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SPECIFICATION CATALOG

HEATING | COOLING | HOT WATER

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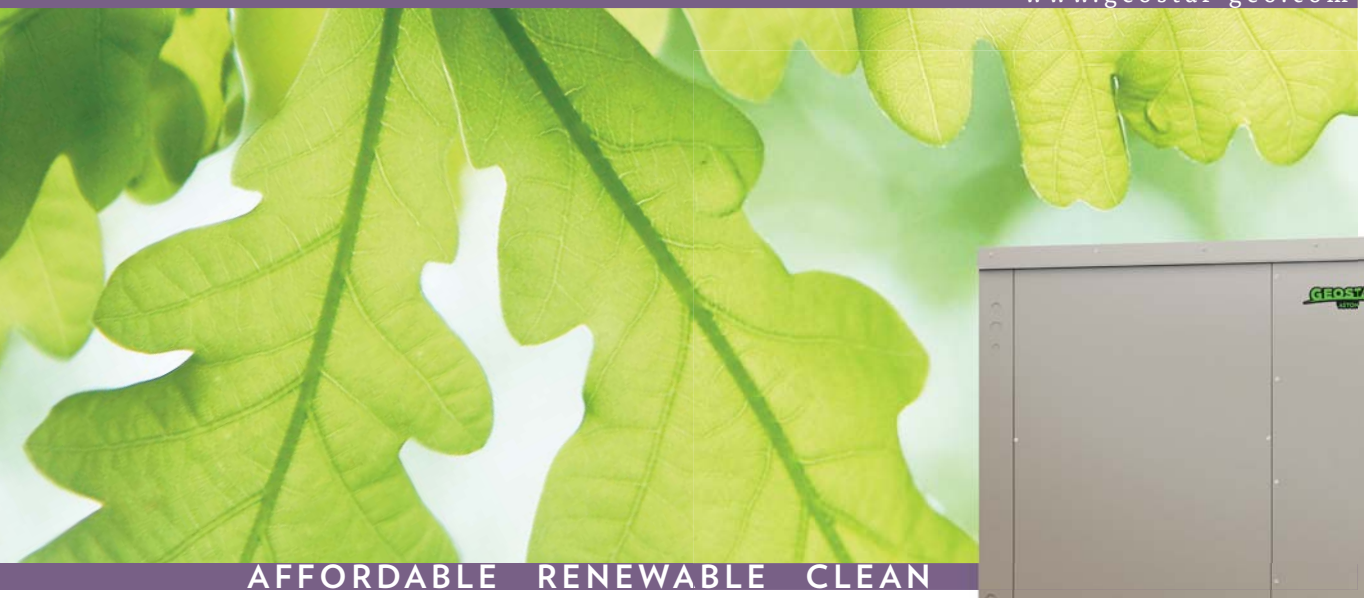

ASTON SERIES OUTDOOR PACKAGED UNIT

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ASTON SERIES

Packaged Outdoor Heat Pump

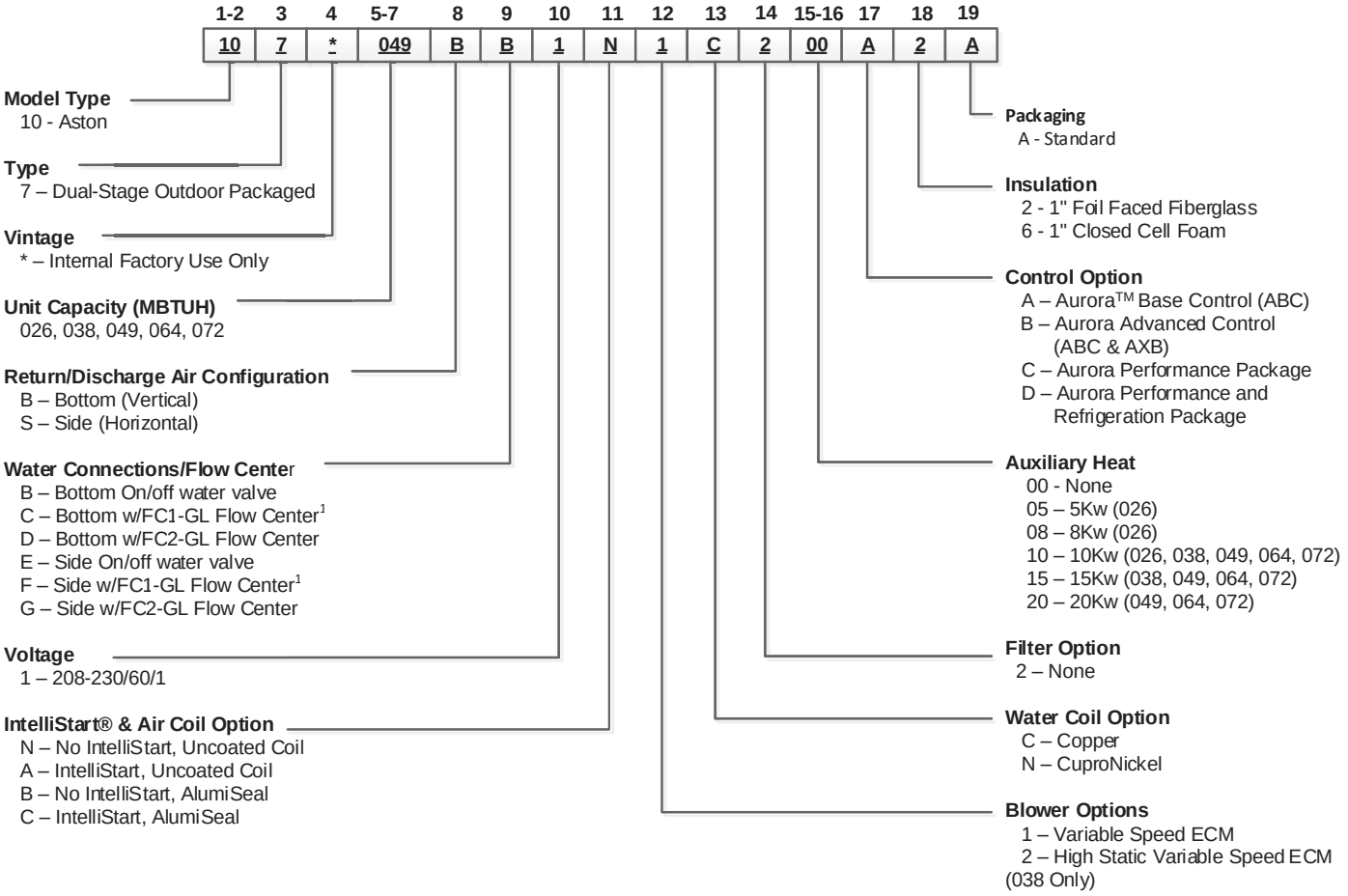
The GeoStar Aston Series Packaged Outdoor Geothermal Heat Pump is a new product designed to meet the highest demands in efficiency and features in an outdoor all-in-one solution. The Aston Series Packaged Outdoor Geothermal Heat Pump benefits from the same technology as the Aston Series Indoor product that has been refined through years of research, engineering advancements, and manufacturing experience. The product is available in five dual capacity sizes (2 to 6 ton) with Copeland Scroll UltraTech™ compressors.

These Aston Series Packaged Outdoor Heat Pump units utilize ozone-safe R-410A refrigerant to meet the most stringent EPA requirements. Variable speed ECM blowers are used to increase comfort, efficiency, and airflow flexibility. A new sophisticated Aurora™ Control system is modular and designed to grow with the application. The Aurora 'Base' Control (ABC) features a microprocessor control to sequence all components during operation for optimum performance. Plus, the ABC provides easy-to-use troubleshooting features with fault lights, on-board diagnostics, and a hand held Aurora Interface Diagnostic (AID) Tool. The Aurora 'Advanced' Control adds the Aurora Expansion Board (AXB) to further extend the capability of the system to include compressor current monitoring, advanced loop pump control as well as service, performance, and energy monitoring sensor kit capability. Aurora Weblink (AWL) allows remote access to the thermostat via WiFi to the internet or smartphone as well as remote monitoring of the heat pump and receives lockout/fault info via text or e-mail. Unit configurations include bottom, or horizontal return and discharge air. Heavy-gauge metal cabinets are fully insulated and coated with an attractive and durable powder coat for long lasting protection.

Aston Series products are performance-certified to AHRI/ISO 13256-1 standards, ETL listed, ENERGY STAR® qualified, and tested in an ISO 17025 accredited testing lab.

As a leader in the industry, we are dedicated to innovation, quality, and customer satisfaction. In fact, every unit built is exposed to a wide range of quality control procedures throughout the assembly process in our ISO 9001:2008 certified manufacturing facility. At the end, it is subjected to a rigorous battery of computerized run tests to certify that it meets or exceeds performance standards for efficiency and safety, and will perform flawlessly at startup. As further affirmation of our quality standards, each unit carries our exclusive Quality Assurance emblem, signed by the final test technician.

Model Nomenclature



Rev.: 9/28/17C

Notes:
All Models include sound kits as std. equipment
[1]FC1-GL not available in 064-072 units.

AHRI/ISO 13256-1 Performance Ratings

ECM motor

AHRI/ASHRAE/ISO 13256-1
English (IP) Units

Model	Capacity Modulation	Flow Rate		Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
				Cooling EWT 86°F		Heating EWT 68°F		Cooling EWT 59°F		Heating EWT 50°F		Cooling Brine Full Load 77°F Part Load 68°F		Heating Brine Full Load 32°F Part Load 41°F	
		gpm	cfm	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP
026	Full	8	950	23,500	15.6	29,100	5.4	26,200	22.5	23,800	4.7	24,800	17.9	19,300	3.9
	Part	7	750	17,600	17.2	21,400	6.0	20,600	28.7	17,100	4.8	19,600	25.1	15,800	4.4
038	Full	9	1300	36,500	17.0	41,900	5.4	40,000	24.4	34,700	4.8	38,200	19.7	28,300	4.1
	Part	8	1150	26,300	18.9	30,200	6.2	29,600	31.7	24,700	5.0	29,000	27.6	22,500	4.6
049	Full	12	1700	48,800	16.7	57,700	5.4	53,800	24.3	46,900	4.5	50,400	19.0	38,000	4.0
	Part	11	1450	36,000	18.8	41,300	6.0	41,000	32.1	33,300	4.6	39,500	27.1	30,200	4.3
064	Full	16	1800	60,000	15.8	71,700	5.1	67,500	23.1	58,200	4.5	62,500	18.2	46,300	3.8
	Part	14	1600	42,300	16.4	51,800	5.9	51,300	30.0	41,400	4.8	48,600	24.7	36,200	4.2
072	Full	18	2100	67,400	14.2	85,800	4.8	77,400	21.5	70,600	4.3	71,700	16.6	55,400	3.7
	Part	16	1600	50,800	15.5	64,700	5.1	59,000	27.3	52,300	4.2	55,800	21.8	46,700	3.9

7/18/17

Cooling capacities based upon 80.6°F DB, 66.2°F WB entering air temperature
Heating capacities based upon 68°F DB, 59°F WB entering air temperature
All ratings based upon 208V operation

Energy Star Compliance Table

Model	Tier 3	
	Ground Water	Ground Loop
026	E	E
038	E	E
049	E	E
064	E	E
072	E	E

E = ECM 7/18/17

Energy Star Rating Criteria
In order for water-source heat pumps to be Energy Star rated they must meet or exceed the minimum efficiency requirements listed below. Tier 3 represents the current minimum efficiency water source heat pumps must have in order to be Energy Start rated.

Tier 3: 1/1/2012 – No Effective End Date Published

Water-to-Air	EER	COP
Ground Loop	17.1	3.6
Ground Water	21.1	4.1
Water-to-Water		
Ground Loop	16.1	3.1
Ground Water	20.1	3.5

AHRI/ISO 13256-1 Performance Ratings cont.

The performance standard AHRI/ASHRAE/ISO 13256-1 became effective January 1, 2000 and replaces ARI Standards 320, 325, and 330. This new standard has three major categories: Water Loop (comparable to ARI 320), Ground Water (ARI 325), and Ground Loop (ARI 330). Although these standards are similar there are some differences:

Unit of Measure: The Cooling COP

The cooling efficiency is measured in EER (US version measured in Btu/h per Watt. The Metric version is measured in a cooling COP (Watt per Watt) similar to the traditional COP measurement.

Water Conditions Differences

Entering water temperatures have changed to reflect the centigrade temperature scale. For instance the water loop heating test is performed with 68°F (20°C) water rounded down from the old 70°F (21.1°C).

Air Conditions Differences

Entering air temperatures have also changed (rounded down) to reflect the centigrade temperature scale. For instance the cooling tests are performed with 80.6°F (27°C) dry bulb and 66.2°F (19°C) wet bulb entering air instead of the traditional 80°F (26.7°C) DB and 67°F (19.4°C) WB entering air temperatures. 80.6/66.2 data may be converted to 80/67 using the entering air correction table. This represents a significantly lower relative humidity than the old 80/67 of 50% and will result in lower latent capacities.

Pump Power Correction Calculation

Within each model, only one water flow rate is specified for all three groups and pumping Watts are calculated using the following formula. This additional power is added onto the existing power consumption.

- Pump power correction = (gpm x 0.0631) x (Press Drop x 2990) / 300
  Where 'gpm' is waterflow in gpm and 'Press Drop' is the pressure drop through the unit heat exchanger at rated water flow in feet of head.

Blower Power Correction Calculation

Blower power is corrected to zero external static pressure using the following equation. The nominal airflow is rated at a specific external static pressure. This effectively reduces the power consumption of the unit and increases cooling capacity but decreases heating capacity. These Watts are significant enough in most cases to increase EER and COPs fairly dramatically over ARI 320, 325, and 330 ratings.

- Blower Power Correction = (cfm x 0.472) x (esp x 249) / 300
  Where 'cfm' is airflow in cfm and 'esp' is the external static pressure at rated airflow in inches of water gauge.

ISO Capacity and Efficiency Calculations

The following equations illustrate cooling calculations:

- ISO Cooling Capacity = Cooling Capacity (Btu/h) + (Blower Power Correction (Watts) x 3.412)
- ISO EER Efficiency (W/W) = ISO Cooling Capacity (Btu/h) x 3.412 / [Power Input (Watts) - Blower Power Correction (Watts) + Pump Power Correction (Watt)]

The following equations illustrate heating calculations:

- ISO Heating Capacity = Heating Capacity (Btu/h) - (Blower Power Correction (Watts) x 3.412)
- ISO COP Efficiency (W/W) = ISO Heating Capacity (Btu/h) x 3.412 / [Power Input (Watts) - Blower Power Correction (Watts) + Pump Power Correction (Watt)]

Comparison of Test Conditions

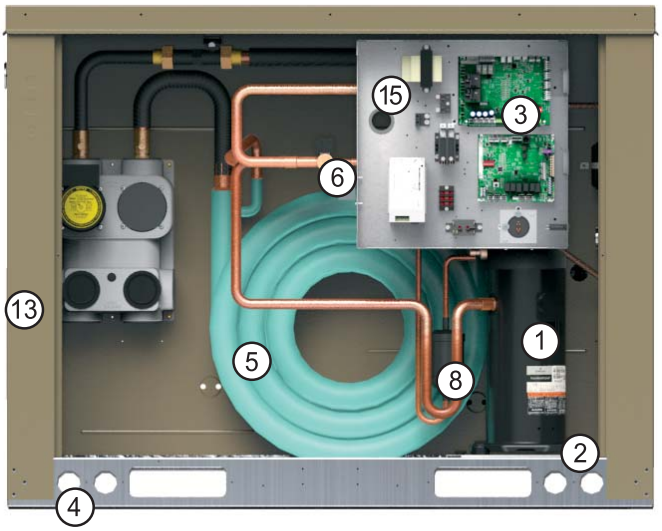
	ARI 320	ISO/AHRI 13256-1 WLHP	ARI 325	ISO/AHRI 13256-1 GWHP	ARI 330	ISO/AHRI 13256-1 GLHP
Cooling						
Entering Air - DB/WB °F	80/67	80.6/66.2	80/67	80.6/66.2	80/67	80.6/66.2
Entering Water - °F	85	86	50/70	59	77	77
Fluid Flow Rate	*	**	**	**	**	**
Heating						
Entering Air - DB/WB °F	70	68	70	68	70	68
Entering Water - °F	70	68	50/70	50	32	32
Fluid Flow Rate	*	**	**	**	**	**

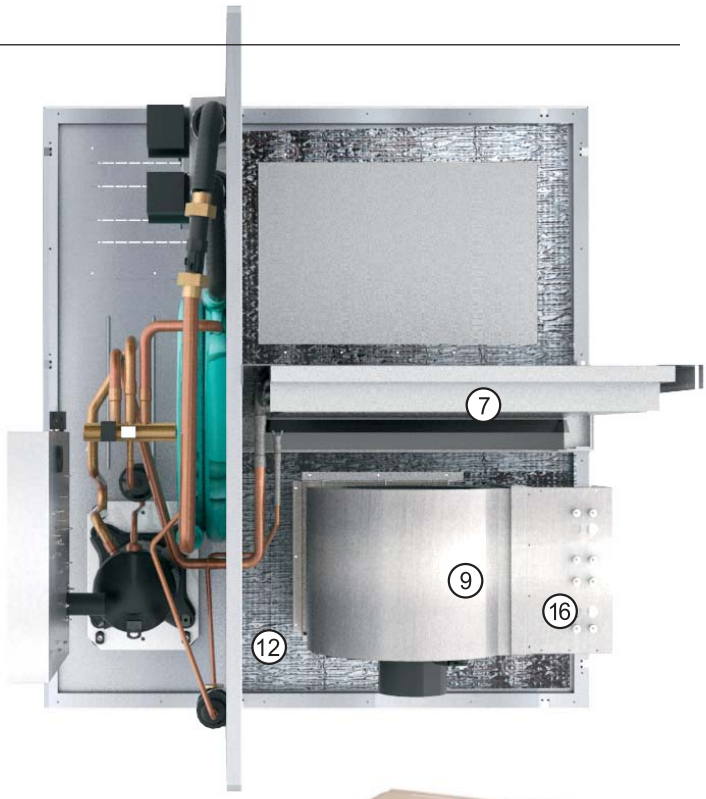
NOTES: * Flow rate is set by 10°F rise in standard cooling test
** Flow rate is specified by the manufacturer
Part load entering water conditions not shown
WLHP = Water Loop Heat Pump; GWHP = Ground Water Heat Pump; GLHP = Ground Loop Heat Pump

Conversions:

Airflow (lps) = cfm x 0.472;
ESP (Pascals) = ESP (in wg) x 249;
WaterFlow (lps) = gpm x 0.0631;
Press Drop (Pascals) = Press Drop (ft hd) x 2990

Design Features





① **COMPRESSOR:** Copeland Scroll UltraTech™ (dual capacity) represent the latest technology

② **DOUBLE ISOLATED COMPRESSOR:** Double isolated compressor mounting to reduce noise and vibration

③ **AURORA CONTROLS & AID TOOL:** Aurora 'Base' Control, Aurora 'Advanced' Control, and Aurora AID Tool

④ **RIGGING POINTS:** Rigging holes for clevis style hangers are provided at all four corners of the cabinet for easy lifting.

⑤ **COAXIAL HEAT EXCHANGER:** Standard large high efficiency copper (optional cupronickel) coax with our exclusive void-free and robotically applied ThermaShield insulation coating

⑥ **BALANCED PORT/BIDIRECTIONAL EXPANSION VALVE:** Balanced port bidirectional expansion valve for rock steady superheat control and reliable efficiency and operation at any condition

⑦ **AIR COIL:** Large all aluminum air coil is designed for maximum efficiency, moisture removal and provides superior protection from formicary corrosion.

⑧ **DISCHARGE MUFFLER:** Helps quiet compressor gas pulsations

⑨ **VARIABLE SPEED ECM BLOWER MOTOR:** High efficiency and ultra-flexible ECM blower motors

⑩ **LOOP CONNECTIONS:** All side water line options are captive fitting in the corner post that accept 1" MPT. All bottom flow center connections are 1-1/4" PE fusion to GL fittings. All bottom water valve options accept 1" hose.

⑪ **INTELLISTART®:** Optional single phase soft starter

⑫ **INSULATION:** 1" Cleanable foil lined fiber insulation to prevent mold growth or an optional 1" closed cell foam; corrosion resistant composite drain pan

⑬ **CABINET FINISH:** Heavy gauge galvanized sheet metal cabinet has 750 hr. salt spray rated tan powder coat paint for long life

⑭ **ACCESS PANELS:** Large lift out access panels for easier removal and servicing

⑮ **CONTROL BOX:** Designed for ease of service

⑯ **AUXILIARY ELECTRIC HEAT:** Optional factory installed available in 5kW to 20kW sizes.

Design Features cont.

What's New?

- All-in-one outdoor packaged solution is the first of its kind in the residential geothermal marketplace.
- Cabinet Insulation Options
  - 1" foil lined fiber insulation
  - 1" closed cell foam insulation
- All aluminum air coil with optional AlumiSeal coating
- Exceptional AHRI/ISO 13256-1 Ratings for traditional geothermal
  - 27.6 EER and 4.6 COP
- Latest technology compressors
  - Copeland UltraTech™ K5 Compressors in dual capacity units (sizes 026, 038, 049, 064, 072)
- Discharge line mufflers to help quiet compressor discharge gas pulsations.
- Variable Speed ECM blower motor for the highest in efficiency and airflow flexibility.
- Communicating Digital Thermostats: The Aurora controls system features either monochromatic or color touch screen graphic display thermostats for user interface with the heat pump system. These displays not only feature easy to use graphical interface but display alerts and faults in plain English.
- Aurora™ Communicating Control Features
  - *Traditional Safety Sensors:* HP, LP, condensate overflow, freeze detection loop, freeze detection air coil
  - *Communicating Modular Design:* Communicating modular design for flexibility and expandability
  - *Loop pump linking:* For multiple units on one flow center with either variable speed, single, or dual capacity units (with Aurora Advanced Control); even works with our legacy controls
  - *Electric Heat Powered Blower and Controls:* Prevents the compressor from tripping out and disabling heat in the house
  - *Internet Ready:* With optional Aurora WebLink (AWL) device and Symphony Web Portal (if available)
- Advanced Service Features
  - Aurora Controls with the AID Tool provide advanced service diagnostics. With this device setup and configurations as well as real-time sensors fault and lockout history can be monitored and much more.
  - Aurora can be internet capable simply by adding the Aurora WebLink (AWL). This device will connect your Aurora system to web for remote monitoring and control. It also comes standard with an SD drive for storing operating and performance data. Providing 'black box' capability. (if available)
  - Complete air flow control throughout the unit's operating range
- Cabinet Design – Large access panels for ease of service. Multiple electrical knockouts in multiple locations for field wiring.
- Cabinet Configurations – Bottom or horizontal return air and discharge air.
- Monitoring Sensor Kits
  - *Energy Monitoring:* With this standard sensor kit, the Aurora Advanced Control will feature power monitoring of the compressor, blower, and electric heat; the information can be displayed on AID Tool, selected thermostats, or through AWL (if available)
  - *Refrigerant Monitoring:* The unit features refrigeration service sensors as an optional feature; now superheat, subcooling, refrigerant pressures, and various temperatures needed to diagnose unit problems are readily available at your finger tips in the AID Tool
  - *Performance Monitoring:* With this optional sensor kit installation, the Aurora controls can measure actual capacity and efficiency performance of the heat pump; the information can be displayed on AID Tool or thru AWL (if available)
- Copper or Cupronickel coaxial heat exchanger
- High static blower on 038 models

Application Flexibility

- Safe, efficient operation in a wide range of liquid temperatures (20°F to 120°F) and flow rates (as low as 1.5 gpm/ton in open loop applications when EWT >50°F)
- Horizontal or bottom air discharge
- Horizontal or bottom return air
- Pad or roof mount
- Variable-speed ECM blowers permit various duct applications with flexible airflow selection.
- Optional factory or field-installed auxiliary electric heater
- Electrical box designed for field wiring from two sides
- Circuit breaker protected loop pump power block for easy wiring
- Relay to control field-mounted accessories
- Field-selectable freeze detection setting for well or closed loop systems
- Loop pump linking feature allows multiple units to share one flow center (requires Aurora 'Advanced' Control option)

Design Features cont.

Operating Efficiencies

- AHRI/ISO 13256-1 rating for heating COPs, cooling EERs, and low water flow requirements
- High-stability expansion valve delivers optimum refrigerant flow over a wide range of conditions and provides bidirectional operation without troublesome check valves
- Efficient scroll compressors operate quietly
- Oversized coaxial tube water-to-refrigerant heat exchanger operates at low liquid pressure drops
- Convoluted copper water tube functions efficiently at low flow rates
- Oversized all-aluminum air coil with lanced fin air-to refrigerant heat exchanger provides high efficiencies at low-face velocity
- Large, low-RPM blowers with Variable Speed ECM motors provide quiet and efficient air movement with high static capability
- Utilizes the ozone-friendly R-410A refrigerant which produces higher efficiencies and warmer discharge air temperatures

Service Advantages

- Easily accessible control box for added serviceability
- Removable panels: two for the compressor compartment and two for the air handling compartment to provide quick access to all internal components with ductwork in place
- Easily accessible thermal expansion valve
- All side water line options are captive fitting in the corner post that accept 1″ MPT. All bottom flow center connections are 1-1/4″ PE fusion to GL fittings. All bottom water valve options accept 1″ hose.
- Insulated divider and separate air handling/compressor access panels permit service testing without air bypass
- LED fault and status lights on the Aurora board with memory for easy diagnostics
- Aurora AID Tool provides enhanced service information via communication directly with the Aurora control including sensor inputs, fault history, and much more
- Detachable thermostat connection strip for wiring convenience
- Control box and blower motors have quick-attach wiring plugs for easy removal
- Internal drop-out blower with permanently-lubricated ball bearing motor
- High- and low-pressure service ports in refrigerant circuit.
- Blower and transformer powered from auxiliary heat supply (when installed) to provide emergency heat with open compressor circuit breaker

Product Quality

- Heavy-gauge steel cabinets are painted with durable powder coat paint for long lasting beauty and service
- Coaxial heat exchanger, refrigerant suction lines, and all water pipes are fully insulated to reduce condensation problems in low temperature operation
- Noise reduction features include double isolation mounted compressors and soft starting blower motors; insulated compressor compartment; interior cabinet insulation using 1 in. coated glass fiber or closed cell foam; all units include compressor blanket for quiet operation
- Safety features include high- and low-pressure refrigerant controls to protect the compressor, condensate overflow protection, freeze detection sensor to safeguard the coaxial heat exchanger and air coils, blower start detection, compressor monitoring, and fault lockout enables emergency heat and prevents compressor operation until thermostat or circuit breaker is reset

Microprocessor Benefits

- Communicating monochromatic or color digital auto-changeover thermostat with 3-stage heating/2-stage cooling holds precise temperature and provides varying blower speed control
- Component sequencing delays for quiet startup, shutdown, and timed staging of auxiliary electric heat
- ECM blower speed control provides higher supply air temperature in heating, better dehumidification in cooling, and quiet operation at reduced airflows in all modes
- Communication capability for future expansions

Design Features cont.

