



# COMPU-AIRE INC.

*Specialized Environmental Air Conditioning Systems*



## System 2100 & System 2100k

Floor Mount System

6-60 tons



Compu-Aire Inc.. Was established 1980 in fullerton, california usa. Presently, the company is operating from a 45,000 square feet plant in whittier, california, located about 15 miles east of los angeles, california.

Compu-Aire Inc.. Manufactures in excess of 100 different models of specialty air conditioners and heat pumps for data processing, telecommunication, educational facilities, paper and pulp mills, and other critical environmental applications.

Compu-Aire Inc.. Products are sold throughout the world through company trained representatives and has many company owned and operated offices in major metropolitan cities of the world.



# Why choose System 2100?

Compu-Aire Inc. **System 2100** equipment provides our customer's with a wide range of options that are tailored to their unique requirements with a choice of configurations having both standard and custom features.

All computers are highly sensitive to their environment. To function efficiently they require specific temperature, humidity and filtration conditions. Whether your conditioned space is large or small, the precise control of temperature, humidity and particulate contamination is critical. Failure to meet these specified conditions can result in distorted or lost data, even complete shutdown computer services.

To protect the total computer investment, it is essential to select air conditioning equipment specifically designed for computer room conditions. Your environmental control system must be reliable, energy efficient and easy to service. Compu-Aire understands the special environment control needs and has designed a system which will meet these needs with continuous reliable operation.....**System 2100**

Representing the culmination of over two decades of technical innovation, performance enhancement, practical design improvements, and field tested reliability, the **System 2100** line of precision cooling and environmental control systems offers the highest levels of quality and performance in the industry.

Ranging from 8-60 ton capacities, ETL Listed the **System 2100** line offers the system specifier greater design flexibility, unequalled ease of service, and practical design features to provide an ideal operating environment for systems ranging from mini computer rooms to major data center installations.

**System 2100** design provides safe and reliable support for a broad variety of operating environments, in addition to computer rooms.

Typical applications include, but are not limited to:

- Telecommunication Rooms
- Networks and Switching Centers
- Hospital diagnostic stations
- Clean Rooms
- Museums and Archives
- Audio/Video control rooms
- Industrial Process Control Rooms Labs
- Sensitive chemical processing areas

**System 2100** reputation for reliability is legendary—units installed over a decade ago continue to provide safe, predictable protection. **System 2100** not only keeps pace with rapidly changing computer technology, but also offers the highest degree of reliability in component and system operation, for year after year, 24 hours a day, 365 days performance.

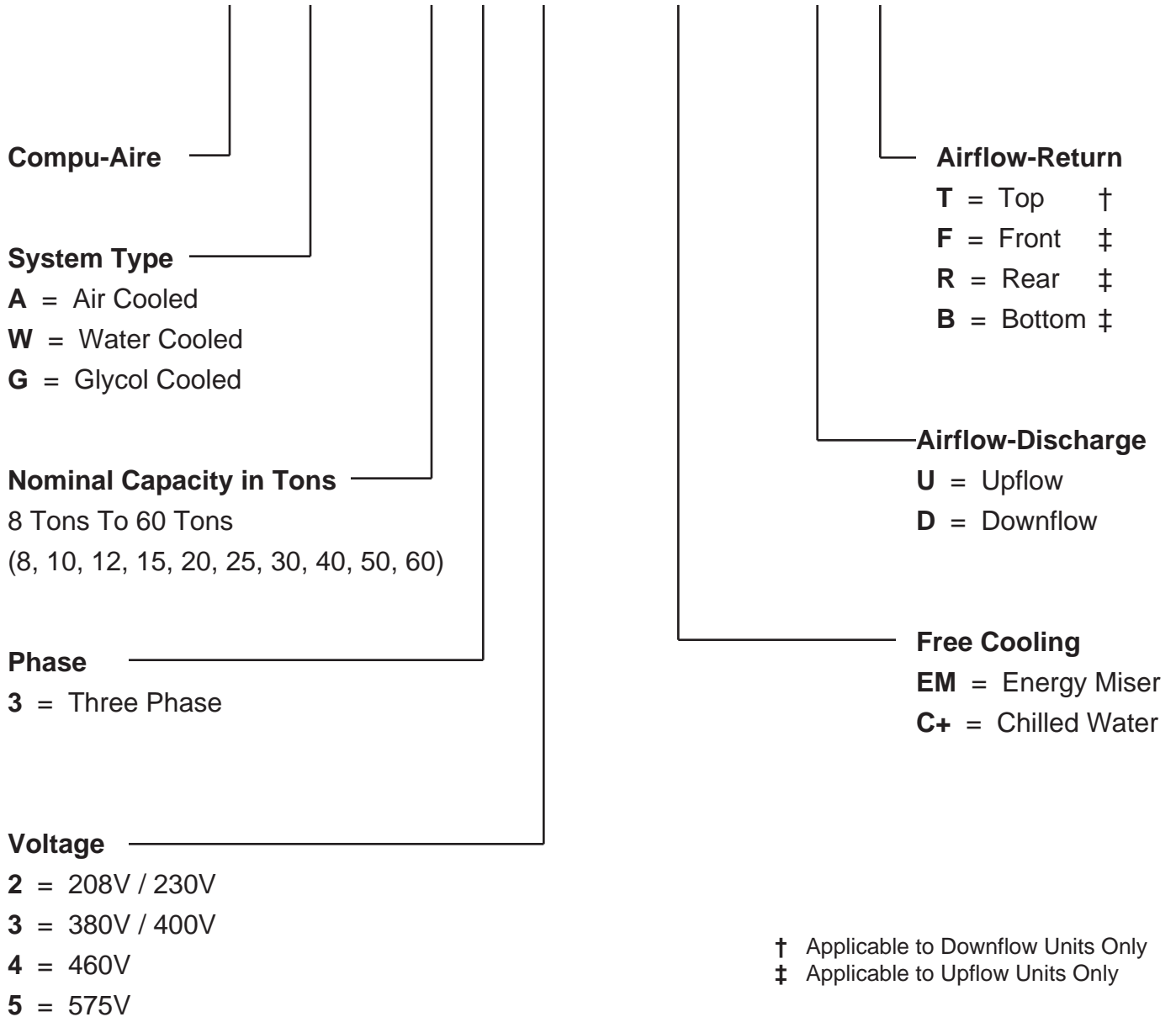
**System 2100** offers you total environmental air protection for your sizable computer investment providing you complete control of critical environments.

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		* Custom Configurations Available, Verify With Factory	

**SYSTEM 2100  
Floor Mount DX Systems**

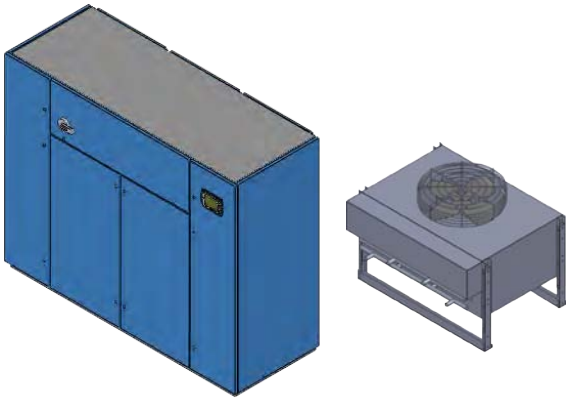
**CA A - 8 3 4 - EM - U F**



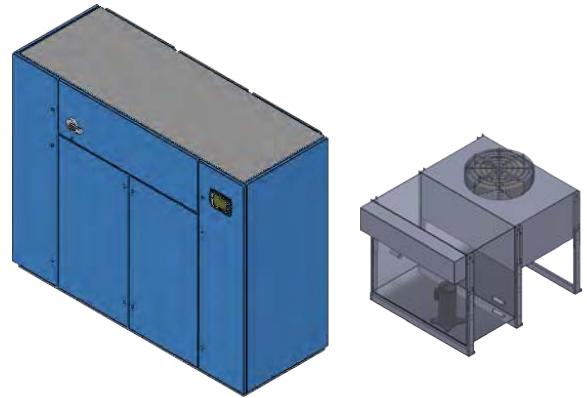
Due to Compu-Aire, Inc. policy of continuous product improvement, we reserve the right to make changes to this product without incurring any obligation

# SYSTEM CONFIGURATION

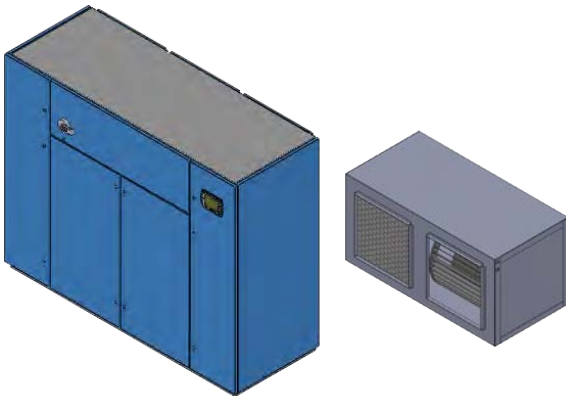
## A. AIR COOLED SYSTEMS



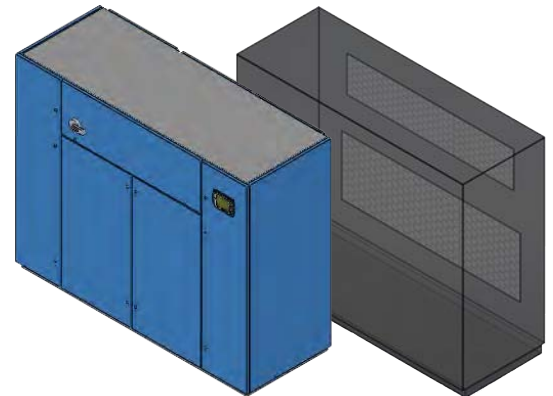
(i) Split DX System With Remote Condenser  
a. Propeller Fan Type-Vertical



(ii) Split DX System With Remote Condensing Unit  
a. Propeller Fan Type-Vertical

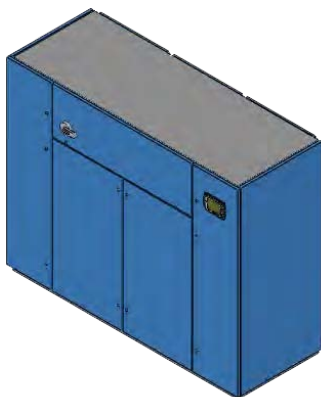


(ii) Split DX System With Remote Condensing Unit  
b. Centrifugal Fan Type-Horizontal



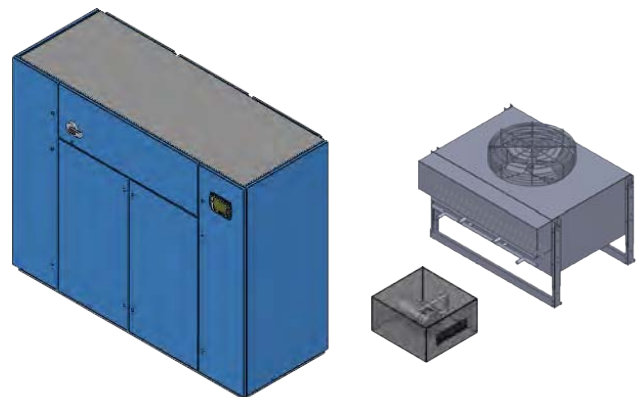
(iii) Packaged DX System  
a. Piggy Back Condenser

## B. WATER COOLED SYSTEMS



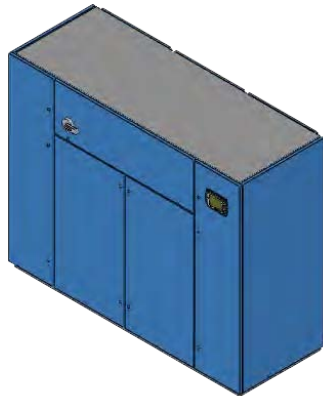
Self-Contained Water Cooled DX System  
Water Source By Others

## C. GLYCOL COOLED SYSTEMS

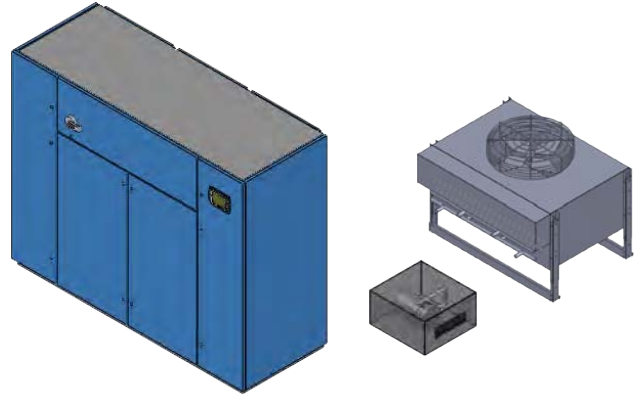


Self-Contained Glycol Cooled DX System  
Remote Dry Fluid Cooler & Pump Package

**D. FREE-COOLING SYSTEMS - WATER SIDE**

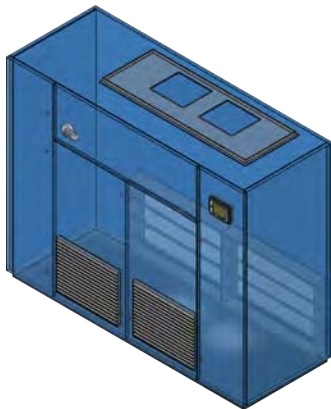


(i) Split Air-Cooled DX + Chilled Water Coil †  
With Remote Condenser

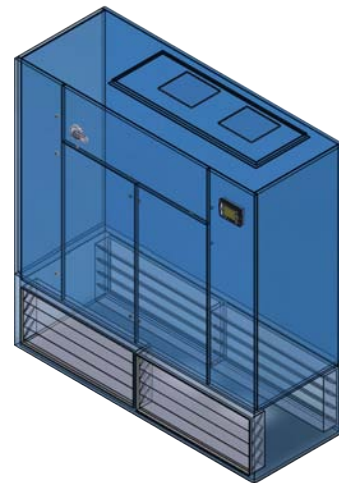


(ii) Glycol Cooled DX + Energy Miser Coil  
Remote Dry Fluid Cooler & Pump Package

**E. FREE-COOLING SYSTEMS - AIR SIDE**



(i) Upflow With Front Return  
With Outside Air Economizer



(ii) Upflow With Bottom Return  
With Outside Air Economizer

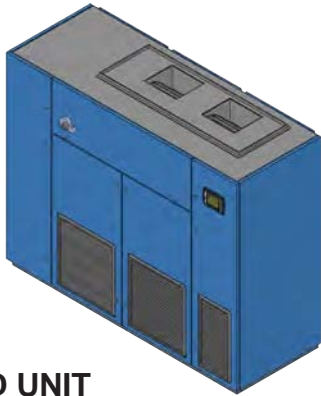


(iii) Downflow With Top Return  
With Outside Air Economizer

† Chilled Water Provided By Others

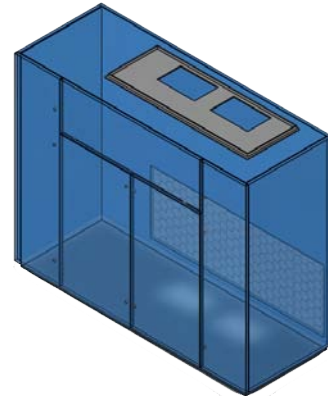
# AIRFLOW CONFIGURATION

## A. UPFLOW

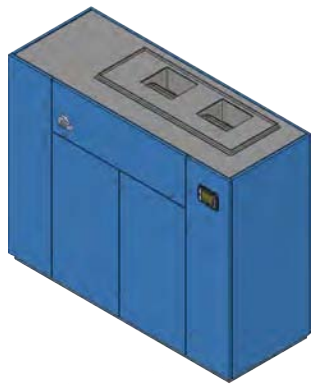


**STANDARD UNIT**

(i) Upflow With Front Return



(ii) Upflow With Rear Return

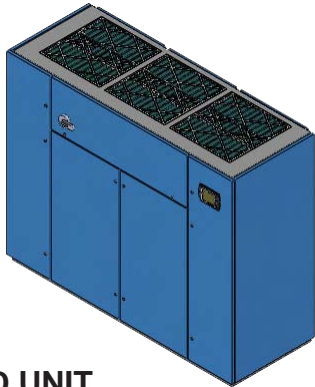


(iii) Upflow With Bottom Return  
Return Thru Raised Floor

Note: See Page 12-13 for  
Cabinet Accessories



**B. DOWNFLOW**

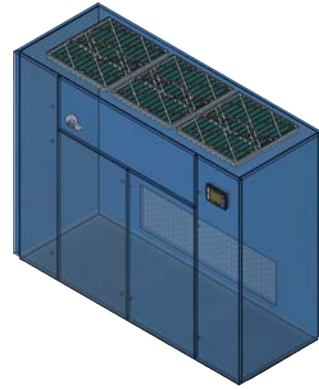


**STANDARD UNIT**

- (i) Downflow With Top Return
  - a. Supply Into Raised Floor



- (i) Downflow With Top Return
  - b. Front Supply Above Floor

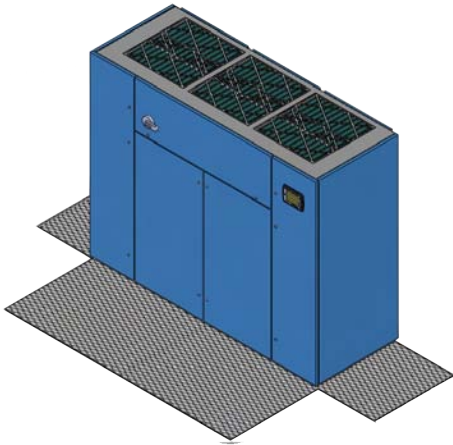


- (i) Downflow With Top Return
  - c. Rear Supply Above Floor

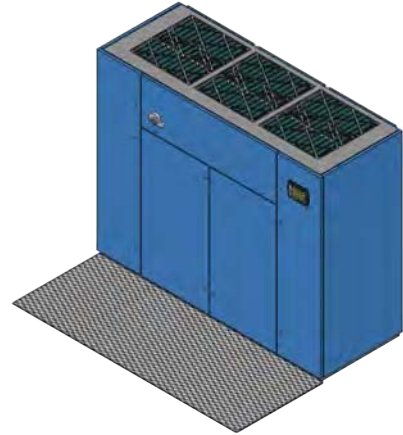
Note: See Page 12-13 for Cabinet Accessories

