ENVISION™

LOW SILL CONSOLE

Geothermal/Water Source Heat Pump

- R-410A Refrigerant
- 0.75-1.5 Ton Single Speed

Envision Low Sill Console Installation Manual

Installation Information

Water Piping Connections

Electrical

Startup Procedures

Troubleshooting

Preventive Maintenance

AHRI CERTIFIED™ www.ahridirectory.org Water Source HP ANSI/AHRI/ASHRAE/ISO13256-1

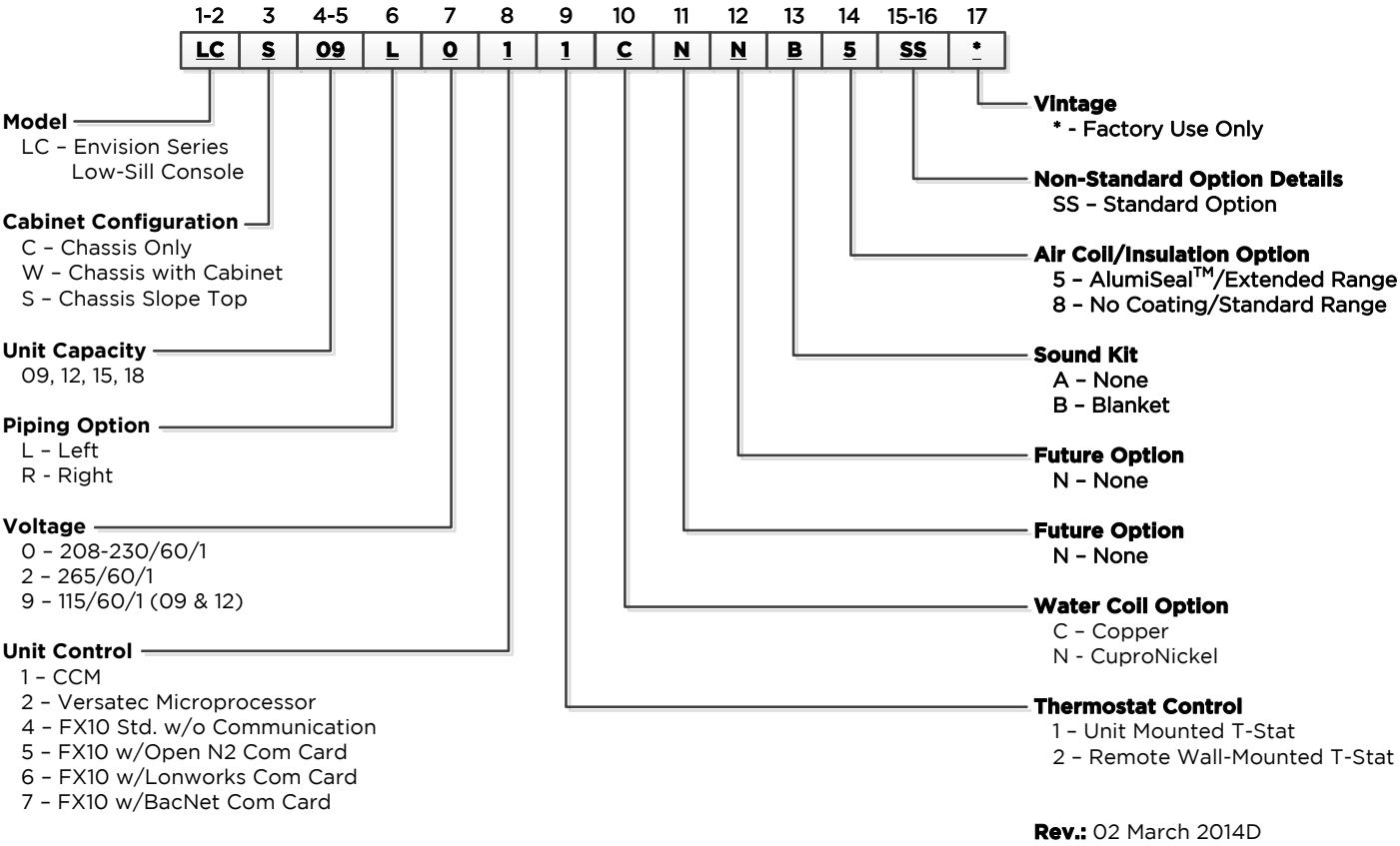
ETL LISTED

WaterFurnace® Smarter from the Ground Up™

IM1012CNA 03/14

Table of Contents

Model Nomenclature



Rev.: 02 March 2014D

NOTES: Chassis only available with left piping option.
FX10 option is only available with remote wall-mounted thermostat control.
09-12 only available with PSC blower.
15-18 only available with 3-Speed ECM blower.

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. Do not stack units. 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.

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.

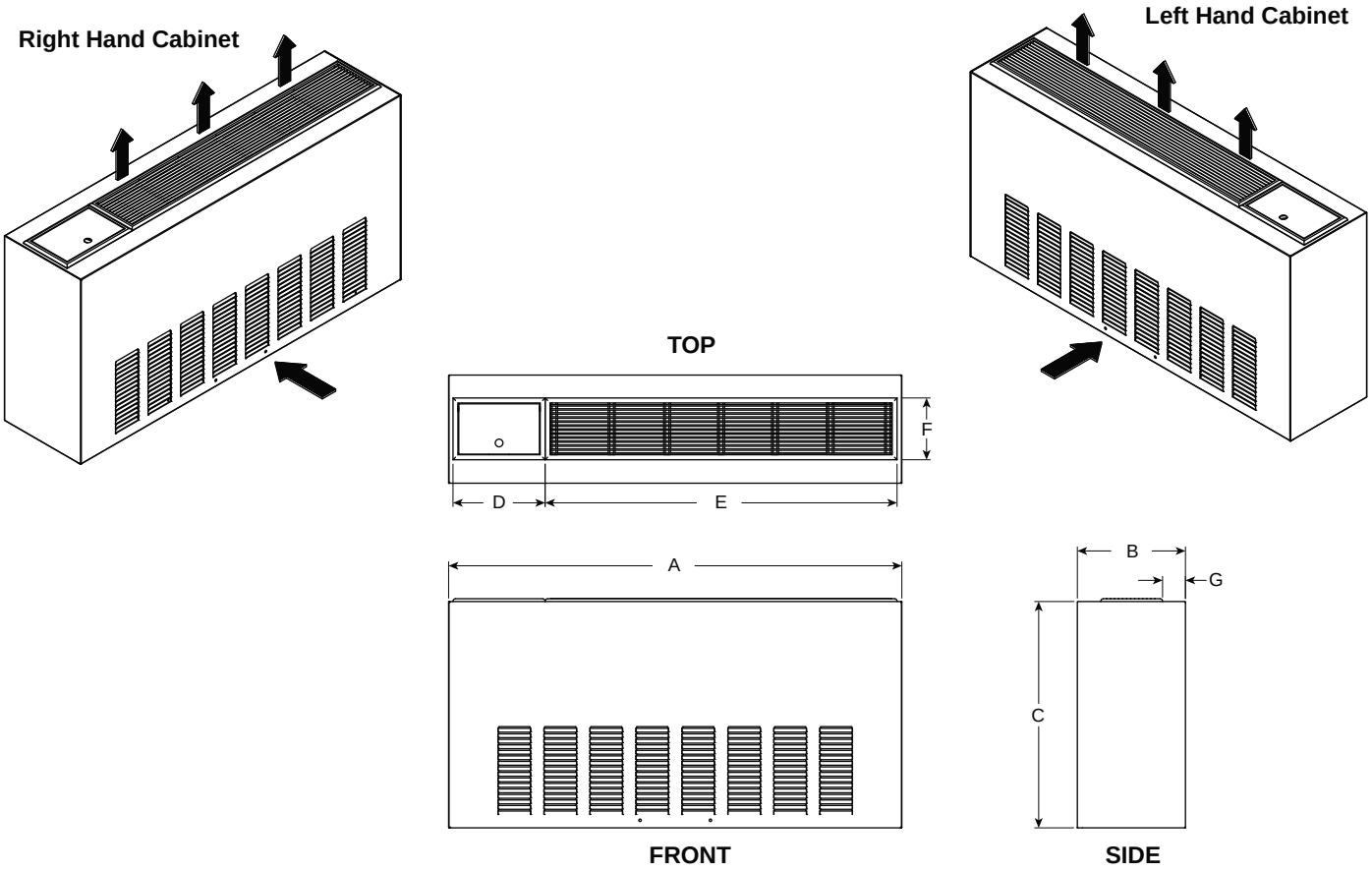
All source water connections on commercial units are fittings that accept a male pipe thread (MPT). Insert the connectors by hand, then tighten the fitting with a wrench to provide a leakproof joint. When connecting to an open loop (groundwater) system, thread any copper MPT fitting into the connector and tighten in the same manner as described above.

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.

Dimensional Data - Flat Top Cabinet

LCW09-18



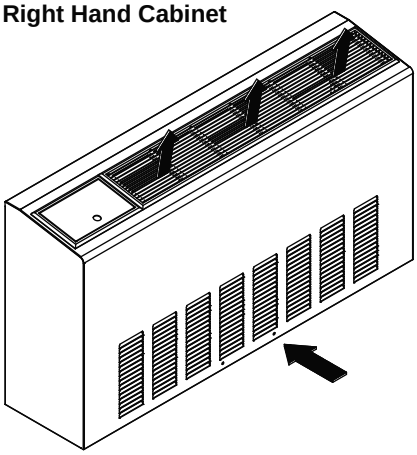
Right return cabinet shown in dimensional views

Flat Top Configuration		Overall Cabinet			Grille			
		A	B	C	D	E	F	G
		Width	Depth	Height	Grille Lid	Grille Length	Grille Width	
09-12	in.	45.1	10.8	22.5	9.2	35.0	6.1	2.3
	cm.	114.6	27.4	57.2	23.4	88.9	15.6	5.8
15-18	in.	50.0	12.8	22.5	9.2	35.0	6.1	3.3
	cm.	127.0	32.4	57.2	23.4	88.9	15.6	8.3

