SUBMITTAL

Project

DISTRICT 2 BLDG1

Date

Tuesday, April 16, 2019

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Prepared By: 08:09AM

10 TON

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Unit Report For 10 TON

Project: DISTRICT 2 BLDG1 — 04/16/2019
Prepared By: — 08:09AM

Unit Parameters

Tag Name: ..... **10 TON**
Quantity: **1**
Unit Model: **50VQP**
Unit Size: ..... **120 (10 tons)**
Compressor Type: ..... **Puron Scroll**
Compressor Quantity: **2**
Configuration: ..... **Vertical**
Capacity/Efficiency: ..... **Large Capacity**

Dimensions

Width: ..... **42.0** in
Depth: ..... **32.0** in
Height: ..... **62.0** in
Shipping Weight: ..... **980.0** lb
Operating Weight: ..... **935.0** lb
Packaging: ..... **Domestic**
Water Connection: ..... **1.5** in

Filters

1-in Throwaway Filter, 20 x 34 1/2 (qty 2)

Electrical

Voltage: ..... **460-3-60** V-Ph-Hz
Neutral wire not required
Compressor RLA: ..... **7.8** Amps
Fan FLA: ..... **3.1** Amps
Min Circuit Amps: ..... **21** Amps
Max fuse amps: ..... **25** Amps

Unit Options

AirFlow: ..... **Rear Return, Top Discharge**
Control: ..... **Complete C Microprocessor Control**
Coil: ..... **Cupro-Nickel**
Blower Drive: ..... **2HP Belt Drive**
Range/Sound: ..... **Extended Range (25 to 110 F)**
Performance Notes .: ..... **Acoustic data is not available for this unit.**

Warranty Information

First Year - Parts Only (Standard): ..... **No Cost**
Five year compressor – Parts only (standard): ..... **No Cost**

Ordering Information

Part Number	Description	Quantity
Base Unit		
50VQP120BCN6A1AB	Standard Vertical Large Capacity Water Source Heat Pump 120 (10 tons) 460-3-60	1
Factory Options		
	Range/Sound: Extended Range (25 to 110 F)	
	Cupro-Nickel	
Accessories		

Certified Drawing for 10 TON

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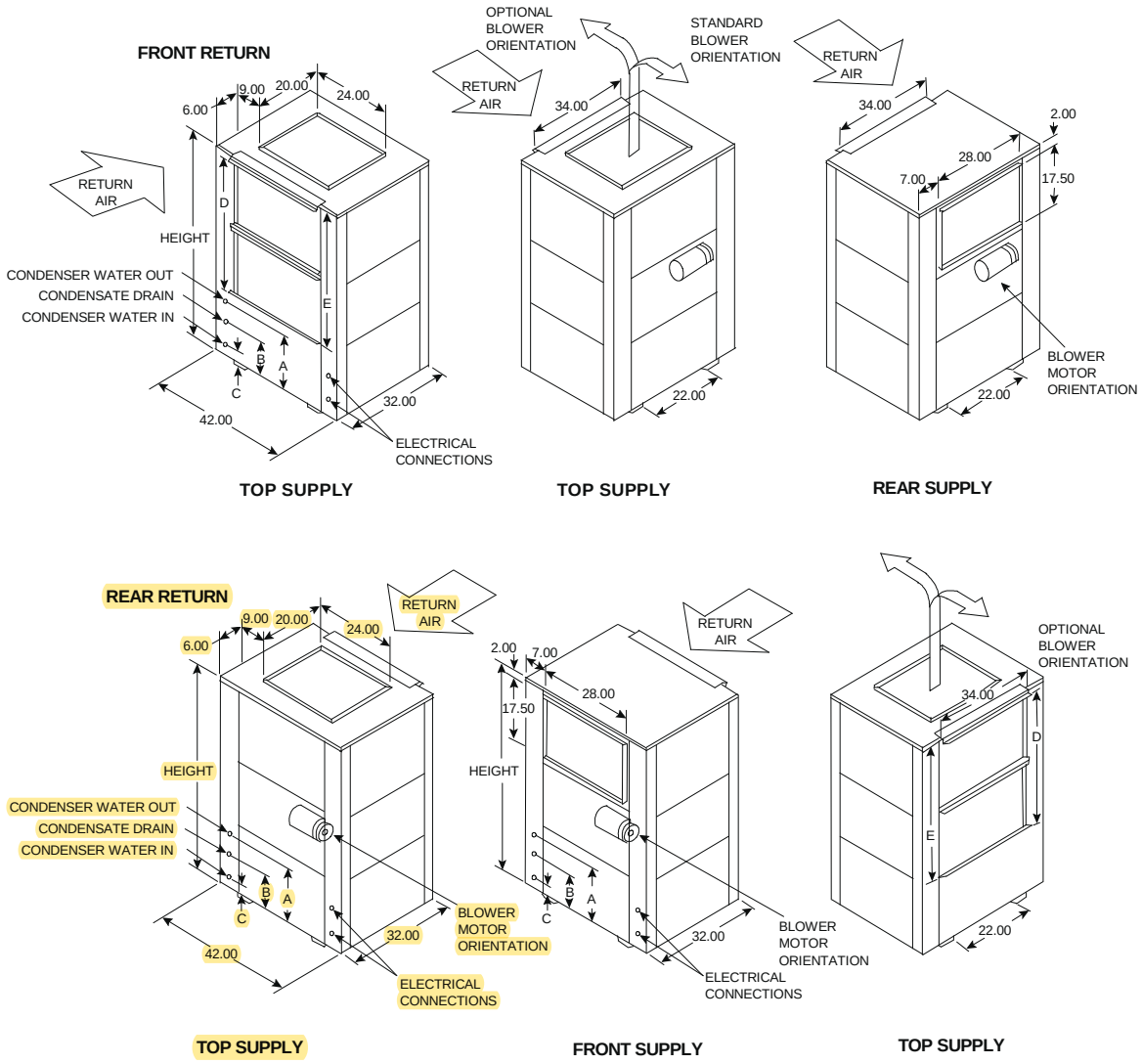
50VQP072-120 UNITS