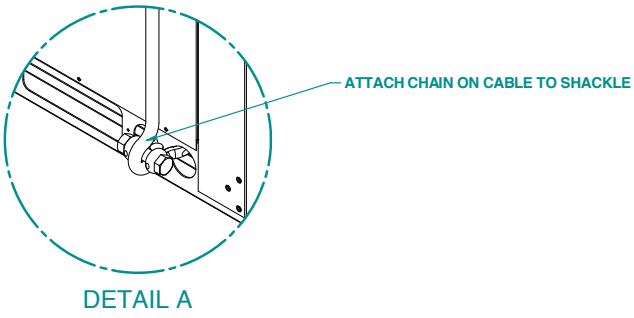
Options and Accessories

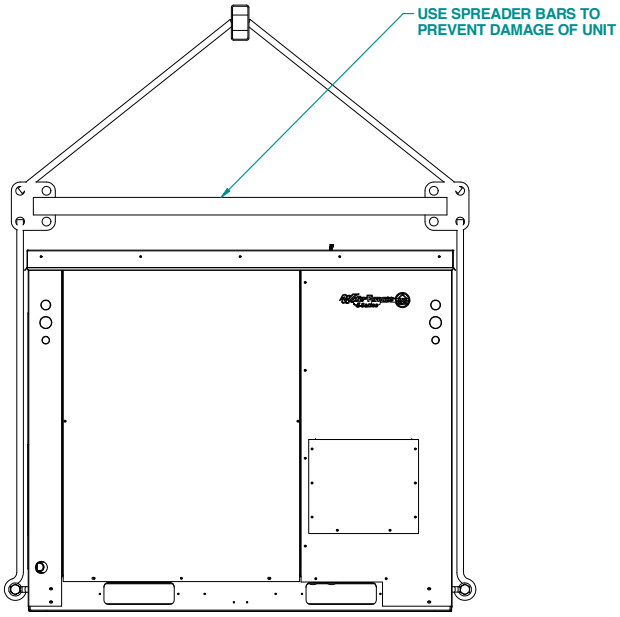
- Communicating Digital Thermostats
  - *Monochromatic Graphic Display Thermostats:* For user interface with the Aurora system; these displays not only feature easy to use graphical interface but display alerts and faults in plain English. When Energy Monitoring is added, instantaneous usage is displayed on the thermostat itself.
  - *Color Touch Screen Graphic Display Thermostats:* For user interface with the Aurora system; these displays not only feature easy to use graphical interface but display alerts and faults in plain English. When Energy Monitoring is added not only instantaneous usage is displayed but also weekly and annual consumptions are stored and graphed. Other features include full color implementation, user loaded background photos, and USB port for easy configuration and software updates.
- IntelliZone2 Zone System: The IntelliZone2 zoning system provides up to 4 zones (Dual Capacity) of individualized comfort via communication to the Aurora Control System. Requires AXB board.
- IntelliZone2 ● 24V is a non-communicating zoning system that uses a daughter board to translate communication to 24 VAC for the heat pump (no AXB). Maximum of 4 zones (Dual Capacity).
- AID Tool: The Aurora Interface and Diagnostics (AID) Tool is a plug-in configuration and troubleshooting tool for the Aurora Control System.
- Aurora WebLink (AWL) (if available): The Aurora Control System can be made internet capable simply by adding the Aurora WebLink (AWL) device. The AWL will connect your Aurora system to the web for remote monitoring and control. It also comes standard with an SD disc for storing operating and performance data providing true 'black box' capability for troubleshooting.
- Optional Aurora 'Advanced' Controls (see controls description)
- Optional cupronickel heat exchangers for open loop applications
- Optional high static ECM blower motor for high static applications on 038 model
- Electronic auto-changeover thermostat with 3-stage heating/2-stage cooling and indicator LEDs (non-communicating)
- Closed loop flow center available with one or two fixed speed pumps
- Open loop factory installed slow operating solenoid valve
- Auxiliary electric heater - factory or field installed
- Additional accessory relay
- IntelliStart soft starter

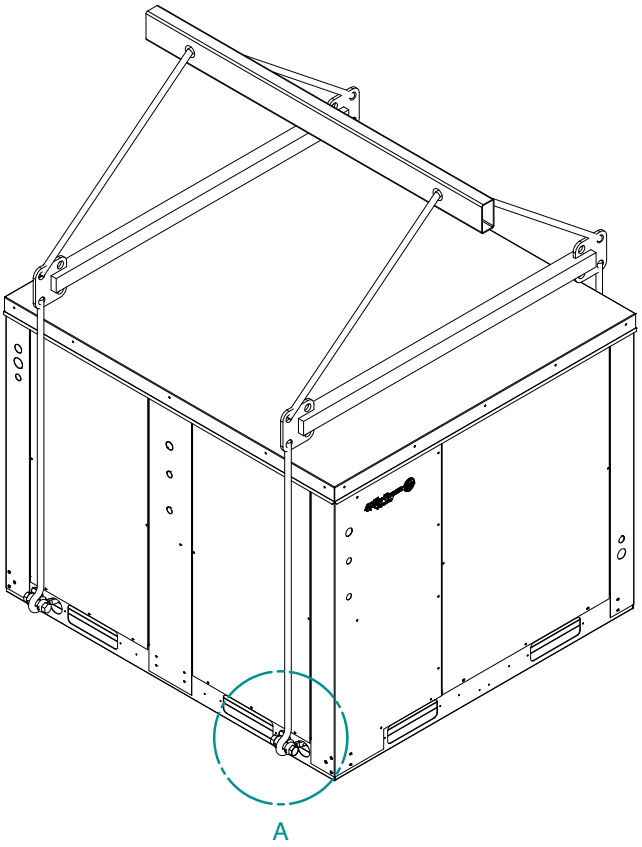
Manufacturing Quality

- All units are computer run-tested, with conditioned source water, in all modes to ensure efficiency and reliability
- All refrigerant brazing is performed in a nitrogen atmosphere
- All units are deep evacuated to less than 150 microns prior to refrigerant charging
- All joints are helium leak-tested to ensure an annual leak rate of less than 1/4 ounce
- All major components bar coded; eliminating possibility of mismatched parts built into unit
- All assembly technicians thoroughly trained in proper quality procedures
- All units have model number and serial number embedded in control for local or remote retrieval
- Manufacturing facility is ISO 9001:2008 certified
- Engineering labs are ISO 17025 accredited

Lifting



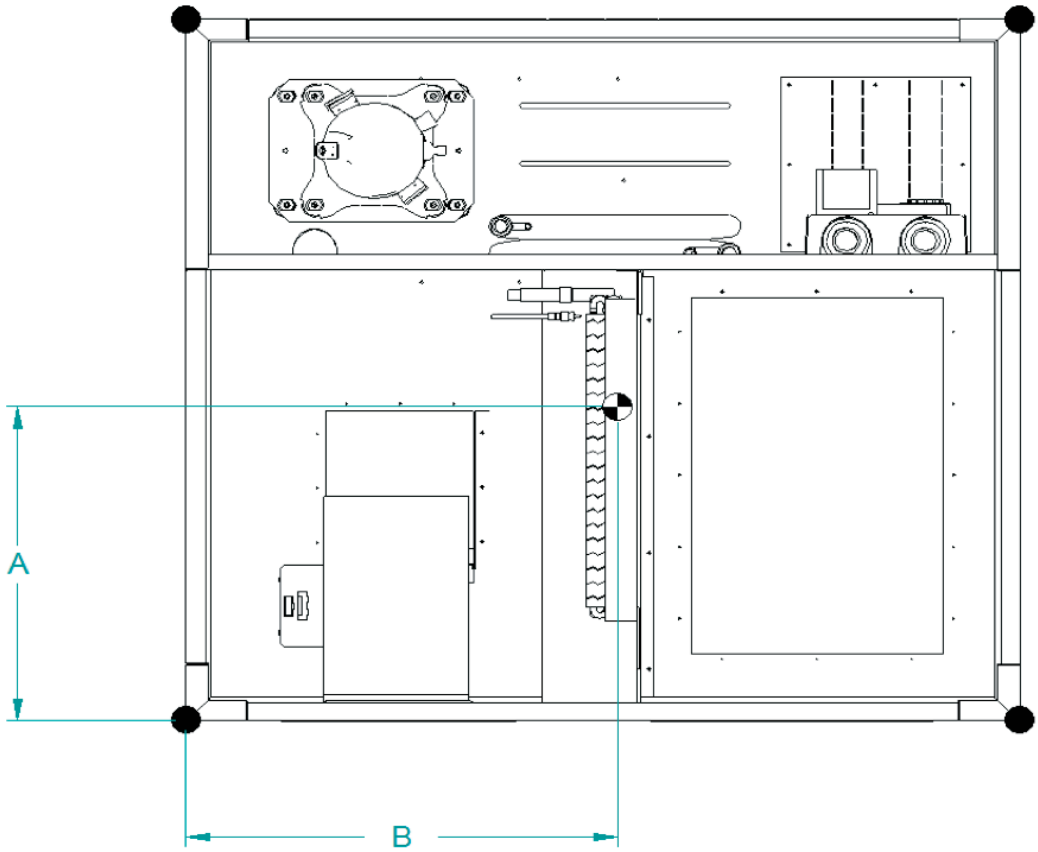




Rigging the Unit

- A rigging illustration and center-of-gravity dimensional data table are shown in this manual. Rigging is typically through a clevis (shackle) attached to each of the four cabinets corners and then employing a lifting bar (spanner) to protect the unit. The unit is then set directly on concrete slab or field installed curb.

Center of Gravity and Weights

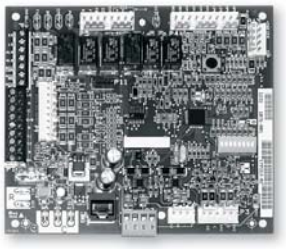


	Shipping Weight	Net Weight	A	B
026	532	502	26.354"	24.944"
038	575	545	26.276"	24.491"
049	610	580	27.163"	23.707"
064	626	599	26.512"	23.787"
072	636	606	26.771"	23.664"

8/8/2017

The Aurora™ Control System

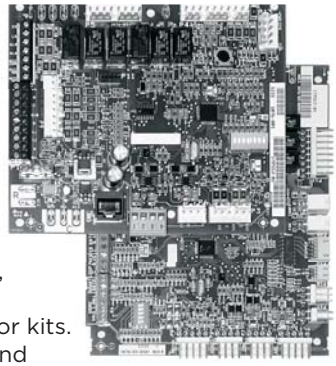
Aurora 'Base' Control



The Aurora 'Base' Control (ABC) System is a complete residential and commercial comfort system that brings all aspects of the HVAC system into one cohesive module network. The ABC features microprocessor control and HP, LP, condensate and freeze detection, over/under voltage faults, along with communicating thermostat capability for complete fault detection text at the thermostat.

Aurora uses the Modbus communication protocol to communicate between modules. Each module contains the logic to control all features that are connected to the module. The Aurora 'Base' Control (ABC) has two Modbus channels. The first channel is configured as a master for connecting to devices such as a communicating thermostat, expansion board, or other slave devices. The second channel is configured as a slave for connecting the Aurora Interface Diagnostics Tool (AID Tool).

Aurora 'Advanced' Control



The Aurora 'Advanced' Control expands on the capability of the Aurora 'Base' Control (ABC) System by adding the Aurora Expansion Board (AXB). The additional features include compressor current monitoring, loop pump linking, and also allows for optional energy, refrigeration, and performance monitoring factory installed add-on sensor kits. The AXB also features a second field configurable accessory relay, and two home automation inputs that are AID configurable for different types of alarms from sump pumps to home security. The Smart Grid input is AID configurable with many options to react to Utility controlled relay operation for ON Peak optimization. The AXB also expands the communication capability for IntelliZone2 ready operation as well as other expansion with the ClimateTalk protocol.

Aurora Control Features	Description	Aurora 'Base'	Aurora 'Advanced'
Microprocessor Compressor Control	Microprocessor control of compressor for timings with FP1, HP, LP, Condensate, assignable Acc relay	•	•
Advanced Microprocessor Features	Smart Grid, Home Automation Alarm Inputs, and Accessory2 Relay (HRV/ERV)	-	•
Base Loop Pump Control	Compressor Contactor powers Loop Pump with inline circuit breaker and no loop pump linking capability.	•	See below
Compressor Monitoring	Control monitors compressor starts for high current, missing leg etc.	-	•
Smart Grid/Utility Input	Allows simple input to externally enable of occupied/ unoccupied mode for basic utility time of use programs.	-	Dry Contact x1
Home Automation Alarm Input	Allows simple input to signal sump, security, or smoke/CO sensor alarms from other home automation or security systems. The two inputs can be field configured to a number of options and logic.	-	Dry Contactx2
HAN/Smart Grid Com (AWL and Portal) Kit (If available)	Allows direct communication of the Aurora to Smart Meters, Home Automation Network and Internet.	-	Optional AWL (if available)
IntelliZone2® Compatibility	IntelliZone2 communicates Modbus to the heat pump via the AXB board.	With Optional AXB Kit and IntelliZone2	Optional IntelliZone2
IntelliZone2 • 24V Compatibility	Communicates to the heat pump via 24VAC (AXB not required)	•	-

The Aurora Control System cont.

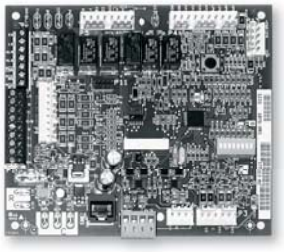
Service Device	Description	Aurora 'Base'	Aurora 'Advanced'
 **Aurora Interface and Diagnostics (AID) Tool**	Allows setup, monitoring and troubleshooting of any Aurora Control. **NOTE:** Although the ABC has basic compatibility with all Aurora, new product features may not be available on older AID Tools. To simplify the basic compatibility ensure the version of AID is at least the same or greater than the ABC software version.	For Service (Ver. 1.xx or greater)	For Service (Ver. 2.xx or greater)

Add On Control Feature Kits (field or factory installed)	Description	Aurora 'Base'	Aurora 'Advanced'
Geo Energy Monitoring Kit	Monitors realtime power consumption of compressor, blower, aux heat and pump. Requires thermostat TPCM32UO3*, TPCM32UO4*, or TPCC32UO1*. AXB required.	-	Standard
Refrigeration Monitoring Kit	Monitors realtime pressures, temperatures, superheat, and subcooling. AXB required.	-	Optional Sensor Kit
Performance Monitoring Kit	Monitors air and water temperatures, and water flow rate and calculates heat of extraction/rejection. AXB required.	-	Optional Sensor Kit
Data Logging (AWL) Kit (if available)	Allows data logging of up to 12 months. AXB required. Can also be temporarily installed.	-	Optional
HAN/Smart Grid Com (AWL and Portal) Kit (If Available)	Allows direct communication of the Aurora to Smart Meters, HAN, and internet. AXB required.	-	Optional
AXB Kit for flow center linking, IntelliZone2	Added for key features of IntelliZone2 communication, Energy, Refrigeration, and Performance monitoring.	Optional (Field Kit)	Standard

Add On Thermostats and Zoning	Description	Aurora 'Base'	Aurora Advanced
 **TP32U03*/04* - MonoChrome Traditional Y1, Y2 Thermostat**	Elite Stat with full English fault codes and alerts, traditional Y1, Y2 thermostat. Not compatible with AWL (if available).	Optional	Optional
 **TP32S01*/02* - Traditional Y1, Y2 Thermostat**	Traditional Y1, Y2 thermostat. Not compatible with AWL (if available).	Optional	Optional
 **TPCM32U03A*/04A* - MonoChrome Communicating Thermostat**	Elite Stat with full English fault codes and alerts, communicating thermostat. Monochrome thermostat allows instantaneous energy measurement only. Compatible with AWL (if available).	Optional	Optional
 **TPCC32U01* - Color Touchscreen Communicating Thermostat**	4.3 in. color touchscreen communicating thermostat with full English fault codes and alerts. Color thermostat allows instantaneous energy measurement and 13 month energy usage history. Compatible with AWL (if available).	Optional	Optional
IntelliZone2 • 24V Zoning Compatibility	IntelliZone2 • 24V is a non-communicating zoning system requiring Y1, Y2 signals that controls up to 4 zones (dual capacity). For heat pumps without the optional AXB board.	-	Optional (IntelliZone2 Preferred)
 **IntelliZone2® Zoning**	IntelliZone2® is a communicating zoning system that includes color main thermostat and up to 6 zones (with variable speed, 4 zones (with dual capacity). There are multiple thermostat options (MasterStat, TPCC32UO1*, SensorStat, ZoneStat, SensorStat-Remote). Compatible with AWL (if available).	-	Optional (IntelliZone2 Preferred)

The Aurora 'Base' Control System cont.

Aurora 'Base' Control



NOTE: Refer to the Aurora Base Control Application and Troubleshooting Guide and the Instruction Guide: Aurora Interface and Diagnostics (AID) Tool for additional information.

Control Features

Variable Speed ECM Blower Motor Option

A Variable Speed ECM blower motor can be driven directly using the onboard PWM output. Four blower speeds are available based upon the G, Y1, Y2, and W input signals to the board. The blower speeds can be changed either by the ECM manual configurations mode method or by using the Aurora AID Tool directly. All four blower speeds can be set to the same speed if desired.

Other Control Features

- Random start at power up
- Anti-short cycle protection
- High and low pressure cutouts
- Loss of charge
- Water coil freeze detection
- Air coil freeze detection
- Over/under voltage protection
- Condensate overflow sensor
- Load shed
- Dehumidification (where applicable)
- Emergency shutdown
- Hot gas reheat operation (where applicable)
- Diagnostic LED
- Test mode push button switch
- Two auxiliary electric heat outputs
- Alarm output
- Accessory output with N.O. and N.C.
- Two Modbus communication ports

Field Selectable Options via Hardware

DIP Switch (SW1) – Test/Configuration Button (See SW1 Operation Table)

Test Mode

The control is placed in the test mode by holding the push button switch SW1 for 2 - 5 seconds. In test mode most of the control timings will be shortened by a factor of sixteen (16). LED3 (green) will flash at 1 second on and 1 second off. Additionally, when entering test mode LED1 (red) will flash the last lockout one time. Test mode will automatically time out after 30 minutes. Test mode can be exited by pressing and holding the SW1 button for 2 to 5 seconds or by cycling the power. **NOTE:** Test mode will automatically be exited after 30 minutes.

Variable Speed ECM Configuration Mode

The control is placed in the ECM configuration mode by holding the pushbutton switch SW1 for 5 to 10 seconds, the high, low, and "G" ECM speeds can be selected by following the LED display lights. LED2 (yellow) will fast flash when entering the ECM configuration. When setting "G" speed LED3 (green) will be continuously lit, for low speed LED1 (red) will be continuously lit, and for high speed both LED3 (green) and LED1 (red) will be continuously lit. During the ECM configuration mode LED2 (yellow) will flash each of the 12 possible blower speeds 3 times. When the desired speed is flashed press SW1, LED2 will fast flash until SW1 is released. "G" speed has now been selected. Next select low speed, and high speed blower selections following the same process above. After third selection has been made, the control will exit the ECM configuration mode. Aux fan speed will remain at default or current setting and requires the AID Tool for adjustment.

Reset Configuration Mode

The control is placed in reset configuration mode by holding the push button switch SW1 for 50 to 60 seconds. This will reset all configuration settings and the EEPROM back to the factory default settings. LED3 (green) will turn off when entering reset configuration mode. Once LED3 (green) turns off, release SW1 and the control will reset.

DIP Switch (SW2)

SW2-1 FP1 Selection – Low water coil temperature limit setting for freeze detection. On = 30°F; Off = 15°F.
SW2-2 FP2 Selection – On = 30°F; Off = N/A
SW2-3 RV – O/B - thermostat type. Heat pump thermostats with "O" output in cooling or "B" output in Heating can be selected. On = O; Off = B.
SW2-4 and 2-5 Access Relay Operation (P2)

Access Relay Operation	SW2-4	SW2-5
Cycle with Blower	ON	ON
Cycle with Compressor	OFF	OFF
Water Valve Slow Opening	ON	OFF
Cycle with Comm. T-stat Hum Cmd	OFF	ON

The Aurora 'Base' Control System cont.

Cycle with Blower - The accessory relay will cycle with the blower output.

Cycle with Compressor - The accessory relay will cycle with the compressor output.

Water Valve Slow Opening - The accessory relay will cycle and delay both the blower and compressor output for 90 seconds.

SW2-6 CC Operation – selection of single or dual capacity compressor. On = Single Stage; Off = Dual Capacity
SW2-7 Lockout and Alarm Outputs (P2) – selection of a continuous or pulsed output for both the LO and ALM Outputs. On = Continuous; Off = Pulsed
SW2-8 *Future Use - Must be in the on position.*

Alarm Jumper Clip Selection

From the factory, ALM is connected to 24 VAC via JW2. By cutting JW2, ALM becomes a dry contact connected to ALG.

Variable Speed ECM Blower Speeds

The blower speeds can be changed either by using the ECM manual configurations mode method or by using the Aurora AID Tool directly (see Instruction Guide: Aurora Interface and Diagnostics (AID) Tool topic).

Field Selectable Options via Software

(Selectable via the Aurora AID Tool)

Variable Speed ECM Blower Speeds

An ECM blower motor can be driven directly using the onboard PWM output. Four blower speeds are available, based upon the "G", Y1 (low), Y2 (high), and Aux input signals to the board. The blower speeds can be changed either by the ECM manual configurations mode method (see ECM Configuration Mode topic) or by using the Aurora AID Tool directly. All four blower speeds can be set to the same speed if desired. Aux blower speed will remain at default or current setting and requires the AID Tool for adjustment.

Safety Features

The following safety features are provided to protect the compressor, heat exchangers, wiring and other components from damage caused by operation outside of design conditions.

Fuse – a 3 amp automotive type plug-in fuse provides protection against short circuit or overload conditions.

Anti-Short Cycle Protection – 4 minute anti-short cycle protection for the compressor.

Random Start – 5 to 80 second random start upon power up.

Fault Retry – in the fault condition, the control will stage off the outputs and then "try again" to satisfy the thermostat Y input call. Once the thermostat input calls are satisfied, the control will continue on as if no fault occurred. If 3 consecutive faults occur without satisfying the thermostat Y input call, then the control will go to Lockout mode.

Lockout – when locked out, the blower will operate continuously in "G" speed. The Alarm output (ALM) and Lockout output (L) will be turned on. The fault type identification display LED1 (Red) shall flash the fault code. To reset lockout conditions with SW2-8 On, thermostat inputs "Y1", "Y2", and "W" must be removed for at least 3 seconds. To reset lockout conditions with SW2-8 Off, thermostat inputs "Y1", "Y2", "W", and "DH" must be removed for at least 3 seconds. Lockout may also be reset by turning power off for at least 30 seconds or by enabling the emergency shutdown input for at least 3 seconds.

Lockout With Emergency Heat - if the control is locked out in the heating mode, and a Y2 or W input is received, the control will operate in the emergency heat mode while the compressor is locked out. The first emergency heat output will be energized 10 seconds after the W input is received, and the blower will shift to high speed. If the control remains locked out, and the W input is present, additional stage of emergency heat will stage on after 2 minutes. When the W input is removed, all of the emergency heat outputs will turn off, and the ECM blower will shift to "G" speed.

High Pressure – fault is recognized when the Normally Closed High Pressure Switch, P4-9/10 opens, no matter how momentarily. The High Pressure Switch is electrically in series with the Compressor Contactor and serves as a hard-wired limit switch if an overpressure condition should occur.

Low Pressure - fault is recognized when the Normally Closed Low Pressure Switch, P4-7/8 is continuously open for 30 seconds. Closure of the LPS any time during the 30 second recognition time restarts the 30 second continuous open requirement. A continuously open LPS shall not be recognized during the 2 minute startup bypass time.

Loss of Charge – fault is recognized when the Normally Closed Low Pressure Switch, P4-7/8 is open prior to the compressor starting.

Condensate Overflow - fault is recognized when the impedance between this line and 24 VAC common or chassis ground drops below 100K ohms for 30 seconds continuously.

Freeze Detection (Coax) - set points shall be either 30°F or 15°F. When the thermistor temperature drops below the selected set point, the control shall begin counting down the 30 seconds delay. If the thermistor value rises above the selected set point, then the count should reset. The resistance value must remain below the selected set point for the entire length of the appropriate delay to be recognized as a fault. This fault will be ignored for the initial 2 minutes of the compressor run time.

Freeze Detection (Air Coil) - uses the FP2 input to protect against ice formation on the air coil. The FP2 input will operate exactly like FP1 except that the set point is 30 degrees and is not field adjustable.

The Aurora 'Base' Control System cont.

Secondary Freeze Detection - A freeze detection thermostat is installed inside the cabinet to automatically start the loop pump if temperature drops below 20˚F.

Over/Under Voltage Shutdown - An over/under voltage condition exists when the control voltage is outside the range of 18 VAC to 30 VAC. If the over/under voltage shutdown lasts for 15 minutes, the lockout and alarm relay will be energized. Over/under voltage shutdown is self-resetting in that if the voltage comes back within range of 18 VAC to 30 VAC for at least 0.5 seconds, then normal operation is restored.

Operation Description

Power Up - The unit will not operate until all the inputs and safety controls are checked for normal conditions. The unit has a 5 to 80 second random start delay at power up. Then the compressor has a 4 minute anti-short cycle delay after the random start delay.

Standby In standby mode, Y1, Y2, W, DH, and G are not active. Input O may be active. The blower and compressor will be off.

Heating Operation

Heating, 1st Stage (Y1) - The blower is started on "G" speed immediately and the compressor is energized 10 seconds after the Y1 input is received. The ECM blower motor is switched to low speed 15 seconds after the Y1 input.

Heating, 2nd Stage (Y1, Y2) - The compressor will be staged to full capacity 20 seconds after Y2 input is received. The ECM blower will shift to high speed 15 seconds after the Y2 input is received.

Heating, 3rd Stage (Y1, Y2, W) - First stage of electric heat is energized 10 seconds after the W command is received. If the demand continues the second stage of electric heat will be energized after 5 minutes.

Emergency Heat (W) - The blower will be started on "G" speed, 10 seconds later the first stage of electric heat will be turned on. 5 seconds after the first stage of electric heat is energized the blower will shift to Aux speed. If the emergency heat demand is not satisfied after 2 minutes the second electric heat stage will be energized.

Cooling Operation

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

Cooling, 1st Stage (Y1, O) - The blower is started on "G" speed immediately and the compressor is energized 10 seconds after the Y1 input is received. The ECM blower motor is switched to low speed 15 seconds after the Y1 input.

Cooling, 2nd Stage (Y1, Y2, O) - The compressor will be staged to full capacity 20 seconds after Y2 input is received. The ECM blower will shift to high speed 15 seconds after the Y2 input is received.

Blower (G) - The blower will start immediately upon receiving a thermostat G command. If there are no other commands from the thermostat the ECM will run on "G" speed until the G command is removed. Regardless of blower input (G) from the thermostat, the blower will remain on for 30 seconds at the end of each heating, cooling, and emergency heat cycle.

Dehumidification (Y1, O, DH or Y1, Y2, O, DH) - When a DH command is received from the thermostat during a compressor call for cooling the ECM blower speed will be reduced by 15% to increase dehumidification.

Emergency Shutdown - Four (4) seconds after a valid ES input, P2-7 is present, all control outputs will be turned off and remain off until the emergency shutdown input is no longer present. The first time that the compressor is started after the control exits the emergency shutdown mode, there will be an anti-short cycle delay followed by a random start delay. Input must be tied to common to activate.