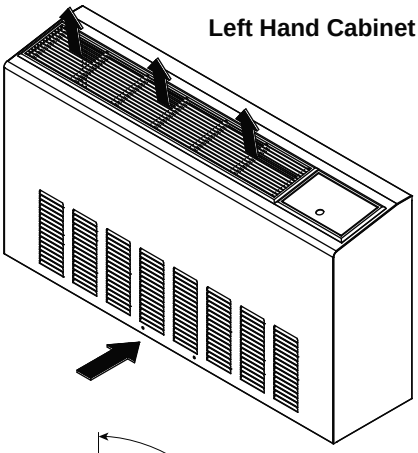
Dimensional Data - Slope Top Cabinet

LCS09-18

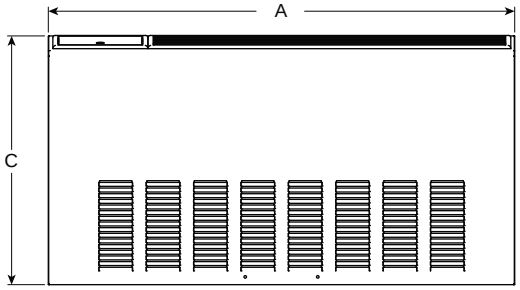
Right Hand Cabinet



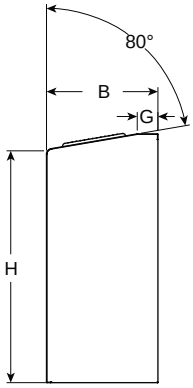
Left Hand Cabinet



TOP



FRONT



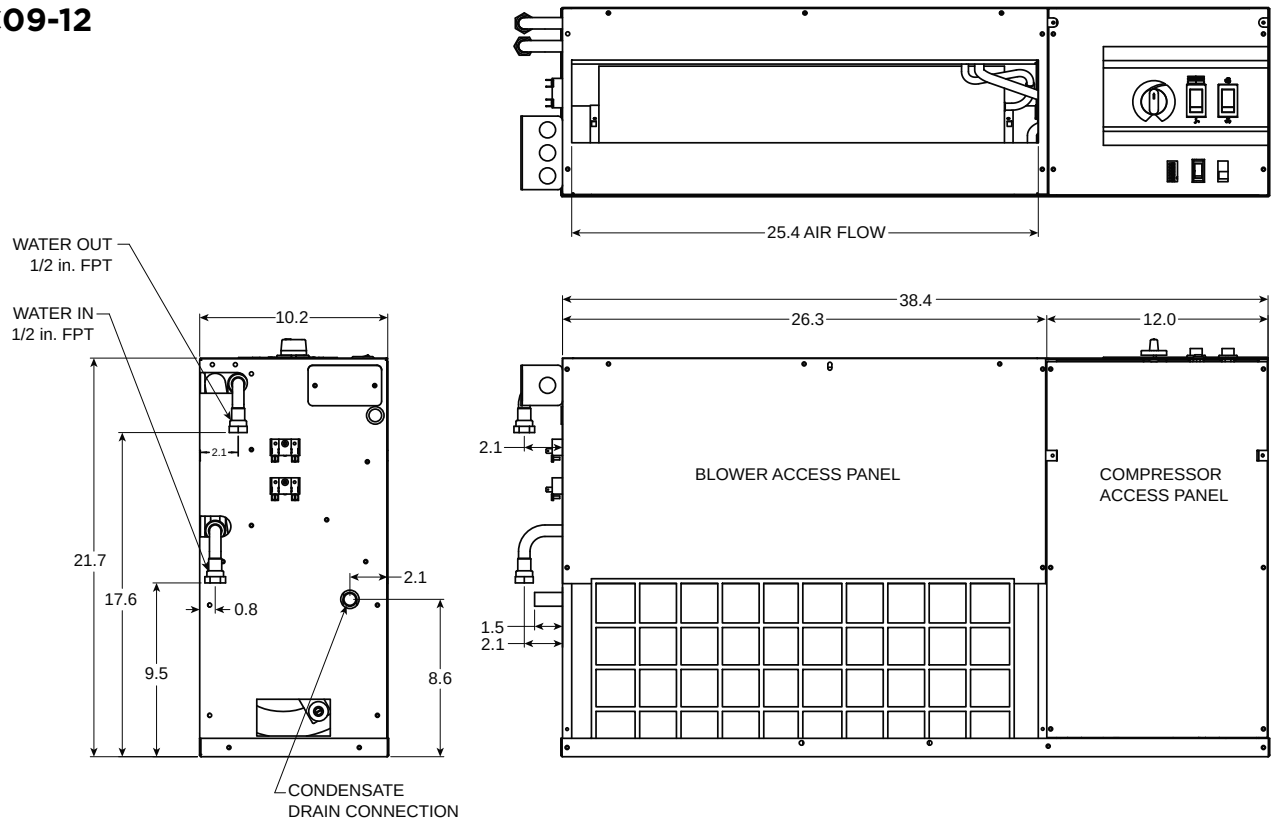
SIDE

Right return cabinet shown in dimensional views

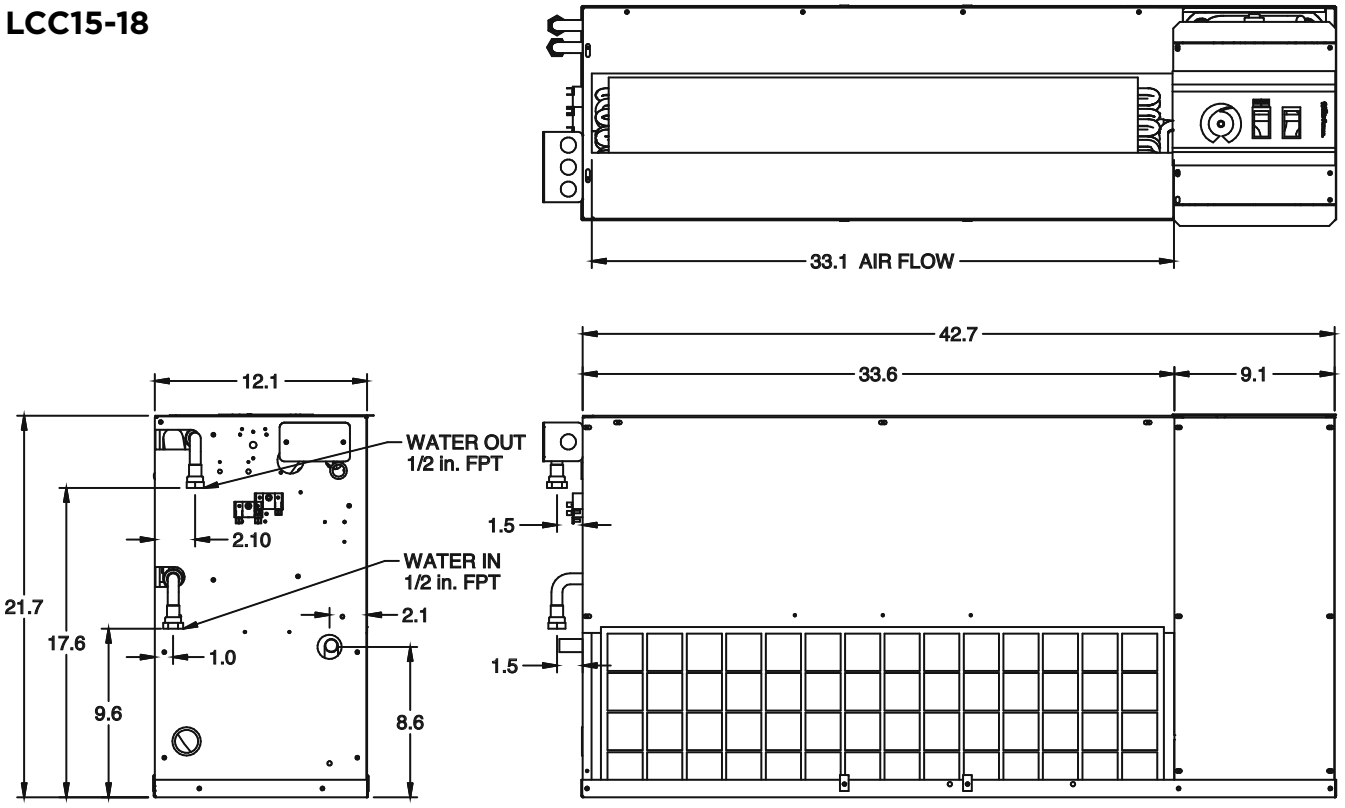
Slope Top Configuration		Overall Cabinet			Grille				
		A	B	C	D	E	F	G	H
		Width	Depth	Height	Grille Lid	Grille Length	Grille Width		
09-12	in.	45.1	10.8	24.0	9.2	35.0	6.1	2.0	22.4
	cm.	114.6	27.4	61.0	23.4	88.9	15.6	5.1	56.9
15-18	in.	50.0	12.8	24.0	9.2	35.0	6.1	2.0	22.5
	cm.	127.0	32.4	61.0	23.4	88.9	15.6	5.1	57.2

Dimensional Data - Chassis

LCC09-12

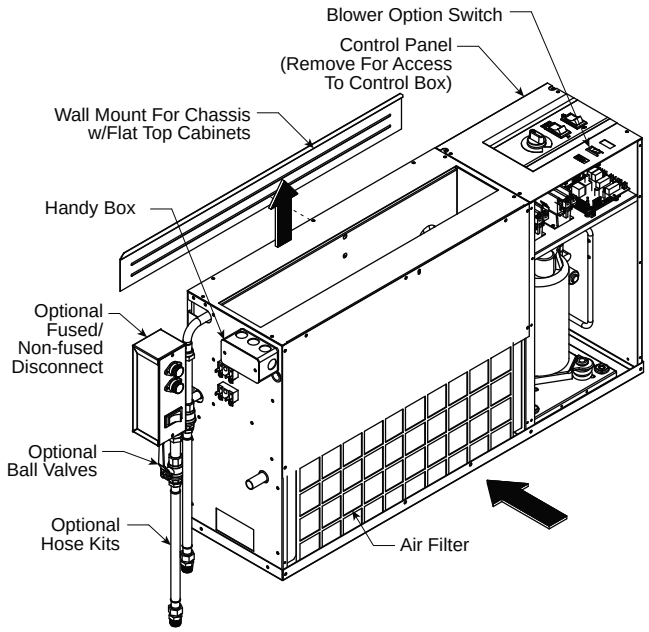


LCC15-18

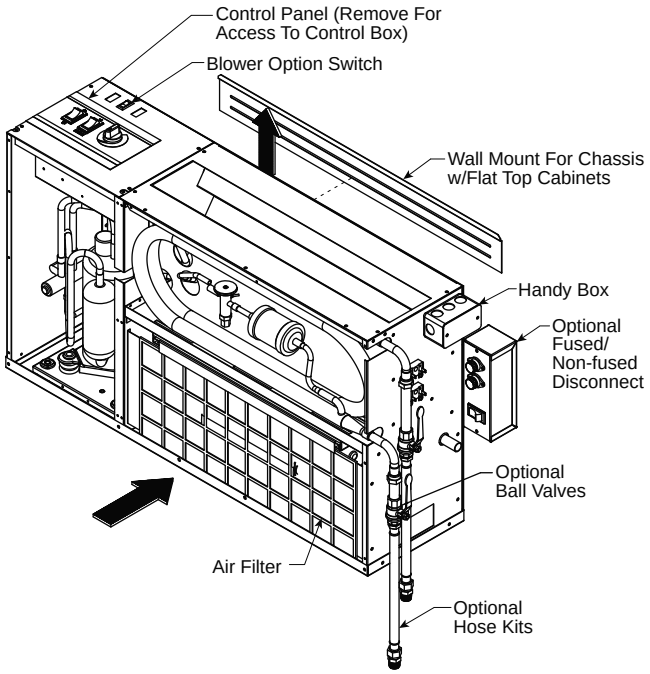


Dimensional Data - Controls Detail: Flat Top Chassis

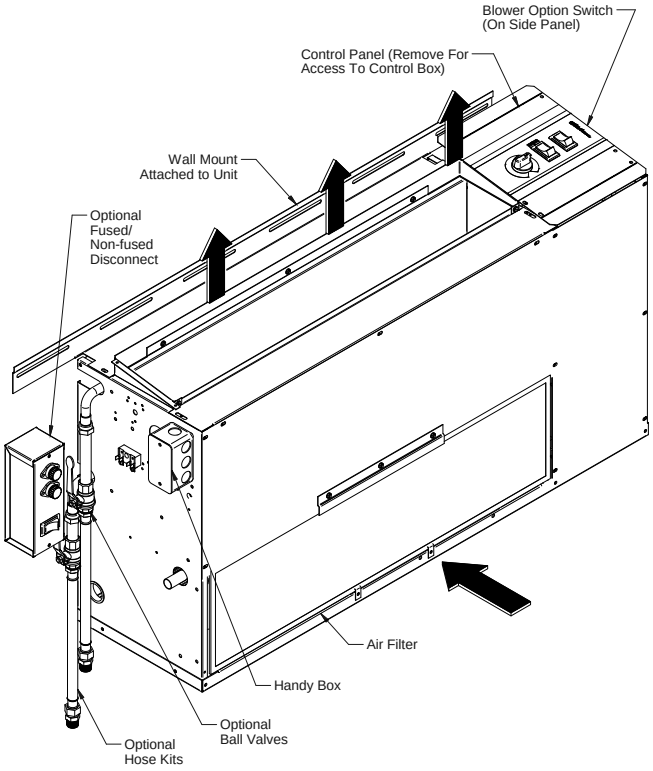
Left Return

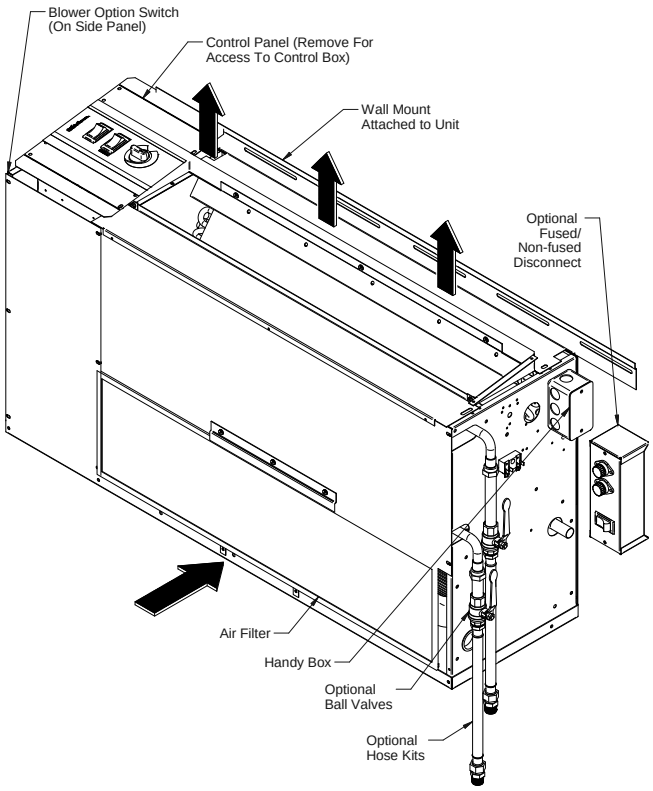


Right Return



Dimensional Data - Controls Detail: Flat Top Chassis





Physical Data

Model		Console			
		09	12	15	18
Compressor (1 each)		Rotary			
Factory Charge R-410A, oz [kg]		27 [0.77]	27 [0.77]	36 [1.02]	34 [1.0]
Blower Motor & Blower					
Blower Motor Type/Speeds	3-Spd ECM	N/A		3 Speeds	
Blower Motor - hp [W]	3-Spd ECM	N/A		1/4 [186]	1/4 [186]
Blower Wheel Size (Dia x W), in. [mm]	3-Spd ECM	N/A		6.0 x 6.5 [152 x 165]	6.0 x 6.5 [152 x 165]
Blower Motor Type/Speeds	PSC	2 Speeds		N/A	
Blower Motor - hp [W]	PSC	1/16 [44.7]	1/16 [44.7]	N/A	
Blower Wheel Size (Dia x W), in. [mm]	PSC	5.75 x 5.50 [146 x 140]	5.75 x 5.50 [146 x 140]	N/A	
Coax and Water Piping					
Water Connection Size - FPT - in [mm]		1/2 [12.7]	1/2 [12.7]	1/2 [12.7]	1/2 [12.7]
Coax & Piping Water Volume - gal [l]		0.15 [0.6]	0.18 [0.7]	0.15 [0.6]	0.18 [0.7]
Air Coil					
Air Coil Dimensions (H x W), in. [mm]		8 x 22 [203 x 559]	8 x 22 [203 x 559]	8 x 30 [203 x 762]	8 x 30 [203 x 762]
Air Coil Total Face Area, ft^2 [m^2]		1.2 [0.114]	1.2 [0.114]	1.7 [0.16]	1.7 [0.16]
Air Coil Tube Size, in [mm]		3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]
Air Coil Number of Rows		3	3	4	4
Filter Standard - Throwaway, in [mm]		23 x 9.6 [584 x 244]	23 x 9.6 [584 x 244]	32 x 9.6 [813 x 244]	32 x 9.6 [813 x 244]
Weight - Packaged, lb [kg]		200 [91]	205 [93]	215 [98]	220 [100]

12/13/13

Installation Steps

Step 1: Unpack Equipment and Inspect for Damage

Step 2: Determine Equipment Location

- Choose level flooring surface (Correctable with shims. Do not pitch towards drain.)
- Location of wall support and fasteners required to secure chassis backplate.
- Easy access for both installation and service.
- Consider availability and ease of wiring, water piping and condensate drain.
- No obstructions to block airflow in front of the unit.

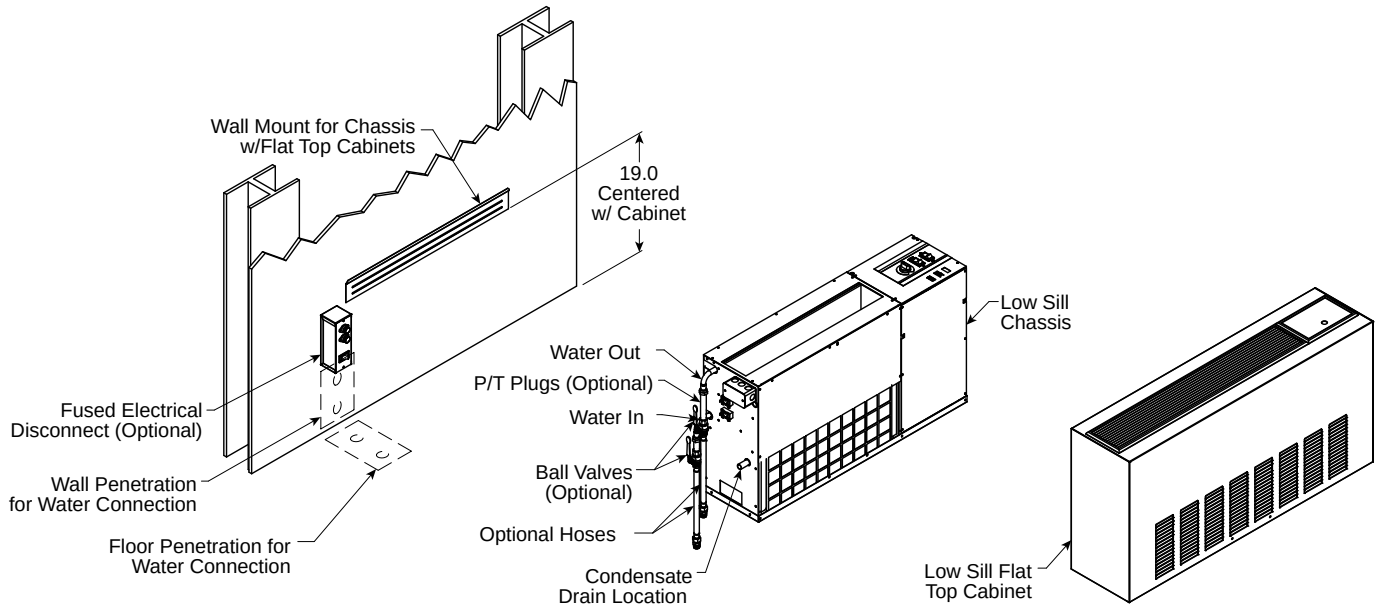
Step 3: Mark Unit Position

- Ensure that floor is level. If shims are required, make sure that the entire compressor compartment area is uniformly shimmed and that the backplate mounting height is increased by the thickness of the shims used.
- Position backplate in desired equipment location. To further reduce the operating sound level of the unit, 1/8-inch thick rubber matting may be placed under the chassis to eliminate vibration on hard flooring surfaces. (Make sure back plate is level).
- Mark and cut floor or wall penetrations for electrical wiring, water and condensate piping.

Optional Electrical Disconnect

- Mark and cut wall penetrations for field fabricated outside air duct sleeve.
- Align mounting holes with backplate and attach with screws supplied.

Figure 1



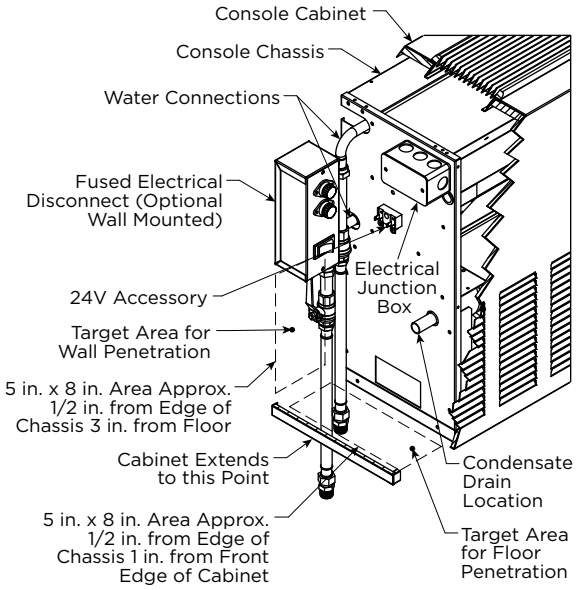
Installation Steps cont.

