COMPU-AIRE INC.
Specialized Environmental Air Conditioning Systems

COMPU KOOL III
-INSTALLATION AND OPERATION MANUAL-

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ISO 9001:2000 CERTIFIED

ETL LISTED Intertek

AIR COOLED (CKA)
WATER COOLED (CKW)
GLYCOL COOLED (CKG)
CHILLED WATER (CKC)
SPLIT EVAP. SECTION (CKE)

COMPU-AIRE

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ISO 9002 REGISTERED COMPANY

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ADDENDUM

CORRECT PHASING OF SCROLL COMPRESSORS:

The scroll compressor is a unidirectional compressor and will only compress refrigerant in one rotation direction. Therefore, the proper rotation of the scroll compressor must be checked. The scroll compressor will run in the reverse direction but it will not pump refrigerant and will draw substantially reduced current as compared to listed values, and will result in elevated sound levels. Scroll compressor will trip on internal protection after running for some time in the reverse direction.

Verification of the proper rotation of the scroll compressor is done by observing that suction pressure drops and discharge pressure rises when the compressor is energized.

WARNING:
EXTENDED IMPROPER OPERATION MAY ALSO VOID COMPRESSOR WARRANTY.

1 SAFETY INFORMATION

PLEASE CAREFULLY READ THE FOLLOWING SAFETY INFORMATION BEFORE PROCEEDING FURTHER

This installation and operation manual (IOM) contains important safety information that should be followed during installation or servicing of a Compu-Aire Compu Kool III system. Below is general safety information as well as descriptions of safety and accident prevention symbols that will be utilized throughout this document. In addition to safety information provided by this manual, all warnings, cautions, and safety instructions located on the unit should be adhered to at all times. If applicable, local codes or ordinances and any other safety requirements must also be taken into consideration when installing or servicing the unit.

This IOM should be stored in a safe and accessible location for service personnel during installation or servicing operations. When no longer needed, this IOM should be returned to its original location for future reference.

DESCRIPTION OF IMPORTANT ACCIDENT PREVENTION SAFETY SYMBOLS

SYMBOL	DEFINITION[1]
DANGER	**Indicates an extremely hazardous situation which, if not avoided, will result in death or serious injury. Use of this symbol is limited to the most extreme situations**
WARNING	**Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**
CAUTION	**Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. Caution may be also be used to alert against unsafe practices**
NOTICE	**Indicates a statement of company policy as the message relates directly or indirectly to the safety of personnel or protection of property**

[1]Accident prevention definitions per ANSI Z535.2- 2011.

HIGH VOLTAGE!

Unit utilizes high voltage power supply. There is a high risk of arc flash and electric shock. Always proceed with caution and wear protective equipment per NFPA 70E specifications at all times before working on the electrical control panel. Failure to comply can cause serious injury or death. The required unit power supply can be found on the nameplate located on the unit.

Service personnel should ensure that the main power supply to the unit is disconnected from the feeder when installation or servicing operations are being performed and when power is not needed.

Compu-Aire Compu Kool III Series equipment requires a permanent power connection from an isolated circuit breaker. The customer must provide earth ground to the unit per NEC, CEC, and local codes when applicable.

INSTALLATION AND SERVICING PERSONNEL TRAINING & QUALIFICATIONS REQUIREMENTS

Installation and service of this equipment should be done only by qualified personnel who have been specially trained and qualified in the installation or servicing of HVAC equipment. Improper installation may result in unaccountable loss or damage.

EQUIPMENT TRANSPORTATION, PROPER BRACING, & HIGH-SPEED MOVING PARTS

Every precaution should be taken before the time of transportation of the equipment that all transportation equipment such as forklifts is properly rated to transport the equipment. Not doing so may cause equipment damage, injury, or death. Please refer to the shipping slip or contact the factory to determine the weight of the unit.

Once installation of the equipment is complete, the equipment should also be properly braced or anchored to the floor or wall if necessitated by local codes and ordinances. Upflow units are especially at risk of falling over due to the fact that EC plug fans are installed at a higher distance from the unit's base, causing the center of gravity to be higher from the base compared to downflow units.

High-speed moving parts can cause serious injury or death. Ensure that all unit panels are installed before any functional testing is done.

SHARP EDGES, SPLINTERS, EXPOSED FASTENERS, AND HOT SURFACES

While every precaution has been made to ensure sharp edges, splinters, and exposed fasteners have been minimized internally and externally on the unit to prevent personal injury, it is highly recommended that all personnel installing or servicing the unit wear safety headgear, glasses, gloves, and shoes at all times. In addition, precaution should be taken to ensure the unit is sufficiently cool to perform any type of servicing operations.

A first aid kit should be readily available and accessible at all times when needed.

NOTICE

EQUIPMENT STORAGE POSITION AND LOCATION

Improper storage of unit may cause unintentional damage. If possible, keep unit in the upright position and store unit indoors at all times before time of installation. In addition, steps should be taken to ensure that the unit is protected from dampness, freezing temperatures, and contact damage.

NOTICE

EQUIPMENT TRANSPORTATION

Prior to transporting unit to final installation location, ensure that there are no risks of overhead interference. Relevant measurements of the unit and all doorways should be taken to determine if unit will be able to be transported to its final location without causing damage to the building and to the unit itself. Required unit clearances at installation site should also be confirmed prior to unit transportation for safe and proper installation operations.

NOTICE

LOCATION OF DRAIN AND WATER SUPPLY LINES

Drains and water supply and return lines should not be located above any equipment that could sustain water damage.

NOTICE

CLOGGED OR LEAKING DRAIN LINES

Any clogged or leaking drain lines must be inspected and maintained to ensure that drain water runs freely through the drain system. Proper installation, application, and service practices should be used at all times to minimize the possibility of water leakage from the unit. Water leakage can cause

severe property damage and loss of critical data center equipment. Suitable leak detection system should be installed inside or around the proximity of the unit to minimize any type of property damage.

REFRIGERANT LEAKAGE DUE TO FREEZING TEMPERATURES AND/OR CORROSION

Refrigerant leaking from the unit coil or piping due to freezing and/or corrosion can cause serious equipment and building damage. Use of proper antifreeze and inhibitors can prevent freezing and premature coil corrosion. To ensure proper unit normal operation, it is highly recommended that the water or water/glycol solution used on the system be analyzed every six months to determine the pattern of inhibitor depletion.

2 CONTACTING COMPU-AIRE FOR TECHNICAL ASSISTANCE

Compu-Aire uses the latest in electronic and software technologies to develop some of the most reliable and cost efficient air conditioning systems in the world. Since many of our customer installations are sensitive to down time, we stock nearly all components for your system ready for same day shipment. In addition, our service departments can usually diagnose and repair the electronic components and return them to you within a few days.

Our customer support staff is available should you require assistance in diagnosing a problem or in setting up your air conditioning system. During usual business hour, you may call at (562) 945-8971 between 8:00am and 04:30pm, Pacific Time, Monday through Friday except holidays, or you may send a facsimile message at (562) 696-0724 anytime. Finally, you may write us at Compu-Aire, 8167 Byron Road, Whittier, CA 90606.

Please do not return system components without prior authorization from Compu-Aire. Whether repair or replacement is required for in warranty or out of warranty parts, Compu-Aire must know what is being returned to keep proper records of returned parts. Call Compu-Aire's service center for a returned merchandise authorization number (RMA) and clearly mark all packages on the outside with the number before sending
them to us.

When contacting the factory, please have information ready as to the model and size of the air conditioner system and most important, the job number. Compu-Aire keeps a file on all equipment sold detailing system components using this latter number. All such information can be found on the Warranty Plate attached to each unit.

3 PRODUCT MODEL INFORMATION

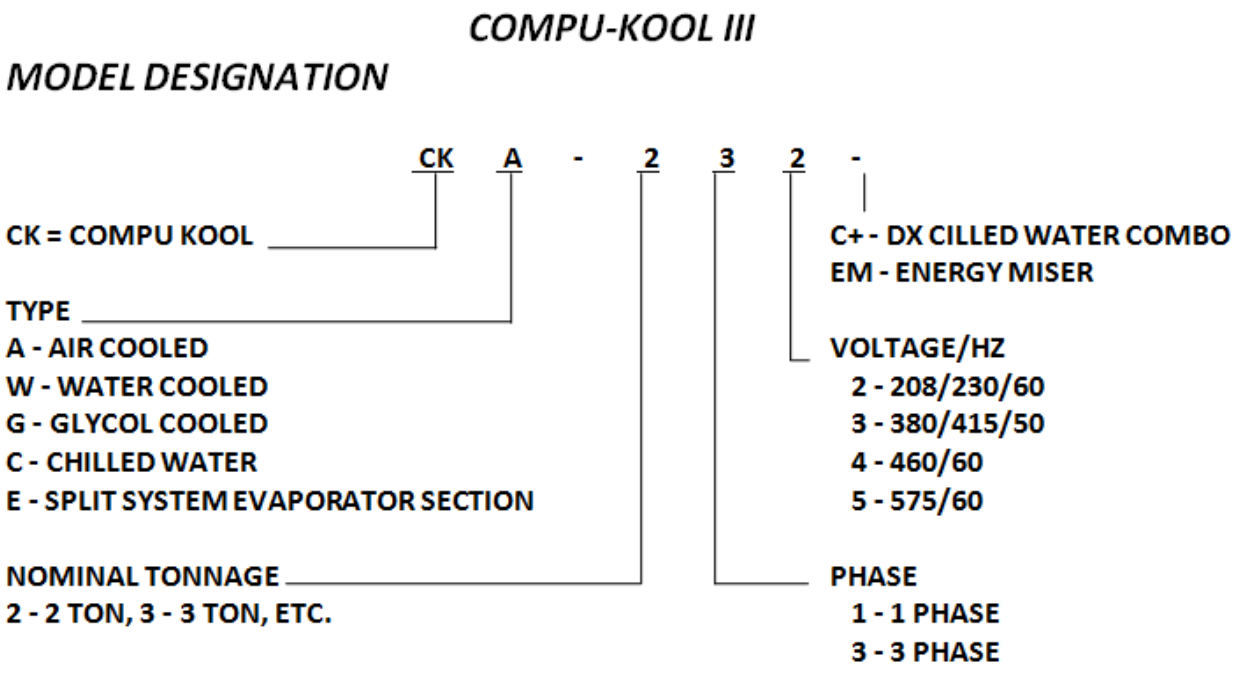

Figure 1. Unit Model Designation

4 GENERAL EQUIPMENT DESCRIPTION

The Compu-Aire Compu Kool III series is a complete environmental control system, factory wired, tested, and specially designed to provide temperature, humidity, and dust control for computer room installations.

The unit as shipped from the factory includes a blower/motor package, evaporator with expansion valves, co-axial condensers, water control valve, and humidifier, reheat elements, electrical control package, control monitor, and other specified special options.

The Compu Kool III is designed to provide localized temperature and humidity control in high heat load areas found in commercial and industrial setting. This free standing unit operates independently of the central air conditioning system and provided auxiliary cooling to a pre-selected environment. Completely factory assembled, piped, and wired, the Compu Kool III offers flexibility features to meet virtually any floor plans.
Finally a unique field reversible blower mounting allows air flow discharge to be reversed from an up-flow configuration to a downflow arrangement for raised flooring systems. Installed in the room center, against a wall, or in a corner, the Compu Kool III will deliver maximum performance at the lowest cost.
Maintaining consistent temperature and humidity conditions requires quick response to changing heat loads in the computer room. Compu KooL III meets this challenge through constant fan operation, thus preventing stratification of room air. Compu Kool III constantly monitors the return

air steam for any change in space conditions; the appropriate air conditioning mode is quickly initiated. All cooling, heating, humidification and dehumidification controls are fully automatic. To keep noise levels at a minimum, thermal and sound barrier insulation fully line cabinet. COMPU KOOL III is available as air, water or glycol cooled system. Compu Kool III answers the need for localized environmental control.

Compu-Kool system is available in several configurations.

4.1 Compu Kool III Air-cooled Systems

The Compu Kool III aircooled system may be a package (self-contained) system or a split system (evaporator section with compressor in a separate condensing unit). All the Compu Kool III air-cooled system consist of refrigeration parts (compressor, DX-Coil, sight glass, expansion valve) and additional refrigeration components depending on the options purchased.

Standard Compu Kool III system has features:

Cooling—one stage standard compressor, 2 stages optional

Heating[1]—two stages of electric reheat standard. SCR controlled reheat, hot water reheat optional

Humidification[2]—steam generating canister humidifier standard, infrared humidifier optional

Dehumification[3]—Hot gas bypass

4.2 Compu Kool III Water/Glycol Cooled Systems

The Compu-Kool water/glycol system consist all the air cooled system parts plus coaxial coil connected to cooling water or glycol for heat rejection. Pressure regulating valve used to control the condensing temperature has option of 2 way or 3 way valve.

Standard Compu-Kool system has features:

Cooling—one stage standard compressor, 2 stages optional

Heating[1]—two stages of electric reheat standard. SCR controlled reheat, hot water reheat optional

Humidification[2]—steam generating canister humidifier standard, infrared humidifier optional

Dehumification—Hot gas bypass

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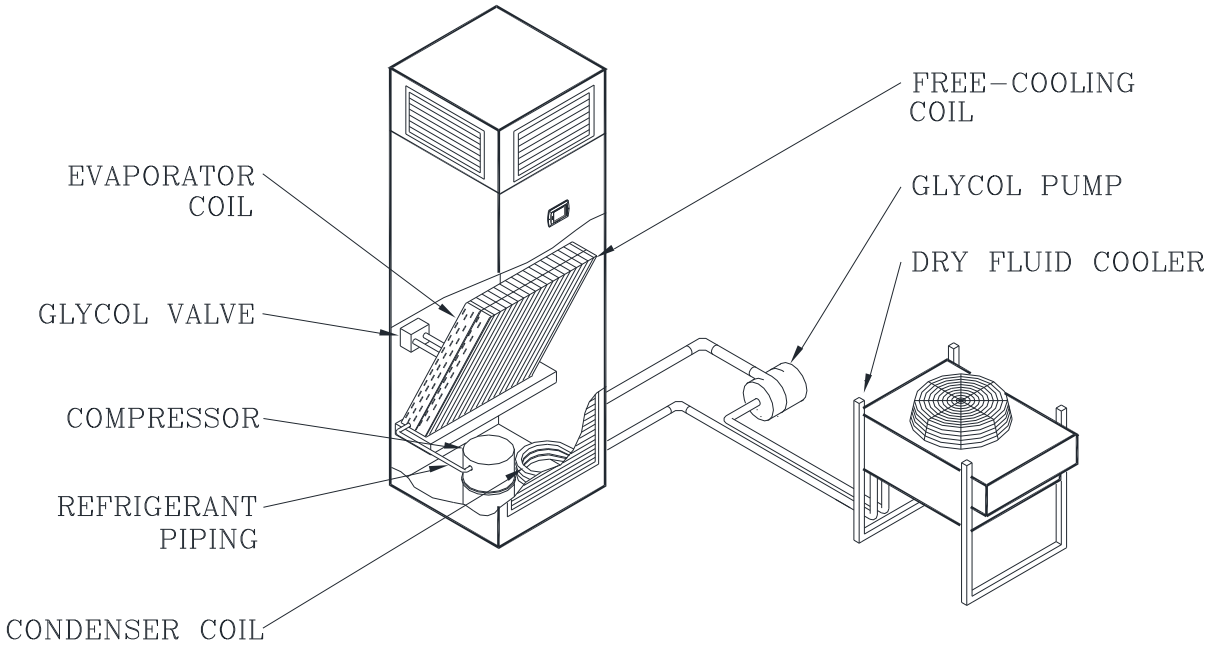
[1] Heating is optional

[2] Humidification is optional



4.3 Compu Kool III Chilled Water Systems

These systems utilize a central chiller and control cooling by modulating a control valve in the chilled water line.

Cooling—Proportional in response to room needs

Heating[1]—two stages of electric reheat standard. SCR controlled reheat, hot water reheat optional

Humidification[2]—steam generating canister humidifier standard, infrared humidifier optional

Dehumification—modulating valve opens proportionally in response to room needs.

4.4 Compu Kool III Evaporator Section--- Split System

This system generally consist of DX coil, expansion valve, solenoid vavle, and service valve in the indoor unit with the compressor and condenser coil are in the split unit, condensing unit (outdoor unit). The standard Compu Kool evaporator section has the option features (reheat, humidified) installed in the unit if purchased. Refer to Air Cooled Condenser Unit IOM manual for details of the condensing unit for the Compu Kool III split system.

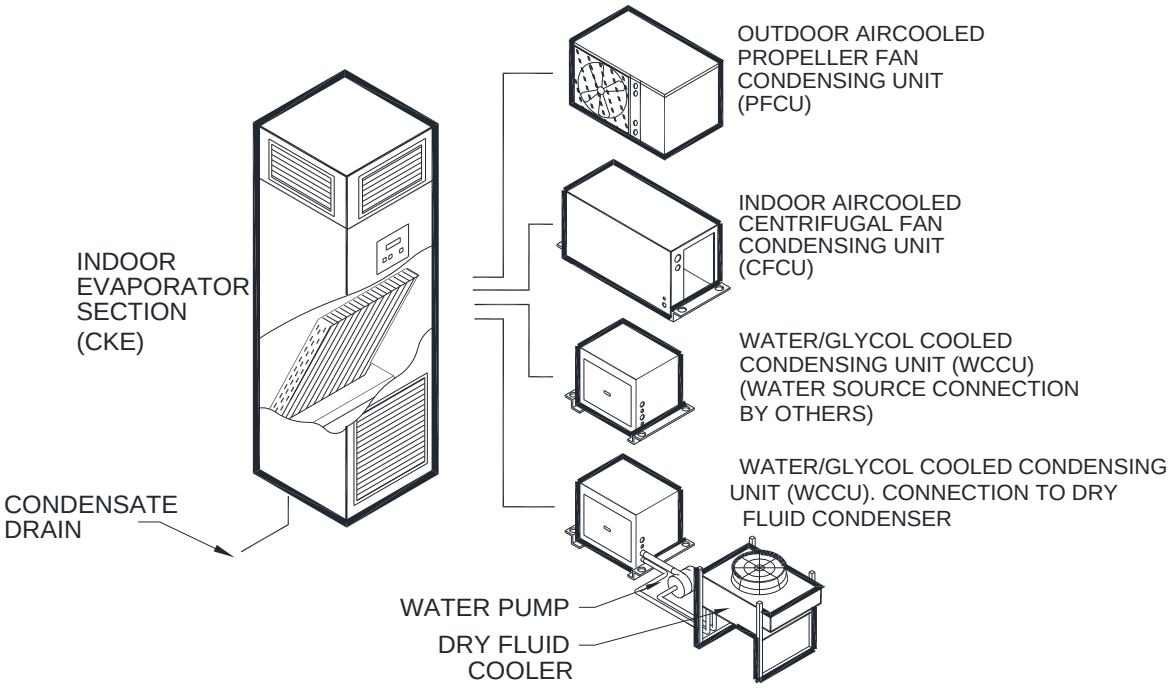


Figure 2 Compu Kool III Split System

5 RECEIPT OF UNIT AND TRANSPORTATION

Upon receipt of the unit, a visual inspection is required. The unit packaging should be entirely intact and the crate should not be damaged. Transport the unit to the desired location in the upright position to avoid damaging to any external panels or internal components. Once the unit is uncrated and in the desired location, inspection of the unit for any external damage is crucial as this may be indicative of internal damage. Any signs of damage to the packaging or system panels or incomplete shipments require a claim to be filed with the shipping company. Freight damage claims are the responsibility of the receiver.

Any items designated as field installed shall be packaged inside of the unit and must be removed and installed prior to startup of the equipment.

Optional articles such as jack-stand parts, condensate pump, and remote control panel are packaged separately.

REPORT ANY DAMAGE TO THE CARRIER. COMPU-AIRE IS NOT RESPONSIBLE FOR FILING OF ANY CLAIMS. ALL NEEDED INSPECTION AND CLAIM FILING IS THE RESPONSIBILITY OF THE RECEIVER

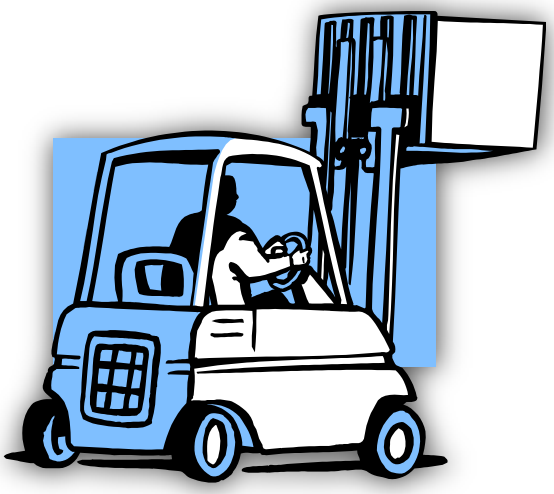


Figure 3 Transportation

5.1 TRANSPORTATION MODE

Visual inspection of the outer casing provides a simple indication of possible internal damage to the equipment. Move the unit to the installation site in the upright position.