# ACCESS CONFIGURATION

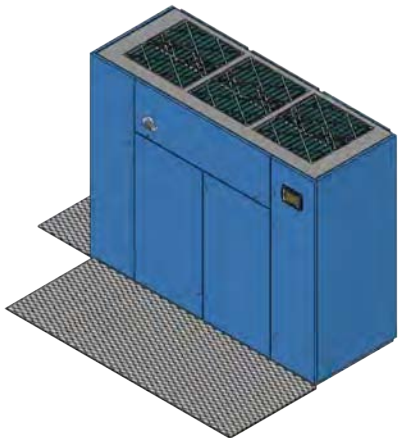
## A. THREE SIDE ACCESS



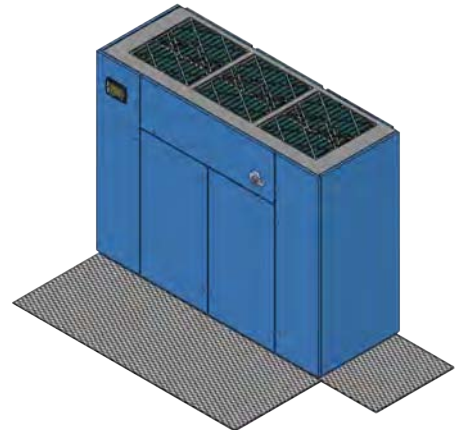
## B. FRONT ACCESS †



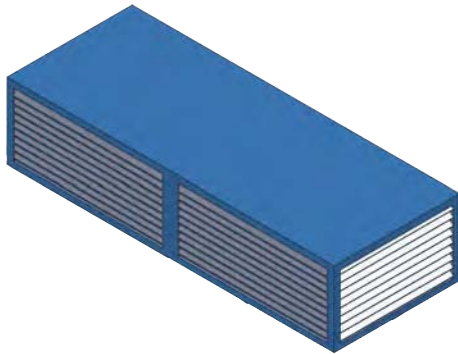
## C. TWO SIDE ACCESS †



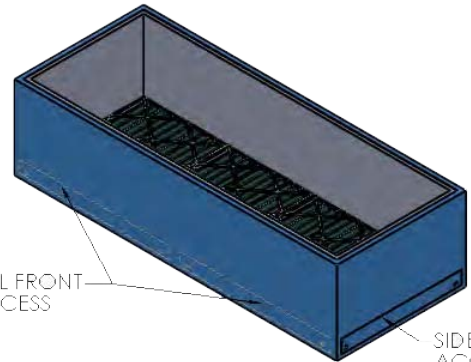
## D. TWO SIDE ACCESS (MIRRORED) †



† Verify System With Factory  
Cabinet Size May Increase



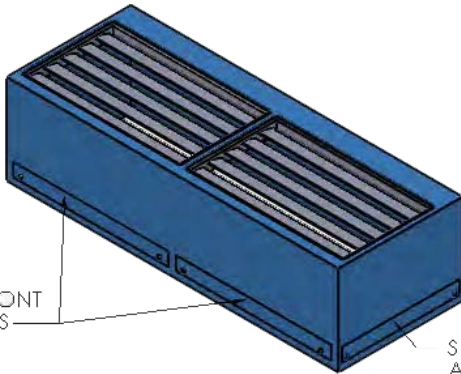
(i) Upflow Supply Plenum With Front Grille  
And Optional Left and/or Right Side Grille



OPTIONAL FRONT  
FILTER ACCESS

SIDE FILTER  
ACCESS

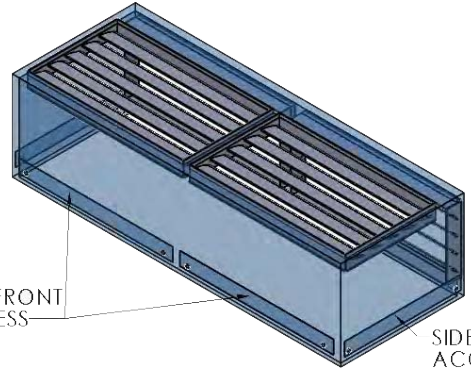
(ii) Top Return Plenum  
a. With Integrated Filter Box



OPTIONAL FRONT  
FILTER ACCESS

SIDE FILTER  
ACCESS

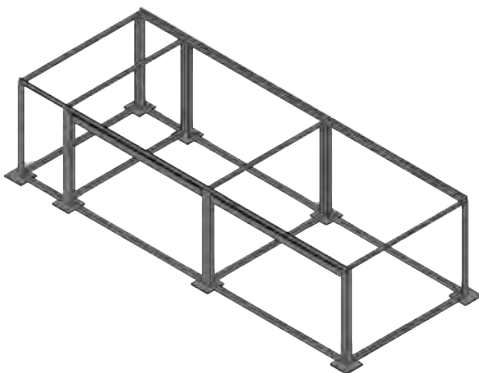
(ii) Top Return Plenum  
b. With Backdraft Damper



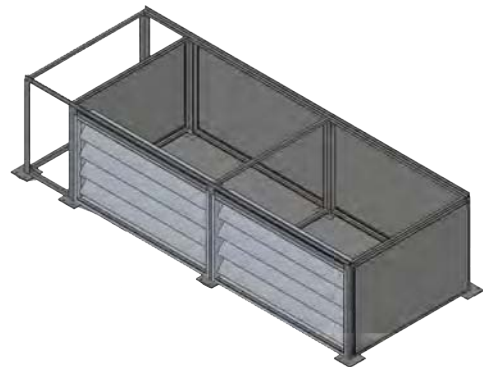
OPTIONAL FRONT  
FILTER ACCESS

SIDE FILTER  
ACCESS

(ii) Top Return Plenum  
c. With Backdraft Damper And Outside Air Damper

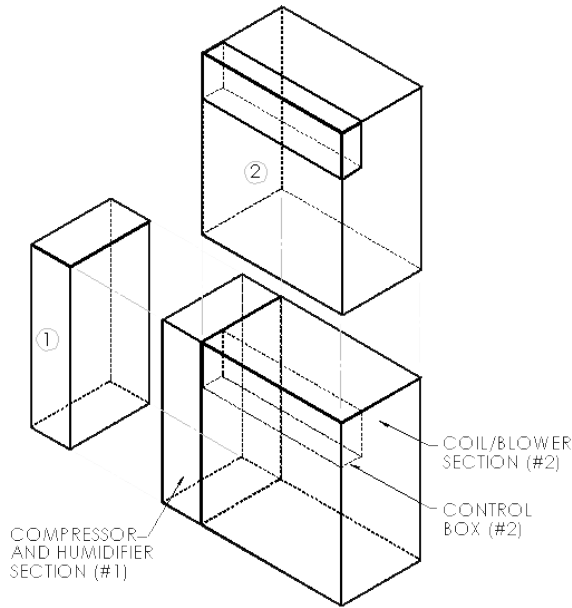


(iii) Floor Stand  
a. Upto Zone IV

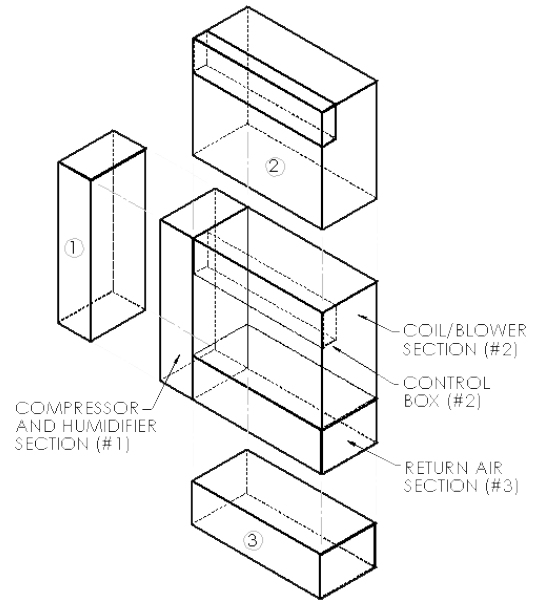


(iii) Floor Stand  
b. With Backdraft Damper

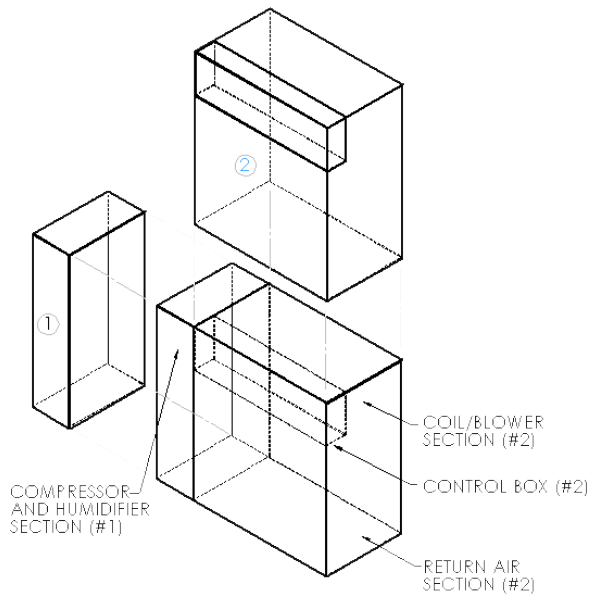
# CABINET ACCESSORIES & OPTIONS



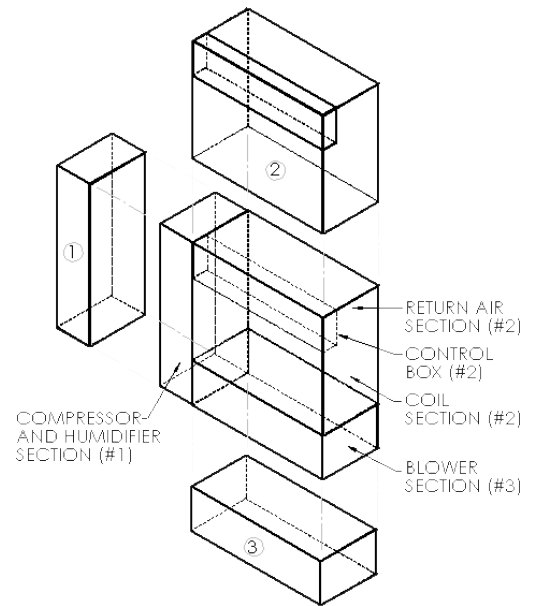
(iv) Split Cabinet - Upflow †  
a. Two Piece Evaporator Section



(iv) Split Cabinet - Upflow †  
b. Three Piece Evaporator Section



(v) Split Cabinet - Downflow †  
a. Two Piece Evaporator Section



(v) Split Cabinet - Downflow †  
b. Three Piece Evaporator Section

† Verify With Factory For Split Cabinet Configuration On Non-Standard Airflow Units

## Standard For All Systems

### CABINET & FRAME

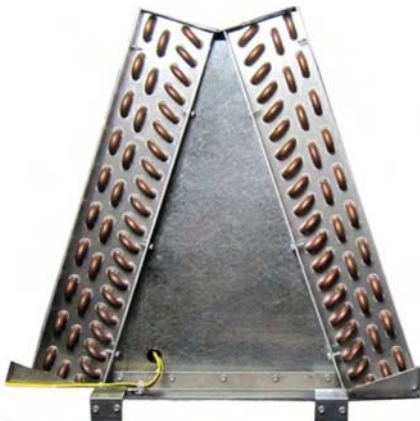
System 2100 frame is constructed of heavy gauge 1.5 square inch heliarc-welded tubular steel for strength and protection. Exterior cabinet front and side access panels are constructed of heavy gauge cold-rolled steel. Access is made easy for servicing, as the cabinet is fitted with captive ¼" fasteners which allow controlled access for service and are positioned to enhance cabinet appearance. Access panels are well-insulated with NFPA 90A rated 1" thick 1.5 lbs. density fiberglass insulation.

The cabinet has decorative front and side panels which can be color coordinated with the decor of the computer room. Standard colors available for the System 2100 are Black, Sky Blue or Cloud White.

### "A" FRAME COIL

System 2100 has two DX cooling circuits provided with high efficiency fins and a larger coil face area. The "A" frame coil is designed to provide the maximum sensible heat ratio as required by the systems application. The larger coil face area and optimized circuit arrangement for both compressor systems not only minimizes the energy consumption but also provides precise control of temperature and humidity. Air bypass is provided to prevent saturated air from being introduced into the controlled space. Air is drawn through both circuits of the coil at low velocity providing effective surface exposure with minimum turbulence.

Every unit is equipped with two drain pans. The primary stainless steel drain pan is provided under each coil. A secondary drain pan is provided at the base of the unit. This provides double protection against any water reaching the sub floor and affecting the computer cables. Each drain pan is piped with a condensate drain outlet.



### AIR BYPASS

The units are equipped with a built-in air bypass (adjustable) to control the maximum relative humidity and limit the temperature variation of the discharge air. Discharge air will not exceed 80% R.H. under all normal computer room operating conditions.

### DUAL COMPRESSOR(S)

Each System 2100 is equipped with two high efficiency Scroll Compressors located in a separate compartment, outside the air stream for ease of service access during unit operation.

The scroll compressors high volumetric efficiency and a constant volume ratio give the scroll compressor an excellent EER rating. Compared to a reciprocating compressor the scroll compressor's capacity, power and current do not fall off as rapidly at high condensing and low suction temperatures.

Scroll compressor can also accommodate liquid slugging, both oil and refrigerant without causing compressor damage. Scroll compressors contain fewer parts resulting in greater reliability. Sound attenuation is also much easier since the dominant sound characteristics are in the higher octave band and the unit enclosure usually is adequate. Vibration in the system is greatly reduced by elimination of the reciprocating masses found in the semi-hermetic compressor.

Each compressor is provided with:

- Built-in thermal overload protection
- Crankcase heaters
- Rotolock valves
- Internal vibration isolation
- Charging and service schraeder ports
- Internal discharge gas vibration eliminator
- External vibration mounting isolation

### DUAL REFRIGERANT CIRCUIT(S)

Each refrigerant circuit is provided with highly efficient refrigeration components.

- Externally equalized expansion valve
- Sight glass with moisture indicator
- Filter drier
- Pump down cycle (air cooled units)
- Schraeder fittings
- Hot gas bypass (when required)
- Suction accumulator when required

## Standard For All Systems

### SAFETY FIRST!

Each compressor system has an automatic reset low pressure switch for loss of refrigerant charge protection and manual reset high pressure switch for high pressure protection. Audio and visual alarms are provided with system shut down in the event of high/low pressure system failure.

Keeping customers and service technicians in mind, all refrigeration components are located out of the air stream enabling the service technician to fully service and analyze the components, while not interrupting conditioned airflow to the controlled indoor environment.

Note: Standard piping access is on the left hand side, when facing the unit. All refrigeration piping will be of refrigerant grade.

### DEHUMIDIFICATION CYCLE

When a System 2100 unit is switched to the dehumidification mode, a call for cooling is energized via the advanced microprocessor and moisture is condensed on the cooling coil. The condensate is then discharged through the primary condensate drain. The reheat provided shall offset sensible cooling during dehumidification and has sufficient capacity to maintain computer room dry bulb conditions.

### ELECTRIC REHEAT

System 2100 standard reheat is provided in multi-stage two, three or four stages. The low-watt density, electrically enclosed elements are surrounded by fin tubular construction elements, thus extending the life of the elements, reducing sheath temperatures and eliminating ionization. Reheat operation is protected by dual temperature limit controls. In the dehumidification mode the system selected has ample reheat capacity to maintain dry-bulb conditions. (See technical data for reheat information on system selected)

### STEAM GENERATING MODULATING HUMIDIFIER-CANISTER TYPE

System 2100 is provided with a pre-piped and pre-wired electronic, electrode self-generating steam type humidifier. The humidifier shall have an adjustable humidity output setting of the full rated humidifier capacity. Furthermore, the total system never allows the leaving relative humidity to exceed 80% so that the threat of condensation beneath the application's floor is eliminated.

The pure steam method eliminates air contaminating mineral deposits and excessive humidity inherent with evaporative or infra-red humidifiers. The steam generator requires no scheduled maintenance and is completely maintenance free. The humidifier has a modulating output control to match its output with humidity requirement signal.



Humidifier shall come standard with an automatic flush cycle that senses the current consumption of the humidifier. The humidifier is equipped with disposable cylinder and an indicator that signals when the canister is to be changed, which insures a reliable and trouble free operation. The humidifier is complete with supply and drain valves, electronic controls and steam distributor.

Vapor produced is piped directly into the bypass air for efficient moisture introduction into the air stream. (See technical data for humidifier information on system selected)

### HIGH VOLTAGE CONTROL PANEL

System 2100 is equipped with a high voltage panel which is easily accessible from the front of the unit and can be accessed for full service without disrupting the air flow. All wiring conforms to National Electrical Code (NEC) and UL 1995 requirements. Electrical components utilized in the control panel are UL Listed and Recognized. Each AC power circuit is individually branch circuit protected on all phases. Each component (humidifier, compressors, motor, electric reheat stage) (if applicable) is provided with a factory mounted and wired definite purpose contactor. The control wiring is 24 VAC low voltage.

The control panel has the following components:

- Disconnect Switch or Power block (if required)
- Relays
- Fuse blocks
- Fuses
- Control transformers
- Microprocessor controller
- Terminal blocks

System 2100 requires a single point main power supply connection.

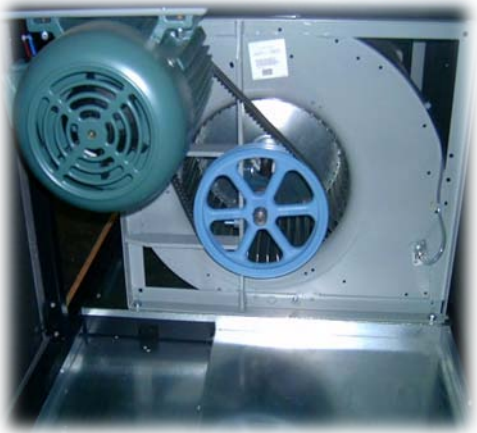
### Standard For All Systems

#### FAN/MOTOR ASSEMBLY

System 2100 features double width, double inlet (DWDI), centrifugal, forward curved blower configuration mounted on a fan deck. The air conditioner is configured for draw-thru air pattern to provide uniform airflow over the entire face area of the coil. Each fan is the centrifugal type with forward curved blades, both dynamically and statically balanced to minimize vibration. The blower(s) operate in the Class-I range, is (are) belt driven, and is (are) rated in accordance with AMCA Standard #210.