Step 4: Provide Water and Condensate Drain Connections

- A two-pipe reverse return piping configuration is recommended as it equalizes the piping circuit lengths and delivers even water flow to each unit. A direct return piping configuration may be used, but it may be difficult to achieve and maintain proper water flow to the units.
- An air vent must be installed in the water distribution system.
- The supply and return water piping should be run through the wall or floor penetration and terminate with a ball valve. The piping material used must comply with all local codes.
- Refer to: ***System Cleaning and Flushing procedures***.

Pipe Locations

Figure 2



Installation Steps cont.

Step 5: Provide Line Voltage Wiring

- Check unit data plate located on control side of chassis for ampacity and fuse size.
- Remove electrical knockouts from chassis backplate.
- Run line voltage wiring through knockout and secure wiring to backplate or disconnect.

Step 6: Chassis Installation

- Level and secure backplate to wall.
- Position the chassis against back plate. Drive (2) screws through holes in lip of backplate into top flange of chassis.

Step 7: Final Electrical Connection

- Install flexible electrical conduit between the backplate or electrical disconnect and the unit mounted junction box.
- Make final wiring connections in disconnect and junction box, taking care to replace all covers when done. Wiring must conform to NEC and/or all local codes. ***Refer to Electrical Data.***

NOTE: It is necessary to make final wiring connections prior to securing unit chassis to back plate on right-hand piping models with electrical disconnect.

Step 8: Final Water Connection

- For ease of installation and sound attenuation, high pressure (recommended) flexible hoses with a swivel fitting should be provided. Apply Teflon® tape or sealant compound to threaded hose fittings.
- Combination shut-off/balancing valves should be installed on both the supply and return water lines of the unit.
- Flow control valves should be installed on the water discharge line.
- It is recommended that P/T ports be installed on the supply and return water lines.

Step 9: Set Unit Controls

- Locate the “continuous fan/cycle fan” switch within the electrical compartment of the chassis and set to desired position. (Remote wall thermostat units do not use this optional switch.)
- Optional Control Settings-
  Remote Thermostat - Run low voltage wiring from unit to the desired thermostat location.
  Mount and wire thermostat according to manufacturer’s recommendations.

Step 10: Secure the Cabinet Cover

- Position and lower cabinet over unit chassis. Apply pressure to the front of the cabinet to ensure that the back lip of the cabinet hooks over the tabs provided on the backplate.
- Secure cabinet to chassis with mounting screws provided.

Step 11: Perform Final Unit Check

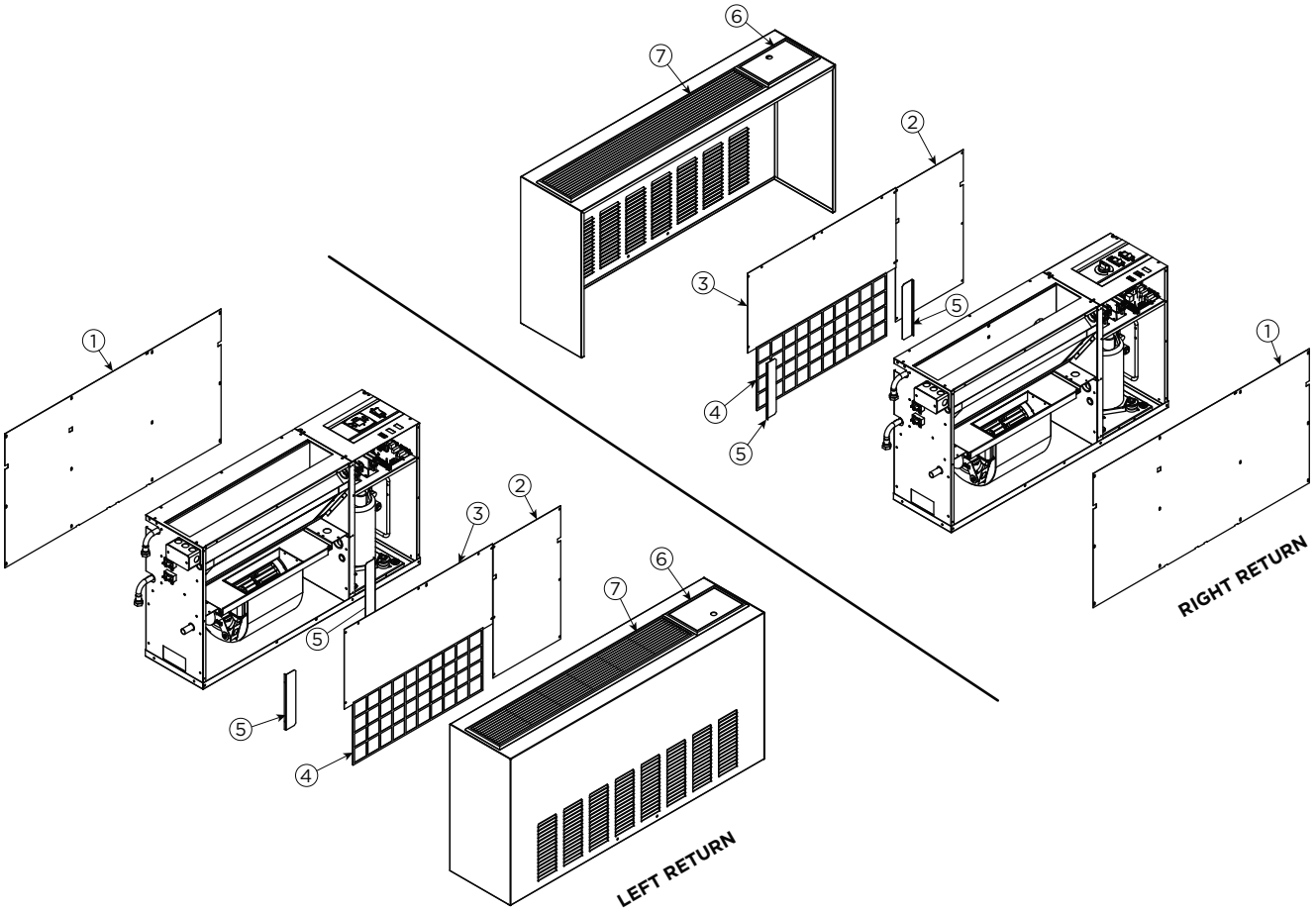
- Measure the pressure drop across the water coil and monitor water or air temperatures in both heating and cooling modes. The measured values should fall within the acceptable ranges shown in the ***Startup Performance table***.

Installation Steps cont.

Field Converting Console

Chassis is normally configured with controls on right end and piping on left end (see Figure 3 top view). In this position panel number 1 would be positioned against wall or back plate. Unit may also be turned 180° against wall or back plate. In this position controls will be on left end and piping on right end panel number 2 would be positioned against wall or back plate. Chassis must be enclosed with an approved cabinet enclosure.

1. Remove 4 screws from front kick panel on cabinet.
2. Remove cabinet from chassis by lifting and sliding cabinet straight up.
3. Remove grille assembly from cabinet by removing 4 screws from brackets located on the bottom of the grille and door assemblies.
4. Replace grille/door assemblies into cabinet repositioning pieces 1, 2, and 3 into the locations directly opposite the original positions. Secure by replacing mounting brackets. (Note: Be sure that louvers on the grille assembly are facing the proper direction when replacing the grille section.)
5. Replace grille/frame assembly into cabinet, and secure by replacing mounting brackets.
6. Replace cabinet by sliding it down over the top of the chassis.
7. Remove tab on leg that extends into return air opening. When the grille side of the cabinet is flat against chassis there will be 4 holes that line up in the leg section. Only use 1 hole for alignment for opposite side of grille. (Note: The tab can be removed by twisting back and forth until it breaks off.)
8. Remove plastic strip from tab and replace on rough edge that the tab was removed from.
9. Replace screws in font kick panel to secure cabinet to chassis.
10. Mount filter bracket in designated opening area. (Note: The filter bracket will only fit in one direction if cabinet is installed properly.)



System Cleaning and Flushing

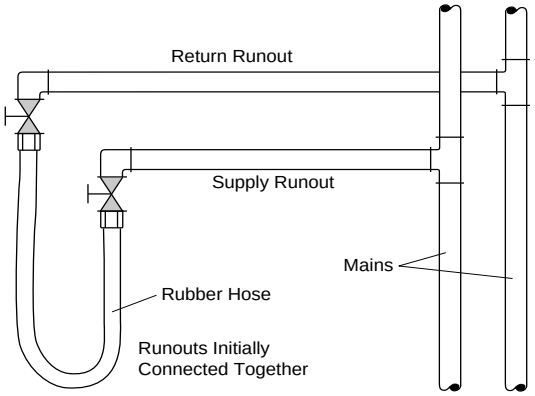
Cleaning and Flushing

Prior to start up of any heat pump, the water circulating system must be cleaned and flushed of all dirt and debris.

If the system is equipped with water shutoff valves, the supply and return runouts must be connected together at each unit location (This will prevent the introduction of dirt into the unit, see Figure 7). The system should be filled at the water make-up connection with all air vents open. After filling, vents should be closed.

The contractor should start the main circulator with the pressure reducing valve makeup open. Vents should be checked in sequence to bleed off any trapped air and to verify circulation through all components of the system.

Figure 7: Flushing with Water Shutoff Valve Equipped Systems



As water circulates through the system, the contractor should check and repair any leaks found in the piping system. Drain(s) at the lowest point(s) in the system should be opened for initial flush and blowdown, making sure water fill valves are set at the same rate. Check the pressure gauge at the pump suction and manually adjust the make-up water valve to hold the same positive pressure both before and after opening the drain valves. Flushing should continue for at least two hours, or longer if required, until drain water is clean and clear.

The supplemental heater and/or circulator pump, if used, should be shut off. All drains and vents should be opened to completely drain the system. Short-circuited supply and return runouts should now be connected to the unit supply and return connections.

Refill the system with clean water. Test the system water for acidity and treat as required to leave the water slightly alkaline (pH 7.5 to 8.5). The specified percentage of antifreeze may also be added at this time. Use commercial grade antifreeze designed for HVAC systems only. Environol™ brand antifreeze is recommended..

Once the system has been filled with clean water and antifreeze (if used), precautions should be taken to protect the system from dirty water conditions. Dirty water will result in system-wide degradation of performance, and solids may clog valves, strainers, flow regulators, etc. Additionally, the heat exchanger may become clogged which reduces compressor service life and can cause premature unit failure.

In boiler/tower application, set the loop control panel set points to desired temperatures. Supply power to all motors and start the circulating pumps. After full flow has been established through all components including the heat rejector (regardless of season), air vented and loop temperatures stabilized, each of the units will be ready for check, test and start up and for air and water balancing.

Ground Source Loop System Checkout

Once piping is completed between the unit pumping system and ground loop, final purging and charging of the loop is needed. A high pressure pump is needed to achieve adequate flow velocity in the loop to purge air and dirt particles from the loop itself. Antifreeze solution is used in most areas to prevent freezing. 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 may decrease soon after initial installation, due to pipe expansion and loop temperature change. Running the unit for at least 30 minutes after the system has been completely purged of air will allow for the “break-in” period. It may be necessary to adjust static loop pressure (by adding water) after the unit has run for the first time. Loop static pressure will also 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 charging the system initially.

Ensure the pump provides adequate flow through the unit by checking pressure drop across the heat exchanger. Usually 2.25-3.0 gpm of flow per ton of cooling capacity is recommended in earth loop applications.

Open Loop Ground Water Systems

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. Ensure 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.

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 SW1-Switch #2 to the "WELL" position (Refer to the Dip Switch Field Selection table). Slow opening/closing solenoid valves (type VM) are recommended to eliminate water hammer.

Water Quality

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. Desuperheater coils can likewise become scaled and possibly plugged. In areas with extremely hard water, the owner should be informed that the heat exchanger may require occasional flushing.

Units 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.

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

Electrical Connections

General

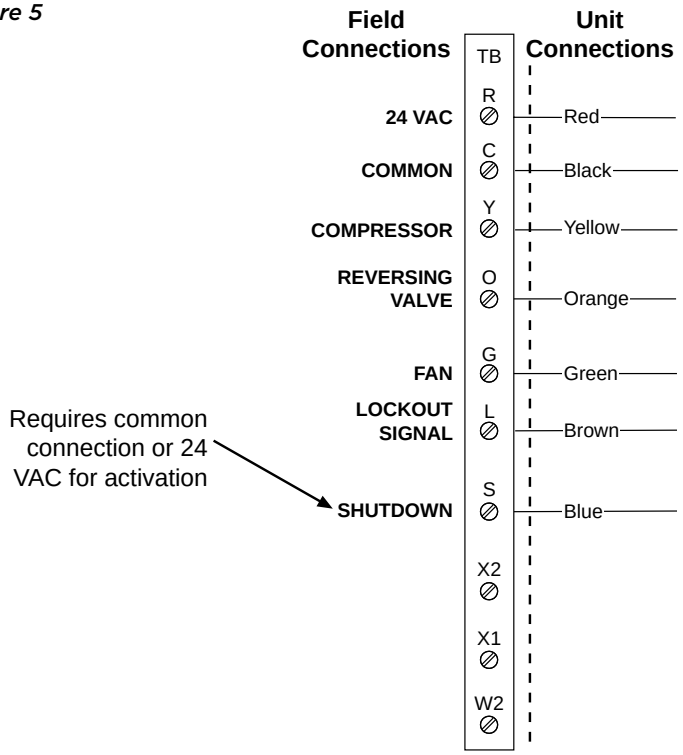
Be sure the available power is the same voltage and phase as that shown on the unit serial plate. Line and low voltage wiring must be done in accordance with local codes or the National Electric Code, whichever is applicable.

208 Volt Operation

All Envision Series 208/230 units are factory wired for 230 volt operation. For 208 volt operation, the red and blue transformer wires must be switched.