FILE A CLAIM WITH THE SHIPPING COMPANY IF THE SHIPMENT IS DAMAGED OR INCOMPLETE. FREIGHT DAMAGE CLAIMS ARE THE RESPONSIBILITY OF THE RECEIVER.

Optional articles such as jack stand parts, condensate pump, and remote control panel are packed inside the unit.

5.2 IMPORTANT – READ BEFORE INSTALLING

⚠DANGER

Check the power supply. Voltage, frequency and phase must correspond to that specified on the unit nameplate. The power supply must be able to handle the additional load imposed by this equipment.

6 LOCATING THE UNIT

Consult local building codes and National Code for special installation requirements. When installing the unit, allow sufficient space for air flow clearance, wiring and servicing the unit. Left side, right side and front should have a minimum clearance of 36 inches for servicing. Rear clearance should be at least 1 inch to allow for out-of-square walls. The unit may be set directly on top of the raised floor or on adjustable jackstands.

The unit should not be placed near any corner of the room. For best air distribution, the unit should be place in mid-point against the unit should be place in mid-point against the longest wall, and as close to the load(s) as possible. For multiple units, place them as far apart from each other as possible for optimum air distribution. Before placing a unit directly on the raised floor, it is important that the proper openings have already been cut.

The location of the unit shall be selected based on air distribution in the room and service access requirement. Proper clearance is important for the unit function and access to various components for service.

Front clearance: 36”

Left clearance: 36”

Right clearance: 36”

Rear clearence: 1”

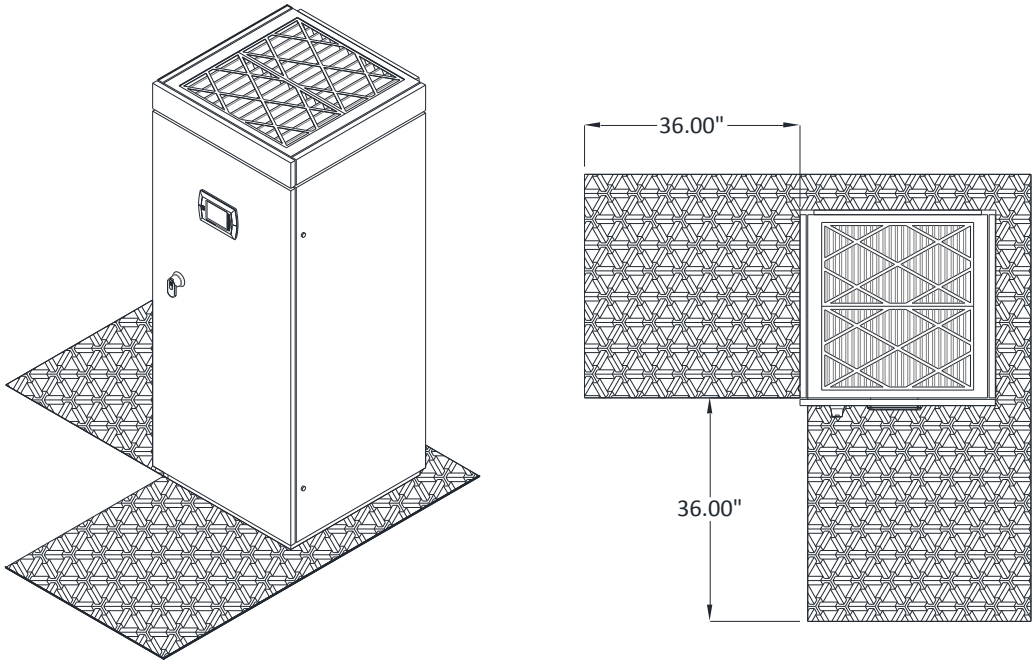


Figure 4 Floor Clearance Requirement

- Install unit on leveled solid floor that can support the unit weight and vibrations.
- Securely mount the unit with floor and brace it with wall if needed.
- Install the unit closer to the largest heat load.

Air distribution is very important for proper unit operation. Air balancing is required to obtain design CFM at site. Fan speed can be adjusted from the controller as needed. Several feet of clearance must be maintained between the supply air and return air intake of the unit. In existing room, the unit supply air shall be directed towards the air intake side of the heat load. Always locate air intake of the servers and any other heat load in the cold aisle for efficient air distribution. The unit supply air shall never be directed towards the exhaust fan of any heat load in the room.

6.1 Setting of the Unit

Locate the unit so the desired clearances are provided, paying special attention to floor height for downflow units. Make sure that piping under floor does not interfere with the discharge air of the unit. Unit can sit on an elevated flooring while remains fully accessible. Floor stand or other support maybe used to further support the unit.

After moving the unit to the desired location, the system needs to be leveled and anchored to the floor as directed by the building design engineer, typically using wedge anchors. Prior to anchoring the unit to the floor, verify locations for Chilled Water Supply and Chilled Water Return line connections, drain line connection as well as the electrical power input locations are matching with unit location requirement. Proper electrical supply power is an absolute necessity as the unit is designed specifically for the requirements on the nameplate. All knock-out shall be provided by others in the field.

The unit is designed with draw-thru air pattern with negative pressure inside. The condensate drain connection with a proper p-trap is factory installed to prevent the water is drawn back by the fans.

6.1.1 Down Flow Units

Down flow units are required to be installed on floor stands. Verify that the raised floor has been properly sized for the design air flow. The raised floor shall be free of air flow restrictions. The height of the adjustable floor stand can be raised or lowered through the use of the adjusting rods. The supply air shall be directed into the cold aisles and avoid any short cycling of cold air back to the unit return air. Floor stand height for down flow models shall be selected based on unit CFM, fan size and static pressure requirement. The floor stand must be securely mounted and all locknuts must be tightened to assure rigidity. See provided floor stand drawing for installation detail.

6.1.2 Upflow Units

The unit may be placed directly on the sub floor. The up flow unit may have duct connection or an optional discharge air plenum. Typical up flow unit has front return configuration but optional rear return with filter box is available.

The most desirable location to maintain appearance is against a wall. All incoming pipes and wires can be fed to the unit directly through the wall. If the room is equipped with the raised floor, the unit can be located anywhere

6.2 Connections

In connecting the unit, several items must be addressed. They are:

6.2.1 Structural Support

The unit can be installed directly on the floor of on the raised floor without the need for any special support. The floor should be level. Gasket material should be placed between the bottom perimeter of the unit and the floor on the downflow unit to act as vibration isolator. The gasket should be foam, ½" x 3/8". No gasket is needed on the upflow unit.

6.2.2 Electrical Support

A fused disconnect or a HVAC approved circuit breaker must be field provided and install per the National Electric Code (NEC). There is acces to the unit for electrical connection through the unit bottom or the top panel on the unit. Be sure unit is properly grounded.

A fused disconnect must also be provided for the air cooled condenser/condensing unit for air cooled units and dry fluid cooler of the glycol cooled units.

6.2.3 Refrigeration Piping

It is of the greatest importance that all refrigerant piping be cleaned and free from dirt and moisture. One drop of water in a refrigerant system will greatly deter the operation and efficiency of the system. Upon installation, all open ends of piping should be sealed to prevent condensation from accumulating inside. (If it is not to be completed during the day). This avoids future problems, malfunctions and corrosion.

It is suggested that hot gas and liquid return lines be silver soldered, using one of the many types, such as silfoss, etc. Absolutely avoid soft solders such as 50/50 or 95/5. Use a flow of dry nitrogen through the piping while being soldered. (To eliminate formation of a copper oxide scale on the inside of the piping).

To reduce noise and pulsations, the air cooled systems are to be field provided with hot gas mufflers. Extreme care and planning must be exercised in running the refrigerant lines; they must be provided with proper isolation by the use of an Arma-Glex or rubber bushing on the supports. Under no circumstances should hot gas lines be laid on steel ceilings, or metal supports without a type of isolation or protection from vibration, which can possibly cause damage to the refrigerant lines.

6.2.3.1 Evacuation Procedures

CAUTION: PULL ALL FUSES EXCEPT MAIN FAN AND TRANSFORMER FUSES. To reduce the possibility of non-condensables in the refrigerant system during charging, the solenoid valves must be open and a vacuum must be pulled on both the suction side and the discharge side of the compressor.

PROCEDURE FOR DEHYDRATION - METHOD #1

1) Open all disconnect switches.
2) Pull all fuses except main fan and transformer fuses.
3) Turn disconnect ON
4) Start the main fan by pushing the main fan switch.
5) Check amperage on main fan and make sure it does not exceed FLA (full load amps).
6) Check fan rotation and correct if necessary.
7) Set thermostat at 40^{o}F.

8) Proceed with paragraph #4 in procedure #2.

PROCEDURE FOR DEHYDRATION - METHOD #2

By using a separate control voltage transformer having an output of 24 volts at 40 VA, the solenoid can be energized without starting the unit.

1) Turn all power OFF to the unit.

2) Remove all fuses including main fan and transformer fuses.

3) Connect the external transformer to the solenoid valves.

4) Evacuate the system in accordance with the following procedure:

Connect the refrigeration gauges on circuits #1 & #2 at both the suction and discharge service valves.

Start with circuit #1 and open all service valves. Place in circuit #1, 150 psig of DRY NITROGEN with a tracer of Freon for the purpose of leak checking. With pressure in circuit #1, open the discharge and suction valve on compressor #2. If pressure increases in #2, the system is cross circuited and must be re-checked for proper piping. If there is no pressure increase, place 150 psig of DRY NITROGEN with a tracer of Freon in circuit #2 and leak test.

After completion of leak testing, release test pressure & pull a vacuum on the system. Leave this pulled down for approximately 4 hours and re-check the gauge reading. If it has not changed purge with Freon, pull another vacuum of 250 microns, leave on for 2 hours and re-check the gauge readings. Purge with Freon and re-pull the vacuum of 250 microns (9.842 in. hg.) or less. After the completion of this step, fill the system with Freon vapor until pressures have equalized in the liquid and discharge lines.

6.2.3.2 Liquid Charge

After the final vacuum has been pulled on the systems, liquid refrigerant may be placed in the receivers. This is accomplished by the following procedure:

1) Make sure the unit is off and that the solenoids are closed.

2) Connect a set of manifold gauges to the refrigerant drum and to the receiver at the rotalock adapter.

3) Purge the refrigerant hoses so that no non-condesables will enter the systems.

4) Open the refrigerant drum so that the liquid will flow from the drum to receiver.

5) Open the rotalock valve and allow the refrigerant to flow into the receiver.

6) Close the rotalock valve and disconnect gauges.

7) Start the compressor.

6.2.3.3 Vapor Charge

1) After the dehydration procedures have been followed, replace the fuses in the condenser fan compressors and transformer circuits.

2) Connect hose from drum to suction port of the compressor, purge hose so that no non-condensables are in the hose.

3) Start the compressors check the level in the sight glass. If the level has lowered, add additional Freon to maintain the sight clear. After charging is complete, reset the high pressure switch.

Approximate charge required per circuit:

As recommended by ASHRAE MANUAL.

Total Charge = Basic Charge + Liquid Line Based on Hermetic Compressor Line and Refrigerated Liquid at 100F

6.2.3.4 Leak Testing

No installation is complete until the entire system has been thoroughly checked for leaks. This includes water tubing, humidifier make-up water, and condensate lines (if provided)

6.2.3.5 How to save the refrigerant charge

The process of opening a refrigerant circuit of the Compu Kool III and saving the refrigerant charge of the system to be opened requires only a few more minutes than does blowing the refrigerant charge. **Intentionally blowing the charge is illegal.**

The procedure for saving the refrigerant charge is as follows:

1) Open disconnect switch.`

2) Pull fuses on system not to be opened.

3) Install manifold on the receiver at each rotalock valve, using the high pressure gauge and the charging hose.

4) Purge the hoses to remove any condensables.

5) Start the unit and set the thermostat at 40 degrees F; this will start the compressor.

6) Return to the receivers.

7) Backseat the rotalock valves on the system being pumped down. Open gauge and rotalock valve on the other system.

8) During this procedure, watch the gauge pressure to prevent the receiver from over-filling. If the gauge pressure starts to rise, do not let the pressure exceed setting on pressure relief device located on the receiver.

9) Open the rotalock valve of the system, release vapor pressure present and make necessary repairs.

10) Evacuate the system. After evacuation is complete, the liquid can be transferred back into the proper system, through the manifold gauge.

6.2.4 Condensate Drain Connection

This must be equipped with 3/4" O.D. drain line. The contractor must provide and install a P-trap in this line at the lowest point in the unit or below the unit. A minimum slope of 1/4" per foot must be provided on the horizontal run.

6.2.5 Water Connection

For water cooled units where water supply shall be either city water or cooling tower. Provide a shut off valve in supply and return line for isolation

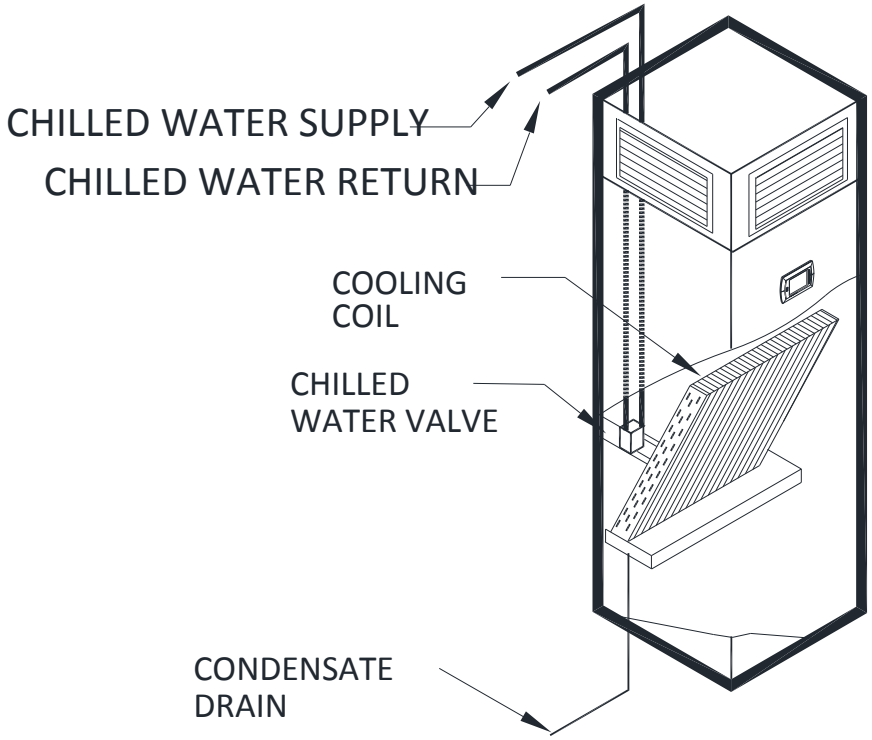


Figure 5 Upflow Unit Water Connection

6.2.6 Humidifier Connection

The humidifier is to be provided with a ¼" O.D. feed line and shut off valve. To connect the humidifier, bring in a ¼" O.D. copper line and connect to the humidifier shut off valve with the

compression fitting. Access to this line is on top panel of the unit for the upflow model and is on the bottom of unit for the downflow model.

FOR GLYCOL UNITS:

A close circuit dry fluid cooler is to be used. Provide shut off valves for isolation at supply and return at the unit and at the dry fluid cooler.

Note: Glycol and water cooled units are designed for maximum of 150 psig water pressure. Higher pressure units are available; refer to unit nameplate.

AIR COOLED UNITS: These units are designed to be used with a remote air cooled condensers. Standard units are designed for ambient controls down to 0°F. Air cooled condensers are provided with variable speed fan motor.

Condensers are dropped shipped from another source. Control panels for the condenser are shipped with the air conditioners. This control panel is to be wired and connected in the field. Provide a rain tight fused disconnect switch in the field. Provide a rain tight fused disconnect switch. Single fan units are generally single phase.

The power supply to the air cooled condenser must be brought through a fused disconnect of a proper handle the electrical requirement of the condenser.

Two 28 gauge wires are required between the air conditioner and the condenser to interlock indoor unit with the outdoor unit. Run wires in conduit. The connection is 24 VAC.

Suggested pipe sizes are: Refer to the ASHRAE guide for proper sizing and layout. **A CHECK VALVE MUST BE INSTALLED IN THE DISCHARGE LINE.**

FOR UNITS REQUIRED AMBIENT BELOW 70°F.
An optional head pressure control is provided. It is shipped with the air conditioner for field mounting; refer to the brochure enclosed in the box.

Receivers are installed inside the air conditioners.

Suggested pipe sizes are:
Hot gas – 7/8" – 50 ft TEL
Liquid Drain – 1 1/8" – 50 ft TEL (refer to ASHRAE guide for details)
(Liquids drain should be sized based on 100 FPM velocity)

- Once it is ascertained as to what kind of low ambient the unit is provided with, install proper size pipes and evacuate using triple evacuation method.
- Charge units based on superheat, set superheat not lower than 10°F and not greater than 15°F.
- Units provided with head pressure control valve and ambient below -10°F will require additional charge.
- Check valve-provide a check valve for the discharge like at the air cooled condenser.

6.2.7 Electrical Connection

The unit is completely factory wired with self-contained controls.

IMPORTANT - Before proceeding with the electrical connections, make certain that the volts, hertz and phase correspond to that specified on the unit rating plate. Also, check to be sure that service provided by the utility is sufficient to handle the additional load imposed by this equipment. Refer to the unit rating plate for equipment electrical requirements. The attached wiring diagram shows the proper high and low voltage field wiring.

Make all electrical connections in accordance with National Electrical Code and any local code ordinances that may apply. USE COPPER CONDUCTORS ONLY.

WARNING -- The unit cabinet must have an uninterrupted or unbroken electrical ground to minimize personal injury if an electrical fault should occur. It is important that an electrical ground wire of adequate size can be connected to the ground lug provided inside the control box.

Supply voltage at the unit must be within ± 10% of the voltage indicated on the nameplate for a dual voltage rating, supply voltage must be within 5% from the lower nameplate rating and within 10% from the higher rating. Phase to phase imbalance must not exceed 3%. Contact your local utility company for correction of improper line voltage. Improper electrical power supply may cause premature failures and void unit warranties

The system cutout terminals on the terminal strip are for connection to a "panic button" or remote shut-off if required. This should only be connected to a switch and NO EXTERNAL SOURCE OF POWER SHOULD BE INTRODUCED AT THIS POINT. The conductors should be sized depending on the length of run and the number of control transformers used in the unit. **Maximum voltage drop must not exceed 1 volt.** Each control transformer draws approximately 3 amps @ 24 V. For long runs where the conductor size becomes too large, an interlocking relay (field provided) should be used.

A dry contact (24 volts rating) is provided for terminals for a remote alarm connection.

