blower performance table below for specific airflow and switch information.

A 12-position DIP switch package on the control allows the airflow levels to be set for low, medium, and high speed when using the ECM blower motor. Only three of the DIP switches can be in the "on" position.

- The first "on" switch (the lowest position number) determines the low speed blower setting.
- The second "on" switch determines the medium speed blower setting.
- The third "on" switch determines the high speed blower setting.

The example to the right shows SW1 on the control board configured for the following 042 airflow settings.

- Low Speed Blower: 900 CFM
- Medium Speed Blower: 1150 CFM
- High Speed Blower: 1450 CFM



CAUTION: Disconnect all power before performing this operation.

Blower Performance Data cont.

Single Speed Unit with 5-Speed ECM Motor

Model	Motor Speed	Motor Tap	T'stat Cnct.	Blower Size	Motor HP	Airflow (cfm) at External Static Pressure (in. wg)															
						0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
	High	**5**	W			980	960	940	930	920	905	890	875	860	840	820	800	745	-	-	-
	Med High	**4**	Y1			890	878	865	845	825	813	800	785	770	753	735	710	665	-	-	-
022	Med	3		9 x 7	1/2	830	815	800	788	775	755	735	723	710	690	670	640	600	-	-	-
	Med Low	**2**	G			780	760	740	703	665	653	640	620	600	585	570	-	-	-	-	-
	Low	1				625	593	560	535	510	495	480	455	430	410	390	-	-	-	-	-
	High	5				1407	1381	1354	1327	1300	1267	1233	1201	1168	1131	1094	1009	-	-	-	-
	Med High	**4**	W			1146	1134	1122	1111	1099	1085	1071	1062	1052	1042	1031	966	-	-	-	-
030	**Med**	**3**	Y1	9 x 7	1/2	1023	1012	1001	985	969	959	949	937	925	913	901	-	-	-	-	-
	Med Low	2				978	962	946	934	922	907	891	882	872	858	843	-	-	-	-	-
	Low	**1**	G			795	777	759	748	737	718	698	686	673	650	626	-	-	-	-	-
	High	**5**	W			1530	1503	1476	1453	1429	1413	1397	1376	1355	1342	1329	1276	1231	1173	-	-
	Med High	**4**	Y1			1413	1388	1363	1342	1321	1303	1285	1263	1240	1226	1212	1173	1016	946	-	-
036	Med	3		11 x 10	1/2	1355	1325	1294	1276	1258	1235	1212	1188	1164	1144	1123	982	909	883	-	-
	Med Low	2				1336	1299	1261	1242	1222	1202	1181	1157	1132	1111	1090	937	874	830	-	-
	Low	**1**	G			1243	1182	1121	1061	1000	964	928	856	784	744	703	647	592		-	-
	High	5				1934	1910	1886	1871	1855	1827	1799	1780	1760	1747	1734	1700	1659	1617	-	-
	Med High	**4**	W			1799	1783	1767	1744	1720	1693	1666	1649	1631	1617	1603	1560	1530	1492	-	-
042	Med	3		11 x 10	1	1694	1680	1666	1642	1617	1592	1567	1552	1537	1519	1500	1453	1421	1372	-	-
	Med Low	2	Y1			1575	1560	1540	1520	1502	1487	1471	1448	1424	1409	1393	1351	1308	1266	-	-
	Low	1	G			1454	1406	1358	1333	1308	1285	1261	1239	1217	1198	1179	1072	1002	988	-	-
	High	5				1934	1910	1886	1871	1855	1827	1799	1780	1760	1747	1734	1700	1659	1617	-	-
	Med High	**4**	W			1799	1783	1767	1744	1720	1693	1666	1649	1631	1617	1603	1560	1530	1492	-	-
048	**Med**	**3**	Y1	11 x 10	1	1694	1680	1666	1642	1617	1592	1567	1552	1537	1519	1500	1453	1421	1372	-	-
	Med Low	2				1575	1560	1540	1520	1502	1487	1471	1448	1424	1409	1393	1351	1308	1266	-	-
	Low	**1**	G			1454	1406	1358	1333	1308	1285	1261	1239	1217	1198	1179	1072	1002	988	-	-
	High	**5**	W			2245	2230	2214	2194	2173	2155	2136	2120	2103	2087	2070	2032	1998	1957	1910	1825
	Med High	4				2092	2073	2054	2035	2015	1995	1975	1958	1940	1922	1904	1880	1843	1806	1767	1728
060	Med	3		11 x 10	1	1951	1931	1910	1889	1868	1850	1831	1812	1793	1774	1755	1722	1688	1654	1612	1562
	Med Low	**2**	Y1			1812	1796	1780	1761	1741	1718	1695	1682	1668	1651	1633	1591	1555	1518	1480	1433
	Low	**1**	G			1682	1661	1640	1616	1591	1573	1555	1533	1510	1495	1480	1441	1400	1351	1316	1263
	High	**5**	W			2472	2454	2435	2414	2393	2371	2349	2328	2306	2289	2271	2230	2189	2121	2033	1936
	Med High	**4**	Y1			2271	2248	2225	2205	2184	2166	2147	2129	2110	2094	2078	2039	2011	1977	1930	1846
070	Med	3		11 x 10	1	2133	2115	2096	2072	2047	2030	2013	1996	1979	1965	1950	1909	1873	1837	1793	1748
	Med Low	2				2008	1985	1962	1939	1915	1898	1880	1862	1843	1828	1812	1774	1742	1703	1669	1635
	Low	**1**	G			1806	1784	1761	1742	1722	1696	1669	1656	1642	1625	1607	1564	1527	1490	1443	1404

Factory speed settings are in Bold 6/14/12

Air flow values are with dry coil and standard filter

For wet coil performance first calculate the face velocity of the air coil (Face Velocity [fpm] = Airflow [cfm] / Face Area [sq ft]).

Then for velocities of 200 fpm reduce the static capability by 0.03 in. wg, 300 fpm by 0.08 in. wg, 400 fpm by 0.12in. wg., and 500 fpm by 0.16 in. wg.

Highest setting is for auxiliary heat (W) and lowest setting is for constant blower (G). The "Y1" and "Y2" settings must be between the "G" and "W" settings.

The gray wire is not factory wired to the motor and is tied to the wire harness. This wire can be field connected and can be used with 3HT/2CL thermostats or IntelliZone2 to deliver the required air flow for the Y2 signal.

5-Speed ECM Constant Torque Motors

The 5-Speed ECM is a 'Constant Torque' ECM motor and delivers air flow similar to a PSC but operates as efficiently as an ECM Motor. Because it's an ECM Motor, the 5-Speed ECM can ramp slowly up or down like the ECM motor. There are 5 possible speed taps available on the 5-Speed ECM motor with #1 being the lowest airflow and #5 being the highest airflow. These speed selections are preset at the time of manufacture and are easily changed in the field if necessary.

If more than one tap are energized at the same time, built in logic gives precedence to the highest tap number and allows air flow to change with G, Y1, Y2 and W signals or with Fan, CC, CC2, and E1 output signals. Each of those 5 speeds has a specific 'Torque' value programmed into the motor for each speed selection. As static pressure increases, airflow decreases resulting in less torque on the rotor. The motor responds only to changes in torque and adjusts its speed accordingly.

The 5-Speed ECM motor is powered by line voltage but the motor speed is energized by 24 VAC.

5-Speed ECM Benefits:

- High efficiency
- Soft start
- 5 speeds with up to 4 speeds on-line
- Built in logic allows air flow to change with G, Y1, Y2 and W signals
- Super efficient low airflow continuous blower setting (G)

Blower Performance Data cont.

Dual Capacity Unit with 5-Speed ECM

Model	Motor Speed	Motor Tap	T'stat Cnct.	Blower Size	Motor HP	Airflow (cfm) at External Static Pressure (in. wg)														
						0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
026	**High**	**5**	W	9 x 7	1/2	1120	1109	1097	1082	1066	1055	1044	1028	1011	1001	991	932	839	-	-	-
	Med High	**4**	Y2			1020	1006	991	980	968	950	932	922	911	894	876	849	812	-	-	-
	Med	3				917	906	895	884	872	854	836	824	812	792	772	754	719	-	-	-
	Med Low	**2**	Y1			836	824	812	794	776	765	754	735	715	703	691	653	631	-	-	-
	Low	**1**	G			735	721	707	687	666	653	640	622	603	589	574	533	-	-	-	-
038	**High**	**5**	W	11 x 10	1/2	1530	1503	1476	1453	1429	1413	1397	1376	1355	1342	1329	1276	1231	1173	-	-
	Med High	**4**	Y2			1413	1388	1363	1342	1321	1303	1285	1263	1240	1226	1212	1173	1016	946	-	-
	Med	**3**	Y1			1355	1325	1294	1276	1258	1235	1212	1188	1164	1144	1123	982	909	883	-	-
	Med Low	2				1336	1299	1261	1242	1222	1202	1181	1157	1132	1111	1090	937	874	830	-	-
	Low	**1**	G			1243	1182	1121	1061	1000	964	928	856	784	744	703	647	592		-	-
049	**High**	**5**	W	11 x 10	1	1934	1910	1886	1871	1855	1827	1799	1780	1760	1747	1734	1700	1659	1617	-	-
	Med High	4				1799	1783	1767	1744	1720	1693	1666	1649	1631	1617	1603	1560	1530	1492	-	-
	Med	**3**	Y2			1694	1680	1666	1642	1617	1592	1567	1552	1537	1519	1500	1453	1421	1372	-	-
	Med Low	**2**	Y1			1575	1560	1540	1520	1502	1487	1471	1448	1424	1409	1393	1351	1308	1266	-	-
	Low	**1**	G			1454	1406	1358	1333	1308	1285	1261	1239	1217	1198	1179	1072	1002	988	-	-
064	**High**	**5**	W	11 x 10	1	2245	2230	2214	2194	2173	2155	2136	2120	2103	2087	2070	2032	1998	1957	1910	1825
	Med High	**4**	Y2			2092	2073	2054	2035	2015	1995	1975	1958	1940	1922	1904	1880	1843	1806	1767	1728
	Med	3				1951	1931	1910	1889	1868	1850	1831	1812	1793	1774	1755	1722	1688	1654	1612	1562
	Med Low	**2**	Y1			1812	1796	1780	1761	1741	1718	1695	1682	1668	1651	1633	1591	1555	1518	1480	1433
	Low	**1**	G			1682	1661	1640	1616	1591	1573	1555	1533	1510	1495	1480	1441	1400	1351	1316	1263
072	**High**	**5**	W	11 x 10	1	2472	2454	2435	2414	2393	2371	2349	2328	2306	2289	2271	2230	2189	2121	2033	1936
	Med High	**4**	Y2			2271	2248	2225	2205	2184	2166	2147	2129	2110	2094	2078	2039	2011	1977	1930	1846
	Med	3				2133	2115	2096	2072	2047	2030	2013	1996	1979	1965	1950	1909	1873	1837	1793	1748
	Med Low	**2**	Y1			2008	1985	1962	1939	1915	1898	1880	1862	1843	1828	1812	1774	1742	1703	1669	1635
	Low	**1**	G			1806	1784	1761	1742	1722	1696	1669	1656	1642	1625	1607	1564	1527	1490	1443	1404

Factory speed settings are in Bold 6/14/12

Air flow values are with dry coil and standard filter

For wet coil performance first calculate the face velocity of the air coil (Face Velocity [fpm] = Airflow [cfm] / Face Area [sq ft]).

Then for velocities of 200 fpm reduce the static capability by 0.03 in. wg, 300 fpm by 0.08 in. wg, 400 fpm by 0.12in. wg., and 500 fpm by 0.16 in. wg.

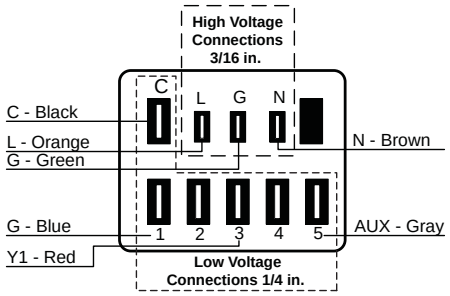
Highest setting is for auxiliary heat (W) and lowest setting is for constant blower (G). The "Y1" and "Y2" settings must be between the "G" and "W" settings.

Setting Blower Speed - 5-Speed ECM

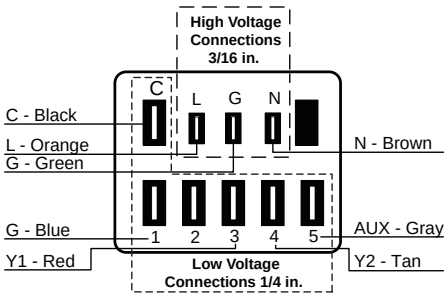
5-Speed ECM blower motors have five (5) speeds of which three (3) are selectable on single speed and four (4) are selectable on dual capacity.

CAUTION: Disconnect all power before performing this operation.

5-Speed ECM Motor Connections - Single Speed



5-Speed ECM Motor Connections - Dual Capacity



Blower Performance Data cont.

Unit with Standard PSC Motor

Model	Motor Spd	Blower Size	Motor HP	Airflow (cfm) at External Static Pressure (in. wg)															
				0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
012	**H**	6 x 8	1/10	480	450	440	420	410	380	360	340	330	310	300	-	-	-	-	-
	MH*			440	410	400	380	370	350	330	310	300	280	270	-	-	-	-	-
	ML			395	370	360	340	330	310	290	280	270	250	240	-	-	-	-	-
	L			325	310	300	280	270	250	240	230	220	210	200	-	-	-	-	-
018	H	9 x 7	1/6	845	835	825	815	800	790	775	755	735	710	680	565	-	-	-	-
	M			735	730	725	715	705	700	690	675	660	630	600	485	-	-	-	-
	L			620	615	610	605	600	590	580	565	550	520	490	-	-	-	-	-
022	H	9 x 7	1/5	1110	1095	1080	1065	1045	1020	995	970	945	915	880	810	-	-	-	-
	M			850	845	835	825	815	805	795	775	755	735	715	-	-	-	-	-
	L			750	745	740	735	725	715	700	685	670	650	630	-	-	-	-	-
030	H	9 x 7	1/3	1290	1270	1245	1220	1190	1160	1125	1090	1055	1020	985	880	760	-	-	-
	M			1100	1090	1075	1060	1045	1020	995	970	940	910	875	785	625	-	-	-
	L			910	905	900	895	885	875	865	850	835	810	780	710	560	-	-	-
036	H	10 x 10	1/2	1665	1640	1610	1580	1550	1515	1480	1450	1415	1315	1215	1090	980	-	-	-
	M			1465	1445	1425	1400	1375	1350	1325	1260	1190	1140	1090	990	890	-	-	-
	L			1130	1115	1100	1090	1075	1035	995	965	930	895	860	795	730	-	-	-
042	H	10 x 10	1/2	2010	1975	1940	1905	1870	1825	1780	1735	1690	1640	1590	1470	1210	-	-	-
	M			1670	1650	1630	1610	1590	1560	1530	1495	1460	1425	1390	1190	1080	-	-	-
	L			1220	1215	1210	1295	1200	1180	1160	1130	1100	1060	1020	930	-	-	-	-
048	H	10 x 10	1/2	2010	1975	1940	1905	1870	1825	1780	1735	1690	1640	1590	1470	1210	-	-	-
	M			1670	1650	1630	1610	1590	1560	1530	1495	1460	1425	1390	1190	1080	-	-	-
	L			1220	1215	1210	1295	1200	1180	1160	1130	1100	1060	1020	930	-	-	-	-
060	H	11 x 10	1	2430	2400	2365	2330	2290	2255	2215	2180	2140	2095	2045	1945	1835	1715	1510	1330
	M			2265	2235	2205	2175	2145	2110	2070	2035	2000	1960	1915	1825	1730	1605	1440	1260
	L			2075	2050	2020	1995	1965	1940	1915	1885	1850	1820	1785	1720	1610	1505	1335	1175
070	**H**	11 x 10	1	2430	2400	2365	2330	2290	2255	2215	2180	2140	2095	2045	1945	1835	1715	1510	1330
	M			2265	2235	2205	2175	2145	2110	2070	2035	2000	1960	1915	1825	1730	1605	1440	1260
	L			2075	2050	2020	1995	1965	1940	1915	1885	1850	1820	1785	1720	1610	1505	1335	1175

2/7/12

Unit with Optional High Static PSC Motor

Model	Motor Spd	Blower Size	Motor HP	Airflow (cfm) at External Static Pressure (in. wg)															
				0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
022	H	9 x 7	1/3	1290	1270	1245	1220	1190	1160	1125	1090	1055	1020	985	880	760	-	-	-
	M			1100	1090	1075	1060	1045	1020	995	970	940	910	875	785	625	-	-	-
	L			910	905	900	895	885	875	865	850	835	810	780	710	560	-	-	-
030	H	9 x 7	1/2	1365	1340	1325	1305	1280	1250	1215	1180	1140	1100	1055	960	850	-	-	-
	M			1040	1040	1035	1030	1020	1005	990	970	945	915	885	810	735	-	-	-
	L			880	880	880	880	875	870	860	840	820	800	775	730	480	-	-	-
036	H	10 x 10	1/2	1930	1905	1875	1840	1805	1765	1725	1680	1635	1530	1425	1270	1150	1025	-	-
	M			1635	1620	1600	1580	1555	1530	1505	1465	1425	1335	1240	1135	1035	775	-	-
	L			1230	1230	1225	1215	1200	1165	1130	1095	1060	1035	1005	935	795	675	-	-
042	H	10 x 10	3/4	2115	2075	2035	1980	1920	1900	1880	1840	1795	1730	1660	1390	1225	1070	-	-
	M			2005	1980	1950	1910	1865	1815	1765	1725	1685	1585	1485	1315	1140	1025	-	-
	L			1860	1835	1805	1780	1750	1715	1675	1635	1590	1540	1490	1260	1115	980	-	-
048	H	10 x 10	3/4	2115	2075	2035	1980	1920	1900	1880	1840	1795	1730	1660	1390	1225	1070	-	-
	M			2005	1980	1950	1910	1865	1815	1765	1725	1685	1585	1485	1315	1140	1025	-	-
	L			1860	1835	1805	1780	1750	1715	1675	1635	1590	1540	1490	1260	1115	980	-	-

Factory settings are in Bold 1/25/12

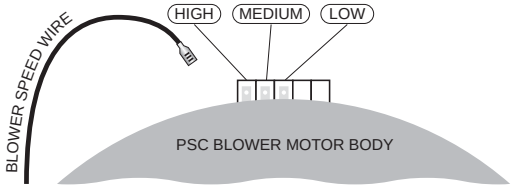
High-Static option not available for 012, 018, 060, and 070

Air flow values are with dry coil and standard filter

For wet coil performance first calculate the face velocity of the air coil (Face Velocity [fpm] = Airflow [cfm] / Face Area [sq ft]).
Then for velocities of 200 fpm reduce the static capability by 0.03 in. wg, 300 fpm by 0.08 in. wg, 400 fpm by 0.12in. wg. and 500 fpm by 0.16 in. wg.

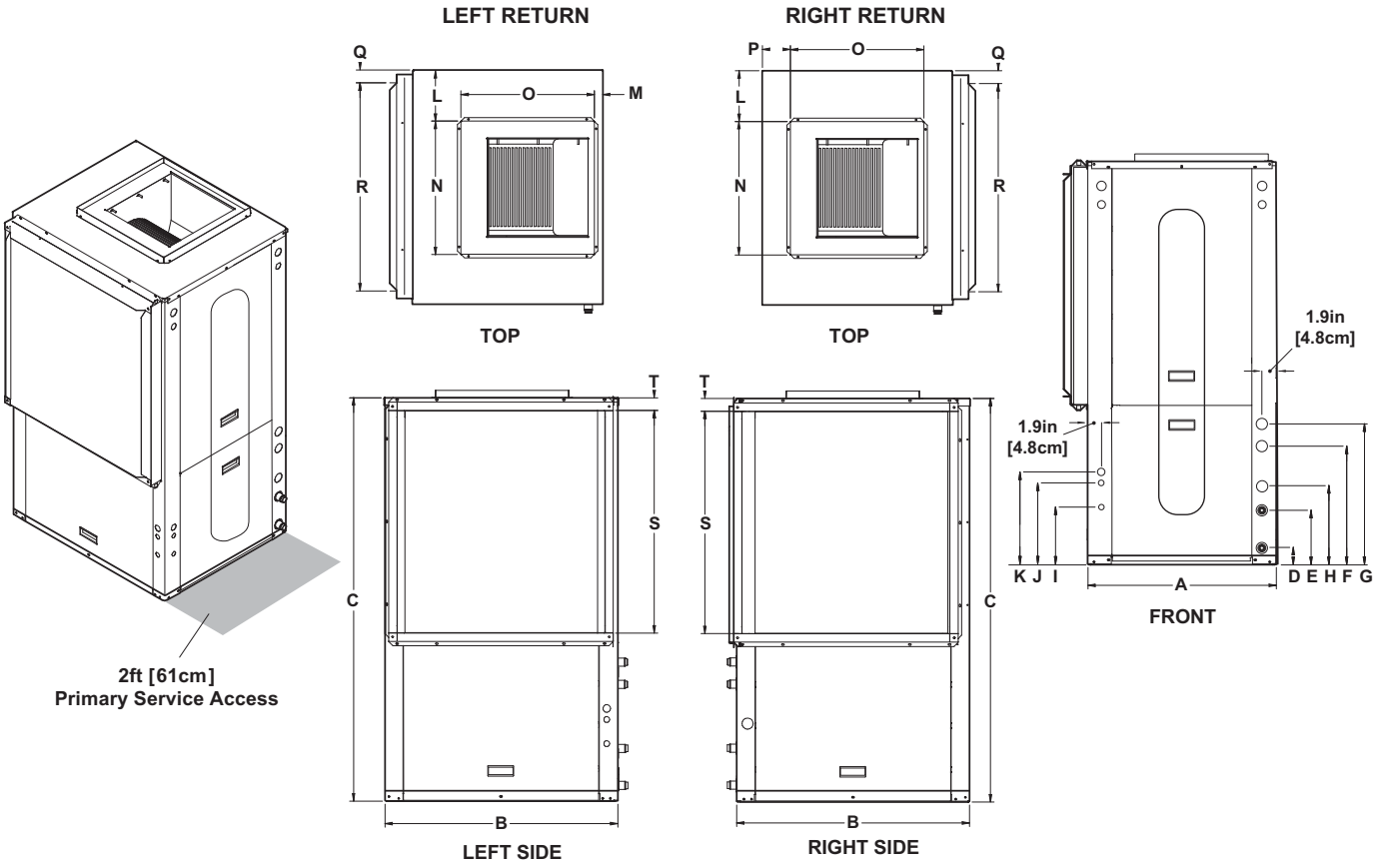
Setting Blower Speed - PSC

CAUTION: Disconnect all power before performing this operation.