Microprocessor Remote Thermostat Wiring

Figure 5



Electrical Data

Model	Rated Voltage	Voltage Min/Max	Compressor			Blower Motor FLA	Total Unit FLA	Min Circ Amp	Max Fuse/ HACR
			MCC	RLA	LRA				
09	115/60/1	104/127	12.5	8.0	50.0	1.5	9.5	11.5	15
	208-230/60/1	187/253	6.4	4.1	21.0	0.6	4.7	5.7	10/15
	265/60/1	238/292	6.7	4.3	22.0	0.6	4.9	6.0	10/15
12	115/60/1	104/127	14.8	9.5	50.0	1.5	11.0	13.4	20
	208-230/60/1	187/253	7.7	4.9	25.0	0.6	5.5	6.7	10/15
	265/60/1	238/292	7.0	4.5	22.0	0.6	5.1	6.2	10/15
15	208-230/60/1	187/253	9.2	5.9	29.0	2.6	8.5	10.0	15
	265/60/1	238/292	7.8	5.0	28.0	2.5	7.5	8.7	10/15
18	208-230/60/1	187/253	10.4	6.7	33.5	2.6	9.3	11.0	15
	265/60/1	238/292	8.7	5.6	28.0	2.5	8.1	9.5	15

HACR circuit breaker in USA only

6/10/13

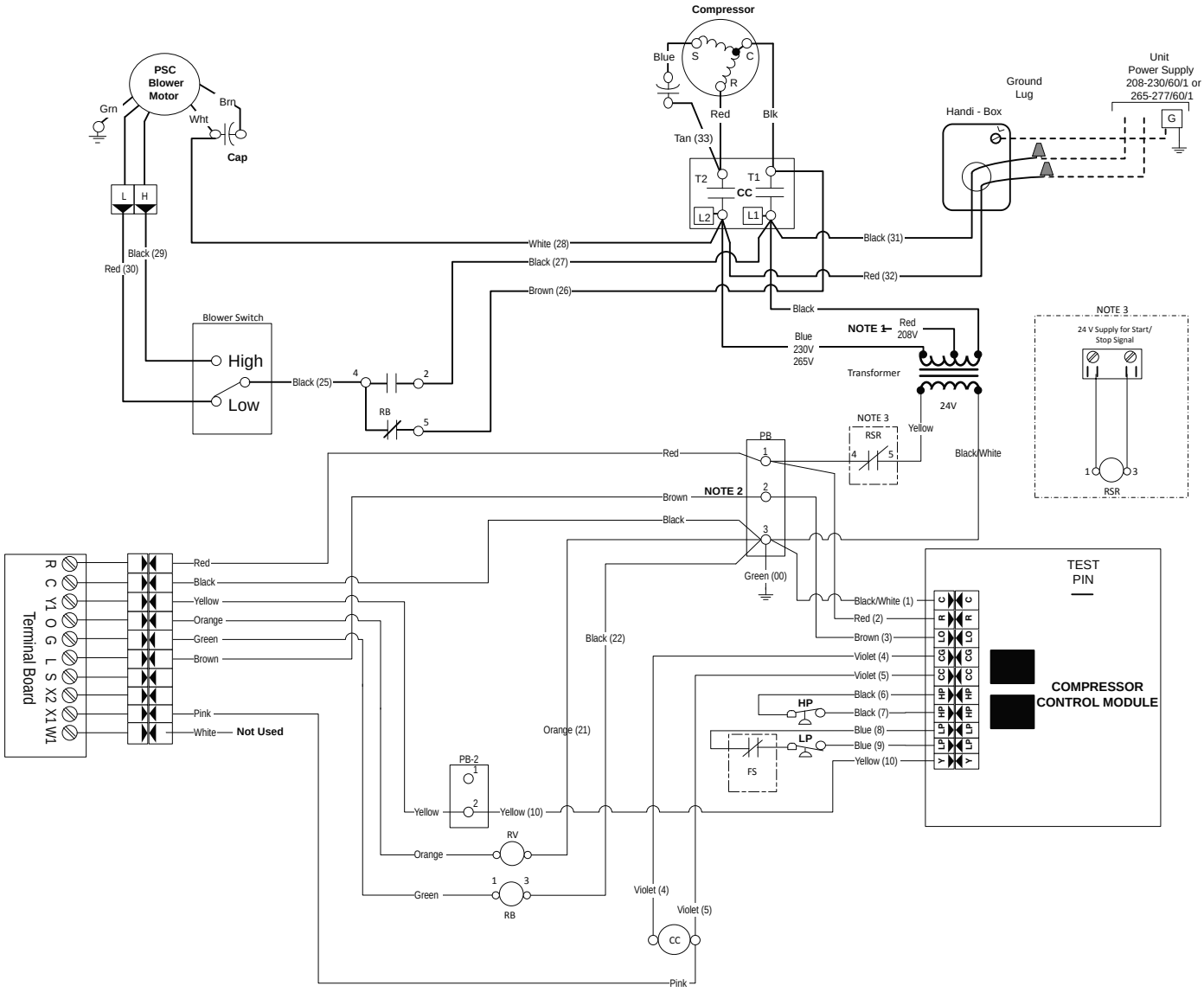
Blower Performance Data

Model	CFM	
	Low Speed	High Speed
09	260	300
12	300	340
15	375	450
18	450	600

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))

Wiring Schematics

CCM with Remote Thermostat - 208-230-265/60/1



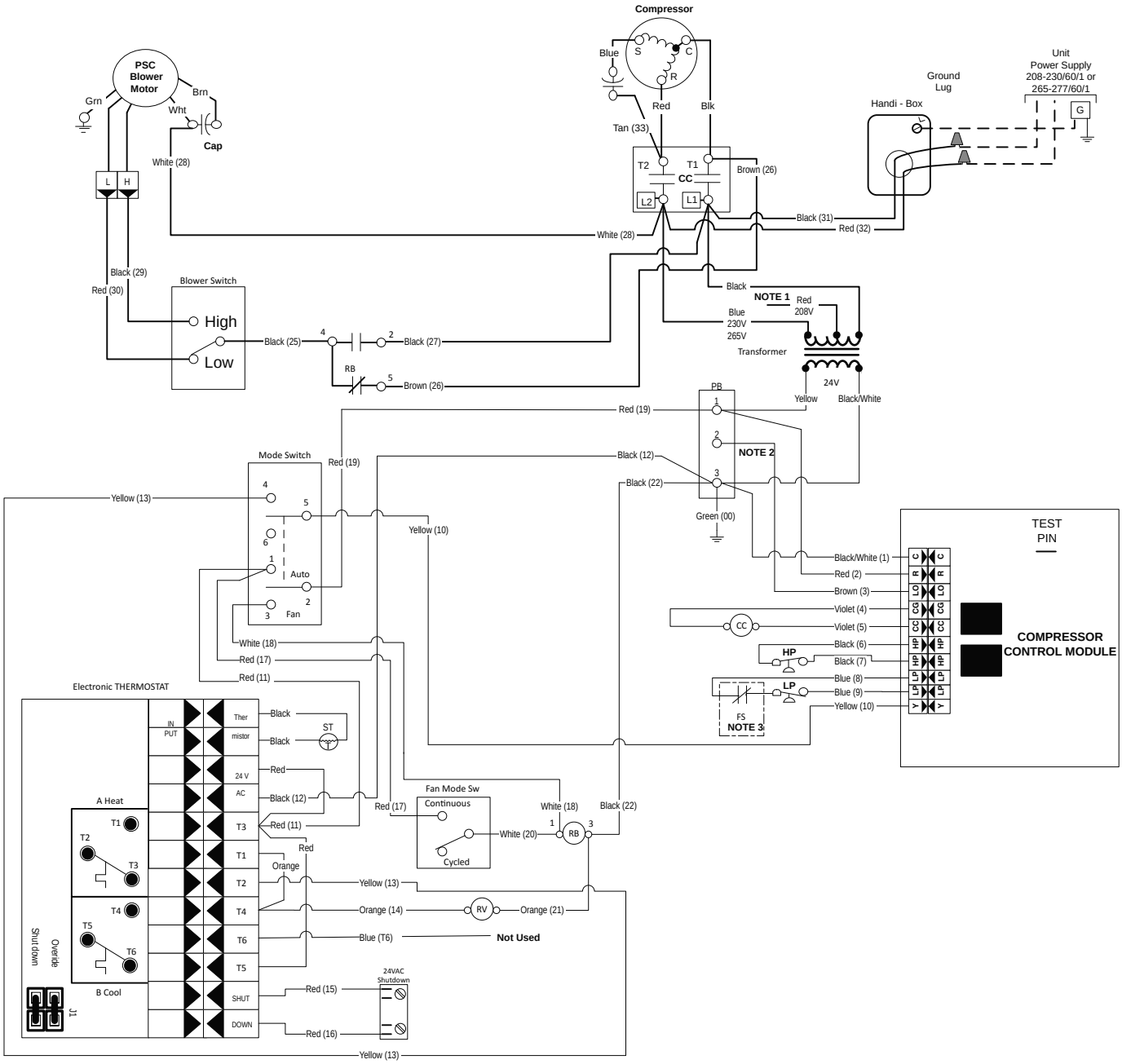
Legend

Factory low voltage wiring Factory line voltage wiring Factory low voltage wiring Factory line voltage wiring Quick connect terminal Wire nut	CC - Compressor Contactor DT - Damper Terminal Block FS - Freeze Sensing Device HP - High Pressure Switch LP - Low Pressure Switch PB - Power Block RB - Blower Relay RSR – Remote Start/Stop Relay RV - Reversing Valve Coil ST - Entering Air Temperature Sensor	L1 Wiring lug Ground Relay Contacts - N.O., N.C.	HP Switch - High Pressure LP Switch - Low Pressure Relay coil Capacitor T Thermistor Temperature Switch	**Notes:** 1. Switch Red and Blue wires for 208 volt operation. 2. Terminal C of the 24V PB is used as “L” output for Brown wire 3 for Lockout. 3. When installed, 24VAC connection for remote start/stop controller option.

97P827-01 6/24/11

Wiring Schematics cont.

CCM with Unit Mounted Thermostat - 208-230-265/60/1



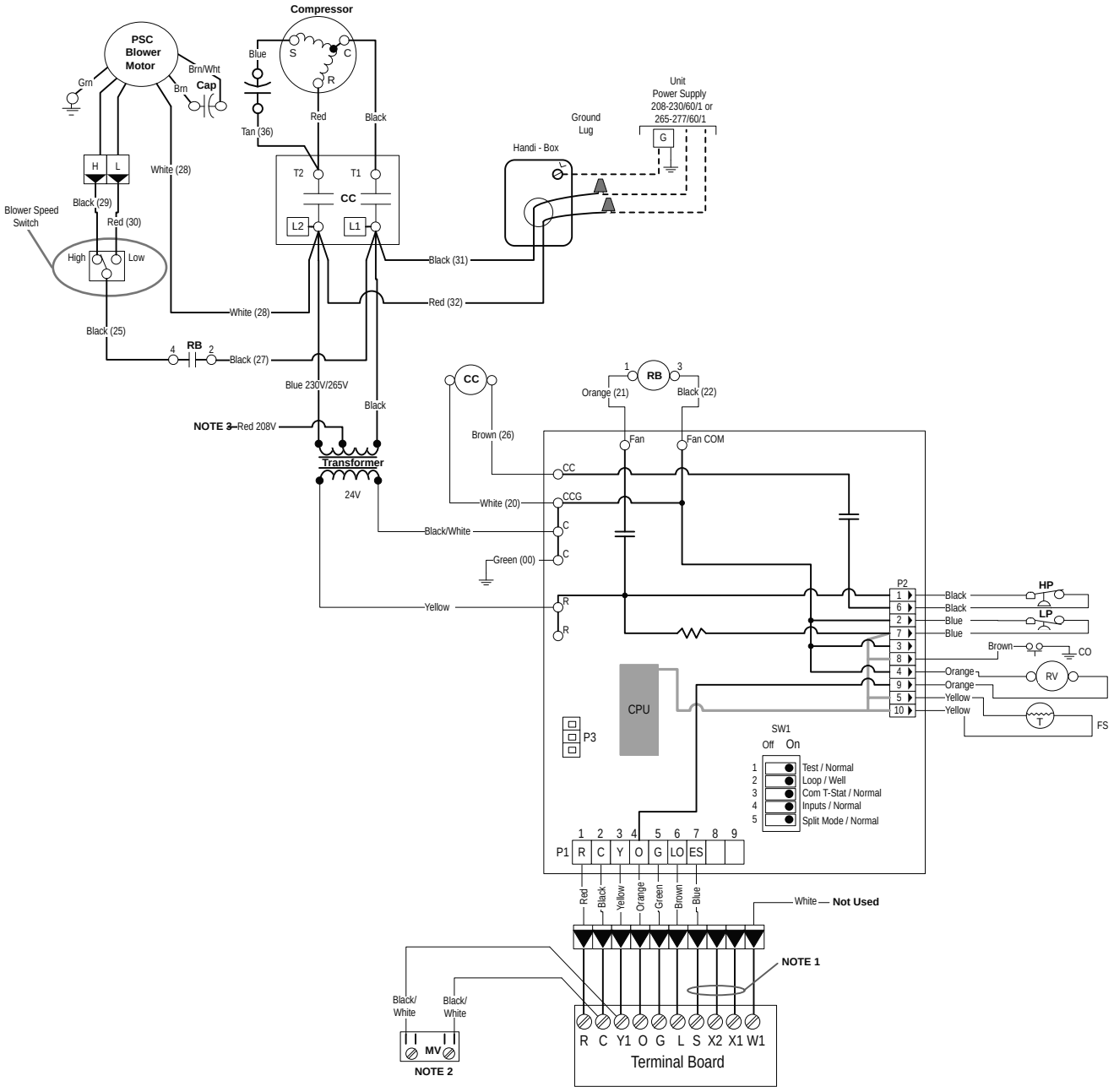
Legend

Factory low voltage wiring Factory line voltage wiring Field low voltage wiring Field line voltage wiring Quick connect terminal Wire nut	CC - Compressor Contactor DT - Damper Terminal Block FS - Freeze Sensing Device HP - High Pressure Switch LP - Low Pressure Switch PB - Power Block RB - Blower Relay RV - Reversing Valve Coil ST - Entering Air Temperature Sensor	L1 Field wire lug Earth Ground Relay Contacts - N.O., N.C. P Polarized Connector	HP Switch - High Pressure LP Switch - Low Pressure Relay coil Capacitor Thermistor Temperature Switch	**Notes:** 1. Switch Red and Blue wires for 208 volt operation. 2. Terminal C of 24 V PB is used as "L"output for Brown wire 3 for Lockout. 3. Optional field installed freeze sensing device.

97P827-02 7/14/11

Wiring Schematics cont.

Versatec with Remote Thermostat - 208-230-265/60/1



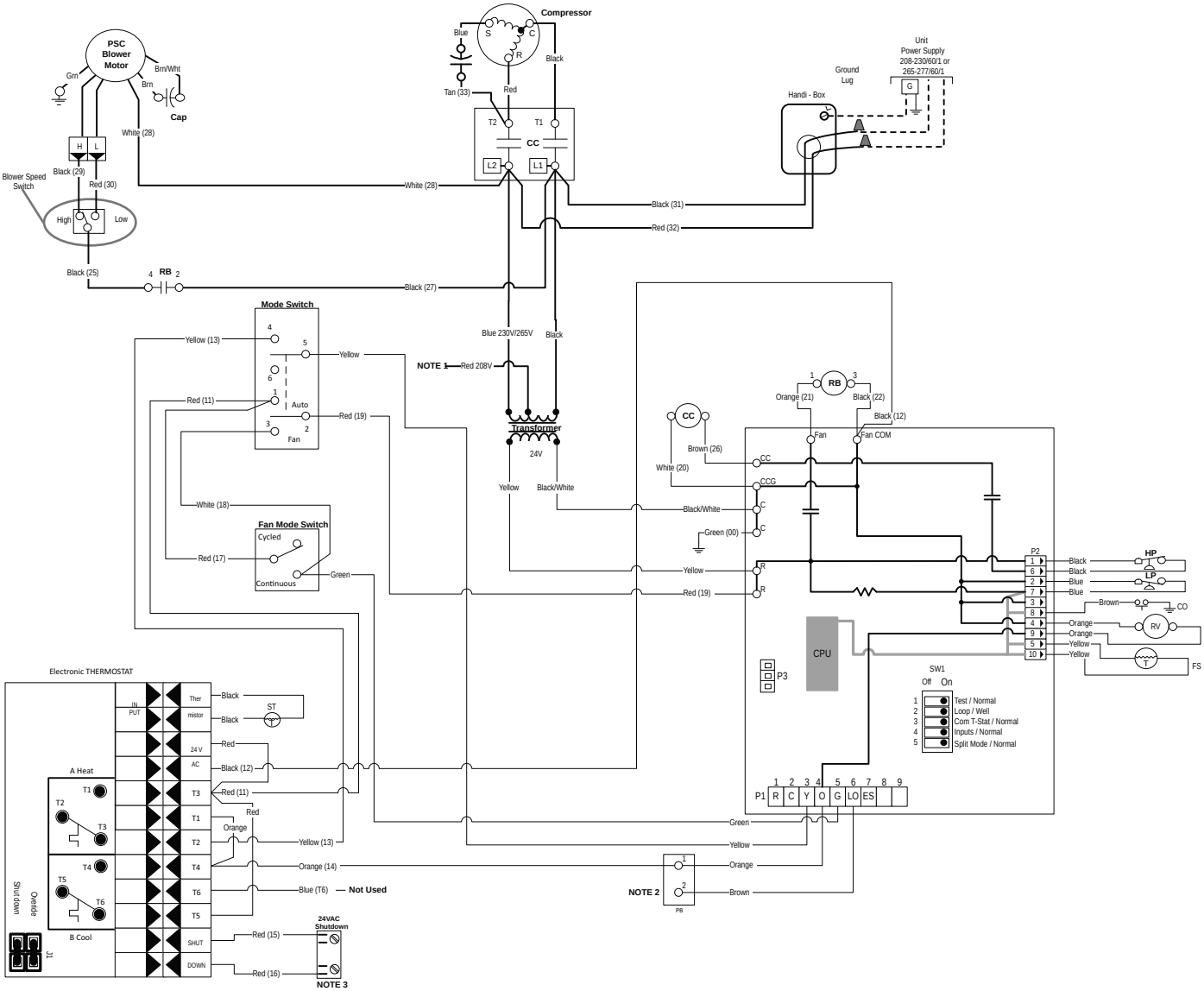
Legend

Factory low voltage wiring Factory line voltage wiring Field low voltage wiring Field line voltage wiring DC voltage PCB traces Internal junction Quick connect terminal Wire nut L1 Field wire lug Ground	Relay Contacts- N.O., N.C. Thermistor Relay coil	Switch - High pressure Switch - Low pressure P 2 3 1 Polarized connector Condensate Overflow	CC – Compressor Contactor CO – Condensate Overflow DT – Damper Terminal Block ES – Emergency Shutdown FS – Freeze Sensing Device HP – High Pressure Switch LP – Low Pressure Switch MV – Motorized Valve RB – Blower Power Relay RV – Reversing Valve Coil SW1 – DIP Switch #1	**Notes:** 1 - Requires common connection or 24 VAC for activation. 2 - When field installed 24VAC motorized valve is used, connect to C and Y. 3 - Switch blue and red wires for 208V operation.

