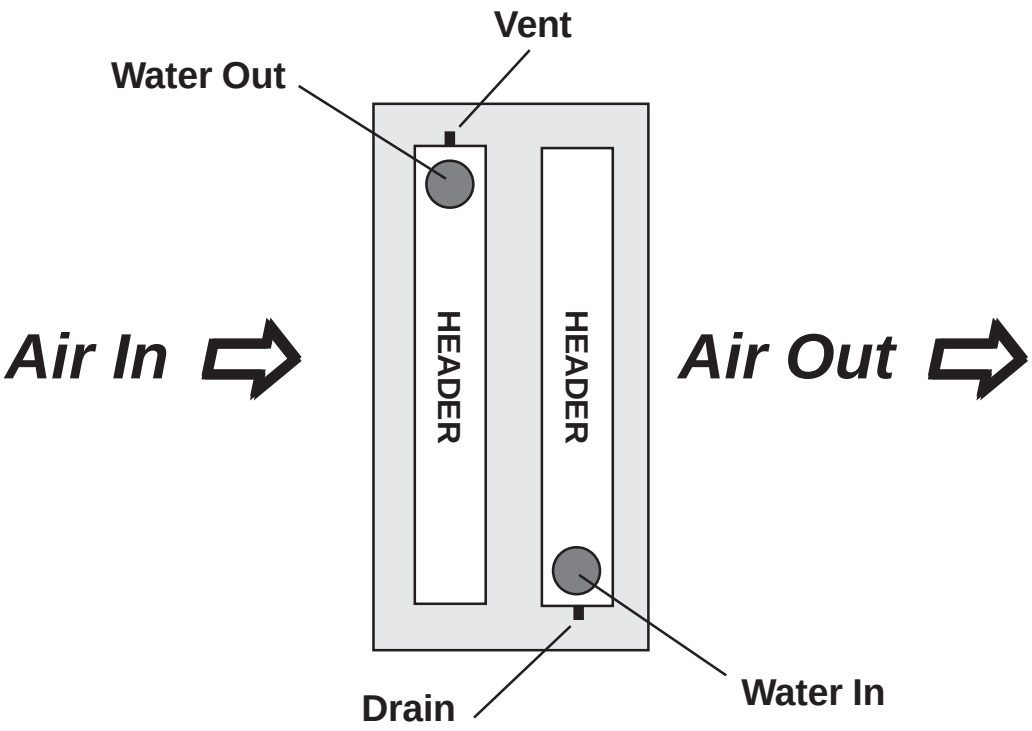
CAPITAL COIL & AIR

Perfect Fit.
Uncommonly Fast.

Fluid Coolers

Application & Installation Recommendations

1. Piping should be in accordance with accepted industry standards and local codes.
2. Provide adequate water treatment to protect the various components against corrosion, scale, slime and algae. Water treatment should always be under the supervision of a water conditioning specialist.
3. Fans must operate in the CW direction from shaft end.
4. Coils must be piped with water supply to connect on the air leaving side of the coil and the return connection on the air entering side. Connections to be arranged for water flow from bottom to top - see sketch.



5. Coils must be vented of air on initial start-up and each time the coil is drained. This can be manual, or an automatic air vent can be installed on the vent connection.
6. Coil must be protected from freezing if applied where ambient temperatures are expected to go below 32° F. This can be by draining, or the use of a suitable antifreeze solution.
7. It is recommended that piping have shut off valves and union fittings to facilitate coil removal, should repairs be necessary.
8. Periodically check and clean the fin surface, if necessary.

CAPITAL COIL & AIR

Perfect Fit.
Uncommonly Fast.

Motor

Installation & Maintenance Instructions

The safety of personnel depends upon following these instructions:

RECEIVING

Inspect the machine before accepting shipment for any damage in transit. Shaft should turned by hand without any rubs. Any damage from transit should be reported to the carrier immediately.

INSTALLATION

Qualified or trained personnel should install the machine. Electrical rotating equipment can result in property damage, serious injury, or death, when improperly installed. Equipment should be installed in accordance with the National Electrical Code, local codes and with NEMA MG2, Safety Standards for Construction and Guide for Selection, Installation and Use of Electric Motors and Generators.

WARNING: Observe the following for safety:

1. When eyebolts are provided, they are intended only for lifting the motor and its included motor accessories. Eyebolts must be fully toughened.
2. The machine must be grounded in accordance with the National Electrical Code and any local code.
3. Permanently guard machine against accidental contact of body parts or clothing with moving parts.
4. Shaft key must be secured before staring motor.
5. The machine should match the line voltage, line frequency, and the equipment load.
6. Applications for motor-mounted brake should have proper safeguards provided for personnel in case of possible brake failure.
7. Remove all power services and allow machine to reach standstill prior to servicing.
8. On single phase motors discharge start and/or run capacitors prior to servicing.
9. Do not bypass or render inoperative safeguard or protective devices.