If the control panel includes a condensate probe, make sure it is mounted below the unit against the floor area where water may collect. To check the operation of the probe, submerse it in a cup of water. The condensate alarm should energize

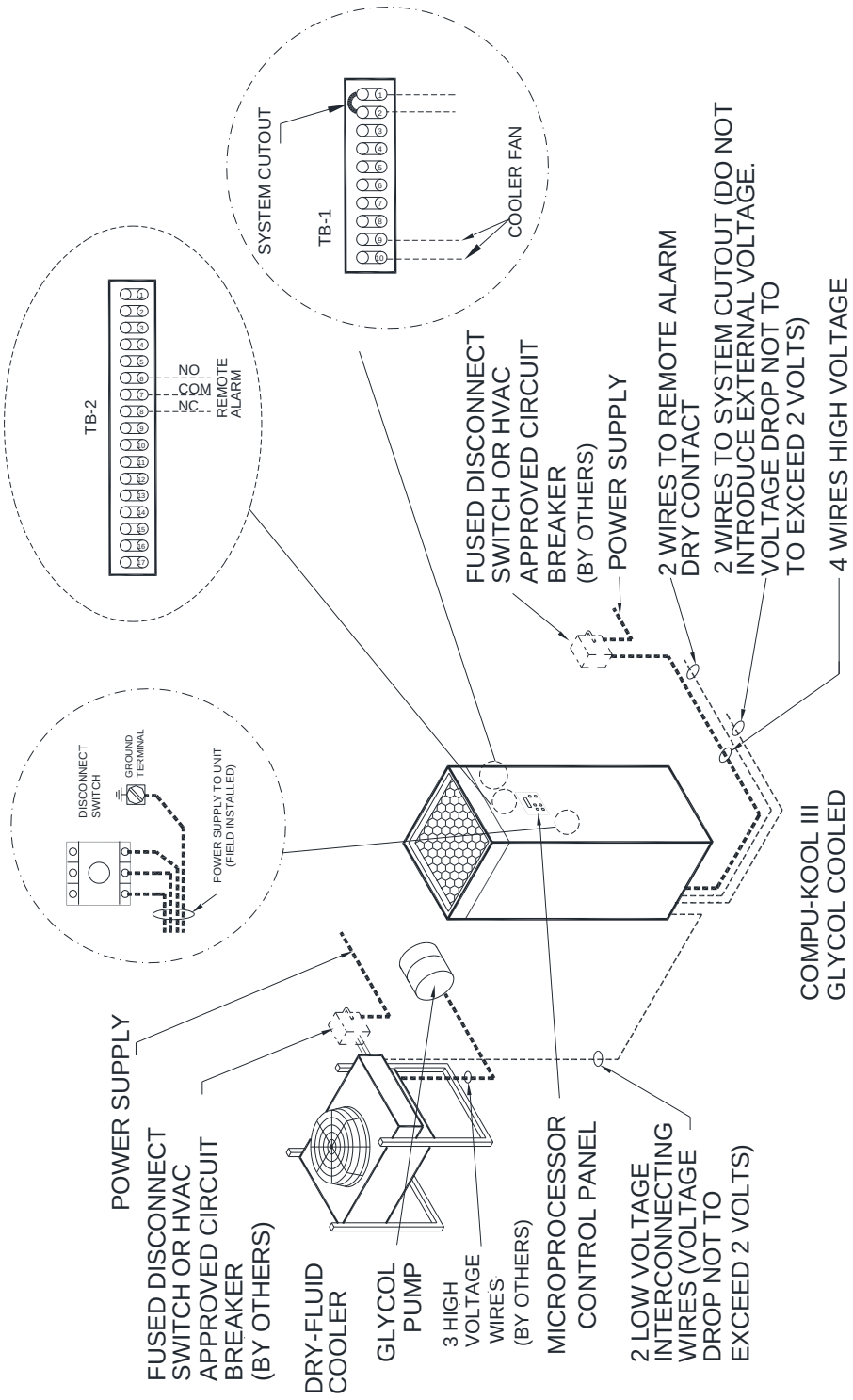
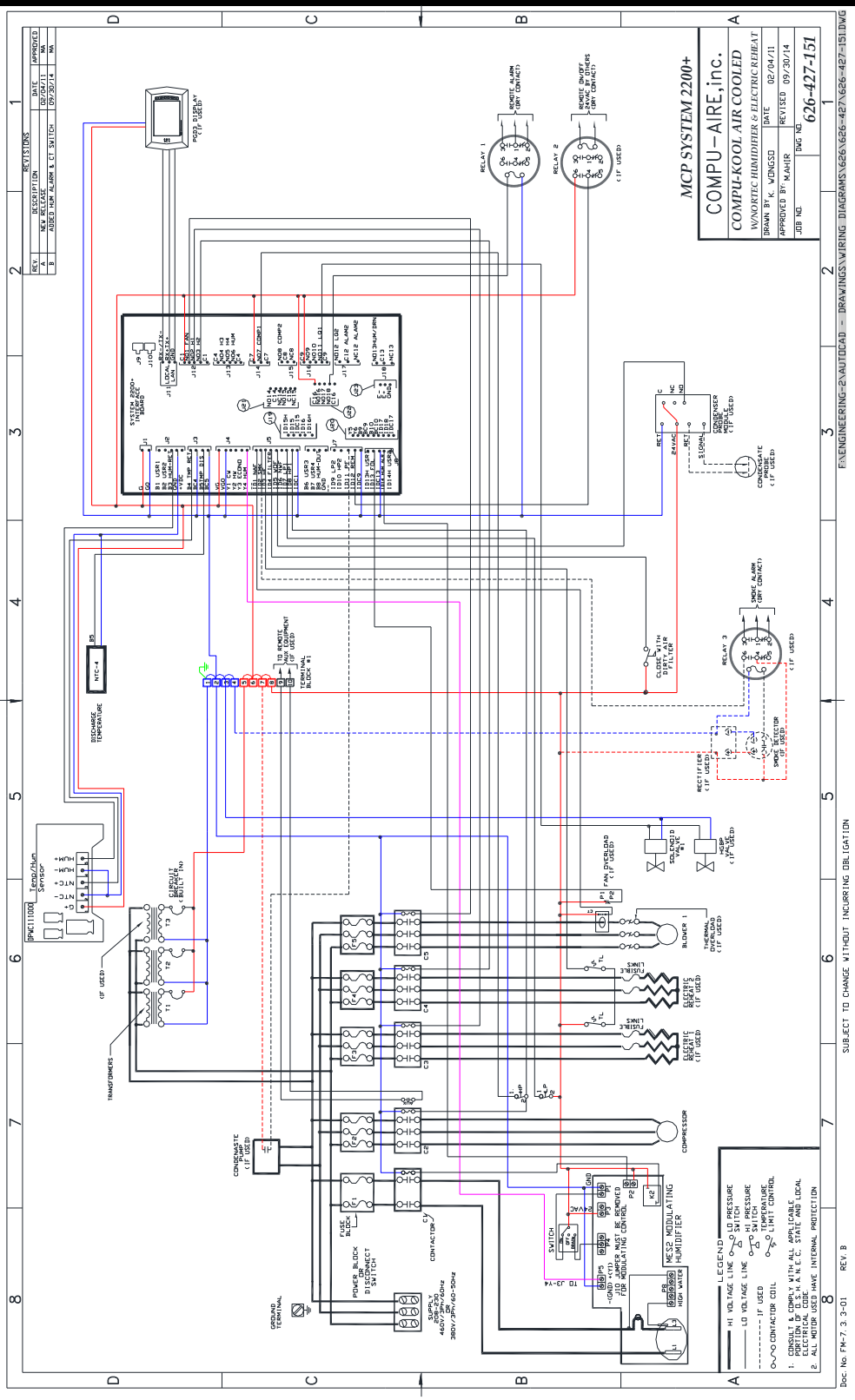


Figure 6 Typical Field Piping Connection and Wiring Connection

7 GENERAL WIRING DIAGRAM



8 COMPONENTS OPERATION GUIDE AND MAINTENANCE

HIGH-SPEED MOVING PARTS

Risk of high-speed moving parts can cause injury or death. Disconnect all local and remote electric power supplies and make sure blowers have stopped rotating before performing service operations.

Do not operate up-flow units without installing a supply air plenum, ductwork or protective guard over the blower openings.

The unit you have received is very special. It is specifically designed for Computer Room applications. Please read the following INSTRUCTIONS prior to working on the equipment.

ELECTRICAL DATA: 208v, 3 phase, 60 h, 460v, 3 phase, 60 hz, 208v, 1 phase, 60 hz, 575v, 3 phase, 60 hz, 3 phase, 60 hz, or 415/380v, 3 phase, 50 hz.
Please check the voltage.

NAMEPLATE DATA: Refer to the unit name plate. It indicates all the electrical data for the unit.
LOCAL ELECTRICAL CODES OR ANY OTHER APPLICABLE CODES MUST BE COMPLIED WITH PRIOR TO WORKING IN THE UNIT.

8.1 System Testing

The performance of all control circuits can be tested by actuating each of the main functions. This is done by temporarily changing the set points.

8.1.1 Cooling

To test the cooling function, set the setpoint for a temperature of 10°F (5°C) below room temperature. A call for cooling should be seen and the equipment should begin to cool. A high temperature alarm may come On. Disregard it. Return setpoint to the desired temperature.

8.1.2 Heating

Reheat may be tested by setting the setpoint for 10°F (5°C) above room temperature. A call for heating should be seen and the heating coils should begin to heat. Disregard the temperature alarm and return the setpoint to the desired temperature.

8.1.3 Humidification

To check humidification, set the humidity setpoint for an RH 10% above the room humidity reading. For infrared humidifiers, the infrared element should come On. Steam generating humidifiers should click immediately as it energizes. After a short delay, the canister will fill with water. The water will heat and steam will be produced. Return the humidity setpoint to the desired humidity.

8.1.4 Dehumidification

Dehumidification can be checked by setting the humidity setpoint for an RH 10% below room relative humidity. The compressor should come On. Return humidity setpoint to the desired humidity.

8.1.5 Electric Panel

The electric panel should be inspected for any loose electrical connections

8.2 Humidifier

Unit is equipped with one of the following humidifiers:

8.2.1 Infrared Humidifier

During normal humidifier operation, deposits of mineral solids will collect in humidifier pan and on the float switch. These must be cleaned periodically to ensure proper operation. Frequency of cleaning must be locally established since it is dependent on humidifier usage and local water quality.

⚠CAUTION PRIOR TO BEGINNING MAINTENANCE ON THE HUMIDIFIER, DISCONNECT THE MAIN POWER TO THE UNIT.

ALWAYS DISCONNECT THE POWER TO THE UNIT BEFORE DOING ANY SERVICES. Infrared lamps are extremely sensitive; take care not to touch the lamps directly with bare skin as the oils left as residue will cause the lamp to burn out very quickly. Infrared lamps are also very sensitive to vibration and shock; take extra care to avoid dropping or jostling the lamps prior to and during installation.

ONLY replace with the same power rating IR lamps supplied by the manufacturer.

Infrared Lamp Replacement Instructions:

- Disconnect main power to the unit.
- Untie and loosen the extra length of infrared humidifier power supply cable
- **(CAC AND CAA SYSTEM ONLY)** Remove 4 of the ¼-20 hex nut screws holding the lamp housing top cover (see Figure 7).

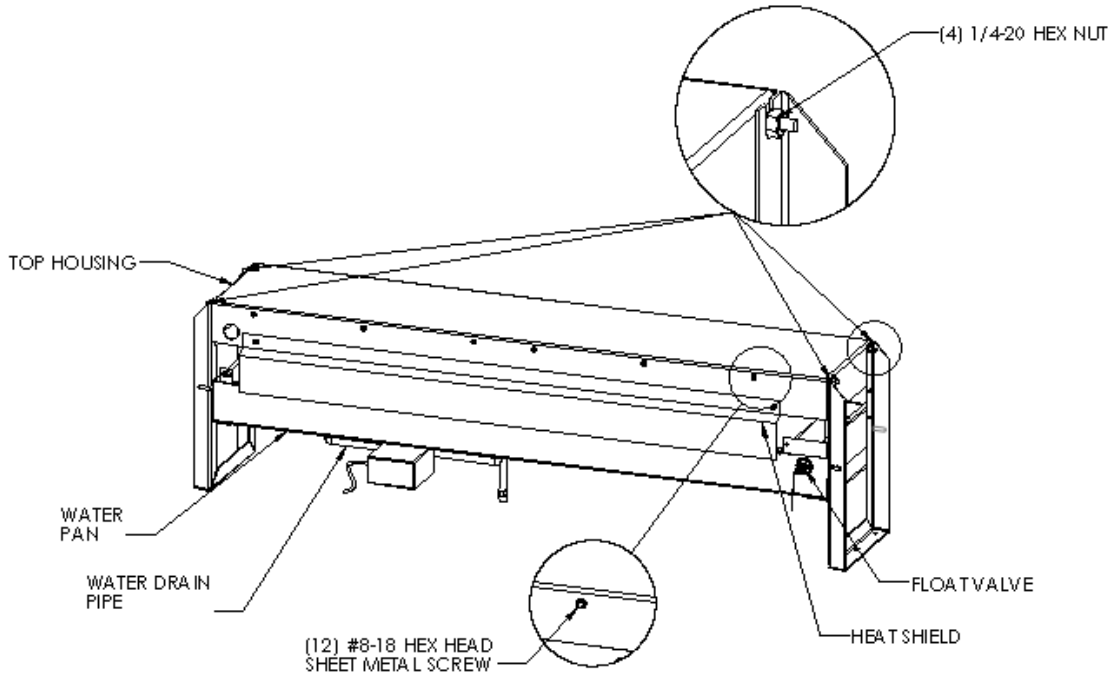


Figure 7. Infrared Humidifier Housing Assembly

- **(FOR ALL COMPU-KOOL MODEL ONLY).** To remove the top housing, loosen all the 6 of hex screws holding the top housing on the hangers and slide the top housing outward.
- Using both hands holding both ends of the top housing, lift the housing top cover up and pull the housing top cover out from the assembly slowly.
- Place the top housing top cover upside down with the lamps facing upside on a flat workbench/table cart.
- Loosen only the #8-18 hex head sheet metal screws securing the deflector panel of the defected lamp to detach the IR lamp deflector panel from the housing top cover (see Figure 7. Infrared Humidifier Housing Assembly

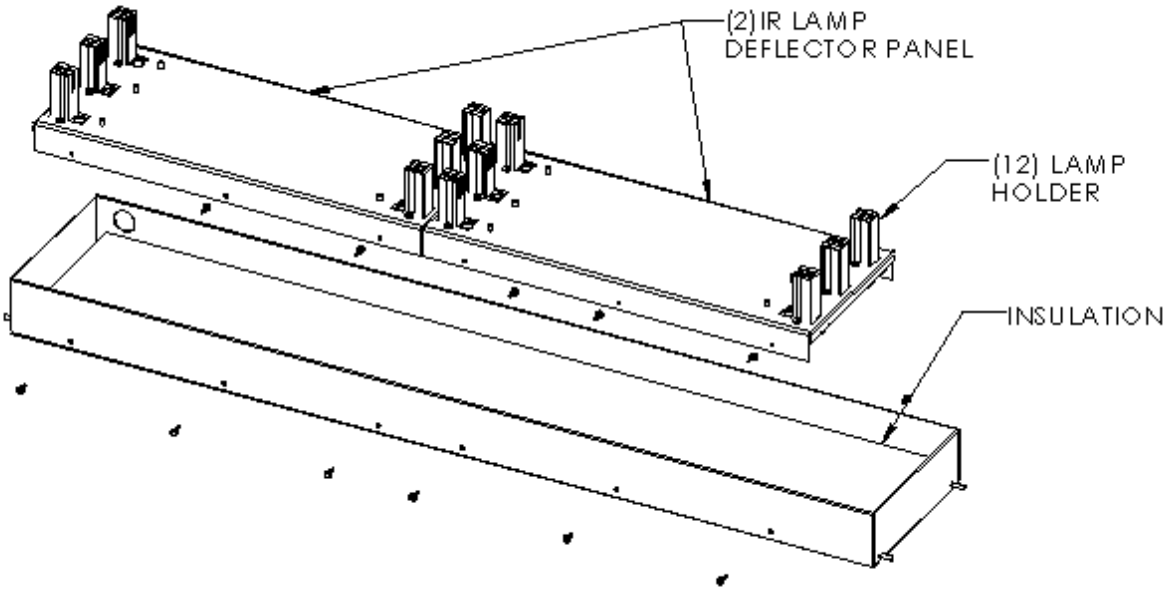


Figure 8 Deflector Assembly

- Using a flat screwdriver, loosen only the set screws that hold both end lead wire of the infrared lamps that needs to be replaced (see Figure 9).

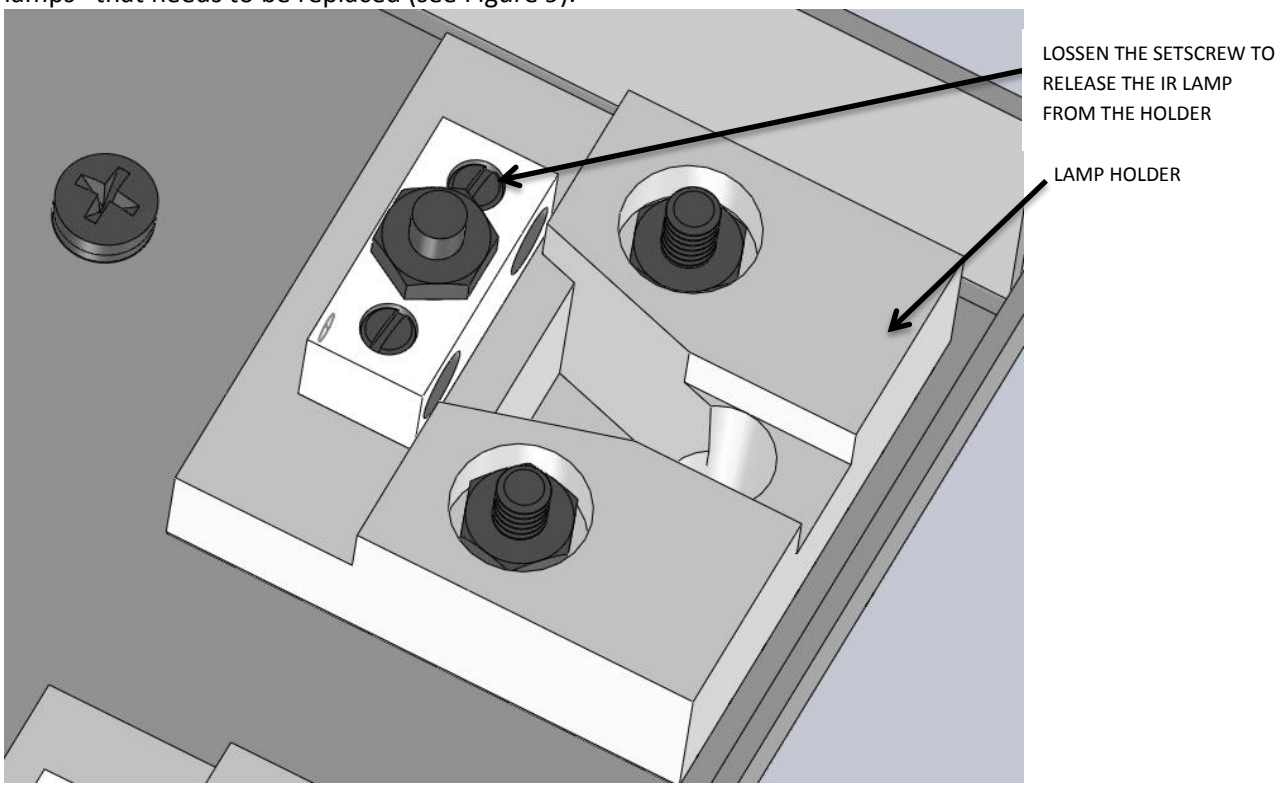


Figure 9 Infrared Lamp Holder

- Carefully detach the IR lamp from the holder and discard the lamp according applicable government regulations. Clean the IR lamp deflector with clean cloth to remove any residues (see Figure 10).
- Unpack the supplied new IR lamp replacement and replace the defected lamp with a new lamp.

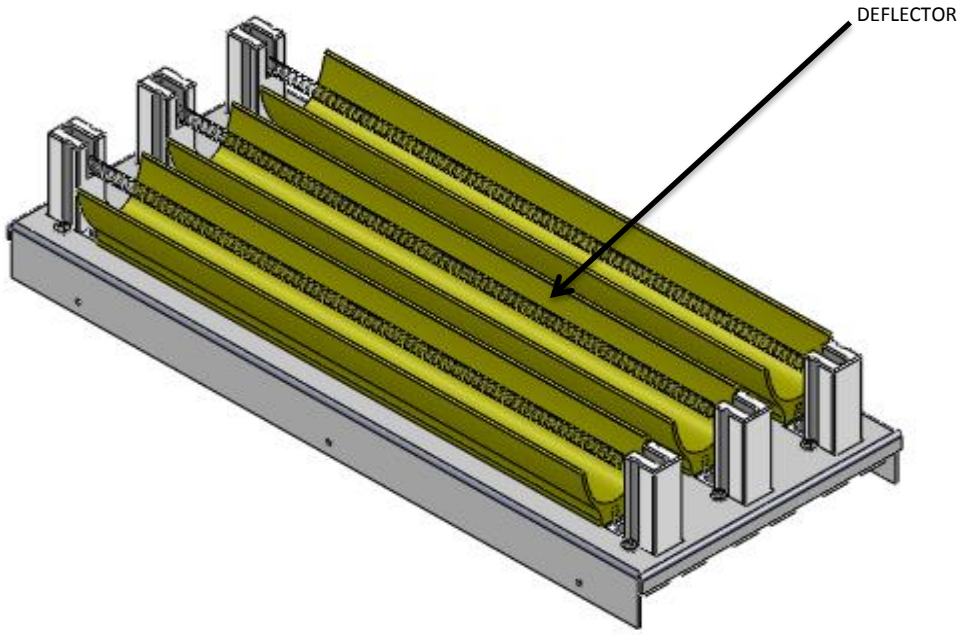


Figure 10 Infrared Lamp Position

- Carefully assemble the IR lamp panel back to the top housing and install the top housing back to the humidifier assembly by using all the same screws. Make sure tighten up all screws.
- Tie wraps the extra length of humidifier power supply cable to the unit properly.