Vertical Dimensional Data

Top Air Discharge

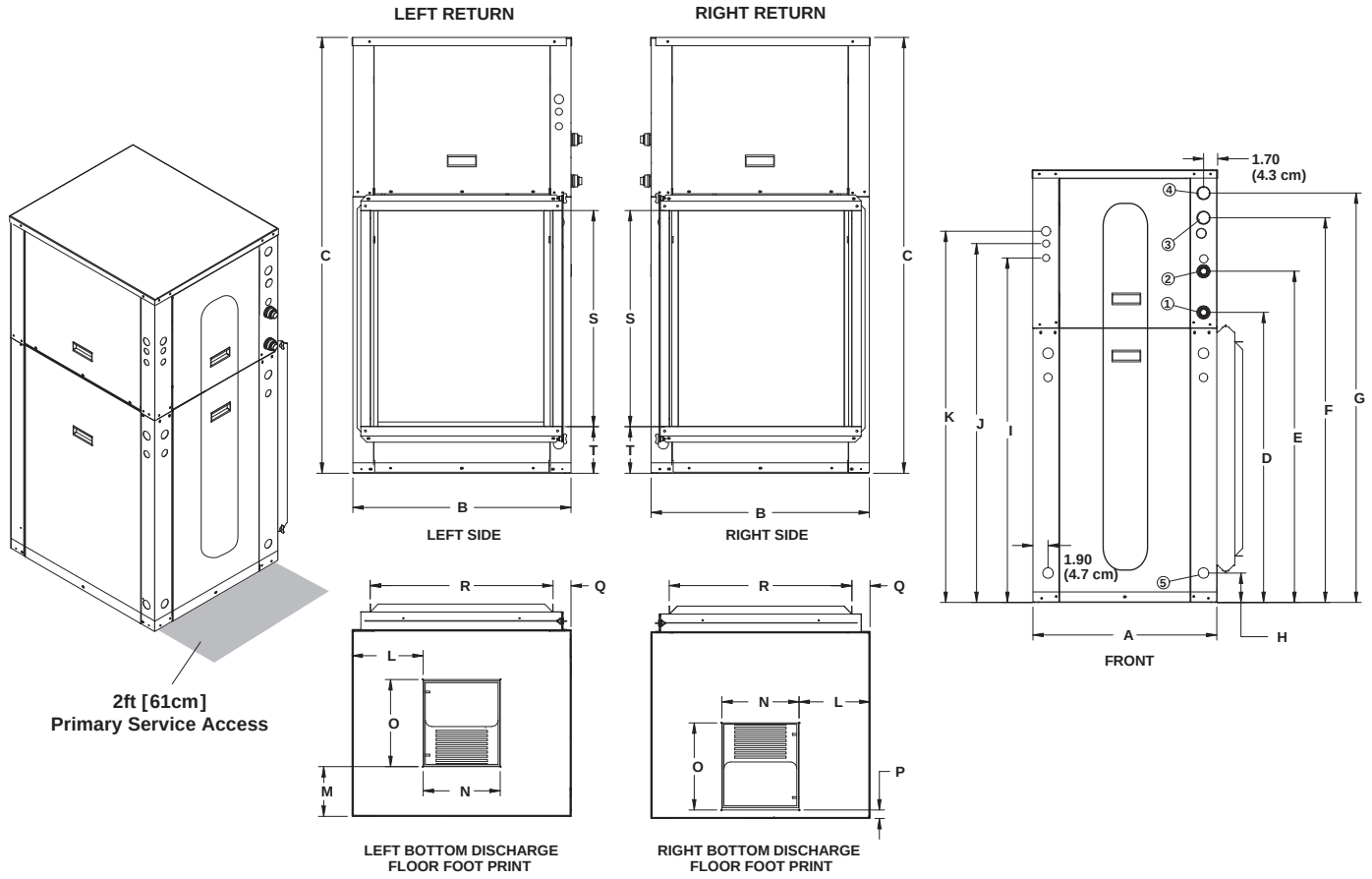


Vertical Top Flow Model		Overall Cabinet			Water Connections							Electrical Connections			Discharge Connection duct flange installed (±0.10 in)					Return Connection using std deluxe filter rack (±0.10 in)			
		A	B	C	D	E	F	G	H			I 3/4 in. cond	J 1/2 in. cond	K 1/2 in. cond	L	M	N	O	P	Q	R	S	T
		Width	Depth	Height	Loop In	Loop Out	HWG In	HWG Out	Cond-ensate	Loop Water FPT	HWG FPT	Power Supply	Ext Pump	Low Voltage			Supply Width	Supply Depth			Return Depth	Return Height	
012	in.	22.2	22.5	34.5	2.3	5.3	11.9	14.9	8.6	1 in.	1 in.	6.9	9.4	11.7	6.1	3.7	10.0	10.0	0.7	2.4	18.1	14.2	1.7
	cm.	56.4	57.2	87.6	5.9	13.5	30.2	37.8	21.8	Swivel	Swivel	17.5	23.9	29.7	15.5	9.4	25.4	25.4	1.8	6.1	46.0	36.1	4.3
018	in.	22.5	26.5	39.4	2.3	5.3	13.4	16.4	9.6	1 in.	1 in.	6.9	9.4	11.7	6.3	0.7	14.0	14.0	2.7	2.3	22.0	18.0	2.0
	cm.	57.2	67.3	100.1	5.8	13.5	34.0	41.7	24.4	Swivel	Swivel	17.5	23.9	29.7	16.0	1.8	35.6	35.6	6.9	5.8	55.9	45.7	5.1
022-030	in.	22.5	26.5	48.5	2.0	7.0	13.5	16.5	10.2	1 in.	1 in.	9.5	12.1	14.3	6.1	0.8	14.0	14.0	4.4	1.7	22.2	26.0	1.7
	cm.	57.2	67.3	123.2	5.1	17.8	34.3	41.9	25.9	Swivel	Swivel	24.1	30.7	36.3	15.5	2.0	35.6	35.6	11.2	4.3	56.4	66.0	4.3
036-038	in.	25.6	31.6	50.4	2.3	7.3	15.9	18.9	10.6	1 in.	1 in.	9.5	12.1	14.3	6.9	1.1	18.0	18.0	3.8	1.7	28.1	26.0	1.7
	cm.	65.0	80.3	128.0	5.8	18.5	40.4	48.0	26.9	Swivel	Swivel	24.1	30.7	36.3	17.5	2.8	45.7	45.7	9.7	4.3	71.4	66.0	4.3
042-049	in.	25.6	31.6	54.4	2.3	7.3	15.9	18.9	10.6	1 in.	1 in.	9.5	12.1	14.3	6.9	1.1	18.0	18.0	3.8	1.7	28.1	30.0	1.7
	cm.	65.0	80.3	138.2	5.8	18.5	40.4	48.0	26.9	Swivel	Swivel	24.1	30.7	36.3	17.5	2.8	45.7	45.7	9.7	4.3	71.4	76.2	4.3
060-072	in.	25.6	31.6	58.4	2.3	7.3	15.9	18.9	10.6	1 in.	1 in.	9.5	12.1	14.3	6.9	1.1	18.0	18.0	3.8	1.7	28.1	34.0	1.7
	cm.	65.0	80.3	148.3	5.8	18.5	40.4	48.0	26.9	Swivel	Swivel	24.1	30.7	36.3	17.5	2.8	45.7	45.7	9.7	4.3	71.4	86.4	4.3

Condensate is 3/4 in. PVC female glue socket and is switchable from side to front 7/11/13
Unit shipped with deluxe 2 in. (field adjustable to 1 in.) duct collar/filter rack extending from unit 3.25 in. and is suitable for duct connection.
Discharge flange is field installed and extends 1 in. [25.4 mm] from cabinet
Decorative molding and/or water connections extend 1.2 in. [30.5 mm] beyond front of cabinet.
Models 012 and 018 do not include decorative molding on front of cabinet.

Vertical Dimensional Data cont.

Bottom Air Discharge



Bottom Flow Models		Overall Cabinet			Water Connections							Electrical Knockouts			Discharge Connection duct flange installed (±0.10 in)					Return Connection using std deluxe filter rack (±0.10 in)			
					1	2	3	4	5			I 3/4 in. cond	J 1/2 in. cond	K 1/2 in. cond									
		A	B	C	D	E	F	G	H	Loop Water FPT	HWG FPT				L	M	N	O	P	Q	R	S	T
		Width	Depth	Height	In	Out	HWG In	HWG Out	Con-densate			Power Supply	Ext Pump	Low Voltage			Supply Width	Supply Depth			Return Depth	Return Height	
022-030	in.	22.5	26.5	52.5	35.3	40.2	46.7	49.7	3.6	1 in. Swivel	1 in. Swivel	41.9	43.6	45.1	8.6	6.0	9.3	10.5	1.0	2.2	22.2	26.0	5.6
	cm.	57.2	67.3	133.4	89.7	102.1	118.6	126.2	9.1			106.4	110.7	114.6	21.8	15.2	23.6	26.7	2.5	5.6	56.4	66.0	14.2
036-072	in.	25.5	31.5	62.5	43.4	48.4	57.0	60.0	3.6	1 in. Swivel	1 in. Swivel	48.9	50.8	52.2	9.1	4.8	13.4	13.6	1.5	1.8	28.1	34.0	5.6
	cm.	64.8	80.0	158.8	110.2	122.9	144.8	152.4	9.1			124.2	129.0	132.6	23.1	12.2	34.0	34.5	3.8	4.6	71.4	86.4	14.2

Condensate is 3/4 in. PVC female glue socket and is switchable from side to front

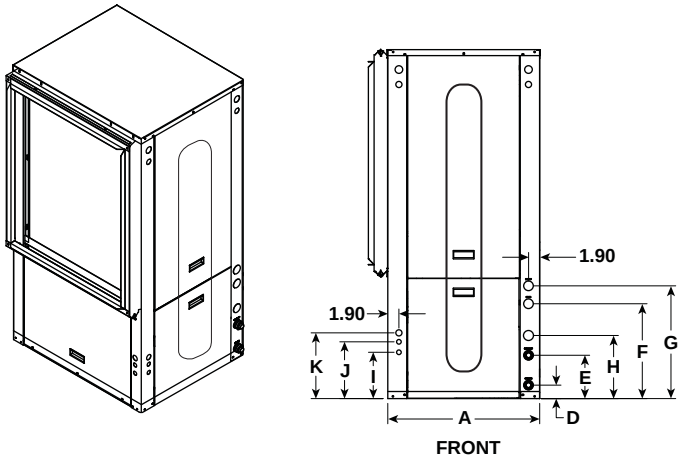
7/11/13

Vertical bottom flow unit shipped with deluxe 2 in. (field adjustable to 1 in.) duct collar/filter rack extending from unit 3.25 in. and is suitable for duct connection.

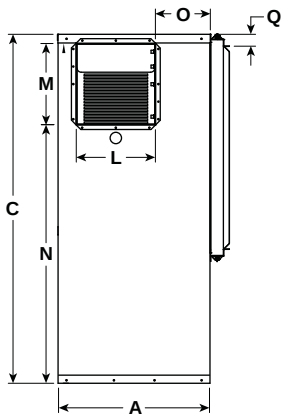
Decorative molding and/or water connections extend 1.2 in. (30.5mm) beyond front of cabinet.

Vertical Dimensional Data cont.

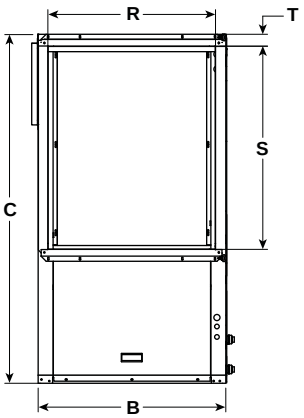
Rear Air Discharge



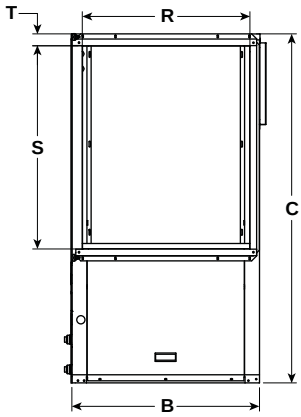
FRONT



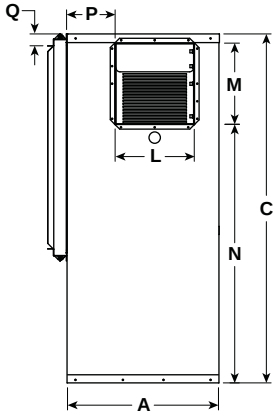
REAR VIEW
LEFT RETURN



SIDE VIEW
LEFT RETURN



SIDE VIEW
RIGHT RETURN

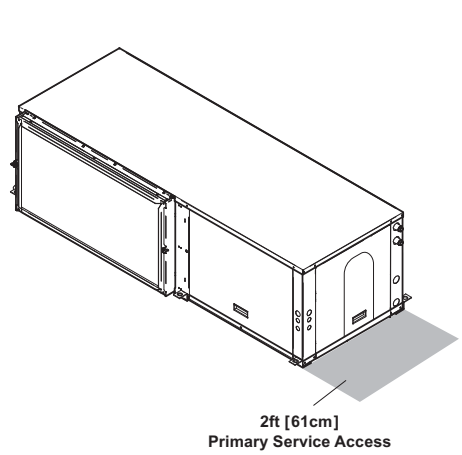


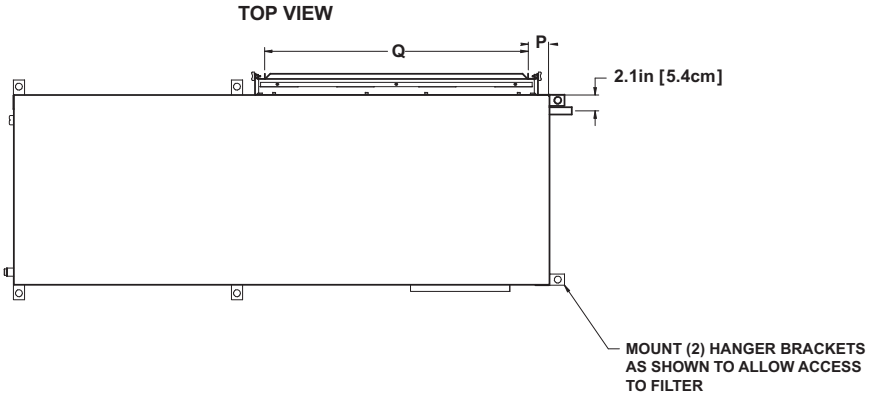
REAR VIEW
RIGHT RETURN

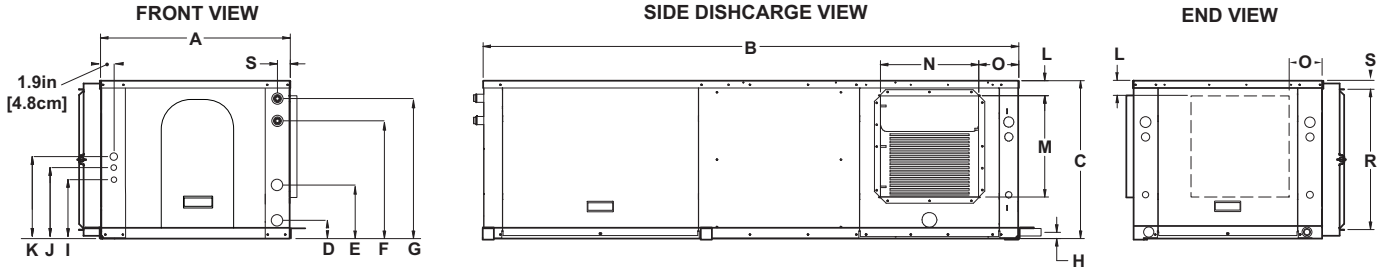
Vertical Rear Discharge Models		Overall Cabinet			Water Connections							Electrical Connections			Discharge Connection duct flange installed (±0.10 in)					Return Connection using std deluxe filter rack (±0.10 in)			
		A	B	C	D	E	F	G	H	Loop Water FPT	HWG FPT	I 3/4 in. cond	J 1/2 in. cond	K 1/2 in. cond	L	M	N	O	P	Q	R	S	T
		Width	Depth	Height	Loop In	Loop Out	HWG In	HWG Out	Cond-ensate			Power Supply	Ext Pump	Low Voltage	Supply Width	Supply Depth					Return Depth	Return Height	
042-049	in.	25.6	31.6	54.4	2.3	7.3	15.9	18.9	10.6	1" Swivel	1 in. Swivel	9.5	12.1	14.3	13.3	13.6	39.4	9.1	8.1	1.7	28.1	30.0	1.7
	cm.	65.0	80.3	138.2	5.8	18.5	40.4	48.0	26.9			24.1	30.7	36.3	33.8	34.5	100.1	23.1	20.6	4.3	71.4	76.2	4.3
060-072	in.	25.6	31.6	58.4	2.3	7.3	15.9	18.9	10.6	1" Swivel	1 in. Swivel	9.5	12.1	14.3	13.3	13.6	43.4	9.1	8.1	1.7	28.1	34.0	1.7
	cm.	65.0	80.3	148.3	5.8	18.5	40.4	48.0	26.9			24.1	30.7	36.3	33.8	34.5	110.2	23.1	20.6	4.3	71.4	86.4	4.3

Condensate is 3/4 in. PVC female glue socket and is switchable from side to front 7/11/13
Unit shipped with deluxe 2 in. (field adjustable to 1 in.) duct collar/filter rack extending from unit 3.25 in. and is suitable for duct connection.
Discharge flange is field installed and extends 1 in. [25.4mm] from cabinet
Decorative molding and/or water connections extend 1.2 in. [30.5mm] beyond front of cabinet.