MOTOR ENCLOSURE

Open drip proof motors are intended for use in clean, dry locations with access to an adequate supply of cooling air. In addition, there should be protection from or avoidance of flammable or combustible materials in the area of open-type motors as they can eject flame and/or molten metal in the event of an insulation failure. Totally enclosed motors are intended for use where moisture, dirt, and/or corrosive materials are present in indoor or outdoor location. Explosion-proof motors, as indicated by the Underwriters Laboratories, Inc. label, are required for hazardous locations in accordance with the National Electrical Code.

MOUNTING

Foot mounted machines should be mounted to a rigid foundation to prevent excessive vibration. Shims may be required if foundation is uneven.

Flange mounted machines should be properly seated and aligned. NOTE: If improper direction of rotation is detrimental to the load, check rotation prior to connecting the motor to the load.

For V-belt drive, mount the sheave (pulley) close to the motor housing, however, allow clearance for end to end movement of shaft. Do not overtighten belts as this may cause premature bearing failure and/or shaft breakage.

Direct coupled machines should be carefully aligned and shaft should turn freely without any binding.

WIRING

Connect the machine in accordance with furnished connection diagram. The wiring, fusing, and grounding must be in accordance to the National Electrical Code and any local codes.

When the machine is connected to the load for proper direction of rotation and started, it should start quickly and run smoothly. If this is not the case, immediately shut motor off. Investigate the cause. The cause could be; low voltage, the motor is misconnected, or the load is too great, etc.

It is recommended that the motor current be checked after it has been operating a short time and compared against nameplate current.

LUBRICATION

This is a ball bearing motor. The bearings have been given initial lubrication at the factory. Motors without regreasing capability are factory lubricated for normal bearing life.

RELUBRICATION INTERVALS (MOTORS HAVING REGREASING CAPABILITY)

New motors having been in storage for *over a year* should be relubricated by the procedure noted below. The following relubrication intervals suggested as a guide for long operating life.

HOURS OF SERVICE PER YEAR	**Suggested Relube Interval**		
	NEMA FRAME SIZE		
	42 TO 215T	**254 TO 326T**	**364 TO 447T**
5000 Hours	5 years	3 years	1 year
Continuous Normal Application	2 years	1 year	9 months
Seasonal Service -- Motor is idle for 6 months or more.	1 year (beginning of season)	1 year (beginning of season)	1 year (beginning of season)
Continuous High Ambients. Dirty or Moist locations. High Vibration, or where Shaft End is Hot (pump-fans)	6 months	6 months	3 months

LUBRICANT

Motors are pre-greased normally with Shell Oil Company's "Dolium R". Several equivalent greases which are compatible are Chevron Oil's "SRI No. 2" and Texaco Inc. "Premium R8".

PROCEDURE

Overgreasing bearings can cause premature bearing failure. If motor is equipped with Alemite fitting, clean tip of fitting and apply grease gun. Use 1 to 2 full strokes on motors in NEMA 215 frame and smaller. Use 2 to 3 strokes on NEMA 254 thru NEMA 365 frame. Use 3 to 4 strokes on NEMA 404 frames and larger. On motors having drain plugs, remove grease drain plug and operate motor for 20 minutes before replacing drain plug.

On motors equipped with slotted head grease screw, remove screw and apply grease tube to hole. Insert 2 to 3 inch length of grease string into each hole on motors in NEMA 215 frame and smaller. Insert 30 to 5 inch length on larger motors. Motors having grease drain plugs, remove plug and operate motor for 20 minutes before replacing the drain plug.

CAUTION: Keep grease clean. Lubricate motors at standstill. Remove and replace drain plugs at a standstill. Do not mix petroleum grease and silicone grease in motor bearings.

CAPITAL COIL & AIR

Perfect Fit.
Uncommonly Fast.

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS
FC SERIES, FLUID COOLER

1. **Rigging**
   a. Equipment is equipped with lifting eyes or sling points. These should be used to prevent structural damage.
   b. Equipment should be lifted in a near level condition to prevent undue stress on structural members.
   c. See enclosed diagram for lifting instructions.