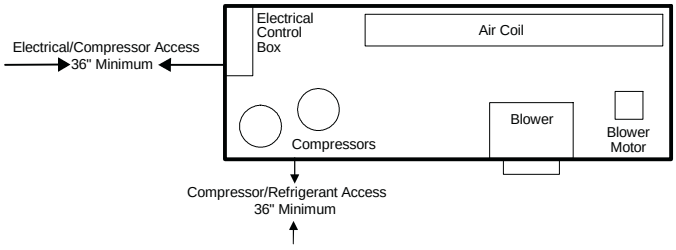


UNIT SIZE	HEIGHT	WIDTH	DEPTH	CONDENSER WATER CONNECTIONS				DUCT FLANGE	FILTER RACK	REPLACEMENT FILTER SIZE (NOMINAL)
				A	B	C	Diameter (FPT)	D	E	
072	62.00	42.00	32.00	14.75	8.50	2.75	1	38.00	40.00	20 x 34 $^1/_2$ x 1 (2)
096	62.00	42.00	32.00	14.75	2.75	2.75	1			
120	62.00	42.00	32.00	15.00	9.00	3.00	1$^1/_2$			

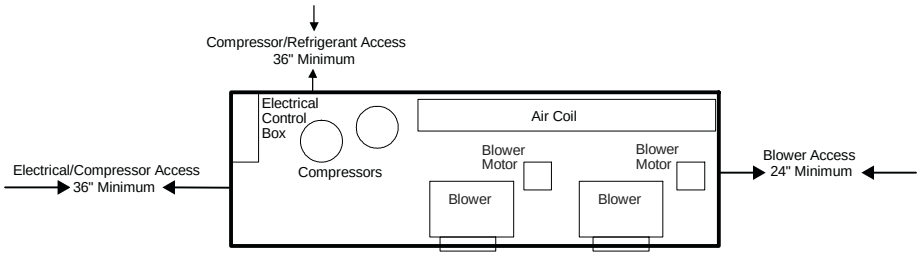
NOTES:
1. All dimensions in inches unless otherwise noted. All dimensions within ± 0.125-in. Specifications subject to change without notice. Condensate connections are 0.75 in. FPT on sizes 072 through 120.
2. Front of unit is side with water and electrical connections.