The speed of the blowers is adjustable by means of a variable pitch motor pulley. Drive set and belts are sized for 200% of the motor horsepower rating, and are oil and heat resistant and static conducting.

The blower has permanently lubricated ball bearings, with an average life span of 100,000 hours. The blower shaft is cold finished center-less ground heavy-duty steel, treated for rust protection. The steel shaft conforms to ASTM A-108 specifications.



The fan section features the following:

- Permanently lubricated, self-aligning ball bearings
- Dual belt variable pitch drive-Providing adjustable air flow capability to match the load requirements
- Fan deck to minimize vibrations
- Draw through airflow for even air distribution over “A” frame coil, static sealing of the filter section and low internal cabinet pressure losses
- Low noise level fan designed for quiet operation

Motors are high efficiency open drip proof (ODP) type. Motors are mounted on an adjustable slide base with a locking assembly to prevent motor play and have internal overload protection. The motors are 1725 RPM with copper windings, phase isolation and are UL component recognized. The motors have a minimum NEMA service factor of 1.15

#### AIR FLOW SWITCH

System 2100 is equipped with airflow switches that continuously monitor the supply airflow and turn the unit off with alarm in case of loss of airflow. The unit also monitors pressure drop across the air filters and provide dirty filter alarm (indication only). Field calibration is required for dirty filter alarm.

#### FILTER SECTION

System 2100 has standard 2 inch deep, 30% (MERV-8) pleated media high efficiency filters, (based on ASHRAE Std. 52-76). The Filter section is serviceable from the top or either side on down-flow units and from the front or right-hand side on up-flow units.

## Standard For All Systems

### ADVANCED MICROPROCESSOR CONTROL PANEL (MCP) - SYSTEM 2200 PLUS (+3L)

System 2200 Microprocessor +3L represents the top of our range of control boards, and has been designed to satisfy a wide range of applications in the field of specialized air-conditioning for precise temperature & humidity control. The System 2200 +3L is a programmable controller made up of a microprocessor based main board equipped with a set of terminals used to interface the microcontroller board to the controlled devices; such compressors, fans, heaters, humidifiers and valves. The program is retained in a flash based memory and configuration parameters are permanently stored (even in the case of power failure) in a non-volatile memory. The microprocessor features a 16-bit microprocessor and flash memory to ensure greater performance. The high capacity of the flash memory (0 MB expandable up to 0 MB), ensures all the alarm situations, the main value controls (temperature, pressure, & humidity) and the status of the devices controlled (compressors, fans, pumps) can all be saved. The control board is supplied in plastic enclosures that guarantee the high mechanical protection of the board and reduces the risk of electrostatic discharge due to incorrect handling, quick DIN rail mounting means faster assembly and wiring. The technology used on the System 2200 +3L allows connection to some of the more widely used communication standards without requiring an additional gateway.

System 2200 +3L also includes a microprocessor based terminal unit complete with Graphical Touch Screen Display with a built-in navigation keypad and led indicators allowing the users to easily set the controlled parameters for set points, dead bands, alarm thresholds and carry out the main working operations (on/off, displaying controlled variables, printouts). The controller and graphical display terminal are powered by 24VAC power supply using low voltage control transformers from the unit. Connection between the terminal unit and main board is necessary only when programming the basic parameters on the System 2200 +3L. The controller is linked to a graphic display terminal via standard three wire cable.

The graphical touch screen display, has a 4 rows X 40 character, back lit, super-twist liquid crystal display (LCD) panel and control keys for user inputs. The MCP is menu driven with user-friendly prompts for easy operation.

The System 2200 MCP allows user review and programming of temperature and humidity set points, setup selections and alarm parameters. A password is required to make system changes and the system is provided with

internal-diagnostics. The microprocessor controller runs the diagnostics and the analysis is displayed on the graphical interface including all component failure alarms.

Inputs for temperature, humidity and time delay are displayed on the LCD. The MCP provides monitoring of room conditions, operational status, component run times, date and time, and 2 analog inputs from field sensors provided by others.

System 2200 MCP control system allows programming of:

- Temperature set point (40°F to 85°F)
- Temperature sensitivity (+1°F to 9.9°F in 0.1°F increments)
- Humidity set point (20% to 80% RH)
- Humidity sensitivity (+1% to 30% RH)

All set points are adjustable from the unit front panel. Temperature and humidity sensors are capable of being calibrated from the front panel.

System 2200 Microprocessor provides the user with two control types: Proportional (P) and Proportional Integral (PI). Proportional uses set points and band to control the system and Proportional Integral is time selective.



### Support System

The microprocessor is equipped with a non-volatile memory to permanently maintain programmed parameters, in case of power interruption.

### Standard Features

- Stand alone panel
- Smooth keyboard type switches with tactile feedback
- Two (2) analog inputs
- Non-volatile memory
- Data of unit and room conditions
- System trending
- Forward & back-up menu access
- Customized control capability



## Standard For All Systems

### Protective & Safety Features

- Watch-dog timer
- Multi-Level password access
- Two remote alarms
- Manual diagnostics\*
- Adjustable alarm limits
- Alarm displayed in order of occurrence
- Compressor short cycle
- Start time delay
- Programmable automatic restart
- Coil temperature high/low alarm set points\*
- Water in/out alarm set point\*
- Fire-stat safety

### Automatic Control Functions

- Compressor short cycle control
- System auto or manual restart
- Sequential load activation
- Common alarm relay
- Compressor lead/lag
- Schedule on/off control\*

### Compressor Short-Cycle Control

Prevents compressor short cycling by field adjustable 3-minute minimum on/off timer.

### System Auto-Restart

For start-up after failure automatic restart is provided with a field adjustable delay up to 60 seconds in 1-second increments.

### Sequential Load Activation

After power failure, or during start-up, the microprocessor panel will sequence operational load activation.

### Common Alarm

System 2200 Microprocessor is field programmable to interface with user-selected alarms with a remote alarm device.

### Automatic Compressor Sequencing

Automatically change the lead/lag sequence of the compressors after selected cycle time for equal compressor usage.

### Programmable Functions

- Temperature set point (65 -85°F/18.3 -29.4°C)
- Temperature sensitivity (1 -5°F, °C in 0.1 Increments)
- Humidity set point (40-60%)
- Humidity sensitivity (1-10% RH in 0.1% Increments)
- Temperature alarm points
- Humidity alarm points

- Unit Stage time delay
- Inter-stage time delay
- Discharge alarm points\*
- Outside humidity/temperature set points
- Water voltage range from 0-100 VDC
- Audio alarm
- Restart mode (0-60 seconds)
- Fire-stat tripped ( fixed at 1000°F)
- Discharge set points\*



### Monitored And Displayed Functions

- Current temperature (degree F/C)
- Current humidity (% RH)
- Cooling 1, 2
- Heating stages 1, 2, 3, 4
- Humidification
- Chilled water flow
- Dehumidification
- Run times for blower, compressors, reheat elements, humidifier, dehumidification
- Two (2) Analog Inputs for customer supplied sensors
- Econo-coil %

### Switch Functions

- System on/off switch
- Menu select button (up/down)
- Alarm silence/program button
- Exit menu key (up/down)
- Edit menu key (up/down)

## Standard For All Systems

### Standard Alarms

Activates a visual and audible alarm in the event of any of the following malfunction conditions:

- Room over temperature
- Room under temperature
- Room over humidity
- Room under humidity
- No air flow
- Change filters
- Fire-stat tripped
- Low voltage alarm
- Temperature sensor failure
- Humidity sensor failure
- Power failure restart
- Compressor short cycle
- Compressor high pressure 1, 2
- Selectable alarm outputs
- Compressor low pressure 1, 2
- Coil high/low temperature \*
- No water flow (differential pressure +/- 10) \*
- High/low water in temperature \*
- High/low water out temperature \*
- High limit heaters

### Firestat

Firestat is programmed within the microprocessor. When return air temperature exceeds 100°F it immediately de-energizes the system and displays an alarm condition. Required by electrical code in certain localities.

### Optional Alarms

- Under floor leak detected
- Smoke alarm
- Fan motor overload
- Discharge sensor failure
- Manual override

### Custom Alarms

Each alarm can be field programmed to be enabled or disabled, selected to activate the common alarm.

- Humidifier failure
- 2nd Alarm relay to select a specific alarm to close or open this relay
- Water flow
- Stand by pump alarm
- Defrost coil alarm

**\* For features requiring optional/ custom sensors or components, contact factory for a detailed analysis of your requirements.**

## Air Cooled System Standard Features

### **AIR COOLED CONDENSER (ACC)**

Remote air-cooled condenser is a low profile design constructed of corrosion resistant aluminum. The condenser cabinet houses the condenser coil, controls, fan(s) and fan motor(s) (compressors are located within the evaporator section). Air-cooled condenser utilizes multiple direct drive propeller fans and dual refrigeration circuits. The condenser coil is constructed of copper tube and high efficiency aluminum fin. A factory wired control panel is provided in a weatherproof housing on the air-cooled condenser. Control panel includes control transformer, motor contactor(s), and variable fan speed controller. Standard air cooled condensers are sized to provide the total heat of rejection at 95°F ambient temperature at sea level. Air-cooled condensers are rated for higher/lower ambient temperatures and/or higher altitudes.

***See Air Cooled Condenser Engineering Manual For Additional Information.***

### **LOW AMBIENT CONTROL**

Low ambient control system features a variable speed motor specially designed to be used in conjunction with a solid-state speed controller. The speed controller senses the head pressure of both compressors and varies the speed of the lead fan to maintain constant condensing temperature. Additional fan motors are controlled by ambient sensitive thermostats. This low ambient control allows system operation as low as -20°F ambient temperatures.

***See Air Cooled Condenser Engineering Manual For Additional Information.***

## Air Cooled System Optional Features

### LOW AMBIENT CONTROL FOR AMBIENT UPTO -30°F

Combination fan control/limitizer head pressure control with flooded receivers is provided for each refrigeration circuit. Air-cooled condenser shall be provided with factory installed and pre-piped head pressure control valve for each refrigeration system. Heated and insulated liquid receivers are provided in a separate enclosure for field installation near the condenser. Receivers to be field wired to the condenser control panel. (Equivalent refrigeration line runs between indoor unit and condenser unit is required. Consult factory for more detail)

### AIR COOLED CONDENSER-LOW NOISE (ACC-LN)

Remote air-cooled condenser is a low profile design constructed of corrosion resistant aluminum. The condenser cabinet houses the condenser coil, controls, fan(s) and fan motor(s) (compressor is located within the evaporator section). Air-cooled condenser utilizes multiple direct drive propeller fans and dual refrigeration circuits. The condenser coil is constructed of copper tube and high efficiency aluminum fin. A factory wired control panel is provided in a weatherproof housing on the air-cooled condenser. Control panel shall include control transformer, motor contactor(s), and variable fan speed controller. Standard air cooled condensers are sized to provide the total heat of rejection at 95°F ambient temperature at sea level. Air cooled condensers can be rated for higher/lower ambient temperatures and/or higher altitudes.

### CENTRIFUGAL FAN TYPE AIR COOLED CONDENSER (ACCB)

Recommended for indoor and outdoor use where quiet operation is desirable. Accommodates itself to installations, which are unsuitable for a direct drive propeller fan type air-cooled condenser. Allows for ducted intake and discharge. The air-cooled condenser (ACCB) is a self-contained unit with front air discharge designed for indoor installation. The ACCB is equipped with DWDI centrifugal fan, belt driven motor and permanent lubricated ball bearing. The system has a total heat rejection capacity as shown in the technical data sheet.

### PIGGY-BACK AIR COOLED CONDENSER (ACC-PB)

Recommended for high-rise building applications, where the use of a standard propeller fan type air cooled condenser is not practical. ACC-PB is Vertical standing type air cooled condenser for indoor use.

ACC-PB frame is constructed of heavy-gauge 1.5 square inch heli-arc-welded tubular steel for strength and protection. Exterior cabinet front and side access panels shall be constructed of heavy gauge cold-rolled steel manufactured in the USA. Access is made easy for servicing, as the cabinet is fitted with captive ¼" fasteners which allow controlled access for service and are positioned to enhance cabinet appearance. The cabinet has decorative front and side panels which can be color coordinated with the decor of the evaporator section.

ACC-PB features double width, double inlet (DWDI), centrifugal, forward curved blower configuration mounted on a fan deck. The air-cooled condenser is configured for draw-thru air pattern to provide uniform airflow over the entire face area of the coil. Each fan is the centrifugal type with forward curved blades, both dynamically and statically balanced to minimize vibration. The blower(s) shall operate in the Class-I range, shall be belt driven, and rated in accordance with AMCA Standard #210. The speed of the blowers shall be adjustable by means of a variable pitch motor pulley. Belts shall be sized for 200% of the motor horsepower rating, and shall be oil and heat resistant and static conducting.

The blower has permanently lubricated ball bearings, with an average life span of 100,000 hours. The blower shaft is cold finished center-less ground heavy-duty steel, treated for rust protection. The shaft shall conform to ASTM A-108 specifications.

Motors are high efficiency open drip proof (ODP) type. Motors are mounted on an adjustable slide base with a locking assembly to prevent motor play and have internal overload protection. The motor is 1725 RPM and will have copper windings, phase isolation and is UL component recognized. The motors shall have a minimum NEMA service factor of 1.15

## Water Cooled System Standard Features

### **CO-AXIAL WATER CONDENSER(s)**

Each evaporator refrigerant circuit shall be provided with a factory installed single pass water-cooled condenser(s). Condensers are of the heavy duty, tube-in-tube co-axial counter flow type. The co-axial condenser(s) are constructed of longitudinal, spirally-wound applied fins with an outer tube serving as a shell. Longitudinal fins assure maximum heat transfer with low pressure drop for efficient heat transfer. Spirally-wound fins give free passage for condensing fluids.

### **WATER REGULATING VALVE(s)**

Each refrigerant circuit is provided with a factory installed head pressure operated two (2) way water regulating valve rated for 150 psig. Valves accurately control the condensing temperature for varying entering water temperatures thus automatically controlling each circuit's head pressure.

(Optional higher rated psig valves available)

## Water Cooled System Optional Features

### **CLEANABLE CONDENSERS - SHELL & TUBE**

Each refrigerant circuit is provided with individual glycol/water cooled condenser. The glycol/water cooled condensers are of heavy duty, shell and tube, counter-flow type with removable heads. Constructed of cupra-nickel with cast iron heads, mechanically cleanable. The shell sides of the condensers act as a receiver and holds refrigerant charge during pump down. Condenser is ASME rated for a maximum refrigerant pressure of 400 psig.

### **THREE (3) WAY WATER REGULATING VALVE**

Each condenser circuit is provided with a factory piped three-way water-regulating valve, which allows for a constant pump operation.

### **HIGH PRESSURE WATER REGULATING VALVE**

Available where a waterside pressure exceeds 150 psig. Good up to 300 psig.

### **WATER FLOW SWITCH (INDOOR UNITS ONLY)**

For installation requiring indication of flow interruption. The pressure differential switch is installed and piped within system.

## Glycol Cooled System Standard Features

### CO-AXIAL WATER CONDENSER(S)

Each evaporator refrigerant circuit shall be provided with a factory installed single pass water-cooled condenser(s). Condensers are of the heavy duty, tube-in-tube co-axial counter flow type. The co-axial condenser(s) are constructed of longitudinal, spirally-wound applied fins with an outer tube serving as a shell. Longitudinal fins assure maximum heat transfer with low pressure drop for efficient heat transfer. Spirally-wound fins give free passage for condensing fluids.

### WATER REGULATING VALVE(S)

Each refrigerant circuit is provided with a factory installed head pressure operated two (2) way water regulating valve rated for 150 psig. Valves accurately control the condensing temperature for varying entering water temperatures thus automatically controlling each circuit's head pressure.

(Optional higher rated psig valves available)

### DRY FLUID COOLER (DFC)

The remote dry fluid cooler is low profile design constructed of aluminum housing with copper tube and high efficiency aluminum fin coil. It has multiple direct drive propeller fans. All fans are sized to maximum energy efficiency, minimum noise, and are individually balanced to minimize vibration. Motors on the dry fluid cooler shall have built in thermal protection. Motor assemblies are supported in all-welded, heavy gauge wire support structures. The wire structures shall be zinc-chromate coated for corrosion protection. A factory installed and wired control panel is provided in weather proof housing on the dry fluid cooler.

### GLYCOL/ WATER CIRCULATING PUMP PACKAGE

The pump package will include pump starter, aqua-stats, and fan cycling contactor(s) to control the condenser glycol/water temperature. The pump package will include a close coupled, industrial duty pump with heavy-duty ball bearings motors, stainless steel shafts and bronze fitted construction 3,500 RPM centrifugal circulating pump close-coupled to a NEMA standard electric motor is provided for field mounting and piping. (1750-RPM pumps available, consult factory). The control panel will be factory provided for field installation in a weatherproof box provided on the dry fluid cooler. Pump package will be electrically interfaced with each dry fluid cooler and indoor evaporator via a 24-Vac low voltage connection. Separate power supply is required (provided by others).

## Glycol Cooled System Optional Features

### CLEANABLE CONDENSERS - SHELL & TUBE

Each refrigerant circuit is provided with individual glycol/water cooled condenser. The glycol/water cooled condensers are of heavy duty, shell and tube, counter-flow type with removable heads. Constructed of cupra-nickel with cast iron heads, mechanically cleanable. The shell sides of the condensers act as a receiver and hold refrigerant charge during pump down. Condenser is ASME rated for a maximum refrigerant pressure of 400 psig.

### THREE (3) WAY WATER (GLYCOL) REGULATING VALVE

Each Condenser circuit is provided with a factory piped three (3) way pressure actuated glycol-regulating valve rated at 150 psig, which allows for a constant pump operation. The water regulating valve shall assure proper head pressure regardless of glycol temperature and pressure.

### HIGH PRESSURE WATER REGULATING VALVE

Available where a waterside pressure exceeds 150 psig. Good up to 300 psig.

### WATER FLOW SWITCH (INDOOR UNITS ONLY)

For installation requiring indication of flow interruption. The pressure differential switch is installed and piped within system.