97P828-01 6/24/11

Wiring Schematics cont.

Versatec with Unit Mounted Thermostat - 208-230-265/60/1



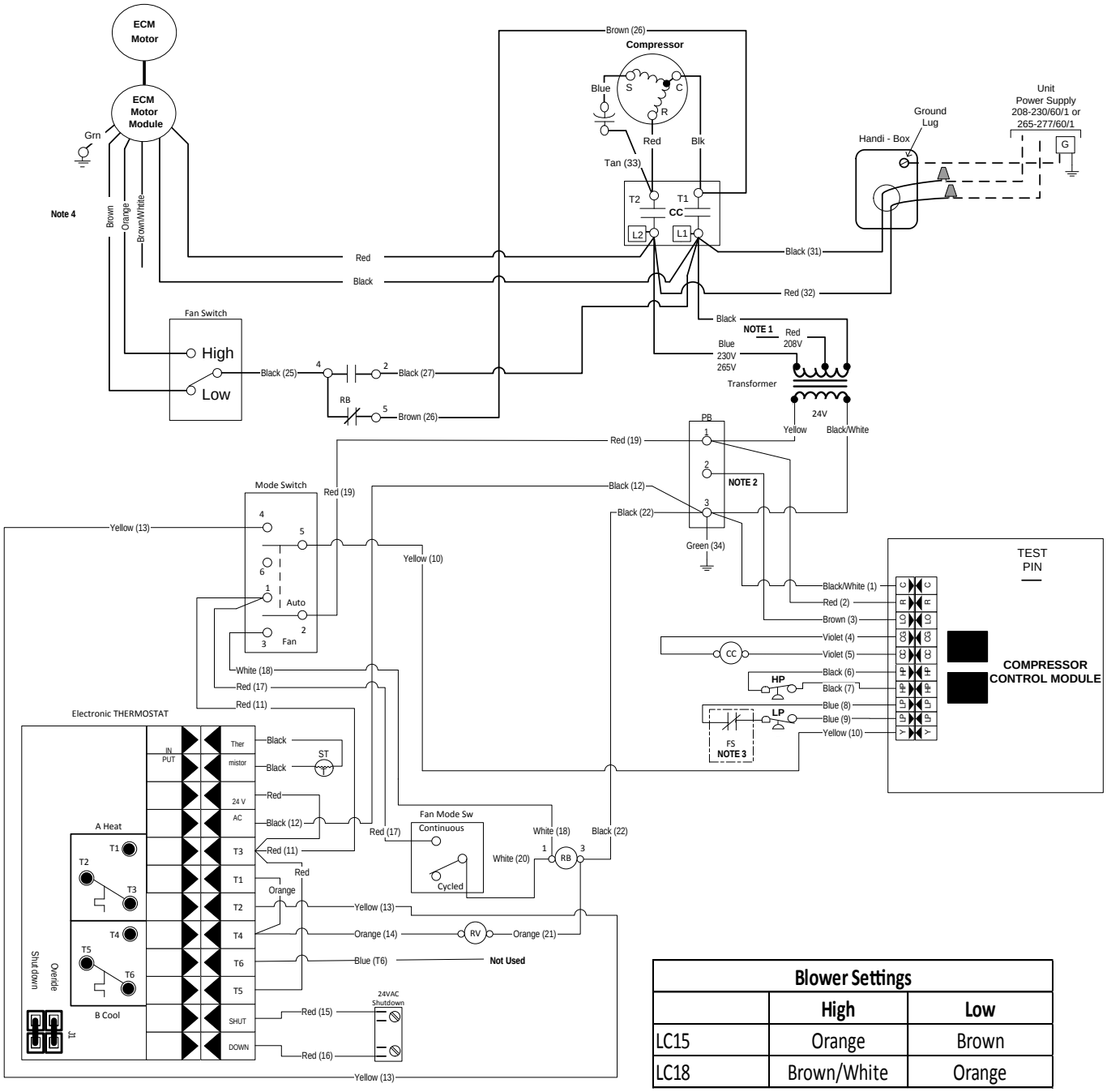
Legend

Factory low voltage wiring Factory line voltage wiring Factory low voltage wiring Factory line voltage wiring Quick connect terminal Wire nut	CC - Compressor contactor CO - Condensate overflow FS - Freeze sensing device HP - High pressure switch LP - Low pressure switch RB - Blower power relay RV - Reversing Valve coil SW1 - DIP switch #1 ES - Emergency Shutdown	L1 Wiring lug Ground Relay Contacts - N.O., N.C.	HP Switch - High Pressure LP Switch - Low Pressure Relay coil Capacitor Thermistor Temperature Switch	**Notes:** 1. Switch Red and Blue wires for 208 volt operation. 2. Terminal 2 of the 24V PB is used as "L" output for Brown wire 3 for Lockout. 3. When installed, 24VAC connection for remote start/stop controller option.

97P828-03 7/14/11

Wiring Schematics cont.

CCM with ECM and Unit Mounted Thermostat - 208-230-265/60/1



Blower Settings		
	High	Low
LC15	Orange	Brown
LC18	Brown/White	Orange

Legend

- Factory low voltage wiring
- Factory line voltage wiring
- Field low voltage wiring
- Field line voltage wiring
- Quick connect terminal
- Wire nut

CC - Compressor Contactor
DT - Damper Terminal Block
FS - Freeze Sensing Device
HP - High Pressure Switch
LP - Low Pressure Switch
PB - Power Block
RB - Blower Relay
RV - Reversing Valve Coil
ST - Entering Air Temperature Sensor

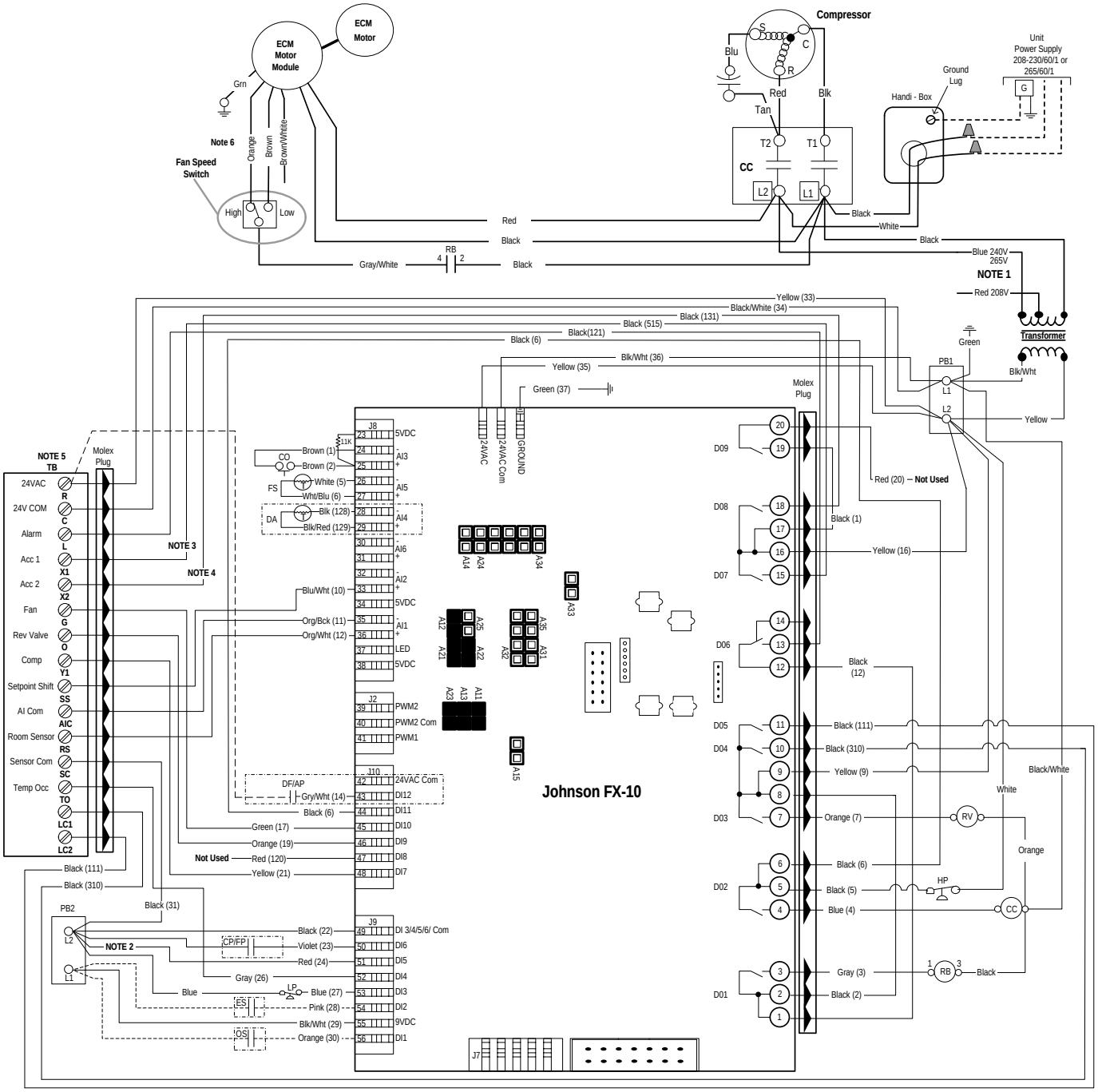
- L1 — Field wire lug
- Earth Ground
- Relay Contacts - N.O., N.C.
- P — Polarized connector
- HP — Switch - High Pressure
- LP — Switch - Low Pressure
- Relay coil
- Capacitor
- Thermistor
- Temperature Switch

Notes:

1. Switch Red and Blue wires for 208 volt operation
2. Terminal C of 24 V PB is used as "L" output for Brown wire 3 for Lockout.
3. Optional field installed freeze sensing device.
4. Factory wired. Refer to blower table settings.

Wiring Schematics cont.

FX10 with ECM and Unit Mounted Thermostat - 208-230-265/60/1



Legend

- Factory low voltage wiring
- Factory line voltage wiring
- Field low voltage wiring
- Field line voltage wiring
- Field Zone Sensor Wiring
- Internal junction
- Quick connect terminal
- Wire nut
- L1 Field wire lug
- Ground
- Relay Contacts- N.O., N.C.
- Thermistor - Johnson Control
- Relay coil
- Open Jumper
- Closed Jumper
- Switch - High pressure
- Switch - Low pressure
- Polarized connector (P: 1, 2, 3)
- Condensate Overflow

CC - Compressor Contactor
CO - Condensate Overflow
CP/FP - Compressor Proving/Fan Proving
DA - Discharge Air Temperature
DF/AP - Dirty Filter/Air Proving
ES - Emergency Shutdown
FS - Freeze Sensing Device
HP - High Pressure Switch
LP - Low Pressure Switch
OS - Occupied Switch
RB - Blower Power Replay
RV - Reversing Valve Coil
TB - Terminal Block

Notes:

1 - Switch Blue and Red wires for 208V operation
2 - Disconnect for 15 degree freeze sensing
3 - Acc 1 output is cycled with the compressor.
4 - Acc 2 output is cycled with the fan.
5 - R, C, Y1, O, and G inputs are for use with a wall mounted thermostat.
6 - Factory wired. Refer to blower table settings.

Blower Settings		
	High	Low
LC15	Orange	Brown
LC18	Brown/White	Orange

Wiring Schematics cont.

Versatec Control Board

Normal Mode Control Timing Table

Blower off delay	30 seconds
Compressor on delay	10 seconds
Compressor short cycle delay	5 minutes
Minimum compressor on time	2 minutes (except for fault condition)
High pressure fault recognition delay	Less than 1 second
Low pressure fault recognition delay	30 seconds
Freeze sensing fault recognition delay	30 seconds
Condensate overflow fault recognition delay	30 seconds
Low pressure fault bypass delay	2 minutes (for first fault only, 0 sec after)
Freeze sensing fault bypass delay	2 minutes (for first fault only, 0 sec after)
Power on delay	5 minutes

Test Mode Control Timing Table

Blower off delay	5 seconds
Compressor on delay	2 seconds
Compressor short cycle delay	15 seconds
Minimum compressor on time	5 seconds (except for fault condition)
High pressure fault recognition delay	Less than 1 second
Low pressure fault recognition delay	30 seconds
Freeze sensing fault recognition delay	30 seconds
Condensate overflow fault recognition delay	30 seconds
Low pressure fault bypass delay	0 seconds
Freeze sensing fault bypass delay	0 seconds
Power on delay	15 seconds
Fault off time	5 minutes

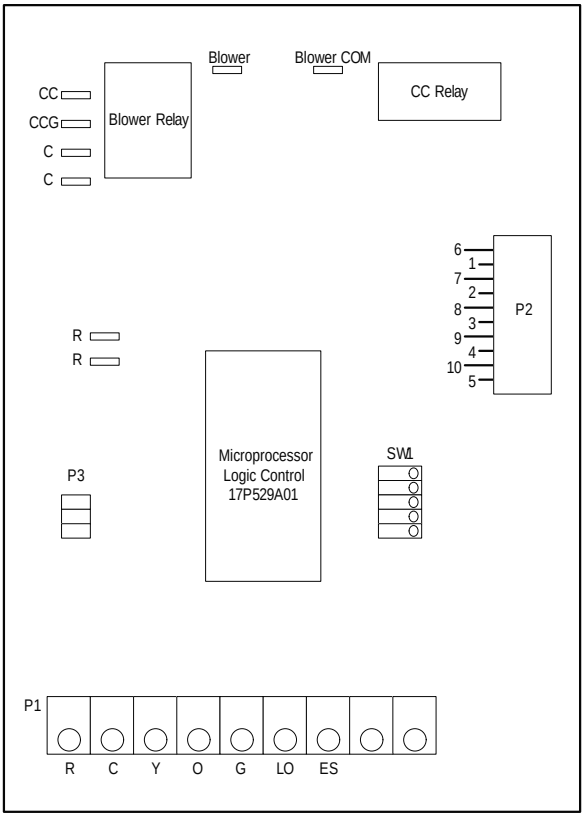
LED Display Mode Table

LED	Normal Display Mode
	SW1-4 On, SW2 Off
Drain	Drain pan overflow lockout
Water Flow	FS thermistor (loop<=15°F, well<=30°F) lockout
High Press	High pressure lockout
Low Press	Low pressure lockout
Air Flow	Not used
Status	Microprocessor malfunction*
DHW Limit	Not Used
HWD	SW2 status (Off=down position,On=up position)

Diagnostic Modes			
LED	**Current Fault Status**	**Inputs**	**Outputs**
	SW1-4 On, SW2 On	SW1-4 Off, SW2 Off	SW1-4 Off, SW2 On
Drain	Drain pan overflow	Y	Compressor
Water Flow	FS thermistor (loop<=15°F, well<=30°F)	G	Blower
High Press	High pressure	O	O
Low Press	Low pressure	ES	ES
Air Flow	Not used	Not Used	Not Used
Status	Not used	Not Used	Not Used
DHW Limit	Not used	Not Used	Not Used
HWD	SW2 in the On position	SW2 in the Off position	SW2 in the On position

*Flashing Status light indicates microprocessor is functioning properly. Solid "on" indicates a microprocessor malfunction.