Horizontal Dimensional Data







AS SHOWN LR UNIT (RR UNIT ON OPPOSITE SIDE—SAME DIMENSIONS)

Horizontal Model		Overall Cabinet			Water Connections							Electrical Connections			Discharge Connection duct flange installed (±0.10 in)				Return Connection using std deluxe filter rack (±0.10 in)			
		A	B	C	D	E	F	G	H	Loop Water FPT	HWG FPT	I 3/4 in. cond	J 1/2 in. cond	K 1/2 in. cond	L	M	N	O	P	Q	R	S
		Width	Depth	Height	In	Out	HWG In	HWG Out	Cond-ensate			Power Supply	Ext Pump	Low Voltage		Supply Height	Supply Depth			Return Depth	Return Height	
012	in.	22.5	44.0	17.3	2.3	5.3	11.9	14.9	8.0	1 in. Swivel	1 in. Swivel	6.9	9.5	11.7	4.1	7.3	9.7	5.8	1.7	17.8	14.6	1.4
	cm.	57.2	111.8	43.9	5.8	13.5	30.2	37.8	20.3			17.5	24.1	29.7	10.4	18.5	24.6	14.7	4.3	45.2	37.1	3.6
018	in.	22.5	53.0	19.3	2.3	5.3	13.8	16.8	8.0	1 in. Swivel	1 in. Swivel	6.9	9.5	11.7	1.8	10.5	9.5	8.2	2.2	21.8	16.5	1.5
	cm.	57.2	134.6	49.0	5.8	13.5	35.1	42.7	20.3			17.5	24.1	29.7	4.6	26.7	24.1	20.8	5.6	55.4	41.9	3.8
022-030	in.	22.5	63.0	19.3	2.0	7.0	13.5	16.5	0.8	1 in. Swivel	1 in. Swivel	9.5	12.1	14.3	2.3	10.5	9.4	5.8	2.8	30.5	16.9	1.3
	cm.	57.2	160.0	49.0	5.1	17.8	34.3	41.9	2.0			24.1	30.7	36.3	5.8	26.7	23.9	14.7	7.1	77.5	42.9	3.3
036-038	in.	25.6	72.0	21.3	2.3	7.3	15.9	18.9	0.8	1 in. Swivel	1 in. Swivel	9.5	12.1	14.3	SEE	13.6	13.2	SEE	2.8	35.5	18.9	1.3
	cm.	65.0	182.9	54.1	5.8	18.5	40.4	48.0	2.0			24.1	30.7	36.3	CHART	34.5	33.5	CHART	7.1	90.2	48.0	3.3
042-049	in.	25.6	77.0	21.3	2.3	7.3	15.9	18.9	0.8	1 in. Swivel	1 in. Swivel	9.5	12.1	14.3	SEE	13.6	13.2	SEE	2.8	40.4	18.9	1.3
	cm.	65.0	195.6	54.1	5.8	18.5	40.4	48.0	2.0			24.1	30.7	36.3	CHART	34.5	33.5	CHART	7.1	102.6	48.0	3.3
060-072	in.	25.6	82.0	21.3	2.3	7.3	15.9	18.9	0.8	1 in. Swivel	1 in. Swivel	9.5	12.1	14.3	SEE	13.6	13.2	SEE	2.8	45.4	18.9	1.3
	cm.	65.0	208.3	54.1	5.8	18.5	40.4	48.0	2.0			24.1	30.7	36.3	CHART	34.5	33.5	CHART	7.1	115.3	48.0	3.3

Condensate is 3/4 in. PVC female glue socket and is switchable from side to front 7/11/13
Unit shipped with deluxe 2 in. (field adjustable to 1 in.) duct collar/filter rack extending from unit 3.25 in. and is suitable for duct connection.
Discharge flange is field installed and extends 1 in. [25.4mm] from cabinet
Decorative molding and/or water connections extend 1.2 in. [30.5mm] beyond front of cabinet.
Models 012 and 018 do not include decorative molding on front of cabinet.

Units Not Shown Above		L	O
Right Return End Discharge	in	2.8	4.6
	cm	7.1	11.8
Right Return Side Discharge	in	4.9	6.9
	cm	12.4	17.5
Left Return End Discharge	in	4.9	7.6
	cm	12.4	19.4
Left Return Side Discharge	in	2.8	6.9
	cm	7.1	17.5

Physical Data

Single Speed

Model		SINGLE SPEED								
		012	018	022	030	036	042	048	060	070
Compressor (1 each)		Rotary		Scroll						
Factory Charge R410a, oz [kg] (Aluminum tube and fin air coil)	Vertical	36 [1.02]	42 [1.19]	56 [1.58]	64 [1.81]	82 [2.32]	84 [2.38]	92 [2.60]	112 [3.17]	134 [3.79]
Factory Charge R410a, oz [kg] (Aluminum tube and fin air coil)	Horizontal	36 [1.02]	48 [1.36]	54 [1.53]	64 [1.81]	76 [2.15]	84 [2.38]	92 [2.60]	88 [2.49]	110 [3.11]
Factory Charge R410a, oz [kg] (Copper tube/Aluminum fin air coil)	Vertical	42 [1.19]	40 [1.13]	62 [1.76]	80 [2.26]	84 [2.38]	92 [2.60]	100 [2.83]	120 [3.40]	150 [4.25]
Factory Charge R410a, oz [kg] (Copper tube/Aluminum fin air coil)	Horizontal	42 [1.19]	40 [1.13]	60 [1.70]	80 [2.26]	84 [2.38]	92 [2.60]	100 [2.83]	120 [3.40]	122 [3.46]
Blower Motor & Blower										
Blower Motor Type/Speeds	VS ECM	n/a	Variable Speed ECM							
	5-Spd ECM	n/a	n/a	5 Speed ECM						
	PSC	PSC - 4 Speeds	PSC - 3 Speeds							
Blower Motor- hp [W]	VS ECM	n/a	1/2 [373]	1/2 [373]	1/2 [373]	1/2 [373]	1/2 [373]	1/2 [373]	1 [746]	1 [746]
	5-Spd ECM	n/a	n/a	1/2 [373]	1/2 [373]	1/2 [373]	1 [746]	1 [746]	1 [746]	1 [746]
	PSC	1/10 [75]	1/6 [134]	1/5 [149]	1/3 [249]	1/2 [373]	1/2 [373]	1/2 [373]	1 [746]	1 [746]
High Static Blower Motor - hp [W]	VS ECM	n/a	n/a	n/a	n/a	1 [746]	1 [746]	1 [746]	n/a	n/a
	PSC	n/a	n/a	1/ [249]	1/3 [249]	1/2 [373]	3/4 [560]	3/4 [560]	n/a	n/a
Blower Wheel Size (Dia x W), in. [mm]	VS ECM & 5-Spd ECM	n/a	9 x 7 [229 x 178]	9 x 7 [229 x 178]	9 x 7 [229 x 178]	11 x 10 [279 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]
	PSC	6 x 8 [152 x 203]	9 x 7 [229 x 178]	9 x 7 [229 x 178]	9 x 7 [229 x 178]	10 x 10 [254 x 254]	10 x 10 [254 x 254]	10 x 10 [254 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]
High Static Blower Wheel Size (Dia x W), in. [mm]	VS ECM	n/a	n/a	n/a	n/a	11 x 10 [279 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]	n/a	n/a
	PSC	n/a	n/a	9 x 7 [229 x 178]	9 x 7 [229 x 178]	10 x 10 [254 x 254]	10 x 10 [254 x 254]	10 x 10 [254 x 254]	n/a	n/a
Coax and Water Piping										
Water Connections Size - Swivel - in [mm]		1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]
HWG Connection Size - Female Sweat I.D. - in [mm]		n/a	1/2" [12.7]	1/2" [12.7]	1/2" [12.7]	1/2" [12.7]	1/2" [12.7]	1/2" [12.7]	1/2" [12.7]	1/2" [12.7]
Coax & Piping Water Volume - gal [l]		0.35 [1.3]	0.40 [1.5]	0.7 [2.6]	1.0 [3.8]	1.3 [4.9]	1.3 [4.9]	1.6 [6.1]	1.6 [6.1]	2.3 [8.7]
Vertical										
Air Coil Dimensions (H x W), in. [mm]		16 x 16 [406 x 406]	19 x 20 [483 x 508]	24 x 20 [610 x 542]	28 x 20 [711 x 542]	28 x 25 [711 x 635]	32 x 25 [813 x 635]	32 x 25 [813 x 635]	36 x 25 [914 x 635]	36 x 25 [914 x 635]
Air Coil Total Face Area, ft2 [m2]		1.8 [0.167]	2.6 [0.242]	3.3 [0.310]	3.9 [0.362]	4.9 [0.451]	5.6 [0.570]	5.6 [0.570]	6.3 [0.641]	6.3 [0.641]
Air Coil Tube Size, in [mm]		3/8 [9.5]	5/16 [7.9]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]
Air Coil Number of rows		3	3	3	3	3	3	3	4	4
Filter Standard - 2" [51mm] Pleated MERV11 Throwaway, in [mm]		16 x 20 [406 x 508]	20 x 24 [508 x 610]	28 x 24 [712 x 610]	28 x 24 [712 x 610]	28 x 30 [712 x 762]	32 x 30 [813 x 762]	32 x 30 [813 x 762]	36 x 30 [914 x 762]	36 x 30 [914 x 762]
Weight - Operating, lb [kg]		165 [75]	200 [91]	293 [133]	308 [140]	353 [160]	368 [167]	408 [185]	443 [201]	468 [212]
Weight - Packaged, lb [kg]		185 [84]	220 [100]	313 [142]	328 [149]	373 [169]	388 [176]	428 [194]	463 [210]	488 [221]
Horizontal										
Air Coil Dimensions (H x W), in. [mm]		16 x 16 [406 x 406]	18 x 21 [457 x 533]	18 x 27 [457 x 686]	18 x 30 [457 x 762]	20 x 35 [508 x 889]	20 x 40 [508 x 1016]	20 x 40 [508 x 1016]	20 x 45 [508 x 1143]	20 x 45 [508 x 1143]
Air Coil Total Face Area, ft2 [m2]		1.8 [0.167]	2.6 [0.242]	3.4 [0.316]	3.9 [0.362]	4.9 [0.451]	5.6 [0.570]	5.6 [0.570]	6.3 [0.641]	6.3 [0.641]
Air Coil Tube Size, in [mm]		3/8 [9.5]	5/16 [7.9]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]
Air Coil Number of rows		3	3	3	3	3	3	3	3	3
Filter Standard - 2" [51mm] Pleated MERV11 Throwaway, in [mm]		1 - 16 x 20 [406 x 508]	1 - 18 x 24 [457 x 610]	1 - 18 x 32 [457 x 813]	1 - 18 x 32 [457 x 813]	1 - 20 x 37 [686 x 940]	1 - 20 x 20 [508 x 508] 1 - 20 x 22 [508 x 559]	1 - 20 x 20 [508 x 508] 1 - 20 x 22 [508 x 559]	1 - 20 x 25 [508 x 635] 1 - 20 x 22 [508 x 559]	1 - 20 x 25 [508 x 635] 1 - 20 x 22 [508 x 559]
Weight - Operating, lb [kg]		165 [75]	200 [91]	300 [136]	315 [143]	368 [167]	403 [183]	418 [190]	453 [205]	478 [217]
Weight - Packaged, lb [kg]		185 [84]	220 [100]	320 [145]	335 [152]	388 [176]	423 [192]	438 [199]	473 [215]	498 [226]

7/15/15

Aluminum Air Coil Implementation

Models: 012, 018, 022, 026, and 030; Vintage 'H' as of September 1st, 2015
Models: 036, 038, 042, 048, and 049; Vintage 'H' as of November 1st, 2015
Models: 060, 064, 070, and 072; Vintage 'H' as of January 1st, 2016
*Uncoated and AlumiSeal option only available for units with aluminum air coils
VIntages prior to 'H' have copper tube/aluminum fin e-coated coils

Physical Data cont.

Dual Capacity

Model		DUAL CAPACITY				
		ND026	ND038	ND049	ND064	ND072
Compressor (1 each)		Copeland UltraTech, Dual Capacity Scroll				
Factory Charge R410a, oz [kg] (Aluminum tube and fin air coil)	Vertical	56 [1.58]	70 [1.98]	93 [2.63]	112 [3.17]	130 [3.68]
Factory Charge R410a, oz [kg] (Aluminum tube and fin air coil)	Horizontal	58 [1.64]	76 [2.15]	93 [2.63]	112 [3.17]	136 [3.85]
Factory Charge R410a, oz [kg] (Copper tube / Aluminum fin air coil)	Vertical	60 [1.70]	82 [2.32]	93 [2.63]	128 [3.63]	138 [3.91]
Factory Charge R410a, oz [kg] (Copper tube / Aluminum fin air coil)	Horizontal	60 [1.70]	82 [2.32]	93 [2.63]	128 [3.63]	138 [3.91]
ECM Blower Motor & Blower						
Blower Motor Type/Speeds	VS ECM	Variable Speed ECM				
	5-Spd ECM	5 Speed ECM				
Blower Motor- hp [W]	VS ECM	1/2 [373]	1/2 [373]	1/2 [373]	1 [746]	1 [746]
	5-Spd ECM	1/2 [373]	1/2 [373]	1 [746]	1 [746]	1 [746]
High Static Blower Motor - hp [W]	VS ECM	n/a	1 [746]	1 [746]	n/a	n/a
Blower Wheel Size (Dia x W), in. [mm]	VS ECM	9 x 7 [229 x 178]	11 x 10 [279 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]
	5-Spd ECM	9 x 7 [229 x 178]	11 x 10 [279 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]
High Static Blower Wheel Size - [Dia. x W], in. [mm]	VS ECM	n/a	11 x 10 [279 x 254]	11 x 10 [279 x 254]	n/a	n/a
Coax and Water Piping						
Water Connections Size - Swivel - in [mm]		1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]
HWG Connection Size - Female Sweat I.D. - in [mm]		1/2" [12.7]	1/2" [12.7]	1/2" [12.7]	1/2" [12.7]	1/2" [12.7]
Coax & Piping Water Volume - gal [l]		0.7 [2.6]	1.3 [4.9]	1.6 [6.1]	1.6 [6.1]	2.3 [8.7]
Vertical						
Air Coil Dimensions (H x W), in. [mm]		24 x 20 [610 x 542]	28 x 25 [711 x 635]	32 x 25 [813 x 635]	36 x 25 [914 x 635]	36 x 25 [914 x 635]
Air Coil Total Face Area, ft2 [m2]		3.3 [0.310]	4.9 [0.451]	5.6 [0.570]	6.3 [0.641]	6.3 [0.641]
Air Coil Tube Size, in [mm]		3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]
Air Coil Number of rows		3	3	3	4	4
Filter Standard - 2" [51mm] Pleated MERV11 Throwaway, in [mm]		28 x 24 [712 x 610]	28 x 30 [712 x 762]	32 x 30 [813 x 762]	36 x 30 [914 x 762]	36 x 30 [914 x 762]
Weight - Operating, lb [kg]		293 [133]	358 [162]	408 [185]	453 [205]	468 [212]
Weight - Packaged, lb [kg]		313 [142]	378 [172]	428 [194]	473 [215]	488 [221]
Horizontal						
Air Coil Dimensions (H x W), in. [mm]		18 x 27 [457 x 686]	20 x 35 [508 x 889]	20 x 40 [508 x 1016]	20 x 45 [508 x 1143]	20 x 45 [508 x 1143]
Air Coil Total Face Area, ft2 [m2]		3.4 [0.316]	4.9 [0.451]	5.6 [0.570]	6.3 [0.641]	6.3 [0.641]
Air Coil Tube Size, in [mm]		3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]
Air Coil Number of rows		3	3	3	4	4
Filter Standard - 2" [51mm] Pleated MERV11 Throwaway, in [mm]		1 - 18 x 32 [457 x 813]	1 - 20 x 37 [686 x 940]	1 - 20 x 20 [508 x 508] 1 - 20 x 22 [508 x 559]	1 - 20 x 25 [508 x 635] 1 - 20 x 22 [508 x 559]	1 - 20 x 25 [508 x 635] 1 - 20 x 22 [508 x 559]
Weight - Operating, lb [kg]		300 [136]	368 [167]	418 [190]	463 [210]	480 [218]
Weight - Packaged, lb [kg]		320 [145]	388 [176]	438 [199]	483 [219]	500 [227]

7/15/2015

Aluminum Air Coil Implementation

Models: 012, 018, 022, 026, and 030; Vintage 'H' as of September 1st, 2015
Models: 036, 038, 042, 048, and 049; Vintage 'H' as of November 1st, 2015
Models: 060, 064, 070, and 072; Vintage 'H' as of January 1st, 2016
*Uncoated and AlumiSeal option only available for units with aluminum air coils
VIntages prior to 'H' have copper tube/aluminum fin e-coated coils

Microprocessor Control System

Startup

The unit will not operate until all the inputs and safety controls are checked for normal conditions. At first power-up, a four minute delay is employed before the compressor is energized.

Component Sequencing Delays

Components are sequenced and delayed for optimum space conditioning performance.

Accessory Relay

An accessory relay on the control board allows for field connection of solenoid valves, electronic air cleaners, etc. The accessory relay has a normally open output and a normally closed output.

Short Cycle Protection

The control employs a minimum "off" time of four minutes to provide for short cycle protection of the compressor.

Condensate Overflow Protection

The microprocessor control board incorporates an impedance sensing liquid sensor at the top of the drain pan. Upon a continuous 30-second sensing of the condensate, compressor operation is suspended (see Fault Retry), and the condensate overflow lockout LED begins flashing.

Shutdown Mode

A 24VAC common signal to the “shutdown” input on the control board puts the unit into shutdown mode. Compressor, hot water pump and fan operation are suspended.

Safety Controls

The microprocessor control receives separate signals for a high pressure switch for safety, a low pressure switch to prevent loss of charge damage, and a low suction temperature thermistor for freeze sensing. Upon a continuous 30-second measurement of the fault (immediate for high pressure), compressor operation is suspended, the appropriate lockout LED begins flashing. (Refer to the "Fault Retry" section below.)

Testing

The microprocessor control allows service personnel to shorten most timing delays for faster diagnostics. (Refer to the Field Selection DIP switch SW2-1 in the Microprocessor Control section.)

Fault Retry

All faults (except for low RPM faults with the variable speed ECM fan motor) are retried twice before finally locking the unit out. An output signal is made available for a fault LED at the thermostat. The “fault retry” feature is designed to prevent nuisance service calls.

Diagnostics

The microprocessor control board allows all inputs and outputs to be displayed on the LEDs for fast and simple control board diagnosis. (Refer to the Field Selection DIP Switch SW2-1 in the Microprocessor Control section.)

Resistance Heat Control (208-230 Units)

The electric heat control module contains the appropriate high-voltage control relays. Control signals energize the relays in the proper sequence, and the LED display board indicates which stages are energized.

Hot Water High Limit (Domestic Hot Water Option)

This mode occurs when the hot water input temperature is at or above 130°F for 30 continuous seconds. The HWG limit status LED on the unit illuminates and the hot water pump de-energizes. Hot water pump operations resume on the next compressor cycle or after 15 minutes of continuous compressor operation during the current thermostat demand cycle.

Hot Water Justification

Since compressor hot gas temperature is dependant on loop temperature in cooling mode, loop temperatures may be too low to allow proper heating of water. The control will monitor water and refrigerant temperatures to determine if conditions are satisfactory for heating water. The HWG limit status LED on the unit illuminates when conditions are not favorable for heating water.

Heating Operation Heat, 1st Stage (Y1)

The fan motor is started on low speed immediately (PSC ON), the loop pump is energized 5 seconds after the “Y1” input is received, and the compressor is energized on low capacity 10 seconds after the “Y1” input. The fan is switched to medium speed 15 seconds after “Y1” input (ECM only). The hot water pump is cycled 30 seconds after the "Y1" input.

Heat, 2nd Stage (Y1,Y2) Single-Speed Units

The hot water pump is de-energized, which directs all heat to satisfying the thermostat, and the fan changes to high speed 15 seconds after the "Y2" input (ECM only).

Heat, 2nd Stage (Y1,Y2) Dual Capacity Units

The second stage compressor will be activated 5 seconds after receiving a “Y2” input as long as the minimum first stage compressor run time of 1 minute has expired. The ECM blower changes from medium to high speed 15 seconds after the “Y2” input.

Microprocessor Control System cont.

Heat, 3rd Stage (Y1,Y2,W) - Single-Speed Units

The first stage of resistance heat is energized 10 seconds after “W” input, and with continuous 3rd stage demand, the second stage of resistance heat will engage after 5 minutes.

Heat, 3rd Stage (Y1,Y2,W) - Dual Capacity Units

The hot water pump is de-energized which directs all heat to satisfy the thermostat. The 1st stage of resistance heat is energized 10 seconds after “W” input, and with continuous 3rd stage demand, the second stage of resistance heat will engage after 5 minutes.

Emergency Heat (W only)

The fan is started on high speed, and the first stage of resistance heat is energized 10 seconds after the "W" input. Continuing demand will engage the second stage of resistance heat after 2 minutes.

Cooling Operation

In all cooling operations, the reversing valve directly tracks the “O” input. Thus, anytime the “O” input is present, he reversing valve will be energized.

Cool, 1st Stage (Y1,O)

The blower motor and hot water pump are started immediately, the loop pump(s) is energized 5 seconds after the “Y1” input is received. The compressor will be energized (on low capacity for Dual Capacity units) 10 seconds after the “Y1” input. The ECM blower will shift from low to medium speed 15 seconds after the “Y1” input (85% of medium speed if in dehumidification mode).

Cool, 2nd Stage (Y1, Y2, O) - Single Speed Units

The fan changes to high speed (85% of high speed if in dehumidification mode) 15 seconds after the “Y2” input (ECM only).

Cool, 2nd Stage (Y1, Y2, O) - Dual Capacity Units

The second stage compressor will be activated 5 seconds after receiving a “Y2” input as long as the minimum first stage compressor run time of 1 minute has expired. The ECM blower changes to high speed 15 seconds after the “Y2” input. (85% of high speed if in dehumidification mode).

Fan (G only)

The fan starts on low speed. Regardless of fan input “G” from thermostat, the fan will remain on low speed for 30 seconds at the end of each heating, cooling or emergency heat cycle.
A DIP switch on the microprocessor control allows field selection of 15% reduced fan speeds for cooling in the dehumidification mode or medium and high fan speeds for cooling in the normal mode.
NOTE: Fan speed can change automatically only with a Variable Speed ECM Motor.

Variable Speed ECM Airflow Selection DIP Switches (SW1)

A 12-position DIP switch package on the microprocessor control allows the airflow levels to be set for low, medium and high speed. (Refer to the Variable Speed ECM Blower table in the Fan Performance Data - Variable Speed ECM section.)