Dimensions (cont)

50HQP072-150 UNITS SERVICE CLEARANCES

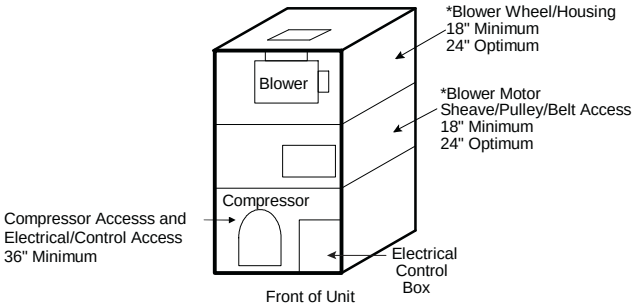


50HQP180-242 UNITS SERVICE CLEARANCES



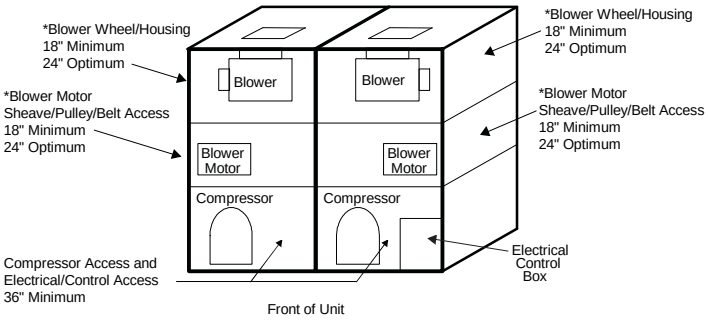
NOTE: The local electric codes may require 36" or more clearance at all electrical control boxes.

50VQP072-181 UNITS SERVICE CLEARANCES



* Blower motor and blower housing access is required on BOTH SIDES of the unit.

50VQP210-360 UNITS SERVICE CLEARANCES



* Blower motor and blower housing access is required on BOTH SIDES of the unit.

Performance Summary For 10 TON

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Unit Parameters

Tag Name: .....**10 TON**
Quantity:..... **1**
Part Number:..... **50VQP120BCN6A1AB**
Unit Size:..... **120 (10 tons)**
Fluid Type: ..... **Water**
Fluid Flow Rate: ..... **30.** gpm
Fluid Pressure Drop: ..... **15.1** ft wg
Altitude:..... **0** ft
External Static Pressure:..... **.15** in wg
Performance Notes .:**Acoustic data is not available for this unit.**.....

Electrical

Voltage:..... **460-3-60** V-Ph-Hz
Neutral wire not required
Compressor Quantity: **2**
Compressor LRA:..... **52.** Amps
Compressor RLA:..... **7.8** Amps
Fan FLA: ..... **3.1** Amps
Total FLA:..... **18.7** Amps
Max fuse amps:..... **25** Amps
Min Circuit Amps: ..... **21** Amps
Min/Max Voltage: ..... **414/506** Volts
Fan Motor:..... **2.0** hp
Fan RPM:..... **651**
Fan BHP: ..... **1.07** BHP

Cooling

Airflow: ..... **4,000.0** CFM
Loop Temp Cooling:..... **86.0** F
Cooling Ent. Air DB Temp: ..... **80.0** F
Cooling Ent. Air WB Temp: ..... **67.0** F
Total Cooling:..... **126.8** MBH
Sensible Cooling: ..... **94.7** MBH
Application Cooling EER: ..... **15.0** Btuh/W
Cooling KW: ..... **7.68** kW
Heat of Rejection:..... **149.3** MBH
Cooling LAT DB: ..... **58.1** F
Cooling LAT WB:..... **56.7** F
Cooling LWT: ..... **96.0** F
ARI/ISO 13256-1 WLHP Cooling: ..... **124.0** MBH
ARI/ISO 13256-1 WLHP EER: ..... **13.2** Btuh/W
ARI/ISO 13256-1 GWHP Cooling:..... **134.0** MBH
ARI/ISO 13256-1 GWHP EER: ..... **18.3** Btuh/W
ARI/ISO 13256-1 GLHP Cooling:..... **127.2** MBH
ARI/ISO 13256-1 GLHP EER:..... **14.7** Btuh/W

Note

"WLHP" = Water Loop Heat Pump (Boiler/Tower)
"GWHP" = Ground Water Heat Pump (Open Loop)
"GLHP" = Ground Loop Heat Pump (Geothermal)
* Application EER and COP are at selection design conditions