Versatec Logic Board Physical Layout



Logic Board DIP Switch Settings

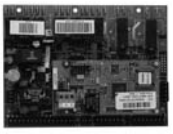
Switch	OFF	ON
SW1 - 1	Test Mode - Selected timings sped up to facilitate troubleshooting	Normal Mode - Standard timings
SW1 - 2	Loop - Closed loop freeze sensing setting (15°F)	Well - Open loop freeze sensing setting (30°F)
SW1 - 3	Commercial - Enables NS features when TA32U02 thermostat is used	Normal - Standard thermostat operation
SW1 - 4	IO Display* - Enables Input/Output display on external LED board*	Normal* - Unit status display
SW1 - 5	Split Mode – Dual-Speed-Compressor and with No blower	Normal - Single-Speed Compressor with blower
SW2	OFF* - Normal or Input display mode activated	ON* - Current fault or Output display mode activated

* Refer to LED Display Mode table for position of SW1-4 and SW2

Operational Logic Table

Mode	Inputs	Blower	Comp	RV
Htg	Y	ON	ON	OFF
Clg	Y,O	ON	ON	ON
Blower	G	ON	OFF	OFF

Controls

Control	General Description	Application	Display/Interface	Protocol	Thermostat Options
CCM Control 	The CCM (Compressor control module) is a more reliable replacement for electro-mechanical control applications. It features a small microprocessor board that handles the lockout function of the unit. A second microprocessor handles the unit mounted thermostat for maintaining accurate room temperature.	Residential and commercial applications requiring minimal but reliable controls. Includes Random Start, High and low pressure switches and auto changeover capability.	Dial thermostat with Hi and Low blower speeds, and auto changeover or continuous blower selection switches.	None	Unit Mounted Digital Dial Thermostat Remote Mounted Standard Thermostat
Versatec Control 	The Versatec Control is a microprocessor based board that adds the features of emergency shutdown (ES), water freeze detection (FD) and condensate overflow (CO). The Versatec Control also features Optional Field servicing LEDs for mode, Fault and diagnostic indication.	Residential and commercial applications requiring more controls features than CCM and Includes Random Start, High and low pressure switches, auto changeover capability, emergency shutdown (ES), water freeze detection (FD), and condensate overflow (CO).	Optional field servicing LED board for mode, fault and diagnostic indication	None	Unit Mounted Digital Dial Thermostat Remote Mounted Standard Thermostat
FX10 	The FX10 microprocessor control is self contained control featuring LP, LOC, HP, LWT, and condensate overflow fault modes can be displayed on BAS system. Optional handheld Medium User Interface (MUI) Control can be used for additional setup or servicing. Program customization is possible. This control is suited for both single and dual capacity compressors as well as PSC and ECM2.3 blower motors.	Commercial applications using single and dual capacity compressors with either PSC or ECM2.3 blower motors. Also suitable for multi-compressor products. Cannot be integrated with centralized building automation systems. Software can be customized for specific projects.	Optional Medium User Interface (MUI) can be used as a field service tool.	Standalone	Remote Mounted Standard Thermostat Remote Mounted Sensor
FX10 w/ N2 	FX10 Control functions as both unitary heat pump control and DDC communication, therefore detail operational and fault information is available to BAS. Other features are same as FX10 with addition of Johnson Controls N2 compatibility.	Same as FX10 with Johnson Controls N2 BAS compatibility.	Optional Medium User Interface (MUI) can be used as a field service tool.	Johnson Controls N2 network	Remote Mounted Standard Thermostat Remote Mounted Sensor
FX10 w/ LonWorks 	FX10 Control functions as both unitary heat pump control and DDC communication, therefore detail operational and fault information is available to BAS. Other features are same as FX10 with addition of LonWorks compatibility.	Same as FX10 with LonWorks BAS compatibility.	Optional Medium User Interface (MUI) can be used as a field service tool.	LonWorks	Remote Mounted Standard Thermostat Remote Mounted Sensor
FX10 w/ BACnet 	FX10 Control functions as both unitary heat pump control and DDC communication, therefore detail operational and fault information is available to BAS. Other features are same as FX10 with addition of BACnet compatibility.	Same as FX10 with BACnet BAS compatibility. Due to communication speed, no more than 30 units should be connected to a single trunk of the network.	Optional Medium User Interface (MUI) can be mounted or used as a ield service tool.	BACnet - MS/TP (19,200 Baud Rate)	Remote Mounted Standard Thermostat Remote Mounted Sensor

Standard CCM Control Features

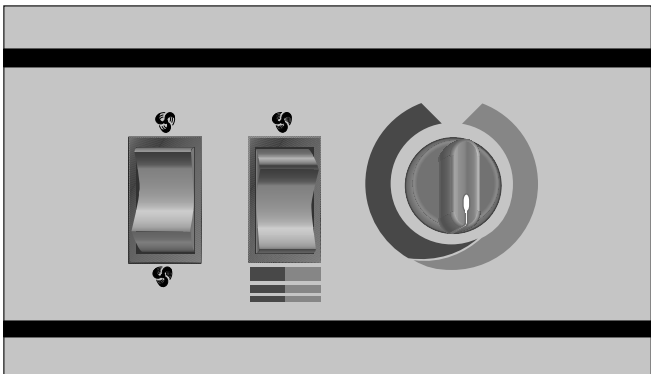
Compressor control module (CCM) controls are standard on the Envision Series Low Sill Console heat pump. This control features unit mounted thermostat and switches,
Features of the standard control are:

- Easy to understand color coded thermostat adjustment markings.
- Large, rocker type mode and blower switches.
- Internally mounted blower switch to choose cycled or constant blower operation.
- High pressure and low pressure safety controls to protect the unit components.
- Lockout circuit to shut down unit operation upon receipt of a fault indicator from the safety controls.
- A 24 volt control circuit allows for safe and easy diagnosis.

Controls cont.

The user selects either “Heat/Cool” or “Fan Only” on the mode switch, then either “High” or “Low” at the blower speed switch. The temperature can be controlled by rotating the thermostat control knob.

Unit Mounted Control



The “Fan Only” setting provides constant blower operation.

In the “Heat” mode, a call for heat by the thermostat closes the compressor contactor contacts, energizing the compressor, which will run until the thermostat is satisfied.

In the “Cool” mode, a call for cooling by the thermostat energizes the reversing valve and closes the compressor contactor contacts, energizing the compressor, which will run until the thermostat is satisfied.

If either the low or high pressure safety switches are opened, the compressor and reversing valve are disabled by the lockout relay. Unit operation will resume only after the voltage to the unit is interrupted or the mode switch is placed in the “Off” position.

Optional Versatec Microprocessor Control Features

The Versatec microprocessor board provides control of the entire unit as well as outputs for status modes, faults and diagnostics. The control system is a microprocessor-based control board that is located in the unit control box. This feature is available for either unit mounted controls or optional remote wall mounted thermostat. A 9-pin low voltage terminal strip provides all necessary terminals for the wall mounted thermostat.

Startup
The unit will not operate until all the inputs and safety controls are checked for normal operating conditions.

Fault Retry
All faults are retried twice before finally locking the unit out to prevent nuisance service calls.

Component Sequencing Delays
Components are sequenced and delayed for optimum unit performance.

Emergency Shutdown
A grounded signal to common or connecting 24 VAC to the ES terminal places the controller into the emergency shutdown mode. The compressor and blower operation are suspended while in the emergency shutdown mode.

Condensate Overflow Protection
The board incorporates an impedance liquid sensor at the top of the condensate drain pan. Upon a continuous 30-second sensing of the condensate, the cooling operation of the unit is suspended.

Safety Controls
The microprocessor board receives separate signals from a high pressure switch for safety, a low pressure switch to prevent loss of refrigerant charge and a low suction temperature thermistor for freeze detection. Upon a continuous 30-second measurement of the fault (immediate for high pressure), compressor operation is stopped.

Controls cont.

Control Tables for Optional Versatec Microprocessor

Logic Board DIP Switch Settings

Switch	OFF	ON
SW1 - 1	Test - Selected timings sped up to facilitate troubleshooting	Normal - Standard timings
SW1 - 2	Loop - Closed loop freeze detection setting (15°F)	Well - Open loop freeze detection setting (30°F)
SW1 - 3	Commercial - Enables NS features when TA32U02 thermostat is used	Normal - Standard thermostat operation
SW1 - 4	IO Display* - Enables Input/Output display on external LED board	Normal* - Unit status display
SW1 - 5	Configures board for 2-speed compressor without blower	Configures board for 2-speed compressor with blower

Normal Control Timing

Blower off delay	30 seconds
Compressor on delay	10 seconds
Short cycle delay	5 minutes
Minimum compressor on time	2 minutes (except for fault condition)
High pressure fault recognition delay	Less than 1 second
Low pressure fault recognition delay	30 seconds
Freeze detection fault recognition delay	30 seconds
Condensate overflow fault recognition delay	30 seconds
Low pressure fault bypass delay	2 minutes
Freeze detection fault bypass delay	2 minutes
Power on delay	5 minutes

Operational Logic

Mode	Inputs	Blower	Comp	RV
Htg	Y	ON	ON	OFF
Clg	Y,O	ON	ON	ON
Blower	G	ON	OFF	OFF

Test Control Timing

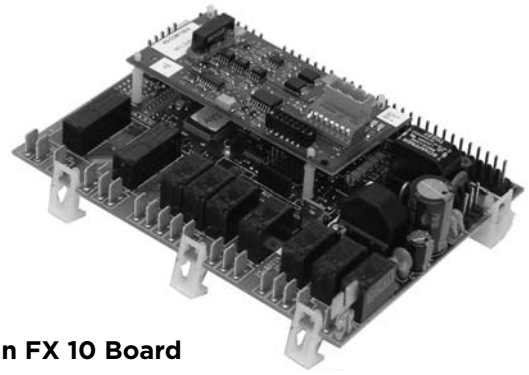
Blower off delay	5 seconds
Compressor on delay	2 seconds
Short cycle delay	15 seconds
Minimum compressor on time	5 seconds (except for fault condition)
High pressure fault recognition delay	Less than 1 second
Low pressure fault recognition delay	30 seconds
Freeze detection fault recognition delay	30 seconds
Condensate overflow fault recognition delay	30 seconds
Low pressure fault bypass delay	0 seconds
Freeze detection fault bypass delay	0 seconds
Power on delay	15 seconds
Fault off time	5 minutes

Diagnostic Modes

LED	Current Fault Status SW1 - #4 On, SW2 On	Inputs SW1 - #4 Off, SW2 Off	Outputs SW1 - #4 Off, SW2 On
Drain	Drain pan overflow	Y	Compressor
Water Flow	FD thermistor (loop <15°F, well <30°F)	G	Blower
High Press	High pressure >600 psi	O	O
Low Press	Low pressure <40 psi	ES	ES
Air Flow	Not used	Not Used	Not Used
Status	Not used	Not Used	Not Used
DHW Limit	Not used	Not used	Not used
HWD	SW2 in the On position	Off position	On position

Controls cont.

Optional FX10 Control



Main FX 10 Board

The optional FX10 control provides unparalleled capability in several areas including performance monitoring, zoning, humidity, energy management, and service diagnosis, and then communicates it all thru standard DDC protocols like N2, Lon and BACnet (MS/TP @ 19,200 Baud rate).

The most unique feature is integrating the FX10 into the Envision series as both the heat pump and DDC controller providing both a cost advantage and providing features not typically found on WLHP controls. This integration allows heat pump monitoring sensors, status and service diagnosis faults to be communicated thru the DDC direct to the building automation system (BAS), giving building supervisors detailed and accurate information on every piece of equipment without removing an access panel.

FX10 Advanced Control Overview

The Johnson Controls FX10 board is specifically designed for commercial heat pumps and provides control of the entire unit as well as input ports for Open N2, LonTalk, BACnet (MS/TP @ 19,200 Baud rate) communication protocols as well as an input port for a user interface. The user interface is an accessory item that can be used to aid in diagnostics and unit setup. A 16-pin low voltage terminal board provides terminals for common field connections. The FX10 Control provides:

- Operational sequencing
- High and low-pressure switch monitoring
- General lockout
- Freeze detection
- Condensate overflow sensing
- Lockout mode control
- Emergency shutdown mode
- Random start and short cycle protection

Short Cycle Protection

Allows a minimum compressor “off” time of four minutes and a minimum “on” time of two minutes.

Random Start

A delay of 1 to 120 seconds is generated after each power-up to prevent simultaneous startup of all units within a building after the release from an unoccupied cycle or power loss.

Emergency Shutdown

A field-applied dry contact can be used to place the control into emergency shutdown mode. During this mode, all outputs on the board are disabled.

Freeze Detection Limit

Field selectable for 15° or 30°F (-9° or -1°C)

Installation Options

- Standalone controlled by standard room thermostat
- Standalone with a Zone Temperature Sensor (must have user interface to change set points beyond the allowed +/- 5°F)
- Integrated into BAS by adding communication module

Accessory Outputs

Quantity 2. One cycled with blower, other with compressor.

User Interface

4 x 20 backlit LCD.

Optional Plug-in Communication Modules - (compatible with standard BAS protocols)

- Open N2
- LonTalk
- BACnet (MS/TP @ 19,200 Baud rate)

Display

Requires DLI Card/Kit. Up to 2 displays, either 1 local and 1 remote, or 2 remote. (A 2-display configuration requires identical displays.) Local display can be up to 3 meters from the controller, power supply, and data communication. Remote display can be up to 300 meters from the controller. Remote display must be independently powered with data communication done via 3 pole shielded cable.

Control Timing & Fault Recognition Delays

Lead compressor “ON” delay (not applicable for single compressor models)	90 seconds
Minimum compressor “ON” time (except for fault condition)	2 minutes
Short cycle delay	5 minutes
Random start delay	0-120 seconds
High pressure fault	<1 second
Low pressure fault	30 seconds
Freeze detection fault	30 seconds

Controls cont.

Condensate overflow fault .....30 seconds
Low pressure fault bypass.....2 minutes
Freeze detection fault bypass.....2 minutes

Optional FX10 Microprocessor and BAS Interface

The FX10 is a microprocessor based control that not only monitors and controls the heat pump but also can communicate any of this information back to the building automation system (BAS). This means that not only does the control monitor the heat pump at the unit you can also monitor and control many the features over the BAS. This clearly puts the FX10 in a class of its own.

The control will enumerate all fault conditions (HP, LP, CO, LOC, and Freeze Detection) over a BAS as well as display them on a medium user interface (MUI). HP, LP, CO and Freeze Detection faults can all be reset over a BAS. A Loss Of Charge fault can not be reset or bypassed until the problem has been corrected. A MUI is invaluable as a service tool for the building service team.

The unit can be commanded to run by a typical heat pump thermostat or run based on heating and cooling set points supplied by a BAS. The control board is wired with quick connect harnesses for easy field change out of a bad control board. An alarm history can be viewed through the MUI and will be held in memory until the unit is power cycled. Relative humidity can be read by a 0-5VDC humidity sensor that is displayed over the network.

The FX10 control has unused analog and digital inputs for field installed items such as air temperature, water temperature, CO^2 or current status switches. The control has unused binary and PWM outputs that can be commanded over the BAS for field use. An optional Medium User Interface (MUI) for control setup and advanced diagnostics is available with some mounting kits, MUIK3 - Panel mount version and the MUIK4 - Wall mount version.