Continuous Blower Operation - The blower output will be energized any time the control has a G input present, unless the control has an emergency shutdown input present. The blower output will be turned off when G input is removed.

Load Shed - The LS input disables all outputs with the exception of the blower output. When the LS input has been cleared, the anti-short cycle timer and random start timer will be initiated. Input must be tied to common to activate.

The Aurora 'Base' Control System cont.

Aurora 'Base' Control LED Displays

These three LEDs display the status, configuration, and fault codes for the control. These can also be read in plain English via the Aurora AID Tool.

Status LED (LED3, Green)

Description of Operation	Fault LED, Green
Normal Mode	ON
Control is Non-functional	OFF
Test Mode	Slow Flash
Lockout Active	Fast Flash
Dehumidification Mode	Flash Code 2
(Future Use)	Flash Code 3
(Future Use)	Flash Code 4
Load Shed	Flash Code 5
ESD	Flash Code 6
(Future Use)	Flash Code 7

Configuration LED (LED2, Yellow)

Description of Operation	Configuration LED, Yellow
No Software Overwritten	Flashing ECM Setting
DIP Switch was Overwritten	Slow Flash
ECM Configuration Mode	Fast Flash

Fault LED (LED1, Red)

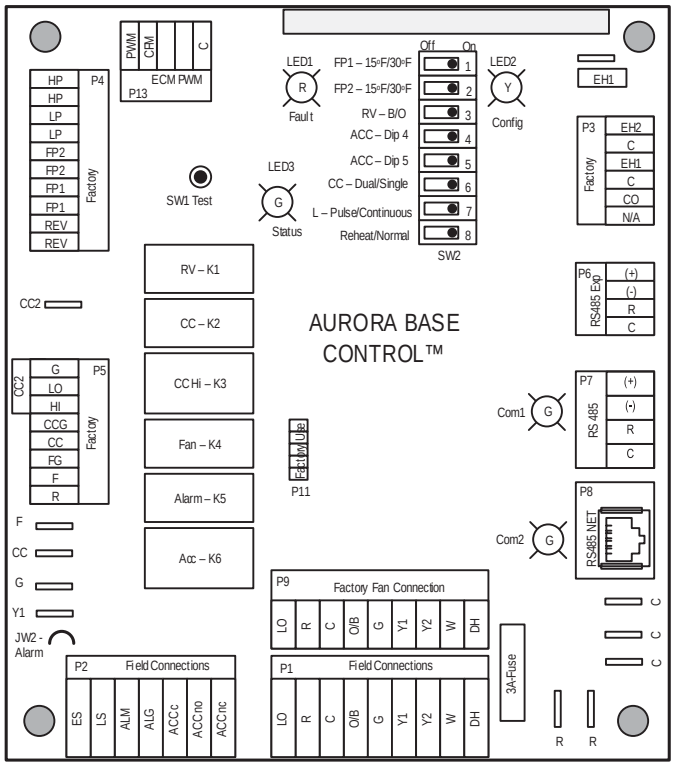
	Red Fault LED	LED Flash Code*	Lockout	Reset/ Remove
ABC Basic Faults	Normal - No Faults	OFF	–	
	Fault - Input	1	No	Auto
	Fault - High Pressure	2	Yes	Hard or Soft
	Fault - Low Pressure	3	Yes	Hard or Soft
	Fault - Freeze Detection FP2	4	Yes	Hard or Soft
	Fault - Freeze Detection FP1	5	Yes	Hard or Soft
	Fault - Condensate Overflow	7	Yes	Hard or Soft
	Fault - Over/Under Voltage	8	No	Auto
	Fault - FP1 Sensor Error	11	Yes	Hard or Soft
	Fault - CritComErr	19	NO	Auto

NOTE: All codes >11 use long flash for tens digit and short flash for the ones digit. 20, 30, 40, 50, etc. are skipped.

Aurora Interface and Diagnostics (AID) Tool

The Aurora Interface and Diagnostics (AID) Tool is a device that is a member of the Aurora network. The AID Tool is used to troubleshoot equipment which uses the Aurora control via Modbus RTU communication. The AID Tool provides diagnostics, fault management, variable speed ECM setup, and system configuration capabilities to the Aurora family of controls. An AID Tool is recommended, although not required, for ECM airflow settings. The AID Tool simply plugs into the RS485 net (P8) connector on the ABC control board.

ABC Control Board Layout



The Aurora 'Advanced' Control System

Aurora 'Advanced' Control Features

The Aurora 'Advanced' Control system expands on the capability of the Aurora 'Base' Control (ABC) by adding the Aurora Expansion Board (AXB). All of the preceding features of the Aurora 'Base' Control are included. The following control description is of the additional features and capability of the Aurora advanced control.

It is highly recommended the installing/servicing contractor obtain an Aurora Interface and Diagnostic Tool (AID) and specialized training before attempting to install or service an Aurora 'Advanced' control system.

The additional AXB features include the following:

AXB DIP Switch

DIP 1 - ID: This is the AXB ModBus ID and should always read On.

DIP 2 & 3 - Future Use

DIP 4 & 5 - Accessory Relay2: A second, DIP configurable, accessory relay is provided that can be cycled with the compressor 1 or 2 , blower, or the Dehumidifier (DH) input. This is to complement the Accessory 1 Relay on the ABC board.

Position	DIP 4	DIP 5	Description
1	ON	ON	Cycles with Fan or ECM (or G)
2	OFF	ON	Cycles with CC1 first stage of compressor or compressor spd 1-6
3	ON	OFF	Cycles with CC2 second stage of compressor or compressor spd 7-12
4	OFF	OFF	Cycles with DH input from ABC board

Compressor Monitoring

The AXB includes two current transducers to monitor the compressor current and starting characteristics. Open circuits or welded contactor faults will be detected. A fault will produce an E10 code.

IntelliZone2 Zoning Compatibility (Optional IntelliZone2 Communicating Zoning)

A dedicated input to connect and communicate with the IntelliZone2 (IZ2) zoning system is provided on P7 on the AXB. The is a dedicated communication port using a proprietary ModBus protocol. An AXB is required. Consult the IntelliZone2 literature for more information. IntelliZone2 should be mounted indoors.

AWL – Aurora Weblink (if available) (optional accessory)

AWL is an add-on WiFi router that connects to the ABC and offers many features:

- Remote access to thermostat settings, schedules, etc. with your smartphone, tablet or laptop
- Receive Lockout/Fault info via text or e-mail
- View heat pump energy usage from the Internet for the day, week, month, year or real-time
- Internet AID Tool capability allows remote troubleshooting for the technician
- Remote AID Tool capability at the heat pump with smartphone, tablet or laptop for the technician
- Allows data acquisition of the heat pump through the Internet, see graphs of performance and chart historical data for the technician
- Stores historical data on SD card

NOTE: The AWL should be installed indoors and the Ethernet cable supplied with the AWL should be run inside conduit to the outdoor unit and connected to the ABC P8 (RS485 NET). Cable should not be in conduit that includes high voltage wires. If the cable supplied with the AWL is not long enough you may purchase standard Cat6 Ethernet cable locally or order our part number 11P951-01, 100′ Cat6 cable. The maximum Cat6 cable length should be kept to 150′ or less.

Advanced Communication Ports

Communication ports P6 and P8 will provide future expansion via dedicated protocols. These are for future use.

Smart Grid-On Peak (SG) Input

The 'On Peak' input was designed to allow utilities to utilize simple radio controlled switches to control the On Electric Peak behavior of the Heat Pump. With a closed contact signal, this input will limit the operation and thus the power consumption of the unit by one of the below selections. The AID Tool will allow configuration of this input for the action of:

- No Action
- Disable compressor operation until removed
- Go to On Peak thermostat settings until removed [Requires Com T-Stat] (Future Release)
- Compressor limited to low cap until removed (Future Release)
- Disable compressor operation for 1/2 hr (can be removed immediately) (Future Release)

Then Flash Code 7 on the Green LED for the 'On Peak' mode. And On Peak will display on communicating thermostats.

The Aurora 'Advanced' Control System cont.

Home Automation 1 and 2 Inputs

The Home automation inputs are simple closed contact inputs that will trigger an AID Tool and thermostat alert for the homeowner. These would require optional sensors and or equipment for connection to the AXB board. With two inputs two different sensors can be selected. The selected text will then be displayed on the AID Tool and communicating thermostats. These events will NOT alter functionality or operation of the heat pump/accessories and is for homeowner/service notification only.

Home Automation 1 - E23 HA1

With a closed dry contact signal, this input will cause an alarm and Alert Code 23 to indicate on the stat or flash on ABC. The AID Tool will allow configuration of this input between the following selections:

- No Action
- Home Automation Fault [no lockout info only]
  - Output from home automation system
- Security Alarm [no lockout info only]
  - Output from home security
- Sump Alarm Fault [no lockout info only]
  - Switch output from sump sensor
- Smoke/CO Alarm Fault [no lockout info only]
  - Switch output from Smoke/CO sensor
- Dirty Filter Alarm [no lockout info only]
  - Output from dirty filter sensor

Home Automation 2 – E24 HA2

With a closed dry contact signal, this input will cause an alarm and Alert Code 24 to indicate on the stat or flash on ABC. The AID Tool will allow configuration of this input between the following selections:

- No Action
- Home Automation Fault [no lockout info only]
  - Output from home automation system
- Security Alarm [no lockout info only]
  - Output from home security
- Sump Alarm Fault [no lockout info only]
  - Switch output from sump sensor
- Smoke/CO Alarm Fault [no lockout info only]
  - Switch output from Smoke/CO sensor
- Dirty Filter Alarm [no lockout info only]
  - Output from dirty filter sensor

Monitoring Sensor Kits

Energy Monitoring (Standard Sensor Kit on 'Advanced' models)

The Energy Monitoring Kit includes two current transducers (blower and electric heat) added to the existing two compressor sensors so that the complete power usage of the heat pump can be measured. The AID Tool provides configuration detail for the type of blower motor, power adjustment and a line voltage calibration procedure to improve the accuracy, and a power adjustment setting that allows the compressor power to be adjusted to match the unit's line voltage using the provided tables. This information can be displayed on the AID Tool, selected communicating thermostats or Symphony. The TPCM32U03A*/04A* will display instantaneous energy use while the color touchscreen TPCC32U01* will in addition display a 13 month history in graph form. Refer to Unit Start Up Energy Monitoring for configuration details.

Dual Capacity Power Adjustment

Model	Unit Capacity	Voltage		
		208	230	250
026	Full Load	0.99	0.99	0.96
	Part Load	0.99	0.99	0.93
038	Full Load	0.99	0.97	0.91
	Part Load	0.99	0.94	0.83
049	Full Load	0.94	0.91	0.85
	Part Load	0.91	0.84	0.75
064	Full Load	0.95	0.9	0.79
	Part Load	0.92	0.83	0.71
072	Full Load	0.94	0.86	0.73
	Part Load	0.92	0.81	0.65

Refrigerant Monitoring (optional sensor kit)

The optional Refrigerant Monitoring Kit includes two pressure transducers, and three temperature sensors, heating liquid line, suction temperature and existing cooling liquid line (FP1). These sensors allow the measurement of discharge and suction pressures, suction and liquid line temperatures as well as superheat and subcooling. This information will only be displayed on the AID Tool or Symphony.

Performance Monitoring (optional sensor kit)

The optional Performance Monitoring Kit includes three temperature sensors, entering and leaving water, leaving air temperature and a water flow rate sensor. With this kit heat of extraction and rejection will be calculated. This requires configuration using the AID Tool for selection of water or

The Aurora 'Advanced' Control System cont.

Special Modes and Applications

Communicating Digital Thermostats

The Aurora controls system also features either mono-chromatic or color touch screen graphic display thermostats for user interface. These displays not only feature easy to use graphical interface but display alerts and faults in plain English. Many of the features discussed here may not be applicable without these thermostats.

Dehumidification – Passive

In passive dehumidification mode with a Variable Speed ECM motor the airflow is reduced by 15% from the heating airflow setting. If cooling airflow is set to +5, -5 or -10% of heating airflow it will automatically be set to -15% of heating airflow whenever the dehumidification call is present in the communicating stat or from the thermostat input DH. If the airflow for cooling is already set to -15% no airflow change will be noticed from normal cooling. Dehumidification mode will be shown on the ABC and the communicating thermostats.

Aurora 'Advanced' Control LED Displays

These three LEDs display the status, configuration, and fault codes for the control. These can also be read in plain English via the Aurora AID Tool.

Status LED (LED3, Green)

Description of Operation	Fault LED, Green
Normal Mode	ON
Control is Non-functional	OFF
Test Mode	Slow Flash
Lockout Active	Fast Flash
Dehumidification Mode	Flash Code 2
Load Shed	Flash Code 5
Emergency Shutdown	Flash Code 6
On Peak Mode	Flash Code 7
(Future Use)	Flash Code 8
(Future Use)	Flach Code 9

Configuration LED (LED2, Yellow)

Description of Operation	Configuration LED, Yellow
No Software Overwritten	ECM Setting
DIP Switch Overwritten	Slow Flash
ECM Configuration Mode	Fast Flash
Reset Configuration Mode	OFF

Fault LED (LED1, Red)

	Red Fault LED	LED Flash Code *	Lockout	Reset/ Remove	Fault Condition Summary
ABC Basic Faults	Normal - No Faults	Off	-		
	Fault-Input	1	No	Auto	Tstat input error. Autoreset upon condition removal.
	Fault-High Pressure	2	Yes	Hard or Soft	HP switch has tripped (>600 psi)
	Fault-Low Pressure	3	Yes	Hard or Soft	Low Pressure Switch has tripped (<40 psi for 30 continuous sec.)
	Fault-Freeze Detection FP2	4	Yes	Hard or Soft	Freeze protection sensor has tripped (<15 or 30 degF for 30 continuous sec.)
	Fault-Freeze Detection FP1	5	Yes	Hard or Soft	Freeze protection sensor has tripped (<15 or 30 degF for 30 continuous sec.)
	Fault-Condensate Overflow	7	Yes	Hard or Soft	Condensate switch has shown continuity for 30 continuous sec.
	Fault-Over/Under Voltage	8	No	Auto	Instantaneous voltage is out of range. **Controls shut down until resolved.
	Fault-FP1 Sensor Error	11	Yes	Hard or Soft	FP1 Sensor Open or Shorted
ABC & AXB Advanced	Fault-Compressor Monitor	10	Yes	Hard or Soft	Open Crkt, Run, Start or welded cont
	Non-CriticAXB SnsrErr	13	No	Auto	Any Other Sensor Error
	CriticAXBSnsrErr	14	Yes	Hard or Soft	Sensor Error for EEV or HW
	Alert-HotWtr	15	No	Auto	HW over limit or logic lockout. HW pump deactivated.
	Fault-VarSpdPump	16	No	Auto	Alert is read from PWM feedback.
	Non-CritComErr	18	No	Auto	Any non-critical com error
	Fault-CritComErr	19	No	Auto	Any critical com error. Auto reset upon condition removal
	Alarm - Low Loop Pressure	21	No	Auto	Loop pressure is below 3 psi for more than 3 minutes
	Alarm - Home Automation 1	23	No	Auto	Closed contact input is present on Dig 2 input - Text is configurable
	Alarm - Home Automation 2	24	No	Auto	Closed contact input is present on Dig 3 input - Text is configurable

NOTES:
*All codes >11 use long flash for tens digit and short flash for the ones digit. 20, 30, 40, 50 etc. are skipped!
Alert' is a noncritical sensor or function that has failed. Normal operation of the heat pump is maintained but service is desired at some point.

Operation Logic Data Table

Operation Logic Table	Heating					Cooling			
	STG1	STG2	STG3	EMERG	Fan Only	STG1	STG2	Reheat	Fan Only
Compressor	On	On	On	Off	Off	On	On	On	Off
Reversing Valve	Off	Off	Off	Off	Off	On	On	On	On
Aux Heat	Off	Off	Staged	Staged	Off	Off	Off	Off	Off
Acc Relay	On	On	On	Off	Off	On	On	On	Off
Fan Relay (PSC)	On	On	On	On	On	On	On	On	On
Loop Pump	On	On	On	Off	Off	On	On	On	Off
ECM Speed	Med	High	Aux	Aux	Low	Med	High	High	Low
T-Stat Signal	Y1	Y1,Y2	Y1,Y2,W	W	G	Y1,O	Y1,Y2,O	DH	G

5/11/12

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.

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. Failure to adhere to the guidelines in the water quality table could result in the loss of warranty.

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

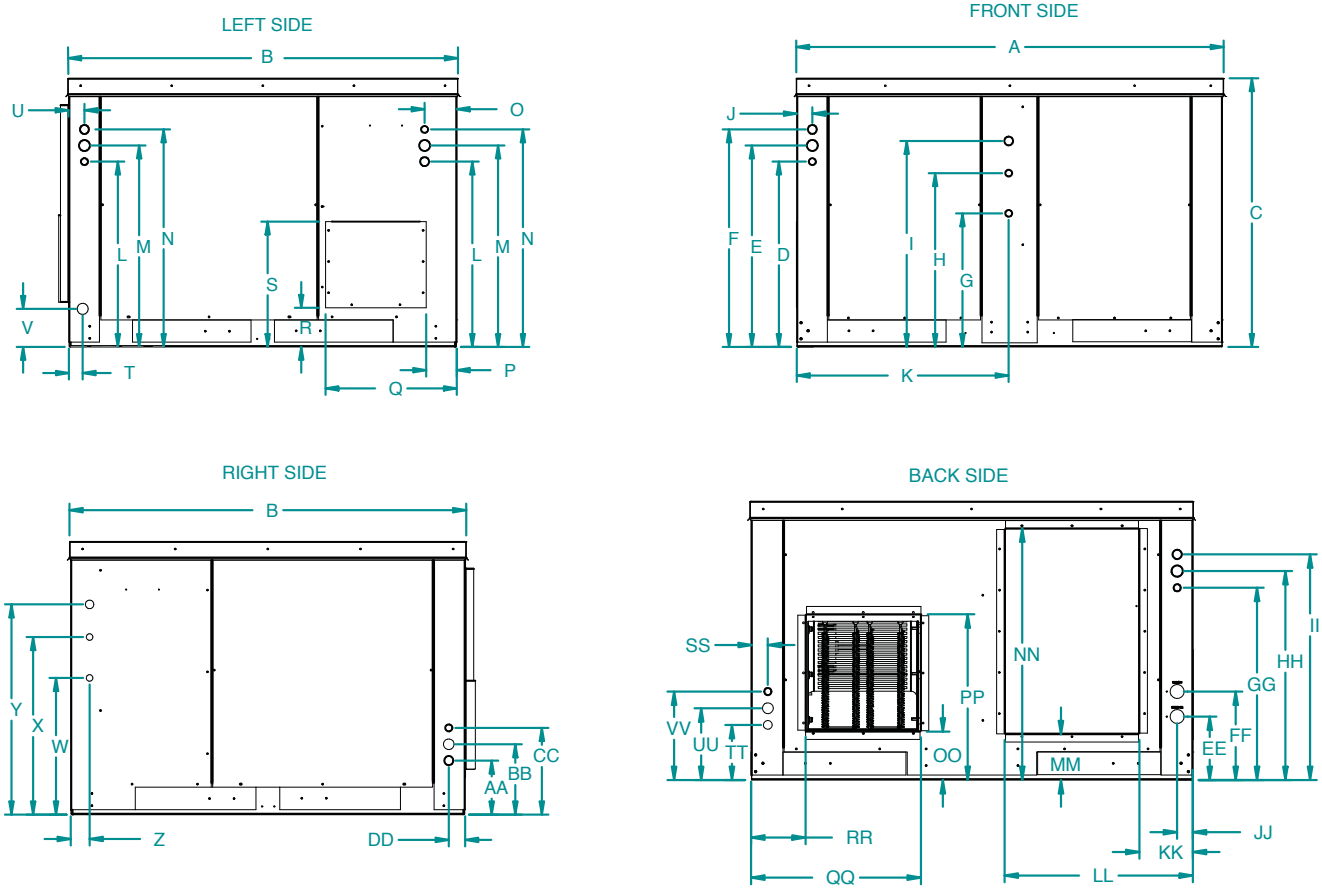
In applications where the water quality cannot be held to prescribed limits, the use of a secondary or intermediate heat exchanger is recommended to separate the unit from the contaminated water. The table above outlines the water quality guidelines for unit heat exchangers. If these conditions are exceeded, 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.

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

Dimensional Data

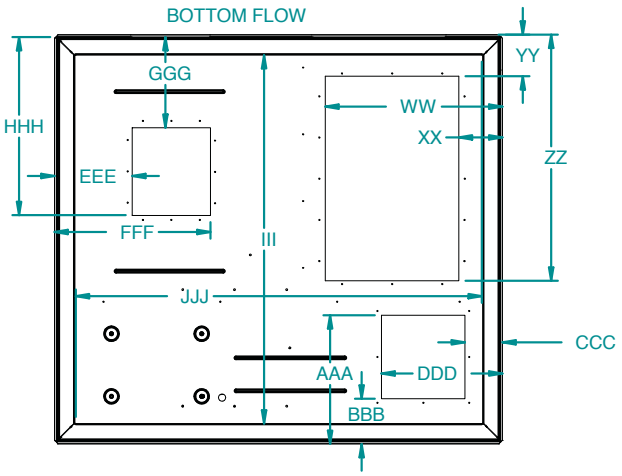


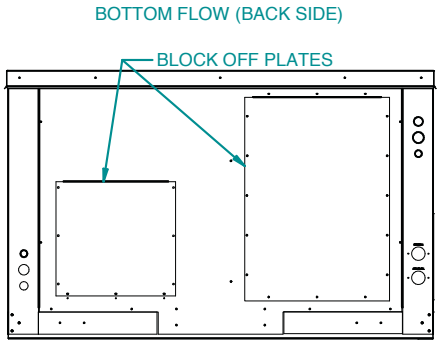
Side Discharge Configuraton		Overall Cabinet			Front Electrical Knockouts								Left Electrical Knockouts									
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
		Width	Depth	Height	7/8"	1-3/8"	1-1/8"	7/8"	7/8"	1-1/8"	N/A	N/A	7/8"	1-3/8"	1-1/8"	N/A	Pump				N/A	N/A	Condensate
026	in.	53.1	48.5	33.3	23.0	25.0	27.0	16.6	21.6	25.6	1.9	26.4	23.4	25.4	27.4	4.0	3.8	16.3	4.9	15.6	1.7	2.0	4.7
	cm.	134.9	123.2	84.6	58.4	63.5	68.6	42.2	54.9	65.0	4.8	67.1	59.4	64.5	69.6	10.2	9.7	41.4	12.4	39.6	4.3	5.1	11.9
038	in.	53.1	48.5	33.3	23.0	25.0	27.0	16.6	21.6	25.6	1.9	26.4	23.4	25.4	27.4	4.0	3.8	16.3	4.9	15.6	1.7	2.0	4.7
	cm.	134.9	123.2	84.6	58.4	63.5	68.6	42.2	54.9	65.0	4.8	67.1	59.4	64.5	69.6	10.2	9.7	41.4	12.4	39.6	4.3	5.1	11.9
049-072	in.	53.1	48.5	41.3	30.9	32.9	34.9	24.5	29.5	33.5	2.0	26.4	30.9	32.9	34.9	1.9	3.8	16.3	8.9	19.6	1.5	2.0	4.9
	cm.	134.9	123.2	104.9	78.5	83.6	88.6	62.2	74.9	85.1	5.1	67.1	78.5	83.6	88.6	4.8	9.7	41.4	22.6	49.8	3.8	5.1	11.9

Side Discharge Configuraton		Right Side Electrical Knockouts								Back Side Electrical Knockouts																
		W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV
		7/8"	7/8"	1-1/8"	N/A	1-1/8"	1-3/8"	7/8"	N/A	WTR OUT	WTR IN	7/8"	1-3/8"	1-1/8"	N/A	Return				Discharge				N/A	1-1/8"	1-3/8"	7/8"
026	in.	16.7	21.7	25.7	2.3	6.6	8.6	10.6	2.0	7.6	10.6	23.0	25.3	27.0	1.9	6.4	22.5	5.5	30.2	5.5	16.5	18.2	8.7	2.0	6.6	8.6	10.6
	cm.	42.4	55.1	65.3	5.8	16.8	21.8	26.9	5.1	19.3	26.9	58.4	64.3	68.6	4.8	16.3	57.2	14.0	76.7	14.0	41.9	46.2	22.1	5.1	16.8	21.8	26.9
038	in.	16.7	21.7	25.7	2.3	6.6	8.6	10.6	2.0	7.6	10.6	23.0	25.3	27.0	1.9	6.4	22.5	5.5	30.2	5.8	19.8	20.4	6.7	2.0	6.6	8.6	10.6
	cm.	42.4	55.1	65.3	5.8	16.8	21.8	26.9	5.1	19.3	26.9	58.4	64.3	68.6	4.8	16.3	57.2	14.0	76.7	14.7	50.3	51.8	17.0	5.1	16.8	21.8	26.9
049-072	in.	24.6	29.6	33.6	2.3	6.6	8.6	10.6	2.0	7.6	10.6	30.9	32.9	34.9	1.9	6.4	22.5	9.3	34.1	5.5	19.1	20.1	6.7	2.0	6.6	8.6	10.6
	cm.	62.5	75.2	85.3	5.8	16.8	21.8	26.9	5.1	19.3	26.9	78.5	83.6	88.6	4.8	16.3	57.2	23.6	86.6	14.0	48.5	51.1	17.0	5.1	16.8	21.8	26.9

Discharge/Return flanges are field installed and extend 1" (25.4 mm) from cabinet
Fractional dimensions indicate knockout sizes.