Humidifier Maintenance Instructions

- Disconnect main power to the unit
- Drain all remaining water in the pan.
- Disconnect the water drain connection to the humidifier by loosen the water connection pipe and disconnect the all electrical connections to the float valve, thermal limit, and the solenoid valve (see

Figure 11)

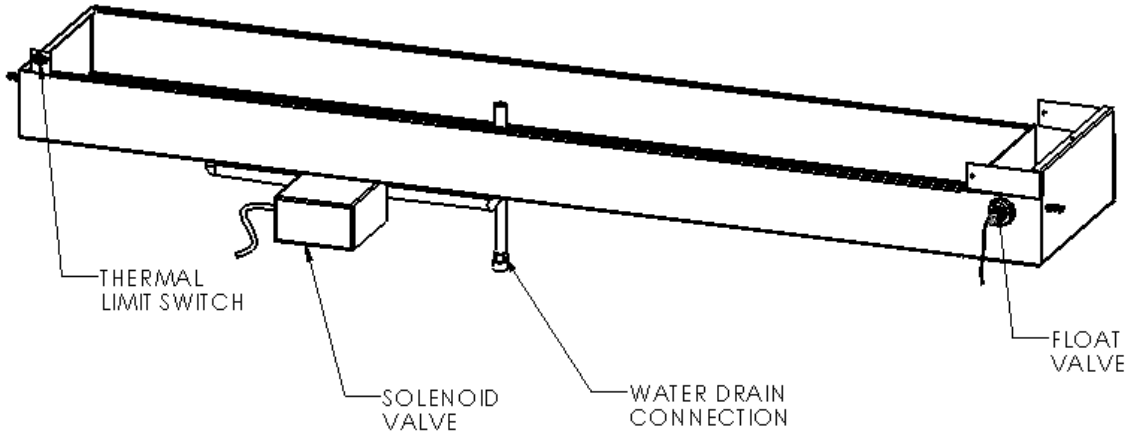


Figure 11 Water Drain Connection

- Remove the ¼-16 hex nut on each side of the humidifier assembly and pull out the water pan (see Figure 12).

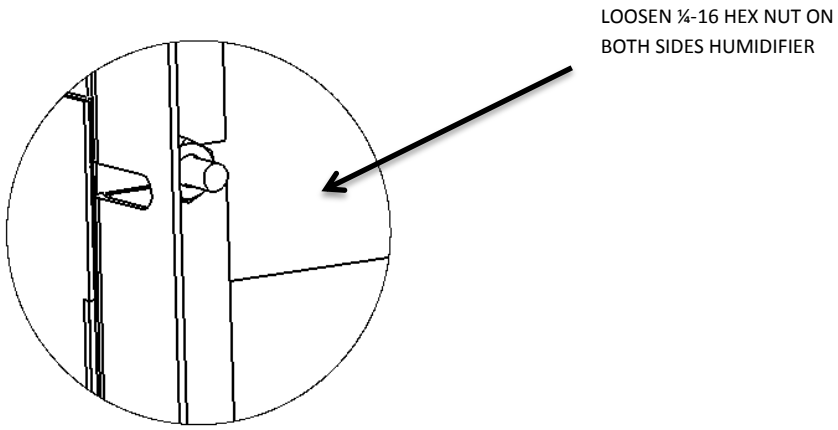
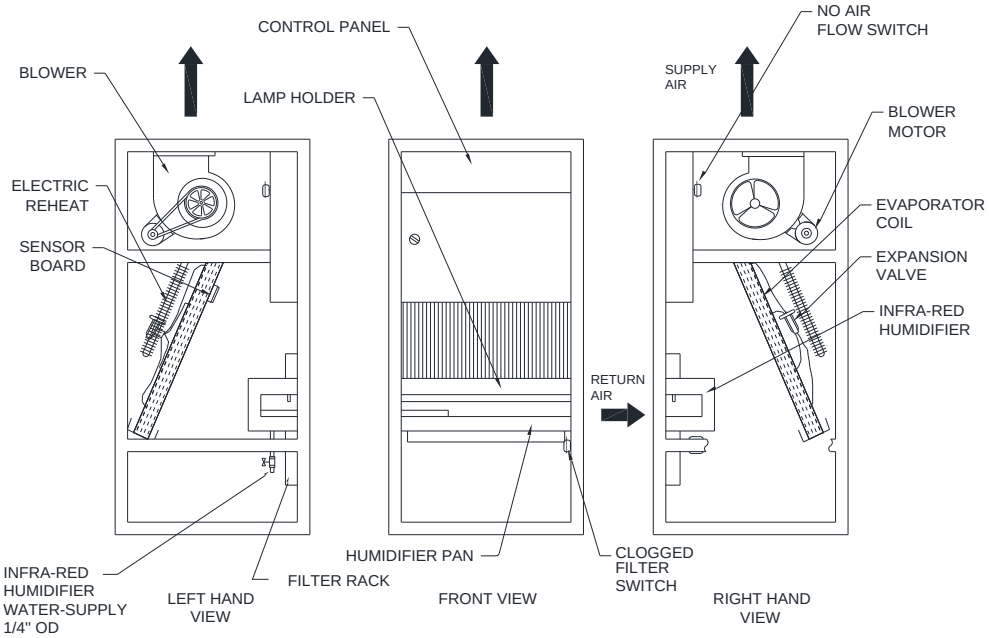


Figure 12 Infrared Water Pan

- To remove the water scale, sulfamic acid scale remover is recommended (check with your local supply house). Flush out all free scale, then add scale remove as noted by the manufacturer of the scale remover to the humidifier pan filled with water. If necessary, repeat the de-scaling procedure

until pan is clean. **NOTE: DO NOT EMPTY THE RESIDUE FROM EITHER OF THESE OPERATIONS INTO THE UNIT DRAIN SYSTEM. DO NOT USE ANY SHARP OBJECTS TO SCRAP OUT THE WATER SCALE ON THE WATER PAN.**

- Place the cleaned water pan back to the humidifier assembly and tighten 2 of ¼-20 hex to secure the water pan in place.
- Reconnect the water drain pipe and all electrical connection of the thermal limit, solenoid valve, and float valve.



8.2.2 Steam Humidifier

The steam humidifier on COMPU KOOL III system is the most advanced OEM steam humidifier and provides steady and reliable humidification using the same proven cylinder technology as Nortec's commercial NHTC. Depending on the unit configuration, the steam humidifier capacity can be range from 5 to 30 lb/hr. Each steam humidifier has different size of mounting cabinet and replaceable canister. Please refer to Table 5. Part List for the correct part number of the humidifier**. Refer to supplied installation and operation manual of the steam generator humidifier for a complete guidance.**

Figure 13 Steam Humidifier

8.3 Reheat

Unit is equipped with one of the following reheats:

- Electrical heating elements
- Hot Gas
- Hot Water
- Steam
- No reheat

Check your unit for the kind of reheat it has. For type hot water and steam piping connections are required. Make sure shut off valves are provided external to the unit.

The most common type of reheat used in Compu Kool III unit is the electrical heating elements. The number of the stages and elements depend on heating required for dehumification.

Figure 14 Reheat Elements

8.4 Condensate Drain

One condensate drain is provided on the Compu Kool III systems. The drain connection is trapped externally. Refer to Table 1. Piping Connection Data for drain piping connection size of the unit.

8.5 Condensate Pump (optional):

When provided it is shipped separately. To avoid any flooding problems provide a separate power source. WIRE THE PUMP TO SHUT THE SYSTEM OFF IN CASE OF OVERFLOW OR PUMP FAILURE. A SYSTEM CUT OFF TERMINAL IS PROVIDED IN THE UNIT.

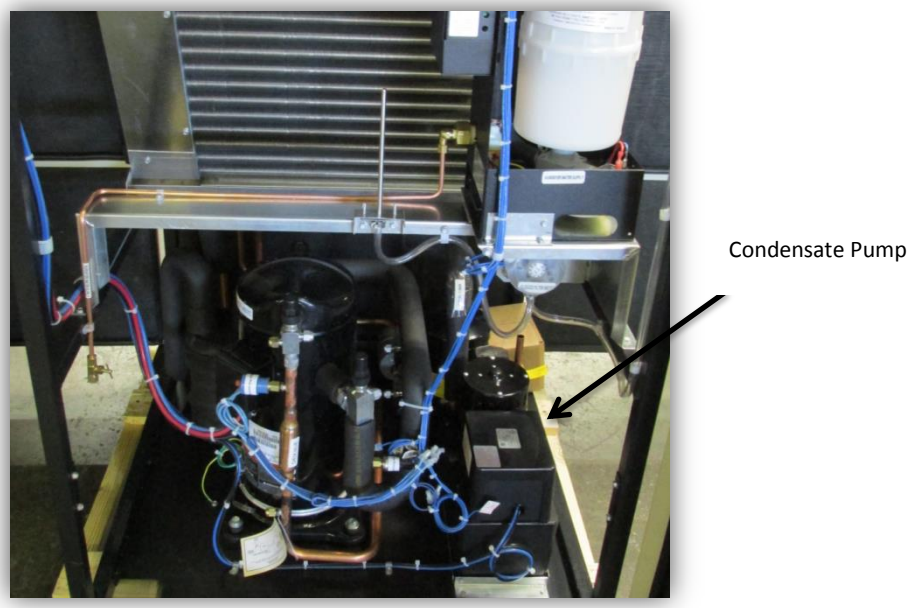


Figure 15. Unit Mounted Condensate Pump

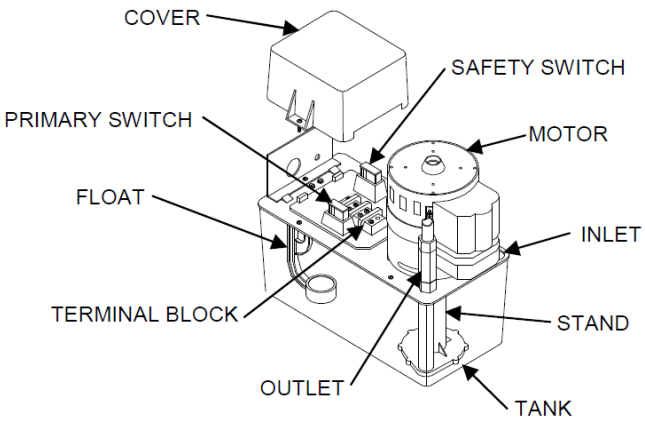


Figure 16 Condensate Pump Schematic

Refer to the provided owner's manual for a complete installation guide of the condensate pump.

COMPRESSOR: Standard units are provided with scroll compressors. Each compressor is provided with a safety high pressure switch. It is manual resettable and is factory set to open at 400 psig. A low pressure switch is also provided which is automatic reset.

AIR COOLED UNITS (CKA): These units are provided in two sections; indoor (Compu-Aire unit) and the outdoor (Air Cooled Condenser). Standard units are provided with Low Ambient control system operable down to 50°F. Variable Fan Speed Control along with fan cycling in case of multiple fans are provided for lower ambient condition.

AIR COOLED CONDENSERS (ACC): These are mostly dropped shipped to the job site ahead of the unit. Air cooled condenser supplied are usually provided with one of these options:

A. Fan Cycling
B. Variable Speed Fan Motor
C. Head Pressure Control
D. Control Box where motor wires terminates less any controls
E. Access fittings to hook up SCR controller

CONTROL PANEL: This is for the air cooled condenser which is shipped from COMPU-AIRE with the air conditioner. This control panel is to be installed and wired in the field. **MAKE SURE TO PROPERLY HOOK UP THE SENSOR CONNECTION TO THE SCR CONTROLLER WHICH ARE TO BE MADE IN THE FIELD**

FOR UNITS EQUIPPED WITH LOW AMBIEANT CONTROL BELOW -30°F: A head pressure control valve for each refrigeration circuit is provided and is shipped with the Computer Room air Conditioner for a FIELD installation on the air cooled condenser. An appropriate control panel for with fan cycling control is also supplied for field installation on the air cooled condenser.

ALL REFRIGERATION PIPING SHALL BE INSTALLED PER ASHRAE STANDARDS.

WATER COOLED UNITS (CW): These units are factory piped and wired Water cooled condensers(s) are complete with a head pressure control valve(s). Field piping must be provided with a shut off valve for the supply and return. **MAXIMUM WATER SIDE WORKING PRESSURE SHOULD NOT EXCEED 125 psig.** Higher pressure units are provided. Refer to the nameplate.

GLYCOL COOLED UNITS (CKG): These units are similar to water cooled units, except they are provided with remote DRY FLUID COOLER AND A PUMP.

DRY FLUID COOLERS: These are mostly dropped shipped on the job site prior to the air conditioner. These units are shipped from the factory with the following:

A. Control Box
B. Surge Tank (if ordered it is pre-piped)
C. Pump Mounting Kit consisting of a special mounting leg and a weather shield (optional)

CONTROL PANEL: With fan cycling thermostats, etc, are shipped from Compu-Aire with the air conditioner. This control panel is to be field mounted, wired and provide a fused disconnect switch for the power.

PLEASE NOTE the nameplate on the condenser does not include power consumed by the pump. Add these amps to the nameplate data prior to wire sizing, etc.

PUMPS FOR CKG MODELS: These are shipped from Compu-Aire along with the air conditioners. Pump supplied are internally protected, but in many localities local codes require that a separate fused disconnect be provided. These pumps are to be field mounted. Every care should be taken to ascertain that no undue noise of vibration be carried to the structure. Provide vibration eliminator and shut off valves.

DUAL PUMP PACKAGE WITH AUTOMATIC CHANGE OVER AND MANUAL CHANGE OVER (optional) FOR CKG MODELS: Control panel are factory supplied for field installation. Flow switch and check valve are to be supplied and installed by the contractor per drawing shown inside.

CHILLED WATER UNITS (CKC): These units are factory piped with a two or three way water regulating valve. These systems are designed for working pressure of 125 psig. Higher pressure- Refer to nameplate.

IMPORTANT SUGGESTION
In order to have trouble free operation free operation please maintain the humidifiers, regularly check the belts for proper tension and change filters when dirty.

For assistance, please call COMPU-AIRE, INC. at (562)945-8971

9 UNIT DIMENSIONS AND GENERAL COMPONENT LAYOUT

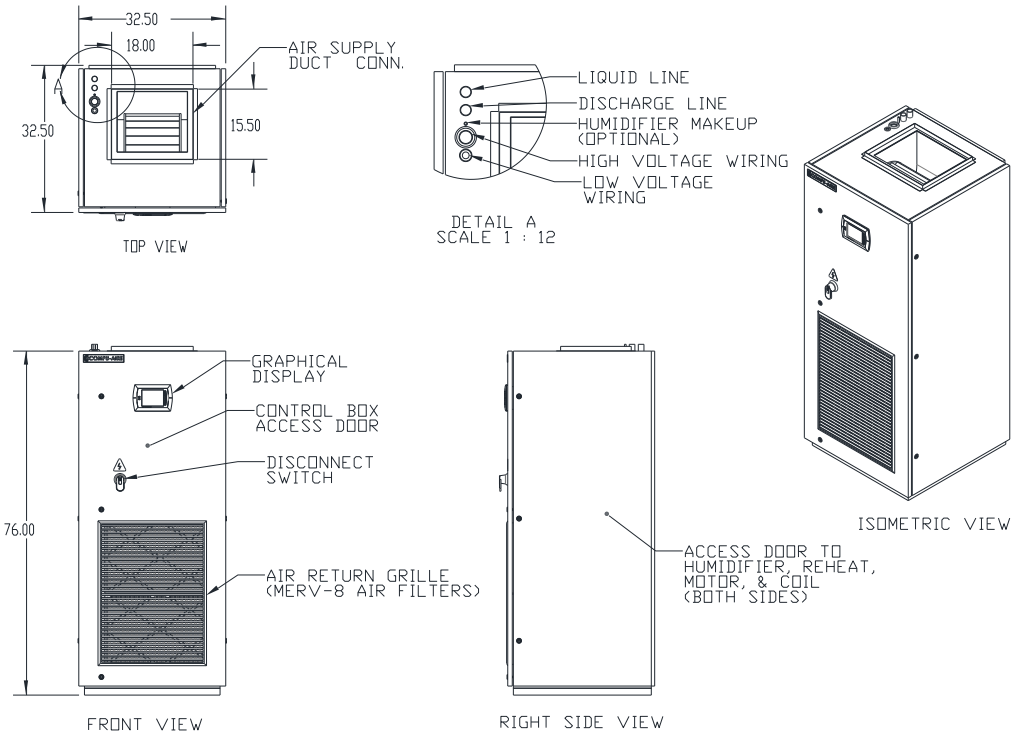


Figure 17. Unit Dimensions-Upflow Unit shown

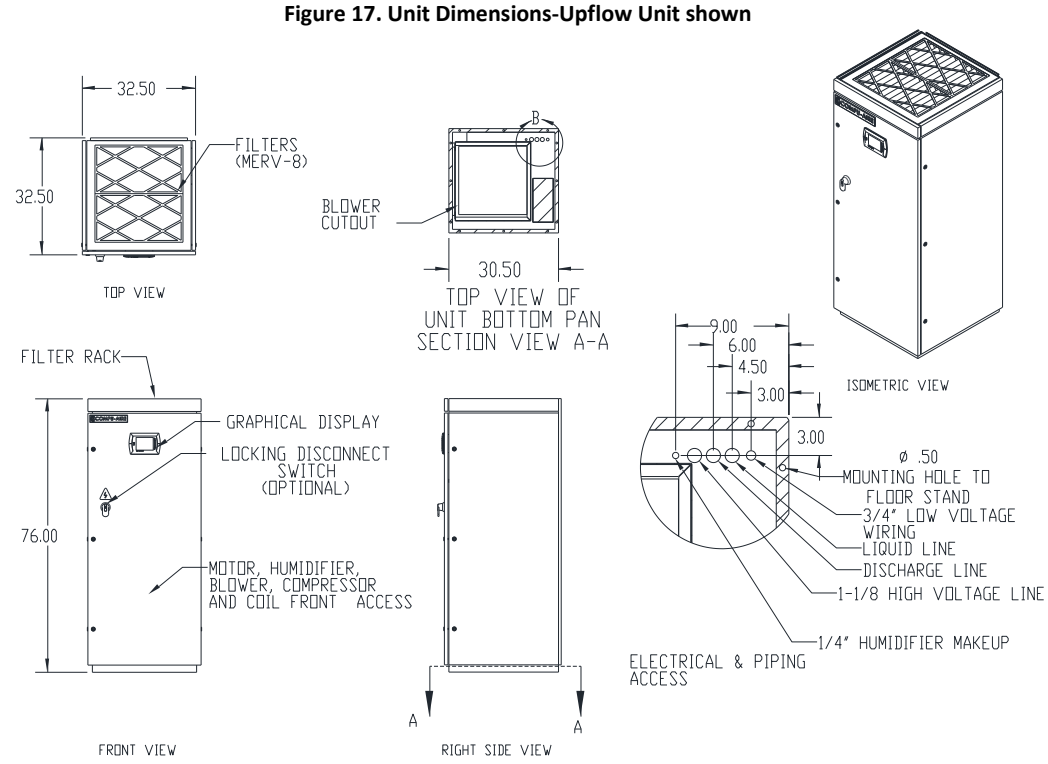


Figure 18 Unit Dimensions-Downflow Unit Shown

PIPING CONNECTION DATA-ALL SIZE IN COPPER OD*

LIQUID LINE	1/2	1/2	5/8	5/8
SUCTION LINE	3/4	3/4	7/8	7/8
HUMIDIFIER WATER SUPPLY	1/4	1/4	1/4	1/4
CONDENSATE DRAIN	3/4	3/4	3/4	3/4
WATER SUPPLY	3/4	3/4	1 1/8	1 1/8
WATER RETURN	3/4	3/4	1 1/8	1 1/8