### DUAL PUMP PACKAGE

Providing redundancy to avoid any pump failure and to keep your system continuously operating dual pump package includes two pumps, pressure differential switch, lead-lag switch and control box containing auto-change over controls are factory provided for field installation. The dual pump package includes close-coupled, industrial duty pumps with heavy-duty ball bearings motors, stainless steel shafts and bronze fitted construction. The pump package will include pump starters, aqua-stats, and fan cycling contactor(s) to control the condenser glycol temperature. The Pressure Differential (No Water Flow) Switch will sense the loss of flow, should the lead pump fail and automatically command the standby pump to start. Differential pressure switch is provided for field installation. The control panel is factory provided in a weatherproof box provided on the Dry Fluid Cooler. Dual pump package is electrically interfaced with each dry fluid cooler and indoor evaporator via a 24-Vac low voltage connection. Dual pump piping and wiring are field done by others.

## Glycol Cooled System Optional Features

### DUAL PUMP ENCLOSURE

Dual pumps are protected with a base and complete vented weather enclosure from the ambient conditions. Enclosure is constructed of galvanized steel supported by factory-mounted rails. Enclosure can be color coordinated with the decor of the roof. Dual pumps are factory mounted in the enclosure ready for field piping and wiring.

### STAND BY PUMP ON ALARM CONTACT CLOSURE

If water flow is lost, the pump auto-change over controller will energize the backup pump and factory wired contact closure will send an alarm to the unit's microprocessor. On pump change over audible alarm shall sound at the indoor unit and a message "Stand-By Pump On" will be displayed on the unit's MCP.

### SINGLE PUMP ENCLOSURE

Pump package is protected with a base and complete vented weather enclosure from the ambient conditions. Enclosure is constructed of galvanized steel supported by factory-mounted rails. Enclosure can be color coordinated with the decor of the roof. Dual pumps are factory mounted in the enclosure ready for field piping and wiring.

### EXPANSION TANK

7.5 or 15 gallon tanks are available for field installation.

### DRY FLUID COOLER-LOW NOISE (DFC-LN)

The remote dry fluid cooler is low profile design constructed of aluminum housing with copper tube and high efficiency aluminum fin coil. It has multiple direct drive propeller fans. All fans are sized to maximum energy efficiency, minimum noise, and are individually balanced to minimize vibration. Motors on the Dry Fluid Cooler have built in thermal protection. Motor assemblies are supported in all-welded, heavy gauge wire support structures. The wire structures are zinc-chromate coated for corrosion protection. A factory installed and wired control panel is provided in weather proof housing on the dry fluid cooler.

### CENTRIFUGAL TYPE DRY FLUID COOLER (DFCB)

Recommended for indoor and outdoor use where quiet operation is desirable. Accommodates itself to installations, which are unsuitable for a direct drive propeller type dry fluid cooler. Allows for ducted intake and discharge. The dry fluid cooler is a self-contained unit with front air discharge designed for indoor installation. DFCB is equipped with DWDI centrifugal fan, belt driven motor and permanent lubricated ball bearing. The system has a total heat rejection capacity as shown in the technical data sheet.

## Glycol Cooled System Optional Features

### PIGGYBACK DRY FLUID COOLER (DFC-PB)

Recommended for high-rise building applications, where the use of propeller fan type dry fluid cooler is not practical. DFC-PB is a vertical standing type dry fluid cooler for indoor use.

DFC-PB frame is constructed of heavy gauge 1.5 square inch heli-arc-welded tubular steel for strength and protection. Exterior cabinet front and side access panels are constructed of heavy gauge cold-rolled steel manufactured in the USA. Access is made easy for servicing, as the cabinet is fitted with captive ¼" fasteners which allow controlled access for service and are positioned to enhance cabinet appearance. The cabinet has decorative front and side panels which can be color coordinated with the decor of the evaporator section.

DFC-PB features double width, double inlet (DWDI), centrifugal, forward curved blower configuration mounted on a fan deck. The air conditioner is configured for draw-thru air pattern to provide uniform airflow over the entire face area of the coil. Each fan is the centrifugal type with forward curved blades, both dynamically and statically balanced to minimize vibration.

The blower(s) will operate in the Class-I range, will be belt driven, and rated in accordance with AMCA Standard #210. The speed of the blower will be adjustable by means of a variable pitch motor pulley. Belts are sized for 200% of the motor horsepower rating, and are oil and heat resistant and static conducting. The blower has permanently lubricated ball bearings, with an average life span of 100,000 hours. The blower shaft is cold finished center-less ground heavy-duty steel, treated for rust protection. The shaft conforms to ASTM A-108 specifications.

Motors are high efficiency open drip proof (ODP) type. Motors are mounted on an adjustable slide base with a locking assembly to prevent motor play and have internal overload protection. The motor is 1725 RPM and has copper windings, phase isolation and is UL component recognized. The motor has a minimum NEMA service factor of 1.15.

## Free Cooling - Dual Coil DX-Chilled Water System Standard Features

Combo "C" Plus units are specifically designed for chilled water applications where mechanical cooling is required as back-up or is operated during off hours or weekends. Chilled Water Plus C+ systems can be integrated with Air Cooled, Water Cooled or Glycol Cooled Systems. This type of equipped also offers stand-by capability.

Design of this type of equipment is similar to the energy miser. The chilled water coils are adequately sized so as to provide identical cooling capacity obtained during the refrigeration cycle with both compressors operating. Combo "C" Plus units are internally piped and wired to automatically change over to the direct expansion system when chilled water cooling or flow is interrupted for any reason.

### CHILLED WATER COIL

The CW Coil shall be "A" frame and have face area as listed in the technical data sheet.

The prime surface shall be seamless copper tubes with aluminum fins. Return bends shall be made of seamless copper tube. Coils are tested at 250 psig. Coils are rated in accordance with ARI Standard 420.

Fins are aluminum plate type, die formed fin design to provide optimum strength and turbulence for maximum peak performance without objectionable high-pressure drop.

The chilled water cooling coil is designed to provide totally sensible cooling.

### MODULATING CHILLED WATER CONTROL VALVE

Unit shall be provided with factory piped and wired three (3) way modulating chilled water control valve. Valves shall accurately control the system's head pressure for varying entering water temperatures, thus automatically controlling each circuit's head pressure. During the chilled water cooling mode the microprocessor controller shall modulate the CW Valve as per the cooling requirement. (Optional higher pressure rated valves are available)

## Free Cooling - Dual Coil Glycol Cooled Energy Miser System Standard Features

Compu-Aire Energy Miser system EM is integrated with Glycol Cooled System 2100. At entering glycol temperatures of 45°F and below, the Energy Miser EM system can provide total system capacity, thereby resulting in substantial reduction in operating costs.

During free cooling mode when cooling is required, the microprocessor control panel signals a three-way free cooling valve to energize and the glycol/water solution is diverted to the free cooling coil thereby providing the necessary cooling at a fraction of the cost. The compressors remain off until needed. "Ramp" simultaneous cooling is allowed.

### FREE COOLING COIL

Free cooling is located at the downstream side of the direct expansion coil. The free cooling coil is properly sized so as to provide the identical cooling capacity obtained during the refrigeration cycle with both compressors operating. The coil shall be "A" frame and have face area as listed in the technical data sheet.

The prime surface is seamless copper tubes with aluminum fins. Return bends are made of seamless copper tube. Coils are tested at 250 psig. Coils are rated in accordance with ARI Standard 420.

Fins are aluminum plate type, die formed fin design to provide optimum strength and turbulence for maximum peak performance without objectionable high pressure drop.

The free cooling coil is designed to provide total sensible cooling.

### THREE (3) WAY MODULATING WATER VALVE

A three (3) way modulating water-cooling control valve rated for 150 psig are factory installed. Valves shall accurately control the condensing temperature for varying entering water temperatures, thus automatically controlling each circuit's head pressure. The microprocessor controller modulates the valve as per the cooling requirement.



## Optional For All Systems

### AIRFLOW CONFIGURATION

#### **Upflow with Front Return & Top Supply**

Up-flow version of the unit is available for installations where raised computer floors are not required and/or not available. The unit can be provided with a duct flange for ducted supply air distribution. Designed for in-the-space applications, where utilizing ductwork is practical. Return air entering through front grille and filters, conditioned air leaving through duct connection at top of unit.

#### **Upflow with Rear Return & Top Supply**

Designed for use in out-of-space applications where return air entering through duct collar mounted on unit rear panel, conditioned air leaving through duct connection at top of unit.

#### **Upflow with Plenum & Front Return**

Up-flow version of the unit is available for installations where computer floors are not required and/or not available. The unit is provided with an air distribution discharge plenum with front supply grille, designed for in-the-space applications, where utilizing ductwork is not practical.

Supply Air Plenum is constructed of heavy gauge reinforced furniture grade steel panels and shall be insulated with 1", 1-1/2lb., density insulation. It is painted to match the unit color. Plenum height shall be 20" or as required. Supply Air Grilles on Front.  
(Optional left and/or right side(s) are available)

#### **Upflow with Bottom Return & Top Supply**

Designed for use in-the-space applications where return air shall come from the bottom of the computer room raised floor, conditioned air leaving through duct connection at top of unit. The unit is provided with an air distribution discharge plenum or can be ducted.

#### **Downflow with Rear Supply & Top Return**

Engineered for a typically computer room in-the-space application, with return air entering through filters at top, and conditioned air leaving through bottom rear. The fan housing is rotated to provide supply air to the rear.

#### **Downflow with Plenum Supply & Top Return**

Downflow version of the unit is available for installations where raised floors are not required and/or not available. The unit can be provided with a supply air distribution plenum where the unit sits on floor stand covered by supply air plenum. Designed for in-the-space applications.

Supply Air Plenum is constructed of heavy gauge reinforced furniture grade steel panels and is insulated with 1", 1-1/2lb., density insulation. It is painted to match the unit color. Supply air grilles on front.  
(Floor stand is required)

## Optional For All Systems

### SPLIT CABINET

#### Two (2) Piece Split Cabinet

The unit is split in two pieces for ease of entry to the computer room. Compressor compartment is made as separate piece and bolted together with the rest of the unit. Unit is factory tested and shipped as a one piece. Consult factory for more detail.

#### Three (3) Piece Split Cabinet

The unit shall be split in three pieces, Compressor compartment, Coil compartment, and blower compartment. Unit is factory tested and shipped as a one piece. Consult factory for more detail.

### OTHER CABINET OPTIONS

#### Mirrored System

As a standard feature a System 2100 system provides left-hand side access for piping and electrical connections. On some applications due to space constraints access on left hand side is not always available or at times when two systems are installed next to each other access on left-hand side for one of the systems is not practical. System 2100 systems can be provided with entire compressor section on the right hand side of the cabinet as oppose to the standard left hand side. This allows easier access, enabling two units to sit side by side, with one unit having access from the left-hand side and the other from the right-hand side. Piping connection will be from bottom right-hand side or optional top right-hand side. Consult Factory for full details

#### Piping Configuration

Piping connection can be terminated from top left-hand side

#### Double Wall Construction

Cabinet exterior access panels shall be constructed of double wall construction. Each access panel shall be reinforced with additional heavy gauge metal with insulation on both panels allowing maximum vibration, noise attenuation and thermal insulation during system operation.

#### High Density Grade Insulation

Access panels are well insulated with NFPA rated 1" thick 3 lbs. density fiber glass type insulation.

#### Rear Decorative Panels

Rear panel(s) of the system, normally black, can be specified to match the selected cabinet color, especially if the unit is to be positioned in such a way that it is centrally located in the room.

#### Floor Stand

Floor stand is constructed of heliarc welded angle steel and is 8"-24" in height and shall have adjustable legs for height adjustability ( $\pm 2"$ ). The floor stand allows the ease for installation and connection of the system prior to the installation of the raised floor. Adjustable floor stand raises the system above the sub floor to match the height of the raised floor. Note: Floor stand height shall be fixed once selected. Height adjustability of  $\pm 2"$  shall be based on selected floor-stand height only.

#### Seismic Base Zone IV Floor Stand

Compu-Aire can provide seismic rated floor stands. In areas where seismic bracing is a concern, the floor-stand shall be constructed of heliarc welded tubular steel and shall be 8"-36" high and shall have adjustable legs for height adjustability ( $\pm 2"$ ). Floor stand are rated for Seismic Zone IV application. Note: Floor stand height shall be fixed once selected. Height adjustability of  $\pm 2"$  shall be based on selected floor-stand height only.

#### Turning Vane (Scoop Only)

Heavy gauge, factory installed turning vane (scoop only) provided with floor stand. Utilized to direct airflow. (Consult factory on specifications for vane assemblies)

#### Back Draft Damper

An automatic back-draft damper is provided at the outlet of the discharge elbow to prevent back flow of air. Motorized damper is available, consult factory.

#### Vibration Isolation Pad(s)

Ribbed Neoprene and cork sandwich pads are provided for field installation under mounting pedestals.

#### Vibration Isolator(s) (Spring type)

Vibration Isolators are equipped with isolation pedestals for ease of installation of sub floor and to prevent any vibration being directly transmitted to the access floor.

## Optional For All Systems

### FILTERS

#### High Efficiency Filters

High efficiency filters for various requirements are available in lieu of standard 2" 30% (MERV-8) efficient filter. Optional high efficiency filters are available in 2" to 4" thick deep pleated filters, 30% to 80% efficiency (MERV-8 to MERV-13). High efficiency filters allow optimal air filtering for even the strictest air quality requirements.

#### Pre-Filters

In addition to the standard or optional high efficiency filters selected for the system, 2" 20% pre filters are provided to allow for additional filtering of return air. Note: Upgraded motors may be required for additional air pressure drop across filter section.

### REFRIGERATION OPTIONS

#### Semi-Hermetic Compressors

Dual high efficiency, heavy duty, cast iron, 1750 RPM, semi-hermetic, serviceable compressors, with gas cooled motor construction is available for each refrigerant system. Compressors are mounted on vibration isolators and have build in overloads, oil sight glass, manual reset high-pressure switch and auto reset low-pressure switch. Each refrigerant circuit is provided with hot gas muffler, liquid line filter dryer, sight glass and an adjustable externally equalized expansion valve. The muffler is factory installed in the hot gas line. Compressors are located in a separate compartment for ease of service without interrupting unit operation.

#### Four(4)- Stage Cylinder Un-loader(s)

Cylinder un-loaders are provided for capacity reduction during light load condition on semi-hermetic compressors. Used with Semi-Hermetic Compressors only.

4 Stage System - Includes cylinder un-loaders on one head of each compressor.

Four stage of DX cooling shall be obtained as follows:

Stage 1: One compressor unloaded, other compressor off

Stage 2: One compressor on full

Stage 3: One compressor on full, other compressor unloaded.

Stage 4: Both compressors are on full.

#### Hot Gas Bypass

Hot gas bypass valve is provided on each refrigerant circuit. Unit are provided with factory piped Hot Gas Solenoid Valve (Air cooled units only) and Externally Equalized, direct acting Discharge Bypass Valve to provide capacity control and maintain the evaporator coil temperature under low load conditions. Used when a constant compressor function is desirable, allowing for compressor cycling and temperature fluctuations to minimize. (Hot gas bypass valve is standard on 15 ton and above units).

Digital hot gas bypass is also available with electronic valve for digital capacity modulation control.

#### Extended Four (4) Year Compressor Warranty

This provides extension of standard one-year warranty to an additional four years on compressors from the date of start up. This additional warranty takes effect after expiration of the 1st year standard warranty. Total coverage is upto 5 years from the date of start up or 18 months from date of shipment, whichever comes first. This warranty is limited to supply of compressor FOB Whittier, CA freight both ways & installation labor to be paid by the customer.

## Optional For All Systems

### REHEAT OPTIONS

#### Steam Reheat

Coil is factory piped with a two (2)-way on/off control valve. Strainer and trap are provided for field installation outside of the unit. Reheat coils are copper tube and aluminum fins of sufficient capacity to maintain dry bulb in the dehumidification cycle. Upgraded motor may be required for this option.

#### Hot Water Reheat

Factory piped with a two (2)-way on/off control valve. Reheat coils are copper tube and aluminum fins of sufficient capacity to maintain dry bulb in the dehumidification cycle. Modulating valve is also available. Upgraded motor may be required for this option.

#### Hot Gas Reheat

Factory piped hot gas reheat coil with a three (3) way heat reclaim valve and refrigerant check valve shall be provided. Hot gas reheat coil are seized to provide reheat capacity equal to the standard electric reheat capacity. Reheat coils are copper tube and aluminum fins of sufficient capacity to maintain dry bulb in the dehumidification cycle. Upgraded motor may be required for this option

#### Extra Electric Reheat

Additional electric reheat can be added to units provided with any other optional reheat source.

#### SCR Reheat Control

Factory installed and wired SCR controller modulate electric reheat rather than staging. Solid-state, noise-free device with no mechanical or moving parts to fail. SCR provides modulating of electric reheat output to help maintain a tighter control of room conditions. (Controller limit may apply. Consult factory for more detail)

#### Reheat Lock-Out Relay

Factory installed and wired relay. De-energizes reheat when emergency power is utilized. Reheat lockout relay prevents the operation of electrical loads that are not essential for continued site operation. Typically, used when facilities have limited back-up power capacity.

### HUMIDIFIER OPTIONS

#### Modulating Steam Generating Humidifier Canister Type

Pre-piped and pre-wired electronic, electrode self generating steam modulating type humidifier. The humidifier has a modulating output control to match its output with humidity requirement signal. (Controller limit may apply. Consult factory for more detail)

#### Humidifier Lockout Relay

Factory installed and wired relay. De-energizes humidifier when emergency power is utilized. Humidifier lockout relay prevents the operation of electrical loads that are not essential for continued site operation. Typically, used when facilities have limited back-up power capacity.

#### Infrared Humidifier

Provided with infrared quartz lamps mounted on a stainless steel pan as a complete assembly equipped with float valve and auto flush system. Serviceable without disconnecting high voltage wires. (Consult factory for availability)

#### Steam-Grid Humidifier

Dry steam, double jacketed type. Piped with a solenoid valve. Steam trap and Y-strainer to be factory provided and field installed outside of the unit.

### MOTORS

#### Plug Fans

Variable speed fan direct drive EC motors (plug fans), to regulate of cooling capacity and adjusting to changes in the thermal load of the server room



## Optional For All Systems

### MOTORS, PUMPS & BLOWERS

#### Upgraded Motor/Blower Package

System 2100 up-flow units are provided with upgraded motor/blower package to accommodate for high external static pressures requirements, special filters or increased CFM. (Consult factory for application requirements).

#### High Efficiency Motors

Premium efficiency motors are available as open-drip proof (ODP) or totally enclosed fan cooled (TEFC). The blower motor shall be mounted on an adjustable base, provided with a locking assembly to prevent motor play. The motor shall be 1765 RPM and shall have copper windings, phase isolation and shall be UL component recognized. The motors shall have a minimum NEMA service factor of 1.25.