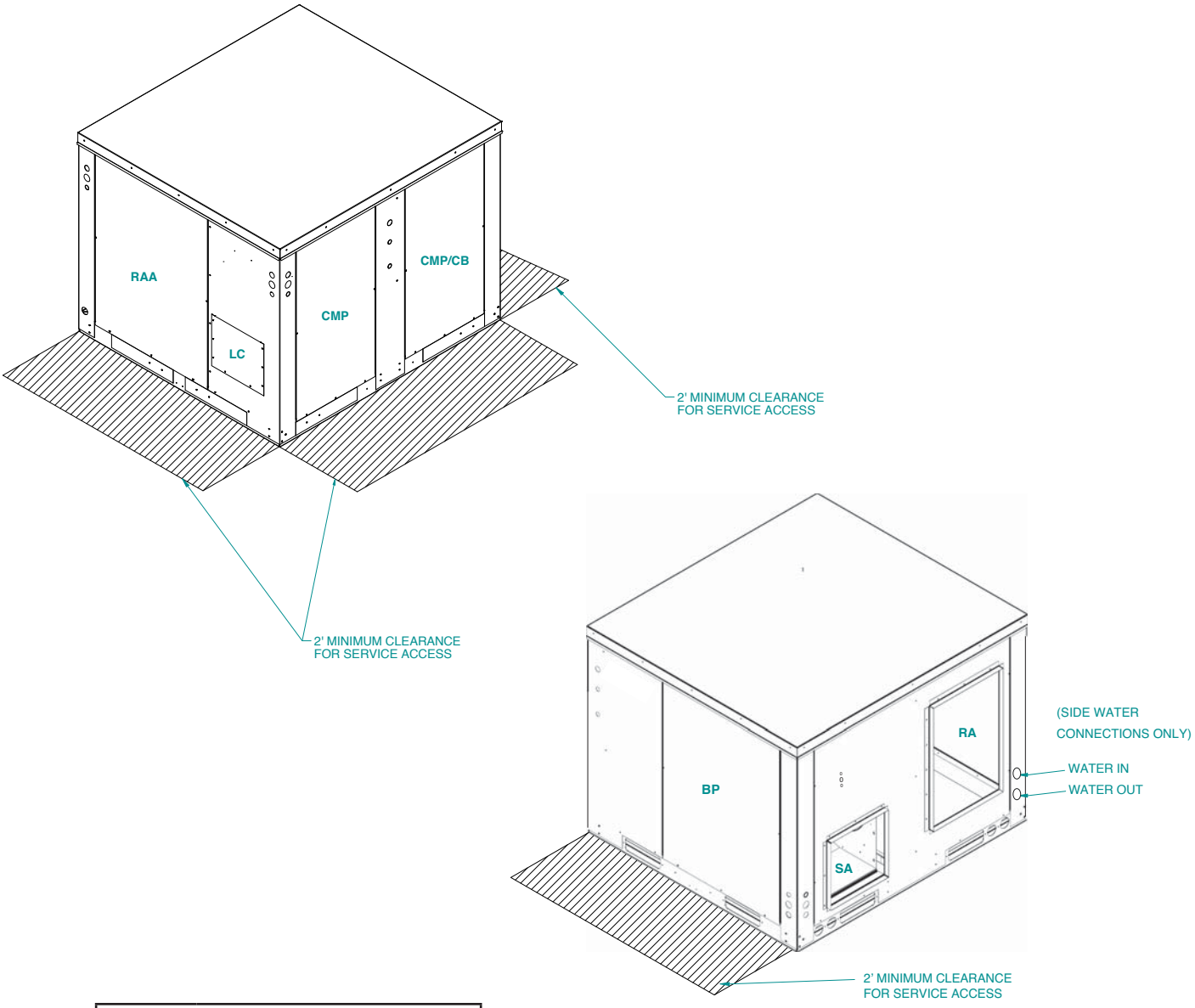
Dimensional Data cont.





Bottom Flow Configuraton		Bottom Side Features													
		WW	XX	YY	ZZ	AAA	BBB	CCC	DDD	EEE	FFF	GGG	HHH	III	JJJ
		Return				Loop				Discharge					
026	in.	21.3	5.3	5.0	29.5	15.4	5.4	4.5	14.5	9.3	18.7	10.9	21.3	44.2	48.8
	cm.	54.1	13.5	12.7	74.9	39.1	13.7	11.4	36.8	23.6	47.5	27.7	54.1	112.3	124.0
038	in.	21.3	5.3	5.0	29.5	15.4	5.4	4.5	14.5	7.2	20.4	12.3	25.7	44.2	48.8
	cm.	54.1	13.5	12.7	74.9	39.1	13.7	11.4	36.8	18.3	51.8	31.2	65.3	112.3	124.0
049-072	in.	21.3	5.3	5.0	29.5	15.4	5.4	4.5	14.5	7.2	20.4	12.3	25.7	44.2	48.8
	cm.	54.1	13.5	12.7	74.9	39.1	13.7	11.4	36.8	18.3	51.8	31.2	65.3	112.3	124.0

Dimensional Data cont.



Legend	
RA	Return Air
RAA	Return Air Access
SA	Supply Air
CB	Control Access Panel
CMP	Compressor Access Panel
BP	Blower Access Panel
LC	Loop Connection Access

Physical Data

Model		DUAL CAPACITY				
		026	038	049	064	072
Compressor (1 each)		Copeland UltraTech, Dual Capacity Scroll				
Factory Charge R410a, oz [kg] (Aluminum tube and fin air coil)		52 [1.47]	78 [2.21]	92 [2.61]	96 [2.72]	110 [3.12]
ECM Blower Motor & Blower						
Blower Motor Type/Speeds	VS ECM	Variable Speed ECM				
Blower Motor- hp [W]	VS 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]	n/a	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]
High Static Blower Wheel Size - [Dia. x W], in. [mm]	VS ECM	n/a	11 x 10 [279 x 254]	n/a	n/a	n/a
Coax and Water Piping						
Water Connections Size (Side) - FPT - in [mm]		1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]
Water Connections Size (Flow Center Bottom)		GeoLink Double O-ring Fitting				
Water Connections Size (Water Valve Bottom)		1" Hose				
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
Weight - Operating, lb [kg]		502 [228]	545 [247]	580 [263]	596 [270]	606 [275]
Weight - Packaged, lb [kg]		532 [241]	575 [261]	610 [277]	626 [284]	636 [289]

8/7/2017

Auxiliary Heat Ratings

Model	KW		Stages	BTU/HR		Min CFM			
	208V	230V		208V	230V		026	038	049 - 072
EAM5*	3.6	4.8	1	12,300	16,300	450	•		
EAM8*	5.7	7.6	2	19,400	25,900	550	•		
EAM10*	7.2	9.6	2	24,600	32,700	650	•		
EAL10*	7.2	9.6	2	24,600	32,700	1100		•	•
EAL15*	10.8	14.4	2	36,900	49,100	1250		•	•
EAL20*	14.4	19.2	2	49,200	65,500	1500			•

Air flow level for auxiliary heat (Aux) must be equal to or above the minimum CFM in this table

7/9/2017

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
EAM5*	Single	17.3	20.0	26.7	30.0	30	30	30	30	30	30
EAM8*	Single	27.5	31.7	39.3	44.6	40	45	40	45	40	45
EAM10*	Single	34.7	40.0	48.3	55.0	50	60	50	60	50	60
EAL10*	Single	34.7	40.0	53.3	60.0	60	60	60	60	60	60
EAL15*	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
EAL20*	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 fan load

7/9/2017

All fuses type “D” time delay (or HACR circuit breaker in USA)

Supply wire size to be determined by local codes

Electrical Data

Dual Capacity Unit with Variable Speed ECM Motor

Model	Rated Voltage	Voltage Min/Max	Compressor				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	5.4	4.0	21.0	24.0	35
038	208-230/60/1	187/253	23.8	15.2	83.0	30.0	5.4	4.0	24.6	28.4	40
038*	208-230/60/1	187/253	23.8	15.2	83.0	30.0	5.4	7.0	27.6	31.4	50
049	208-230/60/1	187/253	33.0	21.1	104.0	37.0	5.4	7.0	33.5	38.8	60
064	208-230/60/1	187/253	42.3	27.1	152.9	54.0	5.4	7.0	39.5	46.2	70
072	208-230/60/1	187/253	46.3	29.6	179.2	63.0	5.4	7.0	42.0	49.4	70

*With optional 1 HP Variable Speed ECM motor 7/10/17
**With optional IntelliStart
Rated Voltage of 208/230/60/1
HACR circuit breaker in USA only
All fuses Class RK-5

Blower Performance Data

Dual Capacity ECM Blower Table without Zoning

MODEL	MAX ESP	AIR FLOW SPEED SETTINGS											
		1	2	3	4	5	6	7	8	9	10	11	12
026	0.50		400	475 G	625	**725 L**	**775**	**850 H**	**950**	**1050**	1175 Aux		
038	0.50	650	700 G	825	950	**1075 L**	**1175**	**1275 H**	**1375**	**1450**	1500 Aux		
038 W/1HP*	0.75	675	850 G	**1025 L**	**1250 H**	**1425**	**1625**	1750	1925	2075 Aux	2225		
049	0.75	675	850 G	1000	1200	**1400 L**	**1600 H**	**1750**	1900	2100	2150 Aux		
064	0.75	700	875 G	1025	1225	1425	**1625 L**	**1775**	**1925 H**	**2125**	2175 Aux		
072	0.75	700	875	1025 G	1225	1425	**1625**	**1775 L**	**1925**	**2125 H**	2175 Aux		

Factory settings are at recommended G-L-H-Aux speed settings 7/24/17
L-H settings MUST be located within boldface CFM range
"Aux" is factory setting for auxiliary heat and must be equal to or above the "H" setting as well as at least the minimum required for the auxiliary heat package
"G" may be located anywhere within the airflow table
CFM is controlled within +/-5% up to the maximum ESP
Max ESP includes allowance for wet coil

Dual Capacity ECM Blower Table with IntelliZone2

MODEL	MAX ESP	AIR FLOW SPEED SETTINGS											
		1	2	3	4	5	6	7	8	9	10	11	12
026	0.50		400 G	475	**625 L 55%**	**725 70%**	**775 85%**	**850 H 100%**	**950**	**1050**	1175 Aux		
038	0.50	650	700 G	**825 L 55%**	**950 70%**	**1075**	**1175 85%**	**1275 H 100%**	**1375**	**1450**	1500 Aux		
038 W/1HP*	0.75	675 G	850 L 55%	1025 70%	1250 85%	1425 H 100%	1625	1750	1925	2075 Aux	2225		
049	0.75	675	850 G	**1000 L 55%**	**1200 70%**	**1400 85%**	**1600 H 100%**	**1750**	1900	2100	2150 Aux		
064	0.75	700	875 G	1025	**1225 L 55%**	**1425 70%**	**1625**	**1775 85%**	**1925 H 100%**	**2125**	2175 Aux		
072	0.75	700	875	1025 G	1225	**1425 L 55%**	**1625 70%**	**1775**	**1925 85%**	**2125 H 100%**	2175 Aux		

Factory settings are at recommended G-L-H-Aux speed settings 9/18/17
L-H settings MUST be located within boldface CFM range
"Aux" is factory setting for auxiliary heat and must be equal to or above the "H" setting as well as at least the minimum required for the auxiliary heat package
"G" may be located anywhere within the airflow table
CFM is controlled within +/-5% up to the maximum ESP
Max ESP includes allowance for wet coil

Dual Capacity ECM Blower Table with IntelliZone2•24V

MODEL	MAX ESP	AIR FLOW SPEED SETTINGS											
		1	2	3	4	5	6	7	8	9	10	11	12
026	0.50		400	475 G	625	**725 L**	**775**	**850 H**	**950**	**1050**	1175 Aux		
038	0.50	650	700 G	825	950	**1075 L**	**1175**	**1275 H**	**1375**	**1450**	1500 Aux		
038 W/1HP*	0.75	675	850 G	**1025 L**	**1250 H**	**1425**	**1625**	1750	1925	2075 Aux	2225		
049	0.75	675	850 G	1000	1200	**1400 L**	**1600 H**	**1750**	1900	2100	2150 Aux		
064	0.75	700	875 G	1025	1225	1425	**1625 L**	**1775**	**1925 H**	**2125**	2175 Aux		
072	0.75	700	875	1025 G	1225	1425	**1625**	**1775 L**	**1925**	**2125 H**	2175 Aux		

Factory settings are at recommended G-L-H-Aux speed settings 7/24/17
L-H settings MUST be located within boldface CFM range or higher
"Aux" is factory setting for auxiliary heat and must be equal to or above the "H" setting as well as at least the minimum required for the auxiliary heat package
"G" may be located anywhere within the airflow table
CFM is controlled within +/-5% up to the maximum ESP
Max ESP includes allowance for wet coil

Blower Performance Data cont.

Setting Blower Speed - Variable Speed ECM

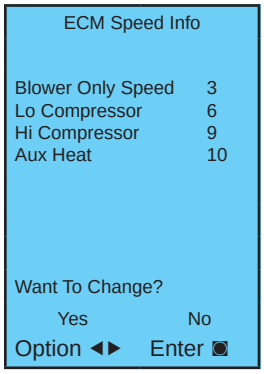
The ABC board's Yellow Config LED will flash the current ECM blower speed selections for "G", low, and high continuously with a short pause in between. The speeds can also be confirmed with the AID Tool under the Setup/ ECM Setup screen. The Aux will not be flashed but can be viewed in the AID Tool. The ECM blower motor speeds can be field adjusted with or without using an AID Tool.

ECM Setup without an AID Tool

The blower speeds for "G", Low (Y1), High (Y2), and Aux can be adjusted directly at the Aurora ABC board which utilizes the push button (SW1) on the ABC board. This procedure is outlined in the ECM Configuration Mode portion of the Aurora 'Base' Control System section. The Aux cannot be set manually without an AID Tool.

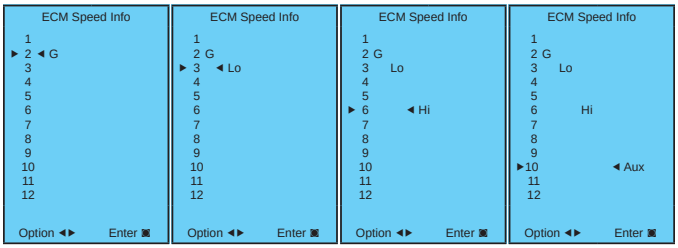
ECM Setup with an AID Tool

A much easier method utilizes the AID Tool to change the airflow using the procedure below. First navigate to the Setup screen and then select ECM Setup. This screen displays the current ECM settings. It allows the technician to enter the setup screens to change the ECM settings. Change the highlighted item using the ◄ and ► buttons and then press the ◙ button to select the item.



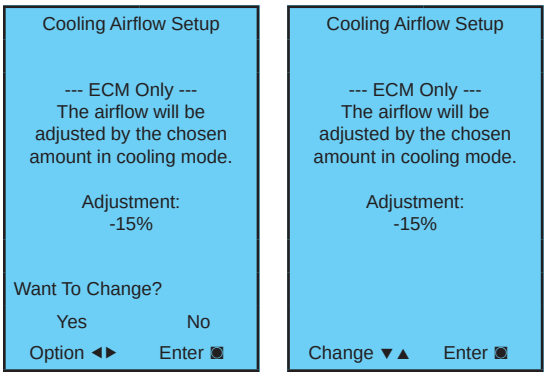
Selecting YES will enter ECM speed setup, while selecting NO will return to the previous screen.

ECM Speed Setup - These screens allow the technician to select the "G", low, high, and auxiliary heat blower speed for the ECM blower motor. Change the highlighted item using the ▲ and ▼ buttons. Press the ◙ button to select the speed.



After the auxiliary heat speed setting is selected the AID Tool will automatically transfer back to the ECM Setup screen.

Cooling Airflow Setup - These screens allow the technician to select -15%, -10%, -5%, None or +5%. Change the adjustment percentage using the ▲ and ▼ buttons. Press the ◙ button to save the change.



Reference Calculations

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

Legend and Notes

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

Notes to Performance Data Tables

The following notes apply to all performance data tables:

- Performance ratings are based on 80°F DB/67°F WB EAT for cooling and 70°F DB EAT for heating.
- Three flow rates are shown for each unit. The lowest flow rate shown is used for geothermal open loop/well water systems with a minimum of 50°F EWT. The middle flow rate shown is the minimum geothermal closed loop flow rate. The highest flow rate shown is optimum for geothermal closed loop systems and the suggested flow rate for boiler/tower applications.
- The hot water generator numbers are based on a flow rate of 0.4 gpm/ton of rated capacity with an EWT of 90°F.
- Entering water temperatures below 40°F assumes 15% antifreeze solution.
- For non-standard EAT conditions, apply the appropriate Correction Factor tables.
- Interpolation between EWT, gpm, and cfm data is permissible, extrapolation is not.

Operating Limits

Operating Limits	Cooling		Heating	
	(°F)	(°C)	(°F)	(°C)
Air Limits				
Min. Ambient Air	-10	-23.3	-10	-23.3
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	30	-1.1
Normal Entering Water	50-110	10-43.3	30-70	-1.1
Max. Entering Water	120	48.9	90	32.2
Nominal Water Flow	1.5 to 3.0 gpm per ton (1.6 to 3.2 l/m per kW)			

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 dependent 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.

Antifreeze Corrections

Catalog performance can be corrected for antifreeze use. Please use the following table and note the example given.

Antifreeze Type	Antifreeze % by wt	Heating	Cooling	Pressure Drop
EWT - °F [°C]		**30 [-1.1]**	**90 [32.2]**	**30 [-1.1]**
Water	0	1.000	1.000	1.000
Ethylene Glycol	10	0.973	0.991	1.075
	20	0.943	0.979	1.163
	30	0.917	0.965	1.225
	40	0.890	0.955	1.324
	50	0.865	0.943	1.419
Propylene Glycol	10	0.958	0.981	1.130
	20	0.913	0.969	1.270
	30	0.854	0.950	1.433
	40	0.813	0.937	1.614
	50	0.770	0.922	1.816
Ethanol	10	0.927	0.991	1.242
	20	0.887	0.972	1.343
	30	0.856	0.947	1.383
	40	0.815	0.930	1.523
	50	0.779	0.911	1.639
Methanol	10	0.957	0.986	1.127
	20	0.924	0.970	1.197
	30	0.895	0.951	1.235
	40	0.863	0.936	1.323
	50	0.833	0.920	1.399

WARNING: Gray area represents antifreeze concentrations greater than 35% by weight and should be avoided due to the extreme performance penalty they represent.

Antifreeze Correction Example

Antifreeze solution is Propylene Glycol 20% by weight. Determine the corrected heating and cooling performance at 30°F and 90°F respectively as well as pressure drop at 30°F for the 026 Full Load.

The corrected cooling capacity at 90°F would be: 22,500 MBtu/h x 0.969 = 21,803 MBtu/h

The corrected heating capacity at 30°F would be: 18,700 MBtu/h x 0.913 = 17,073 MBtu/h

The corrected pressure drop at 30°F and 8 gpm would be: 10.8 feet of head x 1.270 = 13.7 feet of head

Correction Factor Tables

Air Flow Corrections (Dual Capacity Part Load)

Airflow		Cooling				Heating		
cfm Per Ton of Clg	% of Nominal	Total Cap	Sens Cap	Power	Heat of Rej	Htg Cap	Power	Heat of Ext
240	60	0.922	0.778	0.956	0.924	0.943	1.239	0.879
275	69	0.944	0.830	0.962	0.944	0.958	1.161	0.914
300	75	0.957	0.866	0.968	0.958	0.968	1.115	0.937
325	81	0.970	0.900	0.974	0.970	0.977	1.075	0.956
350	88	0.982	0.933	0.981	0.980	0.985	1.042	0.972
375	94	0.991	0.968	0.991	0.991	0.993	1.018	0.988
400	**100**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
425	106	1.007	1.033	1.011	1.008	1.007	0.990	1.010
450	113	1.013	1.065	1.023	1.015	1.012	0.987	1.018
475	119	1.017	1.099	1.037	1.022	1.018	0.984	1.025
500	125	1.020	1.132	1.052	1.027	1.022	0.982	1.031
520	130	1.022	1.159	1.064	1.030	1.025	0.979	1.034

5/30/06

Air Flow Corrections (Dual Capacity Full Load)

Airflow		Cooling				Heating		
cfm Per Ton of Clg	% of Nominal	Total Cap	Sens Cap	Power	Heat of Rej	Htg Cap	Power	Heat of Ext
240	60	0.922	0.786	0.910	0.920	0.943	1.150	0.893
275	69	0.944	0.827	0.924	0.940	0.958	1.105	0.922
300	75	0.959	0.860	0.937	0.955	0.968	1.078	0.942
325	81	0.971	0.894	0.950	0.967	0.977	1.053	0.959
350	88	0.982	0.929	0.964	0.978	0.985	1.031	0.973
375	94	0.992	0.965	0.982	0.990	0.993	1.014	0.988
400	**100**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
425	106	1.007	1.034	1.020	1.010	1.007	0.990	1.011
450	113	1.012	1.065	1.042	1.018	1.013	0.983	1.020
475	119	1.017	1.093	1.066	1.026	1.018	0.980	1.028
500	125	1.019	1.117	1.092	1.033	1.023	0.978	1.034
520	130	1.020	1.132	1.113	1.038	1.026	0.975	1.038

5/30/06

Cooling Capacity Corrections

Entering Air WB °F	Total Clg Cap	Sensible Cooling Capacity Multipliers - Entering DB °F										Power Input	Heat of Rejection
		60	65	70	75	80	80.6	85	90	95	100		
55	0.898	0.723	0.866	1.048	1.185	*	*	*	*	*	*	0.985	0.913
60	0.912		0.632	0.880	1.078	1.244	1.260	*	*	*	*	0.994	0.927
63	0.945			0.768	0.960	1.150	1.175	*	*	*	*	0.996	0.954
65	0.976			0.694	0.881	1.079	1.085	1.270	*	*	*	0.997	0.972
66.2	0.983			0.655	0.842	1.040	1.060	1.232	*	*	*	0.999	0.986
67	**1.000**			0.616	0.806	**1.000**	1.023	1.193	1.330	1.480	*	**1.000**	**1.000**
70	1.053				0.693	0.879	0.900	1.075	1.205	1.404	*	1.003	1.044
75	1.168					0.687	0.715	0.875	1.040	1.261	1.476	1.007	1.141

NOTE: * Sensible capacity equals total capacity at conditions shown.

3/28/12

Heating Capacity Corrections

Ent Air DB °F	Heating Corrections		
	Htg Cap	Power	Heat of Ext
45	1.062	0.739	1.158
50	1.050	0.790	1.130
55	1.037	0.842	1.096
60	1.025	0.893	1.064
65	1.012	0.945	1.030
68	1.005	0.976	1.012
70	**1.000**	**1.000**	**1.000**
75	0.987	1.048	0.970
80	0.975	1.099	0.930

11/10/09

Pressure Drop

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

Performance Data cont.

026 - Dual Capacity - Part Load (750 cfm)

EWT °F	Flow Rate GPM	WPD		HEATING - EAT 70°F						COOLING - EAT 80/67 °F						
		PSI	FT/HD	Airflow CFM	HC MBtu/h	Power kW	HE MBtu/h	LAT °F	COP	Airflow CFM	TC Mbtu/h	SC Mbtu/h	S/T Ratio	Power kW	HR Mbtu/h	EER
20	3.0	0.8	1.9	Operation not recommended						Operation not recommended						
	5.0	2.0	4.6													
	7.0	3.7	8.7	550	11.0	1.09	7.3	88.5	2.96							
				750	11.4	1.11	7.6	84.1	3.01							
30	3.0	0.8	1.8	Operation not recommended						Operation not recommended						
	5.0	1.9	4.5	550	12.5	1.08	8.8	91.0	3.39	550	18.5	12.7	0.68	0.57	20.5	32.6
				750	13.0	1.10	9.2	86.0	3.44	750	18.8	13.9	0.74	0.60	20.9	31.5
	7.0	3.6	8.4	550	13.3	1.10	9.5	92.3	3.52	550	18.6	12.7	0.68	0.55	20.5	33.8
				750	13.8	1.13	9.9	87.1	3.58	750	19.1	13.9	0.73	0.58	21.1	33.0
40	3.0	0.8	1.8	Operation not recommended						Operation not recommended						
	5.0	1.9	4.3	550	14.6	1.09	10.9	94.5	3.91	550	19.4	14.0	0.72	0.63	21.5	30.8
				750	15.1	1.11	11.3	88.6	3.97	750	19.7	15.3	0.77	0.66	22.0	29.9
	7.0	3.5	8.2	550	15.4	1.12	11.5	95.9	4.02	550	19.5	14.0	0.72	0.61	21.6	31.9
				750	15.9	1.14	12.0	89.6	4.09	750	20.0	15.3	0.77	0.64	22.2	31.2
50	3.0	0.7	1.7	550	16.1	1.11	12.3	97.1	4.26	550	19.8	14.6	0.74	0.71	22.2	27.8
				750	16.6	1.12	12.8	90.5	4.33	750	20.3	16.2	0.80	0.72	22.8	28.0
	5.0	1.8	4.2	550	16.7	1.11	12.9	98.1	4.41	550	20.0	14.7	0.74	0.69	22.3	28.8
				750	17.2	1.12	13.3	91.2	4.49	750	20.5	16.3	0.79	0.71	22.9	29.0
	7.0	3.4	7.9	550	17.5	1.13	13.6	99.4	4.51	550	20.3	15.1	0.74	0.69	22.6	29.5
				750	18.0	1.15	14.1	92.2	4.59	750	20.8	16.7	0.80	0.70	23.2	29.8
60	3.0	0.7	1.7	550	18.1	1.11	14.3	100.5	4.77	550	18.7	14.0	0.75	0.82	21.5	23.0
				750	18.5	1.12	14.7	92.9	4.85	750	19.3	15.5	0.81	0.83	22.1	23.2
	5.0	1.8	4.1	550	18.8	1.11	15.0	101.7	4.97	550	18.9	14.1	0.75	0.79	21.6	23.8
				750	19.3	1.12	15.4	93.8	5.06	750	19.4	15.6	0.80	0.81	22.2	24.0
	7.0	3.3	7.6	550	19.5	1.13	15.6	102.8	5.03	550	19.2	14.5	0.75	0.79	21.9	24.4
				750	19.9	1.14	16.0	94.6	5.12	750	19.8	16.0	0.81	0.80	22.5	24.6
70	3.0	0.7	1.6	550	20.1	1.11	16.2	103.8	5.27	550	17.7	13.4	0.76	0.92	20.8	19.3
				750	20.5	1.12	16.6	95.3	5.37	750	18.2	14.8	0.81	0.94	21.4	19.4
	5.0	1.7	3.9	550	20.9	1.11	17.1	105.2	5.53	550	17.9	13.5	0.75	0.90	20.9	19.9
				750	21.3	1.11	17.5	96.3	5.63	750	18.4	14.9	0.81	0.91	21.5	20.1
	7.0	3.2	7.4	550	21.5	1.13	17.6	106.2	5.55	550	18.2	13.8	0.76	0.89	21.2	20.4
				750	21.8	1.13	18.0	97.0	5.66	750	18.7	15.3	0.82	0.91	21.7	20.6
80	3.0	0.7	1.6	550	22.2	1.14	18.3	107.3	5.71	550	16.7	12.8	0.77	1.05	20.3	15.9
				750	22.5	1.13	18.6	97.7	5.81	750	17.2	14.2	0.83	1.07	20.9	16.0
	5.0	1.6	3.8	550	23.2	1.13	19.4	109.1	6.02	550	16.9	12.9	0.76	1.03	20.4	16.5
				750	23.5	1.12	19.7	99.0	6.13	750	17.4	14.3	0.82	1.05	20.9	16.6
	7.0	3.1	7.1	550	23.6	1.15	19.6	109.6	5.98	550	17.2	13.2	0.77	1.02	20.6	16.9
				750	23.8	1.14	19.9	99.4	6.09	750	17.6	14.6	0.83	1.04	21.2	17.0
90	3.0	0.7	1.5	550	24.3	1.16	20.3	110.8	6.12	550	15.8	12.3	0.78	1.19	19.8	13.3
				750	24.5	1.15	20.5	100.2	6.24	750	16.2	13.6	0.84	1.21	20.3	13.4
	5.0	1.6	3.7	550	25.5	1.15	21.6	113.0	6.49	550	15.9	12.3	0.78	1.16	19.9	13.8
				750	25.7	1.14	21.8	101.7	6.62	750	16.4	13.7	0.83	1.18	20.4	13.9
	7.0	3.0	6.9	550	25.6	1.18	21.6	113.1	6.39	550	16.2	12.7	0.78	1.15	20.1	14.1
				750	25.7	1.16	21.8	101.8	6.52	750	16.6	14.0	0.84	1.17	20.6	14.2
100	3.0	0.6	1.5	Operation not recommended						Operation not recommended						
	5.0	1.5	3.5							550	14.9	11.8	0.79	1.33	19.5	11.3
										750	15.4	13.0	0.85	1.35	20.0	11.3
	7.0	2.9	6.6							550	15.2	12.1	0.80	1.32	19.7	11.5
										750	15.6	13.4	0.86	1.34	20.2	11.6
110	3.0	0.6	1.4							Operation not recommended						
	5.0	1.5	3.4							550	14.0	11.2	0.80	1.50	19.1	9.3
										750	14.4	12.4	0.87	1.53	19.6	9.4
	7.0	2.8	6.4							550	14.2	11.5	0.81	1.49	19.3	9.6
										750	14.6	12.7	0.87	1.52	19.8	9.6
120	3.0	0.6	1.3							Operation not recommended						
	5.0	1.4	3.3							550	13.1	11.7	0.89	1.71	18.9	7.6
										750	13.3	12.7	0.95	1.75	19.3	7.6
	7.0	2.7	6.1							550	13.2	11.7	0.89	1.65	18.8	8.0
										750	13.4	12.7	0.94	1.71	19.3	7.9

7/29/17

Performance Data cont.