2. **Mounting**
   a. Equipment should be mounted on a smooth, hard, level surface.
   b. Mounting surface should be rigid, and provisions should be made to prevent noise transmission (structural) to surrounding areas.
   c. Air cooled equipment should not be installed under low structural overhangs which can cause condenser air recirculation or restriction.
   d. Adequate area (approximately 1 unit width) must be provided around equipment for unrestricted airflow and service. Two units side by side should have a minimum of 1 to ½ unit width between them.
   e. If air from other sources is at an elevated temperature, care should be taken to prevent from this air from entering the condenser.
   f. Indoor design equipment must be installed in a protected enclosure.

3. **Piping**
   a. All piping must be in accordance with applicable local and state codes.
   b. Piping should be designed and installed to meet application requirements.
   c. Coils must be piped for counter flow direction (into the top header of the coil and out from the bottom header).
   d. When piping is completed. A thorough leak test should be performed.

4. **Fluid Charging**
   a. Fluid to be cooled must be compatible with copper and all other trim in the fluid circuit.
   b. At low ambient conditions, the percent concentration of ethylene glycol should be sufficient to insure that no damage to the coil from freezing will occur. It should also be noted that excessive ethylene glycol in the system will penalize the performance of the unit. The freezing point curve can be used to select the percentage of ethylene glycol to be used at the lowest expected ambient temperature.
   c. The fluid has to be filled to the full level with all air purged for maximum efficiency. Fill to meet application requirements considering all external piping as well.

5. **Wiring**
   a. All local and state codes must be strictly adhered to and good electrical practices should be followed to achieve the best installation possible.
   b. Power wiring to equipment must be adequately sized for minimum ampacity as shown on unit nameplate. A disconnect should be located adjacent to unit for both safety and servicing purposes.

c. Equipment wiring diagram should be examined and thoroughly understood before field wiring connections are made.
d. Power supply should be checked to be certain that supply voltage agrees with equipment nameplates. Serious damage to compressors and motors can occur if improper voltage is applied.
e. When wiring is completed, fan motors should be checked for proper rotation. All fan motors of multiple fan equipment have been factory wired to operate with same rotation. If rotration is found to be incorrect, reverse two of three leads on the main incoming power.

6. Start-Up

a. Verify fluid flow through coils and check for proper G.P.M. flow rate.
b. Verify supply voltage at the units' terminal block matches nameplate rating.
c. Check fan rotation for any obstructions that might keep the blades from rotating freely. It is a good idea to check fan groups (number of motors wired to one contactor) one at a time by either manually pushing in on each contactor or disabling other contactors in sequence. Take amperage readings of each group tested and pay particular attention to any abnormal noise that a single fan assembly might make. If the total amp draw divided by the number of motor s on the contactor being checked, greatly exceeds the nameplate fan motors "F.L.A. each", check each motor independently to isolate the source. Check this motor for the correct voltage wiring within the motor itself. Same method is done if the amperage is greatly less than rated. If wiring is not the problem, check the motor for free rotation and bearing play.
d. If fluid pumps are present, check for proper rotation and air. Check amperage draw to be certain that it matches the unit nameplate.
e. Start cooler and check for proper fan motor control and/or fluid flow control valve.
f. Take total unit voltage and amperage readings.
g. Observe the unit for proper operation during two complete cycles if possible.
h. Check air temperature rise through the fluid cooler. The air temperature across the fan motors should not exceed 130° F to prevent excessive motor temperature rise.

7. **Maintenance**

a. The system should be checked periodically by a qualified air conditioning service company.
b. If using other than glycol solutions, the coils should be flushed annually to keep scale deposits down for maximum heat transfer efficiency. The water should be tested by a local testing agency and their recommendations adhered to. This should also be applied to, should automatic water treatment be used. Use only preparations from an established reliable source. Follow directions exactly, particularly regarding amounts to use and dilution ratios. Use flushing and neutralizing procedures after cleaning. Again, the cleaning agents must be compatible with copper and all other trim in the fluid circuit.
c. Air side-The inlet side of the coil must be kept clean through a regular preventative maintenance program. The coil should be washed with a cleaning solution designed for condenser coil cleaning, *at least* annually. Make sure the unit is off during this process. The cleaning agent must be compatible with copper and aluminum.
d. Periodically check all electrical connections for possible loose and or corroded terminals. Replace and repair all parts as necessary. Most parts are kept in stock at CCA's manufacturing facility.

H. Draining

a. If determined the fluid cooler will not be in use and will required draining. All vents and the drain plugs should be opened. All glycol must be reclaimed.
b. The coils should be examined for "dead level", pitch, and tube sag to be **positively sure** that no water can be trapped in the system should a freeze occur.
c. Good insurance would be to purge the coils with 50 psi nitrogen or air pressure to eliminate any water from standing in the traps.