Only three of the DIP switches can be in the “on” position. The first “on” switch (the lowest position number) determines the “low speed fan” setting. The second “on” switch determines the “medium speed fan” setting, and the third “on” switch determines the “high speed fan” setting, (see the Fan Performance Data - Variable Speed ECM section).

Lockout Conditions

During lockout mode, the appropriate unit and thermostat lockout LEDs will illuminate. The compressor, loop pump, hot water pump, and accessory outputs are de-energized. Unless the lockout is caused by an ECM low RPM fault, the fan will continue to run on low speed. If the thermostat calls for heating, emergency heat operation will occur.

All lockout modes can be reset at the thermostat after turning the unit off, then on, which restores normal operation but keeps the unit lockout LED illuminated. Interruption of power to the unit will reset a lockout without a waiting period and clear all lockout LEDs.

High Pressure

This lockout mode occurs when the normally closed safety switch is opened momentarily (set at 600 PSI).

Low Pressure

This lockout mode occurs when the normally closed low pressure switch is opened for 30 continuous seconds (set at 40 PSI).

Microprocessor Control System cont.

Freeze Sensing (Water Flow)

This lockout mode occurs when the freeze thermistor temperature is at or below the selected freeze sensing point (well 30°F or loop 15°F) for 30 continuous seconds.

Condensate Overflow

This lockout mode occurs when the condensate overflow level has been reached for 30 continuous seconds.

Fan RPM

The control board monitors fan RPM to sense operation. This lockout mode occurs if the fan RPM falls below the low RPM limit (100 RPM) for 30 continuous seconds.

Thermostat Displays

Fault Flash

When using a TA32W02 or TP32W03 thermostat and SW2-8 is in the pulsing “L” position, FaultFlash will enable a user to view the thermostat and count the fault indicator flashes to determine the lockout condition the unit is experiencing.

FaultFlash Thermostats

TA32W02 and TP32W03 Thermostats	
Thermostat Display Lockout Code	Lockout Description
2 Flashes	High Pressure Fault
3 Flashes	Low Pressure Fault
4 Flashes	Not Applicable
5 Flashes	Water Flow Fault
6 Flashes	Not Applicable
7 Flashes	Condensate Fault
8 Flashes	Voltage out of Range
9 Flashes	RPM Fault

Microprocessor Control System cont.

DIP Switch Settings

Prior to powering unit, ensure that all DIP switches on SW2 & SW3 are set properly according to the tables below.

FACTORY SETUP DIP SWITCHES (SW3)				
DIP SWITCH NUMBER		DESCRIPTION	OFF POSITION	ON POSITION
SW 3-	1	**Dual Capacity/Single-Speed** Configures the control for single-speed compressor operation or dual capacity operation.	Dual Capacity Operation	Single-Speed Operation
SW 3-	2	**Zoned/Finish on Second Stage** This switch allows the unit to down stage with the thermostat when off and finish with second stage when on. Finish on second stage reduces stage changing in reciprocating dual capacity compressors.	Normal - All Other Systems	Finish on 2nd - Unzoned Dual Capacity
SW 3-	3	**No RPM/RPM** Configures the control to monitor the RPM output of an Variable Speed ECM blower motor. When using IntelliZone, 5-speed ECM or a PSC fan motor, the control should be configured for “NO RPM” sensing.	PSC or 5-Speed ECM Fan/RPM Monitoring Disabled	Variable Speed ECM Fan/ RPM Monitoring Enabled
SW 3-	4	**Electric heat and ECM** Allows backward compatibility with older models. In the Off position this switch allows older electric heat board (17P501A01) and older ECM (square end) compatibility. On is for all newer EH board (17P514A01) and ECM (round end).	Old EH & Old ECM	Normal
SW 3-	5	On dual capacity units this switch allows stage change: on the fly when off, and 1 minute delay when on. A delay is required on all reciprocating dual capacity units.	Dual-Capacity Models	N/A

FIELD SELECTION DIP SWITCHES (SW2)				
DIP SWITCH NUMBER		DESCRIPTION	OFF POSITION	ON POSITION
SW 2-	1	**Service Test Mode** On the control, allows field selection of “NORMAL” or “TEST” operational modes. Test mode accelerates most timing functions 16 times to allow faster troubleshooting. Test mode also allows viewing the “CURRENT” status of the fault inputs on the LED display.	Test Mode	Normal Speed Operation
SW 2-	2	**Freeze Sensing Setting** Allows field selection of freeze thermistor fault sensing temperatures for well water (30°F) or antifreeze-protected (15°F) earth loops.	Loop Water Freeze Protection 15° F	Well Water Freeze Protection 30° F
SW 2-	3	**Accessory Relay** Allows field selection of the accessory relay to operate with the compressor or fan.	Acc Relay Tracks Fan	Acc Relay Tracks Compressor
SW 2-	4	**Fan Speed Control** Allows field selection of reduced fan speed (85% of selected medium and high speed – Variable Speed ECM only) for cooling in the dehumidification mode.	Dehumidification Fan Speeds	Normal Fan Speeds
SW 2-	5	**Auxiliary Off** Disables 3rd-stage Heating. Full emergency heat would still be available if needed.	Disable Heating Stage 3	Enable Heating Stage 3
SW 2-	6	**Diagnostics Inputs** Allows viewing the inputs from the thermostat to the control board such as Y1, Y2, O, G, W, SL1-In on the LED display.	Diagnostic Inputs Viewed at LEDs	Normal Display Viewed at LEDs
SW 2-	7	**Diagnostics Outputs** Allows viewing the outputs from the control board such as compressor, reversing valve, blower, hot water pump, and loop pump on the LED display.	Diagnostic Outputs Viewed at LEDs	Normal Display Viewed at LEDs
SW 2-	8	**Thermostat Selection** Configures the control for a pulsed lockout signal (FaultFlash thermostats) or continuous 5 VAC lockout signal.	Pulsed “L” signal	Continuous “L” signal

Operation Logic

OPERATION LOGIC	HEATING				COOLING		FAN ON	SL1 - IN ON
	STG1	STG2	STG3	EMERG	STG1	STG2		
SINGLE SPEED UNITS								
Compressor	On	On	On	Off	On	On	-	-
ECM Normal	Med	High	High	High	Med	High	Low	-
ECM Dehumidify	Med	High	High	High	85% Med	85% High	Low	-
Rev Valve	Off	Off	Off	Off	On	On	-	-
Loop Pump	On	On	On	Off	On	On	-	On
HWG Pump	On	Off	Off	Off	On	On	-	-
Aux Heater	Off	Off	Staged	Staged	Off	Off	-	-
Secondary 1- Out	On	On	On	Off	On	On	-	-
Emerg LED	Off	Off	Off	On	Off	Off	Off	-
T-Stat Signal	Y1	Y1, Y2	Y1, Y2, W	W	Y1, O	Y1, Y2, O	G	-
DUAL CAPACITY UNITS								
Compressor-Lo	On	Off	Off	Off	On	Off	-	-
Compressor-Hi	Off	On	On	Off	Off	On	-	-
ECM Normal	Med	High	High	High	Med	High	Low	-
ECM Dehumidify	Med	High	High	High	85% Med	85% High	Low	-
Rev Valve	Off	Off	Off	Off	On	On	-	-
Loop Pumps	On	On	On	Off	On	On	-	On
HWG Pump	On	On	Off	Off	On	On	-	-
Aux Heater	Off	Off	Staged	Staged	Off	Off	-	-
Secondary 1- Out	On	On	On	Off	On	On	-	-
Secondary 2- Out	Off	On	On	Off	Off	On	-	-
Emerg LED	Off	Off	Off	On	Off	Off	-	-
T-Stat Signal	Y1	Y1, Y2	Y1, Y2, W	W	Y1, O	Y1, Y2, O	G	-

Reference Calculations

Heating Calculations:	Cooling Calculations:
$LWT = EWT - \frac{HE}{gpm \times 500}$	$LWT = EWT + \frac{HR}{gpm \times 500}$
$LAT = EAT + \frac{HC}{cfm \times 1.08}$	$LAT\ (DB) = EAT\ (DB) - \frac{SC}{cfm \times 1.08}$
$TH = HC + HW$	$LC = TC - SC$
	$S/T = \frac{SC}{TC}$

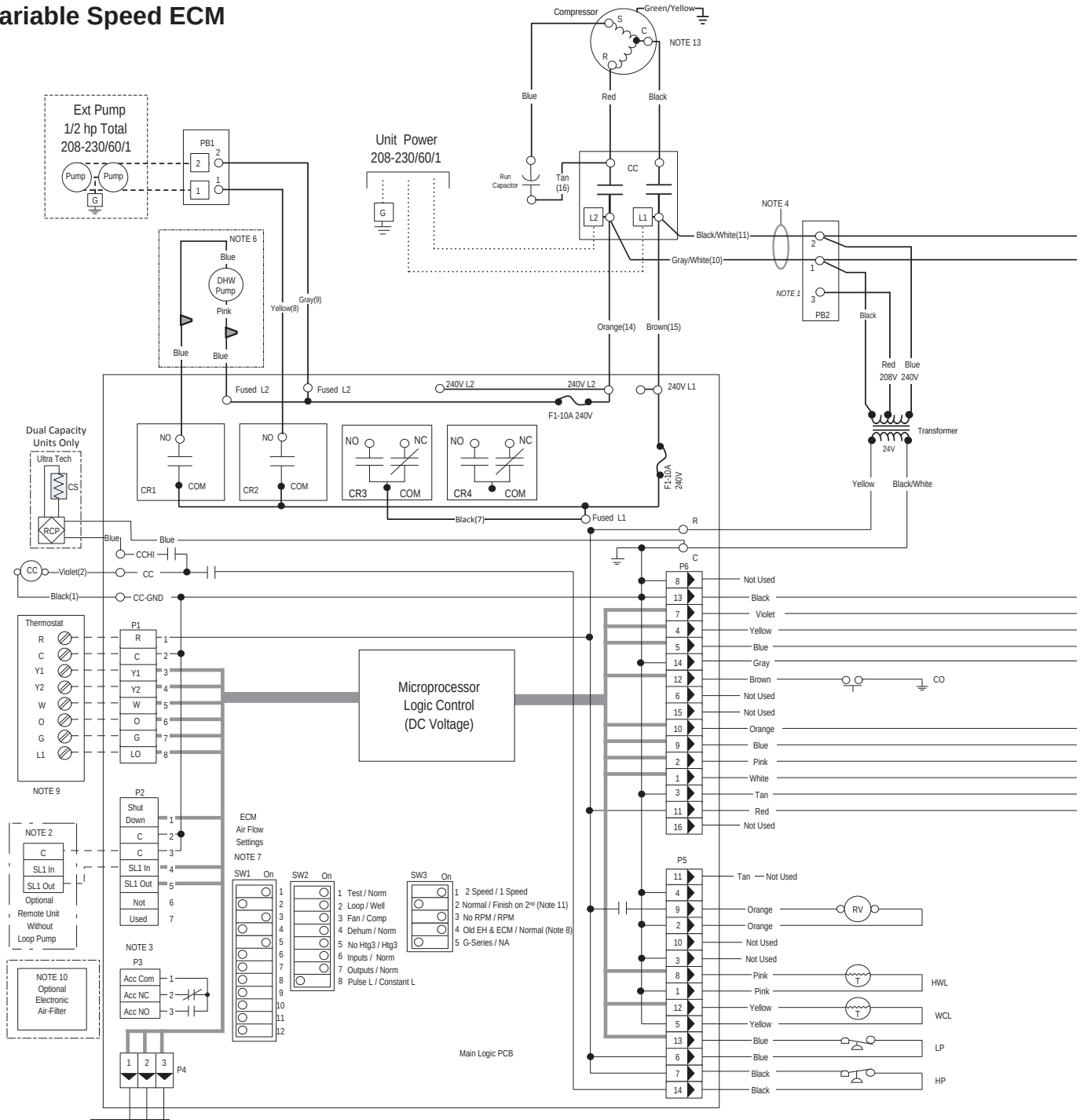
Legend

Abbreviations and Definitions

cfm = airflow, cubic feet/minute
EWT = entering water temperature, Fahrenheit
gpm = water flow in gallons/minute
WPD = water pressure drop, psi and feet of water
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
HC = air heating capacity, MBtu/h
TC = total cooling capacity, MBtu/h
SC = sensible cooling capacity, MBtu/h
kW = total power unit input, kilowatts
HR = total heat of rejection, MBtu/h
HE = total heat of extraction, MBtu/h
HWC = hot water generator capacity, MBtu/h
EER = Energy Efficient Ratio
= Btu output/Watt input
COP = Coefficient of Performance
= Btu output/Btu input
LWT = leaving water temperature, °F
LAT = leaving air temperature, °F
TH = total heating capacity, MBtu/h
LC = latent cooling capacity, MBtu/h
S/T = sensible to total cooling ratio

Wiring Schematics

Variable Speed ECM



LED	Normal Display Mode	Diagnostic Modes			
		Current Fault Status	Inputs	Outputs	Outputs2
	Field Selection Dips - #1 On, #6 On, #7 On	#1 Off, #6 On, #7 On	#6 Off, #7 On	#6 On, #7 Off	#6 Off, #7 Off
Drain	Drain pan overflow Lockout	Drain pan overflow	Y1	Compressor Lo	Blower Lo
Water Flow	WCL thermistor (loop<15°F,well<30°F) Lockout	WCL thermistor (loop<15°F,well<30°F)	Y2	Compressor Hi	Blower Med
High Press	High Pressure	High Pressure	O	RV	Blower Hi
Low Press / CA	Low Pressure / Comfort Alert	Low Pressure / Comfort Alert	G	FAN	Aux Heat #1
Air Flow / Fan	ECM2 RPM < 100 rpm Lockout	ECM2 RPM < 100 rpm	W	DHW Pump	Aux Heat #2
Status	Microprocessor malfunction*	Not Used	SL1	Loop Pump 1	AuxHeat #3
DHW Limit	HWL thermistor > 130°F	HWL thermistor > 130°F	SL2	Loop Pump 2	Aux Heat #4
DHW off	DHW pump switch off	DHW pump switch off	--	--	--

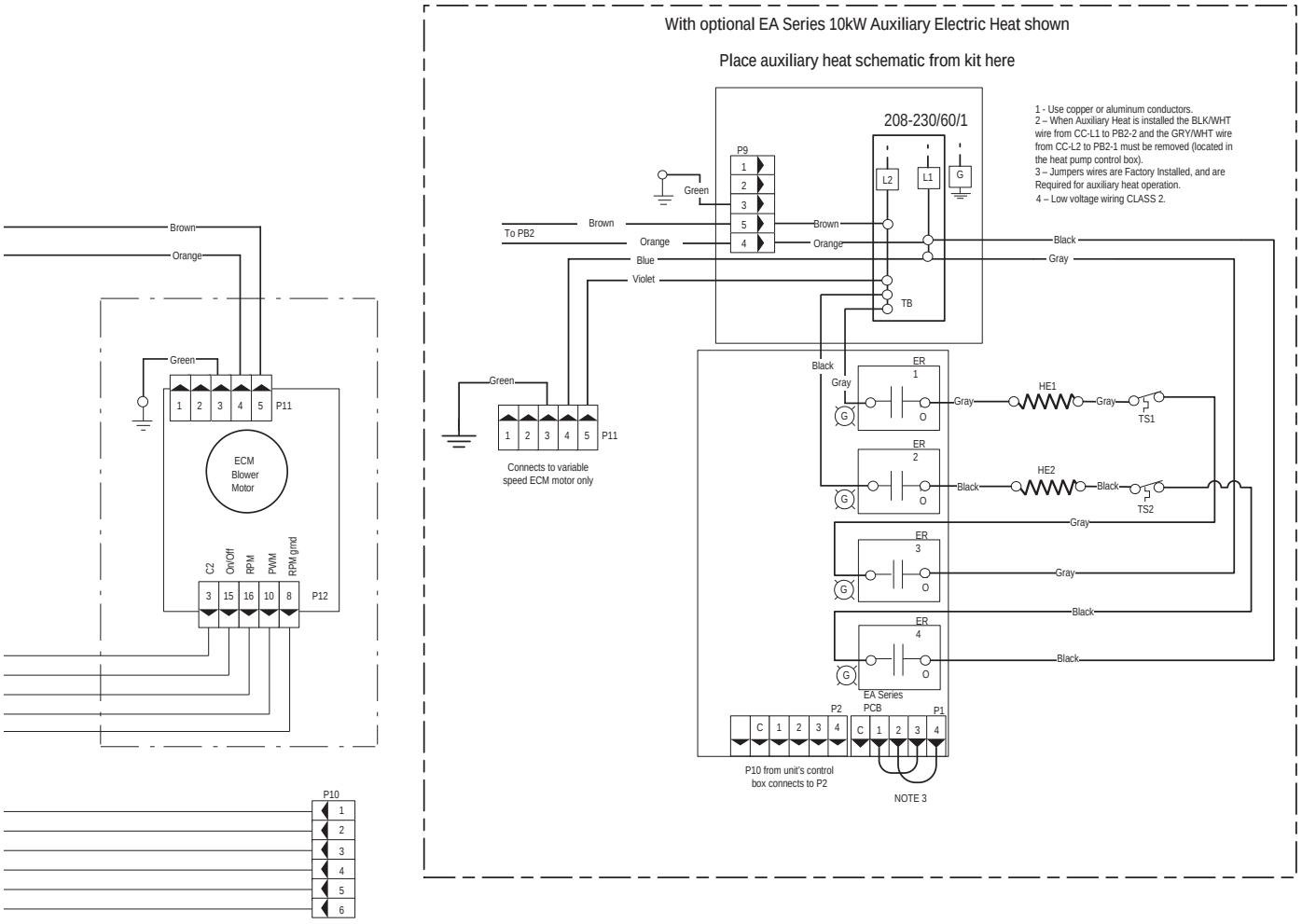
*Green LED not flashing

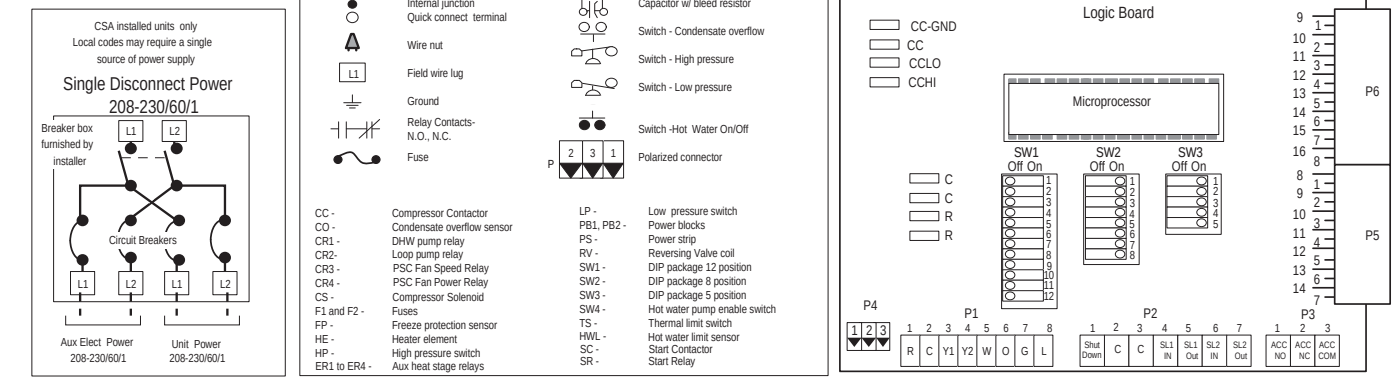
Status LED PCB
SW4
R R R R R G Y R

Notes:
1 – Switch Blue and Red wires for 208V operation.
2 - Connection of remote unit that does not have a loop pump for slave operation.
3 - 24V Accessory relay (see SW2 - 3 for description of operation)
4 - The blk/wh and gray/wh wires are removed when Aux Heat is installed.
5 – Use manufacturer's part number 19P592-01 (jumper bar assembly) when single source power is required.
6 - DHW pump only in models with hot water generation option.
7 - Air Flow Configuration Example: SW1 configured for dip 1 as low, dip 3 as medium, and dip 5 as high Speed ECM2 fan
8 – SW3-4 should be in the OFF position when using ECM motor and 17P501A01 electric heat board and should be ON when using ECM2 with 17P514A01 electric heat board
9 – SW2-8 must be in the OFF position for pulsed "L" lockout signal and in the ON position for constant "L" lockout signal.
10 - When optional electronic air-filter is installed, power for the electronic air-filter is provided by P2-2 and 24 VAC.
11 – This Switch allows the unit to down stage with the t-stat when OFF and finish on second stage when ON.
12 – Low voltage wiring CLASS 2.
13 – Ground wire only on units with aluminum air coils.

Wiring Schematics cont.