#### Fan/Motor Isolation

Fan & motor section are isolated from cabinet. Complete motor-blower assembly is mounted on vibration isolators to minimize the vibration transferred to the unit frame.

#### Condensate Pump

The Condensate Pump can be unit mount and wired at the factory or may be field installed by others. The condensate pump is complete with integral float switch, sump, motor, pump and automatic control. Check valve are field provided and installed by others. Condensate Pump is available in 115V, 208V or 460V. Primary drain and humidifier drain is piped to condensate pump for removal of condensate. A unit mount condensate pump is wired to main control panel on unit. Condensate pump for field installation requires a separate power source. Condensate pump rated for 355 GPH @ 20' of head and high condensate temperatures caused by humidifier flush and drain cycle of canister type humidifier.

#### Variable Frequency Drive

Variable Speed Drive is available for capacity control. The advance microprocessor synchronizes the blower speed with the current demand in the space and consequently the cooling demand of the room. Variable frequency drive shall have automatic bypass included. Note: Inverter Duty Motors will have factory mount and installed shaft grounding rings which divert motor shaft currents away from the bearings.

#### 200,000 Hour (L-10) Pillow Block Bearings

The blower shall have permanently lubricated pillow block bearings, with an average life span of 200,000 hours.

### ELECTRICAL OPTIONS

#### Locking Disconnect Switch

Non-automatic disconnect switch is mounted on the high voltage section of the electrical panel. Handle of disconnect switch is accessible from the front of exterior panel. Access to high voltage panel is permitted after the switch is in the "OFF" position. Disconnect switch shall allow lockout of main power supply to system during maintenance or service

#### Single Phase Unit

Where three-phase power is not available, a single-phase unit can be provided (maximum 10 tons).

#### HACR Circuit Breaker

208 V, 460 V, 575 V

HACR Circuit Breaker is mounted on the high voltage section of the electrical panel.

#### Low Voltage Dropout

Shuts the system to off, when sensing voltage level below 10% of the rated incoming voltage. The system requires manual resetting and voltage drop is field adjustable.

#### Phase Monitor (3-phase units only)

Automatic voltage range selection type phase monitor is provided internally wired, and installed inside the control box. Phase monitor provides protections against Phase loss, Phase reversal, Over voltage, Under voltage and Unbalanced Voltages. Phase monitor shuts the unit down on any of the above conditions.

#### Automatic Transfer Switch

Factory supplied, field installed (by others) switch shall be provided. Switch shall automatically transfer critical load to backup power source in event of power outage. Allowing the system to continuously maintain controlled environment. Verify with factory for unit installed ATS.

## Optional For All Systems

### AIR COOLED CONDENSER & DRY FLUID COOLER OPTIONS

#### **Specially Treated Coils**

Available where air cooled condensers and the dry fluid coolers are subject to contaminating or corrosive air stream. Special coatings can be applied to reduce corrosion. Copper fin/copper tube coils are also available.

#### **Rain-Tight Disconnect Switch**

Available for Air Cooled Condenser and Dry Fluid Cooler. NEMA rated disconnect switch is provided for field installation.

### CONDENSATE LEAK DETECTION OPTIONS

#### **LDSP-420 Condensate Probe Type Leak Detection Sensor (water sensors)**

Spot type point-leak detection sensor, senses moisture under the floor. Provides leak detection at critical point under raised floor applications. Upon sensing moisture, unit mounted microprocessor shall sound an alarm and display message on the LCD and two (2) sensors can be provided for each system.

#### **Zone Leak Detection Monitoring System w/ Cable**

Factory provided leak detection monitoring system comes complete with monitoring unit and sensor cable. System provides monitoring of critical areas for water and water based liquids. Sensor cable is typically placed around the perimeter of a room or around a piece of equipment that is to be monitored for leaks. System continuously monitors the capacitance of the sensor cable and detects changes from the initial value. Leak Detection system is installed by others. Cable shall be 50 feet in length.

#### **Auxiliary Contacts**

Dry contacts for remote customer alarm providing notification of water detection.

## Optional For All Systems

### CONTROL & MONITORING SOLUTION OPTIONS

#### Remote Temperature/Humidity Sensors

Remote temperature/humidity sensor is a wall mounted room sensor. Each sensor is an ideal solution to provide temperature and humidity inputs to the unit mounted microprocessor.

#### Smoke Detector

Mounted in return air section, smoke detector activates an alarm upon sensing smoke in the room and shuts down the system. Upon sensing smoke unit mounted microprocessor shall sound an alarm and display message on LCD. Smoke detector provided is used for system only.

#### Auxiliary Contacts

Dry contacts for remote customer alarm providing notification of smoke alarm

#### Fan Overload Alarm Relay

Fan overload relay alarm provides protection for the fan blower when it operates outside of normal condition. Once fan overload is detected, the normally open relay shall send a signal to the controller to shut the unit down to prevent potential damage.

#### Temperature And Humidity Recorder

7 day, 24 hours, battery powered. Allows for temperature and humidity to closely recorded and allows close examination of customer's application. Comes complete with 100 recording charts and two bottles of ink.

#### Building Management System Interfaces (BMS)

BMS (Building Management Systems) are systems for the integrated management of all the technological functions of a building, one of them being air-conditioning.

The development of these systems has meant that control systems made by different companies often need to be connected together, and consequently not only is a common electrical standard required, but also a common language, or communication protocol. The resulting advantages of such solutions (simpler and more efficient management of the building from a single control station, reduction in running costs, possibility of statistical analysis of all data, immediate identification of and response to faults and alarms) amply justify any extra cost of the individual devices.

Today not only are the quality and the reliability of the instruments important, but also the degree of external

connectability they can offer.

Compu-Aire, Inc. has always designed its controls to communicate with other systems, and has constantly followed the evolution of technology in the communications sector. For this reason, Compu-Aire, Inc. controllers, both parametric and programmable, can:

- be integrated into systems consisting of instruments made by different manufacturers, with which they share information;
- be managed remotely via modem and via Internet, even by simply using a browser;
- inform remote personnel, wherever they may be, of any alarm situations, including by SMS messaging.

"Proprietary" protocols, that is, those developed separately by individual companies, are now being replaced by "independent" standard protocols promoted by international organizations. Nonetheless, a single dominant standard has yet to emerge, and for this reason Compu-Aire, Inc. offers a wide range of solutions that allow its controllers to be connected to the main BMS.

Compu-Aire has implemented compatibility with all the protocols that are emerging as the "de facto" standards in the HVAC/R and intelligent building management industry, and that are consequently used in the leading BMS: LonWorks® / Modbus® / BACnet™ / TCP/IP / SNMP / METASYS®.

#### Connection Mode

Compu-Aire controllers is connected to the BMS in the following ways:

- directly, without any intermediate devices, thanks to the ability of the microprocessor controller to select the protocol being used;
- by connection to a gateway, that is, an external device that makes the hardware standards compatible and converts the Compu-Aire protocol to the protocol used by the BMS;
- integrating the driver that manages the Compu-Aire protocol into the BMS.

## Optional For All Systems

### SENSORS & GAUGES

#### **Magnehelic Pressure Gauge**

Units are provided with Magnehelic Pressure Gauge in front of the unit to constantly read pressure drop across the filter.

#### **Discharge Air Sensor**

NTC sensor will be factory mounted and installed at outlet of fan indicating supply air temperature.



Air Cooled System

Table 1A

MODEL	CAA-832 CAA-834 CAA-835	CAA-1032 CAA-1034 CAA-1035	CAA-1232 CAA-1234 CAA-1235	CAA-1532 CAA-1534 CAA-1535	CAA-2032 CAA-2034 CAA-2035
<b>NOMINAL TONNAGE</b>	8	10	12	15	20
<b>NET CAPACITY DATA - Dual High Efficiency Standard Scroll Compressors, R-407C</b>					
<b>80°F DB, 67°F WB (26.7°C DB, 19.4°C WB), 50% RH Entering Air</b>					
Total - BTU/HR (kW)	124,200 (36.4)	136,100 (39.8)		192,500 (56.4)	248,500 (72.8)
Sensible - BTU/HR (kW)	93,400 (27.4)	116,200 (34.0)		170,200 (49.8)	210,500 (61.6)
<b>75°F DB, 62.5°F WB (23.9°C DB, 16.9°C WB) 50% RH Entering Air</b>					
Total - BTU/HR (kW)	105,000 (30.7)	122,600 (35.9)	136,600 (40.0)	180,200 (52.8)	224,700 (65.9)
Sensible - BTU/HR (kW)	87,900 (25.7)	105,000 (30.7)	119,500 (35.0)	156,200 (45.8)	185,700 (54.4)
<b>72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50% RH Entering Air</b>					
Total - BTU/HR (kW)	100,100 (29.3)	120,000 (35.2)	130,200 (38.2)	174,000 (51.0)	215,900 (63.3)
Sensible - BTU/HR (kW)	86,000 (25.2)	102,800 (30.1)	116,700 (34.2)	152,000 (44.5)	182,500 (53.5)
<b>80°F DB, 65.1°F WB (26.7°C DB, 18.4°C WB), 45% RH Entering Air</b>					
Total - BTU/HR (kW)					
Sensible - BTU/HR (kW)					
<b>75°F DB, 61.1°F WB (23.9°C DB, 16.2°C WB) 45% RH Entering Air</b>					
Total - BTU/HR (kW)	102,000 (29.9)	118,000 (34.6)	131,500 (38.5)	176,300 (51.7)	219,500 (64.3)
Sensible - BTU/HR (kW)	94,100 (27.6)	104,400 (30.6)	118,100 (34.6)	166,200 (48.7)	199,700 (58.5)
<b>72°F DB, 58.6°F WB (22.2°C DB, 14.8°C WB) 45% RH Entering Air</b>					
Total - BTU/HR (kW)	107,900 (31.6)	115,500 (33.8)	125,300 (36.7)	170,200 (50.0)	210,900 (61.8)
Sensible - BTU/HR (kW)	92,000 (27.0)	114,000 (33.4)	115,300 (33.8)	160,400 (47.0)	178,200 (52.2)
<b>AIR DATA - Based on 0.5 inches external static pressure-variable pitch pulley</b>					
CFM (L/s)	4,400 (2,077)	5,500 (2,596)	6,600 (3,115)	8,000 (3,776)	9,600 (5,192)
Fan Motor - HP	3	3	3	5	5
No. of Fans (Downflow)	2	2	2	3	3
No. of Fans (Upflow)	1	2	2	2	2
<b>OPTIONAL AIR - for increased capacities or available static pressures; consult factory</b>					
CFM (L/s)	5,500 (2,596)	7,050 (3327)	7,200 (3,398)	9,600 (4,531)	11,000 (5,900)
Fan Motor - HP	5	5	5	7.5	7.5
<b>EVAPORATOR COIL DATA - High Efficiency, Copper Tubes / Aluminum Fins</b>					
Face Area - Ft <sup>2</sup> (m <sup>2</sup> )	15.3 (1.42)	15.3 (1.42)	15.3 (1.42)	21.5 (2)	24.0 (2.23)
Rows	3	4	4	4	4
<b>REHEAT - Electric</b>					
kW	15	15	15	22.5	30
BTU/HR, includes fan motor	56300	56300	56300	84500	115200
Stages	2	2	2	3	4
<b>HUMIDIFIER - Electronic self generating steam type with disposable cylinder</b>					
kW	6.8	6.8	6.8	10.2	10.2
Capacity - Lb/Hr (kg/hr)	17.5 (7.9)	17.5 (7.9)	17.5 (7.9)	30 (13.6)	30 (13.6)
<b>FILTER (Downflow Units) - 30% Efficient ASHRAE standard 52-76</b>					
16" x 25" x 2"	2	2	2	2	1
25" x 20" x 2"	2	2	2	3	4
Effective Area - 2"; Ft <sup>2</sup> (m <sup>2</sup> )	56.0 (5.2)	56.0 (5.2)	56.0 (5.2)	68.7 (6.3)	73.9 (6.8)
Effective Area - 4"; Ft <sup>2</sup> (m <sup>2</sup> )	84.2 (7.8)	84.2 (7.8)	84.2 (7.8)	107.7 (10.0)	112.6 (10.5)
<b>FILTER (Upflow Units) - 30% Efficient ASHRAE standard 52-76</b>					
16" x 20" x 2"	2	2	2	2	1
20" x 20" x 2"	2	2	2	3	4
Effective Area - 2"; Ft <sup>2</sup> (m <sup>2</sup> )	44.6 (4.1)	44.6 (4.1)	44.6	56.8 (5.3)	58.9 (5.5)
<b>PIPING DATA - All connections are Copper O.D.</b>					
Condensate Drain - (Qty) Inch	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"
Liquid Line - (Qty) Inch	1/2"	1/2"	1/2"	1/2"	5/8"
Hot Gas Line - (Qty) Inch	5/8"	5/8"	5/8"	7/8"	1 1/8"
Humidifier Water Supply	1/4"	1/4"	1/4"	1/4"	1/4"
<b>UNIT WEIGHT - Lb (kg)</b>	1,325 (601)	1,435 (651)	1,515 (687)	1,570 (712)	1,810 (821)
<b>AIR COOLED CONDENSER DATA - Based on 95°F (35°C) ambient, for other ambient conditions refer to heat rejection manual</b>					
<b>Model</b>	<b>ACC-09</b>	<b>ACC-11</b>	<b>ACC-13</b>	<b>ACC-17</b>	<b>ACC-24</b>
CFM (L/s)	4,800	10,400	10,200	9,800	14,750
Motor - (Qty) HP	(1) 4/5	(2) 4/5	(2) 4/5	(2) 4/5	(3) 4/5
Liquid Line - (Qty) Inch	(2) 7/8"	(2) 7/8"	(2) 7/8"	(2) 7/8"	(2) 7/8"
Hot Gas Line - (Qty) Inch	(2) 1 1/8"	(2) 1 1/8"	(2) 2 1/8"	(2) 1 3/8"	(2) 1 3/8"
Coil Face Area - Ft <sup>2</sup> (m <sup>2</sup> )	9.8 (0.91)	19.2 (1.8)	19.2 (1.8)	19.2 (1.8)	28.6 (2.6)
Coil Rows	4	2	3	4	4
<b>ACC WEIGHT - Lb (kg)</b>	305 (138)	340 (154)	355 (161)	400 (182)	560 (245)

**Air Cooled System      Water Cooled System**

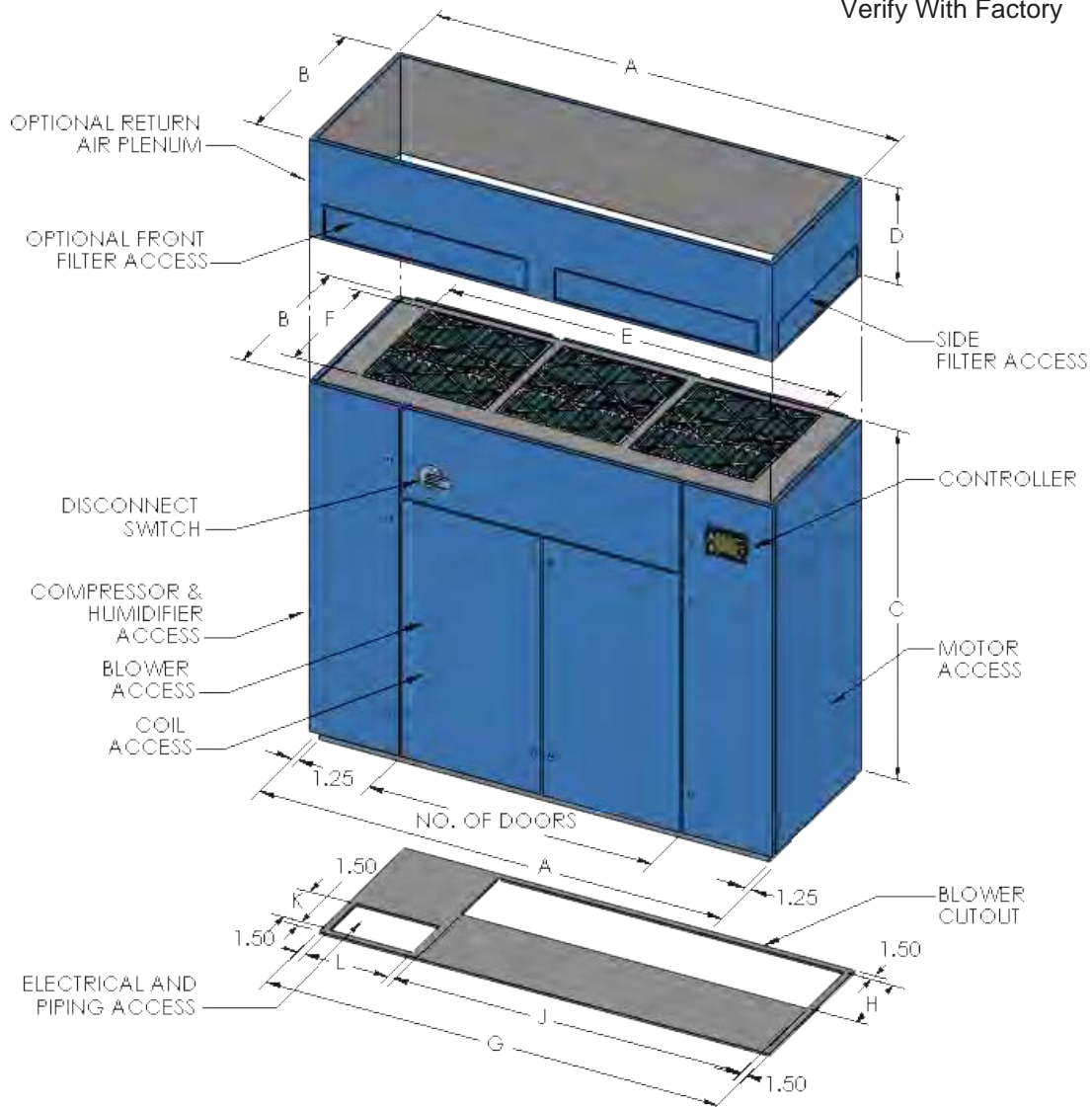
MODEL	CAA-8-K	CAA-10-K	CAW-8-K	CAW-10-K
<b>NOMINAL TONNAGE</b>	<b>8</b>	<b>10</b>	<b>8</b>	<b>10</b>
<b>CAPACITY DATA</b>				
<b>80°F DB/67° WB (26.7°C DB/19.4°C WB)</b>				
Total - BTU/HR	111,858	139,400	115,214	143,500
Sensible - BTU/HR	92,969	118,100	95,758	120,400
<b>75°F DB/62.5°F WB (23.0°C DB/16.9°)</b>				
Total - BTU/HR	97,628	133,400	100,557	137,300
Sensible - BTU/HR	88,877	116,400	91,543	118,700
<b>72°F DB/60°F WB (22.2°C DB/15.5°)</b>				
Total - BTU/HR	76,629	132,300	78,929	136,100
Sensible - BTU/HR	76,629	117,100	78,928	119,200
<b>AIR DATA</b>				
CFM	4,400	5,500	4,400	5,500
Fan Motor - HP	3	5	3	5
Blower Quantity	1	1	1	1
<b>OPTIONAL AIR DATA (With plug fans)</b>				
CFM	5,600	7,050	5,600	7,050
Fan Motor - HP	5	5	5	5
<b>COMPRESSOR DATA (Refrigerant R407C-R410A OR R134a)</b>				
Type	Hermetic Scroll			
Quantity	2	2	2	2
<b>EVAPORATOR COIL</b>				
Face Area Ft <sup>2</sup>	11	11	11	11
Rows	3	4	3	4
<b>REHEAT (Electric)</b>				
kW	15	15	15	15
BTU/HR	56,300	56,300	56,300	56,300
<b>HUMIDIFIER STEAM GENERATOR</b>				
LBS/Kw	10/3.7	17.5/6.8	10/3.7	17.5/6.8
<b>FILTER DATA 30%, BASED ON ASHRAE 52-76</b>				
Filters (Upflow)	(4)20"X 20" X 2"			
Filters (Downflow)	(2)20"X 25" X 2"			
<b>ELECTRICAL DATA</b>				
<b>208/3/60</b>				
FLA	70.1	73.6	70.1	73.6
MCA	85.0	89.9	85.0	89.9
MFS	100.0	110.0	100.0	110.0
<b>460/3/60</b>				
FLA	25.2	33.2	25.2	33.2
MCA	30.7	40.3	30.7	40.3
MFS	40.0	50.0	40.0	50.0
<b>575/3/60</b>				
FLA	25.0	26.9	25.0	26.9
MCA	30.3	32.6	30.3	32.6
MFS	40.0	40.0	40.0	40.0