*ALL DIMENSIONS ARE IN INCH

Table 1. Piping Connection Data

10 COMPONENTS IDENTIFICATION

10.1 FRONT LAYOUT

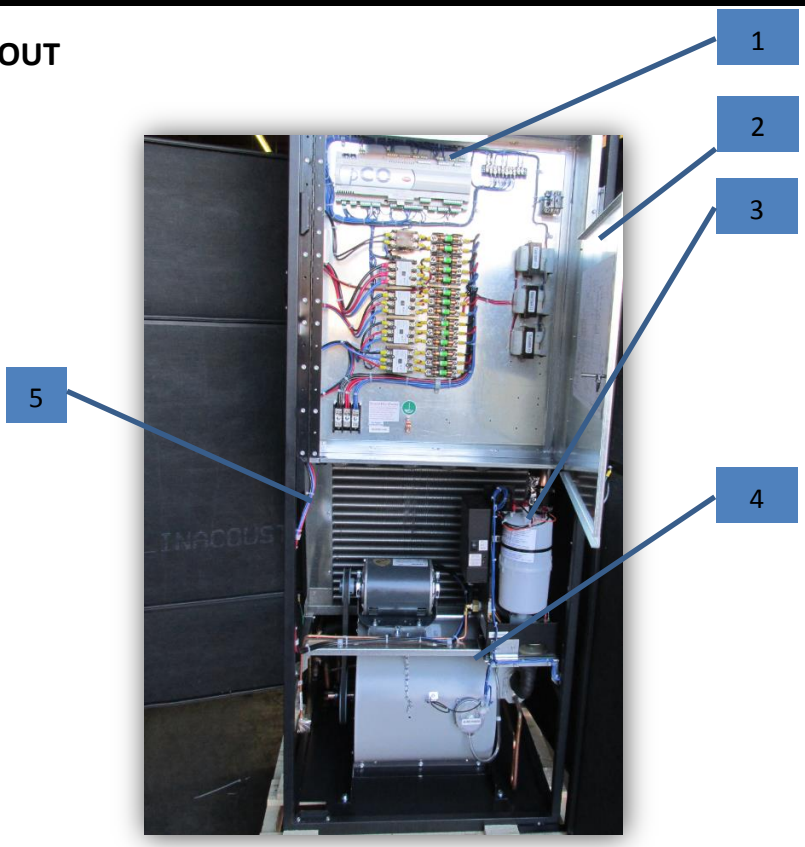


Figure 19 Front Layout-Downflow Unit Shown

NUMBER	NAME
1	MICROPROCESSOR CONTROLLER
2	CONTROL BOX ACCESS DOOR
3	HUMIDIFIER
4	BLOWER
5	COIL

10.2 LEFT SIDE LAYOUT

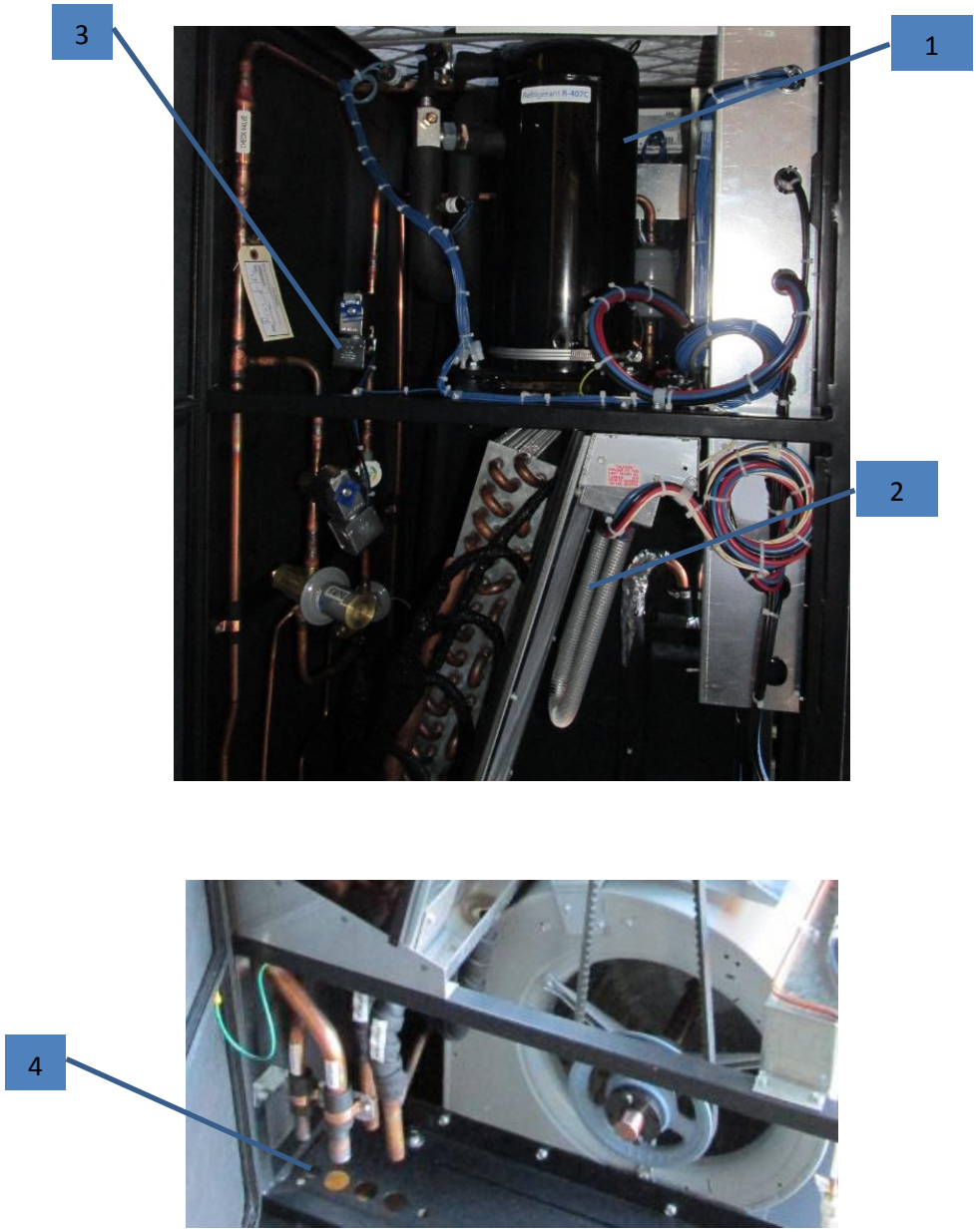


Figure 20. Left Side Layout-Downflow Unit Shown

1	COMPRESSOR
2	HEATING ELEMENTS
3	HOT GAS BYPASS VALVE, SOLENOIDS,ETC
4	PIPING CONNECTION HOLES

10.3 STANDARD FLOOR STAND

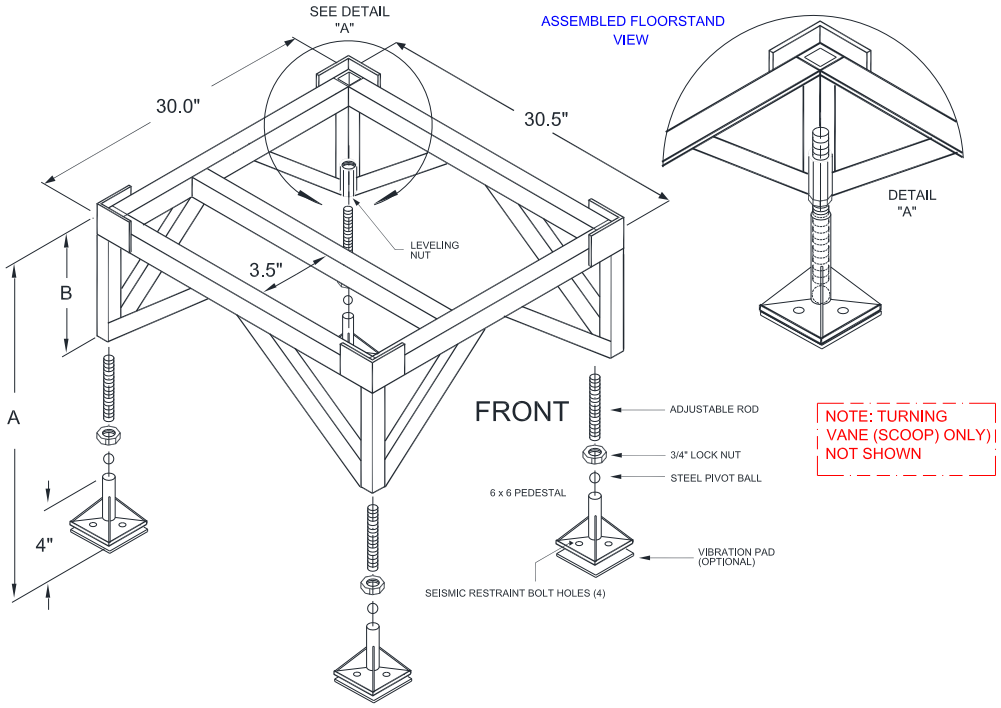


Figure 21. Floor Stand Zone II

FLOOR HEIGHT (A)	B
8” ± 1”	2.5”
12” ± 1”	6.5”
18” ± 1”	12.5”
24” ± 1”	18.5”
60” ± 1”	24.5”

Table 2. Floor Stand Zone II Height Dimensions

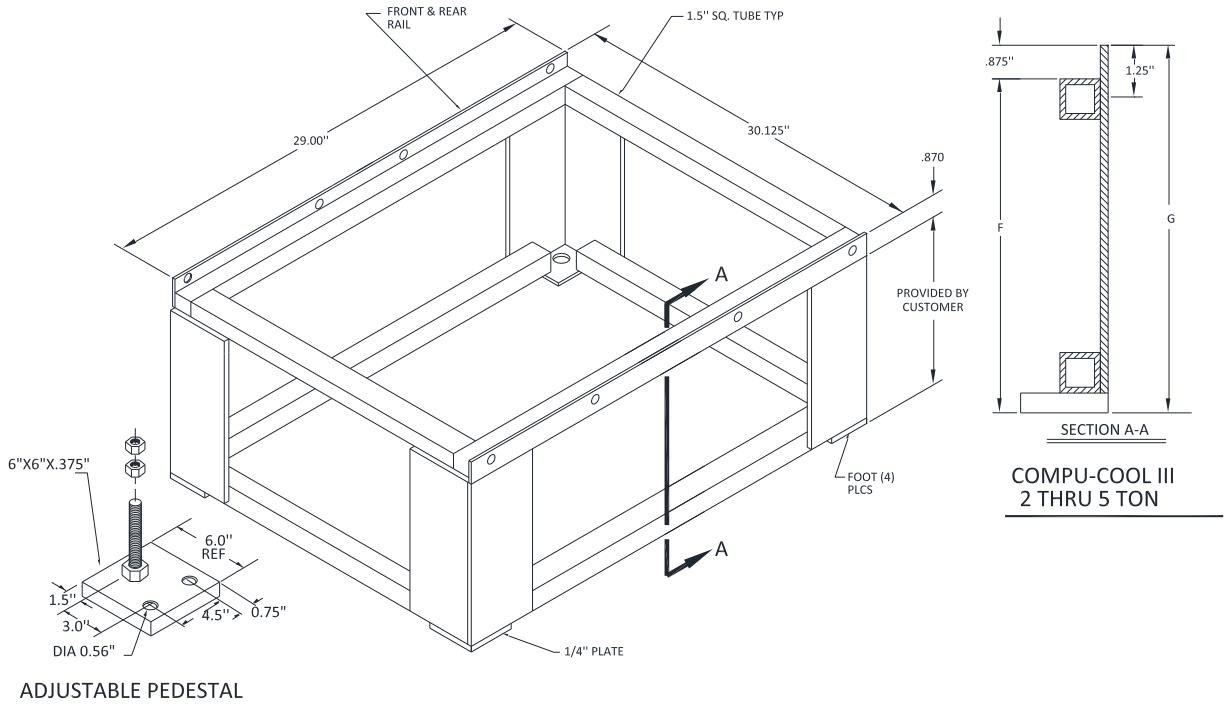


Figure 22. Floor Stand Zone IV

FLOOR HEIGHT (A)	F	G
8”	4.00”	5.25”
12”	6.86”	7.75”
18”	12.87”	13.75”
24”	18.88”	19.75”
30”	27.88”	25.75”

Table 3 Floor Stand Zone IV Height Dimensions

11 SYSTEM CUT-OUT JUMPER FOR EMERGENCY SHUT-DOWN

The unit is completely factory wired with self-contained controls to run without using external system cut-out. When external system cut-out is used, remove the jumper between terminal 5 and 6 and use NC dry contact of field provided system cut-out relay.

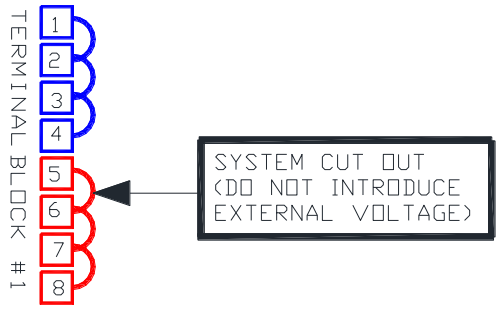


Figure 23 - Terminal Block with System Cut-Out

The system cut-out terminal on the terminals strip is for connection to a “panic button” or EPO Switch when emergency shut-down is required. The system cut-out jumper shall only be replaced by separate dry contact for each unit and **NO EXTERNAL SOURCE OF POWER SHOULD BE INTRODUCED AT THIS POINT**. The EPO relay must be installed in the unit control panel to minimize voltage drop in control circuit.

Remote ON/OFF relay shall not be used for emergency shut-down purpose. This relay is design to provide systematic shut down by the controller programming. Remote ON/OFF relays can be disabled from controller programming and unit may not shut-down in case of emergency.

12 REMOTE ALARMS

One Alarm Relay with a set of dry contact is provided for remote connection whenever the unit alarm is energized. Default setting for this alarm relay is programmed to be energized for global alarm however; it can be changed to selectable alarm to customize for specific alarms only. See controller guide for more detail on how to program this relay for selectable alarms.

If unit is provided with extra relays, see unit wiring diagram and submittal for detail.

If the unit is provided with condensate overflow sensor, the unit mounted control panel includes a condensate probe module. The condensate probe sensor shall be shipped loose for field installation. Condensate probe sensor shall be located underneath the unit where water may collect to sense any condensate overflow. To check the operation of the probe, submerse it in a cup of water. The condensate alarm should energize.

If the unit is provided with sensing cable type leak detection system, use specific manual provided by the manufacturer to install the complete system. Alarm relay dry contact from sensing cable type leak detection system can be connected to the digital input for condensate alarm of unit controller. Use 24VAC power from the unit terminal block for this alarm input

13 PIPING CONNECTION LAYOUT

13.1 WATER LINE CONNECTION

Note: Water side operating pressure not to exceed 125 PSIG. Optional high pressure rated valve is available from the factory.

Down Flow Unit: All plumbing field piping is brought to the unit through the bottom rear left of the frame as shown below.

Up Flow Unit: Field piping is brought through the bottom left hand access panel or back panel.

After all connections are made to the unit, close-off and seal all air openings around the pipes using tubing insulation material such Armaflex.

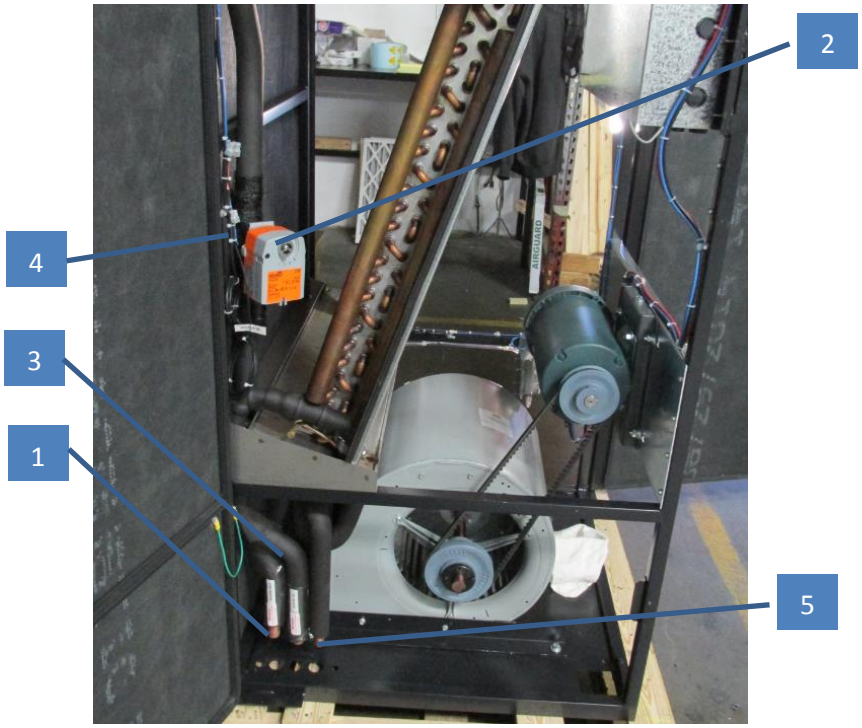
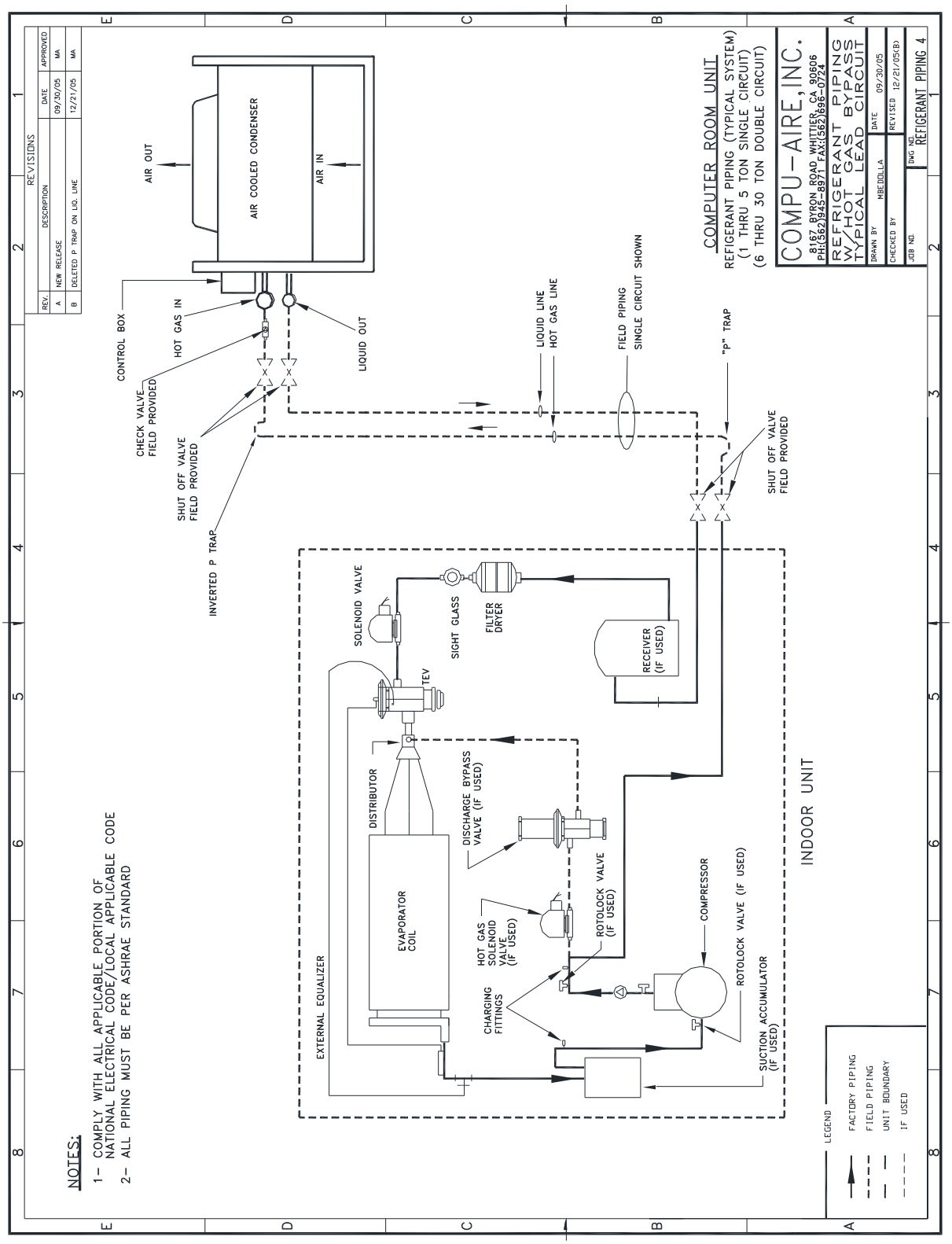