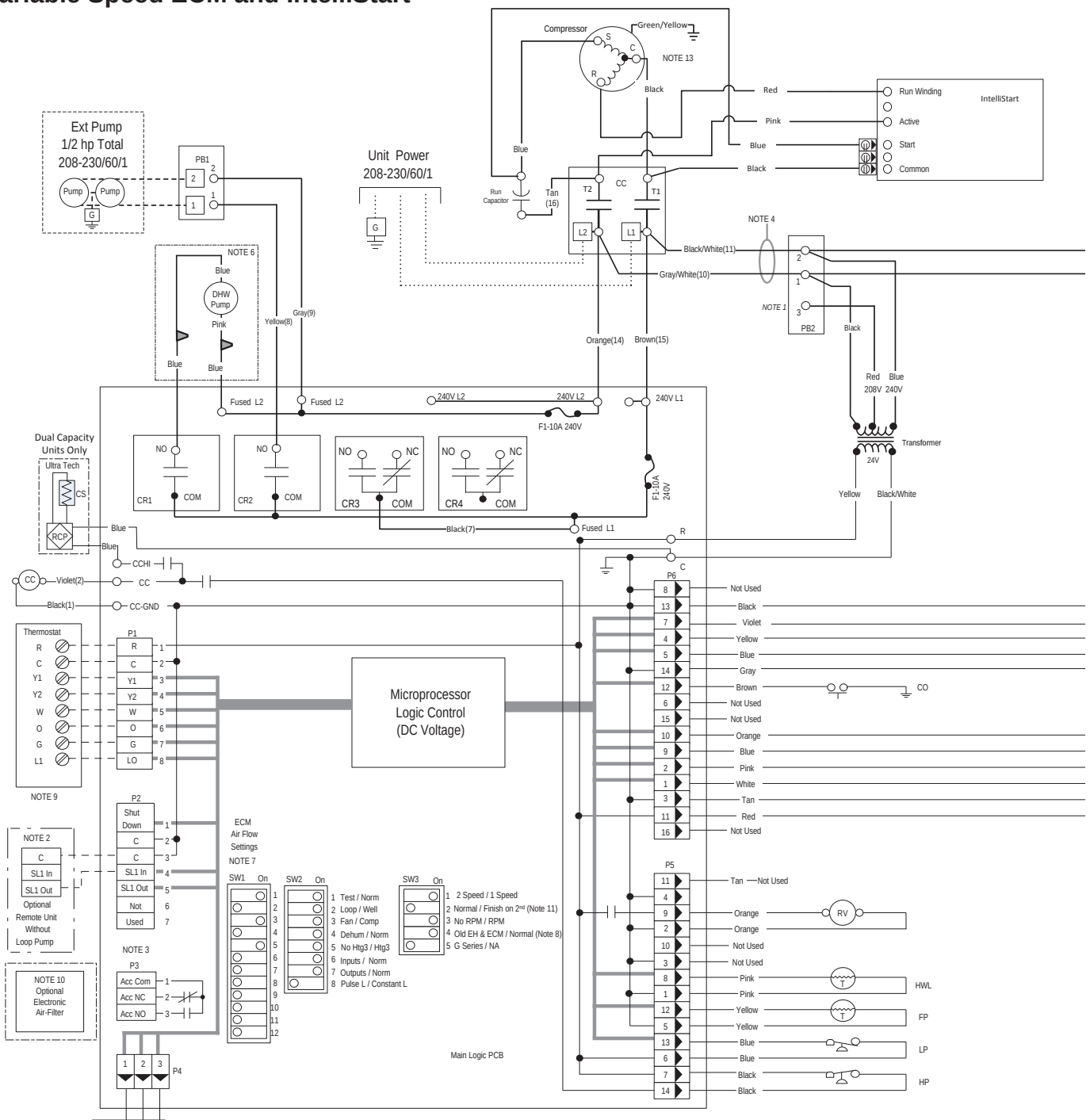
Variable Speed ECM





Wiring Schematics cont.

Variable Speed ECM and IntelliStart



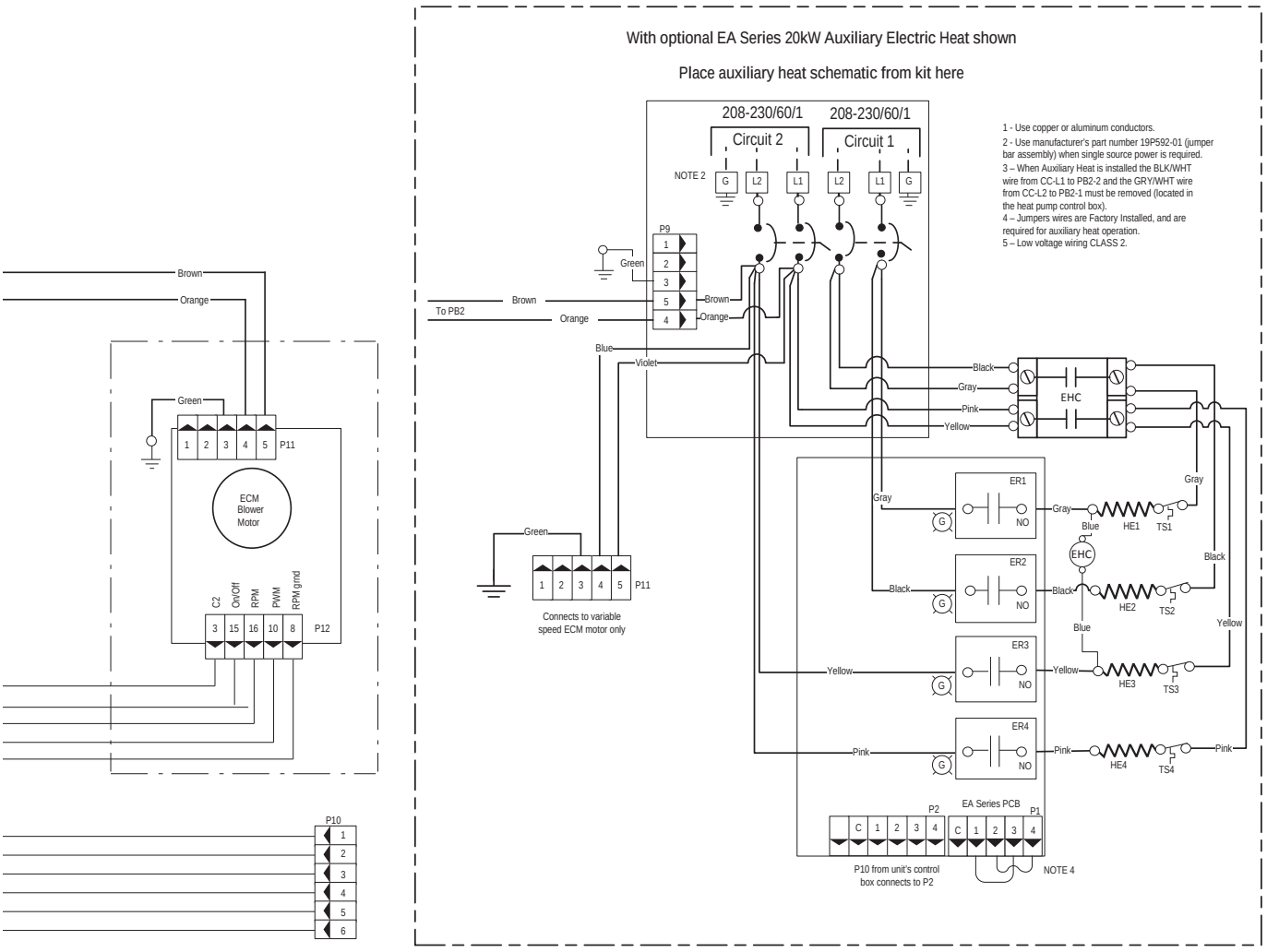
LED	Normal Display Mode	Diagnostic Modes			
		Current Fault Status	Inputs	Outputs	Outputs2
	Field Selection Dips - #1 On, #6 On, #7 On	#1 Off, #6 On, #7 On	#6 Off, #7 On	#6 On, #7 Off	#6 Off, #7 Off
Drain	Drain pan overflow Lockout	Drain pan overflow	Y1	Compressor Lo	Blower Lo
Water Flow	FP thermistor (loop<15°F,well<30°F) Lockout	FP thermistor (loop<15°F, well<30°F)	Y2	Compressor Hi	Blower Med
High Press	High Pressure	High Pressure	O	RV	Blower Hi
Low Press / CA	Low Pressure / Comfort Alert	Low Pressure / Comfort Alert	G	FAN	Aux Heat #1
Air Flow / Fan	ECM2 RPM < 100 rpm Lockout	ECM2 RPM < 100 rpm	W	DHW Pump	Aux Heat #2
Status	Microprocessor malfunction*	Not Used	SL1	Loop Pump 1	AuxHeat #3
DHW Limit	HWL thermistor > 130°F	HWL thermistor > 130°F	SL2	Loop Pump 2	Aux Heat #4
DHW off	DHW pump switch off	DHW pump switch off	--	--	--

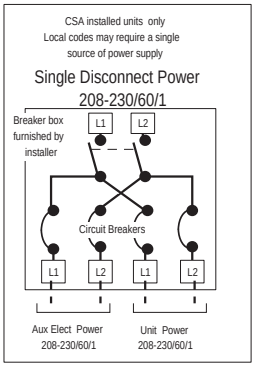
*Green LED not flashing

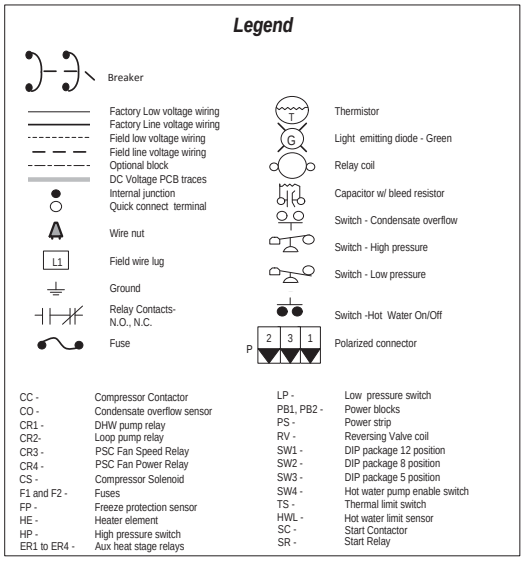
Notes:
1 – Switch Blue and Red wires for 208V operation.
2 - Connection of remote unit that does not have a loop pump for slave operation.
3 - 24V Accessory relay (see SW2 - 3 for description of operation)
4 - The blk/wh and gray/wh wires are removed when Aux Heat is installed.
5 – Use manufacturer's part number 19P592-01 (jumper bar assembly) when single source power is required.
6 - DHW pump only in models with hot water generation option.
7 - Air Flow Configuration Example: SW1 configured for dip 1 as low, dip 3 as medium, and dip 5 as high Speed ECM2 fan
8 – SW3-4 should be in the OFF position when using ECM motor and 17P501A01 electric heat board and should be ON when using ECM2 with 17P514A01 electric heat board
9 – SW2-8 must be in the OFF position for pulsed "L" lockout signal and in the ON position for constant "L" lockout signal.
10 - When optional electronic air-filter is installed, power for the electronic air-filter is provided by P2-2 and 24 VAC.
11 – This Switch allows the unit to down stage with the t-stat when OFF and finish on second stage when ON.
12 – Low voltage wiring CLASS 2.
13 – Ground wire only on units with aluminum air coils.

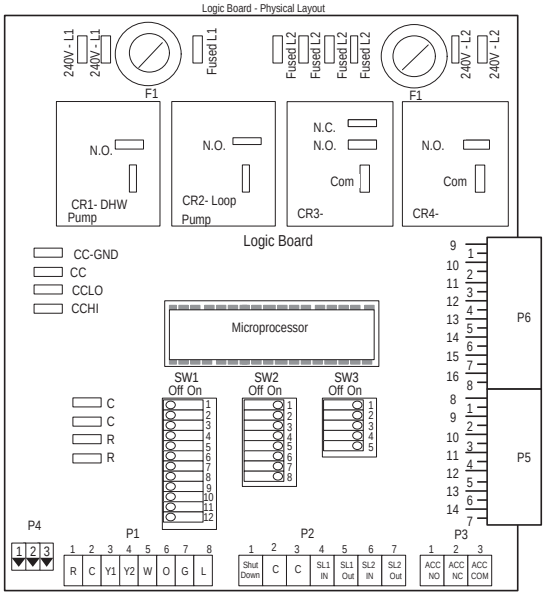
Wiring Schematics cont.

Variable Speed ECM and IntelliStart



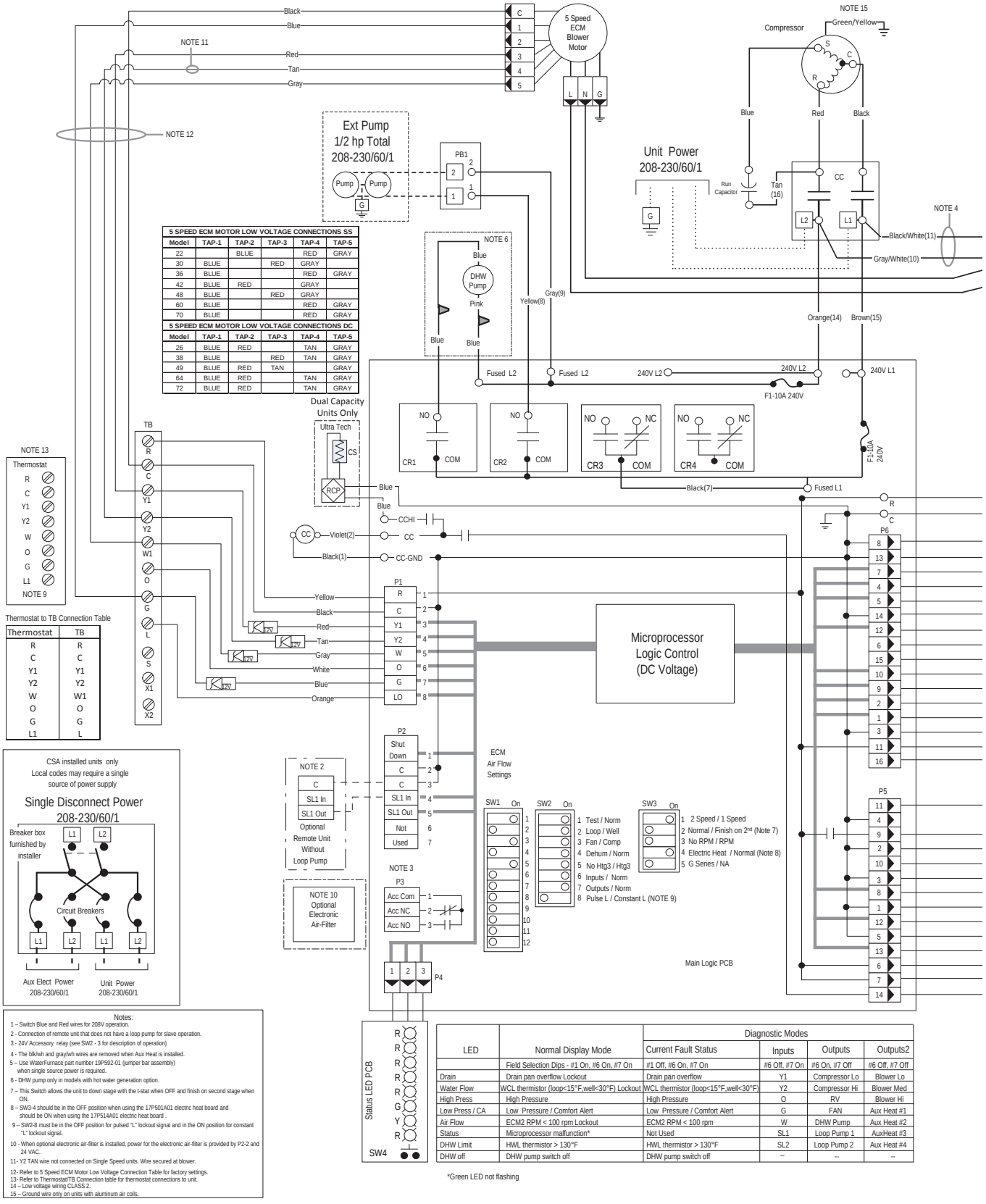






Wiring Schematics cont.

5-Speed ECM



5 SPEED ECM MOTOR LOW VOLTAGE CONNECTIONS SS					
Model	TAP-1	TAP-2	TAP-3	TAP-4	TAP-5
22		BLUE		RED	GRAY
30	BLUE		RED	GRAY	
36	BLUE			RED	GRAY
42	BLUE	RED		GRAY	
48	BLUE		RED	GRAY	
60	BLUE			RED	GRAY
70	BLUE			RED	GRAY
5 SPEED ECM MOTOR LOW VOLTAGE CONNECTIONS DC					
Model	**TAP-1**	**TAP-2**	**TAP-3**	**TAP-4**	**TAP-5**
26	BLUE	RED		TAN	GRAY
38	BLUE		RED	TAN	GRAY
49	BLUE	RED	TAN		GRAY
64	BLUE	RED		TAN	GRAY
72	BLUE	RED		TAN	GRAY

Thermostat to TB Connection Table

Thermostat	TB
R	R
C	C
Y1	Y1
Y2	Y2
W	W1
O	O
G	G
L1	L

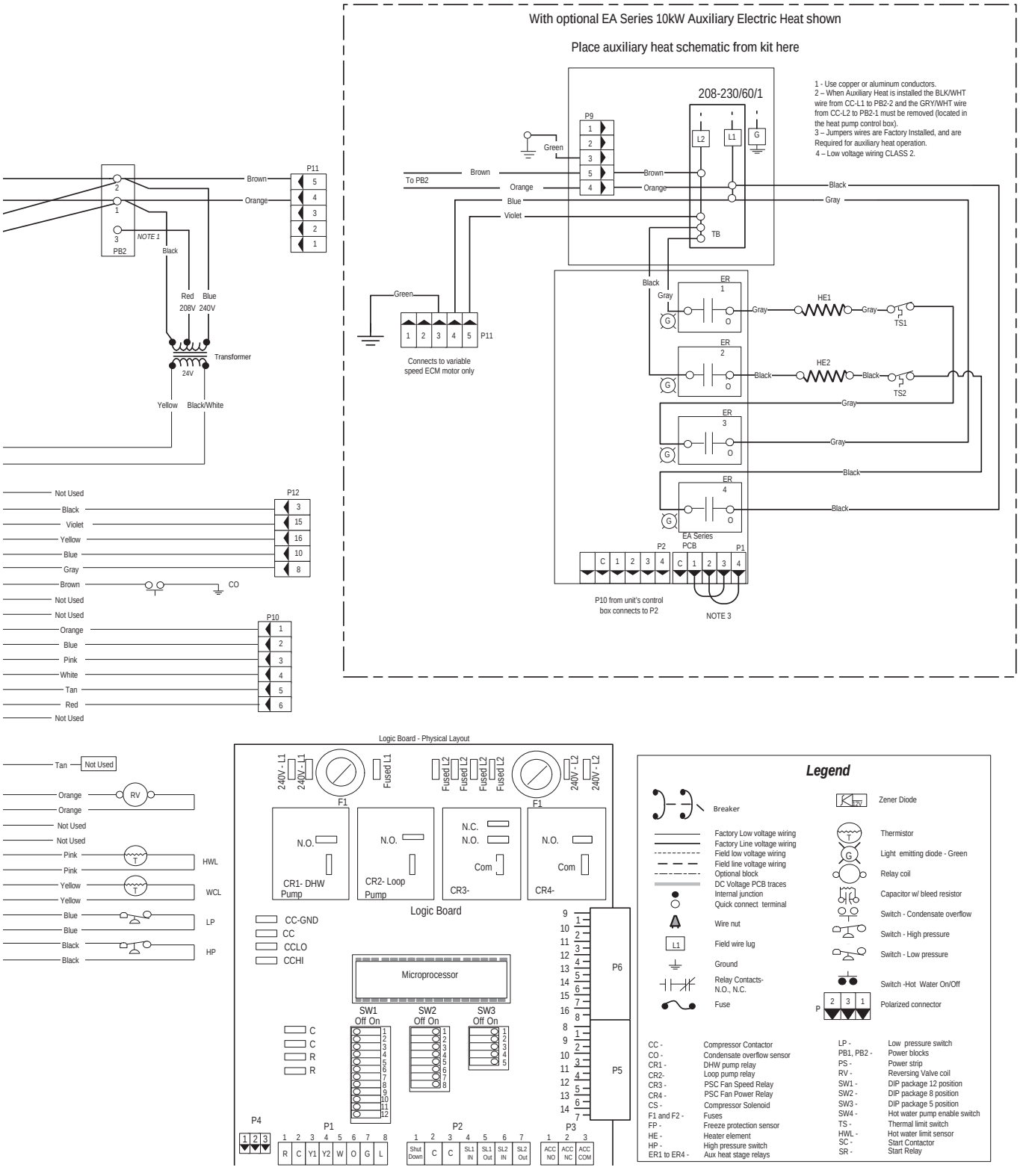
LED	Normal Display Mode	Diagnostic Modes			
		Current Fault Status	Inputs	Outputs	Outputs2
	Field Selection Dips - #1 On, #6 On, #7 On	#1 Off, #6 On, #7 On	#6 Off, #7 On	#6 On, #7 Off	#6 Off, #7 Off
Drain	Drain pan overflow Lockout	Drain pan overflow	Y1	Compressor Lo	Blower Lo
Water Flow	WCL thermistor (loop<15°F,well<30°F) Lockout	WCL thermistor (loop<15°F,well<30°F)	Y2	Compressor Hi	Blower Med
High Press	High Pressure	High Pressure	O	RV	Blower Hi
Low Press / CA	Low Pressure / Comfort Alert	Low Pressure / Comfort Alert	G	FAN	Aux Heat #1
Air Flow	ECM2 RPM < 100 rpm Lockout	ECM2 RPM < 100 rpm	W	DHW Pump	Aux Heat #2
Status	Microprocessor malfunction*	Not Used	SL1	Loop Pump 1	AuxHeat #3
DHW Limit	HWL thermistor > 130°F	HWL thermistor > 130°F	SL2	Loop Pump 2	Aux Heat #4
DHW off	DHW pump switch off	DHW pump switch off	--	--	--

*Green LED not flashing

Notes:
1 – Switch Blue and Red wires for 208V operation.
2 - Connection of remote unit that does not have a loop pump for slave operation.
3 - 24V Accessory relay (see SW2 - 3 for description of operation)
4 - The blk/wh and gray/wh wires are removed when Aux Heat is installed.
5 – Use WaterFurnace part number 19P592-01 (jumper bar assembly) when single source power is required.
6 - DHW pump only in models with hot water generation option.
7 – This Switch allows the unit to down stage with the t-stat when OFF and finish on second stage when ON.
8 – SW3-4 should be in the OFF position when using the 17P501A01 electric heat board and should be ON when using the 17P514A01 electric heat board .
9 – SW2-8 must be in the OFF position for pulsed "L" lockout signal and in the ON position for constant "L" lockout signal.
10 - When optional electronic air-filter is installed, power for the electronic air-filter is provided by P2-2 and 24 VAC.
11- Y2 TAN wire not connected on Single Speed units. Wire secured at blower.
12- Refer to 5 Speed ECM Motor Low Voltage Connection Table for factory settings.
13- Refer to Thermostat/TB Connection table for thermostat connections to unit.
14 – Low voltage wiring CLASS 2.
15 – Ground wire only on units with aluminum air coils.