026 - Dual Capacity - Full Load (950 cfm)

EWT °F	Flow Rate GPM	WPD		HEATING - EAT 70°F						COOLING - EAT 80/67 °F						
		PSI	FT/HD	Airflow CFM	HC MBtu/h	Power kW	HE MBtu/h	LAT °F	COP	Airflow CFM	TC Mbtu/h	SC Mbtu/h	S/T Ratio	Power kW	HR Mbtu/h	EER
20	4.0	1.4	3.2	Operation not recommended						Operation not recommended						
	6.0	2.8	6.5													
	8.0	4.8	11.1	750	15.5	1.41	10.7	89.2	3.21							
				950	16.0	1.46	11.0	85.6	3.22							
30	4.0	1.4	3.2	Operation not recommended						Operation not recommended						
	6.0	2.7	6.3	750	17.8	1.43	12.9	92.0	3.65	750	23.0	16.8	0.73	0.96	26.3	24.1
				950	18.4	1.48	13.3	87.9	3.64	950	23.4	18.4	0.78	1.01	26.9	23.2
	8.0	4.7	10.8	750	18.1	1.45	13.2	92.4	3.67	750	23.2	16.8	0.73	0.93	26.3	24.9
				950	18.7	1.49	13.6	88.3	3.68	950	23.7	18.4	0.77	0.98	27.1	24.3
40	4.0	1.3	3.1	Operation not recommended						Operation not recommended						
	6.0	2.6	6.1	750	20.4	1.49	15.3	95.2	4.02	750	24.9	18.1	0.73	1.06	28.5	23.6
				950	21.0	1.52	15.8	90.5	4.05	950	25.4	19.8	0.78	1.11	29.1	22.9
	8.0	4.5	10.4	750	20.8	1.50	15.7	95.7	4.06	750	25.1	18.1	0.72	1.03	28.6	24.5
				950	21.5	1.53	16.2	90.9	4.10	950	25.7	19.8	0.77	1.07	29.3	23.9
50	4.0	1.3	3.0	750	22.1	1.51	17.0	97.3	4.31	750	25.4	17.7	0.70	1.21	29.5	21.0
				950	22.8	1.53	17.6	92.2	4.37	950	26.7	19.6	0.74	1.27	31.1	21.0
	6.0	2.6	5.9	750	23.0	1.54	17.7	98.3	4.36	750	25.9	17.9	0.69	1.14	29.8	22.7
				950	23.7	1.56	18.4	93.1	4.44	950	27.3	19.9	0.73	1.20	31.4	22.8
	8.0	4.4	10.1	750	23.5	1.56	18.2	99.0	4.42	750	26.2	19.1	0.73	1.11	30.0	23.5
				950	24.2	1.58	18.8	93.6	4.50	950	27.6	21.2	0.77	1.17	31.6	23.6
60	4.0	1.2	2.9	750	24.4	1.56	19.1	100.1	4.58	750	24.3	17.3	0.71	1.32	28.8	18.4
				950	25.2	1.57	19.8	94.5	4.70	950	25.5	19.3	0.76	1.38	30.2	18.5
	6.0	2.5	5.7	750	25.5	1.60	20.0	101.5	4.66	750	24.9	17.5	0.71	1.25	29.1	19.8
				950	26.3	1.61	20.8	95.7	4.78	950	26.0	19.4	0.75	1.31	30.5	19.9
	8.0	4.2	9.8	750	26.1	1.62	20.6	102.2	4.72	750	25.1	18.5	0.74	1.22	29.3	20.5
				950	27.0	1.63	21.4	96.3	4.86	950	26.3	20.5	0.78	1.28	30.7	20.6
70	4.0	1.2	2.8	750	26.7	1.61	21.2	102.9	4.85	750	23.2	17.0	0.73	1.43	28.0	16.2
				950	27.6	1.61	22.1	96.9	5.02	950	24.2	18.9	0.78	1.48	29.2	16.3
	6.0	2.4	5.5	750	28.0	1.66	22.4	104.6	4.94	750	23.8	17.2	0.72	1.37	28.4	17.4
				950	29.0	1.66	23.3	98.2	5.10	950	24.8	19.0	0.77	1.41	29.6	17.5
	8.0	4.1	9.5	750	28.8	1.68	23.0	105.5	5.00	750	24.0	17.9	0.74	1.33	28.6	18.0
				950	29.7	1.68	24.0	99.0	5.19	950	25.1	19.8	0.79	1.39	29.8	18.1
80	4.0	1.2	2.7	750	29.3	1.70	23.5	106.1	5.05	750	22.0	16.7	0.76	1.57	27.4	14.0
				950	30.3	1.69	24.5	99.5	5.26	950	22.9	18.6	0.81	1.62	28.4	14.1
	6.0	2.3	5.4	750	31.0	1.77	24.9	108.2	5.13	750	22.6	17.0	0.75	1.52	27.8	14.9
				950	32.0	1.75	26.0	101.2	5.36	950	23.5	18.8	0.80	1.56	28.9	15.0
	8.0	4.0	9.2	750	31.9	1.79	25.7	109.3	5.21	750	22.9	17.4	0.76	1.49	27.9	15.4
				950	32.9	1.76	26.9	102.1	5.47	950	23.8	19.2	0.81	1.53	29.0	15.5
90	4.0	1.1	2.6	750	31.9	1.79	25.8	109.4	5.22	750	20.9	16.5	0.79	1.72	26.7	12.1
				950	33.0	1.76	27.0	102.2	5.49	950	21.6	18.4	0.85	1.76	27.6	12.3
	6.0	2.2	5.2	750	33.9	1.87	27.5	111.8	5.31	750	21.5	16.7	0.78	1.67	27.2	12.9
				950	35.1	1.84	28.8	104.2	5.60	950	22.3	18.6	0.83	1.71	28.1	13.0
	8.0	3.8	8.8	750	34.9	1.90	28.5	113.1	5.40	750	21.7	16.9	0.78	1.64	27.3	13.2
				950	36.2	1.85	29.8	105.2	5.73	950	22.5	18.7	0.83	1.68	28.2	13.4
100	4.0	1.1	2.5	Operation not recommended						Operation not recommended						
	6.0	2.2	5.0							750	20.5	16.6	0.81	1.87	26.8	11.0
										950	21.1	18.5	0.87	1.89	27.6	11.2
	8.0	3.7	8.5							750	20.7	16.6	0.80	1.83	26.9	11.3
										950	21.3	18.4	0.86	1.86	27.7	11.5
110	4.0	1.0	2.4							Operation not recommended						
	6.0	2.1	4.8							750	19.4	16.5	0.85	2.06	26.5	9.4
										950	20.0	18.4	0.92	2.08	27.1	9.6
	8.0	3.5	8.2							750	19.6	16.3	0.83	2.02	26.5	9.7
										950	20.2	18.0	0.89	2.05	27.2	9.9
120	4.0	1.0	2.3							Operation not recommended						
	6.0	2.0	4.6							750	18.3	15.9	0.87	2.27	26.0	8.0
										950	18.6	17.3	0.93	2.33	26.5	8.0
	8.0	3.4	7.9							750	18.4	15.9	0.86	2.20	25.9	8.4
										950	18.8	17.3	0.92	2.27	26.6	8.3

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Performance Data cont.

038 - Dual Capacity - Part Load (1150 cfm)

EWT °F	Flow Rate GPM	WPD		HEATING - EAT 70°F						COOLING - EAT 80/67 °F						
		PSI	FT/HD	Airflow CFM	HC MBtu/h	Power kW	HE MBtu/h	LAT °F	COP	Airflow CFM	TC Mbtu/h	SC Mbtu/h	S/T Ratio	Power kW	HR Mbtu/h	EER
20	4.0	0.9	2.2	Operation not recommended						Operation not recommended						
	6.0	1.8	4.1													
	8.0	2.9	6.8	1000	14.7	1.54	9.4	83.6	2.79							
				1150	15.3	1.79	9.2	82.3	2.50							
30	4.0	0.9	2.1	Operation not recommended						Operation not recommended						
	6.0	1.7	3.9	1000	16.3	1.49	11.3	85.1	3.22	1000	23.4	16.4	0.70	0.76	25.9	30.9
				1150	17.0	1.53	11.8	83.7	3.26	1150	23.7	18.0	0.76	0.80	26.5	29.8
	8.0	2.8	6.6	1000	17.4	1.53	12.2	86.1	3.34	1000	23.5	16.4	0.70	0.73	26.0	32.0
				1150	18.1	1.57	12.8	84.6	3.39	1150	24.1	18.0	0.75	0.77	26.7	31.2
40	4.0	0.9	2.0	Operation not recommended						Operation not recommended						
	6.0	1.7	3.8	1000	19.1	1.53	13.9	87.7	3.66	1000	27.1	19.3	0.71	0.85	29.9	32.0
				1150	19.7	1.56	14.4	85.9	3.71	1150	27.6	21.1	0.77	0.89	30.6	31.1
	8.0	2.8	6.4	1000	20.1	1.57	14.8	88.6	3.76	1000	27.3	19.3	0.71	0.82	30.1	33.2
				1150	20.8	1.60	15.4	86.7	3.82	1150	27.9	21.1	0.76	0.86	30.8	32.5
50	4.0	0.9	2.0	1000	21.1	1.57	15.7	89.5	3.93	1000	30.1	21.2	0.71	0.96	33.3	31.2
				1150	21.7	1.59	16.3	87.5	4.00	1150	30.9	23.5	0.76	0.98	34.2	31.5
	6.0	1.6	3.7	1000	21.8	1.57	16.4	90.2	4.07	1000	30.3	21.3	0.70	0.94	33.5	32.4
				1150	22.5	1.59	17.0	88.1	4.14	1150	31.2	23.6	0.76	0.96	34.4	32.6
	8.0	2.7	6.2	1000	22.8	1.61	17.3	91.1	4.16	1000	30.8	21.9	0.71	0.93	34.0	33.2
				1150	23.5	1.63	17.9	88.9	4.23	1150	31.7	24.2	0.76	0.95	34.9	33.5
60	4.0	0.8	1.9	1000	24.1	1.59	18.6	92.3	4.43	1000	28.3	21.1	0.75	1.10	32.0	25.6
				1150	24.7	1.60	19.2	89.9	4.51	1150	29.1	23.3	0.80	1.12	32.9	25.8
	6.0	1.6	3.6	1000	25.0	1.59	19.6	93.2	4.62	1000	28.5	21.2	0.74	1.07	32.2	26.6
				1150	25.6	1.60	20.2	90.6	4.70	1150	29.3	23.5	0.80	1.10	33.1	26.8
	8.0	2.6	6.0	1000	25.9	1.62	20.4	94.0	4.68	1000	29.0	21.8	0.75	1.06	32.6	27.2
				1150	26.5	1.63	20.9	91.3	4.76	1150	29.8	24.1	0.81	1.09	33.5	27.5
70	4.0	0.8	1.8	1000	27.1	1.61	21.6	95.1	4.92	1000	26.5	21.0	0.79	1.24	30.7	21.3
				1150	27.6	1.61	22.1	92.2	5.01	1150	27.2	23.2	0.85	1.27	31.5	21.5
	6.0	1.5	3.5	1000	28.3	1.61	22.8	96.2	5.16	1000	26.7	21.1	0.79	1.21	30.9	22.1
				1150	28.8	1.61	23.3	93.2	5.26	1150	27.5	23.3	0.85	1.23	31.7	22.2
	8.0	2.5	5.8	1000	29.0	1.64	23.4	96.8	5.18	1000	27.2	21.6	0.80	1.20	31.3	22.6
				1150	29.5	1.64	23.9	93.8	5.28	1150	27.9	23.9	0.86	1.22	32.1	22.8
80	4.0	0.8	1.8	1000	30.6	1.63	25.0	98.3	5.50	1000	25.3	20.6	0.81	1.43	30.2	17.7
				1150	31.0	1.62	25.5	95.0	5.61	1150	26.1	22.9	0.88	1.46	31.0	17.8
	6.0	1.4	3.3	1000	32.1	1.62	26.5	99.7	5.80	1000	25.6	20.8	0.81	1.40	30.3	18.3
				1150	32.4	1.61	26.9	96.1	5.91	1150	26.3	23.0	0.87	1.42	31.1	18.5
	8.0	2.4	5.6	1000	32.5	1.65	26.9	100.1	5.76	1000	26.0	21.3	0.82	1.38	30.7	18.8
				1150	32.8	1.64	27.2	96.4	5.87	1150	26.7	23.6	0.88	1.41	31.5	19.0
90	4.0	0.7	1.7	1000	34.1	1.65	28.5	101.6	6.07	1000	24.2	20.3	0.84	1.62	29.8	14.9
				1150	34.4	1.63	28.8	97.7	6.19	1150	24.9	22.5	0.90	1.65	30.5	15.1
	6.0	1.4	3.2	1000	35.9	1.63	30.3	103.2	6.44	1000	24.4	20.5	0.84	1.58	29.8	15.5
				1150	36.1	1.61	30.6	99.1	6.57	1150	25.1	22.6	0.90	1.61	30.6	15.6
	8.0	2.3	5.4	1000	36.0	1.67	30.3	103.4	6.34	1000	24.8	21.0	0.84	1.57	30.2	15.9
				1150	36.2	1.64	30.6	99.1	6.47	1150	25.5	23.2	0.91	1.60	31.0	16.0
100	4.0	0.7	1.7	Operation not recommended						Operation not recommended						
	6.0	1.3	3.1							1000	22.8	19.8	0.87	1.81	28.9	12.6
										1150	23.4	21.9	0.93	1.84	29.7	12.7
	8.0	2.2	5.2							1000	23.2	20.3	0.87	1.79	29.3	12.9
										1150	23.8	22.4	0.94	1.83	30.0	13.0
110	4.0	0.7	1.6							Operation not recommended						
	6.0	1.3	3.0							1000	21.1	19.1	0.90	2.04	28.1	10.4
										1150	21.7	21.1	0.97	2.08	28.8	10.5
	8.0	2.2	5.0							1000	21.5	19.5	0.91	2.02	28.4	10.6
										1150	22.1	21.6	0.98	2.06	29.1	10.7
120	4.0	0.7	1.5							Operation not recommended						
	6.0	1.2	2.9							1000	19.6	19.0	0.97	2.32	27.5	8.4
										1150	19.9	20.6	1.04	2.38	28.0	8.4
	8.0	2.1	4.8							1000	19.7	19.0	0.96	2.25	27.4	8.8
										1150	20.1	20.6	1.02	2.32	28.1	8.7

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Performance Data cont.

038 - Dual Capacity - Full Load (1300 cfm)

EWT °F	Flow Rate GPM	WPD		HEATING - EAT 70°F						COOLING - EAT 80/67 °F						
		PSI	FT/HD	Airflow CFM	HC MBtu/h	Power kW	HE MBtu/h	LAT °F	COP	Airflow CFM	TC Mbtu/h	SC Mbtu/h	S/T Ratio	Power kW	HR Mbtu/h	EER
20	5.0	1.3	3.0	Operation not recommended						Operation not recommended						
	7.0	2.2	5.1													
	9.0	3.5	8.1	1100	22.4	2.01	15.5	88.9	3.26							
				1300	23.1	2.08	16.1	86.5	3.27							
30	5.0	1.2	2.9	Operation not recommended						Operation not recommended						
	7.0	2.2	5.0	1100	25.4	2.11	18.3	91.4	3.54	1100	32.5	22.7	0.70	1.28	36.9	25.3
				1300	26.2	2.17	18.8	88.6	3.53	1300	33.0	24.8	0.75	1.35	37.6	24.4
	9.0	3.4	7.9	1100	25.9	2.13	18.6	91.8	3.56	1100	32.7	22.7	0.70	1.25	36.9	26.2
				1300	26.7	2.19	19.2	89.0	3.57	1300	33.5	24.8	0.74	1.31	37.9	25.6
40	5.0	1.2	2.8	Operation not recommended						Operation not recommended						
	7.0	2.1	4.8	1100	28.5	2.17	21.1	94.0	3.85	1100	35.5	24.9	0.70	1.44	40.5	24.6
				1300	29.4	2.22	21.8	90.9	3.88	1300	36.2	27.2	0.75	1.51	41.4	23.9
	9.0	3.3	7.6	1100	29.1	2.19	21.6	94.5	3.89	1100	35.8	24.9	0.69	1.40	40.6	25.6
				1300	30.0	2.24	22.4	91.4	3.93	1300	36.6	27.2	0.74	1.47	41.6	25.0
50	5.0	1.2	2.7	1100	30.5	2.18	23.0	95.6	4.09	1100	36.6	24.6	0.67	1.68	42.4	21.8
				1300	31.4	2.21	23.8	92.3	4.15	1300	38.6	27.4	0.71	1.77	44.6	21.8
	7.0	2.0	4.7	1100	31.6	2.23	24.0	96.6	4.14	1100	37.4	24.9	0.67	1.58	42.8	23.6
				1300	32.6	2.26	24.9	93.2	4.22	1300	39.3	27.7	0.70	1.66	45.0	23.7
	9.0	3.2	7.4	1100	32.3	2.25	24.6	97.2	4.20	1100	37.8	26.6	0.70	1.54	43.0	24.5
				1300	33.3	2.28	25.5	93.7	4.27	1300	39.8	29.5	0.74	1.62	45.3	24.5
60	5.0	1.1	2.6	1100	33.7	2.25	26.0	98.4	4.39	1100	36.3	25.1	0.69	1.83	42.5	19.8
				1300	34.8	2.27	27.1	94.8	4.50	1300	38.0	28.0	0.74	1.91	44.5	19.9
	7.0	2.0	4.5	1100	35.2	2.31	27.3	99.7	4.46	1100	37.1	25.4	0.69	1.74	43.0	21.3
				1300	36.4	2.33	28.4	95.9	4.58	1300	38.9	28.2	0.73	1.81	45.0	21.4
	9.0	3.1	7.2	1100	36.1	2.34	28.1	100.4	4.52	1100	37.5	26.8	0.71	1.70	43.3	22.1
				1300	37.3	2.35	29.3	96.6	4.65	1300	39.3	29.7	0.76	1.77	45.4	22.2
70	5.0	1.1	2.5	1100	37.0	2.32	29.1	101.1	4.68	1100	35.9	25.7	0.72	1.98	42.6	18.1
				1300	38.3	2.32	30.4	97.3	4.84	1300	37.5	28.6	0.76	2.06	44.5	18.2
	7.0	1.9	4.4	1100	38.9	2.39	30.7	102.7	4.76	1100	36.8	26.0	0.71	1.90	43.3	19.4
				1300	40.2	2.39	32.0	98.6	4.92	1300	38.4	28.8	0.75	1.96	45.1	19.5
	9.0	3.0	6.9	1100	39.9	2.42	31.6	103.6	4.82	1100	37.2	27.0	0.73	1.85	43.5	20.1
				1300	41.3	2.41	33.0	99.4	5.01	1300	38.9	29.9	0.77	1.93	45.4	20.2
80	5.0	1.1	2.5	1100	39.9	2.42	31.6	103.6	4.83	1100	34.1	24.2	0.71	2.15	41.5	15.9
				1300	41.3	2.40	33.1	99.4	5.04	1300	35.5	26.9	0.76	2.21	43.0	16.0
	7.0	1.8	4.2	1100	42.2	2.52	33.6	105.5	4.91	1100	35.1	24.5	0.70	2.07	42.1	16.9
				1300	43.6	2.49	35.1	101.1	5.13	1300	36.5	27.1	0.74	2.13	43.8	17.1
	9.0	2.9	6.7	1100	43.4	2.55	34.7	106.5	4.99	1100	35.4	25.1	0.71	2.03	42.4	17.5
				1300	44.9	2.51	36.3	102.0	5.24	1300	36.9	27.8	0.75	2.09	44.0	17.6
90	5.0	1.0	2.4	1100	42.8	2.52	34.2	106.0	4.97	1100	32.4	22.6	0.70	2.31	40.3	14.0
				1300	44.3	2.49	35.8	101.6	5.23	1300	33.5	25.2	0.75	2.37	41.6	14.1
	7.0	1.8	4.1	1100	45.5	2.64	36.5	108.3	5.05	1100	33.3	22.9	0.69	2.25	41.0	14.8
				1300	47.1	2.59	38.3	103.5	5.33	1300	34.6	25.4	0.74	2.31	42.4	15.0
	9.0	2.8	6.5	1100	46.9	2.68	37.8	109.5	5.14	1100	33.7	23.1	0.69	2.21	41.3	15.2
				1300	48.5	2.61	39.6	104.6	5.45	1300	35.0	25.6	0.73	2.26	42.7	15.5
100	5.0	1.0	2.3	Operation not recommended						Operation not recommended						
	7.0	1.7	3.9							1100	31.9	23.6	0.74	2.56	40.7	12.4
										1300	33.0	26.2	0.80	2.60	41.8	12.7
	9.0	2.7	6.2							1100	32.3	23.6	0.73	2.52	40.9	12.8
										1300	33.3	26.1	0.78	2.56	42.0	13.0
110	5.0	1.0	2.2							Operation not recommended						
	7.0	1.6	3.8							1100	30.5	24.4	0.80	2.88	40.3	10.6
										1300	31.3	27.1	0.86	2.90	41.3	10.8
	9.0	2.6	6.0							1100	30.8	24.0	0.78	2.83	40.5	10.9
										1300	31.7	26.5	0.84	2.86	41.4	11.1
120	5.0	0.9	2.1							Operation not recommended						
	7.0	1.6	3.6							1100	28.8	23.8	0.83	3.18	39.6	9.0
										1300	29.3	25.8	0.88	3.26	40.4	9.0
	9.0	2.5	5.8							1100	29.0	23.8	0.82	3.08	39.5	9.4
										1300	29.6	25.8	0.87	3.18	40.5	9.3

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Performance Data cont.

049 - Dual Capacity - Part Load (1450 cfm)

EWT °F	Flow Rate GPM	WPD		HEATING - EAT 70°F						COOLING - EAT 80/67 °F						
		PSI	FT/HD	Airflow CFM	HC MBtu/h	Power kW	HE MBtu/h	LAT °F	COP	Airflow CFM	TC Mbtu/h	SC Mbtu/h	S/T Ratio	Power kW	HR Mbtu/h	EER
20	5.0	0.9	2.2	Operation not recommended						Operation not recommended						
	8.0	2.0	4.6													
	11.0	3.4	7.8	1250	21.2	2.10	14.1	85.7	2.96							
				1450	22.0	2.13	14.7	84.1	3.02							
30	5.0	0.9	2.1	Operation not recommended						Operation not recommended						
	8.0	1.9	4.5	1250	24.5	2.13	17.2	88.1	3.36	1250	33.8	23.4	0.69	1.05	37.4	32.3
				1450	25.2	2.15	17.9	86.1	3.44	1450	34.4	25.5	0.74	1.10	38.1	31.2
	11.0	3.3	7.6	1250	25.1	2.15	17.8	88.6	3.42	1250	34.0	23.4	0.69	1.02	37.5	33.5
				1450	26.0	2.18	18.6	86.6	3.50	1450	34.8	25.5	0.73	1.07	38.5	32.7
40	5.0	0.9	2.0	Operation not recommended						Operation not recommended						
	8.0	1.9	4.3	1250	28.3	2.16	20.9	90.9	3.83	1250	36.6	26.3	0.72	1.18	40.6	30.9
				1450	29.3	2.16	21.9	88.7	3.96	1450	37.2	28.8	0.77	1.24	41.5	30.0
	11.0	3.2	7.4	1250	29.2	2.18	21.8	91.6	3.93	1250	36.8	26.3	0.72	1.15	40.8	32.1
				1450	30.2	2.19	22.7	89.3	4.04	1450	37.7	28.8	0.76	1.20	41.8	31.4
50	5.0	0.9	2.0	1250	29.7	2.12	22.5	92.0	4.11	1250	38.2	27.0	0.71	1.56	43.6	24.6
				1450	30.7	2.12	23.4	89.6	4.24	1450	39.4	31.9	0.81	1.62	45.0	24.3
	8.0	1.8	4.2	1250	32.1	2.19	24.6	93.7	4.29	1250	39.1	27.2	0.69	1.35	43.7	29.0
				1450	33.3	2.18	25.9	91.3	4.48	1450	40.3	32.0	0.79	1.41	45.1	28.5
	11.0	3.1	7.2	1250	33.3	2.21	25.8	94.7	4.42	1250	39.3	27.2	0.69	1.27	43.6	31.0
				1450	34.4	2.21	26.8	91.9	4.57	1450	40.5	32.0	0.79	1.33	45.1	30.4
60	5.0	0.8	1.9	1250	32.3	2.17	24.9	94.0	4.37	1250	37.5	26.7	0.71	1.74	43.4	21.6
				1450	33.5	2.16	26.1	91.4	4.55	1450	38.7	31.4	0.81	1.81	44.9	21.3
	8.0	1.8	4.1	1250	35.0	2.22	27.4	95.9	4.61	1250	38.1	26.9	0.70	1.54	43.4	24.7
				1450	36.4	2.20	28.9	93.2	4.85	1450	39.3	31.6	0.80	1.61	44.8	24.4
	11.0	3.0	6.9	1250	36.5	2.24	28.8	97.0	4.76	1250	38.5	26.9	0.70	1.46	43.5	26.3
				1450	37.8	2.22	30.2	94.1	4.99	1450	39.7	31.7	0.80	1.53	44.9	26.0
70	5.0	0.8	1.8	1250	35.0	2.22	27.4	95.9	4.62	1250	36.8	26.3	0.72	1.92	43.3	19.2
				1450	36.3	2.19	28.9	93.2	4.86	1450	37.9	31.0	0.82	2.01	44.8	18.9
	8.0	1.7	3.9	1250	38.0	2.26	30.3	98.1	4.93	1250	37.1	26.6	0.72	1.74	43.1	21.4
				1450	39.4	2.22	31.9	95.2	5.21	1450	38.3	31.2	0.82	1.81	44.5	21.1
	11.0	2.9	6.7	1250	39.7	2.28	31.9	99.4	5.10	1250	37.8	26.7	0.71	1.66	43.4	22.8
				1450	41.2	2.23	33.6	96.3	5.41	1450	38.9	31.4	0.81	1.72	44.8	22.6
80	5.0	0.8	1.8	1250	37.7	2.25	30.0	97.9	4.90	1250	34.6	25.5	0.74	2.15	41.9	16.1
				1450	39.2	2.21	31.6	95.0	5.18	1450	35.7	30.0	0.84	2.25	43.4	15.9
	8.0	1.6	3.8	1250	40.9	2.28	33.2	100.3	5.27	1250	34.8	25.8	0.74	2.00	41.6	17.4
				1450	42.6	2.22	35.0	97.2	5.62	1450	35.8	30.3	0.85	2.08	42.9	17.2
	11.0	2.8	6.5	1250	43.0	2.30	35.2	101.9	5.47	1250	35.6	26.0	0.73	1.91	42.1	18.6
				1450	44.7	2.24	37.1	98.6	5.85	1450	36.7	30.5	0.83	1.99	43.5	18.4
90	5.0	0.7	1.7	1250	40.4	2.29	32.6	99.9	5.18	1250	32.4	24.7	0.76	2.39	40.6	13.6
				1450	42.0	2.24	34.3	96.8	5.50	1450	33.5	29.0	0.87	2.49	41.9	13.5
	8.0	1.6	3.7	1250	43.9	2.30	36.1	102.5	5.60	1250	32.4	25.0	0.77	2.27	40.2	14.3
				1450	45.7	2.23	38.2	99.2	6.03	1450	33.3	29.4	0.88	2.35	41.3	14.2
	11.0	2.7	6.2	1250	46.3	2.33	38.4	104.3	5.84	1250	33.3	25.3	0.76	2.17	40.7	15.4
				1450	48.3	2.25	40.6	100.8	6.29	1450	34.4	29.7	0.86	2.27	42.1	15.2
100	5.0	0.7	1.7	Operation not recommended						Operation not recommended						
	8.0	1.5	3.5							1250	30.0	23.9	0.80	2.58	38.8	11.6
										1450	30.9	28.1	0.91	2.68	40.0	11.5
	11.0	2.6	6.0							1250	31.1	24.2	0.78	2.48	39.6	12.5
										1450	32.0	28.4	0.89	2.59	40.9	12.4
110	5.0	0.7	1.6							Operation not recommended						
	8.0	1.5	3.4							1250	27.6	22.7	0.83	2.89	37.4	9.5
										1450	28.5	26.7	0.94	3.01	38.7	9.5
	11.0	2.5	5.8							1250	28.9	23.1	0.80	2.80	38.4	10.3
										1450	29.7	27.2	0.92	2.92	39.6	10.2
120	5.0	0.7	1.5							Operation not recommended						
	8.0	1.4	3.3							1250	25.9	23.6	0.91	3.31	37.2	7.8
										1450	26.3	25.6	0.97	3.40	37.9	7.8
	11.0	2.4	5.6							1250	26.1	23.6	0.91	3.20	37.0	8.1
										1450	26.6	25.6	0.96	3.31	37.9	8.1

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Performance Data cont.