Figure 24. Piping

NUMBER	NAME
1	CHILLED WATER IN
2	CHILLED WATER VALVE ACTUATOR
3	CHILL WATER OUT
4	CHILLED WATER VALVE
5	DRAIN PIPE

Table 4: Piping Location

13.2 TYPICAL REFRIGERANT LINE PIPING



14 TECHNICAL DATA

SELF CONTAINED AIR COOLED SYSTEM CKA WITH AIR COOLED CONDENSER				
NOMINAL TONS	**2**	**3**	**4**	**5**
MODEL	**CKA-2**	**CKA-3**	**CKA-4**	**CKA-5**
ENERGY EFFICIENCY RATIO	9.7	10.6	9.2	10.2
CAPACITY DATA				
80°F DB, 67°F WB (26.7°C DB, 19.4°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	33,973**(9.9)**	43,750**(12.8)**	59,600**(18.9)**	64,600**(18.9)**
Sensible BTU/HR**(kW)**	23,713**(6.7)**	34,350**(10.1)**	50,335**(14.7)**	54,200**(15.9)**
75°F DB, 62.5°F WB (23.9°C DB, 16.9°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	26,507**(7.8)**	41,550**(12.2)**	53,715**(15.7)**	62,100**(18.2)**
Sensible BTU/HR**(kW)**	21,443**(6.3)**	33,500**(9.8)**	48,219**(14.1)**	52,120**(15.3)**
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	23,415**(6.8)**	39,820**(11.7)**	44,348**(13.0)**	60,950**(17.9)**
Sensible BTU/HR**(kW)**	20,216**(5.9)**	32,320**(9.5)**	44,348**(13.0)**	52,120**(15.3)**
72°F DB, 58.6°F WB (22.2°C DB, 14.8°C WB) 45% RH Entering Air				
Total BTU/HR**(kW)**	20,349**(5.9)**	38,320**(11.2)**	44,348**(13.0)**	59,150**(17.3)**
Sensible BTU/HR**(kW)**	20,349**(5.9)**	35,120**(10.3)**	44348**(13.0)**	59,150**(17.3)**
FAN DATA - Double width double inlet belt driven - Variable pitch pulley				
Fan Motor HP	3/4	3/4	1	1-1/2
CFM**(L/s)**	1,000**(470)**	1,800**(850)**	2,350**(1104)**	3,050**(1439)**
ESP. IN. WC**(Pa)**	0.3**(75)**	0.3**(75)**	0.3**(75)**	0.3**(75)**
COIL DATA - High efficiency copper tubing-aluminum fins				
Face Area Ft^2**(m^2)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**
Rows	2	2	3	4
COMPRESSOR DATA - Heat pump Semi hermetic scroll R-407C				
Size	2	3	4	5
EER	13.8	13.7	13.8	14.0
REHEAT DATA - Electric - 2 stages				
kW	6	6	10	10
BTU/HR - Includes Fan Motor	22,510	22,510	40,650	40,650
HUMIDIFIER DATA - Electronic self generating steam type with disposable cylinder				
kW	3.4	3.4	3.4	3.4
LBS/HR**(kg/hr)**	10.0**(4.5)**	10.0**(4.5)**	10.0**(4.5)**	10.0**(4.5)**
FILTER DATA - 30% Efficiency based on ASHRAE 52-76 standard				
Downflow 14 x 25 x 2	2	2	2	2
Upflow 16 x 25 x 2	2	2	2	2
Effective Area Ft^2**(m^2)**	20.2**(1.88)**	20.2**(1.88)**	20.2**(1.88)**	20.2**(1.88)**
PIPING CONNECTION DATA - All sizes in copper OD				
Liquid Line	1/2"	1/2"	5/8"	5/8"
Hot Gas Line	5/8"	5/8"	7/8"	7/8"
Humidifier Water Supply	1/4"	1/4"	1/4"	1/4"
Condensate Drain	3/4"	3/4"	3/4"	3/4"
Weight LBS**(kg)**	450**(204)**	550**(250)**	600**(272)**	650**(295)**

AIR COOLED CONDENSER BASED ON 95°F (35°C) AMBIENT *Variable Fan Speed Type - Good down to -20°F (-7°C).* *CONDENSER MODEL*	ACC-2	ACC-5	ACC-5	ACC-6
FAN DATA - DIRECT DRIVE - Propeller Fan Type				
CFM**(L/s)**	2,500**(1180)**	5,200**(2454)**	5,200**(2454)**	5,100**(2407)**
Motor HP	1/6	3/4	3/4	3/4
Fan Size	18	24	24	24
PIPING CONNECTION DATA - All sizes in copper OD				
Liquid Line	1/2"	7/8"	7/8"	7/8"
Hot Gas Line	5/8"	1-1/8"	1-1/8"	1-1/8"
Weight LBS**(kg)**	240**(109)**	275**(125)**	310**(140)**	350**(159)**

Bold Face Data In Metric Units

SELF CONTAINED WATER COOLED SYSTEM CKW				
NOMINAL TONS	**2**	**3**	**4**	**5**
MODEL	**CKW-2**	**CKW-3**	**CKW-4**	**CKW-5**
ENERGY EFFICIENCY RATIO	10.2	12.3	10.3	11.2
CAPACITY DATA				
80°F DB, 67°F WB (26.7°C DB, 19.4°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	33,973**(9.9)**	43,750**(12.8)**	59,600**(17.4)**	64,600**(18.9)**
Sensible BTU/HR**(kW)**	23,713**(6.7)**	34,350**(10.1)**	50,335**(14.7)**	54,200**(15.9)**
75°F DB, 62.5°F WB (23.9°C DB, 16.9°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	26,501**(7.8)**	41,550**(12.2)**	53,715**(15.7)**	62,100**(18.2)**
Sensible BTU/HR**(kW)**	21,443**(6.3)**	33,500**(9.8)**	48,219**(14.1)**	52,120**(15.3)**
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	23,415**(6.8)**	39,820**(11.7)**	44,348**(13.0)**	60,950**(17.9)**
Sensible BTU/HR**(kW)**	20,216**(5.9)**	32,320**(9.5)**	44,348**(13.0)**	52,120**(15.3)**
72°F DB, 58.6°F WB (22.2°C DB, 14.8°C WB) 45% RH Entering Air				
Total BTU/HR**(kW)**	20,349**(5.9)**	38,320**(11.2)**	44,438**(13.0)**	59,150**(17.3)**
Sensible BTU/HR**(kW)**	20,349**(5.9)**	35,120**(10.3)**	44,348**(13.0)**	59,150**(17.3)**
FAN DATA - Double width double inlet driven - variable pitch pulley				
Fan Motor HP	3/4	3/4	1	1-1/2
CFM **(L/s)**	1,000**(470)**	1,800**(850)**	2,350**(1104)**	3,050**(1439)**
ESP. IN. WC **(Pa)**	0.3**(75)**	0.3**(75)**	0.3**(75)**	0.3**(75)**
COIL DATA - High efficiency copper tubing - aluminum fins				
Face Area Ft^2**(m^2)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**
Rows	2	2	3	4
COMPRESSOR DATA - Heat pump duty scroll R-22				
Size	2	3	4	5
EER	13.8	13.7	13.8	14.0
REHEAT DATA - Electric - 2 stages				
kW	6	6	10	10
BTU/HR - Includes Fan Motor	22,510	22,510	40,650	40,650
HUMIDIFIER DATA - Electronic self generating steam type with disposable cylinder				
kW	3.4	3.4	3.4	3.4
LBS/HR**(kg/hr)**	10.0**(4.5)**	10.0**(4.5)**	10.0**(4.5)**	10.0**(4.5)**
WATER DATA - 125 psig working pressure. Higher pressure available if required.				
Condenser type	Co-axial	Co-axial	Co-axial	Co-axial
65°F **(18.3°C)** Entering Water Temperature				
Flow Rate GPM **(L/s)**	2.0**(0.12)**	3.0**(0.19)**	4.0**(0.25)**	5.1**(0.32)**
Press. Drop Ft-H_2O**(kPa)**	4.3**(12.4)**	4.5**(13.0)**	4.6**(13.1)**	5.1**(14.7)**
75°F **(23.9°C)** Entering Water Temperature				
Flow Rate GPM **(L/s)**	3.0**(0.19)**	4.5**(0.28)**	6.0**(0.38)**	7.5**(0.48)**

Press. Drop Ft-H_2O**(kPa)**	8.3**(23.9)**	9.3**(26.8)**	9.4**(27.1)**	12.2**(35.2)**
85°F **(29.4°C)** Entering Water Temperature				
Flow Rate GPM**(L/s)**	5.0**(0.32)**	7.5**(0.28)**	10.0**(0.64)**	12.5**(0.80)**
Press. Drop Ft-H_2O**(kPa)**	12.3**(35.5)**	9.3**(26.8)**	21.4**(61.8)**	27.2**(78.6)**
FILTER DATA - 30% Efficiency based on ASHRAE 52-76 standard				
Downflow 14 x 25 x 2	2	2	2	2
Upflow 16 x 25 x 2	2	2	2	2
Effective Area Ft^2**(m^2)**	20.2**(1.88)**	20.2**(1.88)**	20.2**(1.88)**	20.2**(1.88)**
PIPING CONNECTION DATA - All sizes in copper OD				
Water Supply/Return	3/4"	3/4"	1-1/8"	1-1/8"
Humidifier Water Supply	1/4"	1/4"	1/4"	1/4"
Condensate Drain	3/4"	3/4"	3/4"	3/4"
Weight LBS**(kg)**	480**(218)**	610**(277)**	625**(284)**	675**(306)**

Self Contained Glycol Cooled System CKG

WITH DRY FLUID COOLER

NOMINAL TONS **MODEL**	**2** **CKG-2**	**3** **CKG-3**	**4** **CKG-4**	**5** **CKG-5**
ENERGY EFFICIENCY RATION	**8.6**	**10.5**	**8.9**	**10.2**
CAPACITY DATA				
80°F DB, 67°F WB (26.7°C DB, 19.4°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	30,753**(9.0)**	39,500**(11.6)**	53,640**(15.7)**	62,300**(18.2)**
Sensible BTU/HR**(kW)**	21,341**(6.2)**	32,100**(9.4)**	45,301**(13.3)**	53,100**(15.5)**
75°F DB, 62.5°F WB (23.9°C DB, 16.9°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	23,850**(7.0)**	36,100**(10.6)**	48,343**(14.2)**	57,100**(16.7)**
Sensible BTU/HR**(kW)**	19,298**(5.7)**	31,323**(9.2)**	43,397**(12.7)**	52,100**(15.3)**
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	19,434**(5.7)**	33,420**(9.8)**	38,139**(11.2)**	55,200**(16.2)**
Sensible BTU/HR**(kW)**	18,194**(5.3)**	31,900**(9.3)**	38,139**(11.2)**	50,200**(14.7)**
72°F DB, 58.6°F WB (22.2°C DB, 14.8°C WB) 45% RH Entering Air				
Total BTU/HR**(kW)**	18,314**(5.4)**	34,500**(10.1)**	38,139**(11.2)**	56,150**(16.4)**
Sensible BTU/HR**(kW)**	18,314**(5.4)**	34,500**(10.1)**	38,139**(11.2)**	56,150**(16.4)**
FAN DATA - Double width double inlet belt driven - variable pitch pulley				
Fan Motor HP	3/4	¾	1	1-1/2
CFM**(L/s)**	1,000**(470)**	1,800**(850)**	2,350**(1104)**	3,050**(1439)**
ESP IN. WC **(Pa)**	0.3**(75)**	0.3**(75)**	0.3**(75)**	0.3**(75)**
COIL DATA - High efficiency copper tubing - aluminum fins				
Face Area Ft^2**(m^2)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**
Rows	2	2	3	4
COMPRESSOR DATA - Heat pump dry scroll R-22				
Size	2	3	4	5
EER	13.8	13.7	13.8	14.0
REHEAT DATA - Electric - 2 stages				
kW	6	6	10	10
BTU/HR - Includes Fan Motor	22,510	22,510	40,650	40,650
HUMIDIFIER DATA - Electronic self generating steam type with disposable cylinder				

kW	3.4	3.4	3.4	3.4
LBS/HR **(kg/hr)**	10.0**(4.5)**	10.0**(4.5)**	10.0**(4.5)**	10.0**(4.5)**
WATER DATA - 125 PSIG working pressure, specify higher pressure if required.				
Condenser type	Co-axial	Co-axial	Co-axial	Co-axial
GPM**(L/s)**	8.0**(0.51)**	12.0**(0.77)**	15.0**(0.96)**	18.5**(1.2)**
Pressure drop Ft**(kPA)**	20.3**(58.6)**	28.5**(82.3)**	32.3**(93.3)**	35.2**(101.7)**
FILTER DATA - 30% Efficiency based on ASHRAE 52-76 standard				
Downflow 14 x 25 x 2	2	2	2	2
Upflow 16 x 25 x 2	2	2	2	2
Effective Area Ft^2**(m^2)**	20.2**(1.88)**	20.2**(1.88)**	20.2**(1.88)**	20.2**(1.88)**
PIPING CONNECTION DATA - all sizes in copper OD				
Water Supply/Return	3/4"	3/4"	1-1/8"	1-1/8"
Humidifier Water Supply	1/4"	1/4"	1/4"	1/4"
Condensate Drain	3/4"	3/4"	3/4"	3/4"
WEIGHT LBS**(kg)**	480**(218)**	610**(277)**	625**(284)**	675**(306)**

DRY FLUID COOLER BASED ON 95 °F (35 °C) AMBIENT				
CONDENSER MODEL	**DFC-3**	**DFC-6**	**DFC-8**	**DFC-11**
FAN DATA - DIRECT DRIVE - Propeller Fan Type				
CFM**(L/s)**	2,400**(1128)**	5,100**(2397)**	4,900**(2303)**	10,400**(4888)**
Motor HP	1/6	3/4	3/4	3/4
Quantity	1	1	1	2
Fan Size	18	24	24	24
PIPING CONNECTION DATA - all sizes in copper OD				
Water Supply/Return	7/8"	7/8"	7/8"	7/8"
WEIGHT LBS**(kg)**	290**(132)**	340**(155)**	360**(164)**	400**(182)**
PUMP DATA - Based Mounted - Available Head Ft. 90(260.1 kPA)				
HP	3/4	3/4	1	1
GPM**(L/s)**	8.0**(0.51)**	12.0**(0.77)**	15.0**(0.96)**	18.5**(1.19)**

Bold Face Data In Metric Units

SELF CONTAINED GLYCOL COOLED ENERGY MISER SYSTEM				
CKG-EM WITH DRY FLUID COOLER				
All items listed in the table 3 apply plus the following				
NOMINAL TONS	**2**	**3**	**4**	**5**
MODEL	**CKG-2 EM**	**CKG-3 EM**	**CKG-4 EM**	**CKG-5 EM**
ENERGY MISER COIL DATA				
Face Area Ft^2**(m^2)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**
Rows	2	2	2	2
Capacity BTU/HR**(kW)**	28,359**(8.3)**	42,187**(12.4)**	46,250**(13.5)**	55,000**(16.1)**
WATER DATA - 125 PSIG working pressure, specify higher pressure if required.				

Condenser type	Co-axial	Co-axial	Co-axial	Co-axial
GPM**(L/s)**	8.0**(0.51)**	12.0**(0.77)**	15.0**(0.96)**	18.5**(1.20)**
Pressure drop Ft**(kPA)**	20.3**(58.6)**	28.5**(82.3)**	32.3**(93.3)**	35.2**(101.7)**

CHILLED WATER SYSTEM CKC				
NOMINAL TONS	**2**	**3**	**4**	**5**
MODEL	**CKC-2**	**CKC-3**	**CKC-4**	**CKC-5**
CAPACITY DATA				
80°F DB, 67°C WB (26.7°C DB, 19.4°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	34,651**(10.1)**	68,200**(20.0)**	74,204**(21.7)**	104,235**(30.5**
Sensible BTU/HR**(kW)**	23,971**(7.0)**	50,150**(14.7)**	54,851**(16.0)**	79,380**(23.3)**
75°DB, 62.5°C WB (23.9°C DB, 16.9°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	26,190**(7.7)**	47,974**(14.0)**	56,085**(16.4)**	78,783**(23.1)**
Sensible BTU/HR**(kW)**	21,319**(6.4)**	40,021**(11.0)**	49,145**(14.1)**	64,926**(19.0)**
72°F DB, 60°C WB (22.2°C DB, 15.5°C WB) 50% RH Entering Air				
Total BTU/HR**(kW)**	21,834**(6.4)**	42,300**(12.4)**	46,889**(13.7)**	65,679**(19.2)**
Sensible BTU/HR**(kW)**	19,272**(5.7)**	37,714**(11.0)**	46,889**(13.7)**	59,679**(17.5)**
72°F DB, 58.6°C WB (22.2°C DB, 14.8°C WB) 45% RH Entering Air				
Total BTU/HR**(kW)**	20,567**(6.0)**	39,803**(11.6)**	46,889**(13.7)**	61,184**(18.1)**
Sensible BTU/HR**(kW)**	20,567**(6.0)**	39,803**(11.6)**	46,889**(13.7)**	61,184**(18.1)**
WATER DATA - Entering Water Temperature 45°F (7.2°C)				
GPM **(L/s)**	6.0**(0.38)**	10**(0.63)**	11.2**(0.71)**	18.7**(1.18)**
Press. Drop Ft. **(kPA)**	15.1**(43.7)**	16.3**(47.1)**	17.6**(50.9)**	21.2**(61.3)**
CONTROL VALVE - 3 way 150 psig working pressure - Higher pressure available				
Size	3/4	3/4	1	01/01/1900
Cv	8.0	8.0	12.0	12.0
FAN DATA - Double width double inlet belt driven - variable pitch pulley				
Fan Motor HP	3/4	3/4	1	1-1/2
CFM**(L/s)**	1,000**(470)**	1,800**(850)**	2,350**(1104)**	3,050**(1439)**
ESP IN. WC**(Pa)**	0.**(75)**	0.**(75)**	0.3**(75)**	0.3**(75)**
COIL DATA - High efficiency copper tubing - aluminum fins				
Face Area Ft^2**(m^2)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**
Rows	2	3	4	4
REHEAT DATA - ELECTRIC 2 STAGES				
kW	6	6	10	10
BTU/HR - Includes Fan	22,510	22,510	40,650	40,650
HUMIDIFIER DATA - Electronic self generating steam type with disposable cylinder				
kW	3.4	3.4	3.4	3.4
LBS/HR **(kg/hr)**	10.0**(4.5)**	10.0**(4.5)**	10.0**(4.5)**	10.0**(4.5)**
FILTER DATA - 30% Efficiency based on ASHRAE 52-76 standard				
Downflow 14 x 25 x 2	2	2	2	2
Upflow 16 x 25 x 2	2	2	2	2
Effective Area Ft^2**(m^2)**	20.2**(1.88)**	20.2**(1.88)**	20.2**(1.88)**	20.2**(1.88)**
PIPING CONNECTION DATA - All sizes in copper OD				

Water Supply/Return	3/4"	3/4"	1-1/8"	1-1/8"
Humidifier Water Supply	1/4"	1/4"	1/4"	1/4"
Condensate Drain	3/4"	3/4"	3/4"	3/4"
WEIGHT LBS**(kg)**	475**(216)**	490**(223)**	525**(239)**	550**(250)**

Bold Face Data In Metric Units

EVAPORATOR SECTION CKE matches with either				
Centrifugal Fan Condensing Unit (CFCU) **or Propeller Fan Condensing Unit (PFCU)** **or Water Cooled Condensing Unit (WCCU)**				
NOMINAL TONS **MODEL**	**2** **CKE-2**	**3** **CKE-3**	**4** **CKE-4**	**5** **CKE-5**
ENERGY EFFICIENCY RATIO				
CKE WITH CFCU	8.3	10.6	8.3	9.4
CKE WITH PFCU	9.2	11.5	9.2	10.2
CKE WITH WCCU	10.2	12.3	10.3	11.2
CAPACITY DATA				
80°F DB, 67°F WB (26.7°C DB, 19.4°C WB) 50% RH ENTERING AIR				
Total BTU/HR**(kW)**	33,973**(9.9)**	43,750**(12.8)**	59,600**(17.4)**	64,600**(18.9)**
Sensible BTU/HR**(kW)**	23,713**(6.7)**	34,350**(10.1)**	50,335**(14.7)**	54,200**(15.9)**
75°F DB, 62.5°F WB (23.9°C DB, 16.9°C WB) 50% RH ENTERING AIR				
Total BTU/HR**(kW)**	26,501**(7.8)**	41,550**(12.2)**	53,715**(15.7)**	62,100**(18.2)**
Sensible BTU/HR**(kW)**	21,443**(6.3)**	33,500**(9.8)**	48,219**(14.1)**	52,120**(15.3)**
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50% RH ENTERING AIR				
Total BTU/HR**(kW)**	23,415**(6.8)**	39,820**(11.7)**	44,348**(13.0)**	60,950**(17.9)**
Sensible BTU/HR**(kW)**	20,216**(5.9)**	32,320**(9.5)**	44,348**(13.0)**	52,120**(15.3)**
72°F DB, 58.6°F WB (22.2°C DB, 14.8°C WB) 45% RH ENTERING AIR				
Total BTU/HR**(kW)**	20,349**(5.9)**	38,320**(11.2)**	44,348**(13.0)**	59,150**(17.3)**
Sensible BTU/HR**(kW)**	20,349**(5.9)**	35,120**(10.3)**	44,348**(13.0)**	59,150**(17.3)**
FAN DATA - Double width inlet belt driven - variable pitch pulley				
Fan Motor HP	3/4	3/4	1	1-1/2
CFM**(L/s)**	1,000**(470)**	1,800**(850)**	2,350**(1104)**	3,050**(1439)**
ESP IN. WC **(Pa)**	0.3**(75)**	0.3**(75)**	0.3**(75)**	0.3**(75)**
OPTIONAL AIR - Consult factory for capacities.				
CFM**(L/s)**	1,250**(587)**	2,300**(1086)**	2,650**(1245)**	N/A
Fan Motor HP	3/4	1	1-1/2	N/A
ESP IN. WC **(Pa)**	0.3**(75)**	0.3**(75)**	0.3**(75)**	0.3**(75)**
COIL DATA - High efficiency copper tubing - aluminum fins				
Face Area Ft^2**(m^2)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**	5.9**(0.55)**
Rows	2	2	3	4
REHEAT DATA - Electronic 2 stages				
kW	6	6	10	10
BTU/HR - Includes Fan Motor	22,510	22,510	40,650	40,650
HUMIDIFIER DATA - Electronic self generating steam type with disposable cylinder				
kW	3.4	3.4	3.4	3.4
BTU/HR **(kg/hr)**	10.0**(4.5)**	10.0**(4.5)**	10.0**(4.5)**	10.0**(4.5)**
FILTER DATA - 30% Efficiency based on ASHRAE 52-76 standard				
Downflow 14 x 25 x 2	2	2	2	2
Upflow 16 x 25 x 2	2	2	2	2
Effective Area Ft^2**(m^2)**	20.2**(1.88)**	20.2**(1.88)**	20.2**(1.88)**	20.2**(1.88)**