Heating

Airflow: ..... **4,000.0** CFM
Loop Temp Heating:..... **68.0** F
Heating Ent. Air DB Temp:..... **68.0** F
Heating LAT: ..... **104.3** F
Total Heating:..... **157.0** MBH
Application Heating COP: **5.0**
Heating KW:..... **9.23** kW
Heat of Absorption: ..... **129.9** MBH
Heating LWT: ..... **59.3** F
ARI/ISO 13256-1 WLHP Heating: ..... **158.0** MBH
ARI/ISO 13256-1 WLHP COP:..... **4.4**
ARI/ISO 13256-1 GWHP Heating: ..... **123.0** MBH
ARI/ISO 13256-1 GWHP COP:..... **3.9**
ARI/ISO 13256-1 GLHP Heating:..... **100.0** MBH
ARI/ISO 13256-1 GLHP COP: **3.2**

Performance Summary For 10 TON

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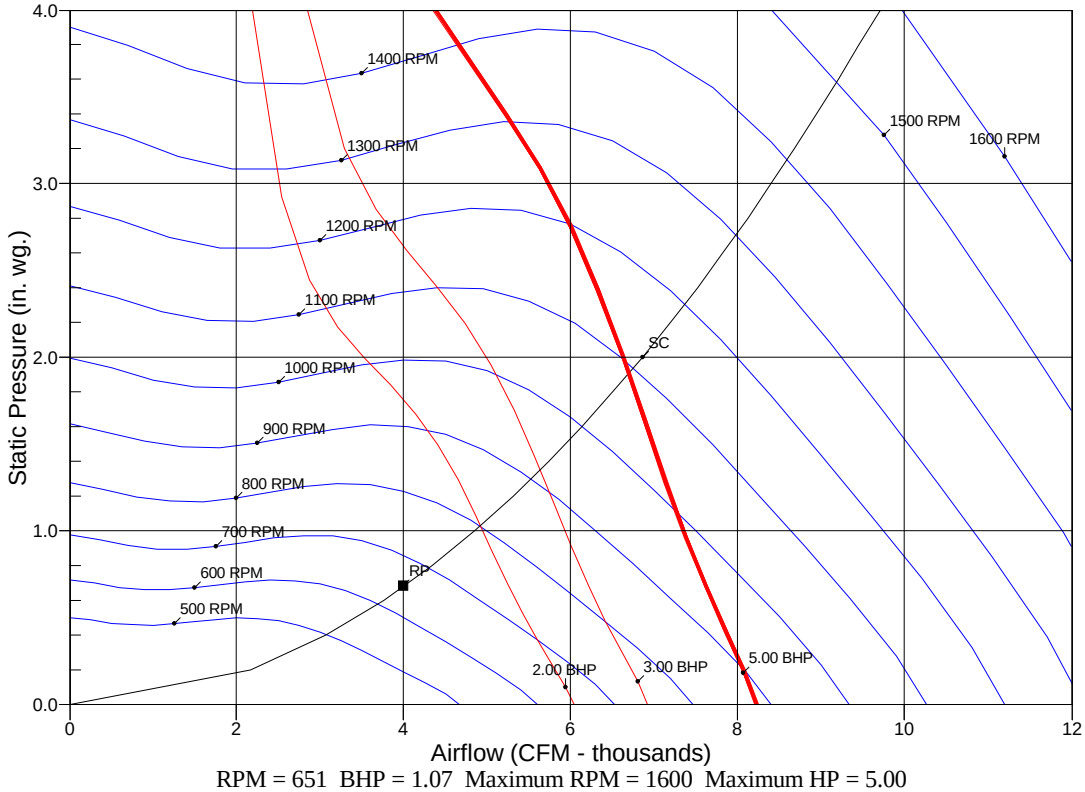
Fan Curve

50VQP/HQP 120-181



RPM = 651 BHP = 1.07 Maximum RPM = 1600 Maximum HP = 5.00

SC - System Curve RP - Rated Point

GUIDE SPECIFICATIONS – 50VQP120BCN6A1AB

HVAC Guide Specifications
Commercial Water Source Heat Pump Units with Puron® Refrigerant (R-410A)

Size: 120

Part 1: General

SYSTEM DESCRIPTION

1.01. Units shall be designed to operate throughout the range of entering fluid temperature 50 to 100 F in the cooling mode and 50 to 80 F in the heating mode. Units shall have an operating range of 50 to 110 F in the cooling mode and 25 to 80 F in the heating mode when equipped with the optional extended range package.