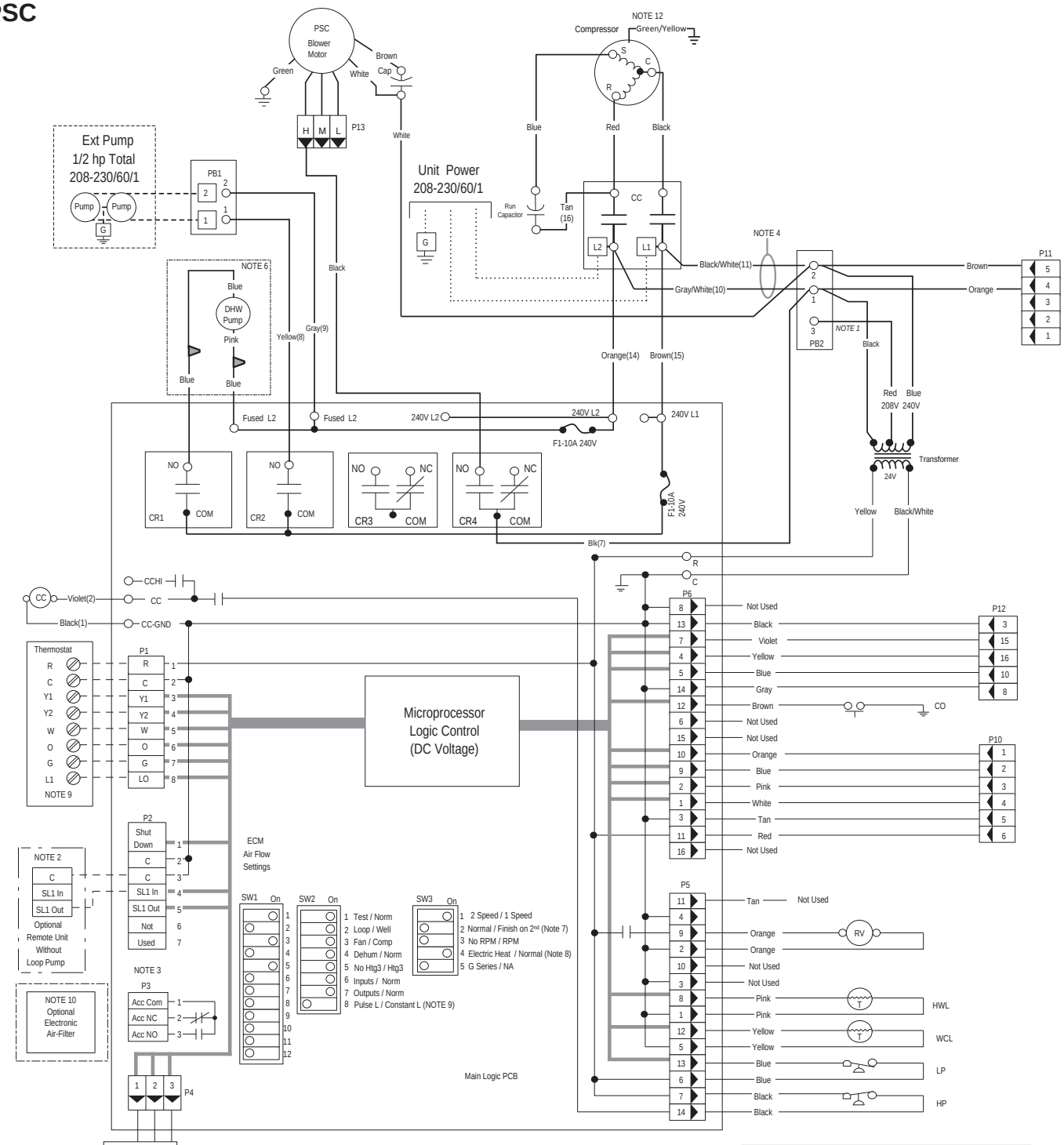
Wiring Schematics cont.

5-Speed ECM



Wiring Schematics cont.

PSC



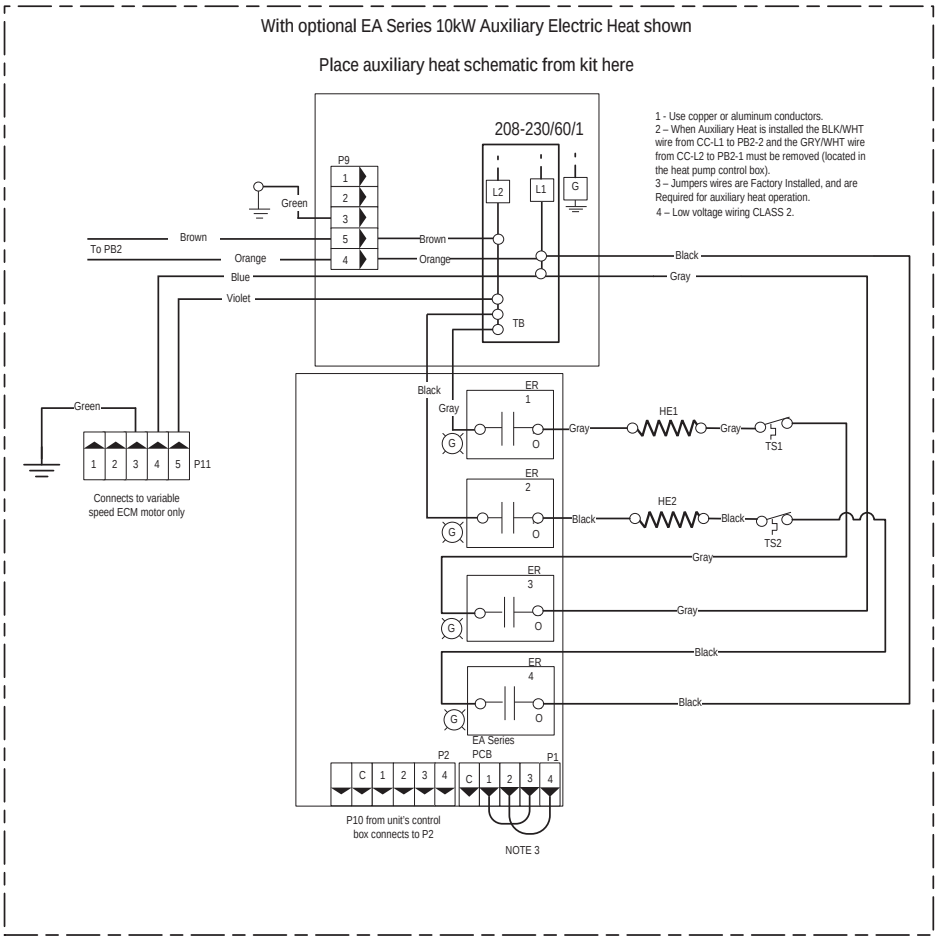
LED	Normal Display Mode	Diagnostic Modes			
		Current Fault Status	Inputs	Outputs	Outputs2
	Field Selection Dips - #1 On, #6 On, #7 On	#1 Off, #6 On, #7 On	#6 Off, #7 On	#6 On, #7 Off	#6 Off, #7 Off
Drain	Drain pan overflow Lockout	Drain pan overflow	Y1	Compressor Lo	Blower Lo
Water Flow	WCL thermistor (loop<15°F,well<30°F) Lockout	WCL thermistor (loop<15°F,well<30°F)	Y2	Compressor Hi	Blower Med
High Press	High Pressure	High Pressure	O	RV	Blower Hi
Low Press / CA	Low Pressure / Comfort Alert	Low Pressure / Comfort Alert	G	FAN	Aux Heat #1
Air Flow	ECM2 RPM < 100 rpm Lockout	ECM2 RPM < 100 rpm	W	DHW Pump	Aux Heat #2
Status	Microprocessor malfunction*	Not Used	SL1	Loop Pump 1	AuxHeat #3
DHW Limit	HWL thermistor > 130°F	HWL thermistor > 130°F	SL2	Loop Pump 2	Aux Heat #4
DHW off	DHW pump switch off	DHW pump switch off	--	--	--

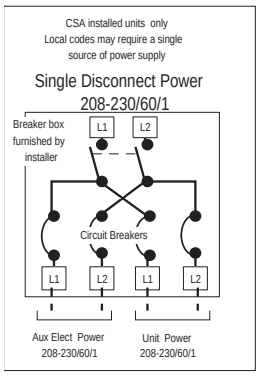
*Green LED not flashing

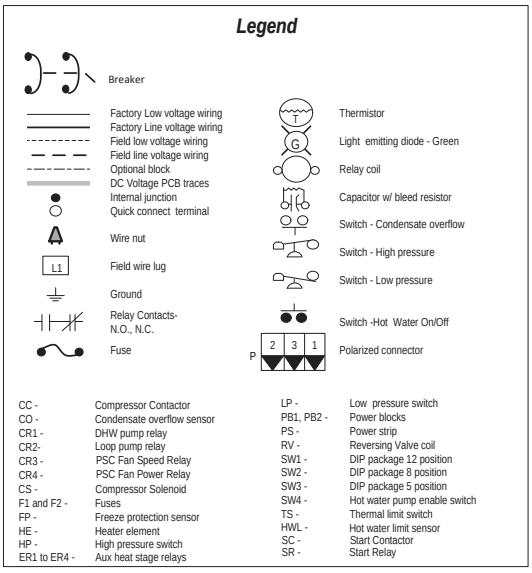
Notes:
1 – Switch Blue and Red wires for 208V operation.
2 - Connection of remote unit that does not have a loop pump for slave operation.
3 - 24V Accessory relay (see SW2 - 3 for description of operation)
4 - The blk/wh and gray/wh wires are removed when Aux Heat is installed.
5 – Use manufacturer part number 19P592-01 (jumper bar assembly) when single source power is required.
6 - DHW pump only in models with hot water generation option.
7 – This Switch allows the unit to down stage with the t-stat when OFF and finish on second stage when ON.
8 – SW3-4 should be in the OFF position when using the 17P501A01 electric heat board and should be ON when using the 17P514A01 electric heat board .
9 – SW2-8 must be in the OFF position for pulsed "L" lockout signal and in the ON position for constant "L" lockout signal.
10 - When optional electronic air-filter is installed, power for the electronic air-filter is provided by P2-2 and 24 VAC.
11 – Low voltage wiring CLASS 2.
12 – Ground wire only on units with aluminum air coils.

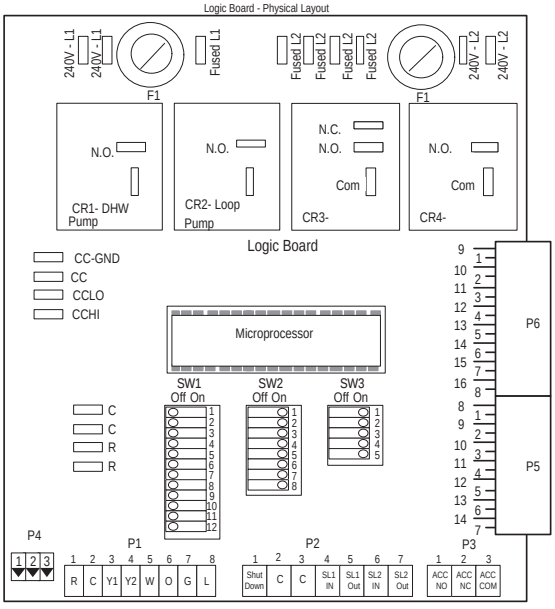
Wiring Schematics cont.

PSC cont.









Unit Startup

Before Powering Unit, Check the Following:

NOTE: Remove and discard the compressor hold down shipping bolt located at the front of the compressor mounting bracket.

- **Black/white and gray/white wires in unit control box have been removed if auxiliary heat has been installed.**
- **Dip switches are set correctly.**
- **Transformer switched to 208V if applicable.**
- **High voltage is correct and matches nameplate.**
- Fuses, breakers and wire size correct.
- Low voltage wiring complete.
- Piping completed and water system cleaned and flushed.
- Air is purged from closed loop system.
- Isolation valves are open, water control valves or loop pumps wired.
- Condensate line open and correctly pitched.
-
- Hot water generator pump switch is “OFF” unless piping is completed and air has been purged.
- Blower rotates freely.
- Blower speed is correct.
- Air filter/cleaner is clean and in position.
- Service/access panels are in place.
- Return air temperature is between 50-80°F heating and 60-95°F cooling.
- Check air coil cleanliness to ensure optimum performance. Clean as needed according to maintenance guidelines. To obtain maximum performance the air coil should be cleaned before startup. A 10% solution of dishwasher detergent and water is recommended for both sides of coil, a thorough water rinse should follow.

Startup Steps

NOTE: Complete the Equipment Start-Up/Commissioning Check Sheet during this procedure. Refer to thermostat operating instructions and complete the startup procedure. Verify that the compressor shipping bolt has been removed.

1. Initiate a control signal to energize the blower motor. Check blower operation through the AID Tool.
2. Initiate a control signal to place the unit in the cooling mode. Cooling setpoint must be set below room temperature.
3. First stage cooling will energize after a time delay.
4. Be sure that the compressor and water control valve or loop pump(s) are activated.
5. Verify that the water flow rate is correct by measuring the pressure drop through the heat exchanger using the P/T plugs and comparing to unit performance data in catalog.
6. Check the temperature of both the supply and discharge water (see the Unit Operating Parameters tables).
7. Check for an air temperature drop of 15°F to 25°F across the air coil, depending on the fan speed and entering water temperature.
8. Decrease the cooling set point several degrees and verify high-speed blower operation.
9. Adjust the cooling setpoint above the room temperature and verify that the compressor and water valve or loop pumps deactivate.
10. Initiate a control signal to place the unit in the heating mode. Heating set point must be set above room temperature.
11. First stage heating will energize after a time delay.
12. Check the temperature of both the supply and discharge water (see the Unit Operating Parameters tables).
13. Check for an air temperature rise of 12°F to 35°F across the air coil, depending on the fan speed and entering water temperature.
14. If auxiliary electric heaters are installed, increase the heating setpoint until the electric heat banks are sequenced on. All stages of the auxiliary heater should be sequenced on when the thermostat is in the Emergency Heat mode. Check amperage of each element.
15. Adjust the heating setpoint below room temperature and verify that the compressor and water valve or loop pumps deactivate.
16. During all testing, check for excessive vibration, noise or water leaks. Correct or repair as required.
17. Set system to desired normal operating mode and set temperature to maintain desired comfort level.
18. Instruct the owner/operator in the proper operation of the thermostat and system maintenance.

NOTE: Be certain to fill out and forward all warranty registration papers.

Operating Parameters

Single Speed Models

Entering Water Temp °F	Water Flow gpm/ton	Cooling -- No Hot Water Generation					
		Suction Pressure psig	Discharge Pressure psig	Superheat	Subcooling	Water Temp Rise °F	Air Temp Drop °F DB
30	1.5	115 - 125	150 - 170	20 - 35	10 - 17	17 - 22	17 - 23
	3.0	105 - 120	130 - 145	20 - 35	10 - 17	8 - 10	17 - 23
50	1.5	130 - 140	215 - 235	12 - 20	8 - 14	16 - 22	17 - 23
	3.0	128 - 138	190 - 210	12 - 20	8 - 14	8 - 12	17 - 23
70	1.5	138 - 148	280 - 310	10 - 16	10 - 16	15 - 21	17 - 23
	3.0	136 - 146	250 - 280	10 - 16	8 - 14	7 - 13	17 - 23
90	1.5	145 - 155	350 - 380	9 - 14	10 - 16	14 - 20	17 - 23
	3.0	143 - 153	320 - 350	9 - 14	8 - 14	6 - 10	17 - 23
110	1.5	145 - 155	420 - 450	9 - 14	10 - 16	14 - 20	17 - 23
	3.0	143 - 153	405 - 435	9 - 14	8 - 14	6 - 10	17 - 23

Entering Water Temp °F	Water Flow gpm/ton	Heating - No Hot Water Generation					
		Suction Pressure psig	Discharge Pressure psig	Superheat	Subcooling	Water Temp Drop °F	Air Temp Rise °F DB
30	1.5	73 - 85	270 - 305	8 - 14	3 - 10	6 - 10	15 - 21
	3.0	77 - 90	280 - 315	8 - 14	3 - 10	4 - 8	17 - 23
50	1.5	97 - 110	290 - 325	10 - 16	3 - 10	9 - 13	22 - 28
	3.0	102 - 115	300 - 335	10 - 16	3 - 10	7 - 11	24 - 30
70	1.5	130 - 145	320 - 355	13 - 19	3 - 10	10 - 14	30 - 36
	3.0	135 - 150	325 - 360	13 - 19	3 - 10	8 - 12	32 - 38
90	1.5	150 - 160	350 - 390	13 - 19	3 - 10	10 - 14	30 - 36
	3.0	155 - 165	365 - 405	13 - 19	3 - 10	8 - 12	32 - 38
110	1.5						
	3.0						

NOTE: Cooling performance based on entering air temperatures of 80° F DB, 67° F WB. 2/15/12
Heating performance based on entering air temperature of 70° F DB.

Operating Parameters cont.

Dual Capacity Models

First Stage Operation

Entering Water Temp °F	Water Flow gpm/ton	Cooling -- No Hot Water Generation					
		Suction Pressure psig	Discharge Pressure psig	Superheat	Subcooling	Water Temp Rise °F	Air Temp Drop °F DB
30	1.5	105 - 120	140 - 155	20 - 35	9 - 17	17 - 21	17 - 23
	3.0	100 - 115	115 - 130	20 - 35	9 - 17	8 - 12	17 - 23
50	1.5	125 - 140	205 - 225	12 - 20	8 - 14	17 - 21	17 - 23
	3.0	120 - 135	180 - 200	12 - 20	8 - 14	8 - 12	17 - 23
70	1.5	135 - 145	280 - 290	10 - 16	8 - 14	16 - 20	17 - 23
	3.0	133 - 143	250 - 260	10 - 16	8 - 14	9 - 13	17 - 23
90	1.5	142 - 152	345 - 355	8 - 12	8 - 14	14 - 20	17 - 23
	3.0	140 - 150	330 - 340	8 - 12	8 - 14	8 - 12	17 - 23
110	1.5	152 - 158	405 - 435	8 - 12	8 - 14	14 - 20	17 - 23
	3.0	148 - 153	390 - 420	8 - 12	8 - 14	8 - 12	17 - 23

Entering Water Temp °F	Water Flow gpm/ton	Heating -- No Hot Water Generation					
		Suction Pressure psig	Discharge Pressure psig	Superheat	Subcooling	Water Temp Drop °F	Air Temp Rise °F DB
30	1.5	76 - 84	270 - 285	8 - 12	3 - 10	5 - 9	12 - 16
	3.0	80 - 88	275 - 290	8 - 12	3 - 10	3 - 7	14 - 18
50	1.5	100 - 115	280 - 310	10 - 14	3 - 10	7 - 11	18 - 22
	3.0	105 - 120	290 - 315	10 - 14	3 - 10	5 - 9	20 - 24
70	1.5	135 - 150	310 - 325	12 - 16	3 - 10	8 - 12	24 - 28
	3.0	140 - 155	315 - 330	12 - 16	3 - 10	6 - 10	22 - 30
90	1.5	155 - 165	330 - 370	12 - 16	3 - 10	8 - 12	24 - 28
	3.0	160 - 170	340 - 380	12 - 16	3 - 10	6 - 10	22 - 30
110	1.5						
	3.0						

NOTE: Cooling performance based on entering air temperatures of 80° F DB, 67° F WB. 2/15/12
Heating performance based on entering air temperature of 70° F DB.