PIPING CONNECTION DATA - All sizes in copper OD				
Liquid Line	1/2"	1/2"	5/8"	5/8"
Suction Line	3/4"	3/4"	7/8"	7/8"
Humidifier Water Supply	1/4"	1/4"	1/4"	1/4"
Condensate Drain	3/4"	3/4"	3/4"	3/4"
Weight LBS**(kg)**	490**(222)**	510**(231)**	505**(229)**	520**(236)**

Bold Face Data In Metric Units

AIR COOLED CENTRIFUGAL FAN CONDENSING UNIT CFCU				
MODEL	**CFCU-2**	**CFCU-3**	**CFCU-4**	**CFCU-5**
NOMINAL TONNAGE	2	3	4	5
EER	8.3	10.6	8.3	9.4
COMPRESSOR DATA - Heat pump duty high efficiency scroll R-22				
Size	2	3	4	5
EER	13.8	13.7	13.8	14.0
FAN DATA - Centrifugal fan type direct drive				
Air Volume CFM**(L/s)**	1,020**(482)**	1,670**(788)**	3,580**(1690)**	3,580**(1690)**
Motor HP	3/4	3/4	1	1-1/2
ESP IN. WC **(Pa)**	0.50**(125)**	0.50**(125)**	0.50**(125)**	0.50**(125)**
CONDENSER COIL DATA				
Face Area Ft^2**(m^2)**	1.75**(0.17)**	4.6**(0.43)**	7.6**(0.71)**	7.6**(0.71)**
Rows	4	3	4	4
Fpi	12	12	12	12
PIPING DATA - All sizes are in copper OD				
Liquid Line	1/2"	1/2"	5/8"	5/8"
Suction Line	3/4"	3/4"	7/8"	7/8"
Weight LBS**(kg)**	310**(140)**	340**(154)**	365**(166)**	395**(180)**

AIR COOLED PROPELLER FAN CONDENSING UNIT PFCU				
MODEL	**PFCU-2**	**PFCU-3**	**PFCU-4**	**PFCU-5**
NOMINAL TONNAGE	2	3	4	5
EER	9.2	11.5	9.2	10.2
COMPRESSOR DATA - Heat pump duty high efficiency scroll R-22				
Size	2	3	4	5
EER	13.8	13.7	13.8	14.0
FAN DATA - Propeller fan type direct drive				
CFM **(L/s)**	1,600**(755)**	2,400**(1132)**	3,200**(1510)**	4,000**(1888)**
Fan Size	20"	24"	24"	24"
Fan Quantity	1	1	1	1
Motor HP	1/3	1/3	3/4	3/4
Quantity of Motors	1	1	1	1
CONDENSER COIL DATA				
Face Area Ft^2**(m^2)**	5.0**(0.46)**	7.7**(0.72)**	10.5**(0.98)**	10.5**(0.98)**
Rows	2	2	3	3
PIPING DATA - All sizes are in copper OD				
Liquid Line	1/2"	1/2"	5/8"	5/8"
Suction Line	3/4"	3/4"	7/8"	7/8"
Weight LBS**(kg)**	310**(140)**	325**(148)**	335**(152)**	340**(155)**

WATER COOLED CONDENSING UNIT WCCU				
MODEL	**WCCU-2**	**WCCU-3**	**WCCU-4**	**WCCU-5**
NOMINAL TONNAGE	2	3	4	5
EER	10.2	12.3	10.3	11.2
COMPRESSOR DATA - Heat pump duty high efficiency scroll R-22				
Size	2	3	4	5
EER	13.8	13.7	13.8	14.0
WATER COOLED CONDENSER DATA				
Condenser Type	Co-axial	Co-axial	Co-axial	Co-axial
GPM**(L/s)** 75°F EWT	3.0**(0.19)**	4.5**(0.28)**	7.5**(0.47)**	7.5**(0.47)**
Pressure Drop Ft. of H_2O**(kPA)**	10.1**(30.1)**	10.1**(30.1)**	10.1**(30.1)**	10.1**(30.1)**
GPM**(L/s)** 85°F EWT	6.0**(0.39)**	7.5**(0.47)**	15.0**(0.95)**	15.0**(0.95)**
Pressure Drop Ft. of H_2O**(kPA)**	17.1**(50.9)**	17.1**(50.9)**	17.1**(50.9)**	17.1**(50.9)**
GPM**(L/s)** 105°F EWT	8.0**(0.5)**	12.0**(0.76)**	20.0**(1.26)**	20.0**(1.26)**
Pressure Drop Ft. of H_2O**(kPA)**	37.1**(110.9)**	37.1**(110.9)**	37.1**(110.9)**	37.1**(110.9)**
PIPING DATA - All sizes are in copper OD				
Liquid Line	1/2"	1/2"	5/8"	5/8"
Suction Line	3/4"	3/4"	7/8"	7/8"
Water Supply	7/8"	1-1/8"	1-1/8"	1-1/8"
Water Return	7/8"	1-1/8"	1-1/8"	1-1/8"
Weight LBS**(kg)**	275**(125)**	290**(132)**	320**(145)**	345**(159)**

Bold Face Data In Metric Units

DIMENSIONAL DATA										
CKIII	**AIR COOLED CONDENSER**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**# OF FANS**	**WEIGHT IBS(KG)**
2 TON	ACC-2	25 **(625)**	26.25 **(667)**	22 **(559)**	6 **(152)**	23.2 **(587)**	-	25.5 **(648)**	1	110 **(50)**
3 TON	ACC-5	32.25 **(819)**	48 **(1219)**	42.75 **(1086)**	18.25 **(467)**	30 **(762)**	-	45 **(1143)**	1	220 **(100)**
4 TON	ACC-5	32.25 **(819)**	48 **(1219)**	42.75 **(1086)**	18.25 **(467)**	30 **(762)**	-	45 **(1143)**	1	220 **(100)**
5 TON	ACC-6	32.25 **(819)**	48 **(1219)**	42.75 **(1086)**	18.25 **(467)**	30 **(762)**	-	45 **(1143)**	1	220 **(100)**

DIMENSIONAL DATA										
CKIII	**DRY FLUID COOLER**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**# OF FANS**	**WEIGHT LBS(KG)**
2 TON	DFC-3	25 **(635)**	26.25 **(667)**	22 **(559)**	6 **(152)**	23.2 **(587)**	-	25.5 **(648)**	1	145 **(66)**
3 TON	DFC-6	32.25 **(819)**	48 **(1219)**	42.75 **(1086)**	18.25 **(467)**	30 **(762)**	-	45 **(1143)**	1	245 **(111)**
4 TON	DFC-8	32.25 **(819)**	48 **(1219)**	42.75 **(1086)**	18.25 **(467)**	30 **(762)**	-	45 **(1143)**	1	295 **(134)**
5 TON	DFC-11	62.25 **(1581)**	48 **(1219)**	42.75 **(1086)**	18.25 **(467)**	30 **(762)**	60 **(1524)**	45 **(1143)**	2	340 **(155)**

PFCU (PROPELLER FAN

CONDENSING UNIT)				
PFCU	**NOMINAL**	**A**	**B**	**WEIGHT**
MODEL	TONNAGE	in. **(mm)**	in. **(mm)**	lbs **(kg)**
02	2	40"**(1016)**	23"**(584)**	300**(136)**
03	3	48"**(1219)**	31"**(787)**	325**(147)**
04	4	54"**(1372)**	37"**(940)**	340(154)
05	5	54"**(1372)**	37"**(940)**	340**(154)**

ELECTRICAL DATA

AIR COOLED - CKA, WATER COOLED - CKW *GLYCOL COOLED - CKG, GLYCOL COOLER ENERGY MISER - CKG-EM*				
VOLT/PH/HZ	CKA-23* CKW-23* CKG-23* CKG-23* EM	CKA-33* CKW-33* CKG-33* CKG-43* EM	CKA-43* CKW-43* CKG-43* CKG-43* EM	CKA-53* CKW-53* CKG-53* CKG-53* EM
208/3/60				
FLA	30.2	31.1	46.7	52.8
MCA	37.0	38.1	57.4	64.6
MFS	50A	50A	70A	80A
380/3/50				
FLA	14.5	16.0	25.0	27.3
MCA	17.8	19.7	30.9	33.6
MFS	20A	25A	40A	45A
460/3/60				
FLA	13.5	14.7	22.6	25.0
MCA	16.5	18.0	27.8	33.6
MFS	20A	25A	35A	40A
575/3/60				
FLA	11.3	11.7	17.8	19.9
MCA	13.8	14.4	21.9	24.4
MFS	20A	20A	30A	30A

EVAPORATOR SECTION - CKE AND CHILLED WATER - CKC				
VOLT/PH/HZ	CKE-23* CKC-23*	CKE-33* CKE-33*	CKE-43* CKC-43*	CKE-53* CKC-53*
208/3/60				
FLA	19.9	19.8	31.7	33.5
MCA	24.8	24.8	39.7	41.9
MFS	25A	25A	40A	45A
380/3/50				
FLA	10.3	10.3	16.8	17.3
MCA	12.9	12.9	21.0	21.6
MFS	15A	15A	25A	25A
460/3/60				
FLA	8.9	8.9	14.4	15.0
MCA	11.2	11.2	17.9	18.8
MFS	15A	15A	20A	20A
575/3/60				
FLA	7.0	7.0	11.4	12.0
MCA	8.8	8.8	14.3	15
MFS	15A	15A	20A	20A

***DENOTES VOLTAGE: 2=208/230, 3=380/415, 4=460, 5=575**

CENTRIFUGAL FAN CONDENSING UNIT - CFCU				
VOLT/PH/HZ	**CFCU-23***	**CFCU-33***	**CFCU-43***	**CFCU-53***
208/3/60				
FLA	15.5	16.4	20.0	24.3
MCA	18.1	19.3	23.8	29.1
MFS	30A	30A	40A	50A
380/3/50				
FLA	7.4	7.4	10.3	12.1
MCA	8.6	8.8	12.4	14.6
MFS	15A	15A	20A	25A
460/3/60				
FLA	6.9	8.2	10.6	12.4
MCA	8.0	9.6	12.7	14.9
MFS	15A	15A	20A	25A
575/3/60				
FLA	5.3	5.7	8.4	9.9
MCA	6.4	6.9	10.0	11.9
MFS	15A	15A	15A	20A

PROPELLER FAN CONDENSING UNIT - PFCU				
VOLT/PH/HZ	**PFCU-23***	**PFCU-33***	**PFCU-43***	**PFCU-53***
208/3/60				
FLA	12.9	13.8	20.0	24.3
MCA	15.5	16.7	23.8	29.1
MFS	25A	30A	40A	50A
380/3/50				
FLA	7.2	7.0	10.7	12.5
MCA	8.4	8.4	12.8	15.0
MFS	15A	15A	20A	25A
460/3/60				
FLA	6.6	6.9	10.7	12.5
MCA	7.75	8.3	12.8	15.0
MFS	15A	15A	20A	25A
575/3/60				
FLA	6.0	6.0	8.0	10.5
MCA	7.2	7.2	9.4	12.5
MFS	15A	15A	15A	20A

***DENOTES VOLTAGE: 2=208/230, 3=380/415, 4=460, 5=575**

WATER COOLED CONDENSING UNIT - WCCU				
VOLT/PH/HZ	**WCCU-23***	**WCCU-33***	**WCCU-43***	**WCCU-53***
208/3/50				
FLA	10.5	11.4	15.0	19.3
MCA	13.1	14.3	18.8	24.1
MFS	25A	25A	35A	45A
380/3/50				
FLA	4.6	5.7	8.2	10.0
MCA	5.7	7.1	10.3	12.5

MFS	15A	15A	20A	25A
460/3/60				
FLA	4.3	5.7	8.6	10.0
MCA	5.4	7.1	10.3	12.5
MFS	15A	15A	20A	25A
575/3/60				
FLA	4.3	4.7	6.4	7.9
MCA	5.4	5.9	8.0	9.9
MFS	15A	15A	15A	20A

***DENOTES COLTAGE: 2=208/230, 3=380/415, 4=460, 5=575**

AIR COOLED CONDENSER (ACC)

VOLTAGE / PHASE / HERTZ															
	208V/1/60			208-230V/3/60			380V/3/50			460V/3/60			575V/3/60		
MODEL	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS
ACC-2	2.9	3.6	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ACC-5	4.5	5.6	15	4.5	5.6	15	2.3	2.9	15	2.3	2.9	15	2.3	2.9	15
ACC-5	4.5	5.6	15	4.5	5.6	15	2.3	2.9	15	2.3	2.9	15	2.3	2.9	15
ACC-6	4.5	5.6	15	4.5	5.6	15	2.3	2.9	15	2.3	2.9	15	2.3	2.9	15

DRY FLUID COOLER (DFC)

VOLTAGE / PHASE / HERTZ															
	PUMP	208V/1/60			208-230V/3/60			380V/3/50			460V/3/60			575V/3/60		
MODEL	HP	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS
DFC-3	0.75	9.8	11.5	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DFC-6	0.75	10.9	13.1	15	7.3	8.4	15	3.7	4.3	15	3.7	4.3	15	3.7	4.3	15
DFC-8	1.0	12.5	14.5	20	8.1	9.2	15	4.1	4.7	15	4.1	4.7	15	4.1	4.7	15
DFC-11	1.0	17.0	19.0	25	12.6	13.7	15	6.4	7.0	15	6.4	7.0	15	6.4	7.0	15

FAN MOTOR AND PUMP MOTOR ELECTRICAL DATA

VOLTAGE / PHASE / HERTZ										
	208V/3/60		230V/3/60		380V/3/50		460V/3/60		575V/3/60	
HORSEPOWER	FLA	LRA	FLA	LRA	FLA	LRA	FLA	LRA	FLA	LRA
0.75	3.0	18.5	2.9	16.8	1.2	8.4	1.5	8.4	1.0	6.6
1.0	3.9	23.1	3.6	21.0	1.6	10.8	1.8	10.8	1.4	8.4
1.5	5.7	33.0	5.2	30.0	2.1	15.0	2.4	15.0	2.0	12.6

HERMETIC COMPRESSORS

VOLTAGE / PHASE / HERTZ						
	208-230V/3/60		460V/3/60		575V/3/60	
SIZE-TONS	RLA	LRA	RLA	LRA	RLA	LRA
2	8.5	65.0	4.5	27.0	N/A	N/A
3	14.3	74.0	6.7	41.0	N/A	N/A
4	17.9	90.0	8.6	45.0	6.0	30.0
5	21.4	130.0	9.6	65.0	7.9	52.0

NOTES:

1. **LRA** = Locked Rotor Amps, **RLA** = Rated Load Amps,
FLA = Full Load Amp, **MCA** = Minimum recommended fuse size

2. Full load amps and minimum circuit ampacity is <u>not</u> the total sum of full load
amps of all the components. It is the <u>sum</u> of components operating in the <u>dehumidification</u> mode.
Humidifier and Reheat do not operate simultaneously.

3. All applicable portions of NATIONAL, STATE, LOCAL, electrical codes, OSHA standards, and FIRE MARSHALL requirements must be consulted and complied with prior to installation of this equipment.

4. **N/A**: Not applicable

SCROLL COMPRESSORS						
VOLTAGE / PHASE / HERTZ						
	208-230V/3/60		**460V/3/60**		**575V/3/60**	
SIZE-TONS	**RLA**	**LRA**	**RLA**	**LRA**	**RLA**	**LRA**
2	8.6	55.0	4.3	27.0	4.3	23.0
3	11.4	77.0	5.7	39.0	4.7	30.6
4	15.0	99.0	8.2	49.5	6.4	40.0
5	19.3	137.0	10.0	62.0	7.9	50.0

REHEAT					
VOLTAGE / PHASE / HERTZ					
kW	**208V/3/60**	**230V/3/60**	**380V/3/50**	**460V/3/60**	**575V/3/60**
6.0	16.7	15.1	9.1	7.5	6.0
10.0	27.8	25.1	15.2	12.6	10.0

HUMIDIFIER						
VOLTAGE/PHASE/HERTZ						
TYPE	**Kw**	**208V/3/60**	**230V/3/60**	**380V/3/50**	**460V/3/60**	**575V/3/60**
INFRARED	4.8	13.3	12.1	7.3	6	N/A
NORTEC	3.4	16.3	14.8	9.8	7.7	6.2

15 START-UP AND TEST PROCEDURE

15.1 Check that ALL WIRING IS CORRECT

To perform this test the unit must be turn OFF. Check that properly sized fuses are installed in the disconnect switch. Correct fuse size and minimum circuit ampacity are listed on the unit nameplate. Now, check the wiring connections in the Main Control Panel to see if they are tight. It is best that this be checked prior to operating the machine. After checking, close the Main Control Panel cover and proceed as follows:

Microprocessor Control Panel – With the system switch in the “OFF” position, apply power to the unit. The “Power ON” light should illuminate.

15.2 Check for Correct Phasing

The equipment should now be checked for correct phasing required to make the blower motor turn in the correct directions. For this test it is necessary to open the right side doors of the unit to observe the blower and blower motor. Now, momentarily switch the system switch to the “ON” position and then back to “OFF”. The blower motor with have started and it is therefore possible to determine rotation. On Compu-Aire units, the blower should be rotating in a CLOCKWISE direction in downflow units and COUNTERCLOCKWISE direction in upflow units, looking in the right side of the unit. Heaters and humidifiers are not affected by phasing.

15.3 Blower Speed Adjustment

Adjustment of the air flow maybe desired. The air flow can be readily adjusted with the variable pitch pulley provided on the blower motors. After the unit has been started and the air flow properly adjusted, check the blower motor current to ensure is increased, the blower motor current should be checked. If a field adjustment is made, the motor should run for at least one hour at maximum design room temperature to see if motor trips on internal overload. For proper motors amps refer to the name plate.

15.4 No air flow & Clogged filter adjustment

The "No Air Flow" light and alarm should be checked prior to the completion of the installation. Although the control adjusted at the factory, varying local conditions make it impossible to provide accurate pressure adjustments.

To check the filter pressure switch, let the unit operate on cooling for about 30 minutes. This will allow the evaporator coil surface to become wet. The air pressure differential switch is provided with adjustable knob. Set the knob to desire pressure drop for dirty filter and verify the Dirty Filter alarm. With the unit cooling and filters in place, block off approximately 75% of the air intake. If the sensing device is correctly adjusted, the "Clogged Filter" alarm should energize; the sensing device should have just turned on the alarm at the 75% blocked inlet condition. An Air Flow Sail switch is also provided at the discharge side of the blower and will activate the No Air Flow malfunction light and alarm.

Similar to the clogged filter switch, adjustment may be necessary for the no air flow switch(s). The loss of airflow switch is wired in the normally closed position to open on airflow and the dirty filter switch is wired to the normally open position and set to close with dirty filter. Adjustment can be made by removing the top cover and turning the dial to the proper pressure. See Figure 9 below.