1.02. Units shall be individually packaged with wooden skid covered with protective corner posts and plastic stretch wrapping for maximum protection.

QUALITY ASSURANCE

1.01. Basic unit shall be rated and certified in accordance with AHRI/ISO/ASHRAE (Air-Conditioning, Heating and Refrigeration Institute/International Organization for Standardization/American Society of Heating, Refrigerating, and Air-Conditioning Engineers) Standard 13256-1, latest edition.

1.02. Units shall have insulation and adhesive which meet NFPA (National Fire Protection Association) 90A requirements for flame spread and smoke generation, and assembled units shall be UL (Underwriters Laboratories) listed, US and Canada, and meet UL- 181 standards.

1.03. Units shall be factory tested under normal operating conditions at nominal water flow rates to assure proper operation of all components and safety devices.

Part 2: Product

EQUIPMENT

2.01. Heat Pump Assembly:

A. Factory-tested and assembled single-piece water source heat pump units shall be factory wired, charged with Puron refrigerant (R-410A), contain refrigerant-to-water heat exchanger, refrigerant-to-air heat exchanger, 4-way reversing valve, fan motor assembly, compressor, metering device, and all internal controls and safety devices.

2.02. Unit Cabinet:

A. All water source heat pumps shall be fabricated from heavy-gage sheet metal steel. All interior surfaces shall be lined with 1/2-in thick, multi-density acoustic fiberglass insulation. Insulation within the air-handling section shall not have any exposed edges. All insulation must meet NFPA 90A and be certified to meet the GREENGUARD Indoor Air Quality Standard for Low Emitting Products. One blower access panel and two compressor compartment access panels shall be removable with supply and return air ductwork in place.

B. Cabinets shall have separate holes and knockouts for entrance of line voltage and low voltage control wiring. Supply and return water connections shall be copper FPT fittings and shall be securely mounted flush to the cabinet allowing for connection to a flexible hose without the use of a back-up wrench. Water connections which protrude through the cabinet shall not be allowed.

C. Units shall have the airflow arrangement as shown on the plans. If units with these arrangements are not used, the

contractor supplying the water source heat pumps is responsible for any extra costs incurred by other trades and must submit detailed mechanical drawings showing ductwork requirements and changes or relocation of any other mechanical or electrical system. If other arrangements make servicing difficult the contractor must provide access panels and clear routes to ease service. The architect must approve all changes 10 days prior to bid.

D. All units shall have a factory-installed two-sided filter rack capable of accepting 1-in. filters. Units shall have a 1 in. thick throwaway type fiberglass filter . The filter rack shall incorporate a 1 in. duct flange.

E. All units shall have stainless steel drain pans to comply with this project's IAQ (indoor air quality) requirements. Painted steel or plastic materials shall not be permitted.

2.03. Fan and Motor Assembly:

A. The fan(s) shall be belt driven DWDI forward curved type with dynamically balanced wheel(s). The fan motor(s) shall be 1725 or 3450 rpm 56 frame sealed ball bearing type. The motor(s) shall be permanently lubricated and have thermal overload protection.

B. The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule. External static pressure rating of the unit shall be based on a wet coil. Ratings based on a dry coil shall not be acceptable.

2.04. Heat Exchangers:

A. The finned tube heat exchanger shall be constructed of lanced aluminum fins not exceeding sixteen fins per inch bonded to rifled copper tubes in a staggered pattern and will have a 600 psig working pressure. The heat exchanger shall have aluminum end sheets.

B. Coaxial (tube in tube) refrigerant-to-water heat exchanger. Refrigerant-to-water heat exchangers shall be of cupro-nickel inner water tube and steel outer refrigerant tube design rated to withstand 600 psig working refrigerant pressure and 400 psig working water pressure. Shell and tube style refrigerant to water heat exchangers shall be treated as pressure vessels and shall require refrigerant pressure relief valves piped to the exterior of the building. The contractor supplying the water source heat pumps with shell and tube heat exchangers shall be responsible for any additional installation costs. Brazed plate water-to-refrigerant heat exchangers shall require additional centrifugal separators added to the supply water piping at each unit. Each separator shall have an automated clean out valve piped to a waste line. The contractor supplying water source heat pumps with brazed plate heat exchangers shall be responsible for any additional costs.