Zone Sensors

There are two options for zone sensors that can be used with the FX10 control. Both sensors use a Johnson controls A99 positive temperature coefficient type sensor. The TAXXJ02 has a set point adjustment now which will give the end user a +/- 5°F adjustment from the set point as well as a push button that can be used for temporary occupancy. The control leaves the factory set to operate with a TAXXJ02 sensor and can be changed to read the TAXXA04 sensor through a building automation system or with a user interface.

Standard Features

- Anti Short Cycle
- High Pressure Protection
- Low Pressure Protection
- Freeze Detection
- Loss Of Charge Detection
- Random Start
- Display for diagnostics
- Reset Lockout at disconnect or through BAS
- 2 Accessory outputs
- Optional BAS add-on controls

DDC Operation and Connection

Other optional network protocol boards that can be added to the FX10 are:

- Johnson Control N2
- LonWorks
- BACnet
  - MS/TP @ 19,200 Baud rate
  - Limit devices to 30 on a single trunk line.

Control and Safety Feature Details

Emergency Shutdown

The emergency shutdown mode can be activated by a command from a facility management system or a closed contact on BI-2. The default state for the emergency shutdown data point is off. When the emergency shutdown mode is activated, all outputs will be turned off immediately and will remain off until the emergency shutdown mode is de-activated. The first time the compressor starts after the emergency shutdown mode has been de-activated, there will be a random start delay present.

Lockout Mode

Lockout mode can be activated by any of the following fault signals: refrigerant system high pressure, refrigerant system low pressure, freeze detection, and condensate overflow. When any valid fault signal remains continuously active for the length of its recognition delay, the controller will go into fault retry mode, which will turn off the compressor. After the Compressor short cycle delay, the compressor will attempt to operate once again. If three

Controls cont.

consecutive faults occur in 60 minutes during a single heating or cooling demand, the unit will go into lockout mode, turning off the compressor, and enabling the alarm output until the controller is reset. If the control faults due to the low pressure input (BI-3) being open during the pre-compressor startup check, the control will go into lockout mode immediately, disabling the compressor from starting and enabling the alarm output (BO-6). The lockout condition can be reset by powering down the controller, by a command from the BAS, or by the holding the ESC and Return keys on the MUI for 5 seconds.

Freeze Detection Limit (AI-5)
The freeze detection limit sensor will monitor the liquid refrigerant temperature entering the water coil in the heating mode. If the temperature drops below the freeze detection limit trip point for the recognition delay period, the condition will be recognized as a fault. The freeze detection limit trip point will be factory set for 30°F and will be field selectable for 15°F by removing a jumper wire on BI-5. The freeze detection limit fault condition will be bypassed 2 minutes at normal compressor startup, to allow the refrigeration circuit to stabilize. If the freeze detection limit sensor becomes unreliable at any time compressor operation will immediately be suspended until the problem is corrected. This should be displayed as an alarm on the BAS and the MUI. This alarm will be reported a "Water Low Temp Limit" fault.

High Pressure (BI-11)
The high-pressure switch shall be a normally closed (NC) switch that monitors the systems refrigerant pressure. If the input senses the high-pressure switch is open it must disable the compressor output immediately and count the fault. The compressor minimum on time does not apply if the high-pressure switch opens. The compressor will not restart until the compressor short cycle time delay has been satisfied.

Low Pressure (BI-3)
The low-pressure switch shall be a normally closed (NC) switch that monitors the systems refrigerant pressure. The input shall be checked 15 seconds before compressor start up to be sure the pressure switch is closed and then ignored for the first 2 minutes after the compressor output (BO-2) is enabled. If the switch is open continuously for (30) seconds during compressor operation the compressor output (BO-2) will be disabled. The compressor will not restart until the compressor short cycle time delay has been satisfied.

Condensate Overflow
The condensate overflow sensing circuit will monitor the condensate level as a resistance input to AI-3. If the condensate water level rises resulting in the input resistance rising above the set point for the recognition delay period, the condition will be recognized as a fault. The condensate will be subjected to a (30) second lockout delay which requires that the fault be sensed for a continuous (30) seconds before suspending unit operation.

Alarm Output (BO-6)
The alarm output will be enabled when the control is in the lockout mode and will be disabled when the lockout is reset.

Test Mode
Raising the zone temperature input (AI-1) reading to 180–220°F or by holding the ESC and down arrow keys on the MUI for 5 seconds will put the control into test mode. In test mode the random start delay and the compressor fixed on delay time will both be shortened to 5 seconds and the reversing valve will be allowed to cycle with out shutting down the compressor. If an MUI is connected to the control LED 8 will flash and the words "Test Mode Enabled" will be shown on the LCD display when the control is in test mode. Test mode will be disabled after a power cycle, 30 minute timeout, or by holding the ESC and Up arrow keys on the MUI.

Sequence of Operation

Power Fail Restart
When the controller is first powered up, the outputs will be disabled for a random start delay. The delay is provided to prevent simultaneous starting of multiple heat pumps. Once the timer expires, the controller will operate normally.

Random Start Delay
This delay will be used after every power failure, as well as the first time the compressor is started after the control exits the unoccupied mode or the emergency shutdown mode. The delay should not be less than 1 second and not longer than 120 seconds. If the control is in test mode the random start delay will be shortened to 5 seconds.

Compressor Fixed On Delay Time
The Compressor Fixed On Delay Time will ensure that the compressor output (B02) is not enabled for (90) seconds after the control receives a call to start the compressor. This delay is adjustable from 30 – 300 seconds over a BAS or a MUI. If the control is in test mode the Compressor Fixed On Delay Timer will be shortened to 5 seconds.

Controls cont.

Compressor Minimum On Delay

The compressor minimum on delay will ensure that the compressor output is enabled for a minimum of (2) minute each time the compressor output is enabled. This will apply in every instance except in the event the high pressure switch is tripped or emergency shutdown then the compressor output will be disable immediately.

Compressor Short Cycle Delay Time

The compressor short cycle time delay will ensure that the compressor output will not be enabled for a minimum of (5) minutes after it is disabled. This allows for the system refrigerant pressures to equalize after the compressor is disabled.

Heating Cycle

On a call for heating, the blower enable output and accessory output 2 will turn on immediately after the random start delay timer has been satisfied. If the compressor short cycle time delay has been satisfied, the compressor will turn on after the blower enable and accessory output 2 are on and the fixed compressor start delay timers have been satisfied.

Cooling Cycle

On a call for cooling, the blower enable output and accessory output 2 will turn on immediately after the random start delay timer has been satisfied. If the compressor short cycle time delay has been satisfied, the compressor will turn on after the blower enable and accessory output 2 are on and the fixed compressor start delay timers have been satisfied.

MUI Alarm History Reporting

If a fault occurs the fault will be recorded in history for display on the medium user interface in the History Menu. Each fault type will be displayed in the history menu with a number between 0 and 3. A reading of 3+ will mean that fault has occurred more than three times in the past. The history menu can be cleared with a power cycle only. Alarm date and time are not included in the history.

Inputs and Outputs Configuration

Field Selectable Options

Freeze Detection Limit Set Point (BI-5)

The freeze detection limit set point input allows you to adjust the freeze detection limit set point (AI-5). When the jumper is installed on BI-5 (Wire #24) the freeze detection limit set point is factory set for 30°F. When the jumper on BI-5 (Wire #24) is removed the freeze detection limit set point will be 15°F.

Accessory Outputs (BO-7 and BO-8)

Accessory Output 1 will be energized 90 seconds prior to the compressor output being energized. Accessory Output 2 will be energized with the fan output (BO-1). When the corresponding compressor output is turned off the accessory output will be deactivated immediately. These outputs are selectable for normally open or normally closed operation through the Medium User interface or through the Building Automation System.

SINGLE and DUAL STAGE WATER-TO-AIR			
Input Name	**Input**	**Output Name**	**Output**
Zone Temp 1	AI 1	Fan Enable	BO1
Relative Humidity Input	AI 2	Comp – Low Capacity	BO2
Condensate Level	AI 3	Reversing Valve	BO3
Universal Temp Input	AI 4	Comp – Full Capacity	BO4
Water Coil Low Temperature Limit	AI 5	Network Output/EH Output	BO5
Warm/Cool Adjust and Temp Occ	AI 6	Alarm	BO6
		Accessory 1 Output	BO7
Occupied	BI 1	Accessory 2 Output	BO8
Emergency Shutdown	BI 2	Network Controlled Output	B09
Stage 1 Low Pressure	BI 3		
Network Viewable Input 1	BI 4	ECM2 Fan	PWM1
Water Coil Low Temp Limit Set Point	BI 5	Network Controlled Output	PWM2
Network Viewable Input 2	BI 6		
Thermostat Y1	BI 7		
Thermostat Y2	BI 8		
Thermostat O	BI 9		
Thermostat G	B10		
Stage 1 High Pressure	BI11		
Compressor Proving	BI12		
XP10 Expansion Card			
Input Name	**Input**	**Output Name**	**Output**
Unused	AI 1	Unused	BO 1
Unused	AI 2	Unused	BO 2
Unused	AI 3	Unused	BO 3
Unused	AI 4	Unused	BO 4

Control Accessories

Zone Sensors

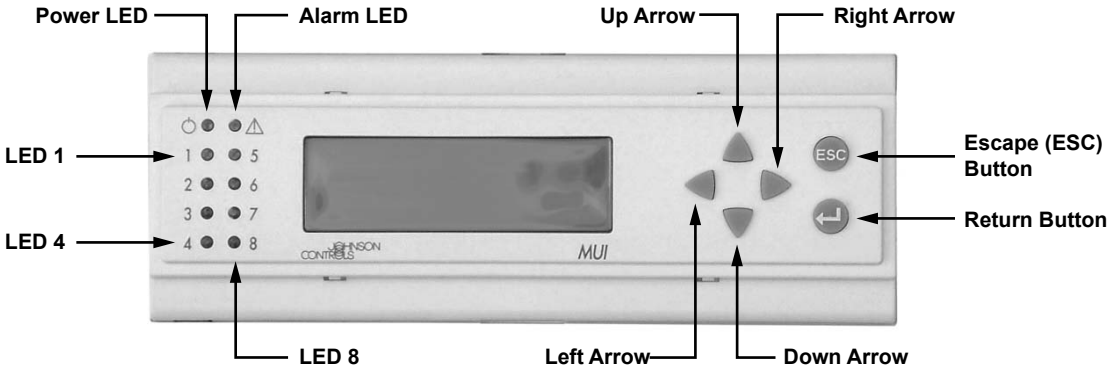
- TAXXJ02 Room Command Module
- TAXXA04 LCD Room Command Module
- A99 Sensor

MUI (LCD User interface) for diagnostics and commissioning.

- MUIK3 - Panel Mount, Portable
- MUIK4 - Wall Mount

Controls cont.

FX10 User Interface (MUI) Physical Layout



Alarm LED - Indicates a **Lock-Out** or a bad **Freeze Sensor**

Power LED - Shows FX processor is operational

LED 1 - Flashing shows **Compressor 1** running

LED 2 - Flashing shows **Full Capacity Compressor** running

LED 3 - On shows **Fan** running

LED 4 - On shows **Reversing Valve** in cool

LED 8 - Flashing shows unit in '**Test' Mode**

MUI Menu Navigation for Single Compressor - Envision Water-to-Air

Welcome

Info Status Temps Outputs Settings Maint Alarms Alm-History

Info

WFI	
Envision Series	
PROFXENV-XX	
3/8/07	

Status

Run Mode	Auto
Eff Occup'y	Occ
Y1 Input	OFF
Y2 Input	OFF
G Input	OFF
O Input	OFF
Occ Input	Occ
Temp Occ Inp	OFF
Condensate	NML
Emg Input	Run
Lo Press	ON
Hi Press	ON
Rndm Tmr	0
BI-4 Input	OFF

Temps

Zone Temp	77.2 ºF
Dis Air Temp	51.0 ºF
Eff Clg Setpt	70.0°F
Eff Htg Setpt	66.0°F
Water Coil	77.8°F
Low WC Limit	30.0°F
Humidity	56.7 %RH
WarmCool AI	14.6
WarmCoolAdj	0.2

Outputs

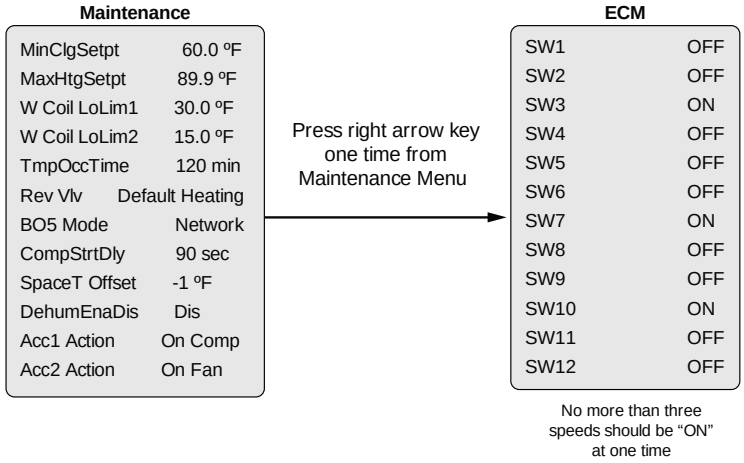
nvoFanStatus	ON
CmpCmd Status	OFF
Cmp Capacity	OFF
Rev Valve	Heat
X1 Output	OFF
X2 Output	OFF
PWMOut	98%
BO5	OFF
BO9	OFF
AO2 Output	0%

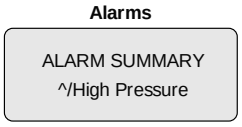
Settings

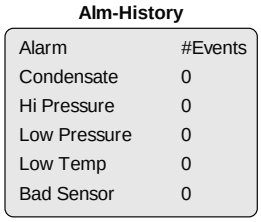
Unit of Measure	F
Occ Clg Setpt	73.9 ºF
Occ Htg Setpt	69.9 ºF
Unocc Clg	84.0 ºF
Unocc Htg	60.0 ºF
DeHumSetpt	0%
SensorSelect	TAXXJ02

Controls cont.

MUI Menu Navigation for Single Compressor - Envision Water-to-Air







NOTE: This FX10 application implements an **alarm history** which is reset only by cycling power. This history shows on the Alm-History page. Any alarm showing 4+ events has occurred more than 4 times.

Alarm lock-outs are reset by cycling power, by pressing the "ESC" and Return ↵ keys simultaneously for a minimum of 15 seconds, or by commanding the nviAlarmReset over the BAS network.

Test mode is enabled by holding the 'Esc' and Down Arrow simultaneously for a minimum of 15 seconds and releasing. Test mode times out after 30 minutes, and may also be ended by pressing 'ESC' and Up Arrow simultaneously and releasing. Test Mode bypasses the On Delay (90 sec) and Random Start timers for quicker troubleshooting. It also allows cycling the reversing valve without compressor shutdown.

Unit Startup Notes

Electrical Disconnect

Optional field installed console disconnect provides a permanent electrical connection to the main electrical supply branch. Wiring between the disconnect and the unit chassis is field supplied and allows the electrical power source to the chassis to be interrupted for unit servicing.

Non-Fused

Constructed of heavy gauge galvanized steel, the rocker style disconnect switch provides reliable electrical control. Wiring pigtails, using 12-gauge wires, are factory installed to simplify field wiring.

Fused

Similar in construction to the non-fused electrical disconnect. The fused disconnect is available in five models with equipment rated fuses to provide additional circuit protection. The fuses are panel mounted to allow easy inspection and removal without removing the cover on the disconnect.

CFD-10 - 10 amp rated fuse
CFD-12 - 12 amp rated fuse
CFD-15 - 15 amp rated fuse
CFD-20 - 20 amp rated fuse
CFD-25 - 25 amp rated fuse

Hydronic Loop Controller for Boiler/Tower Installations

The hydronic loop controller is a microprocessor based control panel for control of water loop heat rejector (tower), heat supplier (boiler), and/or water well pumps and circulation pumps. Includes audible and visual alarms, temperature indication, and add-on options of low switches, remote alarm sensor wells and pump alternator.