Figure 25: Air Pressure Differential Switch

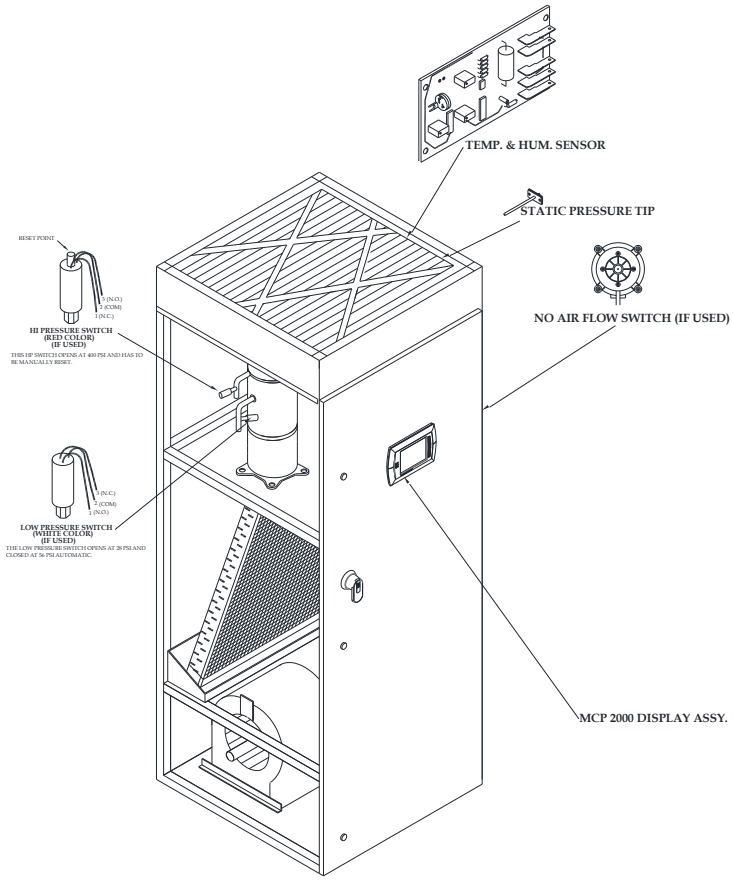


Figure 26 Typical Location of the Aiflow Switch

16 GENERAL MAINTENANCE

General maintenance must be performed in regular intervals to provide continued operation of the entire unit. The maintenance intervals must be determined site specifically. Use the maintenance checklist at the end of this manual when performing maintenance. Typically, air filters should be replaced no less than two times per year.

The filters should be checked and changed periodically. When they become dirty, an alarm is activated the filter pressure switch. If the filters are dirty, they must be changed for efficient operation of your system. To check the alarm indicator, cover approximately 75% of the return air opening; the alarm should energize. If the alarm energizes prematurely or does not energize when it should, adjust the filter switch. All doors to machine should remain closed before determining whether an adjustment is necessary. Spare filters should be kept in stock. Filters should be checked monthly and replaced if necessary.

The maintenance intervals must be determined site specifically. Use the maintenance checklist at the end of this manual when performing maintenance. In order to ensure that the refrigeration system runs trouble free for many years, a follow-up maintenance program (consisting of a minimum of two inspections per year) should be set up. A qualified refrigeration service mechanic should carry out this semi-annual inspection. The main power supply **must be disconnected and locked off** to avoid accidental startup of the equipment.

(1) Check electrical components and tighten any loose connections.
(2) Check all wiring and electrical insulators.
(3) Check contactors to ensure proper operation and contact point for wear.
(4) Check that fan motors (if applicable) are operational, ensure fan blades are tight and all mounting bolts are tight.
(5) Check oil and refrigerant levels in the system.
(6) Ensure that the condenser surface (if applicable) is cleaned and free of dirt and debris.
(7) Check the operation of the control system. Make certain that all of the safety controls are operational and functioning properly.
(8) Check all refrigeration piping. Make sure that all mechanical joints and flare nuts are tight.

Service Parts Availability

Genuine replacement service parts should be used whenever possible. Parts may be obtained by contacting your local sales representative or authorized distributor. Contact us 562.945.8971

17 REFERENCE DOCUMENTS

COMPU-AIRE INC.
Specialized Environmental Air Conditioning Systems

MAINTENANCE CHECKLIST

Inspection Date _____

Job Name _____

Unit Model # _____

Unit Serial Number # _____

Room Temperature _____° Humidity _____%

Ambient Temperature _____°

Filters

___ 1. Check/replace filters
___ 2. Grille area unrestricted
___ 3. Wipe section clean
___ 4. Coil clean

Blower Section

___ 1. Blower wheel(s) free of debris
___ 2. Check belt tension and condition (replace if needed)
___ 3. Check bearings
___ 4. Check sheave/pulley (replace if worn)
___ 5. Check motor mount
___ 6. Motor amp draw L1_____ L2 _____ L3_____
____Compare measured amp draw to nameplate rating

Reheat

___ 1. Inspect elements
___ 2. Check wire connections (inside reheat box)
___ 3. Reheat amp draw _____ #1 _____ #2 _____ #3

Steam Generating Humidifier

___ 1. Check drain valve/drain lines/trap for clogs
___ 2. Check water make-up valve and all hoses for leaks
___ 3. Clean strainer
___ 4. Replace humidifier bottle if necessary

___ 5. Check operation of humidifier
___ 6. Humidifier amp draw L1 _____ L2 _____ L3_____

Condensate Pump
___ 1. Check for debris in sump
___ 2. Check operation of float(s) (free movement)

Electrical Panel
___ 1. Check fuses
___ 2. Check contactors for pitting
___ 3. Check all wire connections

Controls
___ 1. Check/Verify Control Operation (Sequence)
___ 2. Check operation of the airflow switch
___ 3. Check setting/operation of the clogged filter switch
___ 4. Check/test changeover device(s)
___ 5. Check/test water detection device(s)

Notes_____
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Signature _____
Company_____

18 TROUBLESHOOTING GUIDE

Complaint	Problem	Symptom	Action
1. System does not run.	No 24VAC supply voltage.	Power LED is not on.	Check circuit breaker in system 24VAC circuit and reset if necessary. Check System cutout switch. Test for 24VAC at pins 1 and 2 of MCP. If no voltage check machine wiring. Other-wise, if voltage replaces MCP.
	System is not turned on.	Power LED is on but, System LED is off.	Press the On button on the MCP. If the system does not start and the display is blank, replace the MCP.
	Bad or locked up MCP.	Display is blank, shows erroneous characters or does not change messages.	Press Off button on MCP then press On button. If the system does not start or if the display still shows erroneous information, replace the MCP.
Complaint	**Problem**	**Symptom**	**Action**
2. Nothing is visible on the display or is barely visible.	Display contrast is adjusted too low.	Power is on and system is running okay. But, nothing is visible or is barely visible on display.	Refer to the section MCP Circuit Adjustments, in this guide. Adjust display contrast for best visibility. The display will not be visible unless light is directed into it (it does not have its own light source).
3. Temperature or humidity displayed is wrong.	Sensor circuits are out of calibration.	Displayed value(s) are wrong by a few increments.	If the value is wrong by a few degrees or percent when compared to an accurate measuring instrument, then try

			recalibrating the sensor circuits (see the section MCP Circuit Adjustment, in this guide).
	Wiring to sensor circuit board(s) are loose or broken.	Display shows very high or low values or values that change erratically.	Check all wiring between the sensor circuit board and the MCP for loose connections. If the values
Complaint	**Problem**	**Symptom**	**Action**
			don't change and they seem to be at an extreme high or low, test for 24-VAC at the sensor board. Test for continuity be-tween Temp and Hum on the sensor board and pins 9, 14, and 16 on the MCP. If tests fail repair or replace wiring to sensor boards. If tests are okay, swap connections between pins 14 and 16 and observe whether dis-play tracks each okay. If it does, replace the sensor. If it doesn't, replace the MCP.
Complaint	**Problem**	**Symptom**	**Action**
4. Sensor(s) do not adjust into range.	Circuits on MCP are out of calibration.	Displayed values change but, adjustments to the sensor circuit board do not bring the temperature or humidity dis-played to the actual value.	See the section, Adjusting MCP Circuits in this guide. If those adjustments fail and instructions for item 3 above have been followed, contact Compu-Aire for further assistance.
5. System does not cool or does not cool sufficiently.	Control parameters are not set correctly or are	System seems to function okay otherwise.	Refer to the section in this guide, Environment Control Settings, and

	not set as expected.		check that all parameters are set correctly.
	Compressor is not running because of high or low pressure failure.	Display shows compressor failure alarm. Alarm LED is on.	Determine cause of high or low pressure failure and remedy. Press Reset button on MCP.
Complaint	**Problem**	**Symptom**	**Action**
	Compressor is not running because of loose or broken wiring.	Display shows DX cooling is on and there are no compressor failure alarms.	Test for 24VAC at pin 17 and 27 of MCP terminal block while shows DX cooling. If voltage, check wiring back to compressor contactor. If no voltage at pin 27, check wiring back to 24VAC transformers in system. If voltage at pin 27 but not at 17, replace MCP.
Complaint	**Problem**	**Symptom**	**Action**
	Chilled water valve is not opening because of loose or broken wiring.	Display shows chilled water cooling is on or economy cooling is on but, the valve is closed.	Test for 24VAC at valve motor. Check continuity between pins 3 and 12 of MCP and valve motor. If continuity, test for 5VDC to 10VDC between pin 1 and 12 of MCP. If no voltage, replace MCP.
	DIP switches on MCP are set incorrectly.	After setting a temperature set point sufficiently lower than room air, and waiting one minute, the display never indicates cooling is on or shows the wrong type cooling.	Refer to the section in this guide, DIP Switch Settings, and check that the compressors are enabled for DX systems or disabled for chilled water systems.
6. System does not heat or does not heat sufficiently.	Control parameters are not set correctly or are not set as expected.	System seems to function okay otherwise.	Refer to the section in this guide, Environment Control Settings, and check that all control parameters are set

			correctly.
	Humidifier is on.	Display shows the humidifier is operating.	The heaters don't operate while the humidifier is on. Refer to the section, Environment Control Settings, and check that all control parameters are set correctly.
	DIP switches on MCP are not set correctly.	After setting a temperature set point sufficiently higher than room air, and waiting one minute, the display never shows any stage of heating.	Refer to the section in this guide, DIP Switch Settings, and check that the heaters are enabled.
	Heaters are not on because of loose or broken wiring.	Display shows stage one or stage two heating but the heaters are not on.	Test for 24VAC at pin 27 of the MCP terminal connector. Test at pin 30 only if stage two is off. Test at both 30 and 33 if stage two is on. If no voltage at pin 27 or if voltage at each, check back to system terminal block and heater contactors. If voltage at pin 27 but, no voltage at pin 30
Complaint	**Problem**	**Symptom**	**Action**
			Or pin 33 if stage two is on, replace the MCP.
7. System does not humidify or does not do so sufficiently.	Control parameters are not set correctly or set as expected.	System seems to function okay otherwise.	Refer to the section, Environment Control Settings, and check that all control parameters are set correctly.
	Loose or broken wiring in low voltage circuits or bad MCP.	Display shows humidification operating but, the humidifier is not on.	Test for 24VAC at pins 4 and 5 of the MCP. If no voltage, check wiring back to system. If volt-age at pin 4 but not 5 or vise-versa, replace the

			MCP.
8. System does not de-humidify or does not do so sufficiently.	Control parameters are not set correctly or are not set as expected.	System seems to function okay otherwise.	Refer to the section, Environment Control Settings, and check that all control settings are correct.
	Compressors or chilled water valve (depending on type system) is not operating.	Display shows dehumidification but, compressors are not running or, for chilled water systems, the valve is not open.	Check all items under 5 above.
Complaint	**Problem**	**Symptom**	**Action**
9. Display shows messages that don't make sense for this machine.	DIP switches on MCP are set incorrectly.	Display shows function messages for equipment not installed.	Refer to the section in this guide, DIP Switch Settings, and make sure the switches are set correctly.
10. System occasionally forgets control settings.	Battery is dead.	If the system is turned off for a few minutes and then turned on again, the set points are not as they were.	The battery on the MCP has an expected life of at least 5 years. Contact Compu-Aire for assistance in replacing the battery.
	Excessive noise on the power supply.	There has been a thunder storm in the area or there was a power outage or brown-out.	Random problems could be attributed to noise on the power source caused by machinery being switched on and off, power outages or thunder storms. These kinds of problems can be very difficult to identify. Make sure all wiring
Complaint	**Problem**	**Symptom**	**Action**
			connections are secure and that contactors do not chatter when switch-ed. Check that the sys-tem ground is properly connected to

			an earth ground.
11. System is on but, no-thing is operating. The blower is off.	No air flow, fire stat, water on floor or smoke detector alarm is activated.	The display shows one or more of these alarms and the Alarm LED is on.	The system is automatic-ally shut down if any of these conditions occur. Determine what the cause is and remedy. Then, press the Reset button on the MCP.

18 PART LIST

Sub-Components	Components	Voltage/Ph/Hz	Unit(Ton)						Part Number
			2	3	4	5	7.5	10	
Refrigeration Parts	R407C, Scroll Compressor	208/1/60	•						201-020-013
				•					201-030-013
					•				201-040-014
						•			201-050-014
							N/A		N/A
								N/A	N/A
		208/3/60	•						201-020-011
				•					201-030-011
					•				201-040-011
						•			201-050-011
							•		201-075-014
								•	201-100-015
		277/1/60	•						201-020-015
				•					201-030-004
					N/A				N/A
						•			201-050-015
							N/A		
								N/A	
		460/3/60	•						201-020-012
				•					201-030-012
					•				201-040-012
						•			201-050-012
							•		201-075-015
								•	201-100-015
		575/3/60	N/A						
				N/A					
					•				201-030-015
						•			201-040-013
							•		201-075-015
								•	201-100-016
	Expansion Valve	ALL	•						239-020-002
				•					239-030-003
					•				239-040-001
						•			239-050-001
							N/A		

								N/A	
	HP Switch, Manual Reset		•	•	•	•	•	•	236-214-001
	LP Switch		•	•	•	•	•	•	236-101-001
	Filter Drier		•	•	•	•	N/A	N/A	233-075-001
	Sight Glass		•	•	•	•	•	•	232-003-001
	R407C,Pressure Transducer, Low		•	•	•	•	•	•	236-131-003
	R407C,Pressure Transducer, High		•	•	•	•	•	•	236-232-003
	Pressure Transducer, Connector		•	•	•	•	•	•	236-132-001
Air Moving Parts	10 X 8 Blower		•						208-010-003
	10 X 10 Blower			•					208-010-011
	12X12 Blower (Std Housing)				•	•			208-012-008
	12X12 Blower (Tight Housing)				•	•			208-012-011
							N/A		
								N/A	
	Motor	208/1/60	•	•					206-007-008
					N/A				
						•			206-015-002
							N/A		
								N/A	
		208/3/60	•	•					206-007-009
					•				206-010-007
						•			206-015-001
							N/A		
								N/A	
		277/1/60	•	•					206-007-007
					N /A				
						N/A			
							N/A		
								N/A	
		460/3/60	•						206-007-008
				•					206-007-009
					•				206-010-007
						•			206-015-001
							N/A		
								N/A	
	Pulley Blower	ALL	•	•	•	•			211-164-001
							N/A		

								N/A	
	Pulley Motor		•						210-140-001
				•	•	•			210-144-001
							N/A		
								N/A	
	Shaft		•	•					212-101-217
					•	•			212-108-420
							N/A		
								N/A	
	Bearing		•	•					215-001-001
					•	•			215-002-001
							N/A		
								N/A	
	Bearing Bushing		•	•					217-109-001
					•	•			217-115-001
							N/A		
								N/A	
	Belt (Downflow)		•	•					214-001-040
					•				214-002-039
						•			214-002-040
							N/A		
								N/A	
	Belt (Upflow)		•	•					214-001-040
					•	•			214-002-043
							N/A		
								N/A	
	Airflow Switch		•	•	•	•	•	•	222-100-202
	Filters(30%-merv-8)-Upflow		•	•	•	•	•	•	220-116-252
	Filters(30%-merv-8)-Downflow		•	•	•	•	•	•	220-114-252
Electrical Parts	**Reheat Element (KW)**								
	1.0	208/1/60 & 208/3/60	•						259-102-001
	2.0			•	•				259-202-001
	1.6					•			259-162-001
							N/A		
								N/A	
	1.0	277/1/60 & 460/3/60	•	•					259-107-001
	2.5				•				259-257-001

	1.6					•			259-167-001
							N/A		
								N/A	
	Humifidifier(capacity-lbs)								
	10.0	208-230-277/1/60	•	•	•	•	•	•	262-110-212
		380-575/1/60	•	•	•	•	•	•	262-110-312
	Fusible Link		•	•	•	•	•	•	260-100-011
	Temperature Limit Switch		•	•	•	•	•	•	260-200-012
	Contactor		•	•	•	•	•	•	274-030-243
			•	•	•	•	•	•	274-030-336
	Aux Switch		•	•	•	•	•	•	274-100-034
	Fuse	208/1/60 & 208/3/60	•	•	•				271-225-310
						•			271-225-315
			•	•	•	•			271-225-320
				•					271-225-325
					•	•			271-225-330
						•			271-225-345
		277/1/60 & 460/3/60	•			•			271-160-210
			•			•			271-160-215
						•			271-160-510
						•			271-160-520
							N/A		
								N/A	
	Transformer	277/1/60	•	•	•	•	•	•	275-040-015
		208/1/60, 208/3/60 & 460/3/60	•	•	•	•	•	•	275-675-012
Water Circuit	**Water Valve (Nominal Diameter)-Modulating**								
	1/2"	ALL	•						248-022-210
	3/4"			•	•	•			248-122-252
							N/A		
								N/A	
	Head Pressure Regulating VLV-2 Way								
	1/2"	ALL	•						249-212-021
	3/4"			•	•	•			249-213-031
							N/A		
								N/A	

	Head Pressure Regulating VLV-3 Way								
	1/2"	ALL	•						249-212-211
	3/4"			•	•	•			249-213-241
							N/A		
								N/A	
	Coaxial Water Cooled Condenser								
	S-2	ALL	•						231-102-001
	S-3			•					231-103-001
	S-5				•	•			231-105-001
Microprocessor Controller	**Controller Board**								
	MCP-SYS 2200+3S	ALL	•	•	•	•	•	•	254-743-102
	MCP-SYS 2200+3M		•	•	•	•	•	•	254-743-202
	MCP-SYS 2200+3L		•	•	•	•	•	•	254-743-302
	Touch Screen Display								
	Temp/Hum Sensor	ALL	•	•	•	•	•	•	254-744-302
	Connector Kit		•	•	•	•	•	•	254-743-302
	NTC Sensor		•	•	•	•	•	•	254-445-002
	Communication Card								
	pCOnet BACnet OVER MS/TP	ALL	•	•	•	•	•	•	254-549-004
	pCOWEB ETHERNET INTERFACE		•	•	•	•	•	•	254-549-003
	LONWORKS ECHELON		•	•	•	•	•	•	254-649-010

Table 5. Part List

COMPU-AIRE INC.
Specialized Environmental Air Conditioning Systems

8167 Byron Rd., Whittier, CA 90606

PH (562) 945-8971 FAX (562) 696-0724

STANDARD ONE YEAR WARRANTY

Job Name: _____ Job No. _____ Date: _____

We warranty this Compu-Aire, Inc. computer room unit to be free from defects in material and workmanship; our obligation being limited to repairing or replacing at our factory any part (except as noted below) within one year from the date of shipment to the original purchaser. Parts to be returned to us PREPAID. Proof of start-up date must be submitted to the factory.

This warranty is effective only if the unit has been installed in accordance with our instructions and connected to proper and adequate electric, water and drain services, correctly dehydrated and placed into operation by a competent service representative.

Fan motor compressor warranty is covered by original manufacturer's warranty and any repair or replacement should be made by the local authorized service facility as listed the telephone book.

Maintenance and service such as replacing filters, humidifier cylinder, infra-red lamps, float valve assemblies, belts, cleaning, lubrication, calibration and adjusting are NOT INCLUDED in this warranty.

Replacement or repair parts shall be shipped from the factory pre-paid and invoiced for the full amount. Upon receipt of warranteed parts within 30 days with prepayment of the component and which our inspection discloses the parts are defective, and show no signs of misuse, alterations, or abuse, full credit will be issued.

Compu-Aire, Inc. does not assume any responsibility for the labor expense for changing defective parts or replacement of any refrigerant or other cooling medium such as glycol etc.

All parts and goods are thoroughly inspected and packed to meet the requirements of railroad freight classifications bureaus, and under standard shippers risk, when they leave our factory. SHOULD GOODS ARRIVE DAMAGED, call the agents attention to damage, and have same noted on freight bill. For concealed damage, demand immediate inspection from agent of the shipping company and insist on a notation being made on freight bill.

Purchaser-User	Model Number	Serial Number
		Serial Number
		Serial Number
		Serial Number

Technical Support/ Service

Website
www.compu-aire.com

Location
Compu-Aire, Inc.
8167 Byron Road
Whittier, California 90606
United States of America
+1 (562) 945-8971 (Phone)
+1 (562) 696-0724 (Fax)

COMPU-AIRE INC.
Specialized Environmental Air Conditioning Systems

ISO 9001:2000 CERTIFIED

Intertek