# DIMENSIONAL DATA

**TABLE 13**  
**AIR COOLED & WATER/GLYCOL COOLED SYSTEM**  
**STANDARD DOWNFLOW CONFIGURATION**

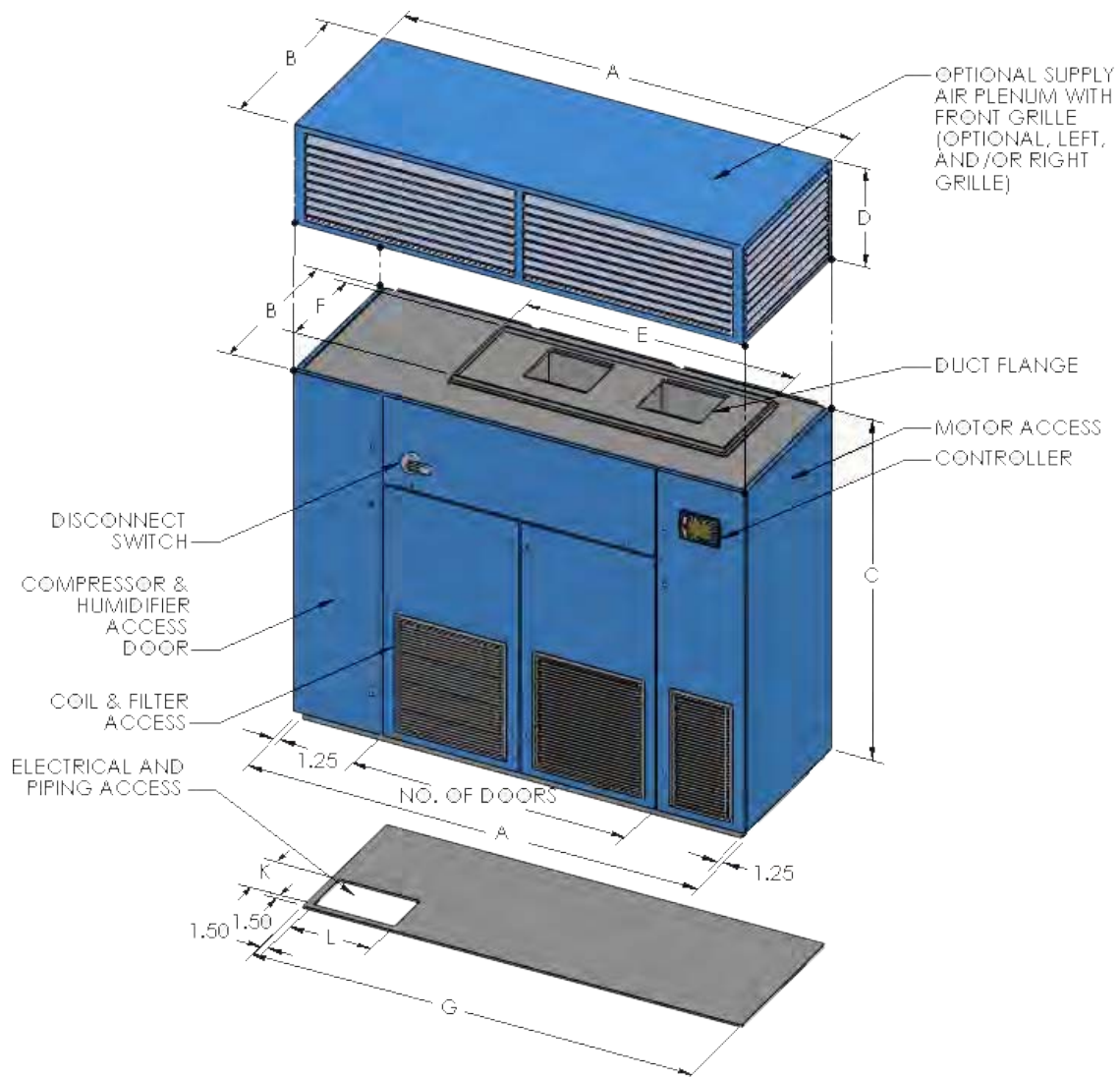
UNIT	A	B	C	D †	E	F	G	H	J	K	L	# OF DOORS
8, 10 & 12 TON	74.5 (1892)	34.5 (876)	76.0 (1930)	30.0 (762)	70.0 (1778)	29.75 (756)	72.0 (1829)	14.0 (356)	51.0 (1295)	10.0 (254)	16.5 (419)	ONE
15 TON	92.5 (2349)	34.5 (876)	76.0 (1930)	30.0 (762)	88.0 (2235)	29.75 (756)	90.0 (2286)	14.0 (356)	69.0 (1752)	10.0 (254)	16.5 (419)	TWO
20 & 25 TON	99.5 (2527)	34.5 (876)	76.0 (1930)	30.0 (762)	95.0 (2413)	29.75 (756)	97.0 (2464)	14.0 (356)	76.0 (1930)	10.0 (254)	16.5 (419)	TWO
30 TON	122.5 (3111)	34.5 (876)	76.0 (1930)	30.0 (762)	118.0 (2997)	29.75 (756)	120.0 (3048)	14.0 (356)	92.0 (2337)	10.0 (254)	16.5 (419)	THREE
40 TON	132.5 (3366)	40.0 (1016)	80.0 (2032)	30.0 (762)	127.0 (3226)	35.25 (895)	130.0 (3302)	20.0 (508)	92.0 (2337)	10.0 (254)	16.5 (419)	THREE
50 & 60 TON	142.5 (3620)	50.0 (1270)	80.0 (2032)	30.0 (762)	137.0 (3493)	45.25 (1149)	140.0 (3556)	20.0 (508)	97.0 (2464)	14.5 (368)	19.5 (495)	FOUR

† Optional Plenum Height Available  
 Verify With Factory



**TABLE 14**  
**AIR COOLED & WATER/GLYCOL COOLED SYSTEM**  
**STANDARD UPFLOW CONFIGURATION**

UNIT	A	B	C	D	E	F	G	K	L	# OF DOORS
8, 10 & 12 TON	74.5 (1892)	34.5 (876)	76.0 (1930)	20.0 (508)	48.0 (1219)	20.00 (508)	72.0 (1829)	10.0 (254)	16.5 (419)	ONE
15 TON	92.5 (2349)	34.5 (876)	76.0 (1930)	20.0 (508)	66.0 (1676)	20.00 (508)	90.0 (2286)	10.0 (254)	16.5 (419)	TWO
20 & 25 TON	99.5 (2527)	34.5 (876)	76.0 (1930)	20.0 (508)	90.0 (2286)	20.00 (508)	97.0 (2464)	10.0 (254)	16.5 (419)	TWO
30 TON	122.5 (3111)	34.5 (876)	76.0 (1930)	24.0 (610)	100.0 (2540)	25.00 (635)	120.0 (3048)	10.0 (254)	16.5 (419)	THREE
40 TON	132.5 (3366)	40.0 (1016)	80.0 (2032)	24.0 (610)	110.0 (2794)	25.00 (635)	130.0 (3302)	10.0 (254)	16.5 (419)	THREE
50 & 60 TON	142.5 (3620)	50.0 (1270)	80.0 (2032)	30.0 (762)	120.0 (3048)	25.00 (635)	140.0 (3556)	14.5 (368)	19.5 (495)	FOUR

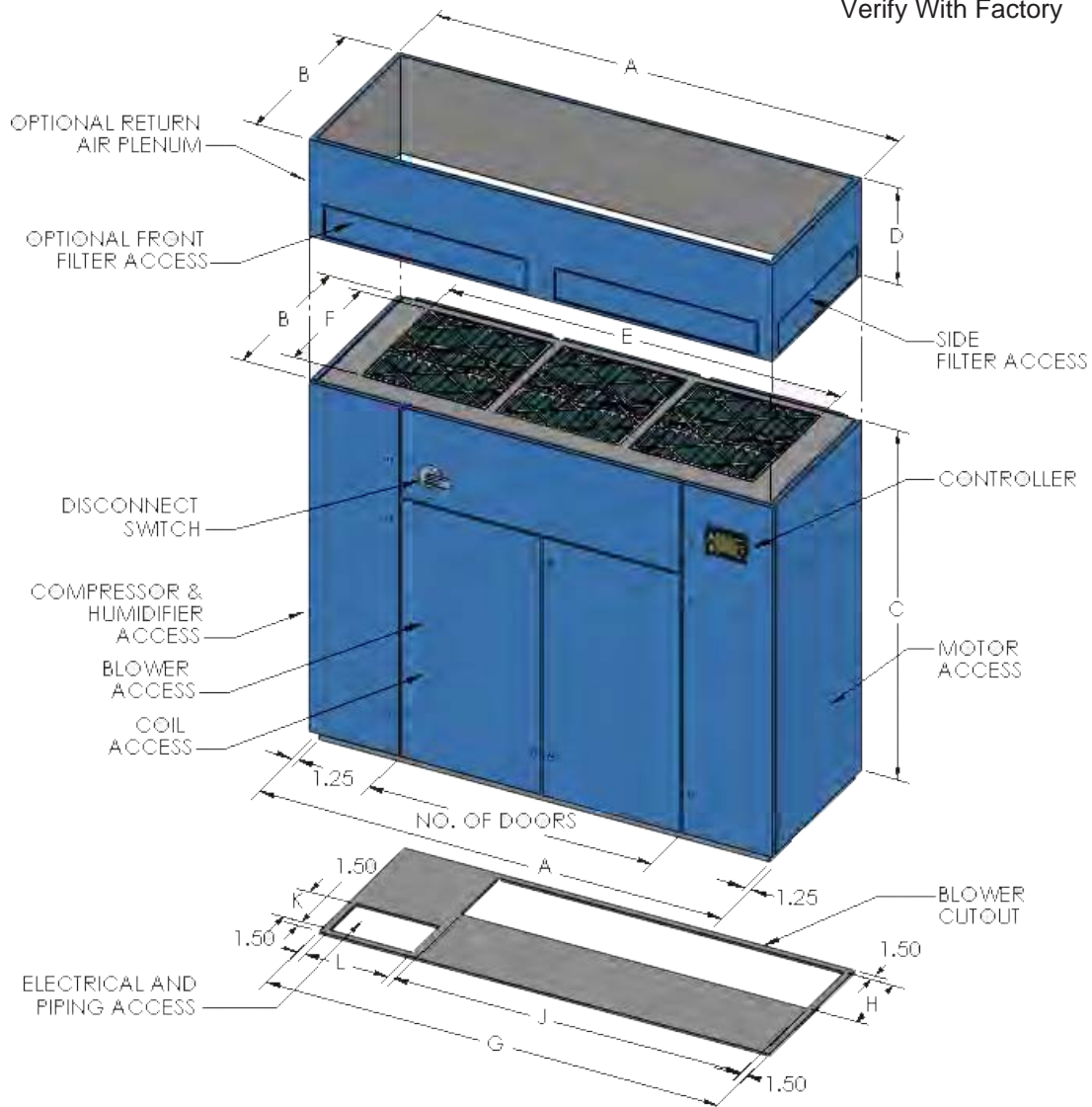


# DIMENSIONAL DATA

**TABLE 15**  
**DX - CHILLED WATER/ ENERGY MISER DUAL COIL SYSTEM**  
**STANDARD DOWNFLOW CONFIGURATION**

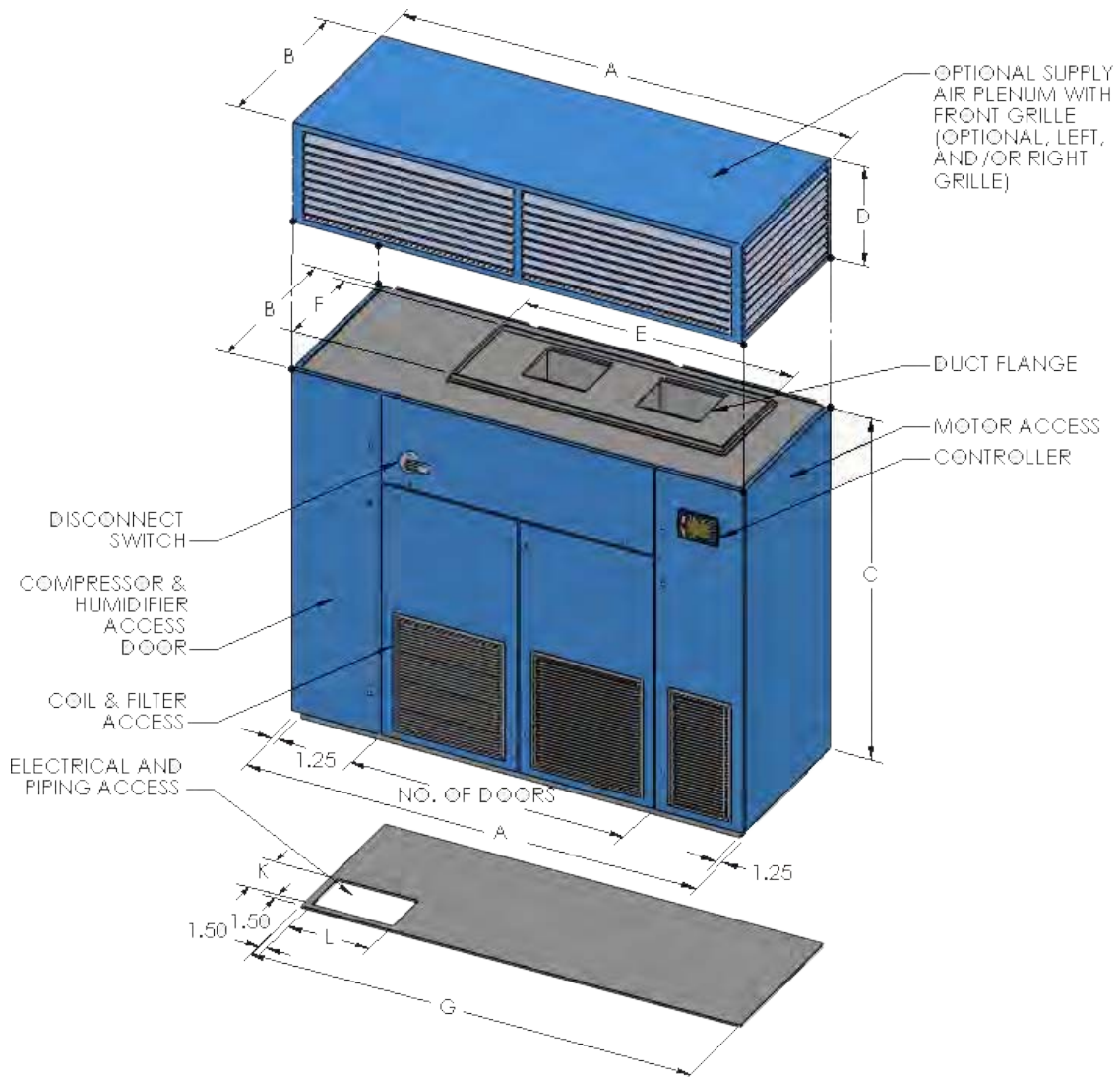
UNIT	A	B	C	D †	E	F	G	H	J	K	L	# OF DOORS
8, 10 & 12 TON	74.5 (1892)	34.5 (876)	76.0 (1930)	30.0 (762)	70.0 (1778)	29.75 (756)	72.0 (1829)	14.0 (356)	51.0 (1295)	10.0 (254)	16.5 (419)	ONE
15 TON	92.5 (2349)	34.5 (876)	76.0 (1930)	30.0 (762)	88.0 (2235)	29.75 (756)	90.0 (2286)	14.0 (356)	69.0 (1752)	10.0 (254)	16.5 (419)	TWO
20 & 25 TON	99.5 (2527)	34.5 (876)	76.0 (1930)	30.0 (762)	95.0 (2413)	29.75 (756)	97.0 (2464)	14.0 (356)	76.0 (1930)	10.0 (254)	16.5 (419)	TWO
30 TON	122.5 (3111)	34.5 (876)	76.0 (1930)	30.0 (762)	118.0 (2997)	29.75 (756)	120.0 (3048)	14.0 (356)	92.0 (2337)	10.0 (254)	16.5 (419)	THREE
40 TON	132.5 (3366)	40.0 (1016)	80.0 (2032)	30.0 (762)	127.0 (3226)	35.25 (895)	130.0 (3302)	20.0 (508)	92.0 (2337)	10.0 (254)	16.5 (419)	THREE
50 & 60 TON	142.5 (3620)	50.0 (1270)	80.0 (2032)	30.0 (762)	137.0 (3493)	45.25 (1149)	140.0 (3556)	20.0 (508)	97.0 (2464)	14.5 (368)	19.5 (495)	FOUR