Unit Startup Checklist/Unit Startup Steps

Before Powering Unit, Check The Following:

- 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.
- Transformer switched to 208V if applicable.
- Dip switches are set correctly, if applicable.
- Blower rotates freely
- Air filter 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-percent 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.

1. Initiate a control signal to energize the blower motor. Check blower operation.
2. Initiate a control signal to place the unit in the cooling mode. Cooling setpoint must be set below room temperature.
3. Be sure that the compressor and water control valve or loop pump(s) are activated.
4. 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 capacity data in specification catalog.
5. Check the temperature of both the supply and discharge water (Refer to Unit Operating Parameters tables).
6. 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.
7. Adjust the cooling setpoint above the room temperature and verify that the compressor and water valve or loop pumps deactivate.
8. Initiate a control signal to place the unit in the heating mode. Heating set point must be set above room temperature.
9. Check the temperature of both the supply and discharge water (Refer to Unit Operating Parameters tables).
10. Check for an air temperature rise of 20°F to 35°F across the air coil, depending on the fan speed and entering water temperature.
11. Adjust the heating setpoint below room temperature and verify that the compressor and water valve or loop pump deactivate.
12. During all testing, check for excessive vibration, noise or water leaks. Correct or repair as required.
13. Set system to desired normal operating mode and set temperature to maintain desired comfort level.
14. 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

Entering Water Temp °F	Water Flow gpm/ton	Cooling					
		Suction Pressure psig	Discharge Pressure psig	Superheat	Subcooling	Water Temp Rise °F	Air Temp Drop °F DB
30	1.5	100 - 115	170 - 190	17 - 26	10 - 14	18 - 22	20 - 30
	3.0	115 - 125	150 - 170	20 - 29	7 - 11	8 - 10	20 - 30
50	1.5	133 - 148	225 - 245	8 - 11	7 - 11	18 - 22	20 - 30
	3.0	129 - 144	185 - 205	8 - 11	6 - 10	8 - 10	20 - 30
70	1.5	139 - 154	300 - 320	6 - 10	6 - 10	18 - 22	18 - 26
	3.0	137 - 152	250 - 270	6 - 10	6 - 10	8 - 10	18 - 26
90	1.5	143 - 158	360 - 380	6 - 10	6 - 10	18 - 22	18 - 26
	3.0	141 - 156	330 - 350	6 - 10	6 - 10	8 - 10	18 - 26
110	2.3	143 - 158	360 - 380	6 - 10	6 - 10	18 - 22	18 - 22
	3.0	141 - 156	440 - 460	6 - 10	6 - 10	8 - 10	18 - 22

Entering Water Temp °F	Water Flow gpm/ton	Heating					
		Suction Pressure psig	Discharge Pressure psig	Superheat	Subcooling	Water Temp Drop °F	Air Temp Rise °F DB
30	1.5	73 - 79	305 - 330	7 - 13	7 - 11	7 -10	20 - 26
	3.0	79 - 85	315 - 345	7 - 13	7 - 11	3 - 6	20 - 26
50	1.5	103 - 109	330 - 370	7 - 13	7 - 11	8 - 11	22 - 32
	3.0	115 - 130	350 - 380	7 - 13	7 - 11	4 - 7	22 - 32
70	1.5	145 - 155	375 - 410	7 - 13	7 - 11	11 - 14	28 - 38
	3.0	155 - 165	415 - 435	10 - 14	7 - 11	7 - 10	35 - 45
90	1.5	170 - 185	435 - 470	11 - 18	7 - 11	8 - 11	42 - 50
	3.0	174 - 190	465 - 500	11 - 18	7 - 11	8 - 11	42 - 50
110	2.3						
	3.0						

NOTES: Cooling performance based on entering air temperatures of 80°F DB, 67°F WB. 6/20/11
Heating performance based on entering air temperature of 70°F DB.

Operating Limits

Operating Limits	Cooling		Heating	
	(°F)	(°C)	(°F)	(°C)
Air Limits				
Min. Ambient Air	45	7.2	45	7.2
Rated Ambient Air	80	26.7	70	21.1
Max. Ambient Air	100	37.8	85	29.4
Min. Entering Air	50	10.0	40	4.4
Rated Entering Air db/wb	80.6/66.2	27/19	68	20.0
Max. Entering Air db/wb	110/83	43/28.3	80	26.7
Water Limits				
Min. Entering Water	30	-1.1	20	-6.7
Normal Entering Water	50-110	10-43.3	30-70	-1.1
Max. Entering Water	120	48.9	90	32.2

NOTE: Minimum/maximum limits are only for start-up conditions, and are meant for bringing the space up to occupancy temperature. Units are not designed to operate at the minimum/maximum conditions on a regular basis. The operating limits are dependant upon three primary factors: 1) water temperature, 2) return air temperature, and 3) ambient temperature. When any of the factors are at the minimum or maximum levels, the other two factors must be at the normal level for proper and reliable unit operation.

Pressure Drop

Model	GPM	Pressure Drop (psi)				
		30°F	50°F	70°F	90°F	110°F
09	1.2	1.0	0.9	0.8	0.7	0.6
	1.8	2.3	2.2	2.0	1.9	1.8
	2.5	3.8	3.7	3.5	3.3	3.1
12	1.5	0.9	0.8	0.7	0.6	0.5
	2.3	1.7	1.5	1.4	1.3	1.1
	3.5	3.0	2.7	2.5	2.4	2.2
15	2.0	1.7	1.6	1.5	1.4	1.3
	3.0	3.3	3.2	3.0	2.9	2.8
	4.5	5.7	5.5	5.3	5.1	4.9
18	3.0	1.7	1.6	1.5	1.4	1.3
	4.0	4.1	4.0	3.9	3.7	3.6
	5.5	7.9	7.6	7.4	7.2	6.9

6/10/13

Compressor and Thermistor Resistance

Compressor Resistance

Model	115/60/1		208-230/60/1		265/60/1	
	Run	Start	Run	Start	Run	Start
09	0.77 - 0.89	1.79 - 2.05	3.65 - 4.19	3.75 - 4.31	3.73 - 4.27	4.45 - 5.13
12	0.77 - 0.89	1.79 - 2.05	3.35 - 3.85	2.80 - 3.22	3.73 - 4.27	4.45 - 5.13
15			2.74 - 3.16	2.60 - 3.00	3.03 - 3.49	2.39 - 2.75
18			2.24 - 2.58	2.84 - 3.26	3.03 - 3.49	2.39 - 2.75

6/10/13

Thermistor Resistance

Thermistor Temperature (°F)	Microprocessor Resistance (Ohms)	FX10 Resistance (Ohms)
5	75757-70117	746-770
14	57392-53234	775-803
23	43865-40771	808-836
32	33809-31487	841-869
41	26269-24513	875-903
50	20570-19230	910-938
59	16226-15196	946-974
68	12889-12093	981-1013
77	10310-9688	1019-1051
86	8300-7812	1058-1090
95	6723-6337	1097-1129
104	5480-5172	1137-1169
113	4490-4246	1179-1211
122	3700-3504	1221-1253
131	3067-2907	1261-1297
140	2554-2424	1305-1341
149	2149-2019	1350-1386

7/6/10

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 Data

Model	gpm	Heat of Extraction (HE)				Heat of Rejection (HR)				
		30°F	50°F	70°F	90°F	30°F	50°F	70°F	90°F	110°F
09	1.2		6.2	8.1	10.6		12.9	12.1	11.8	
	1.8	5.0	6.6	8.5	10.8	13.9	13.1	12.4	11.7	10.9
	2.5	5.0	6.9	9.0	10.9	14.0	13.4	12.6	11.8	11.0
12	1.5		7.8	10.1	12.4		15.2	14.4	13.9	
	2.3	6.3	8.1	10.4	12.6	16.3	15.4	14.6	13.9	12.9
	3.5	6.2	8.6	10.9	12.8	16.3	15.8	14.9	14.0	13.0
15	2.0		10.3	12.4	16.4		19.7	18.2	19.9	
	3.0	8.8	10.7	12.9	16.7	19.4	19.8	18.2	20.0	18.7
	4.5	7.4	11.3	13.7	17.0	19.5	19.9	18.2	20.2	18.9
18	3.0		12.0	15.2	17.6		23.8	22.0	20.7	
	4.0	9.5	12.2	15.5	17.9	23.4	23.9	21.9	20.7	19.4
	5.5	8.5	12.6	16.0	18.2	23.5	23.9	21.9	20.9	19.5

Data provided in MBtu/h 6/10/13

Reference Calculations

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

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

DEALER: _____

PHONE #: _____ DATE: _____

PROBLEM: _____

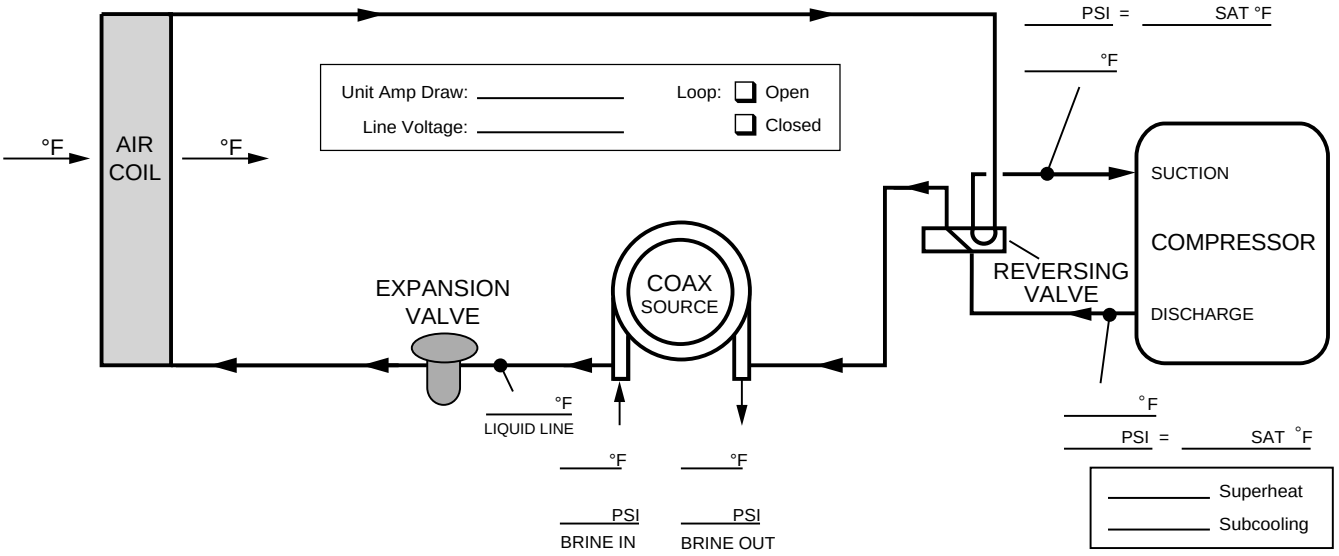
MODEL #: _____

SERIAL #: _____

WaterFurnace® Smarter from the Ground Up™

Startup/Troubleshooting Form

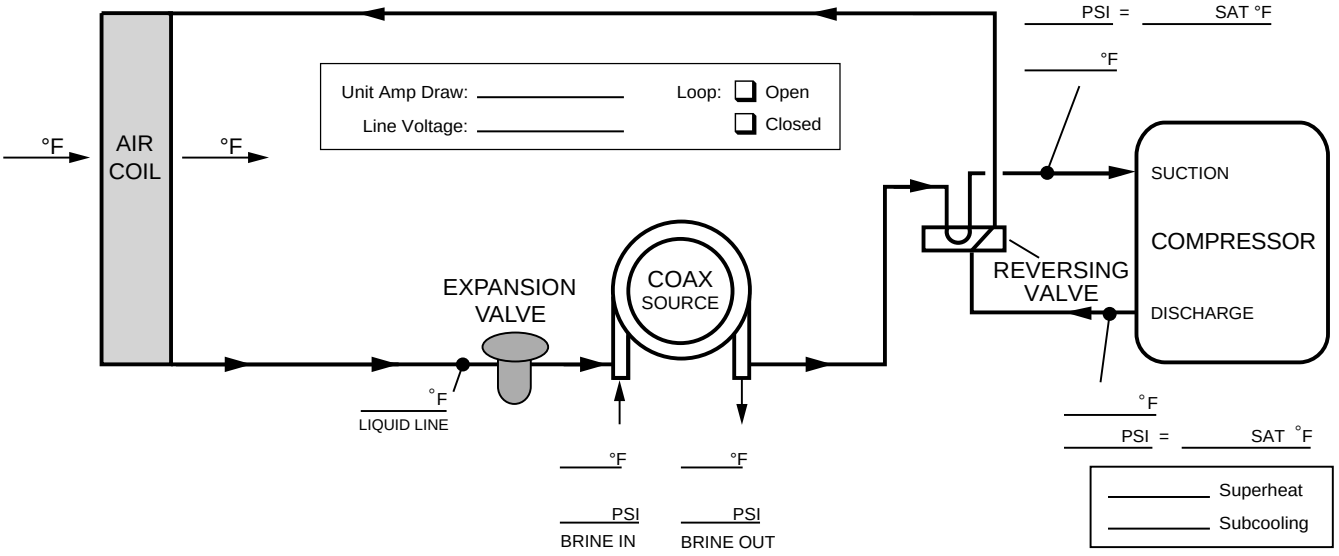
COOLING CYCLE ANALYSIS



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



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

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

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

		Low Sill Consoles			
		09	12	15	18
Compressor	Compressor 115/60/1	34P590-09	34P591-09	N/A	N/A
	Compressor 208-230/60/1	34P590-01	34P591-01	34P592-01	34P593-01
	Compressor 265/60/1	34P590-02	34P591-02	34P592-02	34P593-02
	Run Capacitor 115/60/1	16P002D36	16P002D36	N/A	N/A
	Run Capacitor 208-230/60/1	16P002D17	16P002D18	16P002D19	16P002D19
	Run Capacitor 265/60/1	16P002D27	16P002D27	16P002D30	16P002D30
	Sound Jacket	92P504A01			
PSC Motor & Blower	PSC Motor 115/60/1	14P506-03		N/A	
	PSC Motor 208-230/60/1	14P506-02		N/A	
	PSC Motor 265/60/1	14P506-02		N/A	
	Blower Housing	53P518-02		N/A	
	Blower Capacitor 208-230/60/1	16P002D10		N/A	
	Blower Capacitor 265/60/1	16P002D37		N/A	
ECM Motor & Blower	ECM Motor 115/208-230/265/60/1	N/A		14P550-01	
	ECM Motor Module 115/208-230/265/60/1	N/A		17P577-01	
	Blower Housing	N/A		53P514B01	
Refrigeration Components	Air Coil	61P714-41		61P724-41	
	Coax	62P558-03	62P559-03	62P560-01	
	TXV	33P605-09		33P605-08	
	Reversing Valve	33P502-05			
	Filter Drier	36P500B01			
Controls	CCM Board	17P535-03			
	Versatec Controller	17P529A01			
	Contactor	13P004A03			
Transformer	Transformer 208-230/60/1	15P514-01			
	Transformer 265/60/1	15P515-01			
Sensors & Safeties	High Pressure Switch	35P506B02			
	Low Pressure Switch	35P506B01			

Part numbers subject to change 12/13/2013

Notes

Revision Guide

Pages:	Description:	Date:	By:
All	Updated with All-Aluminum Air Coils	03 Mar 2014	DS
All	Added 15 & 18 Models	09 Oct 2013	DS
45	Added Revision Table	09 Oct 2013	DS

Manufactured by
WaterFurnace International, Inc.
9000 Conservation Way
Fort Wayne, IN 46809
www.waterfurnace.com

Product:	**Envision Series Low Sill Console**
Type:	Geothermal/Water Source Heat Pump
Size:	0.75-1.0 Ton
Document:	Installation Manual

IM1010CNA 03/14