Second Stage Operation

Entering Water Temp °F	Water Flow gpm/ton	Cooling -- No Hot Water Generation					
		Suction Pressure psig	Discharge Pressure psig	Superheat	Subcooling	Water Temp Rise °F	Air Temp Drop °F DB
30	1.5	115 - 125	150 - 170	20 - 35	10 - 17	17 - 22	17 - 23
	3.0	105 - 120	130 - 145	20 - 35	10 - 17	8 - 10	17 - 23
50	1.5	130 - 140	215 - 235	12 - 20	8 - 14	16 - 22	17 - 23
	3.0	128 - 138	190 - 210	12 - 20	8 - 14	8 - 12	17 - 23
70	1.5	138 - 148	280 - 310	10 - 16	10 - 16	15 - 21	17 - 23
	3.0	136 - 146	250 - 280	10 - 16	8 - 14	7 - 13	17 - 23
90	1.5	145 - 155	350 - 380	9 - 14	10 - 16	14 - 20	17 - 23
	3.0	143 - 153	320 - 350	9 - 14	8 - 14	6 - 10	17 - 23
110	1.5	145 - 155	420 - 450	9 - 14	10 - 16	14 - 20	17 - 23
	3.0	143 - 153	405 - 435	9 - 14	8 - 14	6 - 10	17 - 23

Entering Water Temp °F	Water Flow gpm/ton	Heating -- No Hot Water Generation					
		Suction Pressure psig	Discharge Pressure psig	Superheat	Subcooling	Water Temp Drop °F	Air Temp Rise °F DB
30	1.5	73 - 85	270 - 305	8 - 14	3 - 10	6 - 10	15 - 21
	3.0	77 - 90	280 - 315	8 - 14	3 - 10	4 - 8	17 - 23
50	1.5	97 - 110	290 - 325	10 - 16	3 - 10	9 - 13	22 - 28
	3.0	102 - 115	300 - 335	10 - 16	3 - 10	7 - 11	24 - 30
70	1.5	130 - 145	320 - 355	13 - 19	3 - 10	10 - 14	30 - 36
	3.0	135 - 150	325 - 360	13 - 19	3 - 10	8 - 12	32 - 38
90	1.5	150 - 160	350 - 390	13 - 19	3 - 10	10 - 14	30 - 36
	3.0	155 - 165	365 - 405	13 - 19	3 - 10	8 - 12	32 - 38
110	1.5						
	3.0						

NOTE: Cooling performance based on entering air temperatures of 80° F DB, 67° F WB. 2/15/12
Heating performance based on entering air temperature of 70° F DB.

Pressure Drop

Single Speed

Model	gpm	Pressure Drop (psi)				
		30°F	50°F	70°F	90°F	110°F
012	1.5	0.3	0.3	0.3	0.3	0.3
	2.5	1.0	1.0	1.0	1.0	1.0
	3.5	1.7	1.7	1.7	1.6	1.6
	4.5	2.5	2.4	2.4	2.4	2.3
018	3.0	1.6	1.6	1.5	1.5	1.4
	4.0	2.9	2.9	2.8	2.8	2.7
	5.0	4.2	4.2	4.1	4.0	3.9
	6.0	6.0	5.8	5.7	5.6	5.5
022	3	0.9	0.9	0.8	0.7	0.7
	4.5	1.7	1.6	1.5	1.4	1.3
	6	2.8	2.7	2.5	2.3	2.2
	8	4.7	4.4	4.1	3.9	3.6
030	4	1.3	1.2	1.2	1.1	1.0
	6	2.7	2.5	2.4	2.2	2.2
	8	4.5	4.2	3.9	3.7	3.4
	10	6.8	6.3	5.4	5.4	5.0
036	5	1.0	1.0	0.9	0.8	0.8
	7	2.1	1.9	1.8	1.7	1.6
	9	3.6	3.3	3.0	2.8	2.6
	12	6.3	5.9	5.5	5.1	4.8
042	5	0.8	0.7	0.7	0.7	0.6
	8	2.1	2.1	1.9	1.8	1.7
	11	4.2	4.1	3.8	3.5	3.3
	14	7.6	6.7	6.3	5.8	5.4
048	6	1.1	1.0	1.0	0.9	0.8
	9	2.3	2.1	2.0	1.9	1.7
	12	3.9	3.7	3.4	3.2	3.0
	16	6.7	6.3	5.9	5.5	5.1
060	9	2.4	2.2	2.1	2.0	1.8
	12	3.9	3.6	3.4	3.2	2.9
	15	5.7	5.3	5.0	4.7	4.3
	20	9.5	8.9	8.3	7.8	7.2
070	12	3.0	2.8	2.6	2.4	2.2
	15	4.4	4.0	3.8	3.5	3.3
	18	6.0	5.5	5.1	4.8	4.4
	24	9.7	9.1	8.5	7.9	7.3

2/7/12

Dual Capacity

Model	gpm	Pressure Drop (psi)				
		30°F	50°F	70°F	90°F	110°F
026 full load	4	1.4	1.3	1.2	1.1	1.0
	6	2.8	2.6	2.4	2.3	2.1
	8	4.7	4.4	4.1	3.8	3.5
	10	7.0	6.6	6.2	5.8	5.3
026 part load	3	0.8	0.7	0.7	0.7	0.6
	5	2.0	1.8	1.7	1.6	1.5
	7	3.6	3.4	3.2	3.0	2.8
	9	5.8	5.5	5.1	4.8	4.4
038 full load	5	1.2	1.2	1.1	1.0	1.0
	7	2.2	2.1	1.9	1.8	1.7
	9	3.4	3.2	3.0	2.8	2.6
	11	4.9	4.6	4.3	4	3.7
038 part load	4	0.9	0.8	0.8	0.7	0.7
	6	1.7	1.6	1.5	1.4	1.3
	8	2.8	2.6	2.5	2.3	2.1
	10	4.2	3.9	3.7	3.4	3.2
049 full load	6	1.2	1.2	1.1	1.0	1.0
	9	2.4	2.2	2.1	2.0	1.8
	12	3.9	3.6	3.4	3.2	2.9
	15	5.7	5.3	5	4.7	4.3
049 part load	5	0.9	0.9	0.8	0.8	0.7
	8	2.0	1.8	1.7	1.6	1.5
	11	3.4	3.1	2.9	2.8	2.5
	14	5.0	4.7	4.4	4.1	3.8
064 full load	8	1.8	1.7	1.6	1.4	1.3
	12	3.8	3.5	3.3	3.0	2.8
	16	6.5	6.0	5.6	5.2	4.8
	20	9.7	9.1	8.5	8.0	7.4
064 part load	6	1.0	0.9	0.9	0.8	0.8
	10	2.6	2.5	2.3	2.1	2.0
	14	5.0	4.7	4.4	4.1	3.8
	18	8.1	7.6	7.1	6.6	6.1
072 full load	12	3.2	3.0	2.8	2.6	2.4
	15	4.5	4.2	4.0	3.7	3.4
	18	6.0	5.7	5.3	4.9	4.6
	21	7.8	7.3	6.8	6.4	5.9
072 part load	10	2.3	2.1	2.0	1.9	1.7
	13	3.6	3.3	3.0	2.8	2.6
	16	5.0	4.6	4.3	4.0	3.7
	19	6.5	6.2	5.8	5.4	5.0

1/26/12

Compressor Resistance

Model	Compressor Model No.	208-230/60/1	
		Run	Start
012	GK102KAA	3.35 - 3.85	2.80 - 3.22
018	GK151KAA	2.24 - 2.58	2.84 - 3.26
022	ZP16K5E-PFV	1.39 - 1.53	2.15 - 2.30
030	ZP21K5E-PFV	1.21 - 1.39	1.53 - 1.75
036	ZP25K5E-PFV	0.95 - 1.09	1.81 - 2.09
042	ZP31K5E-PFV	0.83 - 0.95	1.54 - 1.78
048	ZP38K5E-PFV	0.51 - 0.59	1.13 - 1.31
060	ZP51K5E-PFV	0.42 - 0.48	0.73 - 0.85
070	ZP57K5E-PFV	0.33 - 0.39	0.90 - 1.04
026	ZPS20K5E-PFV	1.21 - 1.39	1.52 - 1.75
038	ZPS30K5E-PFV	0.81 - 0.94	1.41 - 1.63
049	ZPS40K5E-PFV	0.48 - 0.55	1.72 - 1.99
064	ZPS51K5E-PFV	0.36 - 0.42	1.51 - 1.74
072	ZPS60K5E-PFV	0.31 - 0.36	1.72 - 1.98

2/7/12

Thermistor Resistance

Thermistor Temperature (°F)	Microprocessor Resistance (Ohms)
5	75757-70117
14	57392-53234
23	43865-40771
32	33809-31487
41	26269-24513
50	20570-19230
59	16226-15196
68	12889-12093
77	10310-9688
86	8300-7812
95	6723-6337
104	5480-5172
113	4490-4246
122	3700-3504
131	3067-2907
140	2554-2424
149	2149-2019

2/8/12

Refrigerant Circuit Guideline

Symptom	Head Pressure	Suction Pressure	Compressor Amp Draw	Superheat	Subcooling	Air Temp. Differential	Water Temp. Differential
Under Charged System (Possible Leak)	Low	Low	Low	High	Low	Low	Low
Over Charged System	High	High	High	Normal	High	Normal/Low	Normal
Low Air Flow Heating	High	High	High	High/Normal	Low	High	Low
Low Air Flow Cooling	Low	Low	Low	Low/Normal	High	High	Low
Low Water Flow Heating	Low/Normal	Low/Normal	Low	Low	High	Low	High
Low Water Flow Cooling	High	High	High	High	Low	Low	High
High Air Flow Heating	Low	Low	Low	Low	High	Low	Low
High Air Flow Cooling	Low	High	Normal	High	Low	Low	Normal
High Water Flow Heating	Normal	Low	Normal	High	Normal	Normal	Low
High Water Flow Cooling	Low	Low	Low	Low	High	Normal	Low
Low Indoor Air Temperature Heating	Low	Low	Low	Normal	High	Normal	Normal/High
Low Indoor Air Temperature Cooling	Low	Low	Low	Normal/Low	High	Low	Low
High Indoor Air Temperature Heating	High	High	High	Normal/High	Normal/Low	Low	Normal
High Indoor Air Temperature Cooling	High	High	High	High	Low	Low	High
Restricted TXV (Check Service Advisory)	High	Low	Normal/Low	High	High	Low	Low
Insufficient Compressor (Possible Bad Valves)	Low	High	Low	High	Normal/High	Low	Low
TXV - Bulb Loss of Charge	Low	Low	Low	High	High	Low	Low
Scaled Coaxial Heat Exchanger Heating	Low	Low	Low	Normal/Low	High	Low	Low
Scaled Coaxial Heat Exchanger Cooling	High	High	High	Normal/Low	Low	Low	Low
Restricted Filter Drier	Check temperature difference (delta T) across filter drier.						

7/6/10

Heat of Extraction/Rejection

Single Speed

Model	GPM	Heat of Extraction (kBtuh)				Heat of Rejection (kBtuh)				
		30°F	50°F	70°F	90°F	30°F	50°F	70°F	90°F	110°F
012	1.5		7.4	9.6	12.5		16.9	16.5	15.8	
	2.5	5.9	7.7	10.1	12.7	17.3	16.9	16.4	15.9	16.0
	3.5	6.1	8.1	10.6	12.9	17.4	16.9	16.4	16.0	16.1
018	3.0		11.4	13.9	19.1		23.0	21.6	20.5	
	4.0	10.1	12.2	14.8	19.5	21.1	23.3	21.7	20.5	20.1
	5.0	10.4	13.1	15.8	19.8	21.2	23.6	21.9	20.7	20.1
022	3.0		14.2	18.8	22.9		28.8	28.5	26.1	
	4.5	10.3	15.0	19.9	24.0	26.2	29.0	28.6	26.1	24.8
	6.0	10.5	15.4	20.2	24.5	26.4	29.2	28.6	26.2	24.8
030	4.0		20.0	26.0	31.0		35.1	35.4	33.1	
	6.0	14.6	20.8	27.1	32.3	32.6	35.0	35.3	33.0	29.3
	8.0	14.9	21.3	27.6	32.8	32.9	35.3	35.5	33.2	29.4
036	5.0		23.8	31.3	37.6		41.5	42.7	40.8	
	7.0	17.7	24.9	32.6	39.2	34.9	41.4	42.6	40.7	38.0
	9.0	18.1	25.5	33.2	39.8	35.3	41.8	42.9	40.9	38.2
042	5.0		27.2	33.7	40.0		50.2	51.2	48.8	
	8.0	21.0	28.5	35.5	42.4	46.9	50.4	51.5	49.1	45.9
	11.0	21.4	29.3	36.6	43.9	47.2	50.7	51.8	49.3	45.9
048	6.0		35.1	43.9	51.2		60.6	60.5	57.0	
	9.0	26.8	36.7	46.3	54.3	56.2	60.8	60.9	57.4	53.8
	12.0	27.3	37.7	47.7	56.2	56.5	61.1	61.1	57.5	53.8
060	9.0		44.1	56.3	65.1		83.1	81.3	76.5	
	12.0	31.5	45.5	57.5	69.1	80.2	82.9	81.6	76.3	71.9
	15.0	32.6	46.4	59.9	70.0	80.8	83.2	81.2	76.5	72.0
070	12.0		52.4	66.9	78.1		91.1	89.5	83.0	
	15.0	37.9	53.7	69.8	82.9	83.4	91.2	89.4	82.7	76.8
	18.0	38.1	54.3	70.9	84.8	83.8	91.9	90.3	83.6	77.6

Note: operation not recommended in shaded areas. 11/26/2014

Dual Capacity

Model		GPM	Heat of Extraction (kBtuh)				Heat of Rejection (kBtuh)				
			30°F	50°F	70°F	90°F	30°F	50°F	70°F	90°F	110°F
026	Part Load	3.0		13.7	18.8	23.1		26.5	26.2	23.9	
		5.0	9.9	14.3	19.6	24.5	24.8	26.8	26.4	24.0	22.1
		7.0	10.7	15.0	20.1	24.5	25.0	27.0	26.7	24.3	22.1
	Full Load	4.0		18.8	24.0	28.8		34.4	34.3	32.6	
		6.0	14.3	19.6	25.3	30.7	33.6	34.9	34.8	33.2	31.0
		8.0	14.7	20.1	26.1	31.8	33.9	35.2	35.1	33.4	31.2
038	Part Load	4.0		20.0	26.2	32.7		35.4	34.5	32.4	
		6.0	14.5	20.8	27.6	34.7	32.1	35.6	34.7	32.5	30.3
		8.0	15.6	21.9	28.3	34.7	33.0	36.1	35.2	32.9	30.7
	Full Load	5.0		28.2	34.8	40.8		48.4	48.5	45.9	
		7.0	21.7	29.4	36.7	43.6	45.1	48.8	49.2	46.8	43.5
		9.0	22.3	30.2	37.9	45.2	45.5	49.2	49.5	47.0	43.7
049	Part Load	5.0		24.5	30.2	35.9		47.2	46.3	45.3	
		8.0	19.7	27.0	33.4	39.9	42.0	47.4	46.1	44.8	42.2
		11.0	20.4	28.0	35.1	42.4	42.4	47.4	46.5	45.7	43.3
	Full Load	6.0		33.0	40.9	48.1		63.9	64.2	60.5	
		9.0	27.0	36.4	45.2	53.6	58.8	63.8	63.8	59.6	56.3
		12.0	28.0	37.8	47.6	57.1	59.2	63.7	64.2	60.8	57.7
064	Part Load	6.0		33.7	42.0	49.3		60.6	59.4	55.5	
		10.0	23.7	34.0	43.7	53.1	55.8	60.5	59.5	55.8	52.2
		14.0	24.9	35.3	44.6	53.2	56.3	60.5	59.6	56.1	52.5
	Full Load	8.0		44.0	56.4	69.1		81.0	82.9	76.5	
		12.0	34.5	47.0	58.9	70.2	73.5	81.5	83.4	76.7	71.4
		16.0	34.9	48.0	60.7	73.1	74.1	82.0	83.8	77.2	71.5
072	Part Load	10.0		42.3	54.2	65.4		66.9	68.7	63.2	
		13.0	29.8	42.7	56.6	70.5	61.5	69.0	68.7	63.5	59.9
		16.0	31.6	44.4	57.6	70.6	62.0	68.9	69.1	63.8	60.2
	Full Load	12.0		53.1	68.7	83.7		89.6	90.6	85.2	
		15.0	42.1	56.8	71.6	85.0	80.8	90.0	91.0	85.4	81.9
		18.0	42.6	57.9	73.9	88.6	81.4	90.6	91.6	85.9	82.2

Note: operation not recommended in shaded areas. 11/26/2014

Troubleshooting

Standard Microprocessor Controls

To check the unit control board for proper operation:

1. Disconnect thermostat wires at the control board.
2. Jumper the desired test input (Y1, Y2, W, O or G) to the R terminal to simulate a thermostat signal.
3. If control functions properly:
   - Check for thermostat and field control wiring (use the diagnostic inputs mode).
4. If control responds improperly:
   - Ensure that component being controlled is functioning (compressor, blower, reversing valve, etc.).
   - Ensure that wiring from control to the component is functioning (refer to the LED Definition table below and use the diagnostic outputs mode).
   - If steps above check properly, replace unit control.

LED Definitions and Diagnostics
Standard Microprocessor

LED	NORMAL DISPLAY MODE	DIAGNOSTIC MODES							
		CURRENT FAULT STATUS		INPUTS		OUTPUTS 1		OUTPUTS 2	
	Field Selection DIPS								
	SW2- 1 On	SW2-	1 Off	SW2-	1 NA	SW2-	1 NA	SW2-	1 NA
	SW2- 6 On	SW2-	6 On	SW2-	6 Off	SW2-	6 On	SW2-	6 Off
	SW2- 7 On	SW2-	7 On	SW2-	7 On	SW2-	7 Off	SW2-	7 Off
Drain	Drain Pan Overflow Lockout	Drain Pan Overflow		Y1		Compressor (On or Low)		Blower Low	
Water Flow	FP Thermistor (Loop <15º F, Well <30ºF) Lockout	FP Thermistor (Loop <15º F, Well <30ºF)		Y2		Compressor (On or High)		Blower Medium	
High Pressure	High Pressure >600 PSI Lockout	High Pressure >600		O		Reversing Valve		Blower High	
Low Pressure	Low Pressure <40 PSI Lockout	Low Pressure <40		G		Fan		Aux Heat 1	
Airflow	ECM RPM <100 RPM	ECM RPM <100 RPM		W		HWG Pump		Aux Heat 2	
Status	Microprocessor Malfunction	Not Used		SL1		Loop Pump(s)		Aux Heat 3	
HWG Limit	HWL Thermistor >130º	HWL Thermistor >130°F		Not Used		–		Aux Heat 4	
HWG Off	HWG Pump Switch Off	HWG Pump Switch Off		–		–		–	

Troubleshooting cont.

Refrigerant Systems

To maintain sealed circuit integrity, do not install service gauges unless unit operation appears abnormal. Compare the change in temperature on the air side as well as the water side to the Unit Operating Parameters tables. If the unit's performance is not within the ranges listed, and the airflow and water flow are known to be correct, gauges should then be installed and superheat and subcooling numbers calculated. If superheat and subcooling are outside recommended ranges, an adjustment to the refrigerant charge may be necessary.

NOTE: Refrigerant tests must be made with hot water generator turned "OFF". Verify that air and water flow rates are at proper levels before servicing the refrigerant circuit.