049 - Dual Capacity - Full Load (1700 cfm)

EWT °F	Flow Rate GPM	WPD		HEATING - EAT 70°F						COOLING - EAT 80/67 °F						
		PSI	FT/HD	Airflow CFM	HC MBtu/h	Power kW	HE MBtu/h	LAT °F	COP	Airflow CFM	TC Mbtu/h	SC Mbtu/h	S/T Ratio	Power kW	HR Mbtu/h	EER
20	6.0	1.3	3.0	Operation not recommended						Operation not recommended						
	9.0	2.5	5.7													
	12.0	4.0	9.2	1500	32.7	2.91	22.8	90.2	3.30							
				1700	33.9	2.95	23.8	88.5	3.37							
30	6.0	1.2	2.9	Operation not recommended						Operation not recommended						
	9.0	2.4	5.5	1500	37.0	2.99	26.8	92.8	3.63	1500	45.9	31.6	0.69	1.82	52.1	25.2
				1700	38.1	3.01	27.9	90.8	3.71	1700	46.7	34.5	0.74	1.92	53.2	24.3
	12.0	3.9	8.9	1500	37.9	3.01	27.6	93.4	3.69	1500	46.2	31.6	0.68	1.77	52.2	26.1
				1700	39.3	3.05	28.9	91.4	3.77	1700	47.3	34.5	0.73	1.85	53.6	25.5
40	6.0	1.2	2.8	Operation not recommended						Operation not recommended						
	9.0	2.3	5.3	1500	41.3	3.10	30.8	95.5	3.91	1500	49.4	34.2	0.69	2.04	56.4	24.3
				1700	42.8	3.10	32.2	93.3	4.05	1700	50.4	37.4	0.74	2.14	57.6	23.6
	12.0	3.7	8.7	1500	42.7	3.12	32.0	96.4	4.01	1500	49.8	34.2	0.69	1.98	56.6	25.2
				1700	44.1	3.14	33.4	94.0	4.12	1700	50.9	37.4	0.73	2.07	58.0	24.6
50	6.0	1.2	2.7	1500	42.4	3.11	31.8	96.2	4.00	1500	51.5	33.9	0.66	2.66	60.6	19.4
				1700	43.8	3.11	33.2	93.8	4.13	1700	53.1	40.0	0.75	2.77	62.6	19.2
	9.0	2.2	5.2	1500	45.7	3.21	34.8	98.2	4.18	1500	52.7	34.1	0.65	2.30	60.5	22.9
				1700	47.5	3.19	36.6	95.9	4.36	1700	54.3	40.2	0.74	2.41	62.5	22.5
	12.0	3.6	8.4	1500	47.5	3.23	36.5	99.3	4.31	1500	53.0	34.1	0.64	2.17	60.4	24.4
				1700	49.0	3.23	38.0	96.7	4.45	1700	54.6	40.2	0.74	2.28	62.4	23.9
60	6.0	1.1	2.6	1500	46.8	3.26	35.7	98.9	4.20	1500	50.4	33.7	0.67	2.85	60.1	17.7
				1700	48.5	3.24	37.4	96.4	4.38	1700	52.0	39.7	0.76	2.98	62.1	17.5
	9.0	2.2	5.0	1500	50.6	3.35	39.2	101.3	4.44	1500	51.2	33.9	0.66	2.53	59.9	20.2
				1700	52.6	3.30	41.3	98.7	4.67	1700	52.8	39.9	0.76	2.65	61.8	19.9
	12.0	3.5	8.1	1500	52.8	3.38	41.3	102.6	4.58	1500	51.8	34.0	0.66	2.40	60.0	21.6
				1700	54.7	3.34	43.3	99.8	4.80	1700	53.4	40.0	0.75	2.51	62.0	21.3
70	6.0	1.1	2.5	1500	51.2	3.42	39.5	101.6	4.39	1500	49.3	33.4	0.68	3.05	59.7	16.2
				1700	53.2	3.38	41.7	99.0	4.61	1700	50.8	39.3	0.77	3.19	61.7	15.9
	9.0	2.1	4.9	1500	55.6	3.48	43.7	104.3	4.68	1500	49.8	33.8	0.68	2.76	59.2	18.0
				1700	57.8	3.42	46.1	101.5	4.95	1700	51.3	39.7	0.77	2.88	61.2	17.8
	12.0	3.4	7.9	1500	58.1	3.52	46.1	105.9	4.84	1500	50.7	33.9	0.67	2.64	59.7	19.2
				1700	60.3	3.44	48.6	102.8	5.14	1700	52.2	39.8	0.76	2.74	61.6	19.1
80	6.0	1.1	2.5	1500	55.4	3.59	43.2	104.2	4.53	1500	46.9	32.7	0.70	3.25	58.0	14.4
				1700	57.6	3.52	45.6	101.4	4.79	1700	48.4	38.4	0.79	3.40	60.0	14.2
	9.0	2.0	4.7	1500	60.2	3.63	47.9	107.2	4.87	1500	47.2	33.0	0.70	3.02	57.5	15.6
				1700	62.7	3.53	50.6	104.1	5.20	1700	48.5	38.8	0.80	3.14	59.3	15.4
	12.0	3.3	7.6	1500	63.3	3.67	50.8	109.1	5.06	1500	48.2	33.3	0.69	2.89	58.1	16.7
				1700	65.8	3.57	53.7	105.8	5.41	1700	49.7	39.1	0.79	3.01	60.0	16.5
90	6.0	1.0	2.4	1500	59.7	3.75	46.9	106.8	4.66	1500	44.5	31.9	0.72	3.47	56.3	12.8
				1700	62.0	3.67	49.5	103.8	4.95	1700	45.9	37.5	0.82	3.61	58.2	12.7
	9.0	2.0	4.5	1500	64.9	3.77	52.0	110.1	5.04	1500	44.5	32.3	0.73	3.29	55.7	13.5
				1700	67.6	3.65	55.1	106.8	5.43	1700	45.7	38.0	0.83	3.41	57.4	13.4
	12.0	3.2	7.3	1500	68.5	3.81	55.5	112.3	5.26	1500	45.7	32.6	0.71	3.15	56.5	14.5
				1700	71.3	3.69	58.7	108.9	5.67	1700	47.2	38.4	0.81	3.29	58.4	14.3
100	6.0	1.0	2.3	Operation not recommended						Operation not recommended						
	9.0	1.9	4.4							1500	41.7	31.2	0.75	3.64	54.1	11.4
										1700	42.9	36.7	0.86	3.78	55.9	11.4
	12.0	3.1	7.1							1500	43.2	31.6	0.73	3.51	55.2	12.3
										1700	44.5	37.2	0.84	3.66	57.0	12.2
110	6.0	1.0	2.2							Operation not recommended						
	9.0	1.8	4.2							1500	38.8	30.1	0.78	3.99	52.5	9.7
										1700	40.1	35.4	0.88	4.16	54.3	9.7
	12.0	2.9	6.8							1500	40.7	30.7	0.75	3.87	53.9	10.5
										1700	41.8	36.0	0.86	4.03	55.6	10.4
120	6.0	0.9	2.1							Operation not recommended						
	9.0	1.7	4.0							1500	38.9	32.0	0.82	4.50	54.3	8.6
										1700	39.6	34.7	0.88	4.62	55.4	8.6
	12.0	2.8	6.5							1500	39.1	32.0	0.82	4.36	53.9	9.0
										1700	40.1	34.7	0.87	4.49	55.4	8.9

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Performance Data cont.

064 - Dual Capacity - Part Load (1600 cfm)

EWT °F	Flow Rate GPM	WPD		HEATING - EAT 70°F						COOLING - EAT 80/67 °F						
		PSI	FT/HD	Airflow CFM	HC MBtu/h	Power kW	HE MBtu/h	LAT °F	COP	Airflow CFM	TC Mbtu/h	SC Mbtu/h	S/T Ratio	Power kW	HR Mbtu/h	EER
20	6.0	1.1	2.4	Operation not recommended						Operation not recommended						
	10.0	2.7	6.2													
	14.0	5.1	11.9	1350	25.3	2.58	16.5	87.3	2.87							
				1600	26.1	2.61	17.2	85.1	2.93							
30	6.0	1.0	2.4	Operation not recommended						Operation not recommended						
	10.0	2.6	6.0	1350	28.5	2.62	19.6	89.6	3.19	1350	41.8	30.5	0.73	1.37	46.5	30.6
				1600	29.5	2.65	20.5	87.1	3.26	1600	42.5	33.3	0.78	1.44	47.4	29.5
	14.0	5.0	11.6	1350	29.5	2.62	20.6	90.3	3.30	1350	42.0	30.5	0.72	1.33	46.6	31.7
				1600	30.5	2.65	21.5	87.7	3.37	1600	43.1	33.3	0.77	1.39	47.8	30.9
40	6.0	1.0	2.3	Operation not recommended						Operation not recommended						
	10.0	2.5	5.9	1350	33.8	2.66	24.7	93.2	3.72	1350	46.0	32.7	0.71	1.53	51.3	30.1
				1600	34.7	2.67	25.6	90.1	3.81	1600	46.9	35.7	0.76	1.60	52.4	29.2
	14.0	4.8	11.2	1350	34.9	2.67	25.8	93.9	3.83	1350	46.4	32.7	0.71	1.49	51.5	31.2
				1600	35.8	2.68	26.7	90.7	3.92	1600	47.4	35.7	0.75	1.55	52.7	30.5
50	6.0	1.0	2.2	1350	38.5	2.66	29.4	96.4	4.24	1350	50.1	33.4	0.67	1.73	56.0	29.0
				1600	39.5	2.66	30.4	92.9	4.35	1600	51.6	37.9	0.73	1.82	57.8	28.3
	10.0	2.5	5.7	1350	39.1	2.71	29.8	96.8	4.22	1350	50.2	33.6	0.67	1.67	55.9	30.1
				1600	39.9	2.69	30.8	93.1	4.35	1600	51.7	38.2	0.74	1.74	57.6	29.6
	14.0	4.7	10.9	1350	40.2	2.73	30.9	97.6	4.33	1350	50.4	33.6	0.67	1.63	55.9	30.8
				1600	41.1	2.71	31.9	93.8	4.45	1600	51.8	38.2	0.74	1.71	57.7	30.3
60	6.0	0.9	2.2	1350	43.8	2.80	34.3	100.0	4.59	1350	47.0	32.3	0.69	1.98	53.8	23.8
				1600	44.7	2.77	35.3	95.9	4.73	1600	48.4	36.5	0.75	2.07	55.5	23.4
	10.0	2.4	5.5	1350	45.2	2.85	35.5	101.0	4.65	1350	47.2	32.6	0.69	1.92	53.8	24.6
				1600	45.9	2.81	36.3	96.6	4.79	1600	48.6	36.8	0.76	2.00	55.5	24.3
	14.0	4.5	10.5	1350	46.3	2.87	36.5	101.7	4.72	1350	47.4	32.7	0.69	1.88	53.8	25.3
				1600	47.0	2.83	37.3	97.2	4.86	1600	48.8	36.9	0.76	1.96	55.5	24.9
70	6.0	0.9	2.1	1350	49.2	2.93	39.2	103.7	4.91	1350	44.0	31.3	0.71	2.23	51.6	19.7
				1600	50.0	2.88	40.2	98.9	5.08	1600	45.3	35.1	0.77	2.32	53.3	19.5
	10.0	2.3	5.3	1350	51.3	2.98	41.1	105.2	5.04	1350	44.2	31.6	0.71	2.17	51.6	20.4
				1600	51.8	2.92	41.9	100.0	5.21	1600	45.6	35.5	0.78	2.26	53.3	20.2
	14.0	4.4	10.2	1350	52.2	3.02	42.0	105.8	5.08	1350	44.5	31.7	0.71	2.12	51.7	21.0
				1600	52.8	2.95	42.7	100.6	5.25	1600	45.9	35.6	0.78	2.21	53.4	20.7
80	6.0	0.9	2.0	1350	53.6	3.03	43.3	106.8	5.20	1350	41.0	29.6	0.72	2.56	49.7	16.0
				1600	54.1	2.96	44.0	101.3	5.36	1600	42.2	33.0	0.78	2.65	51.3	15.9
	10.0	2.2	5.1	1350	56.7	3.07	46.2	108.9	5.40	1350	41.3	29.9	0.72	2.50	49.9	16.5
				1600	56.9	2.98	46.8	102.9	5.59	1600	42.6	33.5	0.79	2.60	51.4	16.4
	14.0	4.3	9.8	1350	57.3	3.12	46.7	109.3	5.39	1350	41.6	30.1	0.72	2.46	50.0	16.9
				1600	57.6	3.03	47.2	103.3	5.58	1600	42.9	33.7	0.78	2.55	51.6	16.9
90	6.0	0.8	1.9	1350	58.1	3.12	47.5	109.9	5.47	1350	38.0	27.9	0.73	2.90	47.9	13.1
				1600	58.3	3.03	47.9	103.7	5.63	1600	39.2	31.0	0.79	2.98	49.3	13.1
	10.0	2.1	5.0	1350	62.0	3.17	51.2	112.5	5.74	1350	38.4	28.2	0.73	2.83	48.1	13.6
				1600	62.0	3.05	51.6	105.9	5.96	1600	39.6	31.4	0.79	2.93	49.6	13.5
	14.0	4.1	9.5	1350	62.4	3.21	51.5	112.8	5.69	1350	38.7	28.5	0.74	2.80	48.3	13.8
				1600	62.3	3.10	51.7	106.1	5.89	1600	40.0	31.7	0.79	2.88	49.8	13.9
100	6.0	0.8	1.9	Operation not recommended						Operation not recommended						
	10.0	2.1	4.8							1350	35.4	26.4	0.74	3.24	46.5	10.9
										1600	36.5	29.2	0.80	3.32	47.8	11.0
	14.0	4.0	9.1							1350	35.8	26.7	0.75	3.20	46.7	11.2
										1600	36.9	29.5	0.80	3.27	48.1	11.3
110	6.0	0.8	1.8							Operation not recommended						
	10.0	2.0	4.6							1350	32.4	24.6	0.76	3.65	44.8	8.9
										1600	33.4	27.0	0.81	3.72	46.1	9.0
	14.0	3.8	8.8							1350	32.8	25.0	0.76	3.59	45.1	9.1
										1600	33.9	27.4	0.81	3.67	46.4	9.2
120	6.0	0.7	1.7							Operation not recommended						
	10.0	1.9	4.4							1350	29.7	21.9	0.74	4.15	43.8	7.1
										1600	30.2	23.8	0.79	4.26	44.7	7.1
	14.0	3.7	8.4							1350	29.9	21.9	0.73	4.02	43.6	7.4
										1600	30.5	23.8	0.78	4.15	44.7	7.4

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Performance Data cont.

064 - Dual Capacity - Full Load (1800 cfm)

EWT °F	Flow Rate GPM	WPD		HEATING - EAT 70°F						COOLING - EAT 80/67 °F						
		PSI	FT/HD	Airflow CFM	HC MBtu/h	Power kW	HE MBtu/h	LAT °F	COP	Airflow CFM	TC Mbtu/h	SC Mbtu/h	S/T Ratio	Power kW	HR Mbtu/h	EER
20	8.0	1.9	4.3	Operation not recommended						Operation not recommended						
	12.0	3.9	8.9													
	16.0	6.6	15.1	1500	39.8	3.36	28.3	94.5	3.46							
				1800	40.7	3.52	28.7	90.9	3.39							
30	8.0	1.8	4.2	Operation not recommended						Operation not recommended						
	12.0	3.7	8.7	1500	45.9	3.42	34.2	98.3	3.93	1500	58.1	39.7	0.68	2.36	66.1	24.6
				1800	47.1	3.64	34.7	94.2	3.79	1800	59.0	43.4	0.74	2.49	67.5	23.7
	16.0	6.4	14.7	1500	46.5	3.51	34.5	98.7	3.88	1500	58.4	39.7	0.68	2.29	66.2	25.5
				1800	47.6	3.68	35.1	94.5	3.80	1800	59.8	43.4	0.73	2.40	68.0	24.9
40	8.0	1.8	4.1	Operation not recommended						Operation not recommended						
	12.0	3.6	8.4	1500	51.9	3.62	39.6	102.1	4.20	1500	61.8	41.4	0.67	2.61	70.7	23.6
				1800	53.1	3.78	40.2	97.3	4.12	1800	63.0	45.2	0.72	2.74	72.3	23.0
	16.0	6.2	14.3	1500	52.7	3.68	40.2	102.5	4.19	1500	62.3	41.4	0.66	2.54	71.0	24.6
				1800	53.9	3.81	40.9	97.7	4.14	1800	63.7	45.2	0.71	2.65	72.8	24.0
50	8.0	1.7	3.9	1500	54.8	3.74	42.1	103.8	4.29	1500	65.0	42.4	0.65	2.84	74.6	22.9
				1800	56.0	3.86	42.8	98.8	4.26	1800	66.3	46.1	0.70	3.02	76.6	22.0
	12.0	3.5	8.1	1500	58.0	3.81	45.0	105.8	4.46	1500	65.6	42.8	0.65	2.78	75.1	23.6
				1800	59.2	3.91	45.8	100.4	4.44	1800	67.0	46.6	0.70	2.95	77.0	22.7
	16.0	6.0	13.8	1500	59.0	3.86	45.8	106.4	4.48	1500	66.3	43.3	0.65	2.73	75.6	24.3
				1800	60.2	3.95	46.7	101.0	4.47	1800	67.6	47.0	0.70	2.90	77.5	23.3
60	8.0	1.7	3.8	1500	61.8	4.02	48.1	108.1	4.51	1500	62.2	41.7	0.67	3.09	72.7	20.1
				1800	63.1	4.08	49.2	102.5	4.53	1800	63.8	45.3	0.71	3.28	75.0	19.4
	12.0	3.4	7.9	1500	64.6	4.08	50.7	109.9	4.64	1500	62.8	42.0	0.67	3.02	73.1	20.8
				1800	66.0	4.13	51.9	104.0	4.68	1800	64.4	45.7	0.71	3.21	75.4	20.0
	16.0	5.8	13.4	1500	66.0	4.13	51.9	110.8	4.69	1500	63.4	42.5	0.67	2.97	73.6	21.3
				1800	67.5	4.18	53.3	104.7	4.74	1800	65.0	46.1	0.71	3.16	75.8	20.6
70	8.0	1.6	3.7	1500	68.8	4.29	54.1	112.4	4.70	1500	59.4	40.9	0.69	3.34	70.8	17.8
				1800	70.3	4.31	55.6	106.1	4.78	1800	61.2	44.4	0.73	3.55	73.3	17.2
	12.0	3.3	7.6	1500	71.3	4.35	56.4	114.0	4.80	1500	60.0	41.3	0.69	3.27	71.1	18.3
				1800	72.9	4.36	58.0	107.5	4.90	1800	61.9	44.8	0.72	3.48	73.8	17.8
	16.0	5.6	12.9	1500	73.1	4.40	58.1	115.1	4.87	1500	60.5	41.7	0.69	3.21	71.5	18.8
				1800	74.8	4.40	59.8	108.5	4.98	1800	62.5	45.3	0.73	3.42	74.1	18.3
80	8.0	1.5	3.6	1500	75.2	4.57	59.6	116.4	4.83	1500	56.4	39.4	0.70	3.67	68.9	15.4
				1800	77.0	4.54	61.5	109.6	4.97	1800	58.5	42.8	0.73	3.91	71.8	15.0
	12.0	3.2	7.4	1500	77.0	4.63	61.2	117.5	4.88	1500	57.0	39.8	0.70	3.60	69.3	15.8
				1800	78.9	4.58	63.2	110.6	5.05	1800	59.1	43.2	0.73	3.83	72.1	15.4
	16.0	5.4	12.5	1500	79.4	4.68	63.4	119.0	4.97	1500	57.5	40.2	0.70	3.54	69.6	16.3
				1800	81.3	4.63	65.6	111.8	5.15	1800	59.7	43.7	0.73	3.76	72.5	15.9
90	8.0	1.5	3.4	1500	81.7	4.85	65.2	120.4	4.94	1500	53.4	38.0	0.71	4.00	67.0	13.3
				1800	83.7	4.78	67.4	113.0	5.13	1800	55.7	41.2	0.74	4.26	70.3	13.1
	12.0	3.1	7.1	1500	82.8	4.90	66.1	121.1	4.95	1500	54.0	38.3	0.71	3.92	67.4	13.8
				1800	84.8	4.80	68.5	113.6	5.18	1800	56.3	41.6	0.74	4.18	70.5	13.5
	16.0	5.2	12.1	1500	85.6	4.96	68.7	122.9	5.06	1500	54.5	38.8	0.71	3.86	67.7	14.1
				1800	87.9	4.85	71.3	115.2	5.31	1800	56.9	42.0	0.74	4.11	70.9	13.8
100	8.0	1.4	3.3	Operation not recommended						Operation not recommended						
	12.0	3.0	6.8							1500	50.0	35.7	0.71	4.36	64.9	11.5
										1800	52.4	38.8	0.74	4.65	68.2	11.3
	16.0	5.0	11.6							1500	50.5	36.1	0.71	4.29	65.1	11.8
										1800	52.9	39.2	0.74	4.57	68.5	11.6
110	8.0	1.4	3.2							Operation not recommended						
	12.0	2.9	6.6							1500	46.0	33.1	0.72	4.81	62.4	9.6
										1800	48.5	35.9	0.74	5.13	66.0	9.5
	16.0	4.8	11.2							1500	46.5	33.4	0.72	4.72	62.6	9.8
										1800	48.9	36.3	0.74	5.04	66.1	9.7
120	8.0	1.3	3.1							Operation not recommended						
	12.0	2.7	6.3							1500	45.6	32.3	0.71	5.58	64.7	8.2
										1800	46.5	35.0	0.75	5.73	66.0	8.1
	16.0	4.6	10.7							1500	46.0	32.3	0.70	5.40	64.5	8.5
										1800	47.0	35.0	0.74	5.57	66.0	8.4

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Performance Data cont.