2.05. Refrigerant Components:

A. Units shall use R-410A refrigerant. Units that use R-22 refrigerant shall not be allowed. All units shall have a factory sealed and fully charged refrigerant circuit with the following components.

B. Thermostatic expansion valve shall be provided for refrigerant metering.

C. Hermetic Compressor: Hermetic reciprocating or scroll compressors shall be specifically designed for R-410A refrigerant and shall be internally sprung (if reciprocating), externally isolated and with thermal overload protection. Unit compressors shall have rubber isolators to prevent transmission of vibration to the structure.

D. Reversing Valve: Reversing valves shall be four-way solenoid activated refrigerant valves which shall fail to the heating operation should the solenoid fail to function. Reversing valves which fail to the cooling operation shall not be allowed.

2.06. Controls and Safeties:

A. Safety devices on all units shall include low-pressure sensor or loss-of-charge switch, high-pressure switch, low water temperature sensor, and condensate overflow switch.

B. The Complete C electronic control system shall have the following features:

1. Anti-short cycle time delay on compressor operation; time delay shall be 5 minutes minimum.
2. Random start on power-up.
3. Low voltage protection.
4. High voltage protection.
5. Condensate overflow shutdown.
6. Condensate overflow protection: A condensate sensor shall activate the lockout circuit upon sensing a high

level of condensate in the drain pan and immediately put the unit into a hard lockout.

7. Unit shutdown on low or high refrigerant pressures.
8. Unit shutdown on high or low water temperature (selectable for antifreeze solutions).
9. Option to reset unit at thermostat or disconnect.
10. Automatic intelligent reset. Unit shall automatically reset after a safety shutdown and restart the unit after the anti-short cycle timer and random start timer expire. Should a fault reoccur within 60 minutes after reset, then a permanent lockout will occur. Reset attempts shall be selectable for either 2 or 4 tries. Condensate overflow shall put the unit into a hard lockout on the first fault.
11. Ability to defeat time delays for servicing.
12. Light-emitting diode (LED) to indicate high pressure, low pressure, improper voltage, water coil freeze protection, air coil freeze protection, condensate overflow, and control status.
13. Selectable 24-v or pilot duty dry contact alarm output.
14. 24-v output to cycle a motorized water valve with compressor contactor.
15. Freeze Protection. The freeze protection sensor shall be mounted close to the water coil to monitor refrigerant temperature between water coil and the thermal expansion valve or capillary tube. If the refrigerant temperature between the expansion device and water coil drops below or remains at 30 F for 30 seconds, the controller shall shut down the compressor and enter into a soft lockout condition. This trip point can be changed to 15 F by cutting the R17 and R77 resistors located above the DIP switch SW1 for applications that employ antifreeze. The freezestat may not provide protection in the case of loss of flow in the heating mode. A flow switch or pressure differential switch is recommended to prevent unit operation in case of loss of flow.
16. Low pressure switch 120-second bypass timer.
17. Alarm output selectable for constant output for general alarm notification, or pulse output for communication of the specific fault alarm.

2.07. Electrical:

A. A control box shall be located within the unit and shall contain a transformer, controls for the compressor, reversing valve and fan motor operation and shall have a terminal block for low voltage field wiring connections. The transformer shall be rated for a minimum 75 VA.
B. Units shall be nameplated for use with time-delay fuses or HACR (heating, air-conditioning, and refrigeration) circuit breakers.
C. Unit controls shall be 24-volt and provide heating or cooling as required by the remote thermostat.

2.08. Factory-Installed Options:

A. Cupronickel Coils:
   1. Cupronickel coaxial water-to-refrigerant heat exchangers shall be provided, with cupronickel inner water tube construction.
B. Extended Range:
   1. Extended range units shall provide an insulated water circuit for the coaxial coil and refrigerant circuit to prevent condensation, and therefore potential dripping problems, in applications where the entering water temperature is beyond the normal operating range.