DEALER: _____

PHONE #: _____ DATE: _____

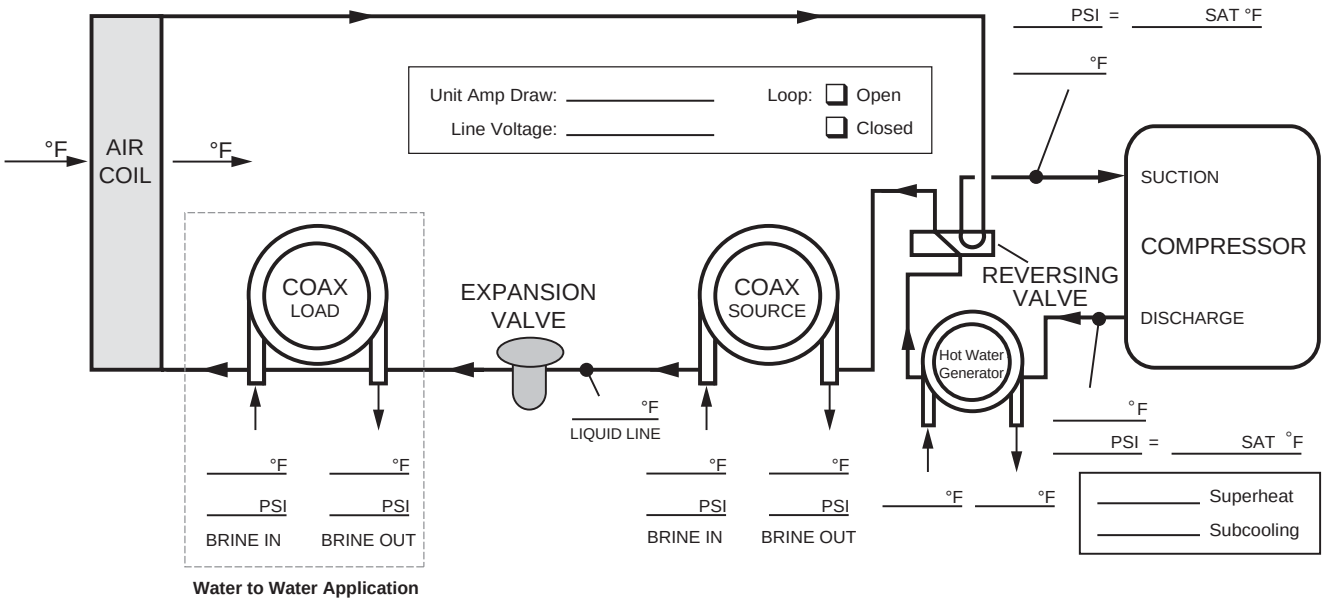
PROBLEM: _____

MODEL #: _____

SERIAL #: _____

Startup/Troubleshooting Form

COOLING CYCLE ANALYSIS

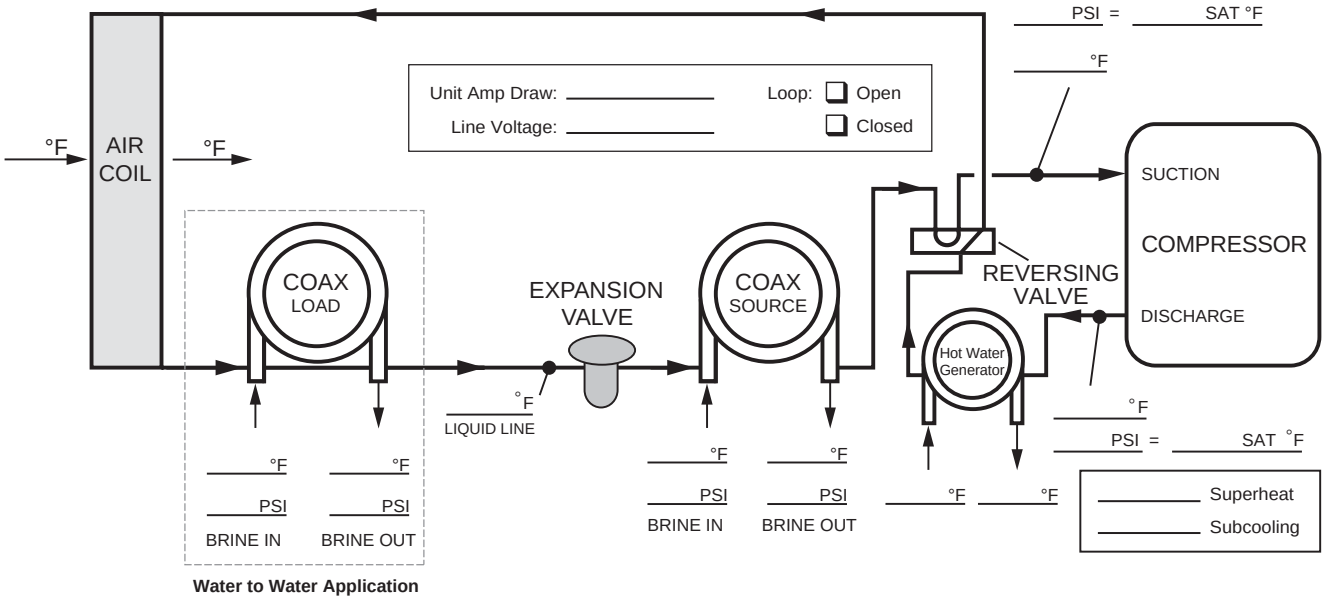


Water to Water Application

Heat of Extraction/Rejection = gpm x 500 (485 for water/antifreeze) x ΔT

Note: DO NOT hook up pressure gauges unless there appears to be a performance problem.

HEATING CYCLE ANALYSIS



Water to Water Application

Single Speed/Dual Capacity Startup/Troubleshooting Form

1. Job Information

Model # _____ Job Name: _____ Loop: Open / Closed

Serial # _____ Install Date: _____ Hot Water Generator: Y / N

2. Flow Rate in gpm	**SOURCE COAX**		**LOAD COAX (Water-to-Water)**	
	HEATING	COOLING	HEATING	COOLING
WATER IN Pressure:	a. _____ psi	a. _____ psi	a. _____ psi	a. _____ psi
WATER OUT Pressure:	b. _____ psi	b. _____ psi	b. _____ psi	b. _____ psi
Pressure Drop: a - b	c. _____ psi	c. _____ psi	c. _____ psi	c. _____ psi
Look up flow rate in table:	d. _____ gpm	d. _____ gpm	d. _____ gpm	d. _____ gpm

3. Temp. Rise/Drop Across Coaxial Heat Exchanger[1]		
	HEATING	COOLING
WATER IN Pressure:	e. _____ °F	e. _____ °F
WATER OUT Pressure:	f. _____ °F	f. _____ °F
Temperature Difference:	g. _____ °F	g. _____ °F

4. Temp. Rise/Drop Across Air Coil	**SOURCE COAX**		**LOAD COAX (Water-to-Water)**	
	HEATING	COOLING	HEATING	COOLING
SUPPLY AIR Temperature:	h. _____ °F	h. _____ °F	h. _____ °F	h. _____ °F
RETURN AIR Temperature:	i. _____ °F	i. _____ °F	i. _____ °F	i. _____ °F
Temperature Difference:	j. _____ °F	j. _____ °F	j. _____ °F	j. _____ °F

5. Heat of Rejection (HR)/Heat of Extraction (HE)

Brine Factor[2]: k. _____

	HEATING	COOLING
HR/HE = d x g x k	l. _____ Btu/h	l. _____ Btu/h

STEPS 6-9 NEED ONLY BE COMPLETED IF A PROBLEM IS SUSPECTED.

6. Watts	ENERGY MONITOR	
	HEATING	COOLING
Volts:	m. _____ Volts	m. _____ Volts
Total Amps (Comp. + Blower)[3]:	n. _____ Amps	n. _____ Amps
Watts = m x n x 0.85:	o. _____ Watts	o. _____ Watts

7. Capacity

	HEATING	COOLING
Cooling Capacity = l - (o x 3.413):		
Heating Capacity = l + (o x 3.413):	p. _____ Btu/h	p. _____ Btu/h

8. Efficiency

	HEATING	COOLING
Cooling EER = p / o:		
Heating COP = p / (o x 3.413):	q. _____ Btu/h	q. _____ Btu/h

9. Superheat (S.H.)/Subcooling (S.C.)

	HEATING	COOLING
Suction Pressure:	r. _____ psi	r. _____ psi
Suction Saturation Temperature:	s. _____ °F	s. _____ °F
Suction Line Temperature:	t. _____ °F	t. _____ °F
S.H. = t - s	u. _____ °F	u. _____ °F
Head Pressure:	v. _____ psi	v. _____ psi
High Pressure Saturation Temp:	w. _____ °F	w. _____ °F
Liquid Line Temperature[4]:	x. _____ °F	x. _____ °F
S.C. = w - x	y. _____ °F	y. _____ °F

NOTES: [1] Steps 3-9 should be conducted with the hot water generator disconnected.

[2] Use 500 for pure water, 485 for methanol or Environol™. (This constant is derived by multiplying the weight of one gallon of water (8.34) times the minutes in one hour (60) times the specific heat of the fluid. Water has a specific heat of 1.0.

[3] If there is only one source of power for the compressor and blower, amp draw can be measured at the source wiring connection.

[4] Liquid line is between the coax and the expansion device in the cooling mode; between the air coil and the expansion device in the heating mode.

Preventive Maintenance

Water Coil Maintenance

1. Keep all air out of the water. An open loop system should be checked to ensure that the well head is not allowing air to infiltrate the water line. Lines should always be airtight.
2. Keep the system under pressure at all times. It is recommended in open loop systems that the water control valve be placed in the discharge line to prevent loss of pressure during off cycles. Closed loop systems must have positive static pressure.

NOTE: On open loop systems, if the installation is in an area with a known high mineral content (125 PPM or greater) in the water, it is best to establish with the owner a periodic maintenance schedule so the coil can be checked regularly. Should periodic coil cleaning be necessary, use standard coil cleaning procedures which are compatible with either the cupronickel or copper water lines. Generally, the more water flowing through the unit the less chance for scaling.

Other Maintenance

Filters

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

Condensate Drain

In areas where airborne bacteria produce a slime in the drain pan, it may be necessary to treat chemically to minimize the problem. The condensate drain can pick up lint and dirt, especially with dirty filters. Inspect twice a year to avoid the possibility of overflow.

Blower Motors

ECM blower motors are equipped with sealed ball bearings and require no periodic oiling.

PSC blower motors should only be lubricated if dry operation is suspected.

Hot Water Generator Coil

See Water Coil Maintenance section above.

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 (with a brush attachment) clean. Care must be taken not to damage the aluminum fins while cleaning.

CAUTION: Fin edges are sharp.

Replacement Procedures

Obtaining Parts

When ordering service or replacement parts, refer to the model number and serial number of the unit as stamped on the serial plate attached to the unit. If replacement parts are required, mention the date of installation of the unit and the date of failure, along with an explanation of the malfunctions and a description of the replacement parts required.

In-Warranty Material Return

Material may not be returned except by permission of authorized warranty personnel. Contact your local distributor for warranty return authorization and assistance.

Service Parts List

Parts List		Single Speed Units								
		012	018	022	030	036	042	048	060	070
Compressor	Compressor 208-230/60/1	34P591-01	34P593-01	34P581-01	34P582-01	34P583-01	34P578-01	34P579-01	34P580-01	34P646-01
	Run Capacitor 208-230/60/1	16P002D18	16P002D19	16P002D18	16P002D20	16P002D20	16P002D21	16P002D21	16P002D25	16P002D24
	Sound Jacket	92P504A01	92P504A01	92P504A05	92P504A05	92P504A05	92P504A05	92P504A05	92P504A05	92P504A03
	Power Harness	11P521A01	11P521A01	11P781-01	11P781-01	11P781-01	11P781-01	11P781-01	11P781-01	11P781-01
	Solenoid Harness	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ECM Motor & Blower	ECM Motor 208-230/60/1	n/a	14S542-01	14S542-01	14S542-01	14S543-01	14S543-01	14S543-01	14S544-01	14S544-01
	ECM Blower Housing	n/a	53P500B01	53P500B01	53P500B01	53P501B01	53P501B01	53P501B01	53P501B01	53P501B01
	ECM Harness - horizontal	n/a	11P827-02	11P827-02	11P827-02	11P827-02	11P827-02	11P827-02	11P827-02	11P827-02
	ECM Harness - vertical	n/a	11P827-01	11P827-01	11P827-01	11P827-01	11P827-01	11P827-01	11P827-01	11P827-01
	ECM Power Harness - vertical	n/a	11P585B01	11P585B03	11P585B03	11P585B03	11P585B03	11P585B03	11P585B03	11P585B03
	ECM Power Harness - horizontal	n/a	11P585B04	11P585B04	11P585B04	11P585B04	11P585B04	11P585B04	11P585B04	11P585B04
PSC Motor & Blower	PSC Motor 208-230/60/1	14P506-02	14P507B01	14P508B01	14P509B01	14P511B01	14P512B01	14P512B01	14P514B01	14P514B01
	PSC Blower & Housing	53P506B01	53P512B01	53P500B01	53P500B01	53P517-01	53P517-01	53P517-01	53P501B01	53P501B01
X13 ECM Motor & Blower	X13 ECM Motor 208-230/60/1	n/a	n/a	14S536-01	14S536-02	14S536-13	14S537-01	14S537-01	14S537-07	14S537-03
	X13 ECM Blower Housing	n/a	n/a	53P500B01	53P500B01	53P501B01	53P501B01	53P501B01	53P501B01	53P501B01
Air Filters	1" Electrostatic Filter (Horizontal)	EAF1620	EAF1824	EAF1832	EAF1832	EAF2037	EAF2042	EAF2042	EAF2047	EAF2047
	1" Electrostatic Filter (Top Flow/ Rear Discharge)	EAF1620	EAF2024	EAF2428	EAF2428	EAF2830	EAF3032	EAF3032	EAF3036	EAF3036
	1" Electrostatic Filter (Bottom Flow)	n/a	n/a	EAF2428	EAF2428	EAF3036	EAF3036	EAF3036	EAF3036	EAF3036
Refrigeration Components	Air Coil (Vertical Model)	61P704-41	61P721-41	61P705-41	61P711-41	61P706-41	61P715-41	61P715-41	61P725-41	61P725-41
	Air Coil (Horizontal Model)	61P704-41	61P720-41	61P707-41	61P708-41	61P709-41	61P710-41	61P710-41	61P716-41	61P716-41
	Coax	62I502A01	62I503A01	62I504-01	62I588-01	62I542A01	62I542A01	62I543A01	62I543A01	62I555-01
	TXV	33P608-13	33P608-02	33P619-01	33P619-02	33P619-02	33P619-03	33P619-03	33P619-04	33P619-05
	Reversing Valve	33P502-05	33P502-05	33P506-04	33P506-04	33P503-05	33P503-05	33P526-05	33P526-05	33P526-05
	Discharge Muffler	n/a	n/a	36P503B02	36P503B02	36P503B02	36P503B02	36P503B02	36P503B02	36P503B02
	Filter Dryer	36P500B01	36P500B01	36P500B01	36P500B01	36P500B01	36P500B01	36P500B01	36P500B02	36P500B02
Desuperheater	Hot Water Generator	n/a	62P516-05	62P516-05	62P516-05	62P516-05	62P516-03	62P516-03	62P516-03	62P516-03
	Hot Water Generator Pump	n/a	24P501A01	24P501A01	24P501A01	24P501A01	24P501A01	24P501A01	24P501A01	24P501A01
Electrical	Contactor	13P004A03	13P004A03	13P004A03	13P004A03	13P004A03	13P004A03	13P004A03	13P004A03	13P004A03
	Transformer 208-230/60/1	15P501B01	15P501B01	15P501B01	15P501B01	15P501B01	15P501B01	15P501B01	15P501B01	15P501B01
	3 Pole Power Block	12P503-06	12P503-06	12P503-06	12P503-06	12P503-06	12P503-06	12P503-06	12P503-06	12P503-06
	2 Pole Screw Term. Block	12P500A01	12P500A01	12P500A01	12P500A01	12P500A01	12P500A01	12P500A01	12P500A01	12P500A01
	Status Light Board	17P503A03	17P503A03	17P503A03	17P503A03	17P503A03	17P503A03	17P503A03	17P503A03	17P503A03
	Premier Board	17P513-07	17P513-07	17P513-07	17P513-07	17P513-07	17P513-07	17P513-07	17P513-07	17P513-07
Sensors & Safeties	Freeze Protection Thermistor	12P505B03	12P505B03	12P505B03	12P505B03	12P505B03	12P505B03	12P505B03	12P505B03	12P505B03
	HWL Thermistor	12P505B02	12P505B02	12P505B02	12P505B02	12P505B02	12P505B02	12P505B02	12P505B02	12P505B02
	High Pressure Switch	SKHPE600	SKHPE600	SKHPE600	SKHPE600	SKHPE600	SKHPE600	SKHPE600	SKHPE600	SKHPE600
	Low Pressure Switch	SKLPE40	SKLPE40	SKLPE40	SKLPE40	SKLPE40	SKLPE40	SKLPE40	SKLPE40	SKLPE40

Part numbers subject to change 7/28/15

Service Parts List cont.

Parts List		Dual Capacity Units				
		026	038	049	064	072
Compressor	Compressor 208-230/60/1	34P640-01	34P641-01	34P642-01	34P643-01	34P644-01
	Run Capacitor 208-230/60/1	16P002D19	16P002D20	16P002D18	16P002D31	16P002D31
	Sound Jacket	92P504A16	92P504A16	92P504A16	92P504A16	92P504A16
	Power Harness	11P781-01	11P781-01	11P781-01	11P781-01	11P781-01
	Solenoid Harness	11P782-02	11P782-02	11P782-02	11P782-02	11P782-02
ECM Motor & Blower	ECM Motor 208-230/60/1	14S542-01	14S543-01	14S543-01	14S542-01	14S542-01
	ECM Blower Housing	53P500B01	53P501B01	53P501B01	53P501B01	53P501B01
	ECM Harness - horizontal	11P827-02	11P827-02	11P827-02	11P827-02	11P827-02
	ECM Harness - vertical	11P827-01	11P827-01	11P827-01	11P827-01	11P827-01
	ECM Power Harness - vertical	11P585B03	11P585B03	11P585B03	11P585B03	11P585B03
	ECM Power Harness - horizontal	11P585B04	11P585B04	11P585B04	11P585B04	11P585B04
PSC Motor & Blower	PSC Motor 208-230/60/1	n/a	n/a	n/a	n/a	n/a
	PSC Blower & Housing	n/a	n/a	n/a	n/a	n/a
X13 ECM Motor & Blower	X13 ECM Motor 208-230/60/1	14S536-12	14S536-13	14S537-01	14S537-07	14S537-03
	X13 ECM Blower Housing	53P500B01	53P501B01	53P501B01	53P501B01	53P501B01
Air Filters	1” Electrostatic Filter (Horizontal)	EAF1832	EAF2037	EAF2042	EAF2047	EAF2047
	1” Electrostatic Filter (Top Flow/ Rear Discharge)	EAF2428	EAF2830	EAF3032	EAF3036	EAF3036
	1” Electrostatic Filter (Bottom Flow)	EAF2428	EAF3036	EAF3036	EAF3036	EAF3036
Refrigeration Components	Air Coil (Vertical Model)	61P705-41	61P706-41	61P715-41	61P725-41	61P725-41
	Air Coil (Horizontal Model)	61P707-41	61P709-41	61P710-41	61P717-41	61P717-41
	Coax	62I504-01	62I542A01	62I543A01	62I543A01	62I555-01
	TXV	33P619-01	33P619-02	33P619-03	33P619-04	33P619-05
	Reversing Valve	33P506-04	33P503-05	33P526-05	33P526-05	33P526-05
	Discharge Muffler	36P503B02	36P503B02	36P503B02	36P503B02	36P503B02
	Filter Dryer	36P500B01	36P500B01	36P500B01	36P500B02	36P500B02
Desuperheater	Hot Water Generator	62P516-05	62P516-05	62P516-03	62P516-03	62P516-03
	Hot Water Generator Pump	24P501A01	24P501A01	24P501A01	24P501A01	24P501A01
Electrical	Contactor	13P004A03	13P004A03	13P004A03	13P004A03	13P004A03
	Transformer 208-230/60/1	15P501B01	15P501B01	15P501B01	15P501B01	15P501B01
	3 Pole Power Block	12P503-06	12P503-06	12P503-06	12P503-06	12P503-06
	2 Pole Screw Term. Block	12P500A01	12P500A01	12P500A01	12P500A01	12P500A01
	Status Light Board	17P503A03	17P503A03	17P503A03	17P503A03	17P503A03
	Premier Board	17P513-07	17P513-07	17P513-07	17P513-07	17P513-07
Sensors & Safeties	Freeze Protection Thermistor	12P505B03	12P505B03	12P505B03	12P505B03	12P505B03
	HWL Thermistor	12P505B02	12P505B02	12P505B02	12P505B02	12P505B02
	High Pressure Switch	SKHPE600	SKHPE600	SKHPE600	SKHPE600	SKHPE600
	Low Pressure Switch	SKLPE40	SKLPE40	SKLPE40	SKLPE40	SKLPE40

Part numbers subject to change

7/28/15

Revision Guide

Pages:	Description:	Date:	By:
All	Released Aluminum Air Coil Option	1 Sept 2015	MA
All	Wiring Schematics Updated, Electric Heating Updated	11 June 2015	MA
All	First Published.	21 Aug 2013	DS

GEOSMART ENERGY

650 Jamieson Parkway, Unit #1, Cambridge, Ontario N3C 0A5 | o: 1.866.310.6690 | f: 1.866.533.3889
GEOSMARTENERGY.COM

Product:	**Premium G Series**
Type:	Geothermal/Water Source Heat Pumps
Size:	1 - 6 Ton Single Speed 2 - 6 Ton Dual Capacity
Document Type:	Installation, Operation & Maintenance Manual
Ref. Number:	IM2500AG2
Revision Date:	09/15
Revision Number:	
Document Name:	TEC-IOM-G-0915v2