072 - Dual Capacity - Part Load (1600 cfm)

EWT °F	Flow Rate GPM	WPD		HEATING - EAT 70°F						COOLING - EAT 80/67 °F						
		PSI	FT/HD	Airflow CFM	HC MBtu/h	Power kW	HE MBtu/h	LAT °F	COP	Airflow CFM	TC Mbtu/h	SC Mbtu/h	S/T Ratio	Power kW	HR Mbtu/h	EER
20	10.0	2.3	5.4	Operation not recommended						Operation not recommended						
	13.0	3.5	8.1													
	16.0	5.0	11.6	1300	35.9	3.50	23.9	95.5	3.01							
				1600	37.6	3.54	25.5	91.7	3.11							
30	10.0	2.3	5.3	Operation not recommended						Operation not recommended						
	13.0	3.4	7.9	1300	38.8	3.60	26.5	97.7	3.16	1300	50.5	35.4	0.70	1.74	56.5	29.1
				1600	40.8	3.65	28.3	93.6	3.28	1600	51.4	38.7	0.75	1.83	57.6	28.1
	16.0	4.9	11.3	1300	40.5	3.60	28.3	98.9	3.30	1300	50.8	35.4	0.70	1.69	56.6	30.1
				1600	42.5	3.65	30.0	94.6	3.41	1600	52.0	38.7	0.74	1.77	58.1	29.4
40	10.0	2.2	5.1	Operation not recommended						Operation not recommended						
	13.0	3.3	7.6	1300	45.4	3.73	32.6	102.3	3.57	1300	54.1	37.0	0.68	2.00	60.9	27.1
				1600	47.3	3.74	34.6	97.4	3.71	1600	55.1	40.4	0.73	2.09	62.3	26.3
	16.0	4.7	11.0	1300	46.9	3.74	34.2	103.4	3.68	1300	54.5	37.0	0.68	1.94	61.1	28.2
				1600	49.0	3.75	36.2	98.4	3.83	1600	55.7	40.4	0.72	2.03	62.7	27.5
50	10.0	2.1	4.9	1300	51.1	3.81	38.1	106.4	3.93	1300	57.4	36.7	0.64	2.30	65.2	25.0
				1600	53.3	3.77	40.5	100.9	4.15	1600	59.2	41.6	0.70	2.42	67.4	24.5
	13.0	3.2	7.4	1300	51.8	3.85	38.7	106.9	3.94	1300	57.5	37.0	0.64	2.22	65.1	25.9
				1600	53.9	3.83	40.8	101.2	4.12	1600	59.3	42.1	0.71	2.34	67.3	25.4
	16.0	4.6	10.6	1300	53.3	3.87	40.1	108.0	4.04	1300	57.7	37.0	0.64	2.16	65.1	26.7
				1600	55.6	3.85	42.5	102.2	4.23	1600	59.4	42.1	0.71	2.28	67.2	26.1
60	10.0	2.1	4.8	1300	56.9	3.94	43.5	110.5	4.23	1300	54.6	36.2	0.66	2.57	63.3	21.2
				1600	59.3	3.86	46.1	104.3	4.50	1600	56.2	40.9	0.73	2.68	65.4	20.9
	13.0	3.1	7.2	1300	58.5	3.98	44.9	111.7	4.31	1300	54.8	36.6	0.67	2.49	63.3	22.0
				1600	60.8	3.91	47.5	105.2	4.56	1600	56.4	41.4	0.73	2.60	65.3	21.7
	16.0	4.4	10.3	1300	59.8	4.02	46.1	112.6	4.36	1300	55.0	36.7	0.67	2.44	63.3	22.6
				1600	62.2	3.95	48.8	106.0	4.62	1600	56.7	41.5	0.73	2.54	65.4	22.3
70	10.0	2.0	4.6	1300	62.8	4.07	48.9	114.7	4.52	1300	51.8	35.7	0.69	2.84	61.4	18.2
				1600	65.3	3.95	51.8	107.8	4.85	1600	53.3	40.2	0.76	2.95	63.3	18.0
	13.0	3.0	6.9	1300	65.1	4.11	51.1	116.4	4.64	1300	52.1	36.2	0.70	2.75	61.4	18.9
				1600	67.7	3.99	54.1	109.2	4.97	1600	53.6	40.7	0.76	2.86	63.3	18.7
	16.0	4.3	9.9	1300	66.3	4.17	52.1	117.2	4.66	1300	52.4	36.3	0.69	2.71	61.6	19.3
				1600	68.9	4.05	55.0	109.9	4.98	1600	54.0	40.8	0.76	2.80	63.6	19.3
80	10.0	1.9	4.5	1300	68.2	4.14	54.1	118.6	4.83	1300	49.0	34.5	0.70	3.27	60.2	15.0
				1600	70.7	3.99	57.1	110.9	5.19	1600	51.2	38.5	0.75	3.36	62.7	15.2
	13.0	2.9	6.7	1300	71.8	4.19	57.5	121.1	5.02	1300	50.1	34.8	0.70	3.18	60.9	15.7
				1600	74.4	4.02	60.6	113.0	5.42	1600	51.6	39.0	0.76	3.28	62.8	15.7
	16.0	4.2	9.6	1300	72.6	4.25	58.1	121.7	5.01	1300	50.5	35.1	0.69	3.14	61.2	16.1
				1600	75.1	4.09	61.2	113.5	5.39	1600	51.3	39.2	0.76	3.22	62.3	15.9
90	10.0	1.9	4.3	1300	73.6	4.20	59.3	122.4	5.13	1300	46.3	33.2	0.72	3.70	58.9	12.5
				1600	76.1	4.03	62.3	114.0	5.54	1600	47.7	36.9	0.77	3.77	60.6	12.6
	13.0	2.8	6.5	1300	78.4	4.26	63.8	125.8	5.39	1300	46.8	33.5	0.72	3.62	59.1	12.9
				1600	81.0	4.05	67.2	116.9	5.87	1600	48.2	37.3	0.77	3.70	60.8	13.0
	16.0	4.0	9.3	1300	78.9	4.32	64.1	126.2	5.35	1300	47.2	33.8	0.72	3.56	59.4	13.3
				1600	81.3	4.13	67.3	117.1	5.78	1600	48.7	37.6	0.77	3.64	61.1	13.4
100	10.0	1.8	4.2	Operation not recommended						Operation not recommended						
	13.0	2.7	6.2							1300	43.6	31.8	0.73	4.15	57.7	10.5
										1600	45.0	35.2	0.78	4.20	59.3	10.7
	16.0	3.9	8.9							1300	44.2	32.2	0.73	4.09	58.1	10.8
										1600	45.5	35.6	0.78	4.14	59.6	11.0
110	10.0	1.7	4.0							Operation not recommended						
	13.0	2.6	6.0							1300	40.4	30.0	0.74	4.69	56.4	8.6
										1600	41.8	33.1	0.79	4.71	57.8	8.9
	16.0	3.7	8.6							1300	41.1	30.5	0.74	4.63	56.9	8.9
										1600	42.3	33.6	0.79	4.65	58.1	9.1
120	10.0	1.7	3.8							Operation not recommended						
	13.0	2.5	5.8							1300	37.2	28.8	0.77	5.28	55.3	7.1
										1600	37.9	31.3	0.82	5.42	56.4	7.0
	16.0	3.6	8.2							1300	37.6	28.8	0.77	5.11	55.0	7.4
										1600	38.4	31.3	0.81	5.27	56.4	7.3

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Performance Data cont.

072 - Dual Capacity - Full Load (2100 cfm)

EWT °F	Flow Rate GPM	WPD		HEATING - EAT 70°F						COOLING - EAT 80/67 °F						
		PSI	FT/HD	Airflow CFM	HC MBtu/h	Power kW	HE MBtu/h	LAT °F	COP	Airflow CFM	TC Mbtu/h	SC Mbtu/h	S/T Ratio	Power kW	HR Mbtu/h	EER
20	12.0	3.3	7.6	Operation not recommended						Operation not recommended						
	15.0	4.7	10.8													
	18.0	6.2	14.3	1750	48.9	4.22	34.5	95.9	3.40							
				2100	50.7	4.49	35.4	92.4	3.31							
30	12.0	3.2	7.4	Operation not recommended						Operation not recommended						
	15.0	4.5	10.5	1750	55.9	4.35	41.1	99.6	3.76	1750	65.8	46.2	0.70	2.84	75.5	23.1
				2100	57.9	4.63	42.1	95.5	3.66	2100	66.9	50.5	0.75	3.00	77.1	22.3
	18.0	6.0	13.9	1750	56.4	4.40	41.4	99.8	3.76	1750	66.1	46.2	0.70	2.76	75.6	24.0
				2100	58.5	4.68	42.5	95.8	3.66	2100	67.8	50.5	0.75	2.90	77.6	23.4
40	12.0	3.1	7.1	Operation not recommended						Operation not recommended						
	15.0	4.4	10.2	1750	63.5	4.57	47.9	103.6	4.08	1750	68.9	48.2	0.70	3.21	79.9	21.5
				2100	65.7	4.78	49.4	99.0	4.03	2100	70.2	52.6	0.75	3.37	81.7	20.9
	18.0	5.8	13.5	1750	64.4	4.62	48.7	104.1	4.09	1750	69.5	48.2	0.69	3.12	80.1	22.3
				2100	66.6	4.83	50.2	99.4	4.05	2100	71.0	52.6	0.74	3.26	82.1	21.8
50	12.0	3.0	6.9	1750	67.4	4.68	51.4	105.6	4.22	1750	71.4	49.3	0.69	3.53	83.4	20.2
				2100	69.6	4.85	53.1	100.7	4.21	2100	72.9	53.6	0.74	3.75	85.7	19.4
	15.0	4.3	9.9	1750	71.2	4.77	54.9	107.6	4.37	1750	72.1	49.8	0.69	3.46	83.9	20.9
				2100	73.5	4.93	56.7	102.4	4.37	2100	73.5	54.2	0.74	3.68	86.1	20.0
	18.0	5.7	13.1	1750	72.4	4.83	56.0	108.3	4.40	1750	72.9	50.8	0.70	3.40	84.5	21.4
				2100	74.8	4.98	57.8	103.0	4.41	2100	74.3	54.7	0.74	3.62	86.7	20.5
60	12.0	2.9	6.7	1750	75.0	4.96	58.1	109.7	4.43	1750	70.2	48.7	0.69	3.82	83.2	18.4
				2100	77.5	5.06	60.2	104.2	4.49	2100	71.7	52.6	0.73	4.06	85.5	17.7
	15.0	4.1	9.6	1750	78.3	5.05	61.1	111.4	4.55	1750	70.9	49.2	0.69	3.74	83.7	19.0
				2100	80.9	5.13	63.4	105.7	4.62	2100	72.3	53.2	0.74	3.97	85.9	18.2
	18.0	5.5	12.7	1750	80.1	5.11	62.7	112.4	4.60	1750	71.7	50.0	0.70	3.67	84.2	19.5
				2100	82.7	5.18	65.1	106.5	4.68	2100	73.1	53.8	0.74	3.91	86.4	18.7
70	12.0	2.8	6.5	1750	82.6	5.23	64.8	113.7	4.63	1750	69.0	48.1	0.70	4.10	83.0	16.8
				2100	85.2	5.27	67.3	107.6	4.74	2100	70.5	51.7	0.73	4.36	85.3	16.2
	15.0	4.0	9.2	1750	85.5	5.32	67.4	115.3	4.72	1750	69.7	48.6	0.70	4.01	83.4	17.4
				2100	88.3	5.33	70.1	108.9	4.86	2100	71.1	52.2	0.73	4.26	85.7	16.7
	18.0	5.3	12.2	1750	87.8	5.38	69.4	116.4	4.78	1750	70.5	49.1	0.70	3.94	83.9	17.9
				2100	90.7	5.38	72.3	110.0	4.94	2100	71.9	52.8	0.73	4.20	86.2	17.1
80	12.0	2.7	6.3	1750	91.3	5.57	72.4	118.3	4.81	1750	66.0	46.4	0.70	4.50	81.3	14.7
				2100	94.3	5.52	75.5	111.6	5.00	2100	67.4	50.2	0.74	4.79	83.7	14.1
	15.0	3.9	8.9	1750	93.5	5.64	74.3	119.5	4.86	1750	66.6	46.9	0.70	4.41	81.7	15.1
				2100	96.5	5.57	77.5	112.5	5.08	2100	68.0	50.6	0.74	4.69	84.0	14.5
	18.0	5.1	11.8	1750	96.3	5.71	76.9	121.0	4.94	1750	67.4	47.6	0.71	4.33	82.1	15.6
				2100	99.5	5.63	80.4	113.9	5.19	2100	68.7	51.2	0.74	4.61	84.5	14.9
90	12.0	2.6	6.0	1750	100.1	5.90	79.9	122.9	4.97	1750	63.0	44.8	0.71	4.90	79.7	12.8
				2100	103.3	5.78	83.6	115.6	5.24	2100	64.3	48.6	0.76	5.22	82.1	12.3
	15.0	3.7	8.6	1750	101.5	5.96	81.1	123.7	4.99	1750	63.6	45.2	0.71	4.80	79.9	13.2
				2100	104.7	5.80	84.9	116.2	5.29	2100	64.9	49.1	0.76	5.11	82.3	12.7
	18.0	4.9	11.4	1750	104.9	6.04	84.3	125.5	5.09	1750	64.3	46.1	0.72	4.72	80.4	13.6
				2100	108.4	5.87	88.4	117.8	5.42	2100	65.6	49.6	0.76	5.03	82.7	13.0
100	12.0	2.5	5.8	Operation not recommended						Operation not recommended						
	15.0	3.6	8.3							1750	59.6	43.1	0.72	5.34	77.8	11.1
										2100	60.8	46.6	0.77	5.69	80.2	10.7
	18.0	4.8	11.0							1750	60.2	43.7	0.73	5.25	78.1	11.5
										2100	61.4	47.0	0.77	5.59	80.5	11.0
110	12.0	2.4	5.6							Operation not recommended						
	15.0	3.5	8.0							1750	55.6	41.0	0.74	5.89	75.6	9.4
										2100	56.7	44.1	0.78	6.27	78.1	9.0
	18.0	4.6	10.6							1750	56.2	41.4	0.74	5.79	75.9	9.7
										2100	57.3	44.5	0.78	6.15	78.3	9.3
120	12.0	2.3	5.4							Operation not recommended						
	15.0	3.3	7.7							1750	50.5	38.1	0.75	6.88	74.0	7.3
										2100	51.4	41.3	0.80	7.06	75.5	7.3
	18.0	4.4	10.2							1750	51.0	38.1	0.75	6.66	73.7	7.7
										2100	52.0	41.3	0.79	6.87	75.5	7.6

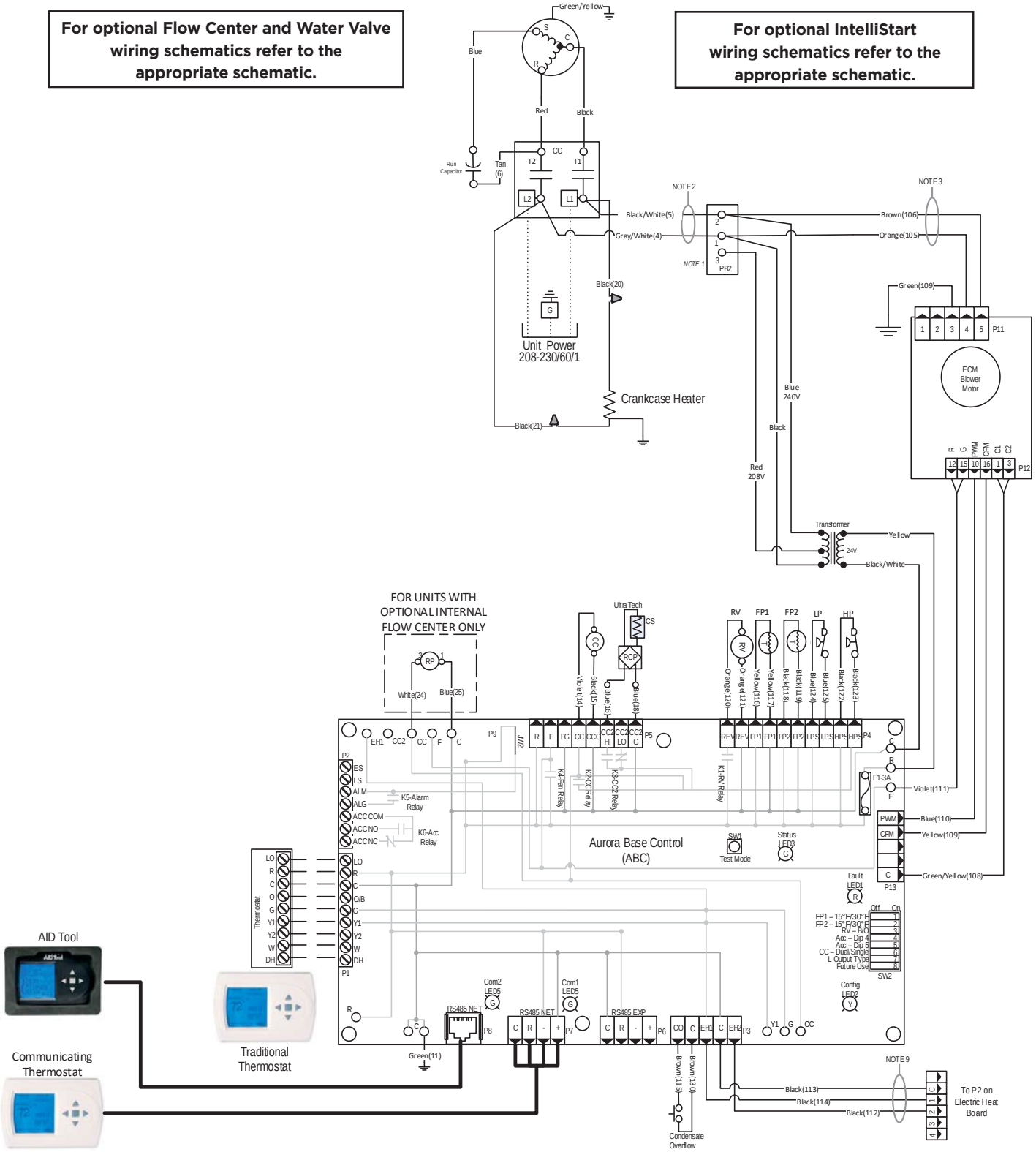
7/29/17 ADL

Wiring Schematics

Aurora Base Controls with ECM and IntelliStart

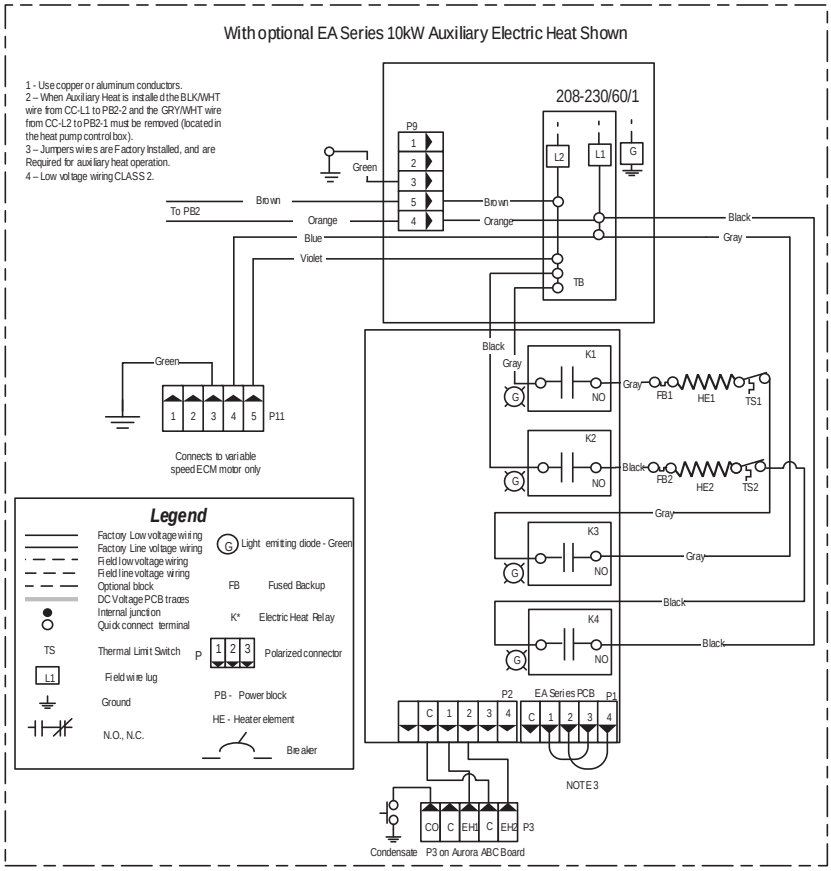
For optional Flow Center and Water Valve wiring schematics refer to the appropriate schematic.

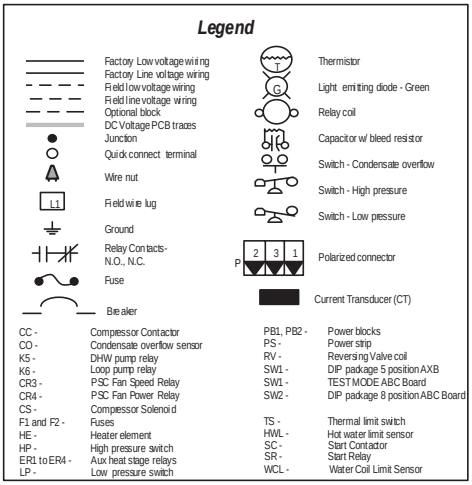
For optional IntelliStart wiring schematics refer to the appropriate schematic.



Wiring Schematics cont.

Aurora Base Controls with ECM and IntelliStart cont.





Notes

1 - Switch blue and red wires for 208V operation.

2 - The blk/wh and gray/wh wires are removed when Aux Heat is installed

3 – When Auxiliary Heat is field installed the harness will then be connected to the auxiliary heat unit. The auxiliary heat unit will then power the blower. Refer to EAS/EAM/EAL Auxiliary Heat kit installation instructions.

4 – Low voltage wiring CLASS 2.

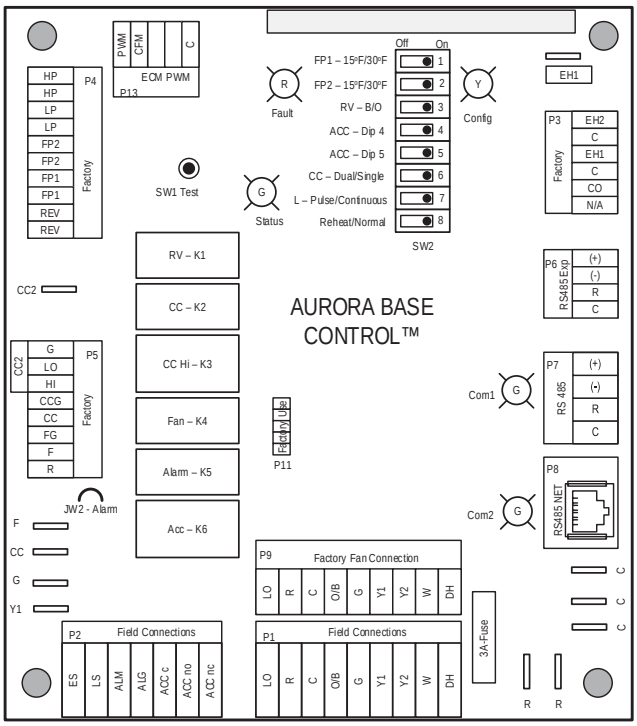
5 – Brown blower power wire routed through Current Transducer two times.

6 – Field Connected: Refer to Installation Manual and Auxiliary Heat Instructions for Current Transducer installation.

7 - Wires provided for Auxiliary Heat low voltage control. Wires are secured at blower.

Wiring Schematics cont.

Aurora Base Controls with ECM and IntelliStart



ABC SW2 Accessory Relay		
DESCRIPTION	**SW2-4**	**SW2-5**
Cycle with Blower	ON	ON
Cycle with Compressor	OFF	OFF
Water Valve Slow Opening	ON	OFF
Cycle with Comm. T-stat Hum Cmd	OFF	ON

Aurora LED Flash Codes			
Slow Flash	1 second on and 1 second off		
Fast Flash	100 milliseconds on and 100 milliseconds off		
Flash Code	100 milliseconds on and 400 milliseconds off with a 2 second pause before repeating		
Random Start Delay (Alternating Colors)		Configuration LED (LED2, Yellow)	
Status LED (LED1, Green)	Fast Flash	No Software Overide	OFF
Configuration LED (LED2, Yellow)	Fast Flash	DIP Switch Overide	Slow Flash
Fault LED (LED3, Red)	Fast Flash		
Fault LED (LED1, Red)		Status LED (LED3, Green)	
Normal Mode	OFF	Normal Mode	ON
Input Fault Lockout	Flash Code 1	Control is Non-Functional	OFF
High Pressure Lockout	Flash Code 2	Test Mode	Slow Flash
Low Pressure Lockout	Flash Code 3	Lockout Active	Fast Flash
Future Use	Flash Code 4	Dehumidification Mode	Flash Code 2
Freeze Detection – FP1	Flash Code 5	Future Use	Flash Code 3
Reserved	Flash Code 6	Future Use	Flash Code 4
Condensate Overflow Lockout	Flash Code 7	Load Shed	Flash Code 5
Over/Under Voltage Shutdown	Flash Code 8	ESD	Flash Code 6
Future Use	Flash Code 9	Future Use	Flash Code 7
Future Use	Flash Code 10		
FP1 and FP2 Sensor Error	Flash Code 11		

Notes

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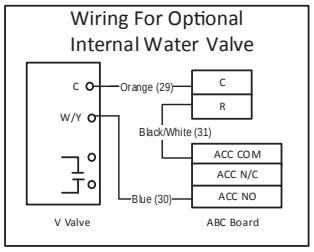
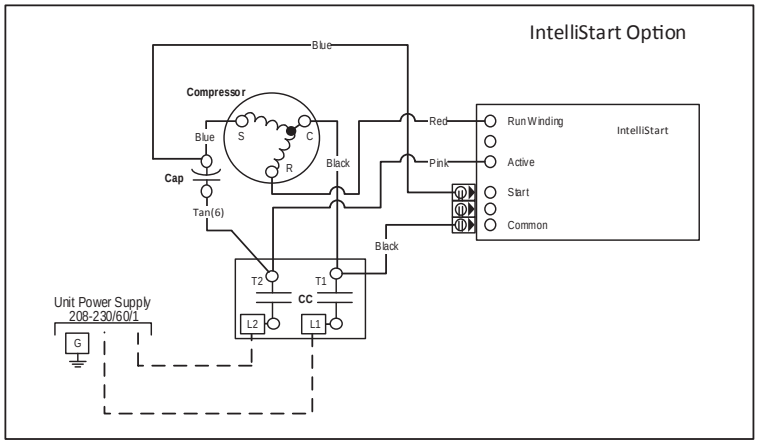
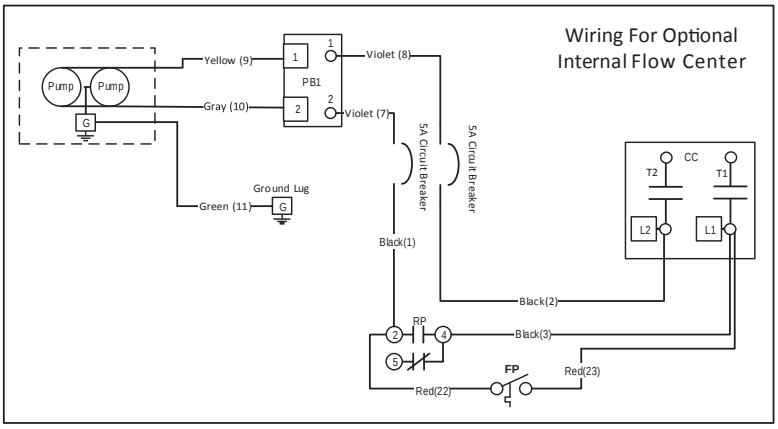
6 – Field Connected: Refer to Installation Manual and Auxiliary Heat Instructions for Current Transducer installation.
7 - Wires provided for Auxiliary Heat low voltage control. Wires are secured at blower.

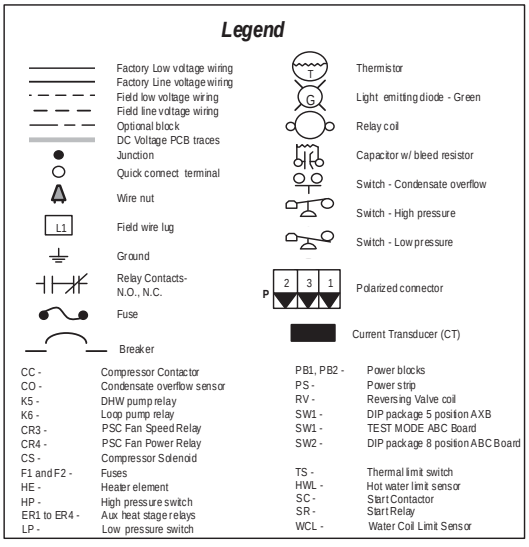
Wiring Schematics cont.