† Optional Plenum Height Available  
 Verify With Factory



**TABLE 16**  
**DX - CHILLED WATER/ ENERGY MISER DUAL COIL SYSTEM**  
**STANDARD UPFLOW CONFIGURATION**

UNIT	A	B	C	D	E	F	G	K	L	# OF DOORS
8, 10 & 12 TON	74.5 (1892)	34.5 (876)	76.0 (1930)	20.0 (508)	48.0 (1219)	20.00 (508)	72.0 (1829)	10.0 (254)	16.5 (419)	ONE
15 TON	92.5 (2349)	34.5 (876)	76.0 (1930)	20.0 (508)	66.0 (1676)	20.00 (508)	90.0 (2286)	10.0 (254)	16.5 (419)	TWO
20 & 25 TON	99.5 (2527)	34.5 (876)	76.0 (1930)	20.0 (508)	90.0 (2286)	20.00 (508)	97.0 (2464)	10.0 (254)	16.5 (419)	TWO
30 TON	122.5 (3111)	34.5 (876)	76.0 (1930)	24.0 (610)	100.0 (2540)	25.00 (635)	120.0 (3048)	10.0 (254)	16.5 (419)	THREE
40 TON	132.5 (3366)	40.0 (1016)	80.0 (2032)	24.0 (610)	110.0 (2794)	25.00 (635)	130.0 (3302)	10.0 (254)	16.5 (419)	THREE
50 & 60 TON	142.5 (3620)	50.0 (1270)	80.0 (2032)	30.0 (762)	120.0 (3048)	25.00 (635)	140.0 (3556)	14.5 (368)	19.5 (495)	FOUR



<b>TABLE 17</b>									
<b>AIR COOLED &amp; WATER/GLYCOL COOLED SYSTEM</b>									
<b>FLOOR STAND ASSEMBLY - UPTO ZONE IV</b>									
UNIT	A	B	C	D	E		FLOOR HEIGHT	F	G
8, 10 & 12 TON	72.0 (1829)	18.25 (876)	OMIT	OMIT	33.375 (848)		8.0	4.00 (254)	5.25 (419)
15 TON	90.0 (2286)	18.25 (876)	36.75 (934)	51.25 (1302)	33.375 (848)		12.0	6.875 (254)	7.75 (419)
20 & 25 TON	97.0 (2464)	18.25 (876)	49.00 (1245)	46.00 (1168)	33.375 (848)		18.0	12.87 (254)	13.75 (419)
30 TON DOWNFLOW	120.0 (3048)	21.25 (876)	59.50 (1511)	58.50 (1486)	33.375 (848)		22.0	16.875 (254)	17.75 (419)
30 TON UPFLOW	130.0 (3302)	21.25 (876)	64.50 (1638)	63.50 (1613)	38.625 (981)		24.0	18.875 (254)	19.75 (419)
40 TON	140.0 (3556)	21.25 (876)	69.50 (1765)	68.50 (1740)	38.625 (981)		30.0	24.875 (368)	25.75 (495)
50 & 60 TON	140.0 (3556)	21.25 (876)	69.50 (1765)	68.50 (1740)	38.625 (981)		36.0	30.875 (368)	31.75 (495)

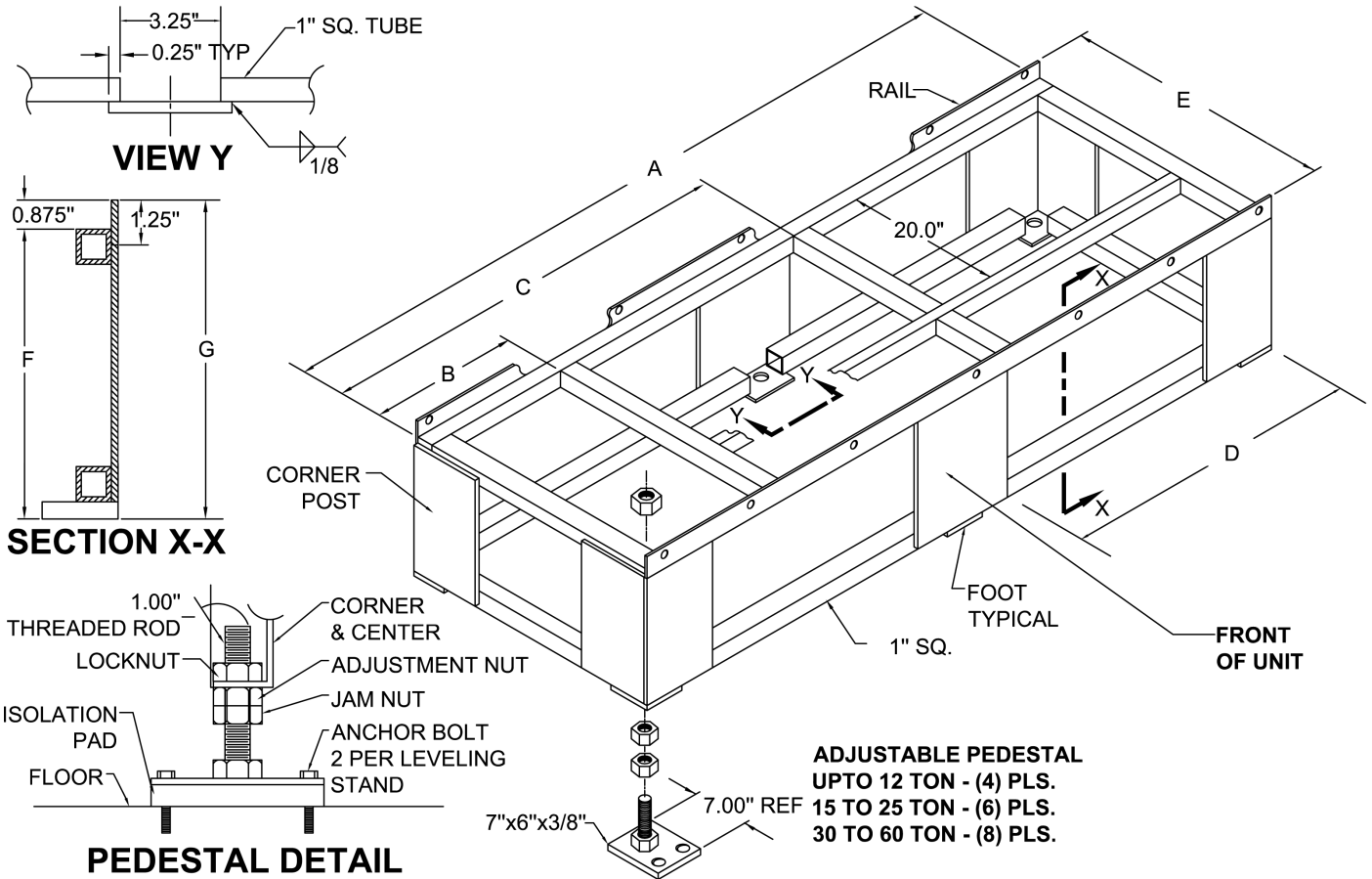
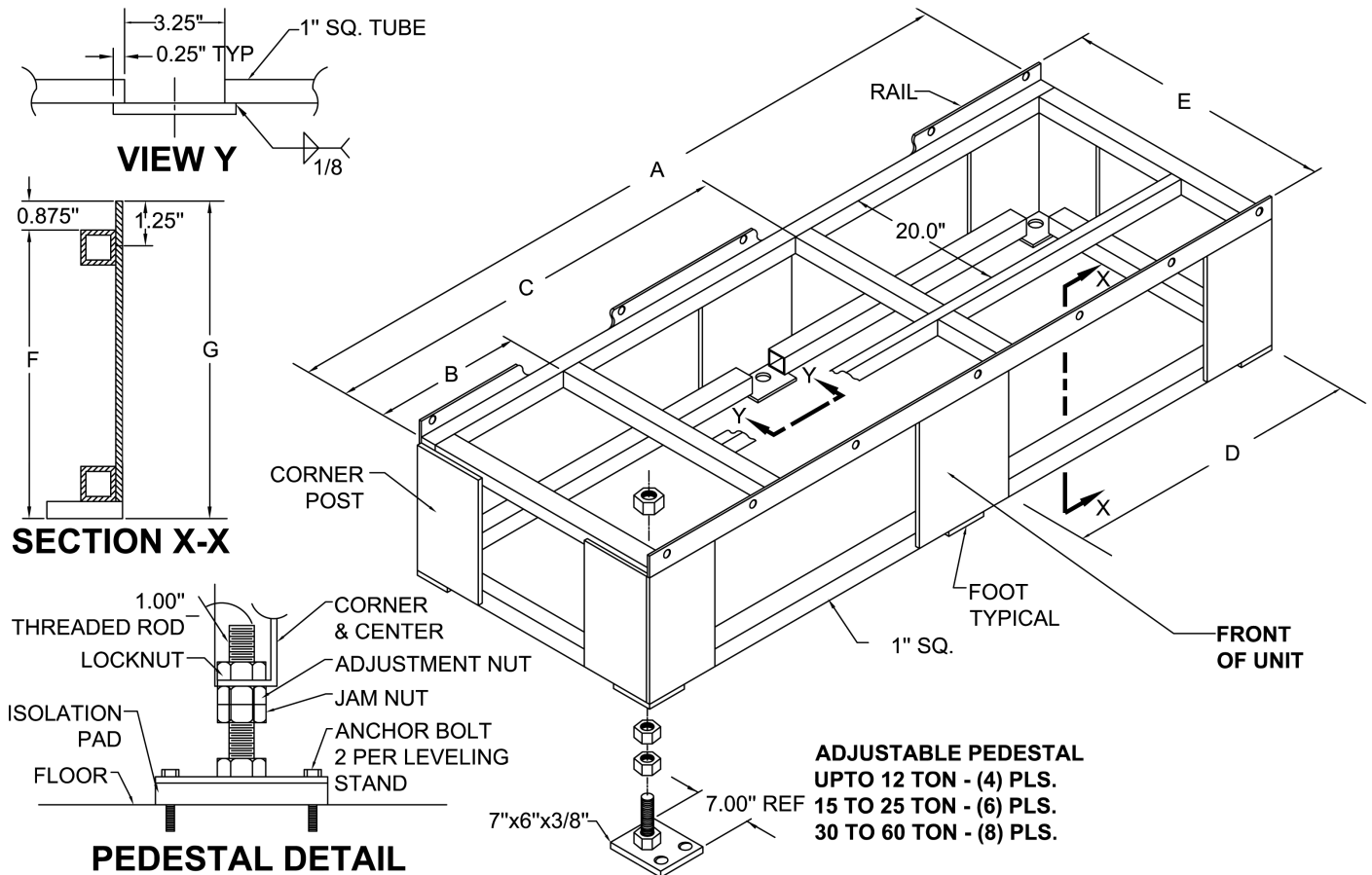


TABLE 18 DX - CHILLED WATER/ ENERGY MISER DUAL COIL SYSTEM FLOOR STAND ASSEMBLY - UPTO ZONE IV									
UNIT	A	B	C	D	E		FLOOR HEIGHT	F	G
8, 10 & 12 TON	90.0 (2286)	18.25 (876)	36.75 (934)	51.25 (1302)	33.375 (848)		12.0	6.875 (254)	7.75 (419)
15 TON	97.0 (2464)	18.25 (876)	49.00 (1245)	46.00 (1168)	33.375 (848)		18.0	12.87 (254)	13.75 (419)
20 & 25 TON	120.0 (3048)	21.25 (876)	59.50 (1511)	58.50 (1486)	33.375 (848)		22.0	16.875 (254)	17.75 (419)
30 TON DOWNFLOW	130.0 (3302)	21.25 (876)	64.50 (1638)	63.50 (1613)	38.625 (981)		24.0	18.875 (254)	19.75 (419)
30 TON UPFLOW	140.0 (3556)	21.25 (876)	69.50 (1765)	68.50 (1740)	38.625 (981)		30.0	24.875 (368)	25.75 (495)
40 TON	140.0 (3556)	21.25 (876)	69.50 (1765)	68.50 (1740)	38.625 (981)		30.0	24.875 (368)	25.75 (495)
50 & 60 TON	140.0 (3556)	21.25 (876)	69.50 (1765)	68.50 (1740)	38.625 (981)		36.0	30.875 (368)	31.75 (495)





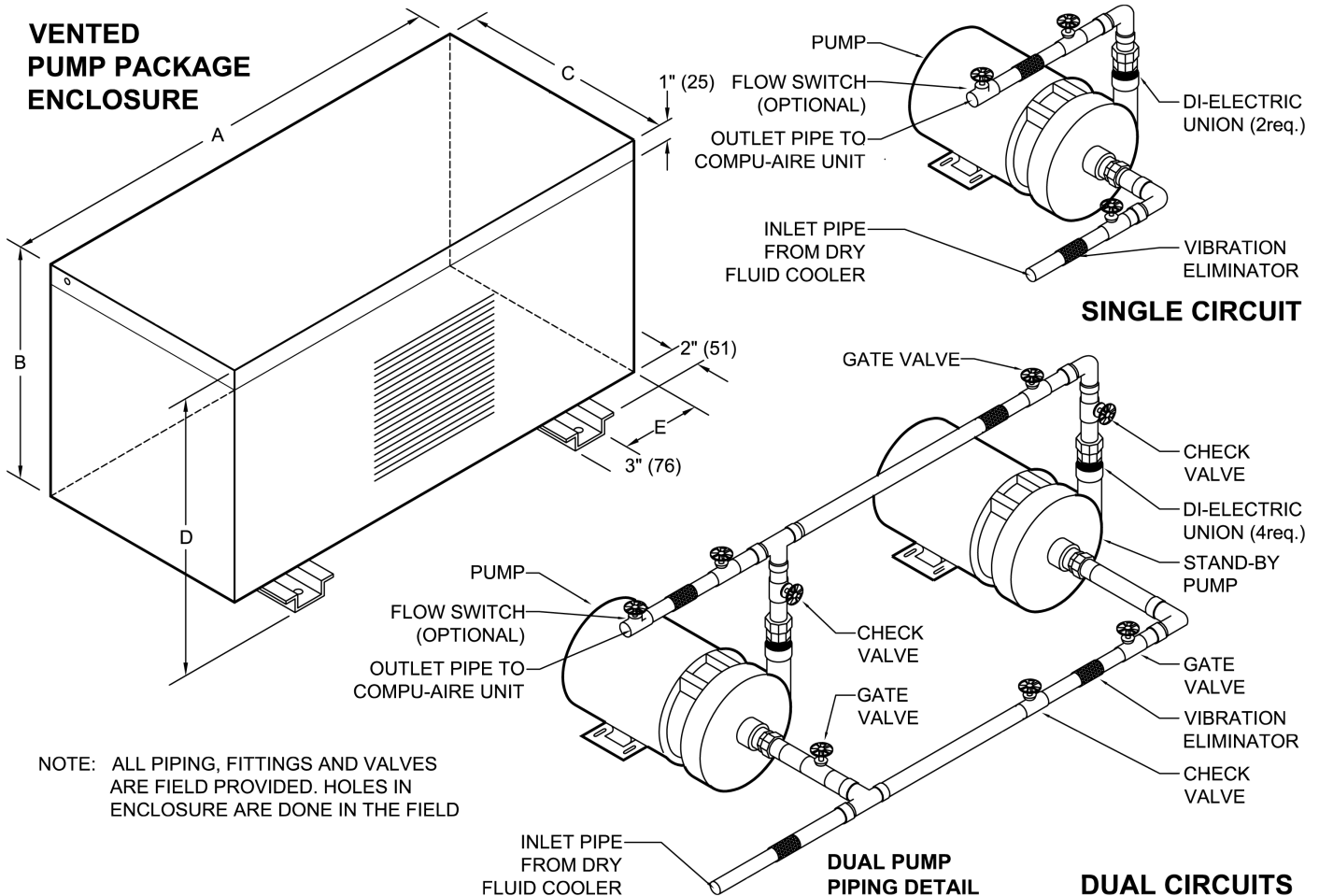
# DIMENSIONAL DATA

TABLE 19 PUMP PACKAGE - ENCLOSURE SINGLE CIRCUIT					
PUMP HP	A	B	C	D	E
3/4 THRU 2	15.0 (381)	22.0 (559)	25.0 (635)	27.75 (705)	2.0 (51)
3 THRU 7.5	21.0 (533)	30.0 (762)	30.0 (762)	30.75 (781)	4.0 (102)
10 & 15	21.0 (533)	40.0 (1016)	30.0 (762)	40.75 (1035)	4.0 (102)

TABLE 20 PUMP PACKAGE - ENCLOSURE DUAL CIRCUIT					
PUMP HP	A	B	C	D	E
3/4 THRU 2	30.0 (762)	22.0 (559)	25.0 (635)	27.75 (705)	3.0 (76)
3 THRU 7.5	42.0 (1067)	30.0 (762)	30.0 (762)	30.75 (781)	8.0 (203)
10 & 15	42.0 (1067)	40.0 (1016)	30.0 (762)	40.75 (1035)	8.0 (203)

**NOTE:**

1. Verify Dimensions With Factory For The Following Assemblies:
  - a) Non-Standard Airflow Configurations
  - b) Split Cabinet Units
  - c) Floor Stand With Motorized Damper and/or Outside Air Economizer
  - d) Plenum Box With Motorized Damper and/or Outside Air Economizer
  - e) Piggy Back Condenser
2. For Heat Rejection Units Verify Dimensions In Heat Rejection Manual.