Aurora Base Controls with ECM and IntelliStart



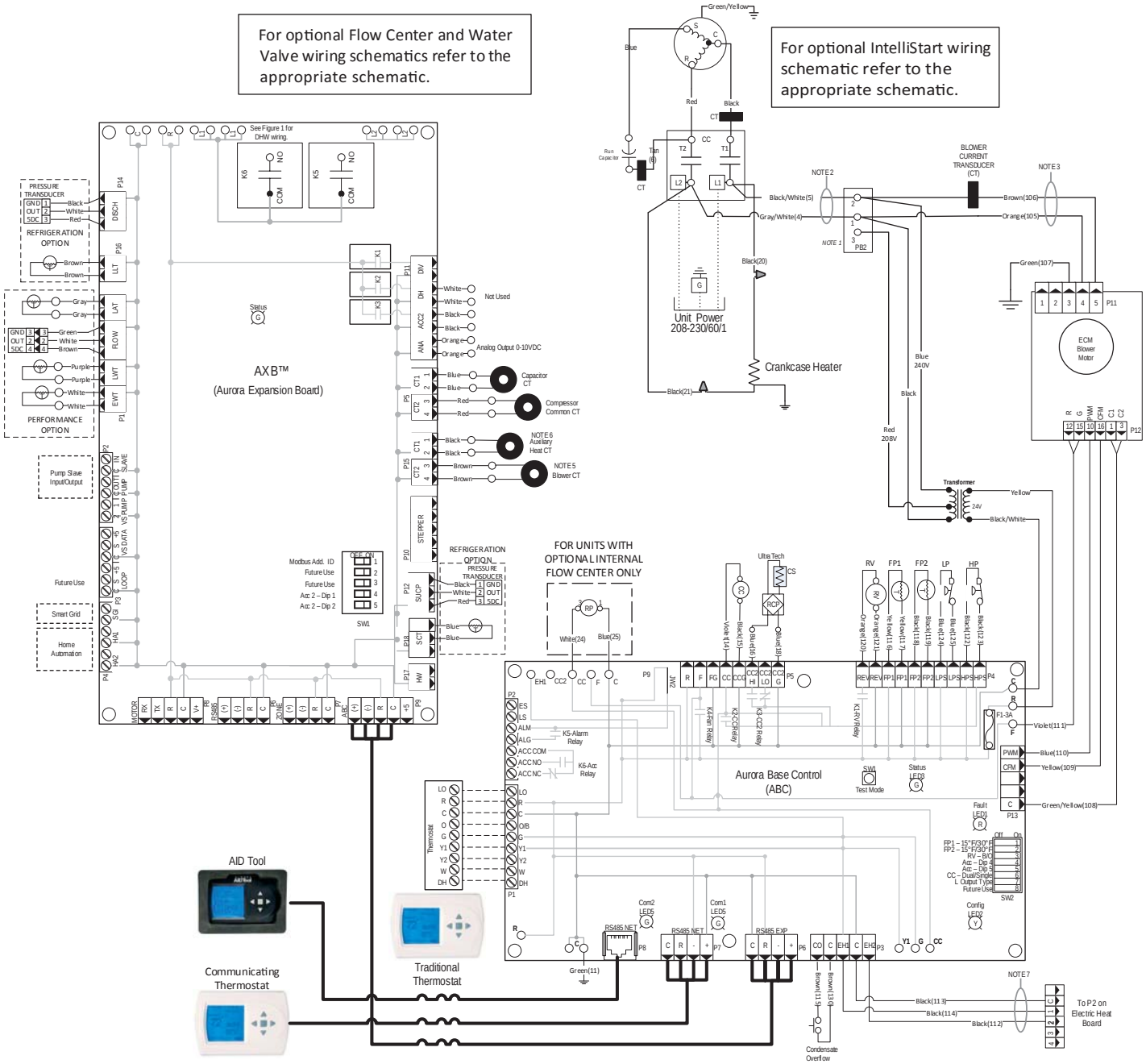






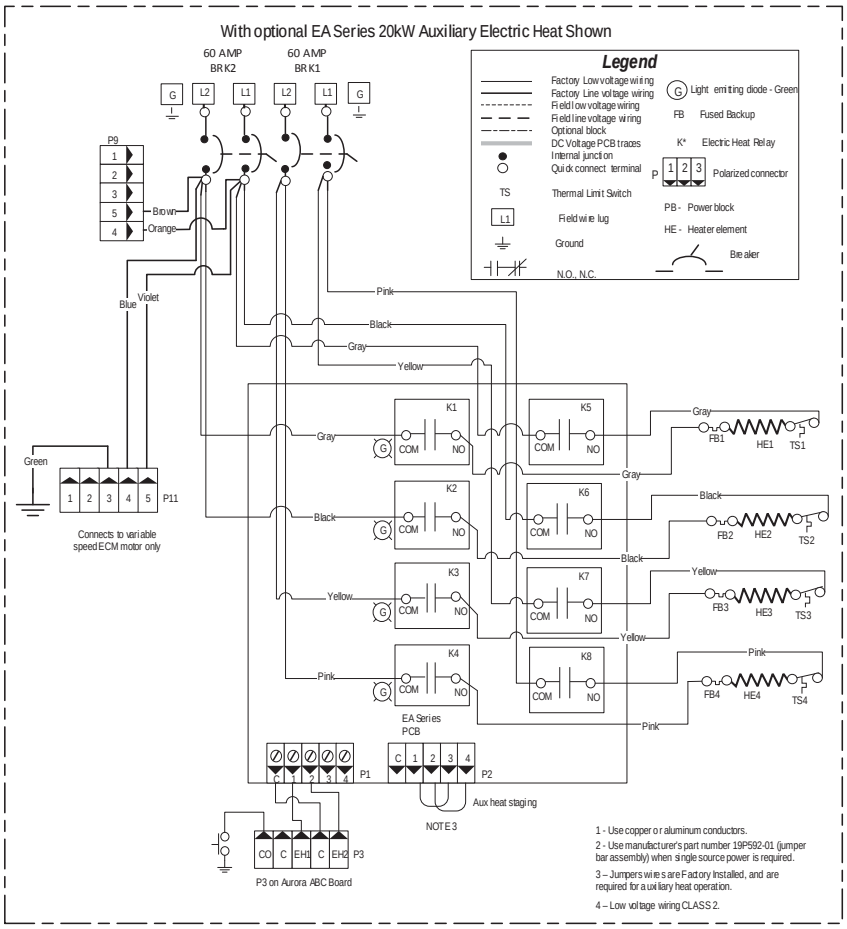
Wiring Schematics cont.

Aurora Advanced Controls with ECM and IntelliStart



Wiring Schematics cont.

Aurora Advanced Controls with ECM and IntelliStart cont.



Notes

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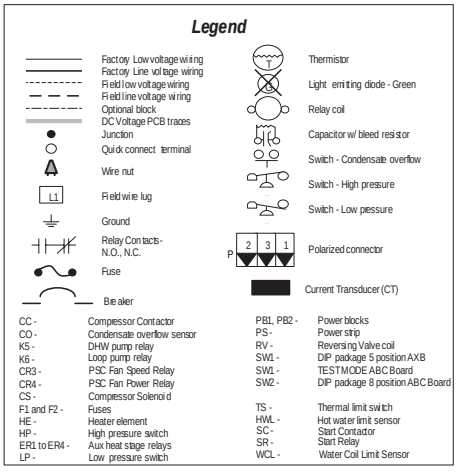
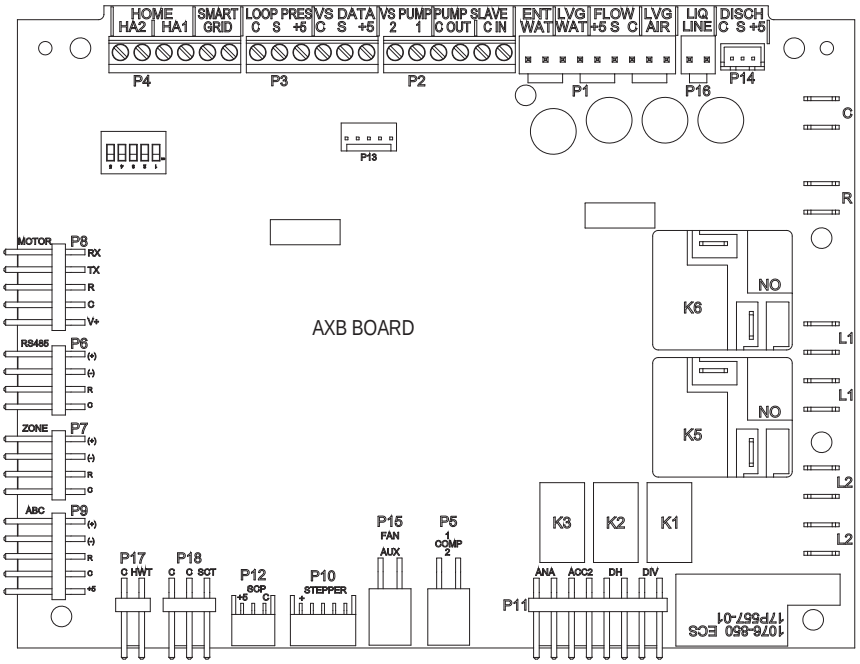
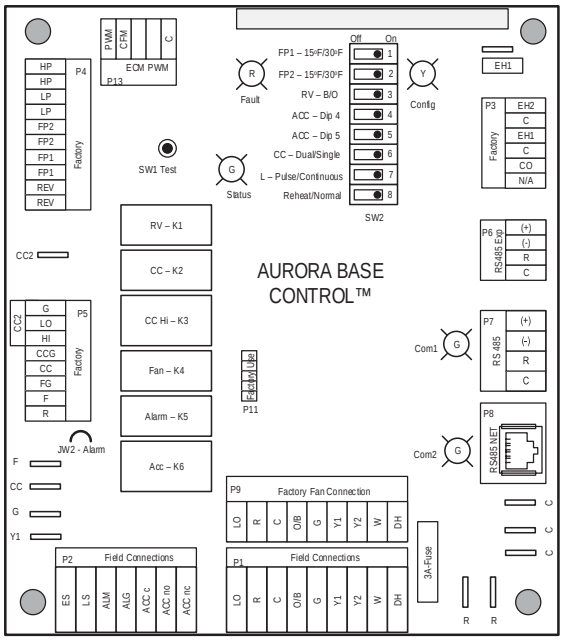
5 – Brown blower power wire routed through Current Transducer two times.
6 – Field Connected: Refer to Installation Manual and Auxiliary Heat Instructions for Current Transducer installation.
7 - Wires provided for Auxiliary Heat low voltage control. Wires are secured at blower.



Wiring Schematics cont.

Aurora Advanced with ECM and IntelliStart





Aurora LED Flash Codes			
Slow Flash	1 second on and 1 second off		
Fast Flash	100 milliseconds on and 100 milliseconds off		
Flash Code	100 milliseconds on and 400 milliseconds off with a 2 second pause before repeating		
Fault LED (LED 1, Red)		Random Start Delay (Alternating Colors)	
Normal Mode	OFF	Status LED (LED1, Green)	Fast Flash
Input Fault Lockout	Flash Code 1	Configuration LED (LED 2, Yellow)	Fast Flash
High Pressure Lockout	Flash Code 2	Fault LED (LED 3, Red)	Fast Flash
Low Pressure Lockout	Flash Code 3	Configuration LED (LED 2, Yellow)	
Freeze Detection - FP2	Flash Code 4	No Software Overide	OFF
Freeze Detection - FP1	Flash Code 5	DIP Switch Overide	Slow Flash
Reserved	Flash Code 6	Status LED (LED 3, Green)	
Condensate Overflow Lockout	Flash Code 7	Normal Mode	ON
Over/Under Voltage Shutdown	Flash Code 8	Control is Non - Functional	OFF
Future Use	Flash Code 9	Test Mode	Slow Flash
Compressor Monitoring	Flash Code 10	Lockout Active	Fast Flash
Fault- FP1 Sensor Error	Flash Code 11	Dehumidification Mode	Flash Code 2
Future Use	Flash Code 12	Future Use	Flash Code 3
Non-Critical AXB Sensor Error	Flash Code 13	Future Use	Flash Code 4
Critical AXB Sensor Error	Flash Code 14	Load Shed	Flash Code 5
Alarm - Hot Water	Flash Code 15	ESD	Flash Code 6
Fault Variable Speed Pump	Flash Code 16	Future Use	Flash Code 7
Future Use	Flash Code 17	Fault LED (LED 1, Red) Cont.	
Non-Critical Communication Error	Flash Code 18	Alarm - Home Automation 1	Flash Code 23
Fault - Critical Communication Error	Flash Code 19	Alarm - Home Automation 2	Flash Code 24
Alarm - Low Loop Pressure	Flash Code 21	Fault - EEV Error	Flash Code 25
Fault - Communication ECM Fan Motor Error	Flash Code 22		

AXB Accessory 2 DIP Settings		
SW1-4	SW1-5	DESCRIPTION
ON	ON	Cycles with Blower
OFF	ON	Cycles with CC first stage compressor or compressor spd 1-12
ON	OFF	Cycles with CC2 second stage of compressor or comp spd 7-12
OFF	OFF	Cycles with DH from ABC board

ABC SW2 Accessory Relay		
DESCRIPTION	SW2-4	SW2-5
Cycle with Blower	ON	ON
Cycle with Compressor	OFF	OFF
Water Valve Slow Opening	ON	OFF
Cycle with Comm. T-stat Hum Cmd	OFF	ON

Notes

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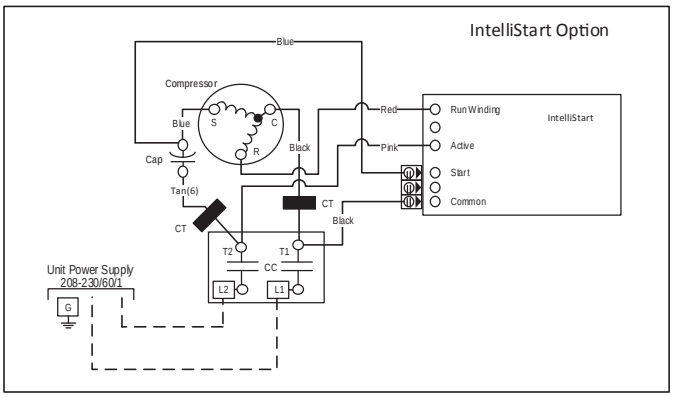
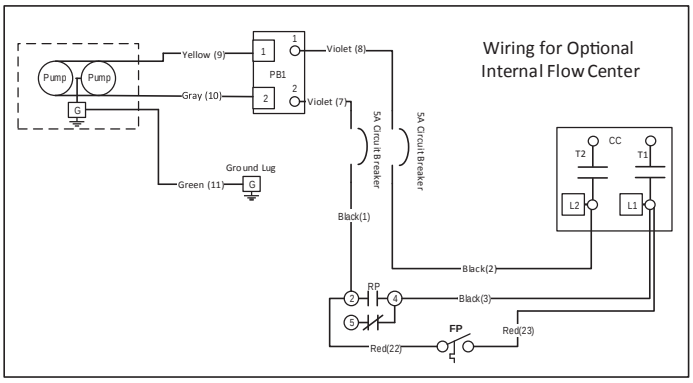
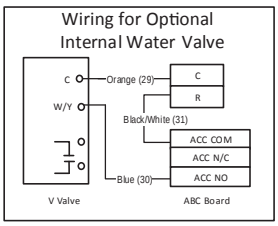
7 - Wires provided for Auxiliary Heat low voltage control. Wires are secured at blower.

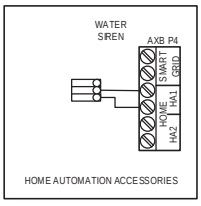
Wiring Schematics cont.

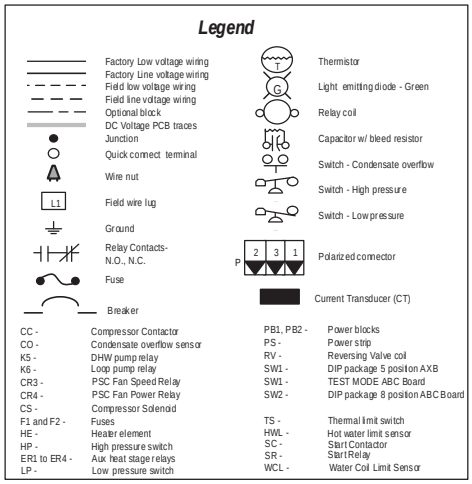
Aurora Advanced with ECM and IntelliStart cont.











Engineering Guide Specifications

General

Furnish and install Water Source Heat Pumps, as indicated on the plans. Equipment shall be completely assembled, piped and internally wired. Capacities and characteristics as listed in the schedule and the specifications that follow. The reverse cycle heating/cooling units shall be either side or bottom air inlet and discharge for pad or roof mounting. Units shall be AHRI/ISO 13256-1 certified and listed by a nationally recognized safety-testing laboratory or agency, such as ETL Testing Laboratory. Each unit shall be computer run-tested at the factory with conditioned water and operation verified to catalog data. Each unit shall be mounted on a pallet and shipped stretch-wrapped. The units shall be designed to operate with entering liquid temperature between 20°F and 120°F [-6.7°C and 48.9°C].

Casing and Cabinet

The cabinet is constructed of a super durable polyester powder coat paint on G60 galvanized heavy gauge sheet metal which is certified for: 750 hour certified ASTM B117 salt spray, 80 cycles of SAE-J2334 cyclical salt spray, >336 hours. ASTM G154 UVB rating. The interior shall be insulated with 1-inch thick, multi-density, cleanable aluminum foil coated glass fiber with edges sealed or tucked under flanges to prevent the introduction of glass fibers into the discharge air or 1″ closed cell foam. Standard cabinet panel insulation must meet NFPA 90A requirements, air erosion and mold growth limits of UL-181, stringent fungal resistance test per ASTM-C1071 and ASTM G21, and shall meet zero level bacteria growth per ASTM G22. Unit insulation must meet these stringent requirements or unit(s) will not be accepted.

One blower, one return air, and two compressor compartment access panels shall be 'lift-out' removable with supply and return ductwork in place. The front access panels shall be lift-out to provide easy access to the electrical/compressor section. The control box shall be removable to allow easy access to the compressor. The internal component layout shall provide for service access from the front side for restricted installations.

A duct collar shall be provided for field installation on the supply and return air openings. All units shall have an insulated divider panel between the air handling section and the compressor section to minimize the transmission of compressor noise and to permit operational service testing without air bypass.

The compressor shall be double isolation mounted using selected durometer grommets to provide vibration free compressor mounting.

The drain pan shall be of plastic construction to inhibit corrosion and bacterial growth. Drain outlet shall be located on pan as to allow complete and unobstructed drainage of condensate. The unit as standard will be supplied with solid-state electronic condensate overflow protection. Mechanical float switches WILL NOT be accepted. All units shall be furnished with a PVC stub condensate drain connection.

Refrigerant Circuit

All units shall contain a sealed refrigerant circuit including a hermetic motor-compressor, discharge line muffler, bidirectional thermostatic expansion valve, finned tube air-to-refrigerant heat exchanger, reversing valve, coaxial tube water-to-refrigerant heat exchanger, and service ports.

Compressors shall be high-efficiency dual capacity scroll type designed for heat pump duty and mounted on vibration isolators. Compressor motors shall be single-phase PSC with overload protection. The finned tube air-to-refrigerant heat exchanger will be aluminum tube/aluminum fin and shall be sized for low-face velocity and constructed of lanced aluminum fins bonded to performance enhanced tubes in a staggered pattern not less than three rows deep for superior performance. The aluminum tube and fin air-to-refrigerant heat exchanger has as optional to be electro-coated with AlumiSeal. All models shall include discharge mufflers to help quiet compressor discharge gas pulsations. Refrigerant to air heat exchangers shall utilize enhanced tube construction rated to withstand 600 psig (4135 kPa) refrigerant working pressure.

The coaxial water-to-refrigerant heat exchanger shall be designed for low water pressure drop and constructed of a convoluted copper (cupronickel option) inner tube and a steel outer tube. Refrigerant to water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design, rated to withstand 600 psig (4135 kPa) working refrigerant pressure and 450 psig (3101 kPa) working water pressure. The thermostatic expansion valve shall provide proper superheat over the entire liquid temperature range with minimal "hunting." The valve shall operate bidirectionally without the use of check valves.

All units shall have the source coaxial tube refrigerant-to-water heat exchanger coated with ThermaShield. Refrigerant suction lines shall be insulated to prevent condensation at low liquid temperatures.

Engineering Guide Specifications cont.

Blower Motor and Assembly

The blower shall be a direct drive centrifugal type with a dynamically balanced wheel. The housing and wheel shall be designed for quiet low outlet velocity operation. The blower housing shall be removable from the unit without disconnecting the supply air ductwork for servicing of the blower motor. The blower motor shall be a variable-speed ECM type. The Variable Speed ECM blower motor shall be soft starting, shall maintain constant cfm over its operating static range, and shall provide 12 cfm settings. The blower motor shall be isolated from the housing by rubber grommets. The motor shall be permanently lubricated and have thermostatic overload protection. Variable Speed ECM motors shall be long-life ball bearing type.

Electrical

A control box shall be located within the unit compressor compartment and shall contain a 75VA transformer, 24 volt activated, 2 pole compressor contactor, circuit breakers for protecting loop pumps, terminal block for thermostat wiring, and solid-state controller for complete unit operation. Electromechanical operation WILL NOT be accepted. Units shall be name-plated for use with time delay fuses or HACR circuit breakers. Unit controls shall be 24 volt and provide heating or cooling as required by the remote thermostat/sensor. An Aurora, a microprocessor-based controller, interfaces with a multi-stage electronic thermostat to monitor and control unit operation shall be provided. The control shall provide operational sequencing, blower speed control, high and low pressure switch monitoring, freeze detection sensing, condensate overflow sensing, auxiliary heat staging, lockout mode control, loop pump control, LED status and fault indicators, fault memory, field selectable options, and accessory output. The Lockout signal output shall have a pulsed option so that DDC systems can read specific lockout conditions from the control.

The optional Aurora Advanced Control shall also feature an Energy Monitoring Package that will provide real time total power consumption, compressor monitoring, On Peak input signal for utility controlled demand programs, loop pump linking for multiple units driving a common flow center and up to two optional home automation inputs to drive dedicated alarms for sump pump, security system, and smoke/CO_2 or dirty air filter sensors. Optional Refrigerant and Performance Monitoring kits to provide real time data including refrigerant superheat and subcooling, as well as heat of extraction/rejection capacity data. The capability for communicating to advanced IntelliZone2 zoning packages with up to 4 zones (Dual Capacity), shall also be provided with complete fault and information display on the zoning MasterStat.

A detachable terminal block with screw terminals will be provided for field control wiring. All units shall have knockouts for entrance of low and line voltage wiring. The blower motor and control box shall be harness plug wired for easy removal.

An optional Aurora Interface Diagnostic (AID) Tool shall communicate with the Aurora control allowing quick and easy access to setup, monitoring, and troubleshooting of any Aurora control. The device shall include the features of ECM airflow setup, fault description and history, manual operation capability, sensor readings, timings, and other diagnostic tools.

Optional IntelliStart® (compressor Soft Starter) shall be factory installed for use in applications that require low starting amps, reduced compressor start-up noise, off-grid, and improved start-up behavior. IntelliStart shall reduce normal starting current by up to 60%.

Piping

All side water line (supply and return) connections shall be 1″ FPT copper fittings fixed to the corner post, which eliminates the need for backup pipe wrenches. All bottom flow center connections shall be 1-1/4″ PE fusion to GL fittings that provide a double o-ring seal. All bottom water valve options accept 1″ hose. All water piping shall be insulated to prevent condensation at low liquid temperatures, the condensate connection shall be a 3/4 in. [19.1 mm] PVC pipe.

Options and Accessories

Cupronickel Heat Exchanger

An optional cupronickel water-to-refrigerant heat exchanger shall be provided.

Thermostat (field-installed)

A multi-stage auto-changeover electronic digital thermostat shall be provided. The thermostat shall offer three heating and two cooling stages with precise temperature control. An OFF-HEAT-AUTO-COOL-EMERG system switch, OFF-AUTO blower switch, and indicating LEDs shall be provided. The thermostat shall display in °F or °C. The thermostat shall be either a communicating type or a traditional 24 VAC type.

Communicating Thermostat (field-installed)

A communicating auto-changeover electronic digital thermostat shall be provided. The thermostat shall offer variable speed heating and cooling staging with precise temperature control. An OFF-HEAT-AUTO-COOL-EMERG system switch, OFF-AUTO blower switch, and indicating display shall be provided. The thermostat shall display in °F or °C. The thermostat shall provide real time energy consumption data of the unit.

Engineering Guide Specifications cont.

Communicating Color Touchscreen Thermostat (field-installed)

A color touchscreen communicating auto-changeover electronic digital thermostat shall be provided. The thermostat shall offer variable speed heating and cooling staging with precise temperature control. An OFF-HEAT-AUTO-COOL-EMERG system switch, OFF-AUTO blower switch, and indicating display shall be provided. The thermostat shall display in °F or °C. The thermostat shall provide real time and historical energy consumption data of the unit.

AlpinePure Drain Pan Treatment

Provides dependable, sustained time-release protection from slime build-up and foul smelling odors in the drain pan. Also adds a light, pleasant scent to the air.

Earth Loop Flow Center

A self-contained module shall provide all liquid flow, fill and connection requirements for ground source closed loop systems up to 20 gpm. The pumps shall be wired to a power block located in the nearest unit. The heat pump units shall contain low voltage pump linking control so that two units may share one flow center.

Auxiliary Heater (factory or field-installed)

An electric resistance heater shall provide supplemental and/or emergency heating capability. Units shall have the control panel and resistance heater coil assembly mounted internally. A low voltage plug shall be provided in each unit for quick auxiliary heat connection. The heater shall operate in sequenced stages as controlled by the unit's microprocessor. The heater shall feed line voltage power to the unit blower and transformer to provide emergency heat capability in the event of an open compressor circuit breaker.

Symphony/Aurora Weblink (if available)

Symphony is a Wi-Fi enabled smart comfort system for your geothermal heat pump that is unsurpassed in its ease of use, feature set and capability. Symphony marries the sophisticated Aurora controls of your Geothermal System with a web enabled Aurora Weblink Router giving you access to your comfort geothermal heat pump from practically anywhere. Symphony is cloud-based and includes your whole geothermal system and isn't limited to just the thermostat as in other 'smart thermostat' systems. Symphony web-portal provides control over every aspect of your geothermal heat pump including:

- View your geothermal system's operation from anywhere. Great for vacation or second homes.
- Dashboard for quick review of operation, alerts and energy use (if installed).
- Smart Device capability
- Modify your zone temperature setpoints and programs remotely
- IntelliZone2 zoning system compatible to access up to 6 zone thermostats with variable speed, 4 zones with dual capacity, and 2 zones with single speed geothermal heat pumps.
- Observe and track energy use for the last 13 months (if installed).
- Receive equipment alerts and service reminders (as well as your dealer) via email and texts
- Monitor earth loop and air temperature of your geothermal heat pump directly (if installed).
- Utilize a 'wireless' thermostat system with no visible thermostats using a smart device. By mounting a communicating thermostat in a closet with external mud-in sensor located in the living space, a smart device can be used as a wireless thermostat for the ultimate in flexibility (TPCC32U01*, TPCM32U03A*, TPCM32U04A*, or MasterStat only)
- Optional Add-on sensor for sump pump alarm. If a sump pump overflows you will receive a text or email.

External Sump Alarm Sensors for Aurora Controls (if available)

The sensor can be added to any Aurora Advanced Control System (including both ABC and AXB) to monitor a sump pump. The sensor can be connected to the Aurora Home Automation inputs (HA-1 or HA-2) of the AXB board. These will each display an E23 and E24 code respectively when the alarm is active and when Symphony/AWL is installed will also produce text/e-mail notifications.

- This sensor provides a relay closure that can be used to trip a fault when moisture is present. This can be used as a primary sump alarm or simply a wet basement or signal a blown washing machine hose.

Revision Guide

Pages:	Description:	Date:	By:
All	Document Created	23 Nov 2017	JM/MA

Product:	**Aston Series**
Type:	Geothermal Heat Pumps
Size:	2-6 Ton Dual Capacity
Document Type:	Specification Catalog
Part Number:	SC2505AG
Release Date:	11/17