**PRODUCT SPECIFICATION  
FLOOR-MOUNTED UNITS 8 TONS AND LARGER**

- A. Manufacturer:** Subject to compliance with requirements available manufacturer offering products that may be incorporated into the Work include, the following:
1. Compu-Aire, Inc.
- B. Description:** Packaged, factory assembled, prewired, and prepiped; consisting of cabinet, fans, filters, humidifier, and controls. Refer to drawings for airflow configuration.
- C. Evaporator Cabinet and Frame:** Welded steel, braced for rigidity, and supporting compressors and other mechanical equipment and fittings.
1. Cabinet and Chassis: 14 gauge galvanized steel.
  2. Doors and Access Panels: 18 gauge galvanized steel with polyurethane gaskets, hinges, and concealed fastening devices.
  3. Insulation: Thermally and acoustically insulate cabinet interior with 25-mm- thick duct liner. Thermally and acoustically insulate cabinet interior with one inch (25-mm) thick acoustic duct liner or 1/2" (12.5-mm) thick 6 lbs/cu.ft. density foam insulation.
  4. Finish of Interior Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.
  5. Finish of Exterior Surfaces: Baked-on, textured vinyl enamel; color as selected from manufacturer's standard colors.
  6. Floor Stand: Welded tubular steel with adjustable legs and vibration isolation pads. Refer to the drawings and schedule for required height to match floor.
  7. Upflow Plenum: 18 gauge galvanized steel with front supply grilles. Optional left and/or right side grilles. Refer to the drawings and schedule for required height to match floor.
- D. Evaporator Supply-Air Fan(s) and Motor(s):**
1. Fans: Double-inlet, double width, forward-curved centrifugal fan(s); statically and dynamically balanced.
  2. Drive: V-belt, with steel shaft with self-aligning ball bearings and cast iron or steel sheaves, variable and adjustable-pitch motor sheave, minimum of two matched belts, with drive rated at a minimum of two times the nameplate rating of motor.
- E. Refrigeration System:**
1. **Air-Cooled Refrigeration System:**
    - a. Compressors: Scroll type with suction-gas cooled 3,500 RPM motor, vibration isolators, crank case heater, thermal overloads, automatic-reset high-pressure switch with lockout after three

failures, rotolock service valves, pump-down low-pressure transducer; with suction line oil strainer, internal motor overload protection, and resilient suspension system.

- b. Refrigeration Circuits: Two; each with hot-gas mufflers, thermal-expansion valve with external equalizer, liquid-line solenoid valve, liquid-line filter-dryer, sight glass with moisture indicator, service shutoff valves, charging valves,. The refrigerant piping shall be threaded closed with a nitrogen holding charge. Units shall be charged in the field with refrigerant shall be field. Relief of the Schrader valve shall indicate a leak-free system.
- c. Refrigerant: R-407C
- d. Refrigerant Evaporator Coil: Alternate-row or split-face-circuit, direct-expansion coil of seamless copper tubes expanded into aluminum fins.
  - i. Mount coil assembly over stainless-steel drain pan complying with ASHRAE 62.1-2004.
  - ii. Provide a condensate pump unit with integral float switch, pump-motor assembly, and condensate reservoir where scheduled.
- e. Remote Air-Cooled Refrigerant Condenser: Corrosion-resistant cabinet, copper-tube aluminum-fin coils arranged for two circuits, multiple direct-drive propeller fans with permanently lubricated ball bearings, and single-phase motors with internal overload protection and integral electric control panel and disconnect switch. Control capacity by modulating fan speeds.
- f. The system shall be capable of minus 20 or minus 30 degrees F outdoor ambient operation.

### **2. Water-Cooled / Glycol Cooled Refrigeration System:**

- a. Compressors: Scroll type with suction-gas cooled 3,500 RPM motor, vibration isolators, crank case heater, thermal overloads, automatic-reset high-pressure switch with lockout after three failures, rotolock service valves, pump-down low-pressure transducer; with suction line oil strainer, internal motor overload protection, and resilient suspension system.
- b. Refrigeration Circuits: Two; each with hot-gas mufflers, thermal-expansion valve with external equalizer, liquid-line solenoid valve, liquid-line filter-dryer, sight glass with moisture indicator, service shutoff valves, charging valves, and charge of refrigerant.
- c. Refrigerant: R-407C
- d. Refrigerant Evaporator Coil: Alternate-row or split-face-circuit, direct-expansion coil of seamless copper tubes expanded into aluminum fins.
  - i. Mount coil assembly over stainless-steel drain pan complying with ASHRAE 62.1-2004.
  - ii. Provide a condensate pump unit with integral float switch, pump-motor assembly, and condensate reservoir where scheduled.
- e. Evaporator Water-Cooled / Glycol Cooled Condenser: The water or glycol system shall be equipped with a water/glycol cooled condenser that shall be designed for closed-loop applica

tions. The condenser(s) shall be equipped with a fully proportional 3-way control valve. This motorized control valve shall be powered by the air conditioning unit and shall control the amount of flow to the condenser.

- i. Co-Axial Condenser: Condenser shall have an inner tube constructed of copper and an outer tube constructed of steel. The coaxial condenser shall be hydrostatically tested at 400 PSIG and rated for 300 PSIG working pressure.
  - ii. Shell and Tube Condenser: Each refrigerant circuit shall be provided with individual Glycol Cooled Condenser. The Glycol-cooled condensers shall be of heavy duty, shell and tube, counter-flow type with removable heads. It is constructed of cupra-nickel with cast iron heads, mechanically cleanable from either side. The shell sides of the condensers act as a receiver and holds refrigerant charge during pump down. Condenser shall be ASM stamped for a maximum refrigerant pressure of 400 PSI.
  - iii. Brazed-Plate Heat Exchanger: The heat exchanger shall be a brazed-plate type. The primary side shall be piped to the glycol condenser water, and the secondary side shall be connected to the refrigeration system. A strainer shall be installed upstream of the CRAC unit, on the primary condenser water side.
- f. Modulating Valve: A three (3) way modulating valve shall control the water/glycol flow passing through the water/ glycol cooled condenser. The System 2200 microprocessor control shall manage the valve actuator movement in order to maintain the desired condensing temperature for various entering water temperatures. The maximum differential pressure across the closed valve shall be 43.5 PSI (300 kPa). Maximum system pressure shall be 230 PSI (1,586 kPa).
- g. Water or Propylene Glycol
- i. The Contractor shall furnish propylene glycol for use in the air-conditioning system. Propylene glycol shall be food grade, approved by USDA and FDA for food use. Refer to drawings and schedule for appropriate propylene glycol-water mixture, composition and characteristics:
- h. Dry Fluid Cooler
- i. General: The glycol-cooled drycooler shall be a low profile, slow speed, multiple direct drive, propeller fan type, and arranged for vertical airflow. The drycooler shall have a capacity matching the capacity of the air conditioning unit at an ambient temperature as indicated on the drawings and schedule. The drycooler shall consist of casing, drycooler coil, fans, fan guards, and mounting legs. It shall be factory-assembled, wired and tested, and shall be ready for field installation. It shall be furnished complete with components and necessary controls as specified hereinafter.
  - ii. Casing: The casing shall be constructed of minimum 16-gauge aluminum sheet and divided into individual fan sections by full-width baffles. Structural support members shall be galvanized steel construction. Mounting legs shall be 10-gauge aluminum construction with rigging holes.
  - iii. Dry Fluid Cooler Coil: The coil shall be constructed of copper tubes with aluminum fins and shall be dehydrated, evacuated and sealed. Coil and fins shall be coated with a baked

- phenolic coating. The drycooler coil shall be hydrostatically tested at 400 PSIG and rated for 300 PSIG working pressure.
- iv. Fans: Direct-drive propeller fans shall have aluminum blades secured to a corrosion-protected steel hub. Blades shall be secured to fan shaft by means of a heavy-duty keyed hub and dual set screws. Ball bearings shall have a minimum L-10 life span of 200,000 hours. Fans shall be factory balanced and tested to meet AMCA Standard 204. Fan guards shall be heavy gauge, close-meshed, steel wire, with corrosion resistant finish. Fans shall be resiliently mounted to drycooler frame. Sound level shall be no greater than 75 dB measured five (5) feet from the unit.
  - v. Fan Motors: Fan motors shall be totally-enclosed air over (TEAO), equipped with rain shields and permanently-sealed ball bearings with a minimum L-10 life span of 200,000 hours. Motors shall include built-in overload protection. Motors shall be rigidly mounted on galvanized steel supports.
  - vi. Fan Control: Fan control shall be microprocessor-based. Fan cycling shall be used to control leaving fluid temperature by cycling the two fans in one (1), two (2) or three (3) steps. The 24-volt control circuit shall be provided with control transformer, fan contactors, and temperature control as specified. The local control shall include four (4) aquastats, an outside air temperature (OAT) switch, and controls to meet the sequence of operations on the Contract Drawings.
  - vii. Drycooler Electrical Control Panel:
    - 1) All electrical connections shall be furnished and installed in a weatherproof NEMA 3R control panel. The control panel shall be integral with the drycooler and shall be factory-wired and furnished with control transformer, contactors, and all necessary control components for proper operation of the unit. A complete wiring diagram shall be mounted on the inside of the panel. The drycooler shall be provided with NEMA 4X disconnect switch mounted and wired.
    - 2) Drycooler shall have single power feed. Drycooler electrical panel shall supply power to glycol pumps.
    - 3) All power and control wiring shall run in rigid galvanized steel (RGS) conduit.
  - j. Glycol Dual Pump Package
    - i. General:
      - 1) The dual pump package shall include pumps, pump enclosure, expansion tank, and air separator.
      - 2) Controls shall include a field-mounted flow switch.
      - 3) Pumps shall be powered and controlled through the drycooler electrical panel and provided with step-down transformer as required.
    - ii. Pumps:

- 1) Furnish and install factory-assembled and factory-tested centrifugal pumps.
- 2) Pumps shall be rated for a minimum working pressure of 125 psig.
- 3) Pumps shall be designed with non-overloading characteristics throughout their design curves (motors shall not operate at their service factors).
- 4) Impeller:
  - a) Impellers shall be ASTM B584, cast bronze, keyed to shaft.
  - b) Impellers shall be statically and dynamically balanced.
  - c) All impeller surfaces shall be machined and ground smooth.
  - d) If needed for water balancing purposes, provide an allowance for all necessary work in the field and shop to trim each pump impeller. Impeller shall be trimmed to no more than 90% of the largest allowable impeller size for that impeller casing to meet design capacity.
- iii. Pump and Motor Bearings: Unless otherwise noted on the Contract Drawings, furnish permanently lubricated ball bearings, with a minimum (L-10) life rating in excess of 200,000 hours. Pump provided with mechanical seals with carbon rings and silicon-carbide seats, stainless or brass metal parts, stainless steel springs, and Buna-N or ethylene propylene terpolymer (EPT) bellows and gasket, unless otherwise noted on Contract Drawings. Seals shall operate satisfactorily to 250 degrees F without external cooling.
- iv. Pump motors shall be TEFC and single speed.
- v. Pumps shall be mounted on steel channel frame. Frame shall be capable of being bolted down to seismic roof curb.
- vi. Pump controls be factory-wired and located in the drycooler control panel.

Controls shall include, but not be limited to, the following components:

  - 1) Pump starters
  - 2) Built-in disconnect switch
  - 3) Automatic controls to switch to the standby in the event of failure of the primary pump. Switchover shall be initiated by a flow switch, shipped with the dual pump package.
  - 4) Manual switch to select which pump is primary and which pump is standby
- vii. Pump internal components shall be serviceable without disturbing motor or connected piping. Removable bearing housings shall permit inspection and/or replacement of the mechanical seals, shaft sleeves, and bearings without requiring removal of the rotating assemblies or top casing halves.

- k. Glycol Pump Enclosure:
    - i. Pump enclosure shall be 16-gauge aluminum (minimum). Enclosure shall be all-welded, waterproof, and vented.
    - ii. Pump enclosure shall be capable of being bolted down to the seismic roof curb.
    - iii. Pump enclosure shall have a removable top.
  - l. Expansion Tank:
    - i. Furnish and install diaphragm-type expansion tank.
    - ii. Shell shall be welded carbon steel construction per ASME Boiler and Pressure Vessel Code, stamped with "U" symbol, factory-pressurized at the pressure shown on the Contract Drawings.
    - iii. Furnish and install dielectric fittings at system connections.
    - iv. Diaphragm shall be heavy-duty butyl, bonded with propylene liner to tank shell.
  - m. Air Separator
    - i. Furnish and install an in-line type air separator. Air separator shall have brass body with threaded inlet and outlet connections, bottom threaded connection to expansion tank, and top connection to air vent.
    - ii. Air separator shall have a stainless steel internal coalescing medium design that traps and collects air bubbles.
    - ii. The air separator shall be rated for 150 psig and 250 degrees F.
  - n. High-Capacity Automatic Air Vent: Furnish and install a high-capacity automatic air vent. Air vent shall have a brass body and stern, with a cap of non-ferrous metals. The air vent shall be rated for 150 psi and 250 degrees F and shall be suitable for use with specified glycol solution.
  - o. The system shall be capable of minus 20 OR minus 30 degrees F outdoor ambient operation.
- 3. Free Cooling Dual Source Systems:** The dual cooling source system shall consist of an air or water cooled compressorized system with the addition of a chilled water coil, a modulating control valve, and a comparative temperature sensor. The system shall be able to function either as a modulating chilled water system or as a compressorized system, or a combination of both. The primary mode of cooling shall be chilled water. Switchover between the two cooling modes shall be performed automatically by the microprocessor control.
- a. Hydronic Economizer Cooling Coil: The unit hydronic economizer coil shall be constructed of seamless copper tubes expanded into aluminum fins and be located upstream of the evaporator coil. The hydronic economizer coil shall be designed for closed-loop applications using properly treated water or glycol solutions. The coil shall be hydro statically tested at 400 PSIG and rated for 300 PSIG working pressure. The unit will be with a modulating two (2) way or three (3) way,

pressure independent control valve. Refer to schedule for information on water or glycol cooling medium.

- i. Cooling Medium: Water.
- ii. Control Valve: Class 125 body.
  - 1) Maximum Pressure Drop: 21 kPa (3 psig) at design flow rate.
  - 2) Close-Off (Differential) Pressure Rating: 100 percent of pressure differential across valve or 100 percent of total system (pump) head.
- iii. Mount coil assembly over stainless-steel drain pan complying with ASHRAE 62.1-2004 and having a condensate pump unit with integral float switch, pump-motor assembly, and condensate reservoir.

**F. Extended-Surface, Disposable, Panel Filter:** Pleated, lofted, nonwoven, reinforced cotton fabric; supported and bonded to welded-wire grid; enclosed in cardboard frame with disposable, glass-fiber filter.

1. Thickness: 2 inches or 4 inches
2. Initial Resistance: 0.3 inch W.G. maximum
3. Recommended Final Resistance: 1.0
4. Arrestance (ASHRAE 52.1): 30 percent
5. Merv (ASHRAE 52.2): 8

**G. Electric-Resistance Heating Coil:** Enclosed finned-tube electric elements arranged for minimum of two stages, with thermal safety switches, manual-reset overload protection, and branch-circuit overcurrent protection.

**H. Electrode Steam Humidifier:** Self-contained, microprocessor-controlled unit with disposable, polypropylene-plastic cylinders, and having field-adjustable steel electrodes and stainless-steel steam dispersion tube.

1. Plumbing Components and Valve Bodies: Plastic, linked by flexible rubber hosing, with water fill with air gap and solenoid valve incorporating built-in strainer, pressure-reducing and flow-regulating orifice, and drain with integral air gap.
2. Control: Fully modulating to provide gradual 0 to 100 percent capacity with field-adjustable maximum capacity; with high-water probe.
3. Drain Cycle: Field-adjustable drain duration and drain interval.

**I. Integral Electrical Controls:** Unit-mounted electrical enclosure with piano-hinged door, grounding lug, combination magnetic starters with overload relays, circuit breakers and cover interlock, and fusible control-circuit transformer.



- J. Disconnect Switch:** Non-automatic, molded-case circuit breaker with handle accessible when panel is closed and capable of preventing access until switched to off position.
- K. Electronic-Control System:** Solid state, with start button, stop button, temporary loss of power indicator, manual-reset circuit breakers, temperature control, humidity control, and monitor panel.
1. Monitor Panel: Backlighted, with no visible indicator lights until operating function is activated; indicators include cooling, humidification, loss of airflow, change filters, high temperature, low temperature, high humidity, low humidity, high head pressure (each compressor), and low suction pressure (each compressor).
  2. Temperature- and Humidity-Control Modules: Solid state, plug-in with adjustable set point, push-to-test calibration check button, and built-in visual indicators to show mode of operation.
  3. Location: Behind hinged door in front of unit; isolated from conditioned airstream to allow service while system is operating.
- L. Microprocessor-Control System:** Continuously monitors operation of process cooling system; continuously displays room temperature and room relative humidity; sounds alarm on system malfunction and simultaneously displays problem. If more than one malfunction occurs, system displays fault in sequence with room temperature and continues to display fault when malfunction is cleared until system is reset.
1. Malfunctions:
    - a. Power loss
    - b. Loss of airflow
    - c. Clogged air filter
    - d. High room temperature
    - e. Low room temperature
    - f. High humidity
    - g. Low humidity
    - h. Smoke/fire
    - i. Water under floor
    - j. Supply fan overload
    - k. Compressor No. 1 - Overload.
    - l. Compressor No. 1 - Low Pressure
    - m. Compressor No. 1 - High Pressure
    - n. Compressor No. 2 - Overload
    - o. Compressor No. 2 - Low Pressure
    - p. Compressor No. 2 - High Pressure
  2. Digital Display:
    - a. Control power on
    - b. Humidifying
    - c. Dehumidifying
    - d. Compressor No. 1 – Operating
    - e. Compressor No. 2 – Operating

- f. Heat operating
  - g. Chilled water cooling
  - h. DX cooling
3. Push buttons shall stop and start process cooling system, silence audible alarm, test indicators, and display room's relative humidity.
  4. BMS Interface: Factory-installed hardware and software to enable the BMS to monitor, control, and display unit status and alarms.
    - a. Hardwired Points:
      - i) Monitoring: On-off status, common trouble alarm space temperature space relative humidity
      - ii) Control: On-off operation, space temperature set-point adjustment space relative humidity set-point adjustment.
    - b. ASHRAE 135 2004 (BACnet), open-protocol communication interface with the BAS shall enable the BAS operator to remotely control and monitor the unit from an operator workstation. Control features and monitoring points displayed locally at unit control panel shall be available through the BAS.

#### **M. Factory Options:**

1. Zone Leak Detection Monitoring System With 50 Feet Cable: Factory provided leak detection monitoring system comes complete with monitoring unit and sensor cable. System provides monitoring of critical areas for water and water based liquids. Sensor cable is typically placed around the perimeter of a room or around a piece of equipment that is to be monitored for leaks. System continuously monitors the capacitance of the sensor cable and detects changes from the initial value. Leak Detection system shall be installed by others.



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